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FMC
Finnish Maritime Cluster

2020–2021 Yearbook

Finnish Maritime Cluster

Contents

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Read Finnish Maritime Cluster Yearbook 2020 online and print out the magazine or single stories.

The Finnish Maritime Cluster includes, from left to right: Juha Mutru, the Managing Director of the Finnish Port Operators Association, Tiina Tuurnala, the Managing Director of the Finnish Shipowners' Association, Elina Andersson, the Managing Director of Finnish Marine Industries and Annaleena Mäkilä, the Managing Director of the Finnish Port Association.

Finland is a pioneer in digital seafaring and environmental technology

The Finnish maritime cluster is significant by international standards. There is strong high technology development like digitalisation and environmental expertise in Finland, and these areas represent two global megatrends.

Among Finland's defining characteristics are its small size, agility and mutual trust, which are reflected in strong collaboration between the public sector and companies. Various joint projects are also spawning startups.

Collaboration is bearing fruit in the form of innovations. Finnish vessels act as references and testing platforms for innovations in the marine industry and, once testing is complete, the innovations can be launched on world markets. The competitive shipowning sector underpins the growth of the maritime cluster as a whole.

The industries are intrinsically linked – ports and port operators do well when shipowners and the marine industry are buoyant. In turn, these industries require good ports and fairways, functional logistics chains and good mutual collaboration.

navigatormagazine.fi *The website keeps you updated on sea cluster topics!*

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In cooperation:

EUROPEAN MARITIME AND FISHERIES FUND
OPERATIONAL PROGRAMME FOR FINLAND 2014-2020

Centre for Economic Development, Transport and the Environment

The Finnish maritime cluster knows collaboration

Finland's maritime cluster is one of the country's most significant business sectors with annual revenues of EUR 14 billion. The sector employs 50,000 people all over the country. The maritime cluster encompasses about 3,000 companies from various sectors, all of which are connected by their maritime expertise. Our diversity differentiates us from many other countries. Among our number are passenger and cargo ship owners, specialist ship owners, marine industries ranging from leading marine equipment manufacturers, turn-key suppliers, designers, software and system providers, not forgetting the shipyards, as well as the ports that handle almost 90 per cent of Finland's foreign trade. Passenger traffic is also an important category. The Port of Helsinki is the busiest passenger port in Europe.

The past year of 2020 has been difficult for many actors in the maritime cluster, as effects of the covid-19 pandemic have impacted the maritime sector heavily. The yearly Breaking Waves conference, that usually gathers key industry players from all over Europe to Helsinki, was organized virtually in 2020 due to the circumstances. Speakers and audience at Breaking Waves highlighted the increased need for collaboration and further cooperation between stakeholders, in order to navigate through the crisis. They also stated, that decarbonization efforts and developing digital operations are more important than ever.

Finland's unique strength has always been the exceptionally openminded collaboration between entities. This strength is now even more crucial than ever for future success post covid-19. It helps us to move forward, and it also enables experimentation and creating new innovations.

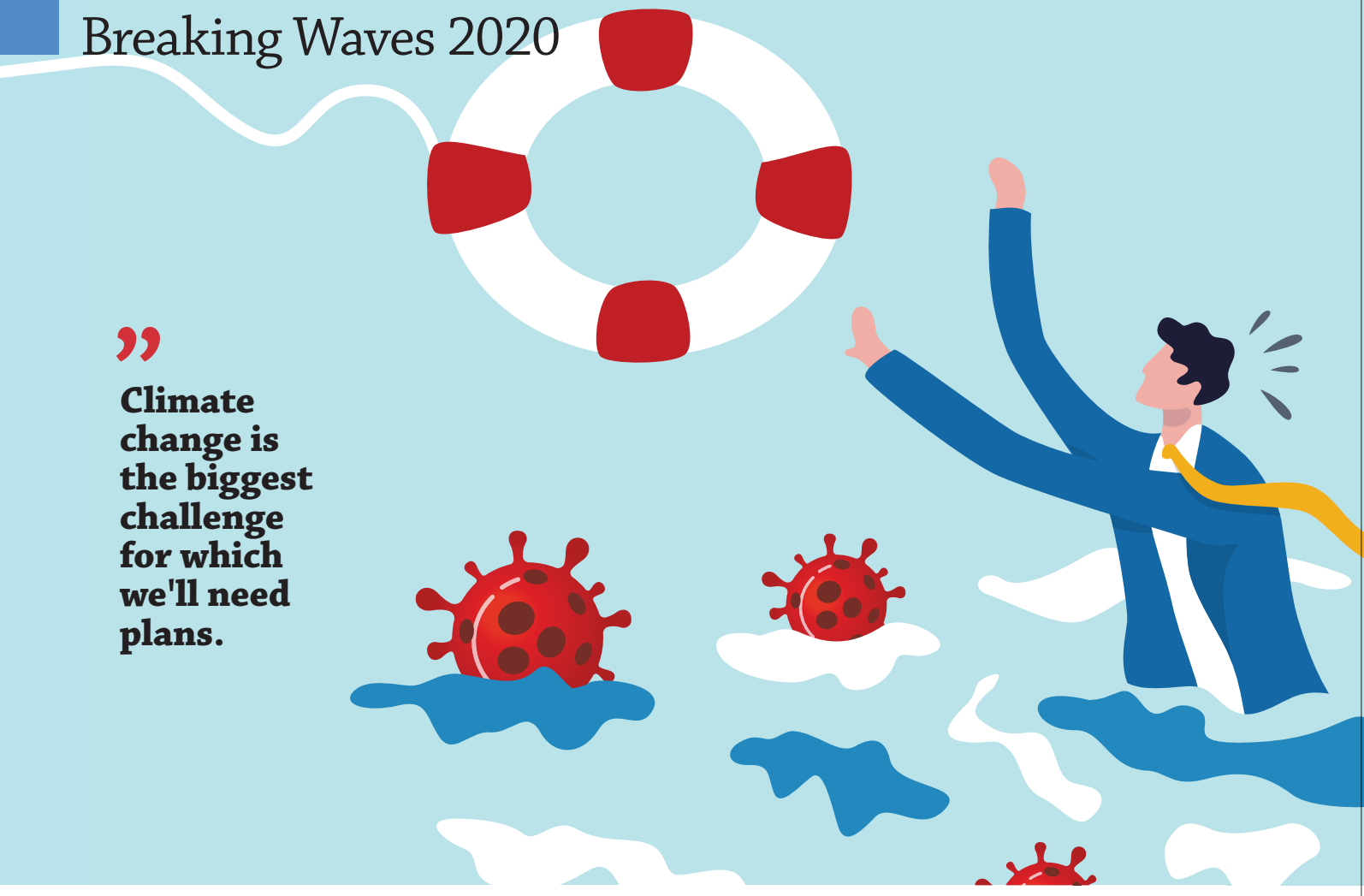
For example, maritime cluster companies in Finland have teamed up with AI developers to develop machine learning solutions that improve the situational awareness at ports and vessels by analyzing freight and logistics chains. There is strong high-technology development in Finland. The Finnish maritime cluster is a pioneer in environmental innovation, and it is at the global spearhead of the development and deployment of low emission technologies that enhance energy efficiency. Liquefied natural gas (LNG), wind, electricity and biofuels manufactured from waste are already in use – they have long since graduated from the planning phase. At the heart of Finland's expertise are the most energy-efficient cruise vessels and the greenest and quietest ferries in the world. Finland also has very strong Arctic expertise. Finnish shipbuilding, as well as seafaring expertise is unique, and the icy winter and difficult navigation conditions require seafarers and entities in the maritime industry to have special skills.

Finnish vessels act as references and testing platforms for innovations in the marine industry and, once testing is complete, they can be launched on world markets. The competitive shipowning sector underpins the growth of the maritime cluster as a whole. The industries are intrinsically linked – ports and port operators do well when ship owners and the marine industry are buoyant. In turn, these industries require good ports and fairways, functional logistics chains and good mutual collaboration.

Maritime operations are going through a major transformation, due to digitalization and automation. Climate change is also challenging the maritime cluster to identify solutions for low-emission maritime traffic. The global pandemic will add its own challenge in addition to these megatrends. This publication highlights the world-class Finnish expertise and innovations that will address the challenges and eventually lead the way to recovery.

Tiina Tuurnala, Annaleena Mäkilä, Elina Andersson, Juha Mutru

Breaking Waves 2020



”Climate change is the biggest challenge for which we'll need plans.

Times have been tough for whole maritime industry since the beginning of Covid-19. Åland-based Rederi Ab Eckerö was forced to close one route completely and reduce third of the personnel.

”Traffic on Birka Cruises from Mariehamn to Stockholm stopped in the middle of March. Mostly because of this we have had to cut down our workforce by around 400 people,” says **Björn Blomqvist**, Managing Director of Rederi AB Eckerö.

Eckerö also closed company’s Stockholm office and made further reductions on head office in Mariehamn. The passenger route Eckerö Linjen which runs from Eckerö to Grisslehamn was closed from 15th of March to 25th of June. The route between Helsinki and Tallinn has operated uninterrupted. Eckerö Line receives state support for the route as it is deemed essential for freight deliveries.

Better news on cargo

On cargo side pandemic has affected on lower degree. During the winter Eckerö’s cargo ship m/s Finbo Cargo went under refurbishment in Landskrona. The vessel was upgraded to an Ice Class program and is now better equipped to handle ice conditions on Baltic Sea. Finbo returned to traffic between Vuosaari (Helsinki) and Muuga (Tallinn) in the beginning of April.

Björn Blomqvist says that cargo route between Vuosaari and Muuga has been very successful. Three new departures were recently added to the route.

”Naturally the loss of private passengers has had negative effect on route but the effect has been small compared to the situation on Helsinki-Tallinn passenger ferry m/s Finlandia.”

Blomqvist is also pleased that Vuosaari harbour got a new gate on summer. New gate eases the departure for the passenger cars.

”There’s also constructions in Muuga with new ro-ro facility and the next step is to build double ramps. So things are developing. Of course there’s less traffic at the moment but when the pandemic will be under control the volume will come back.”

Sustainable solutions needed

Even though survival in pandemic crisis has taken all the company’s resources Blomqvist emphasizes importance of sustainability. Energy solutions for fleet is one of the big questions for future.

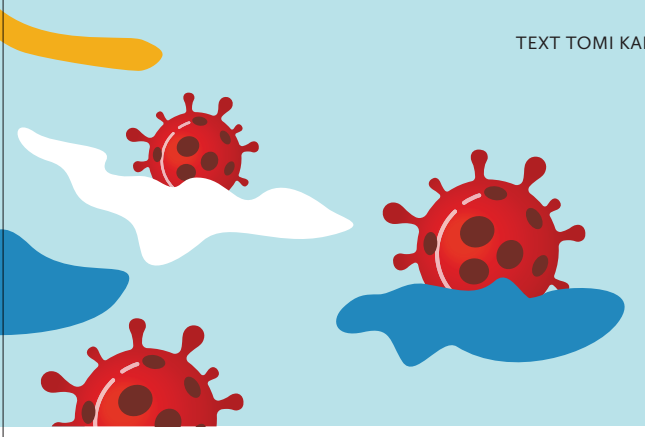
”Climate change is the biggest challenge for which we’ll need plans. We can’t solve it on our own and we need to cooperate with suppliers. Help from the state will also be needed.”

Blomqvist believes that company will need at least two fuel solutions. On shorter distances such as Eckerö-Grisslehamn electric battery solution could

Aid crucial in pandemic survival

One lesson learned from Covid-19 has been asking for help, says Björn Blomqvist, Managing Director of Rederi AB Eckerö.

TEXT TOMI KANGASNIEMI



Economically Eckerö Shipping's situation has been good compared to company's passenger ferry operations, says Björn Blomqvist. For the three ro-ro's operated by Eckerö Shipping the pandemic has mostly caused challenging crew changes – especially concerning non-EU crew members.

be feasible. Longer routes require non-fossile combustion fuel solution. Hydrogen fuel is one alternative but Blomqvist wishes for more conventional combustion fuel.

He notes that liquid fuels have many advantages and some kind of synthesized combustion fuel solution could be the thing. That would be easier to use by modifying current engines and also less challenging to scale up for wider use.

"We are very interested in battery technology and also looking at Power-to-X. It is challenging as we haven't got enough capacity to product bio-fuel. We will also need solar, wind and probably nuclear energy to supply the amount of electricity needed to produce the synthesized climate neutral combustion fuels."

Blomqvist doesn't think that demands for environmentally conscious solutions in transport are too strict. However, regulations could be more straightforward. He says that on detailed and regional level you have to be very careful with regulations as they can be counterproductive when it comes to competitiveness.

He also points out one oddity. Eckerö has a small bus company that runs local buses. Now EU demands that 20 percent of company's buses have to be electric.

"Why EU chooses the form of energy? Why don't they just demand it has to be carboneutral? That is frustrating."

Priority in survival

Now we are in the midst of second wave of pandemic. It seems to hit at least as hard as the first one and restrictions for travelling will make it tough for passenger ferry companies.

"Now our priority is to survive. It's very challenging situation and we are depending on state aid. So far we've managed to handle it with 15 millions of extra funding, says Blomqvist."

He notes that on third quarter Eckerö made very small profit but the last quarter of the year goes below zero. As whole 2020 will be the year of heavy losses.

"We will have to keep moving but next year will also mean low-cost culture. When pandemic will be over, we can go planning ahead."

Blomqvist remarks that although pandemic has been harsh something good can come out of it. Company has received different kinds of support and it has been able to postpone payments of government fees and tax. Blomqvist also adds that trade unions have been very cooperative during the crisis.

"In these times of crisis we've seen that when you ask for help, people are prepared to help. Maybe we ask that too rarely. Maybe learning this is the one good thing coming out of this pandemic." ✖

Breaking Waves 2020 was held as an online event. Annaleena Mäkilä (Finnish Port Association, right) and Tiina Tuurnala (Finnish Shipowners' Association) give their conclusions of the event to presenter Jussi Tapio (Ghost Company).

Breaking Waves focused on smart recovery – *speakers emphasized cooperation and digitalization*

Maritime industry faces big challenges due COVID-19-pandemic. Pandemic is seen to lead to stronger collaboration and accelerated digitalisation.

TEXT AND PHOTOS TOMI KANGASNIEMI

Breaking Waves 2020 was held as online event in Helsinki. All three keynote speakers emphasized collaboration in smart recovery of pandemic crisis. **Martin Stopford**, shipping economist and President of Clarkson Research, reminded how pandemic has caused lot of uncertainty. Clarkson stated that the recession caused by the pandemic could be anything from mild to severe but whatever the outcome, in longer term the fleet must be rebuilt. Zero-carbon ships will be needed in future and this demands good strategy, great investments and cooperation between stakeholders, shippers and builders.

Wärtsilä Corporation's President of Marine Power/EVP **Roger Holm** and **Magda Kopczynska** of European Commission's DG MOVE also emphasized need for technical development. Kopczynska noted that we will see more effective and environmentally conscious transport system in future. However, she recommended not to commit to certain alternative fuel technology yet as further testing is still needed.

More open dialogue

Breaking Waves gathered 200 participants from all over Europe. On interactive workshops participants stated that the pandemic had hugely affected the business. On short term pandemic was seen to have a negative impact but new technologies will drive strongly on medium and long term.

The effects on cooperation between maritime players was seen positively. There is more willingness to exchange information and big companies are more open to remote meetings. The discourse between stakeholders has also accelerated and dialogue is more open and supportive. Lack of live meetings and events were seen hindrances for cooperation.

Sauli Eloranta, Professor of Practice at VTT, noted how more challenging business environment enhances cooperation.

"Public funding has been boosted especially for COVID-19 recovery actions. Confederation of Finnish Industries has a COVID recovery programme (Digital Game Changers) to recover through growth," Eloranta pointed out.

Pandemic was also seen as an accelerator for digitalization and development of automation. Eloranta predicted that increased use of digital platforms for remote work, shopping, education and mobility will lead to greater globalisation of all services that are online.

Regulation worries

It was also predicted that logistic needs of customers will change in future. They will require full-chain digitalized solutions and it will be more commonplace to have online tracking in cargo. Also the demand on door-to-door multimodal services grows.

When prediciting the situation of major business areas in 2023, participants saw most positive growth in global freight. Worst situation was predicted for growth in global passenger traffic. This means that shipping companies that are dependent on passenger transport are forced to rethink their business models.

One major worry for the workshop participants seemed to be the regulation. Hopes were raised that maritime regulation at international level should keep up with technical development.

Some participants felt that the world of regulations acts too slowly to the urgent crisis. Furthermore, industries cannot plan investments as future regulations are pending.

Companies seek solutions together

On panel discussion **Santiago Garcia-Mila** (Port of Barcelona) reminded how pandemic functioned as catalyst. Lot of routes have been shut down and slim operations return to market. **Piet Opstaele** (Port of Antwerp) stated that there's rapid development of new technologies in horizon and steps towards more contactless supply chain will be taken by acceleration of automation in ports.

Sauli Eloranta (VTT) also emphasized power of digitalisation. However, he reminded that technology is already there and the pandemic is just the catalyst.

"We will just take the existing technology in use. The new world will be much more digital and it is an opportunity for us."

Karin Orsel (MF Shipping Group) noted how crisis has been a big wake up call. It has caused the companies to reach out for each other and seek solutions together. **Björn Blomqvist** (Rederi Ab Eckerö) had similar thoughts.

"Crisis has allowed us to be vulnerable. We are all weak and we need help. This has made it normal to ask for help and by asking you also get positive reactions."

Spirit in the air

Annaleena Mäkilä, Managing Director of Finnish Port Association, and **Tiina Tuurnala**, CEO of the Finnish Shipowners' Association, were happy with the online version of Breaking Waves. The spirit was achieved despite the lack of face-to-face contacts.

Mäkilä thought that there was interesting discussion about future of the accelerating digitalization in ports. She also noted that even though the current crisis is seen to be short the competition in maritime industry will get tougher.

Both Mäkilä and Tuurnala emphasized that in the crisis EU must secure that Europe stays competitive in global market.

"The best solution would be global regulation. EU could then concentrate in supporting acceleration of fleet renewal and innovations," Tuurnala remarked. ✖

Breaking Waves 2020 -event was held by Finnish Maritime Cluster in Helsinki on 18th of November.

"The new digital world will be an opportunity for us.

Speakers Jussi Tapio, Pia Meling, Mikael Ruhala, Jens Meier and Mikael Mäkinen.

Breaking Waves: Towards smart and emission-free shipping

The Breaking Waves conference 2019 at the Messukeskus Helsinki Expo and Convention Centre as part of the world-leading start-up event Slush. The famous buzz surrounding the event also extended to the maritime cluster's conference, as the top names and influencers in the sector met to discuss the future challenges facing maritime logistics.

TEXT MICHAEL HUNT PHOTO ANTERO AALTONEN

The themes of 2019 conference were ecosystems and optimising shipping's logistics chains. The main topic was how they can help us to develop more environmentally friendly and more efficient maritime logistics. Keynote speakers included international names such as **Emanuele Grimaldi** from the Grimaldi Group, **Jens Meier** from the Port of Hamburg and **Pia Meling** from Masterly, who all approached the topic from their own perspectives.

Emanuele Grimaldi's speech emphasised ambitious targets, even going as far as zero-emission ships."While shipping is already today the most efficient method of moving goods and people around the world, its green bar will be set higher and higher," said Grimaldi in his speech.

The programme also included presentations from the best start-ups in Maritime Accelerator's corporate accelerator programme. In the spirit of Slush, the most interesting start-ups in the marine sector were paired with the industry's major operators. As in the previous year, a Think Tank was organised in conjunction with the conference. It was targeted at the maritime cluster's directors and key influencers from Finland and Europe.

A shared challenge for the maritime cluster

The day's speeches and panels discussed the shared challenge faced by the entire maritime cluster and expressed a willingness to reduce emissions. Cooperation, including knowledge and data sharing along the entire logistics chain, was considered an important area for development to ensure success. Communications was also held to be another challenge facing the entire field. The speakers called for openness and transparency, as well as more effective communications about the investments the sector is already making to cut emissions and in the general interests of the environment. In addition to ambitious targets, we need a wide range of new technologies and innovations to meet the challenge posed by climate change. Harnessing artificial intelligence and platforms to boost the efficiency of maritime logistics was seen as a future trend in the sector. Ecosystems were perceived as ways to promote knowledge sharing and enable innovation in maritime logistics.

At the end of the day, it was noted that from the perspective of the European maritime cluster, these challenges can also be seen as opportunities. The sector is forward-looking and innovative, and is always harnessing new technologies. The European maritime cluster has the potential to play a decisive role in attaining global environmental targets within the sector. ✖

The world is becoming autonomous

"The world is becoming autonomous," Pia Meling said in Breaking Waves -conference in Helsinki. Why should it not happen in maritime?

TEXT MICHAEL HUNT
PHOTO ANTERO AALTONEN

As vice president for sales and marketing for Norway-based Massterly, the world's first company to exclusively concentrate on autonomous ships, **Pia Meling** believes the firm is sailing in the proper direction.

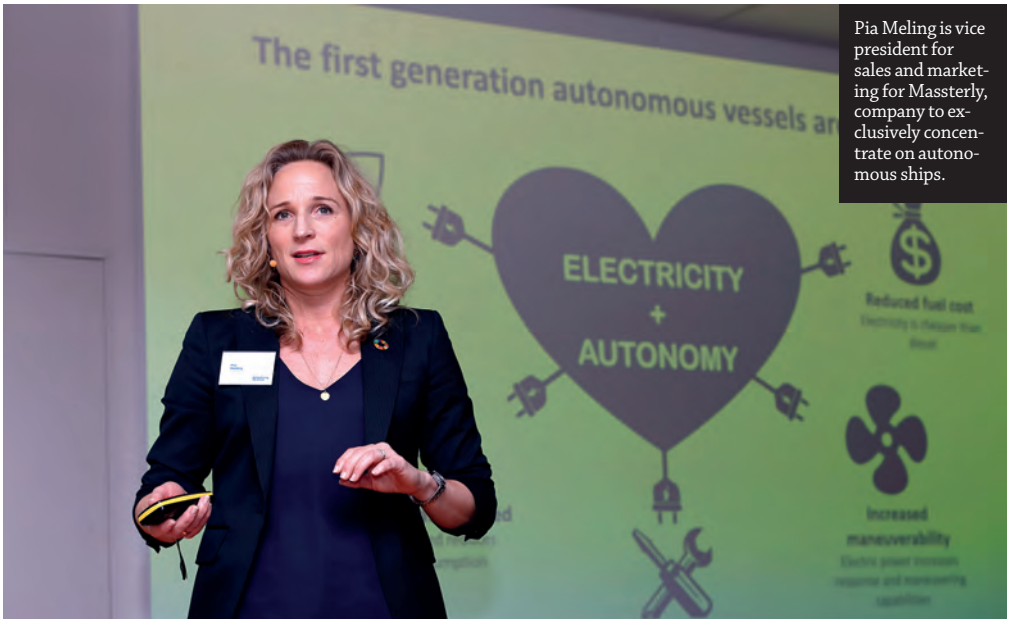
"We are quite positive that we are on the right track, that there will be a lot more automation in shipping," she said. "The only question is how fast this development will go."

Massterly, the result of a collaboration between Kongsberg and Wilhelmsen, is involved with the Yara Birkeland, an 80-meter container ship that is scheduled to go fully autonomous this year. It entered service in 2019 with a crew carrying chemicals and fertilizer between its Norwegian production facilities at Herøya and the ports of Brevik and Larvik. Powered by electric motors, the ship cost $25 million and was partially funded by the Norwegian government.

With its carbon-neutral footprint, the ship could replace the need for about 40,000 trucks a year running the same route, said Meling, who hopes the Yara Birkeland will help create a path for autonomous shipping as a viable emerging technology.

"Right now it's still quite slow, but it's our opinion that as soon as these first vessels start hitting the water, then the market will understand the potential of it and you will see an exponential increase," she said. "The main focus for us is not to go global now, but to prove it in Norway, in a smaller area between three ports and take out a lot of complexity."

Meling said the Norwegian government is offering incentives for zero-emission solutions, but the technology to make it happen is still evolving. "That's why we don't see a lot of people doing it right now," she said. "But this will pave the way. When it's proved, tested and works, you will see a rush of people to start moving into that area."



Pia Meling is vice president for sales and marketing for Massterly, company to exclusively concentrate on autonomous ships.

The primary challenge for autonomous shipping, of course, is safety, which will be based on object-detection technology.

"Societal acceptance will require a zero-failure tolerance (for accidents)," she said. "We cannot afford that with an autonomous ship."

Societal acceptance also involves what crewless ships will mean for the future. While some might object to a loss of jobs, Meling sees autonomous shipping as a way to create new land-based opportunities, as well as flexible, less physically demanding labor.

"There are not enough people to take the jobs in the maritime industry," she said. "It's hard to get skilled staffs. There are aging crews in many countries. I think in Japan the average age is 55 or 60, and they don't have new recruits. They don't want those jobs. It's a tough job."

"If you can work ships on the land, it's a different job. It's closer to your family. It's creating better jobs. And it's opening up jobs for women and the disabled."

And while society at large may not currently associate autonomy with the shipping industry, Meling sees it as part of the evolvement of machines.

"The world is becoming autonomous," she said. "In the grocery shop I scan my own goods. It's happening. Why should it not happen in maritime?" ✖

"We are not dinosaurs"

Erwin Verstraelen is chief of digital and innovation officer of the Port of Antwerp.

"I am so sick and tired of hearing that we are the dinosaurs," Erwin Verstraelen said. "If 90 percent of the global trade is maritime based, you can't be a dinosaur."

TEXT MICHAEL HUNT
PHOTO ANTERO AALTONEN

As chief digital and innovation officer of the Port of Antwerp, **Erwin Verstraelen** was brought onboard in 2017 to help Europe's second-largest port solve supply-chain problems with technology-driven solutions.

He has a message for the maritime industry at large:

"I am so sick and tired of hearing that we are the dinosaurs," Verstraelen said. "If 90 percent of the global trade is maritime based, you can't be a dinosaur."

That was the theme he brought to colleagues during the annual Breaking Waves seminar in Helsinki, where Verstraelen urged those in the maritime industry to expand their vision of an industry that is not nearly as primitive as some might believe.

"Let's stop pretending that we're dinosaurs, because we're not," he said. "See the opportunity for what it is. Start small with committed people and it gets started. Stick out your neck."

"We have seven billion brains, four billion of them are connected. We have brilliant technology. We have ideas. They only thing is mindset. That's the big thing, the glue to get it all together. The mindset to see all of these things coming together on the table. What is lacking? Nothing. Plus, we have the challenges that are driving us forward. Simple as that. That's my role, to keep convincing people. Don't stop. Do it."

Such an expanded, enlightened and progressive mindset must include data sharing, he emphasized. If 15 worldwide ports move half of the global containers, Verstraelen said it is imperative for those competitors to join forces and share information, particularly in a joint defense against cyber-security attacks.

"Right now, there is a lack of trust, not wanting to share data," Verstraelen said. "But if there is a cyber-security incident, we will share knowledge. If possible, we'll help each other out. That's the next level. That will continue as we gain trust among each other."

The reluctance to share data, he said, "is the big elephant in the room. Acknowledge that. For example, in exports, one of the founding principles in the data platform is you'll always be the one who decides who has access. So, your data is in a vault and you open it up to someone, depending on your trust level. By doing that, gradually, trust increases and you open up more and more of your data. Question is, how do we create an opportunity or a solution around it?"

In his mission to put the maritime industry on an upward trajectory, Verstraelen applies the four principles he has used in Antwerp to keep the port innovative.

The first proved values, because he does not believe in proved concepts. "In most cases today, technology works," Verstraelen said. "If it doesn't work, then try again in six, 12 or 18 months because technology evolves at an exponential rate. The most dangerous thing you can do is not try it again."

Second, expand experimentation to all levels within the organization. "I do not believe in a model where it's limited to one group," he said. "Innovation is everywhere, but innovation is not chaos. It's a structured process. You need to have innovation enablement, a culture where people see opportunities for change."

Third, open up the innovation platform and allow and invite outsiders with expertise to come to the port. "That pushes innovation further, it speeds it up," Verstraelen said.

And fourth, outside-in innovation.

"Inside-out innovation is the more traditional approach, where a company has a challenge or a problem and goes outside to find a solution," he said. "We believe the opposite is much more powerful, which is outside-in innovation. You surround yourself with ecosystems, with academia, with research centers, with incubators and so on that continuously inspire you with what they're doing."

For example, Verstraelen said he noticed that drones with cameras were being used in the agriculture industry to detect crop disease. He wondered if the same technology could be used to detect oil spills.

"Why? I'm the fifth largest bunkering port on the planet and I spend an amount with six zeros in it on a yearly basis to clean oil spills up," he said. "I have a port of 120 square kilometers. The harder it is for me to see the oil spill, the more costly it is to clean up. If I have a drone that flies six times a day and night over the port with the hyperspectral camera, I would be able to spot oil spills far better. That kind of merge with technology doesn't happen if you start going outside with your problem looking for a solution."

Bottom line, Verstraelen said, the maritime industry is not a dinosaur, and nor should it behave like one. ✖

"The world is getting more complex"

"We have to use infrastructure in a clever way. Our target must be in cities and ports, to avoid traffic jams and keep the traffic flowing," says Port of Hamburg CEO Jens Meier.

TEXT MICHAEL HUNT
PHOTO ANTERO AALTONEN

Almost five years ago, Port of Hamburg CEO **Jens Meier** joined colleagues in Los Angeles, Antwerp, Barcelona, Lausanne and other ports to share data.

"We shared our knowledge," Meier said. "We shared our ideas. That is the chain-port networking, so efficient in so many areas."

Upcoming threats in the realm of cybersecurity makes data sharing mandatory to the world's leading ports, but data sharing also helps in sorting one of the largest challenges facing the maritime industry today: traffic management.

Disentangling traffic has been one of the major benefits of data sharing in Hamburg, third busiest in Europe behind Rotterdam and Antwerp. Meier, chairman of the port's executive board since 2008, uses the combined knowledge to help keep traffic moving through the port as well as the surrounding northern Germany city of almost two million residents, as well as ensuring that the supply chain is efficient.

"If you look at real statistics in many ports, I can guarantee you that you have a percentage of close to 40 percent empty trucks. Avoid that. Try to implement platforms where you can pick up goods, that's a win-win. Empty trucks bring nothing; you only lose money. From an ecological standpoint it's also important that we avoid that and give the residential people the chance to get through a city much smoother."

In Hamburg, Meier has implemented a project called Mozart to help with traffic management based on traffic-flow patterns.

Jens Meier is CEO in Port of Hamburg.

"We work with the city because we want to serve the interface between port and city to make traffic management more efficient than today," he said. "When you visit the Port of Hamburg, you'll see that traffic flow is quite good. We've invested heavily in sensors, in traffic-light management, and in technology that makes it safe, secure, and in a much better way than before."

"The dream at the end is we can combine everything. There's a vessel coming up, a container has a final destination and we've got an optimizer to put in on a train, a truck or a small vessel to reach the final destination – to balance all that out to use the empty capacity and integrate all modes of transport."

Hamburg began working in 2018 with Nokia and other companies to implement 5G technology to help with traffic management.

"We were the central test bed for the European Union," Meier said.

It's all about keeping the supply chain – or, as Meier calls it, the demand chain – efficiently moving with innovative solutions.

"We are working with rail operators, with freight forwarders," he said. "Freight forwarders don't like to be stuck in a traffic jams, so we bring people together and we look at facts and figures. What would be the right place to move from a truck to a train before being stuck in a traffic jam?"

"But we also have meetings with production companies, from the textile industry, for example, and they tell us they have to make sure a container has to be removed from vessel quicker so they can bring it into their central distribution center to make sure the stuff of the new collection that they have already advertised is on their shelves in the shops on Monday morning. The customer perspective is much more interesting to me than just looking at a shipping line or a rail operator wanting to optimize themselves."

"We have to use infrastructure in a clever way, before something happens," Meier said. "Our target must be in cities and ports, to avoid traffic jams and keep the traffic flowing. That's what we think about."

In meeting future carbon-emissions targets, Meier said Hamburg is looking less at electric technology and more toward future solutions, such as hydrogen.

"We don't believe that batteries are the future," he said. "We think that future technology is the future. We try to invest and look at that because battery technology is just for city movement. But if you have long distances and heavy goods, we believe you need something for the future."

And with future threats from cybersecurity, ports must be more vigilant.

"The world is getting more complex," Meier said. "Complexity, as a single thing, is not a threat. To make things unnecessarily complicated is a threat. To share knowledge, to work with the complexity, that is a key factor for success, to be able to work with the complexity and find the best solutions for the customers' needs. That's what we're working on, while trying to avoid threats coming from the cyber side." ✖

Record Years 2018 And 2019 For The Finnish Maritime Cluster – *However The Looming Corona Slowdown Behind The Corner*

TEXT MIKKO NIINI
PHOTO TIMO PORTHAN

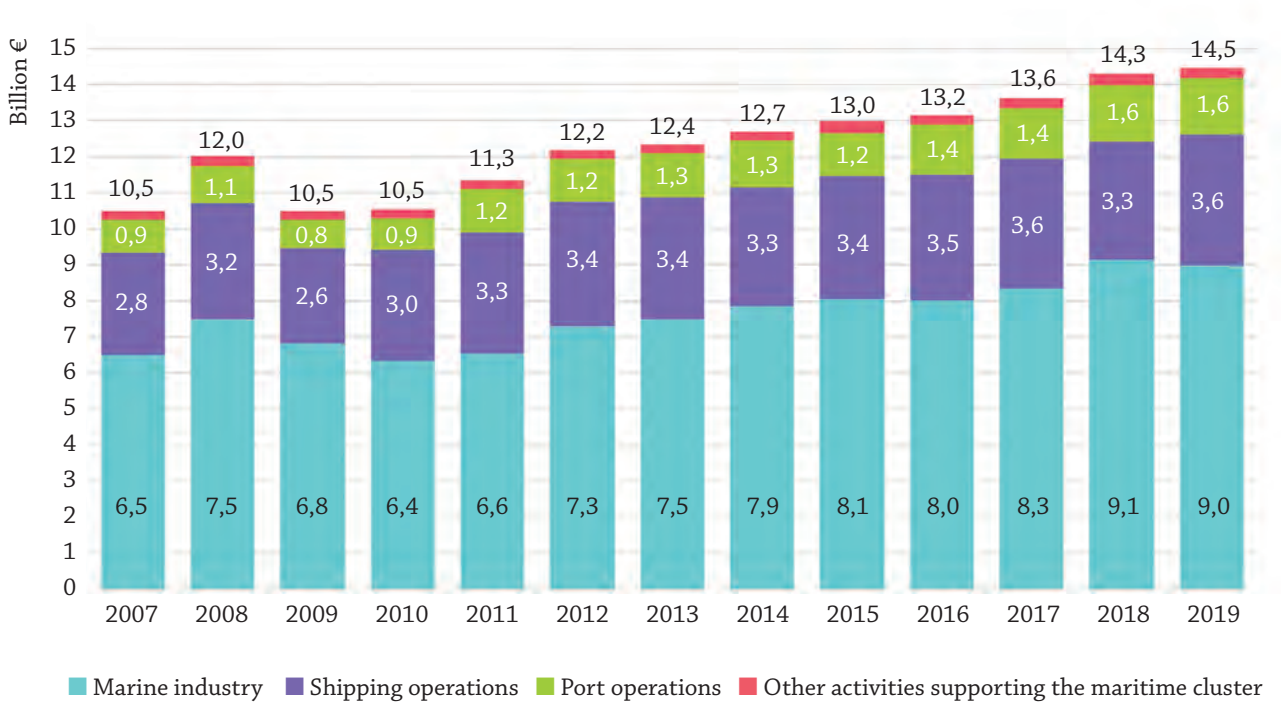
Recently Rauma Marine Construction announced a MoU with the Tasmanian TT-Line to build in 2022–2023 two Ro-Paxes in Finland and simultaneously reported that the RMC orderbook already had exceeded 1 billion euros in value. These two announcements well reflect the excellent growth path in the Finnish Maritime Cluster that prevailed in 2018 and 2019. The marine, shipping and port industries in the private and public sectors are the three main interdependent groups of the Finnish national maritime cluster. Since the 2008 financial crises there was a continuous growth for all these maritime segments. Since the first maritime cluster report published in 2003 for Finland on initiative of the Finnish Maritime Association there has been continued analytic gathering of data by the Turku University Brahea Center with a "bottom up" method from the accounts of all the 3.000 enterprises working within the cluster.

Since 2008, despite of the challenging global maritime market environment, the total turnover of Finland's maritime cluster has grown from 10,5 billion € steadily to 14,5 billion € in 2019, from where the latest figures have been available. According to estimates this overall figure in 2020 will exceed the 15 billion € mark.

With a record order book at the shipyards extending to the year 2026 and the ship owners having 13 environmentally advanced ship newbuildings valued at one billion underway under Finnish flag, this steady growth scenario was still the case in the beginning of March.

The COVID-19 pandemic has caused a doldrums never experienced before. The collapse in 2008 was about 10% in the Finnish maritime cluster but the preliminary estimates today indicate something similar, or even worse. At the time of this writing all the yards have been able still to continuously operate, the dry bulk and tanker shipping is continuing, with significant downfall in the summer, but are now recovering, but the regular ferry services are hit hardest. Some of the lines still operate only as rolling cargo carriers with the financial support from the National Emergency Supply Agency and Transport Safety Agency, as all passenger traffic over the closed borders was for several months generally prohibited and today the on-board entertainment activities are restricted and some routes totally closed down. The yards' delivery times have been put forward and e.g. the

Total turnover of the Finnish Maritime Cluster by the various sectors in 2007–2019, billion €



No index increase has been done to the figures. Source; Ranti T., Grönlund M. and Karvonen T., University of Turku, Brahea Centre 2020.

MoU mentioned above has so far not been confirmed as a firm contract.

From continued success and growth into unknown

About 3,000 companies operate in the Finnish maritime cluster and more than 1,800 limited liability companies had submitted their 2019 accounts to the authorities. As a summary, the total maritime cluster turnover increased to 14,5 billion euros while the directly employed personnel was 48,500.

The total turnover of Finnish marine industry (shipyard, equipment manufacturers, services) and related services remained close to the EUR 9.0 billion of the previous year. In 2019, the industry employed a total of 29,600 (30,600) people in their marine-related businesses. It is important to note that these "bottom-up" figures, collected directly from the accounts of the marine industry, differ considerably from the figures of the EU Commission's cluster data, which is collected from Eurostat. According to the EU Commission shipbuilding's turnover in Finland in 2018 was EUR 1,4 billion, but equipment and

Financial performance indicators of the Finnish maritime cluster in 2019

The main industry groups	**Number of companies**	**Share of the maritime sector** *Turnover (1,000 EUR)*	*Employees*
Marine industry (yards, equipment, services)	1,088	8,996,200	29,600
Shipping industry	316	3,622,800	11,100
Port operations	242	1,551,500	6,300
Other functions serving the maritime cluster	176	312,000	1,500
Total	**1,822**	**14,482,500**	**48,500**

> **The growth of turnover 2017-2018 was 5.0% and growth of number of employees 0.2%.**

Mikko Niini is the Chairman of the Finnish Maritime Association.

outfits only 300 million, whereas the reality is for them more than 7,3 billion EUR. Unfortunately Eurostat is not counting at all the equipment industry and therefore only assumptions are made. The dominant part of Finland's marine industry is other than shipbuilding, mainly equipment manufacturing and services.

The factual marine industry figures reflected especially the good market situation for cruise ship construction, which was forecasted already a year earlier by Mr. **Tapio Karvonen** at the University of Turku, Brahea Center, who has led the updating study of the economic indicators. The combined net sales of the largest shipyards increased in 2018 by almost 18% despite the continued weak market situation in the offshore business. Mr. Karvonen expects that in the 2020 figures the positive development of the strong orderbook will continue in shipbuilding, as the turnover growth will begin to be seen more in the subcontracting network companies.

The net sales of the shipping and other shipping-related operations was EUR 3.6 billion. The favorable development of the freight market in 2019 is the most important factor. On the passenger side, the change has been much smaller.

In port operations the volume of foreign trade-sea transport increased and the volume stabilized around EUR 1,6 billion and number of personnel somewhat lower, 6,300 (6,600).

From silos to active cluster cooperation

Two major cluster studies were conducted in Finland in the years 2003 and 2008. During the shipbuilding market collapse in 2013 Finland was lacking proper economic indicators on the branches and on the Finnish Maritime Association's initiative funding was made available for a new, updated cluster study. One of the conclusions of the CEO interviews in the most recent 2015 cluster study was the low level of interaction between the various segments in the cluster.

In addition to the conclusion of the economic importance of the maritime cluster for the nation, the Government of Finland launched a number of special programs to enhance the maritime clustering. These included establishing of a specific maritime technology promotion program valued up to 100 million EUR between 2014 to 2017 as well as granting support to a project for enhancing the clustering from 2016 to 2020. See *finnishmaritimecluster.fi*.

In October 2016, the Prime Minister's Office finally appointed a steering group on the Baltic Sea and maritime policy, with representatives from different ministries, to prepare an update of the Government Report on the Baltic Sea and to develop and coordinate, for the first time, the national maritime policy. At the first stage of the work, the steering group prepared *Finland's Strategy for the Baltic Sea Region* and in the second stage the guidelines for Finland's maritime policy. The guidelines were prepared in close cooperation with various stakeholders. The Government adopted the maritime policy in January 2019, as "Guidelines for Finland's Maritime policy". According to the vision for the policy, Finland has global influence and produces solutions to ensure that the use of marine natural resources is sustainable, the status of the marine environment is good, and the impacts of climate change do not exceed the carrying capacity of the oceans. The guidelines determine the focus areas of Finland's maritime policy, extending all the way to the oceans.

While the guidelines were in the planning, on the basis of the cluster study conclusions, a special project "Finnish Maritime Cluster" was established. This book is an example of the results of this further clustering, achieved in the best cooperation of the various cluster segments. The work of the cluster project has been very active and many international events have been set up, especially on the digitalization and autonomous ship development sector.

Last September the national steering group for the maritime policy funds under the European Maritime and Fisheries Fund (EMFF) was reappointed and the composition revised. Its term has been extended until June 2022. The steering group monitors the implementation of the European Maritime and Fisheries Fund's operational plans and projects derived from it. The steering group is also participating in the preparation and implementation of the EMFF's 2021–2027 funding as concerns maritime policy.

The maritime cluster study itself was conducted by the University of Turku, Brahea Center jointly with the university's Business School. The yearly work on updating the cluster indicators has also been carried out as part of the Maritime Information Portal project funded as mentioned above by the Finnish Government jointly with the European Maritime and Fisheries Fund (EMFF), as part of preparing for an open data portal for Finland's all maritime activities. This comprehensive public portal www.MaritimeFinland.fi was launched in the beginning of April, 2020. ✖

Conclusions From The Cluster Study

› The Finnish maritime cluster is made up of companies that combine marine expertise and mutual interaction. The cluster's versatility is not easy to see, for example, in media reporting on the industries.

› The marine cluster should be considered as a versatile market-specific value network. The versatility of the cluster's demand structure means that the economic success of the cluster is not homogeneous, but the fluctuations of the global market cycles affect the cluster parts in different ways and at different times.

› The activities of cluster companies are strongly international, and fostering international connections is the lifeblood of the cluster.

› The share and importance of foreign ownership in Finnish maritime cluster companies has increased. Although foreign ownership is estimated to be largely positive in terms of the development of the industry, retaining of a fleet of national ownerships and flying of Finnish flag must be ensured to maintain security of supply. It is therefore important to preserve the overall competitive national conditions now available in shipping.

”

The marine cluster should be considered as a versatile market-specific value network.

› The influence of the 2008 financial crisis on the Finnish maritime cluster was dramatic. However, the aggregate turnover of the cluster companies have been steadily increasing since 2010 and growth is expected to continue for at least the next few years. The business outlook varies by main categories due to cyclicality, which is a significant feature of the industry. Especially in the construction of cruise ships, the outlook for 2020 and beyond is bright, while the oil and gas and global freight markets are currently facing challenges.

› The strength of the Finnish maritime cluster can be seen in the diverse markets that balance each other.

› There are already good examples of new emerging businesses in the blue bioeconomy and renewable energy developments

› Renewal of companies takes place through a wide range of innovation activities. We must therefore ensure that Finland has an operating environment that enables the launching and piloting of new ideas, technologies and operating models in Finland.

› New enterprises in the maritime cluster often arise to benefit from existing technologies or ideas that are still unknown from other fields. At present, companies involved in large-scale digitization processes, for example, combine technologies developed in other sectors with traditional maritime cluster activities, possibly revolutionizing industry practices.

› Shipping is an industry that operates strategically independently, building a growth-generating business. So shipping is not just a continuation of the transport network serving the needs of industry, but an independent industry that has to have its own national business policy.

› The competition between ports is intensifying as total traffic volumes do not grow and logistically it would be cost-efficient to combine and concentrate export and import of general cargo. The Finnish transport system needs an overall visionary reform.

› The global field of action is unpredictable, so marine clusters must ensure their ability to survive by preparing for many future options. A strong knowledge base must be guaranteed by quality education and research. In particular, new maritime education and maritime training resources should be created.

› For many, the long-term future of the marine cluster seems to be quite bright and includes many opportunities for development for both large and small operators.

› In order to support international operations, not only cluster actors, but also administration, politicians and, for example, delegations from the public and private sectors, should strive to strengthen the brand of a high-quality and diverse Finnish maritime cluster.

Rauma is one of the three primary shipbuilding cities in Finland. The other two are Helsinki and Turku.

TEXT EERO MÄKINEN
PHOTOS PUOLUSTUSVOIMAT, RMC AND WASALINE

Rauma Marine Construction has secured a solid orderbook

Ferry for Kvarken Link - for Wasaline operation route Vaasa - Umeå.

From World War II onwards, the shipbuilding industry in Finland has had a somewhat similar history to many other European countries: rapid reconstruction and expansion after the war, later diminishing global market share, mergers, closures and ownership changes, but also innovation and dynamic technology development, very much in cooperation with the local maritime supplier network grown with the yards.

The background of Rauma Marine Construction covers features listed above. In the late 1940s, there were two strong shipyards in the city: the family-owned Hollming Oy and another yard owned by one of the largest industrial conglomerates in Finland at that time, Rauma-Repola Oy. Until the early 1950s, the two yards were busy with the "war reparations" program that covered a large amount of ship deliveries to the Soviet Union as "compensation for the war lost by Finland". The positive consequence of the program was that it was followed by solid bilateral trade agreements to the great benefit of both nations – Finland and the Soviet Union. This phase lasted over three decades and, during that period, the yards also had a chance to develop their businesses to serve clients in the West.

Soviet trade diminished and actually deteriorated in the late 1980s, even some years before the Soviet Union collapsed. At that time, the yards were already operating at full speed in the Western market, mainly with specialized products.

Hollming and Rauma-Repola merged their shipbuilding businesses in 1991 and formed Finnyards Oy. Later in 1998 Finnyards was sold to the Norwegian company Aker Maritime, resulting in the name change to Aker Finnyards. Then, in 2004, Aker Finnyards and yards in Helsinki and Turku (which were owned by another Norwegian company, Kvaerner, at the time) merged to form a company that became part of Aker Yards. This meant that all the major yards in Finland were part of one single company.

STX in Korea later acquired Aker Yards in its entirety in 2008, and the new company in ›

”After the closure in 2013, a completely new shipyard was established in Rauma under new ownership.

Shipyard

Jyrki Heinimaa President and CEO (left) and Timo Suistio COO.

Finland was renamed STX Finland and now owned all major yards in Finland, with one in each of the three shipbuilding cities. STX spun off the Helsinki yard to Russian interests, starting the process in 2011, closed the yard in Rauma in 2013 and finally sold the Turku yard to Meyer Werft in Germany in 2014. This resulted in the three yards being totally separate from each other.

A long and rather complex history of over 70 years!

After the closure in 2013, a completely new shipyard was established in Rauma under new ownership, and the operation was started at the existing facility by the same people who had previously run the yard before it closed.

Below is an interview with **Jyrki Heinimaa**, President and CEO of Rauma Marine Construction. Having started his 23-year career in Finnish shipbuilding in Rauma, Mr. Heinimaa spent a significant amount of time in Turku, and in different positions at the company's head office, covering all three major yards in the country.

RMC has been in business since 2014. Please summarize the operations and finances of the first six years in a few words?
In the beginning, RMC was a start-up, which required us to make various investments in our operations and productions. The start-up phase of the company lasted until the end of 2018, by which the first successful newbuilding project was delivered to the client. After the new sales in 2019, the company entered a growth phase, due to which our financial earning power has grown, and we have now moved onto profitability.

The company is owned by nine shareholders with different backgrounds and obviously with somewhat different interests. How is that working? Is that a good concept for the long term?
The company was founded by three people, all of whom have an entrepreneurial background. Thus, the company's operational philosophy is based on entrepreneurship. As our operational activities have grown, we have looked for partners from the investment markets and have selected strong and reliable operators, which brings depth to our stakeholder collective. For this reason, our owner portfolio is excellent for this kind of growing company. Right now, we have a great stakeholder collective for the concept we have. They are strongly committed to the company's operations long into the future.

The city of Rauma played an instrumental role in supporting the reestablishment of RMC's operations. Please elaborate on the relationship between both the city and RMC, and the city and the yard's suppliers.
The city of Rauma bought the docklands and set up the Seaside Industry Park to administer the area for the use of local businesses, for whom this was an opportunity to expand their operations. For RMC, it was a chance to establish a new shipyard. About 30 companies are currently operating in the Seaside Industry Park. In addition to the city, Kongsberg has also invested heavily in the area.

City established a (marine) industrial park. How is that functioning? What are the competitive advantages for RMC and various suppliers?

Rauma Seaside Industry Park. Graving dock for Rauma Marine Construction operation in the middle.

RMC has those areas at its disposal when needed. There are also other businesses operating within the area. Common costs related to the property are being shared between a larger group of operators. Seaside Industry Park is responsible for the area's infrastructure and related services. Many of the companies within our network operate within the industry park, and the synergy it offers benefits everyone.

There is a division of shipbuilding facilities between RMC and the company owned by the city (land, shops, equipment, services, and so on). How is that working out?

The industry park operates much like a hotel – we pay for the facilities based on usage. Some of the main equipment needed in operations, such as welding equipment, are owned by RMC, which is also responsible for their maintenance.

Do you foresee the city having the same role in the long term, or do you anticipate the development towards a more privatized and fully "independent" operation?

The role of the city will remain as it is, due to the nature of the industry park. RMC is a lessee of the industry park and we own some of our main equipment. This arrangement has been agreed upon for a significant period of time.

RMC claims that it has a novel business/operation concept in shipbuilding – "a networking yard". Please describe the key features and benefits of that.

The RMC's operation model has been adapted to correspond with how passenger car ferries and naval vessels are built at Rauma shipyard. The RMC's network-based mode of operation has been developed from the late 1990s operation mode in a way that further emphasizes a network-based mode of operation. The biggest difference is that RMC has hardly any of its own employees, such as welders. RMC is a project management and technology company and, as such, is responsible for designing, planning, coordinating and commissioning the ship building projects, as well as being responsible for deliveries for clients.

The challenge with network-based operations is that the subcontractor chains grow wider. For this reason, RMC has increased the role of supervision and coordination, and these sectors are still developed further.

Any similar examples in the shipbuilding world?

We have not come across a similar operations model elsewhere in the world. Instead, we are looking for experiences from like-minded partners and docks around the world.

A main slogan is "partnership" with key suppliers. What are the key features of these partnerships? Do these mean truly exclusive and long-term relationships?

Yes, they do. We want to cooperate with such partners that have innovative abilities and know-how. This can mean, for example, new kinds of technologies or designs the prospective partner has, or it can be found from the partner's network. The partnership of the future requires you to know how to select the winning team with whom you will negotiate the ship trade.

Competitive well-established innovation capability will lead to long-term, exclusive relationships. ›

"The industry park operates much like a hotel.

What areas do these long-term relationships cover: design, hull production, machinery and deck outfitting, interior accommodation, services…?
Long-term relationships can cover various sectors of shipbuilding projects, from planning to finalization of the project.

Is it anticipated that the same business concept is applied both to merchant and naval contracts? If not, what are the differences?
Our aim is to build the vessels in the same way, but building naval vessels include aspects that make the operations model a bit different. Merchant and naval vessel suppliers have very different profiles. This is why we apply "one company, two shipyards" thinking, in order to cater to these differing needs.

What are the experiences so far with the "networking yard"?
Network-based operations require strong supervision and presence from the shipyard and further responsibility from suppliers, taking proactive responsibility of their actions. This is constantly developed further.

RMC has an orderbook of over EUR 1 billion, which is huge for a company with fewer than 150 employees. Please detail the contracts (key technical characteristics – just to have an idea of contract volumes, order of magnitude of price, special features, delivery times, and so on).
The new Wasaline ferry, Aurora Botnia, will accommodate 800 passengers and will have a freight capacity of 1,500 lane meters for cargo and cars. The vessel is designed to be environmentally friendly, with machinery running on a dual fuel solution: besides liquefied natural gas it can also be operated using biogas. The vessel order is approximately EUR 120 million.

The new Tallink MyStar shuttle ferry will be approximately 212 meters long with a gross tonnage of some 50,000 dwt. It will be able to accommodate 2,800 passengers. The ferry will provide over 1,500 man-years of employment for the shipyard. The vessel order is approximately EUR 250 million. Compared to Tallink's newest shuttle ferry Megastar, which also operates between Helsinki and Tallinn, the new ferry will have an increased passenger area with more seating, as well as more crew cabins. From a technical standpoint, the ferry will have powerful shore connection equipment and will also be equipped with LNG fuel tanks approximately one third bigger than Megastar. Furthermore, the new enhanced design will allow the ferry's CO2 emissions to be reduced by 10 per cent.

Four new multipurpose corvettes for the Finnish Navy will be constructed at Rauma shipyard. The design phase will resume with immediate effect and construction of the first vessel will start at the shipyard in 2022. The Finnish Government approved the procurement, valued at approximately EUR 700 million, September 19, 2019. The multipurpose corvettes will be delivered by 2026 and will be taken into operational use by the Finnish Navy in 2028. The procurement will have a considerable impact on employment, totaling around 3,600 person-years. The work will continue after the delivery as well, through the life-cycle services provided for the vessels.

RMC signed an LoI with TT Line, Australia to build two large ropaxes for the Tasmania operation. The contract, however, did not materialize as the Federal Government of Australia did not authorize funding. Is it likely that the the program will resurface in the near future? If positive, will RMC still be in the picture?

Rauma Marine Constructions (RMC) signed a Memorandum of Understanding on 27 February 2020 with TT-Line Company Pty Ltd. Australia, (TT-Line) to develop, design and construct two large RoRo-Passenger Ferries for their Bass Strait service between Devonport and Geelong. The shipbuilding contract, however, did not materialize because TT-Line was advised by their Shareholder Ministers that the Government would not proceed with the proposed vessel replacement contract due to COVID-19 and its economic implications for the State.

The decision was not a reflection of the quality of the business case developed by TT-Line, nor the ability of RMC to deliver the proposed contracts, but simply a matter of timing and the unprecedented impact of COVID-19.

The Tasmanian Government and TT-Line still

believe it is essential that the vessels are replaced in coming years to support the growing passenger and freight transport needs of the state. The Government launched a Taskforce for an investigation, among the other, on possibilities to increase the local content in the RoRo-Passenger Ferries.

RMC has announced its readiness to participate in the vessel replacement program when TT-Line will present such an opportunity.

In your orderbook you have large commercial ferries and quite sizeable naval vessels for the Finnish Defense Force. For the last decades the general trend in shipbuilding has been towards complete segregation of commercial and naval shipbuilding for many reasons. What challenges do you foresee in combining these in your operations?
We build vessels with a dual-shipyard model, and we utilize synergies, but we otherwise respect the differences between the products and do not try to force them into a one mold.

Any specific challenges related to the huge naval program?
Integrating the RMC and SAAB systems into the procurement model that includes the Finnish Defence Forces Logistics Command requires seamless cooperation for it to succeed.

Does the orderbook at hand require additional facility investments? What is the role of the city in these investments?
We will invest in facilities when needed. Whether the investments are carried out primarily by the lessor or the lessee has yet to be decided.

What is the ideal product portfolio of RMC in the future?
Our product portfolio meets the targets we set out in 2018, and we intend to continue on this path, yet we are also looking into other possibilities such as building smaller cruisers, for example.

Shipbuilding in Finland as a whole is experiencing a phase of growth again. There is obviously a major shortage of specialized skills in many subareas. How do you plan to tackle that? What is the position of Rauma versus the other shipbuilding cities, Turku and Helsinki?
The Finnish maritime cluster has a unified vision to develop know-how and networks, as well as create a new shipbuilder generation in Finland. Therefore, we have no intrinsic position versus other shipbuilding cities – we would rather work together and encourage people in the maritime industries to seek coalitions within the whole shipbuilding industry. This then makes the creation of a holistic viewpoint possible.

Customer		Delivery
Kvarken Link Oy	car and passenger ferry	Spring 2021
AS Tallink Group	car and passenger ferry	Winter 2022
Finnish Defence Forcesfour	multipurpose corvettes	By 2026

Wasaline, Aurora Botnia		Tallink, MyStar	
Length	150 m	Length	212 m
Passengers	800	Passengers	2 800
Speed	20 kn	Speed	27 kn
Gross tonnage, about	24 300 t	Gross tonnage, about	50 000 t

Do you anticipate the role of non-Finnish labor to further increase in the future?
The know-how that has been accumulated over the centuries-long shipbuilding history across Europe enrichens shipbuilding in Finland. Due to the strong order portfolio, in addition to Finnish experts, we will also need professionals from other countries. Many of the European countries represent the long history of shipbuilding with honor, which enriches the manufacturing.

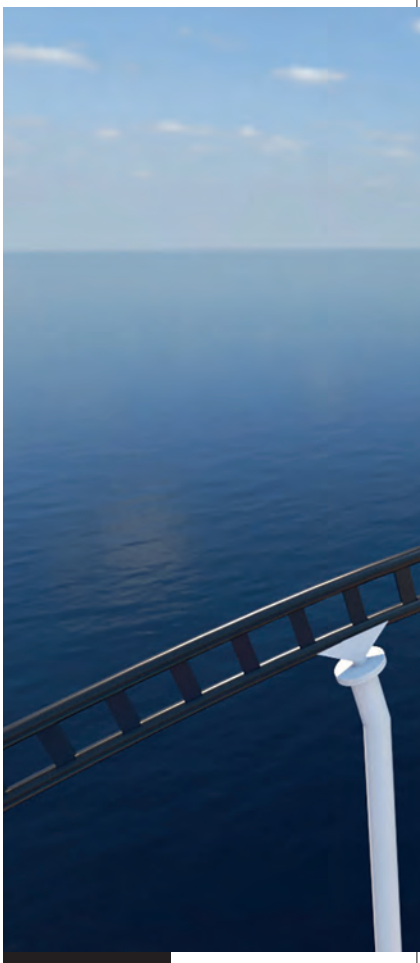
The three big yards of the country were part of the same company for many years. Now all three are fully separate. Is there the need for cooperation? Do you foresee constructive collaboration with other yards?
We work in cooperation based on commercial grounds, but of course we have common interests in terms of increasing training and growing the know-how as well as the networks. This includes technology-related research and development programs.

The pandemia COVID-19 has had an impact to all manufacturing industries in Finland. Please elaborate how the pandemia has affected the operation of RMC and what the situation is today?
The COVID-19 pandemic have had an impact to the marine industry worldwide. Especially long lead ship-components, which are manufactured in areas that have had lockdown and seizure measures by local Governments due to pandemic, have experienced challenges.

Despite these challenging times, RMC has continued building of ships at Rauma shipyard. Although COVID-19 counter-measures have affected the shipbuilding processes, RMC has been able to avoid lockdowns. RMC sees that this is due to good and early HSE responses undertaken at shipyard by RMC and its North European shipbuilding partners as well as actions by the Finnish Government.

The cumulative net effect of the COVID-19 on the shipbuilding operations worldwide remain open for as long as the pandemic is active. ✖

Costa Smeralda is leading the LNG revolution in cruise ships.



"Mardi Gras is floating smart city," says Ben Clement, Carnival's senior vice president of newbuilds.

Costa Smeralda delivered from Meyer Turku shipyard

Costa Smeralda is one of the most innovative, and some would claim, the most beautiful ships ever built at Turku shipyard.

PHOTO MEYER TURKU

"Costa Smeralda will be a further boost to the use of LNG in cruise ships, a technology we were the first to believe in, setting a new course in the cruise sector. Our Costa Group has invested in the construction of five new LNG ships as part of our leadership in sustainable tourism. It is an innovation in the cruise and overall shipping industries, destined to mark a step change as it guarantees a significant reduction in our environmental impact without compromising the safety aspects that are an essential priority for us," said **Neil Palomba**, President of Costa Cruises.

"Costa Smeralda is a significant product innovation as well, with Italian hospitality remaining a fundamental and distinctive element of our brand, able to enchant and excite not only new cruise passengers but also more experienced ones."

Costa Smeralda is leading the LNG revolution in cruise ships, being part of the first LNG-powered cruise ship class in the world. The usage of LNG as fuel will cut down all small-particles and sulfur oxide emissions and significantly reduce nitrogen oxide and CO2 emissions of the ship.

Costa Smeralda is a breakthrough project featuring creative Italian design and innovative spaces for the guests to enjoy.

"We have used all our knowledge, skills and imagination to design and build this ship. I would especially like to mention the Colosseo, a three-deck open area in the middle of the ship with state-of-the-art audio-visual technology inside which required a specific design and building capabilities. We are looking forward to the passengers enjoying some exceptional shows and performances there," CEO of Meyer Turku, **Jan Meyer**, states.

"We trust that the passengers will very much appreciate the design, quality and features of the ship during their coming holidays. The exceptional upper deck areas and the Spanish stairs in the aft of the ship will be a treat in warm Mediterranean weathers," Jan Meyer envisions.

Costa Smeralda is truly a traveling "smart city". Apart from the major innovation of liquefied natural gas, the ship incorporates a series of cutting-edge technological innovations designed to further reduce environmental impact. The daily water requirement is achieved directly from the sea thanks to the ship's desalination systems. Energy consumption is reduced to a minimum by using LED lights, recovering the heat generated by the engines, the particular shape of the hull designed to significantly reduce drag in the water, and new-generation elevators that recover energy by re-introducing it into the electricity system.

Carnival Mardi Gras floated out at Meyer Turku shipyard

Carnival Cruise line 'Mardi Gras' will be the largest one in the Carnival fleet after delivery later in 2020.

"We can't wait for our guests to experience Mardi Gras, a one-of-a-kind ship that is true game changer and continues the evolution of the Carnival vacation experience," says **Ben Clement**, Carnival's senior vice president of newbuilds.

"I believe Mardi Gras will be a truly special ship. She will be the first to use our now proven LNG cruise ship propulsion system in North American markets and feature many other sophisticated technologies – including BOLT, the first roller coaster onboard a ship," CEO of Meyer Turku Jan Meyer states.

With the float-out Mardi Gras' six themed zones are also beginning to take shape with the interior build out of spaces like Emeril's Bistro 1396 created by famed chef **Emeril Lagasse** and a groundbreaking new atrium concept with spectacular three-deck-high floor-to-ceiling windows and moveable LED screens.

A custom designed floating smart city

A cruise ship is always a result of cooperation by many parties. The ship yard's own design office works with the ship owner architects to create a custom designed ship for the signature style of the Carnival brand – a totally new architectural design. Next almost 1000 specialized companies are engaged in providing materials and complex services to create the cruise ship at Turku Shipyard.

CEO Jan Meyer reminds that the ships are truly smart floating cities:

"We are building all the facilities a smart modern city would have: hospitals, IT-networks, restaurants and sophisticated environmental technologies, on a ship sailing the seas. It is a very difficult undertaking but also the end result is really spectacular."

Mardi Gras will be delivered in late October and Carnival has announced she will enter revenue service on Nov. 14, 2020 from Port Canaveral, Florida. ›

> **Costa Smeralda truly became an icon of Italy's finest designs and our passengers very much appreciate this style.**

Meyer Turku Shipyard is under construction on Costa Smeralda's sister ship Costa Toscana

"Costa Toscana marks a further step forward in the use of LNG in the cruise sector. We were the first in the world to believe in this innovation five years ago, when we ordered these new ships, starting a transformation process toward make tourism increasingly sustainable," said Neil Palomba, President of Costa Cruises.

"LNG is currently the solution that allows the best and most immediate results to be achieved in terms of reducing the environmental impact of ships."

Costa Toscana will be delivered in late 2021.

Toscana is a sister ship to Costa Smeralda, now sailing in the Mediterranean. Even with good feedback from the cruise passengers Meyer Turku CEO Jan Meyer reminds that every ship is an evolution from the previous one.

"We are always building on the learnings of previous ships, but Costa Toscana will also have totally new designs in many features to inspire her passengers. Today is the day when this all starts to become visible in the form of one beautiful ship," Jan Meyer comments.

The passengers have described Costa Smeralda as a very beautiful and entertaining ship. The crew onboard have already learned to trust her capabilities at sea.

"Costa Smeralda truly became an icon of Italy's finest designs and our passengers very much appreciate this style. For Costa Toscana we will build on the innovative and now proven LNG-propulsion ship technology from Costa Smeralda," Neil Palomba comments.

At Meyer Turku shipyard today, the lucky coins were placed on the keel blocks by senior management from Meyer Turku and Costa Cruises along with VIP guests. The mayor of Turku, Ms. Minna Arve was a guest of honor and acted as the godmother of the ceremony.

"I'm very proud of Costa Cruises' brave vision and the world-class know-how of Meyer Turku and also of the cooperation that will once again create a jewel of a cruise ship built in Turku," **Minna Arve** says.

When finished, Costa Toscana will be one of the most environmentally safe cruise ships in the world. By using LNG as fuel Costa Toscana will have virtually no sulfur dioxide emissions (zero emissions) and particulate matter (95-100% reduction). LNG also significantly reduces emissions of nitrogen oxides (85% direct reduction) and CO2 (reduction of up to 20%). ✖

Meyer Turku and Aalto University to expand collaboration in marine technology research and education

On 19 December 2019, Aalto University and Meyer Turku Oy signed an agreement that will strengthen and develop multidisciplinary research and education collaboration as well as give a boost to expert co-operation.

"We want Finland to be the leading country in maritime technology and science development in the world. At the same time, we want to be present at Aalto campus and in the academic lives of the students. The agreement is a very natural extension to the already good cooperation with Aalto University," Meyer Turku CEO **Jan Meyer** says.

"The combination of different fields and close multidisciplinary collaboration of Aalto University are an excellent foundation for innovation, generating new kinds of expertise for the maritime industry. This agreement forms another link in a long chain of co-operation between the Turku shipyard and our university, which brings together cutting-edge research, high-quality education and stakeholders from the marine technology sector," says President **Ilkka Niemelä** of Aalto University.


Navigator
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"We've made it our mission to once again make the shipyard competitive and interesting to our customers," says CEO Rotkirch.

Carl-Gustaf Rotkirch, who became CEO of Helsinki Shipyard in May 2019, feels confident about the future.

Changes at Helsinki Shipyard

In Spring 2019, Arctech Helsinki Shipyard sold Helsinki Shipyard to Algador Holdings Ltd, which is registered in Cyprus. The holding company operates river cruises and engages in the merchant naval business.Quite soon after the deal the shipyard received first order for two expedition cruise ships.

Carl-Gustaf Rotkirch, who became CEO of Helsinki Shipyard in May 2019, feels confident about the future.

"Our owners intend to develop the shipyard with a profit-oriented approach, while also utilising their own fleet. To get the ball rolling, the new owner has ordered two luxury expedition cruise ships. The orders were received in June 2019 and the deliveries are scheduled for autumn 2021 and spring 2022," says Rotkirch.

Hull block manufacture is carried out in Klaipeda, Lithuania and construction started in the end of summer 2020, when the first blocks arrived and hull assembly began.

In October 2020 the shipyard received a new order for another expedition cruise ship, slightly bigger than the 2 first ones. The orderbook now consists of 3 cruise ships and reaches to the end of 2022.

"We've done a great deal of work since our change in ownership. As a consequence of sanctions, Arctech experienced problems and delayed payments during construction. The new company has started out with a clean slate. The business was transferred to its new owner, while the debts remained with the previous owner."

Rotkirch says there is currently plenty of global interest in both cruise ships and icebreakers.

"Helsinki shipyard has been manufacturing icebreaking vessels for the past ten years and we intend to continue. Cruise ships will also be added to our

repertoire, as they suit the shipyard's facilities. The largest conceivable cruise ship that we could consider would be a 70–80,000 ton Panamax. The ships currently on order have gross tonnage of 10 to 11,000. Globally, shipyards have an order backlog of about 30 small cruise ships. Demand is exceeding supply. We currently have half a dozen projects on our list."

Both Finland and the shipyard are unarguable specialists in ice-class vessels. The Helsinki shipyard has built about 60 per cent of all the icebreakers in service in the World.

"Finland and Sweden are planning to renew their fleets. Russia has a large fleet of icebreakers, many of which are 30 to 40 years old. These will soon be up for replacement and we'll definitely be participating in the tenders."

New strategy under construction

A new strategy is being drawn up for the shipyard. A lease agreement has been signed with the city reaching until 2035.

"The Helsinki shipyard has long been a place for constructing ships, but circumstances have changed. We've made it our mission to once again make the shipyard competitive and interesting to our customers. This lease agreement is a good basis and enables us to look forward well into the future."

The Shipyard has demolished its block outfitting halls in Hernesaari and is returning the Hernesaari area to the City of Helsinki at the end of 2020 as part of an agreement with the City. As a result the available area of the shipyard is reduced by one third.

"We have created a precise resource planning model so that the shipyard does not fill up with goods waiting to be used. The blocks are outfitted and painted at the block factories, so that they are ready for further outfitting and hull erection when they arrive in the yard. The shipyard only has small buffer stocks. Other storage areas will also be opened outside the shipyard."

Rotkirch says that new production processes must be developed without spending too much time gazing in the rear-view mirror. That said, all experience is useful.

"Twenty years ago, the construction industry took examples from shipyards. Now we're looking in the opposite direction. How is the construction industry handling things like logistics and project management?"

Domestic competition and workforce

There has already been talk of workforce availability and mutual arrangements between shipyards, but currently there is no harmful competition in sight.

"We've spoken with Rauma Shipyard about not needing to compete for a few years. We make smaller cruise chips, icebreakers and workboats. Rauma will be busy making corvettes and car ferries over the next few years. However, it's not impossible that we may end up competing in the future. Yet I believe there will be enough orders to go round. And investing in our own core expertise will also set us apart," says Rotkirch.

It is obvious that all shipyards need to have a skilled workforce. Rotkirch thinks that the entire industry has handled generation change poorly. The industry needs thousands of employees and must attract young people.

"Helsinki Shipyard in particular maintained a low profile for some time, and people transferred to other employers. We've jokingly been talking about returnees, and have indeed managed to get people back. However, a certain section of the workforce has reached retirement age and we've lost a lot of expertise. At some point, it looked like shipbuilding as a whole was under threat, and the industry didn't obtain experts." That will, and has to change in the years to come.

"Seventy is the new normal"

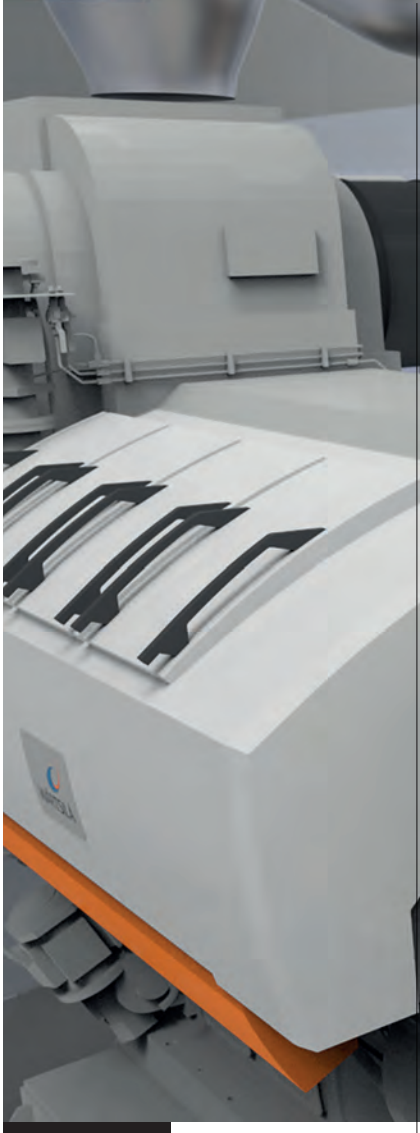
Carl-Gustaf Rotkirch (71) has spent his entire working life in the shipbuilding industry. Helsinki Shipyard has been a familiar place since the early days of his career. In 2008, Rotkirch's career took him to the Bahamas for seven years, where he was CEO of a repair yard owned by the cruise line companies Carnival and Royal Caribbean. He didn't have time to retire, working instead as a consultant before being asked to revitalise Helsinki Shipyard – an offer he couldn't turn down.

"Seventy is the new normal," he smiles. ✖

Helsinki Shipyard

- Helsinki Shipyard Inc is located in the Hietalahti district of Helsinki and specialises in demanding marine technology and shipbuilding.
- Since 2019, it has been owned by Algador Holdings Ltd. The shipyard employs about 400 people.

"We have the most extensive offering for the shipping market," says Wärtsilä Group's President & CEO Jaakko Eskola.



Aurora Botnia is one of the most environmentally friendly ropax vessels in its size class in the world. The ferry will be able to accommodate 800 passengers, with 1,500 lane metres for vehicles and cargo.

Roger Holm from Wärtsilä Marine:

Technology is already creating many opportunities for smart shipping

As a tech group, Wärtsilä Oyj's strategy has long revolved around smart technology and smart shipping. In practice, this means providing safe, energy-efficient and sustainable solutions for Wärtsilä Marine's customers.

Roger Holm heads up Wärtsilä Marine Power and is a member of the Group's Board of Management. He promises to do his utmost to achieve these strategic targets.

"There are a lot of question marks surrounding the future of shipping. There's no silver bullet solution that will solve all of its problems. However, I see technology offering a range of alternatives for smarter shipping. We no longer need to wait – some of the future's answers are already here," says Holm.

He thinks that four major issues are affecting shipping at the moment: fuel flexibility, energy efficiency, smart solutions (connectivity) and, last but not least, safety.

"Over the past few years, global warming and the IMO's emission limits have raised debate about fuels and energy efficiency to a new level. We're thinking about cleaner fuels all the time. For example, I believe in the growing use of LNG and its long future as a marine fuel, and Wärtsilä also has a great deal of expertise in this area."

Holm says that, as a renewable fuel, biogas (LBG) will rise alongside LNG, which is a fossil fuel. And there are plenty of other interesting and effective alternatives for both energy production and shipping's future fuel mixes – ammonia, electricity and hydrogen to name but a few.

"Engine technology itself is not the greatest challenge. Wärtsilä's ship engines run on a variety of fuels and also utilise hybrid solutions. It will ultimately be a question of fuel prices and availability. On an industrial scale, distribution chains cannot be created quickly," says Holm.

One good example of a hybrid solution is the energy solution being supplied by Wärtsilä Marine for m/s Aurora Botnia. This ferry is scheduled for completion in spring 2021 and will be operated by the shipping company NLC Ferry Ab Oy. Its main fuel will be LNG, but it will also be able to run on biogas. Aurora Botnia will be equipped with Wärtsilä's 31DF dual-fuel hybrid solution and rechargeable batteries, thanks to which it will significantly lower its carbon footprint at sea and reach almost zero emissions in ports.

These features will make Aurora Botnia one of the most environmentally friendly ropax vessels in its size class in the world. The ferry will be able to accommodate 800 passengers, with 1,500 lane metres for vehicles and cargo.

"FOS technologies form one of the Group's strategic cornerstones.

Wasaline´s hybrid vessel Aurora Botnia, sailing between Finland and Sweden.

In addition to marine engines, Wärtsilä Marine is one of the world leaders in scrubbers. Roger Holm is very familiar with the environmental debate surrounding scrubbers.

"Scrubbers form part of a package and constitute one good alternative among many. It's also a question of fuel prices and many scrubbers have been installed in many old ships worldwide," he says.

Smart Marine – a smart shipping ecosystem

The second major challenge raised by Roger Holm relates to smart ecosystems, which doesn't just mean that vessels move more efficiently. Instead of smart vessels, the tech group is creating smarter fleets via, for example, Wärtsilä's Fleet Operations Solutions (FOS).

Holm thinks that the various FOS technologies form one of the Group's strategic cornerstones. One good indication of this came in November 2019, when Wärtsilä Marine and Anglo-Eastern (one of the world's leading ship management companies, headquartered in Hong Kong) agreed on the digitalisation of a fleet of more than 600 vessels.

FOS integrates all of an individual vessel's functions – from trimming and port arrival, to route planning and navigation – into a single data-based and optimised solution. This saves fuel and reduces emissions, as vessels will no longer sail at full speed only to end up waiting around outside the port.

"As you can see, technology already offers plenty of solutions. The Anglo-Eastern case is a good and extremely important example of 'just-in-time' shipping and the connectivity of its various aspects through data and digitalisation," says Holm.

Smart shipping will also lead to self-driving, aka autonomous, vessels. The IntelliTug project is Wärtsilä's first 'win' in this field. A dynamic positioning system was installed on PSA Polaris, a tug belonging to the Singaporean tug company PSA Marine, and successful tests were carried out in March in Southeast Asian waters.

"Singapore's busy port is a really good test site for us. The tug has performed as expected during the test drives, in both automatic and manual mode. With the aid of automation and artificial intelligence, the tug obeys many optimised param-

"Marine is a world leader in exhaust gas cleaning technology.

Roger Holm heads up Wärtsilä Marine Power and is a member of Wärtsilä Oyj Abp Board of Management.

Increased agility

In March 2020, Wärtsilä announced a new organisational model that will accelerate customer service and make it more agile, while also highlighting the important role played by shipping within the Group.

In July 2020 Wärtsilä Marine's operations have been divided into three business areas: Marine Power, Marine Systems and Voyage.

Marine Power focus on engine and propulsion solutions. Marine Systems provides gas solutions, exhaust gas treatment, electrical systems for shipping, seals and bearings. Voyage handles automation and navigation solutions, simulation and training solutions, vessel operation, and vessel traffic control solutions.

Roger Holm is leading the Marine Power business. The heads of the two other business areas are – **Tamara de Gruyter**, President of Marine Systems, and **Sean Fernback**, President of Voyage. All three are members of the Board of Management.

"We have the most extensive offering for the shipping market. Creating three separate packages gives us a stronger grasp of each individual market's needs, which will help us to realise our Vision of a Smart Marine Ecosystem more quickly," says **Jaakko Eskola**, the Wärtsilä Group's President & CEO.

eters while waiting and only moves to a new location after receiving the command to do so," says Holm.

He emphasises that an autonomous vessel is not the same thing as an unmanned vessel.

"The idea is not to remove the captain or the crew, but rather to use technology to assist them in all of their routines," he says.

In 2018, Wärtsilä Marine took a major step towards becoming the world leader in developing autonomous vessels by acquiring the UK software company Transas.

"Through Transas, we have gained a great deal of expertise in shipping software, and this can be seen in both the Anglo-Eastern and PSA Marine cases."

Wärtsilä moves to new premises in Vaasa

Wärtsilä Smart Technology Hub – a tech cluster and international campus for industry actors that is currently being established in Vaasa – is an integral part of the technology group's R&D functions.

The Vaasa research centre has attracted a great deal of interest both in Finland and abroad. So much so, that more than 200 parties have already registered for the open innovation platform before it has even been launched.

"It's based on a new approach in which innovations are flexibly shared between partners, and at different times if necessary. We've launched the initial development of this model with a smaller group. The Smart Technology Hub is expected to start its operation by the end of 2021," says Holm.

He says that the technology hub's location in Vaskiluoto, Vaasa is good by virtue of its proximity to the harbour.

"Almost every day, we'll be able to look out of the window and see one of our clients' hybrid vessels, the Aurora Botnia, sailing between Finland and Sweden. This vessel will act as a floating test laboratory linking to the Smart Technology Hub, which will allow real time monitoring and management of the vessel. This will improve efficiency and allow for further R&D of solutions that can help the marine industry meet the targets and environmental requirements in the future," says Roger Holm. ✖

Every year, close to 800 million container moves are made globally in ports, with every fourth of them being handled by a Kalmar solution.

Cargotec sees great benefits in the optimisation of traffic flows

The Finnish listed company Cargotec Corporation has set its sights on becoming the market leader in intelligent cargo handling. Cargotec harnesses digitalisation and cloud services to boost efficiency in shipping logistics chains, save money for customers and pave the way for responsible business.

Tommi Pettersson, VP, Cargotec Digital Solutions, heads up Cargotec's Technology and Competence Centre in Tampere. He says that Cargotec's strategy seeks to optimise cargo traffic flows with smart technology.

"In shipping, we of course aim to ensure optimal transport – enhancing the efficiency of ports and their capacity plays an important role in this," says Pettersson.

Cargotec's business areas – Kalmar, MacGregor and Hiab – provide customers with solutions and maintenance services, optimizing global cargo flows and creating sustainable customer value. These three businesses are known for their leading cargo and load handling solutions around the world.

Kalmar's offering includes port automation and cargo handling equipment, such as ship-to-shore cranes, rubber-tired gantry cranes, straddle and shuttle carriers, reachstackers, empty container handlers, terminal tractors, forklift trucks and automated guided vehicles as well as maintenance and support. Every year, close to 800 million container moves are made globally in ports, with every fourth of them being handled by a Kalmar solution.

Automation revolutionises ports

In May 2018, Cargotec's Kalmar business area announced its commitment to reduce emissions in cargo and material handling operations by fostering eco-efficient technologies. According to the commitment, Kalmar's full offering will be available as electrically powered versions by 2021. . According to Pettersson, the majority of Kalmar's range is already electric.

"End-to-end logistics chain optimization and better flow of transport thanks to digital data based solutions are even more important than electrification of single machine. For this reason, Cargotec continues to invest heavily into its software business."

The Kalmar One automation system, Navis N4 terminal operating system (TOS) and the Navis Smart suite of terminal applications, Octopi SaaS TOS, loading computer, stowage planning and fleet performance monitoring software are also part of the Kalmar business area. These enable customers to optimise the loading and unloading of goods flows, transport and transportation speeds.

"By handling cargo faster, we significantly reduce total emissions. The ship can then spend more time at sea – that is, sail at more environmentally friendly speeds. The aim is that ships will be better informed about when they should come to port. This enables them to avoid having to wait unnecessarily outside the port," says Pettersson, describing the benefits of just-in-time shipping.

Pettersson says that sharing data is another ongoing challenge in shipping, as many operators jealously protect their own information.

"Rationally sharing data and documents with everyone would be a better alternative. Another problem is that traditional means of communication, such as email and faxes, are still used frequently in shipping. Container arrivals are even announced by phone," he says.

Kalmar is an important trailblazer in automated communications with its open interfaces, such as Kalmar ONE and the Navis Smart suite. Tommi Pettersson says that robitzation is the next step in making equipment more intelligent and self-sustainable. Robotics allows the industry to focus on managing the overall flow of goods instead of trying to control individual equipment in an optimal way.

Tommi Pettersson says that port automation solutions and the optimisation of shipping traffic flows in general will yield great financial benefits to companies that know how to make the most of them. Of course, environmental factors and responsibility must be taken into consideration in business operations.

"All our operations seek to ensure that smart technology will enable customers to save on kilometres and cut down on machine idling, thereby reducing emissions and achieving greater cost-savings," says Tommi Pettersson. ✖

Automated mooring system Yara Birkeland.

ABB Electric Digital Connected offering.

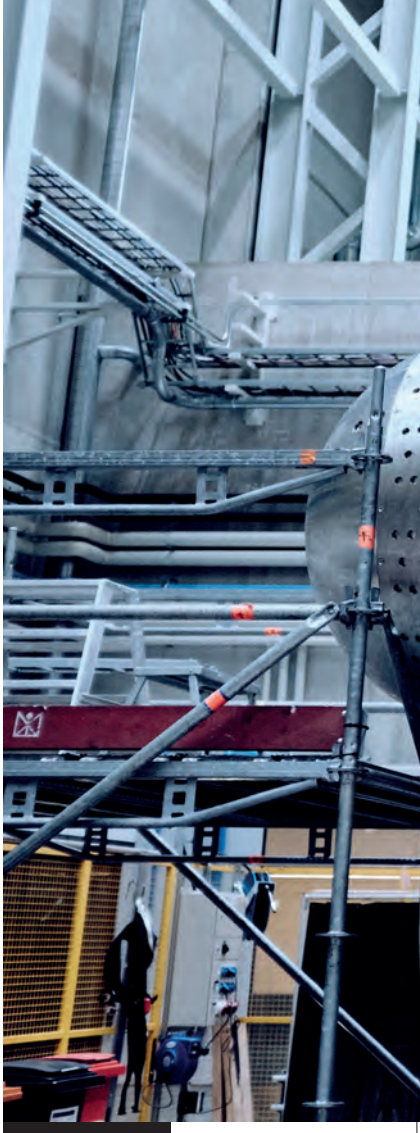


ABB Azipod propulsion factory in Helsinki.

ABB riding the wave of marine industry digitalization

As vessels become electric, digital and connected, ABB Marine & Ports´s unit in Finland has plenty of work ahead of it to digitalize the marine industry. Autonomous solutions are expected to transform international shipping in the coming decades.

PHOTOS ABB

Mr. Antti Ruohonen, Senior Vice President for propulsion solutions at ABB Marine & Ports discusses the future scenarios of new technologies, along with the rising demands for safe, efficient and sustainable seafaring.

How do you see digitalization evolving in 2020?
Digitization has the potential to change the face of the marine transport industry in a substantial way, from the way ships are driven, cargo is handled and even to the design of vessels at the architect's desk.

Rising trends, such as the development of autonomous vessels, remote maintenance and proactive maintenance of vessels (industrial internet or connected devices). The growing importance of data?
Autonomous solutions are expected to transform international shipping in the coming decades. Recent

developments in sensor technology, data analytics and computing power are enabling us to increase the level of automation in ship navigation, steering and control.

As vessels become more electric, digital and connected than ever before, ABB equips seafarers with existing solutions that augment their skillsets and enhance the overall safety and efficiency of operations.

Autonomous doesn't mean unmanned. Human oversight of vessels from anywhere is achievable with today's technologies.

What kind of solutions does ABB provide for these?

ABB Ability™ Marine Pilot product family provides tools and functionalities to improve visibility and operability for the crew - wherever they may be located.

ABB Ability™ Marine Pilot Control is an intelligent maneuvering and control system that enables safer, more efficient ship operations. The solution offers multiple real-time visualizations of a vessel's surroundings presenting the ship and its environment in ways beyond the capabilities of the human eye. With its user-centric design, ABB Ability™ Marine Pilot Control reduces the workload on automating navigational tasks and allows bridge officers to focus holistically on the overall control and positioning of the ship. The system integrates seamlessly with existing onboard equipment, and ensures ease of installation and maintenance, adding significant "bridge-to-propeller" value for the shipowners.

> **"ABB has become one of the world's leading enablers of sustainable transportation for all modes.**

Automation solutions, especially ABB Ability™ and its cost savings?

ABB Ability™ is the company's unified, cross-industry, digital offering — extending from device to edge to cloud — with devices, systems, solutions, services and a platform which enables customers increase productivity and lower costs. ABB Ability™ was launched in 2017 and already offers more than 210 solutions.

Already today, shipboard sensors are routinely used as a data source to optimize vessel operations and achieve just-in-time delivery with the least energy consumed. ABB Ability™ Collaborative Opera- ›

tions Centers are already harnessing cloud-based analytics to help prevent, predict and rectify remote equipment problems. Every day ABB is collecting gigabytes of data from about 1,000 connected vessels, with its shore-side experts offering support to engineers on the ship from afar.

For decades, ABB Azipod® propulsion has held its solid and established position as the driving force for modern vessels of all types. New and different applications from cruise ships to tankers and bulk carriers to icebreakers. What does the market look like?
In 1990, ABB transformed maritime shipping by introducing Azipod® propulsion, an electric propulsion system for marine vessels. The Azipod® propulsion, which extends below the hull of a ship, can rotate 360 degrees to increase maneuverability, efficiency and space available on board.

For three decades, Azipod® electric propulsion has been the driving force behind safe, efficient and sustainable operations for a wide range of vessels.

Today, over 25 vessel types depend on Azipod® propulsion, including cruise ships; icebreakers and ice-going cargo vessels; ferries and mega-yachts; offshore supply fleets; research vessels; wind turbine installation boats and drilling rigs.

Azipod® propulsion has become the industry standard in the cruise segment, securing the 100th cruise ship order in early 2018, with a contract to power the world's first electric hybrid icebreaker. Energy savings equivalent to 900,000 tons of fuel have been made in the cruise sector due to the selection of Azipod®.

Environmental technologies and new fuels. How is ABB's work on fuel cells going forward?
In April 2020, ABB has signed a Memorandum of Understanding with hydrogen technologies specialist Hydrogène de France to jointly manufacture megawatt-scale fuel cell systems. Building on an existing collaboration announced on June 27, 2018 with Ballard Power Systems, the leading global provider of proton exchange membrane (PEM) fuel cell solutions, ABB and HDF intend to optimize fuel cell manufacturing capabilities to produce a megawatt-scale power plant for marine vessels.
Fuel cells turn the chemical energy from hydrogen into electricity through an electrochemical reaction. With the use of renewables to produce the hydrogen, the entire energy chain can be clean.
Among alternative emission-free technologies, ABB is already well advanced in collaborative development of fuel cell systems for ships. Fuel cells are widely considered as one of the most promising solutions for reducing harmful pollutants. Already today, this zero-emission technology is capable of powering ships sailing short distances, as well as supporting auxiliary energy requirements of larger vessels..

Environment requires cleaner shipping, how does technology respond?
Global pressures of climate change, emerging-market economic development and growing urbanization demand new and more environmentally sustainable ways to move people and goods. ABB has become one of the world's leading enablers of sustainable transportation for all modes, including marine vessels.

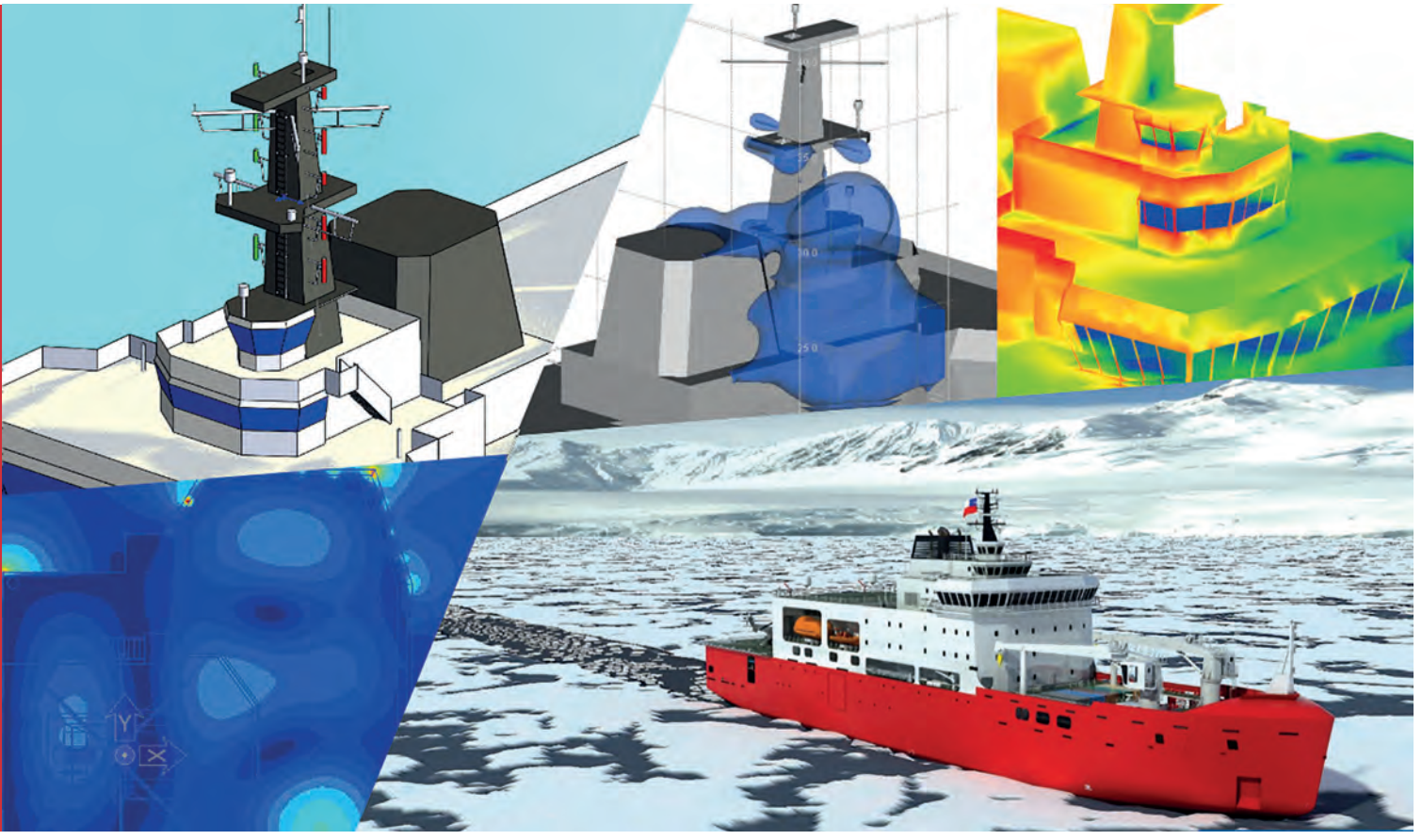
There are commercially available technologies that can enable reduced emissions and more sustainable shipping, such as shore power, energy storage, fuel cells and others.

How do you see the Northeast Passage developing? ABB opened an Arctic center in Murmansk and another one in Russia's Far East?
In 2019, ABB has opened Marine Service Center in Russia in support of growing Arctic maritime industries. The center supports ABB's ship power, propulsion and automation technologies and further expands service capabilities for ice-going vessels. The new Marine Service Center builds on a decade of local ABB services in support of ice-going vessels and relies on a strong core of engineering expertise in Murmansk.

In 2009, ABB's engineers operating from smaller scale service facilities in Murmansk supported 15 vessels featuring the group's equipment; in 2019, the number of ships has exceeded 50, with projects covering over 100 Azipod® propulsion units. Responding to the needs of a growing customer base, ABB has expanded its service capabilities by opening a new, dedicated service facility.

Located in Murmansk, the world's largest city above the Arctic Circle, the new center occupies 2,000 m^2 in a purpose-built facility with its offices, electrical and mechanical testing areas, and a workshop served by overhead gantry cranes. The center also features a warehouse for Azipod® propulsion and electrical spare parts to ensure shortest delivery times and to further enhance responsiveness. ✖

Mr. Antti Ruohonen, Senior Vice President for propulsion solutions at ABB.



Surma joins Chilean icebreaker project

Surma, a Finnish company in the defence equipment sector, has signed an agreement with ASMAR shipyard covering electromagnetic compatibility design and management for Chile's Antártica 1 icebreaker.

Surma's CEO **Kristian Tornivaara** says that the modern wireless sensors and communication systems used onboard vessels have a significant impact on their electromagnetic compatibility (EMC) management. Managing electromagnetic disturbances and ensuring the electromagnetic compatibility of all the various systems are both critical factors in improving the efficiency of the research work that will be carried out by the icebreaker.

"We're very happy to be part of the Antártica 1 team. Chile's new icebreaker will be one of the most advanced vessels built for research in the Antarctic region," says Tornivaara, commenting on the agreement that was announced in early 2019.

Surma will be assisting ASMAR on this multi-year project, and will be heading up the shipyard's EMC/EMI team. **Martti Helamaa**, Surma's Engineering Director, and the entire EMC team are excited at the prospect of participating in such a significant project – one that will advance marine and climate research in the Antarctic region.

Surma belongs to the DA-Group

DA-Group is a Finnish company that designs and manufactures demanding high-tech and electronics solutions for customers' applications, in order to promote both their performance and business. The company serves both industrial companies and organisations in the defence and space industries.

DA-Group's specialist expertise lies in embedded systems, electronics and mechanics, and radio frequency and microwave technologies. Established in 1995, the company employs more than 100 professionals. It is headquartered in Forssa, with offices in Helsinki, Tampere and Kaarina.

Its subsidiary Surma is an expert organisation that specialises in comprehensive battle endurance. The company provides services, systems and software for navies, shipyards and other operators in the sector all around the world. Its offering covers impulse response and vulnerability analyses, electromagnetic environmental management, and a range of design support, research and development.

Surma also supplies entire systems, such as magnetic protection devices and loading calculators for naval use. Established in 2007, the company employs 15 professionals. ✖

Foreship currently employs more than a hundred marine engineers and other design professionals. The company provides the full spectrum of design services. With new ownership, the Finnish design company has great potential to increase its international footprint in cruise ship design.

Aurora Botnia – a challenge for Foreship

The design of Wasaline's new ferry has already posed challenges for marine engineers at the design agency Foreship. In addition to being environmentally friendly, the ship must be able to operate to a strict timetable in shallow and freezing waters – and often in difficult weather conditions.

Merenkurkku is a short sea route connecting Finland and Sweden via the cities of Vaasa and Umeå. It is a vital connection for both passengers and cargo.

"When designing Wasaline's new ferry concept, we've had to consider factors such as optimal use of space and the vessel's power and adaptability," says **Lauri Haavisto**, CEO of marine engineers and consultants Foreship Oy.

"The waterway is rocky and shallow, and freezes over in the winter. There are strict requirements for stability, especially as the new vessel's design has had to maximise lane metres for growing cargo volumes," says Haavisto.

Foreship has been acting as a consultant and technical advisor to the client, Kvarken Link, throughout the development of the new ferry concept and continues to assist the Owner during the building phase as Owner's technical advisor.

An ecological powerhouse

The ferry must be highly steerable, and its main engines and transmission systems must be very powerful. This is due to the narrow turning zones in the Ports of Vaasa and Umeå, the very shallow waters in places along the route, and the ferry's strict timetable that must be kept in often difficult sailing conditions.

The work carried out by Foreship's design team resulted in a sustainable and cutting-edge treble-fuel solution (LNG/LBG/MGO) for an ice-strengthened passenger-car ferry of class Super 1A.

This ropax vessel has space for 800 passengers and 1,500 lane metres for trucks and cars. The environmentally friendly ferry will run on LNG (liquefied natural gas). Aurora Botnia will use rechargeable batteries, which will enable the ferry to lower its carbon footprint in the open sea and reach almost zero-emissions in ports.

The new build will cost about EUR 120 million and is being financed by the client, Kvarken Link AB, which is jointly owned by the City of Vaasa and the City of Umeå. Aurora Botnia is scheduled for completion at RMC's shipyard in spring 2021, after which it will travel daily between Vaasa and Umeå.

A new owner to boost growth

Foreship currently employs a hundred marine engineers and other design professionals. The company provides the full spectrum of design services from project management to class-compliant design, as well as solutions to cover a vessel's entire lifecycle.

The company has four offices in Finland, one in Germany, one in Estonia and two in the United States. ✖

Wello's Penguin

will become a common sight on the world's oceans

Wello's technology for harnessing ocean-wave energy is now ready to be put into real action. Thanks to an increasing number of devices and installations, the Finnish company believes that wave energy will soon become the most affordable type of renewable energy.

"By 2050, wave energy could meet a tenth of the world's clean energy needs," says Wello's CEO **Heikki Paakkinen**.

Wello tested the first model of its Penguin wave technology on Scotland's Orkney Islands, where it has safely been generating electricity in waves of up to 18 metres in height. For two years, the WEC1 wave energy converter was connected to the electricity grid at Billia Croo off the coast of Orkney.

Wello's new converter, the Penguin WEC 2, will be installed in the autumn 2020, at Armintza on the coast of the Bay of Biscay in Spain. The installation will be carried out by Wello's partner, the Italian company Saipem Xsight. Wello is receiving project funding from Ente Vasco de la Energia (EVE) and Business Finland.

Wave-energy parks all the way to Indonesia

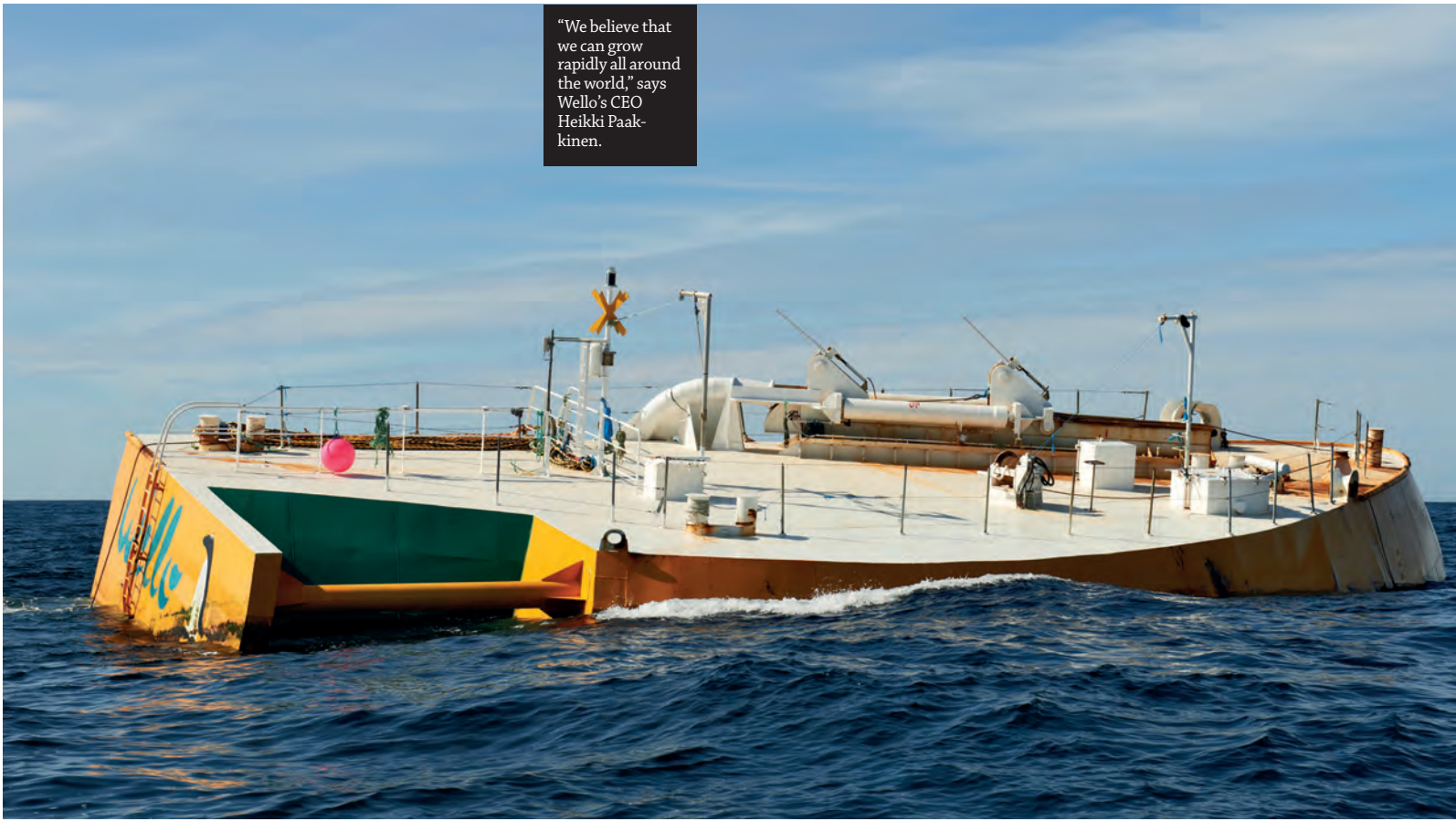
Over the past few years, Wello has received many enquiries about wave-energy parks containing dozens of units. One of these enquiries came from Nusa Lembonga in Indonesia, where a project is currently being planned. With a capacity of ten megawatts, it is currently the largest wave-energy park in the pipeline in the world.

Paakkinen says that the Indonesians are interested in wave energy as many tourists visit the island of Nusa Lembonga and wind farms and solar energy solutions disturb travel experiences.

"Wello is the leading provider of wave energy, as no one else can boast comparable technology. We believe that we can grow rapidly all around the world," says Paakkinen.

Wello was established in 2008 and operates out of E spoo. The company develops technology to harness renewable wave-energy and has been granted several patents. The company's leading investors are Fortum Oyj, VNT Management, Innovestor Ventures and Estlander Holdings Oy.

Finland has another wave-energy company in addition to Wello, AW-Energy, which has developed WaveRoller technology. AW-Energy collaborates with Wärtsilä, which seeks to sell AW-Energy's technology globally. ✖



"We believe that we can grow rapidly all around the world," says Wello's CEO Heikki Paakkinen.

Aker Arctic's freezable test basin in Vuosaari has been in heavy use.

Aker Arctic plays with high stakes at high latitudes

The technology company Aker Arctic is a notable international player in northern shipping. In addition to icebreakers and ice-going vessels that are working in Finland, the company also holds an important position in international markets. For example, icebreaker design for Sweden and many Arctic transport projects in the Northeast Passage are currently ongoing.

The port icebreaker Ob, which was delivered in October 2019, is a prime example of Finnish icebreaking expertise. The vessel was built at USC's Vyborg Shipyard for use by a Russian client, Rosatomflot. Ob ensures year-round transport for energy company Novatek's LNG terminal in Sabetta.

According to Aker Arctic's CEO, **Reko-Antti Suojanen**, Ob is based on the company's earlier icebreaker designs, but its technical solutions have been improved to meet Sabetta's extremely difficult ice conditions.

"The vessel has been designed to operate in ports and shallow waters that experience extremely difficult ice conditions during the winter. According to our knowledge, Ob has managed extremely well in the Arctic winter conditions in which it has been operating since entering service," says Suojanen.

Ob is a Polar Class 7 icebreaker measuring 89.2 metres long, 21.9 metres wide and 6.5 metres deep. It has four 3 MW diesel-electric propulsion units, two in the fore and two in the aft. Ob has a top speed of 16 knots and is able to break ice of 1.5 metres in thickness at a speed of two knots. The vessel is significantly smaller than the icebreaker Aleksandr Sannikov, which was also designed by Aker Arctic and delivered in 2018.

"Thanks to its unique propulsion system, Ob is an effective and extremely agile icebreaker. Ob is a one of a kind vessel that has been specifically designed for the task at hand. Only one of these vessels has been ordered. Although we do, of course, hope that more will be built," says Suojanen.

Concept and basic design work began back in 2015, and thorough test drives were carried out using a miniature model of Ob in Aker Arctic's ice tank in Vuosaari, Helsinki. According to Reko-Antti Suojanen, this almost five-year period is quite normal for developing new vessel concepts.

"The majority of this time will be spent on building the ship itself, but the design phase also takes between one and two years."

It's all go in the Northeast Passage

Aker Arctic and Reko-Antti Suojanen firmly believe that the Northeast Passage and its Arctic transport projects will also spawn new ships and vessel concepts for Finnish designers.

"The energy company Novatek and its partners are building a new LNG production facility on the Yamal peninsula. Demand for transport is increasing, and new icebreakers and ice-breaking LNG carriers will be required," says Suojanen.

Aker Arctic has been involved in designing Russia's next generation of large and LNG-powered polar icebreakers. LNG has been chosen to fuel the icebreakers for two reasons: advancements in both tanking technology and fuel distribution.

"Unlike with diesel oil, gas production and local distribution work in the north. There is sufficient LNG available along the Northeast Passage."

Suojanen says that polar icebreakers must have extremely large, 8,000–10,000 cubic-metre LNG tanks to enable them to operate for a month at sea. Although this of course depends on their voyages and the weather conditions.

Even nuclear-powered vessels could materialise

Aker Arctic has already headed up the development of 15 ice-strengthened LNG tankers for the Northeast Passage and participated in their design. These first-generation Arctic LNG vessels were built in Asian shipyards, namely Daewoo's (DSME, Daewoo Shipbuilding and Marine Engineering) shipyard in Okpo, South Korea.

Although the Russians have handled the design of their new Arktika-class nuclear icebreaker themselves, Suojanen thinks that demand for nuclear-powered vessels may rise as a result of increased traffic in the Northeast Passage.

"The IMO is tightening its environmental requirements all the time, and we expect this will also lead to nuclear-powered cargo ships in northern waters," he forecasts.

Aker Arctic was initially involved in the early design of the USA's new polar icebreaker, but no longer. The US Coast Guard recently decided to order the first of its new batch of icebreakers from the VT Halter shipyard in Mississippi, and VT Halter will also handle icebreaker design.

The USA's polar cutter is the superpower's first new icebreaker in 25 years.

Aker Arctic's CEO, Reko-Antti Suojanen firmly believe that the Northeast Passage and its Arctic transport projects will bring work for Finnish designers.

Plenty of ongoing projects in the Baltic Sea

Aker Arctic has signed a contract for the development of new icebreakers for demanding Baltic Sea escort operations. "New ship will represent a completely new generation of icebreakers. It will incorporate design, construction and operational experience from existing Baltic assistance icebreakers as well as our other icebreaker designs. As the operational requirements and environmental conditions are changing in the Bothnian Bay, we will work closely with the Finnish and Swedish operators to jointly develop a solution that best answers to the future icebreaking needs. With an operational lifetime spanning half a century, the new icebreaker must be designed to comply with future emission goals. Responding to this major technological challenge today will require us to apply the full extent of our icebreaker design expertise as well as to utilize the latest environmental technologies developed by the maritime industry", says Suojanen.

The new icebreaker is required to be able to assist ships with 32 m beam. Cost-effective operation, low life-cycle costs, the transition to fossil-free fuel by 2030 and the reduction of CO2 emissions are also important goals.

Back home in Finland, Aker Arctic Technology Oy is designing and delivering full propulsion systems, complete with propellers and axles, for the Navy's four new Pohjanmaa-class multipurpose corvettes.

"This is a very significant agreement for us. We've already put five years of work into this project with the client," says Suojanen.

Aker Arctic's EUR 27 million share of the contract is for the design, manufacture, delivery and installation supervision of a complete propulsion system. The design of the stainless-steel adjustable blade propellers and axles has paid particular attention to low propeller noise output and the vessel's speed and ability to move through ice.

Other new projects include the world's first motorised detachable ice-breaking bow, whose propellers were designed and supplied by Aker. The prototype was launched at the Turku Repair Yard in Naantali in late summer 2019.

Like other Finnish ship designers, Reko-Antti Suojanen has high expectations concerning design contracts for Finland and Sweden's new icebreakers.

"It's always beneficial to cooperate, as we share the same sea. Both countries will definitely save money by building a series of ships, but as a design company we first need to wait for a call for tenders," he says.

Suojanen considers global warming to be an undeniable fact whose impacts on maritime transport are extremely difficult to manage. We've just had a record-breaking warm winter without much need for icebreakers, but more difficult winters may lie ahead. Stringent environmental targets and variable conditions are posing special challenges in the design of new icebreakers.

"As designers, our goal has always been to build ships that run on minimal energy. In this sense, a vessel's icebreaking capacity adds to our design challenges, but we should also keep in mind that many ships spend most of their time sailing in open waters," he says.

Suojanen says that Aker Arctic's freezable test basin in Vuosaari has been in heavy use, as miniature models of new ice-breaking vessels are being developed and tested at a fast pace.

"We conduct the bulk of these tests for ourselves, but we also provide a service to external customers, such as shipyards and shipping companies."

"We're able to offer an extremely comprehensive service for shipbuilding projects, all the way from icebreaker concept development and testing to design, equipment delivery and commissioning. We're at the top of the world in this field. No one else can provide these kinds of services for icebreaking vessels." ✖

NauticAi and Inmarsat join forces

NauticAi, one of Finland's leading maritime start-ups, has joined the Fleet Data service provided by the satellite company Inmarsat. Fleet Data aims to make shipping smarter by collecting data from meters and sensors located on ships and sending the information to Inmarsat's central database for analysis.

Fleet Data, which was developed by the British satellite communications company Inmarsat and the Danish company Danelec, was commercially launched in 2019. The Finnish company NauticAi uses the Fleet Data API in its own BOQA (Bridge Operations Quality Assurance) solution. This agreement opens up good opportunities for Finns to develop their own services.

NauticAi's founder, Captain **Henrik Ramm-Schmidt**, says that working with Inmarsat will help NauticAi to collect vessels' route and other data more easily and affordably – in other words, without having to build expensive infrastructure themselves.

"We can focus on our own expertise and create affordable cloud solutions for our customers," says Ramm-Schmidt.

NauticAi's situational data, performance and weather services are used by shipping companies such as Tallink-Silja, Meriaura, Containerships and Eckerö.

Modelled on aviation

Ramm-Schmidt says that BOQA was developed in the aviation industry. The solution was introduced a few years ago on cruise ships operated by major shipping companies, such as the Royal Caribbean and Carnival.

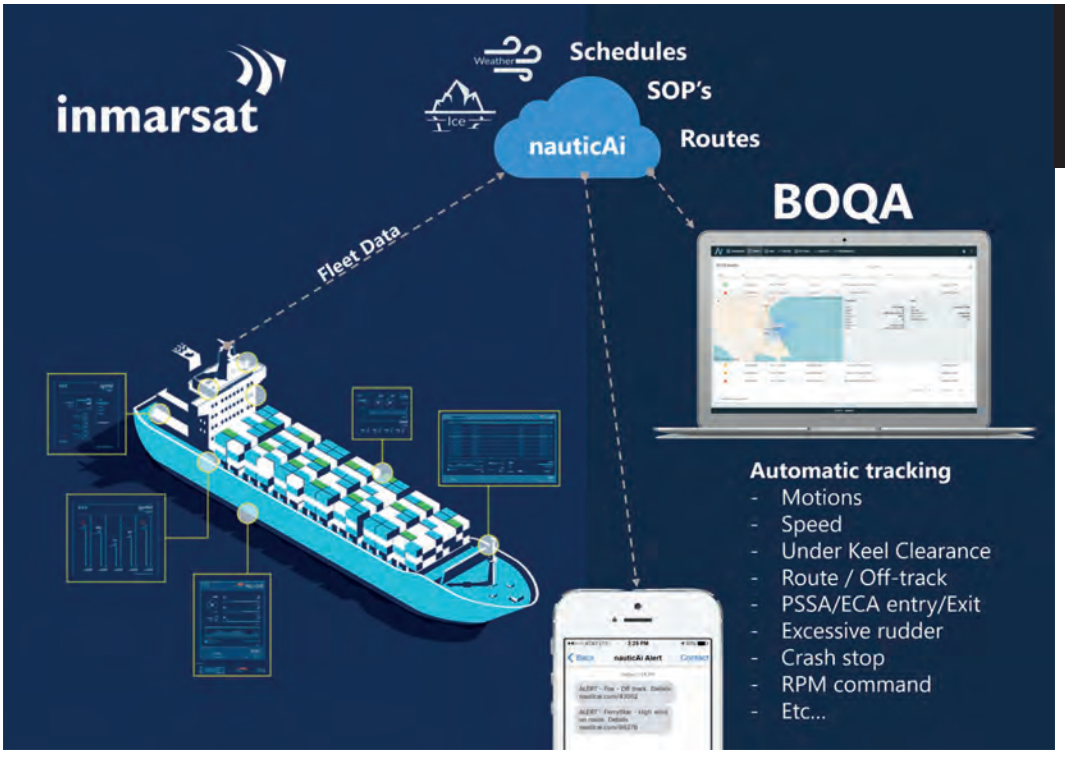
BOQA uses artificial intelligence to automatically collect data about, for example, atypical behaviour on the bridge. The system monitors route selections, weather data, the vessel's movements, power outages or emergency stops. New functions are continually being developed for the system, such as reporting on near misses.

In addition to its collaboration with Inmarsat, NauticAi is also involved in the Maritime AI-NAV project, which is funded by the European Space Agency (ESA). This project is exploring the use of artificial intelligence in autonomous vessels. Tallink-Silja's Megastar is a test ship in this project.

Utislising open data

A few years ago, the Finnish Meteorological Institute launched a pilot for seafarers that included making its weather forecasting model available to everyone in the Amazon cloud. The data itself has already been open access since 2013. This new distribution channel makes weather data easily available to companies and other organisations such as NauticAi. Open data promotes innovation and insights.

"We want to enhance the use of weather data. Making open weather data available on the AWS cloud platform lowers the threshold for its utilisation. Developers and companies can quickly, easily and flexibly create applications via the cloud service. It will also reduce the load on the Finnish Meteorological Institute's own servers," says **Roope Tervo** from the Finnish Meteorological Institute. ✖



BOQA combines data from multiple sources and automatically monitors operational decisions.

Cadmatic has a firm belief in data-driven shipbuilding

As CEO of Cadmatic, a company that provides design and information management software for the shipping, construction and process industries, **Jukka Rantala** has firsthand experience of the progress being made in 'paperless design' at shipyards. He thinks that digitalisation in data-driven shipbuilding, with all its digital twins and automation, is without a doubt a trend that is here to stay.

"Ships require just as much design as industrial production units. Digital twins (that is, virtual models) of ships are becoming increasingly commonplace, as they make it easier to fit pipelines and other larger elements together," says Rantala, describing the developments in 3D design that began back in the 1980s.

According to Rantala, the reason for digitalisation and automation's triumph is clear: technology eliminates routine work and reduces the number of errors that end up in production and manufacture. Provided, of course, that they use data of sufficient quality.

Cadmatic and its software lie at the heart of shipbuilding, as it is exactly this type of 3D software that is able to check and minimise design flaws in advance. Good software improves information management, leads to higher-quality work, and reduces delivery times.

"Thanks to digitalisation, ships can already be designed and built almost without paper. Data is transferred straight from the designer's desk to production and manufacture," says Rantala, adding that Cadmatic is an extremely competitive partner and software provider both for shipbuilding design and for processing large volumes of data and data models.

"We support a very modern networked operating model in which dozens – and sometimes even hundreds – of networked companies and suppliers are responsible for a ship's design and construction," he says.

Cadmatic's position as the market leader in 3D design software and information management solutions is reflected in its customer base. Almost half of the world's approximately 450 active shipyards use Cadmatic software.

"Our customers are shipyards and the design agencies that serve them, and to some extent also shipping companies. We employ about 230 people, half of whom are based in Finland. All of our software development is carried out in Finland or the Netherlands," says Rantala.

Acquisition to round out design palette

Although some of Cadmatic's major customers are cruise ship builders, the company's future in shipbuilding is not dependent on the cruise business alone, says Jukka Rantala.

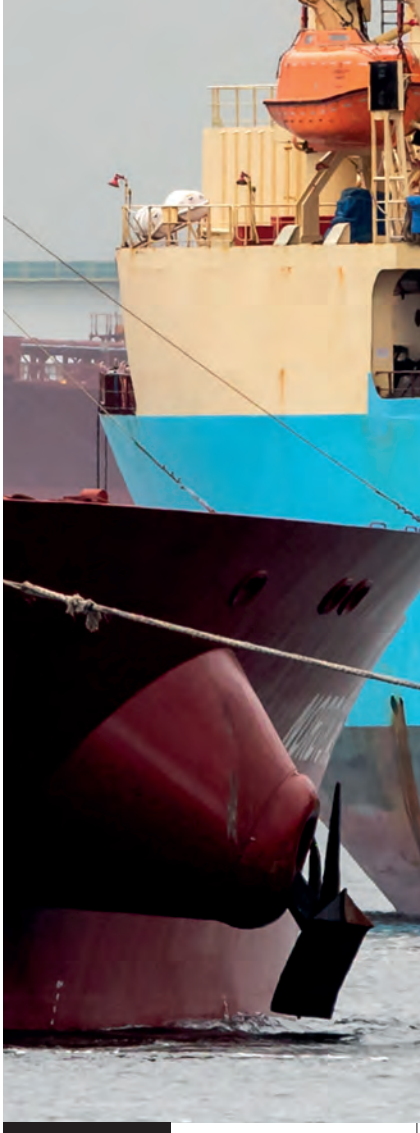
"We've been seeing slow signs of recovery in our cargo ship order book for some time now. That's good for Cadmatic, as our software and tools work just as well in the design of all types of vessels."

In 2019, Cadmatic acquired the software company Kymdata to round out its design palette. This start-up is based in Kotka and its products perfectly complement Cadmatic's repertoire.

"This acquisition has brought us a great deal of added value, as Kymdata's electricity and automation software is extremely competitive and rounds out Cadmatic's product portfolio to encompass all the relevant areas, including for ships," says Rantala, explaining the reason for the acquisition.

Cadmatic is owned by Elomatic (53%), Sampo and Mandatum Life (17%) and personnel (30%). In 2019, Cadmatic's net sales rose to EUR 28.5 million from EUR 20.5 million in the previous year. More than 80 per cent of the company's products are exported. ✖

According to the data, rotor sails were proven to reduce the Maersk Pelican fuel consumption by an average of 8.2 per cent.



According to Norsepower's calculations, the use of rotor sails has led to a reduction of about 5,000 tons of carbon dioxide emissions to date.

Maintenance agreement with Wärtsilä

Norsepower, a cleantech company that develops wind power solutions for ships, made several significant steps forward during the year. The company has gained new customers, significant partners, and firm proof that its Flettner rotors perform well under real-life conditions.

In late 2019, Norsepower and Wärtsilä announced a cooperation agreement to boost the efficiency of global rotor sail maintenance. Smart technology is currently being rolled out in the industrial sector and, as a technology company, Wärtsilä wants to be at the forefront of this in every way. Norsepower is an example of this smart technology.

"We're really excited about collaborating with Norsepower. This agreement is an excellent indication of our goal to develop a sustainable society using smart technology. Together, we're seeking to promote technologies for a cleaner future," said Wärtsilä's **Stefan Wiik**, Vice President, Asset Management Services when the agreement was announced.

Rotor Sail systems have been installed on three ships to date: Viking Line's m/s Viking Grace, Bore's m/s Estraden and Maersk Tankers' m/s Maersk Pelican.

The Danish ferry company Scandlines will be installing Norsepower's rotor sails on its hybrid vessel,

the Copenhagen. Thanks to the Rotor Sail Solution, Scandlines' ferry will be one of the lowest-emission passenger ferries in the Baltic Sea.

Scandlines' m/s Copenhagen will operate between Gedser in Denmark and Rostock in Germany. The shipping company estimates that the rotor sail will help to reduce its carbon dioxide emissions by 4–5 per cent on Danish and German routes.

In addition to these, Norsepower has an order for two rotor sail installations on a European shipping company's vessel sometime this year.

Maersk Pelican saves fuel

In October 2019, Norsepower Oy Ltd and its project partners Maersk Tankers, Energy Technologies Institute (ETI) and Shell Shipping & Maritime announced the successful test trials of two rotor sails on Maersk Tankers' product tanker Maersk Pelican.

According to the data, rotor sails were proven to reduce the vessel's fuel consumption by an average of 8.2 per cent, which is equivalent to a reduction of about 1,400 tons of carbon dioxide emissions. The fuel savings were verified by comparing the vessel's actual performance data before and after the installation of the rotor sails.

In 2019, the Rotor Sail Solution was also the first in the world to receive type approval for a mechanical sail for a large vessel. Inspectors from the classification society DNV GL said that the Rotor Sail Solution units were safe mechanical sails for commercial ships "in all operational and environmental conditions."

Shipping is harnessing more wind power

Norsepower's invention has already been used in real-life conditions for more than 45,000 hours, and it has been proven that rotor sails can save an average of up to 20 per cent on vessel fuel costs. According to Norsepower's calculations, the use of rotor sails has led to a reduction of about 5,000 tons of carbon dioxide emissions to date.

The classification society DNV GL wants to be involved in developing even cleaner fuel alternatives and technological solutions for the shipping sector. The European Union forecasts that up to 10,700 different wind power units will have been installed on bulkers and tankers by 2030.

The International Windship Association (IWSA) divides wind-power inventions into other subcategories in addition to the Flettner rotors, such as hard and soft sails and turbine solutions. ✖

"Norsepower is an example of smart technology.

Finnlines has ordered three hybrid Ro-Ro vessels from the Jinling Shipyard in China.

Baltic Sea vessels rapidly getting cleaner

Shipping companies operating in Finland's sea areas have rapidly reacted to requirements for cleaner shipping. In the coming years, dozens of highly advanced cargo and passenger vessels will be completed for the Baltic Sea.

One good example is m/s Aurora Botnia. This ropax vessel commissioned by Wasaline will be one of the most environmentally friendly vessels in its class. The vessel's four main engines will be supplied by Wärtsilä and will be able to run on both liquefied natural gas (LNG) and biogas. The vessel will use biogas produced in Vaasa from recycled materials, and also electrical shore power whilst in port.

This new build was commissioned by Kvarken Link, which is owned by the City of Vaasa and the City of Umeå. It is scheduled for completion in spring 2021. The vessel has a passenger capacity of 800 people and a cargo capacity of 1,500 lane metres for trucks.

Its construction will employ about 800 people for a year. The project is worth approximately EUR 120 million and the vessel is being built at RMC's Rauma Shipyard.

Aurora Botnia will be the first passenger-car ferry in the world that is qualified to carry Clean Design notation. This is due to its hybrid system and electric azimuth thruster system, which is "quite unusual" in passenger-car ferries.

"RMC wants to provide its clients with cutting-edge end-to-end solutions that harness the latest technology. To this end, we have launched R&D collaboration with Aalto University," says **Jyrki Heinimaa**, President & CEO of Rauma Marine Constructions.

Viking Line trusts in clean gas

Viking Line's new LNG ferry, Viking Glory, is currently being built in Xiamen, China. The vessel will start sailing between Turku, Åland and Stockholm in 2021. It will be equipped with many technical innovations to reduce emissions and climate impacts.

Thanks to advanced, innovative technological solutions, Viking Glory will be one of the world's most climate-smart passenger ships. It is expected to use up to 10% less fuel than Viking Line's smaller vessel Viking Grace, which was previously (2013) honored with the distinction of being the world's most environmentally-friendly passenger ship.

Viking Glory will use recovered heat from its engines to both heat the vessel and generate clean electricity. Viking Line will also become the first shipping company in the world to use steam turbines manufactured by the Swedish company Climeon in the recovery of waste heat from gases produced during the combustion process.

Viking Glory will be able to carry 2,800 passengers with a crew of a couple of hundred people. It will be 222.6 metres in length with a gross tonnage of 63,800 tons. The ferry will have an ice class of 1A Super and a cargo capacity of 1,500 lane metres.

Viking Glory's sister ship – Viking Grace, which entered service in January 2013 – is the world's first LNG passenger-car ferry. Viking Grace has already been bunkered a few thousand times in the Port of Stockholm.

Tallink Mystar – built and designed in Finland

TallinkSilja has commissioned a shuttle from RMC's Rauma Shipyard to serve the Helsinki-Tallinn route. This new build will be Rauma Shipyard's second largest ship to date, with a passenger capacity of 2,800 people and a vehicle capacity of 1,900 lane metres.

Thanks to cutting-edge technology and innovations, the Tallink Mystar ferry will be both environmentally friendly and energy-efficient. It will use a dual-fuel solution with the option to use liquefied natural gas (LNG) as the second fuel. The ferry will be delivered to Tallink in early 2022.

The Deltamarin design agency will supply the basic design and production plan for the ship's hull, machinery and electrical systems. The agreement made with RMC is worth about EUR 7.5 million and the work is estimated to take 16–18 months. Deltamarin will handle design work online through its Finnish and Polish offices.

Five new ships for Finnlines

The shipping company Finnlines' ongoing half-billion euro investment programme includes three green hybrid ro-ro vessels as well as two eco-friendly Superstar ro-pax ships. The ro-ro vessels are expected to be delivered during 2021–2022 and the Superstar ro-pax vessels are set to start in traffic in 2023.

"Finnlines has invested considerably in energy efficiency and green technologies during the past years. Our significant EUR 500 million investment programme will further increase Finnlines' energy efficiency and emission reduction as well as it will provide perfect tools to respond future customer needs," says Finnlines' CFO **Tom Pippingsköld**.

The hybrid ro-ro's will be 238 metres long with a ro-ro cargo capacity of some 5,800 lane metres. The weather deck will have a container capacity of about 520 twenty-foot equivalent units. The vessels will be able to flexibly handle a variety of ro-ro cargos, e.g. some 5,800 m^2 can be dedicated for efficient carriage of cars by hoistable car decks. The lower hold and main deck have been designed for the efficient loading and unloading of paper sto-ro cargo in addition to ro-ro units. One ship will be able to transport a maximum of 17,400 tons of cargo.

"The ro-ro vessels' will be fitted with hybrid power system. The deliveries will include approximately ›

UPM is chartering seven new LNG vessels from the Dutch Spliethoff Group.

Viking Glory will use recovered heat from its engines to both heat the vessel and generate clean electricity.

5,000 kWh battery systems that will enable the vessels to operate emission-free while in port. In addition to lithium-ion batteries we will also be supplying our vessels with the other parts of a DC-Link integration package. These consists of shaft generators, a DC-switchboard and converters, energy and power management systems and an integrated automation system," says Finnlines' **Mikael Lindholm**, Head of the Newbuilding Department.

The vessels will be equipped with two-stroke energy efficient engines. "Thanks to all the smart technology these new vessels will be among the most environmentally friendly ships of their type in the Baltic Sea," he adds.

Two of the ordered three vessels are now under construction as the first vessel had its steel cutting in early summer and the second vessel in autumn. The new hybrid ro-ro vessels will be named Finneco I, Finneco II and Finneco III in honour of the green innovations.

Finnlines Superstar ro-pax vessels are especially designed for the company's Finland-Sweden traffic. The vessels will serve the Naantali-Kapellskär route with a passenger capacity of 1,100 people and a cargo capacity of 5,100 lane metres. The air lubrication system located beneath the keel creates a field of air bubbles between the vessel bottom and water to reduce friction, that is, the hull's hydrodynamic resistance. This solution reduces fuel consumption and cuts emissions. Automooring at berth will ensure faster mooring. This timesaving gives lower average speed at sea.

"Superstar ro-pax vessels will be fitted with shore connection and lithium-ion batteries. The batteries will be charged during port stay and their energy is used at sea instead of that from generators. Emissions will be reduced respectively. The shore connection will also make port calls practically emission-free," says Mikael Lindholm.

"These new vessels will modernize our fleet further and thereby reduce the environmental impact and emissions," Tom Pippingsköld adds.

UPM's logistics slot into place

Forestry company UPM is streamlining its logistics chain and time chartering seven new LNG vessels from the Dutch Spliethoff Group. Of the seven ships being built in China, three are bound for the Finnish shipping company Bore and four for the Dutch shipping company Wijnne Barends. As the shipper, UPM has been involved in designing the vessels from the outset.

Lauri Rikala, UPM Logistics' Director of Global Break Bulk Shipping, says that the Spliethoff agreement will safeguard sustainable, competitive and reliable shipping solutions for forestry sector businesses and customers for a long time into the future.

All seven new builds will be fuelled by cleaner liquefied natural gas (LNG). The vessels will enter service in 2021–2022.

"The use of LNG will reduce carbon-dioxide emissions by a fourth compared to other maritime fuels. Nitrogen oxides will fall by 85 per cent and sulphur oxides to almost zero. Particulate emissions will also be lowered to around zero," says Rikala, assessing the impact of the sustainable fuel solutions.

"The Port of Rauma in Finland remains by far the largest gateway for UPM's exports. Next is the Port of HaminaKotka, with Pietarsaari coming in third," says Rikala, describing the arrangements at the head of UPM's logistics chain.

Superstar ropax vessels run on traditional fuels and use scrubbers and lithium batteries.

Neste to replace two aframax tankers

The energy company Neste Oyj has ordered two aframax vessels from South Korea as new builds. However, the purchase of the vessels for approximately 140 million dollars does not signal that Neste intends to return to the tanker business. According to **Ilkka Iittiläinen** (Vice President, Logistics), these are replacement investments for the aging m/t Mastera and m/t Stena Arctica.

Neste's new aframax tankers are currently being built by the South Korean shipyard HHI (Hyundai Heavy Industries). They will be 250 metres long with an ice class of 1A and a deadweight tonnage of 112,000 tons. Once completed in 2021, they will handle Finland's crude old deliveries from Primorsky Krai and Ust-Luga to Neste's refineries.

As is the fashion, Neste has also considered a variety of fuels to power its new ships. According to Iittiläinen, the new aframax's engines can be converted to run on LNG if the situation demands.

"When considering engine and fuel alternatives, we focused on energy efficiency, while taking into account the fact that tankers often operate on short routes in the Gulf of Finland, which makes loading and unloading times significant," says Iittiläinen.

Neste Oyj reorganised its shipping business in 2013–2014. In conjunction with this restructuring, most of its vessels were sold to a company owned by the Finnish National Emergency Supply Agency and the insurance company Ilmarinen. After the transaction, Neste time chartered vessels for its own use.

"We currently have about a dozen vessels, including tugboats," says Iittiläinen, ending his short history of the former Neste Shipping, which was once Finland's largest shipping company in terms of tonnage. ✖

Support and promotion for Finnish Shipping Industry

The Shipowners' Foundation in Finland was established in 2008. The Foundation aims to support research, education, and communication in the Finnish shipping industry as well as to promote activities related to the shipping industry. The Foundation awards grants and provides funding in order to fulfil its purpose.

The primary purpose of the Foundation is to work for the benefit of the Finnish shipping business by promoting social activities related to shipping and by awarding grants. The Foundation also strives to participate in research, education, and communication within the shipping industry.

In order to accomplish its purpose the Shipowners' Foundation in Finland awards grants several times a year in accordance with the rules of the Foundation. Applicants may submit their grant applications on a continuous basis.

For more information, visit varustamosaatio.fi

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The Foundation also strives to participate in research, education, and communication within the shipping industry.

Meriaura Group

- No. of employees: 200
- Fleet: 20 vessels + 7 under VG-Shipping's management
- Turn over 65milj.s

The EcoCoaster vessels Eeva VG and Mirva VG are regurlarly using bio oil.

Meriaura – pioneer of sustainable shipping

Meriaura is family owned Turku-based shipping company that offers a variety of services in marine transportation. Meriaura is the first sea carrier that can offer a carbon neutral sea transport contract for its customers.

The company operates mainly on two segments; industrial bulk and demanding project cargos, the principal trading area being Northern Europe. What sets Meriaura apart from other players in the shipping industry, is that the company has been investing in carbon neutral future solutions already more than a decade before other shipping companies. The company is regularly using biofuel on it's vessels and also produces the waste-based biofuel inside the group.

The story of biofuel powered vessels in Meriaura fleet dates back to 1992 when the first trial with biodiesel was carried out with tug boat 'Aura'. After a long break the next step was taken in 2010 when designing of the biofuel powered deck cargo carrier, "Meri" started. Meri was the improved version of sister vessel 'Aura', that was a new invention to replace tug and barge tandems in project cargo sea transports.

"For us it was already ten years ago clear that a newbuilding could no longer lean only on fossil fuels," says **Ville Koskinen**, Managing Director of VG-Shipping, the Shipowning and management company in Meriaura Group. The EcoCoaster dry cargo carriers Eeva VG and Mirva VG built in 2016 were improved versions of 'Meri', in terms of using the bio oil.

"We are continously developing the product, 'VG Marine EcoFuel', and also the technique in the vessels," Koskinen continues.

Based on the biofuel powered EcoCoaster vessels, Meriaura introduced last year a new sea transport concept, Meriaura EcoVoy. When using waste-based biofuel, transports' lifecycle emissions are 92–96% lower than with fossil fuels. The biofuel that Meriaura uses, is also produced within the group. The commodities of VG Marine EcoFuel are completely derived from recycled materials and side streams, sourced in the Nordic Region. Used cooking oils collected from restaurants are one main source of raw material.

The EcoVoy has convinced Meriaura that even the traditional shipping industry is slowly changing.

”Since the EcoCoasters came to the market we have regurlarly asked our customers would they be interested in a low emission transport. Last year we finally got the first green light from a customer that was willing to pay a small premium for the carbon neutrality,” tells **Beppe Rosin**, Managing Director of Meriaura. So far Meriaura has made a few EcoVoy contracts, but the interest for the new type of contract has been surprisingly extensive.

In order to achieve a remarkably lower total consumption, Meriaura’s EcoCoaster vessels were built with lower main engine power with a possibility to add electrically more power to meet the ice restrictions in northern waters during ice period, and then again to do the passage on open water with lower engine power. Koskinen questions the need of high ice classed, high engine power vessels in the future; ”As we have seen, the climate has already changed here in the North. Winter on the southern parts of Baltic Sea doesn’t mean anymore heavy ice and calm frosty days like before. Do we really need vessels of high engine power that continuously use more fuel the year around, if we might have a few weeks of a bit harder ice conditions? Good icebreaking capacity is what we need,” Koskinen adds.

Like the past winter has shown, there’s more rain and storms. This is a new challenge for the loading operations as well. Rain stops and longer port times cost money for the shipping companies.

”It seems that all the regulation is directed to the ships, which in some cases is not the most efficient solution for the environment as many things could be improved in a more efficient way ashore. A good example are the washing waters of holds, that are strictly regulated, but no one seems to care how much of the same product ends up to the seas from ports and loading operations. The chain should be viewed as a whole,” Koskinen continues.

Besides the EcoVoy concept VG-Shipping launched a zero waste-project in 2019 also on the older fleet. The purpose is to decrase the amount of all waste generated onboard, and stop all emissions to sea. Still today all ports are not capable to receive for example waste waters and sewage from ships like the no special fee-system requires, so they are released into the sea. This is very harmful for especially the Baltic Sea that is overloaded with nutrients.

”Thanks to our hard work within the zero-waste project, the lack of reception capacity has raised discussion, and that has already lead to improved waste reception facilities in some ports. We still need change in terms of attitudes and old established practices. We hope that other shipping companies can follow our example,” says Koskinen. The zero waste-project will go through every aspect onboard, also the meals will be guided towards more sustainable and climate friendly options.

The enthusiasm behind the environmentalism and the company’s values is the main owner, **Jussi Mälkiä** and his ideas. A family company has better possibilities to invest: ”We can look further than the outcome in the next quarterly report. We think all companies should look more into the report to be given after 10 years, or the one they will need to give for their children and future generations. The world is changing, and the companies who cannot keep up with the pace, will not survive,” says Koskinen.

It is usually thought in schools that the main purpose of a company is to make profit for the shareholders. ”I guess we make an exception, as our mission and main purpose is to develop the shipping industry to a more environmentally sustainable direction. Our next step will be 100% carbon neutral solution,” Rosin reveals. ✖

The Managing Directors, Beppe Rosin and Ville Koskinen are in charge of Meriaura Group.

Expert in Arctic conditions

Arctia provide icebreaking and specialised multipurpose vessel services in polar areas.

Arctia's icebreakers open shipping lanes every winter

The 100% Finnish state-owned shipping company Arctia Oy safeguards year-round maritime transport in Finland in all conditions. Arctia's President and CEO **Maunu Visuri** says that, while global warming is a fact, icebreakers will still be required for many years to come. "The record-breaking warm ice winter of 2019–2020 is behind us. Only three out of eight Arctia's ice-breakers were in operation. In the big picture these kind of extra-warm winters will save money for the taxpayers, as less ice-breaking assistance is needed. However, for the time being the consensus on the amount of icebreakers needed remains the same, even as we most likely face more milder winters in future," Visuri says.

He also notes that the real challenges of the winter sometimes only become apparent in late spring. This happened a few years ago, when the mild early winter turned extremely harsh and all Finnish icebreakers were required towards the end of the season. "Demand for icebreakers also varies locally. For example, as pack ice or thick slush belts block traffic to various ports in different ways," says Visuri.

Icebreaker fleet considerations

"The starting point is always to note the fact, that Finland is the only country in the world of which all harbours may freeze during winter. In this respect Finland is a true island. This is emphasized further especially looking at the important industry ports in the Bay of Bothnia. These far north ports must be kept open to serve local industry," says Visuri.

Visuri says that five key factors influence the future need of icebreakers. These are (1) operational requirements, i.e. the future characteristics of cargo ships, (2) global warming, (3) economic life of current ice-breakers, (4) potential larger co-operation models e.g. between Finland and Sweden and (5) regulatory changes especially in respect of the environment.

Out of the operational requirements there are two major issues. First one is that ships in the Baltic Sea are growing in size and, in particular, in width. More ships of approximately 34 metres wide will be coming to the Baltic Sea. Most of Arctia's current icebreakers are about 24 metres wide. This means that, in difficult ice conditions, although some icebreakers are able to create broad ice-channels by adjusting prop wash, some cargo ships will need to be assisted by two icebreakers. The second point relates to the IMO's emission regulations and the subsequent reduction in vessels' engine power. In time, this will be reflected in an increasing number of EEDI ships, which are less capable of sailing in ice and there will be a greater need for an icebreaker assistance.

Assisted by Arctia's icebreakers, merchant vessels can sail safely and reliably, regardless of the ice conditions.

Global warming will reduce ice in the Baltic Sea over the long term. The Finnish Meteorological Institute has done a great deal of research on this topic. Climate change may also lead to a situation, in which vessels in the Bay of Bothnia will find it more difficult to operate in the pack ice of a mild winter, than in the more stable conditions afforded by fast ice. I.e, sometimes milder winter means more challenging conditions.

Out of the last three points it is worthwhile to point out that both Finland and Sweden will still need icebreakers. Both countries' fleets are getting older every year and both face similar challenges. This is also why Finnish and Swedish maritime authorities have agreed to design the next generation of icebreakers together. Maunu Visuri says that this is a good and worthwhile objective. Co-operation has been good and we expect to see the preliminary plans for the new icebreaker designs in the early 2021.

Arctia is very environmentally responsible corporation. Today Arctia operates worlds first LNG-powered ice-breaker Polaris, which was completed in 2016. Arctia has had excellent experiences operating the vessel by LNG.

Offshore business waiting for better days

Arctia's icebreaking armada consists of eight heavy icebreakers and one port icebreaker. In the summertime, two multipurpose icebreakers – the 90s vessels Fennica and Nordica – have been time chartered to undertake offshore work in foreign seas. Last year, Arctia ended its offshore services for the time being. "The good sources of income generated by these vessels dried up in 2016. There's currently little or no demand in the offshore sector, which would suit our vessels. That's why we've put this part of the business on ice. If things improve over time, we'll be more than happy to ramp up our offshore business again," says Visuri.

The new Arctia

In late 2018 another Finnish government owned company, Meritaito Oy, become Arctia's 100% owned subsidy. Today, in addition to the ice-breaking services, Arctia provides fairway maintenance and hydrografic surveys in its service portfolio. Last year, Arctia's new consolidated net sales totalled to apprimately EUR 80 million, of which icebreaking accounted for approximately EUR 45 million. The company employs about 500 people. ✖

Finland and Sweden to design icebreakers together

The Finnish Transport Infrastructure Agency and Swedish Maritime Administration have agreed to design the next generation of icebreakers as a joint acquisition. The agreement that was signed in March only includes design, as no decision has yet been made on construction. The agreement covers two icebreakers for Finland and three for Sweden.

The size of commercial vessels sailing between Finland and Sweden is growing all the time. At the same time, tighter environmental requirements are reducing vessels' engine power. Together, these factors weaken a vessel's ability to move through ice.

"We need to enhance our current fleet of icebreakers in order to safeguard winter shipping. This new agreement with Sweden is a continuation to many years of excellent cooperation within the icebreaker community," says **Kari Wihlman**, Director-General of the Finnish Transport Infrastructure Agency.

Close cooperation between agencies is based on intergovernmental agreements. Back in the 1970s, the two countries engaged in similar collaboration on the acquisition of the Urho/Atle class of vessels. Sweden's icebreakers are already nearing the end of their useful lives.

"We've now taken the first step towards the next generation of icebreakers. Ninety per cent of Swedish products are transported by sea, and northern ports would be closed for 130 days per year without effective icebreaking," says **Katarina Norén**, Director-General of the Swedish Maritime Administration.

In Finland, the Finnish Transport Infrastructure Agency is responsible for official and client-related tasks to assist winter shipping, and also for national coordination, development and steering. The Agency has signed icebreaking service agreements with Arctia Icebreaking Oy, Alfons Håkans Oy, and other private tug companies.

Finland is recognised for its extensive icebreaker expertise. Finnish design agencies and shipyards are therefore already waiting for the next stage in the two countries' joint icebreaker project.

Finnish Transport and Communications Agency Traficom.

5G is coming – ports are going digital

The digitisation of Finnish ports is progressing bit by bit. The benefits of going digital include safety, situational data, emission reductions and smoother running operations in general. 5G technology will now be running hand-in-hand with digitalisation. TEXT **TERO ELSILÄ**

Projects supported by the Finnish Transport and Communications Agency Traficom's 5G Momentum ecosystem are studying how 5G technology and wireless can promote digitalisation and automation in a variety of sectors, such as industry, ports and transport. The projects are seeking genuine improvements to existing practices and ways to enable new operating and business models. These include logistics, safety and transport connections. Extreme examples would be autonomous buses or smart lanes at ports.

"5G boosts three features. Enhanced mobile broadband enables the quick transfer of large amounts of data, such as video materials. Low-latency and greater reliability enable robots or autonomous buses. The Internet of Things (IoT) enables a massive amount of sensors for data collection. In the future, it will be possible to slice the capacity of a 5G network. A specific slice could specialise in the use of IoT devices, while another could serve automation requiring low-latency," says **Heidi Himmanen** from the Finnish Transport and Communications Agency Traficom.

"A large number of sensors can be connected to the network for data collection. Data is food for artificial intelligence, which can use it for functions such as video identification or determining maintenance requirements. Sensor batteries can last for up to ten years.

5G brings not only increased speed but also lower latency. This would, for example, enable the remote control of harbour cranes," says Himmanen.

Himmanen says that, although we cannot yet know the exact characteristics of the 5G networks and the progress they will bring, tests are already giving us a good idea.

"We're now having the first user equipment that support the first version of 5G on the market. Many trials are using prototype devices whose features can be adapted during testing. Although

enhanced 5G broadband is already entering the consumer market, many features for automation and robotisation are still at the standardisation stage. But in a few years' time, we will come a long way."

Port projects

One example of partial automation is automooring, that is, mooring vessels without the need for onshore personnel. The Port of Rauma's smart lanes provide data about climatic conditions.

About a year ago, the Port of Hanko launched UnitSpotter – "a dating service for transport" – which seeks to match cargo with free transport units. The freight forwarding agent uses a browser-based service to enter details about the cargo, such as what type of transport unit is required and when. Alternatively, the transport company may announce what kind of transport units are currently free. This reduces empty runs, which in turn improves cost-effectiveness, reduces coordinators' workloads, and helps the environment.

The service is free and open to all registered users operating in the sector. Development work is continuously being carried out – for example, map views and scheduling make the service more user friendly.

In the Port of Oulu a project called 5G-Viima is developing situational awareness and camera apps with funding from Business Finland. The Port of Turku is currently working on an EU-funded project called SecurePax, which is seeking increased control and safety in passenger traffic. This project aims to develop methods to better identify passengers and ensure that prohibited goods and items are not brought onboard. Passenger ports in both Turku and Stockholm will be piloting security and ICT solutions. A report on this will be published in the summer.

More time is spent at larger ports. The Port of Hamburg has tested 5G networks that harness IoT and Industry 4.0 applications. The port authority's vessels are equipped with sensors that collect data about a ship's movements at the port. A second pilot boosted the efficiency of traffic control from a remote monitoring centre. In a third pilot, 3D data on port structures was sent to an augmented reality app, enabling viewers to use smart goggles to explore new buildings planned for the port.

Concrete ideas for the Port of HaminaKotka in a year's time

The 5G Finlog – 5G Future Innovation Platform for Logistics -project, which is funded by the Structural Fund of Southern Finland, is exploring opportunities to harness 5G in the HaminaKotka port areas of Mussalo. Mussalo is an industrial and port zone that contains industrial manufacturing, warehouses and an extensive port. The project is setting up a research and innovation platform based on 5G technology and building a 5G Test Network to execute different 5G related technology pilot use-cases.

"Our project is finally taking shape as the structure and specifications for the 5G Test Network are finished. Next we´ll build the network and implement testing at the site. The actual 5G pilots will be launched on the first quarter of 2021," says Project Manager **Jonne Holmén** from South-Eastern Finland University of Applied Sciences.

The test environment will be established in a diverse environment. Up to a million sensors can be placed in an area of one square metre. The port's entire infrastructure will be controllable via the sensor network.

In a physical business environment that requires the transportation of dangerous and valuable products, sensoring and optimisation could have a favourable impact on logistics processes. Turnaround times for trucks and ships will be shortened, and the port's cargo handling systems can be made as efficient as possible.

"In a 5G environment, cloud and edge computing will enable two-way data transfer in the machine environment. 3G and 4G are good, but 5G is necessary for IoT applications and will also enable the use of sensor technology," says Ulmanen.

What would be a concrete idea at this stage?

"Our aim at this point is to test high capacity camera uplink application and NB-IoT road surface measurement sensors. In addition we've been brainstorming whether artificial intelligence could boost the efficiency of port production, or whether port air quality could be controlled with the aid of emission measurements, or if drone technology could be combined with thermal cameras whose HD images could be sent to security stations. These discussions are trying to determine what is sensible and appropriate, and to what extent. How far is it worth taking automation and digitalisation?" wonders Holmén. ✖

Our vision is to be the world's most functional port

Helsinki has been Europe's busiest international passenger port for several years, but the covid-19 pandemic and travelling restrictions have quieted down the lively passenger traffic. Many precautions against the pandemic have taken place and the industry is developing safe and sound measures to keep the economic engines working.

Cruise industry has a strong belief in future

The pandemic situation impacted on international cruise traffic particularly strongly – the whole season 2020 was cancelled in Helsinki. Helsinki has a good number of bookings for the season 2021 as cruise lines have a strong belief in future, as well as safe and responsible travelling.

On April 2019, the Port of Helsinki opened its newest LHD quay to serve cruise ships in Hernesaari.

The Port of Helsinki organises waste management for international cruise ships in Helsinki. Every quay has a wastewater reception system through which wastewater is channelled to Helsinki Region Environmental Services Authority (HSY) for treatment. Since 2016 the Port has granted a 20 per cent discount on vessel waste fees for those vessels that leave their wastewater at the port. Otherwise Port of Helsinki has applied a "no special fee"-system for waste waters.

Important crossborder logistics

The Port of Helsinki is the most important first stop port for food and other daily consumer goods in Finland, and its role in ensuring international cargo traffic and Finland's security of supply is significant.

Cargo traffic at the Port has been successfully maintained, although the total amount of cargo has in 2020 decreased to a level of roughly 10% lower than previous year. The figures follow quite nearly to those of the national GDP.

On with the spearhead projects

"Our vision is to be the most functional port in the world. Despite the covid-19 we've been systematically putting our strategic priority spearhead projects into practice in collaboration with our partners, in both passenger and cargo transport," says **Ville Haapasaari**, CEO of the Port of Helsinki.

"Alongside developing port infrastructure, we're strongly focusing on expanding our service business."

5G services for passengers

The Port of Helsinki and Elisa have made 5G technologies available to ship passengers in Helsinki's West Harbour. A commercial 5G network was introduced autumn 2019 inside West Terminal 2 and the harbour's outdoor areas. A suitable model for indoor 5G coverage is also being sought for other Helsinki passenger terminals.

"We're currently seeking to improve passengers' mobile connections at terminals in particular. This is a significant opening for us in bringing 5G technology to more of the Port's terminals," says Haapasaari.

Carbon Neutral Port 2035

Port of Helsinki has set up a programme to become a carbon neutral port. The Carbon Neutral Port 2035 programme's key targets are: the Port of Helsinki's own operations will be carbon neutral by 2035, emissions from road transport will be reduced by 60 per cent (compared to 2015), and emissions from vessel traffic will be reduced by 25 per cent, that is, almost 20,000 tons of carbon dioxide (compared to 2015).

To meet these challenges, port of Helsinki has built a new shore power station in South Harbour. New ones are already on the planning table for cruise vessels. Also the use of solar panels is extended. The port is participating many co-operation programmes to meet the needs of the industry.

The Port of Helsinki's ERP meets ISO 9001, ISO 14001 and ISO 45001 standards.

"We have a duty to operate responsibly. We want to succeed over the long term, which means that instead of focusing on baseline performance, we need to be pioneers in sustainable development. At the same time, we're encouraging all operators to help us significantly reduce emissions at the port," says Haapasaari.

The company has had to postpone some of the investments to the coming years.

"However, we have still been able to move forward with the most important investments as planned, including the deepening of the Vuosaari fairway and sustainable development projects, says Haapasaari."

The Port of Helsinki affects the entire country

The Port of Helsinki has major positive impacts on both the region's economy and employment in the capital city and its surrounding areas. Functions related to the traffic passing through the port directly employ 9,400 people, with that figure rising to 18,100 when the multiplier impact is taken into account. The Port is a major generator of municipal taxes in the Helsinki region, roughly estimated at about EUR 112.3 million.

When you add the financial impact of the business travelling through the port to the financial impact of the port's other operations, you get a total financial impact of EUR 4.1 billion and 25,100 person-years.

In addition to its local impacts, the effects of cargo and passenger traffic passing through the Port of Helsinki extend to the entire country, as the Port of Helsinki is Finland's largest port for general cargo and passenger transport.

In terms of tonnage, Helsinki accounts for about half of all the general cargo passing through Finland's ports. Helsinki likewise accounts for about 50 per cent of the tonnage of all truck and articulated trailer transport. 32 per cent of container traffic passes through the Port of Helsinki (calculated in terms of TEUs).

An estimated 40–50 per cent of the total value of Finland's sea transport passes through Helsinki, which translates to about EUR 43–54 billion. ✖

Rauanheimo focuses on the port of HaminaKotka

Rauanheimo and Port of HaminaKotka Ltd have signed an agreement on the investments for the expansion of the Mussalo Bulk Terminal.

In addition to the current infrastructure, Rauanheimo will invest in a new rail waggon unloading terminal and in tracks serving the terminal, to be built in co-operation with Port of HaminaKotka Ltd. Rauanheimo uses the investments to strengthen the leading position of the Mussalo terminal in the handling of dry bulk products that require indoor storage.

By the summer, Rauanheimo will have invested more than 17 million euros in the warehouses and equipment at Mussalo. This includes conveyor, crane and wheel loader equipment plus a bulk warehouse of 30,000 m^2. The M-1, M-3, M-4 and M-5 warehouses have been divided into separate departments, which enables the simultaneous storage of more than 100,000 tonnes of various types of products.

Rauanheimo plans to elevate the annual capacity of the Mussalo Bulk Terminal in steps from the present over 1 million tonnes to 3 million tonnes. To achieve this, the new unloading station with its tracks hold a key role.

Rauanheimo serves as the operator in warehouses M-6 and M-5, too. The operations cover all the services needed by a customer, from rail waggon unloading to the loading of ships.

Rauanheimo continues to focus its resources heavily on the upgrading of the operations to become even more effective and environmentally friendly.

”The co-operation with the management of Port of HaminaKotka Ltd and the planning of the investments with the Technical Department of the Port has been fluent, which is of utmost importance in achieving our shared goal of attracting additional transport volumes,” says **Joakim Laxåback**, Managing Director of Rauanheimo.

”Rauanheimo is a dynamic port operator which operates comprehensively in various parts of Finland. Port of HaminaKotka Ltd has had the pleasure of conducting constructive and developing co-operation with Rauanheimo for several years in both Hamina and Kotka. The leap now taken will bring bulk transport at the Port of HaminaKotka to a whole new level,” says **Kimmo Naski**, CEO of Port of HaminaKotka Ltd.

Rauanheimo is a leading port operator and the biggest operator in transit transport in Finland.

In addition to Russian transit customers, the company’s clientele includes the biggest players in the mining, wood processing and metal industries in Finland.

Rauanheimo operates at 7 ports and is the biggest dry bulk operator in Finland. ✖

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Rauanheimo operates at 7 ports and is the biggest dry bulk operator in Finland.

Port of Turku heads into the future *despite the exceptional times*

The Port of Turku looks confidently to the horizon and invests in the future. Economical, environmentally sound and modern solutions are implemented to improve the safety, smooth flow and attractiveness of passenger traffic and cargo transports.

TEKSTI HELI KAIJANSALO/TURUN SATAMA **KUVA** JARMO PIIRONEN

The new joint terminal for passenger traffic is due for completion in 2026. The investment decision on the project was delayed, but the work for promoting the project has proceeded as per normal. The goals are to provide a better passenger experience, and develop solutions that decrease the environmental impacts and improve safety. Enhanced digital services allow for making the port operations environmentally friendlier, reducing the carbon dioxide emissions throughout the transport chain, improving occupational safety, and increasing the safety of passengers.

The digitalisation of the port services proceeds hand in hand with the joint passenger terminal. For example the SecurePax co-operation project aims at development of telecommunications and security. The project will be piloting methods by which passengers are identified and registered digitally, and dangerous goods are detected in the passenger area or the passenger terminal. That will allow for exchange of information with the authorities and prevent the access of unwelcome passengers and goods to ships.

In cargo services, locating technologies that serve the entire logistics chain are being developed. The truck drivers receive information on the location of the cargo to their devices, and at the gate of the port the vehicle register plate is scanned to check automatically the access pass, booking details of the cargo and the vehicle dimensions for charging, and the truck is then forwarded to wait for loading. That saves time and streamlines the logistics.

The automooring system of ships will be introduced in 2021, which will speed up the mooring and unmooring of ships. Furthermore, fuel will be saved, the emissions will be reduced, and occupational safety will improve. The joint terminal will also involve an automatic traffic control system.

”Cruise liner traffic will recover once the pandemic has been defeated. In cargo transports, we believe strongly in unit cargo and project shipments. We are experts in those and want to focus on and invest in them in the future, too. We are ready to invest in the development of the logistics and services in the port area. Let’s look together to the future and believe in our goals, despite the difficult situation”, says **Erik Söderholm**, Managing Director of Port of Turku Ltd. ✖

One of Port of Pori´s areas of expertise is handling project cargoes – including high and heavy pieces.

Port of Pori – the green port of Bothnia

Port of Pori Ltd provides land rental, ship, crane and conveyor services. The Port of Pori consist of three harbors: Mäntyluoto, Tahkoluoto oil and chemical harbor and Tahkoluoto deep harbor. The depth of the Tahkoluoto fairway is 15,3 meters, making it Finland's deepest harbor. All harbor areas can be safely approached via short and direct fairways by land and sea.

We are making major investments in safety and environmental friendliness of the harbor. For example, we have lowered the charges for vessels running on alternative fuels. The most recent investment was a transition to LED lighting. All our outdoor lighting in harbor is being replaced with new LED lights.

We are also investing to new storage areas and new berths with 12 m draft in Mäntyluoto harbor. At the same time, we are investing to new closed conveyor systems, which will allow us to handle bulk cargos more effectively and environmentally friendly. Our further plan is also to invest into a new oil pier in Tahkoluoto harbor. This will also improve the safety and efficiency of our liquid bulk operations. Everything is done by focusing to sustainable development and environmental friendliness.

We also have good overland connection to Russia. We are handling remarkable volumes of Russian transit bulk already now and prospects of growth in this traffic are significant. The railway tracks are completely electrified already all the way from Russian border to Mäntyluoto harbor and Tahkoluoto will be included by end of this year. Electrified rails enable our customers to transport their cargo to our port with less CO2 emissions but also more cost-effective way.

One of our areas of expertise is handling project cargoes – including high and heavy pieces. We have plenty of space and expertise for demanding project cargo warehousing and handling. Port of Pori has the strongest harbor cranes in Finland. We can offer most diverse range of lifting services, all the way up to 280-ton hoists. ✖

Finland is very dependent on the maritime logistics. During the COVID pandemic the role of the foreign service providers, like agents and container shipping companies, has grown. Year 2020 appr. 80% of the cargo flow and the port calls in Finland were made on foreign vessels.

From Kämp to corona – *100 years of maritime logistics*

The Finnish Shipbrokers Association, currently Shipbrokers Finland, turns 100 this year. Like the title of pilot, shipbroker is one of the oldest professional titles in Finland. But what exactly does a shipbroker do?

When the history of navigation began, in the era of sailing ships, shipowners also served as the shipmasters, who were responsible for procuring cargo, sailing the ship to its port of destination and handling all ship-related matters at the port. The shipmaster also oversaw the entire trade interaction from the selling of the cargo in the port of destination to the procuring of new cargo for the next leg of the journey.

Secured by Decree

During the 18th century, while Finland was under Swedish rule, specific decrees were issued regarding the operations of the shipbrokers. It was stated then that official shipbrokers would broker contracts concerning the sale and purchase of ships, insurance, marine loans, chartering and freight. Shipbrokers were entitled to receive a brokerage paid for their services. Only licensed shipbrokers were permitted to carry out ship clearance processes. The shipbrokers were licensed by the magistrate, but the applications were submitted directly to the burghers and shipowners engaged in trade. The tasks of the shipbrokers included the acquisition of clearance documents, passports, guidance for visiting skippers and matters related to loading and unloading.

Steamships and shipbrokers

When steam power was taken into use in the 19th century, it enabled traffic to be faster and more regular, thereby creating the need for shipowners to contract with co-operative partners in ports. This resulted in a network of agents that assumed certain port routines that earlier were the responsibility of the shipmaster. In 1863, during Finland's period under Russian rule, new decrees were issued concerning shipbrokerage and ship clearance. According to the decrees, the shipbrokers took care of the documentation, bills of exchange and agreements related to the acquisition and sale of goods and ships as well as charter and clearance documentation. The title of shipbroker (laivameklari in Finnish) became established in the 19th century and the work included all the same aspects it does today.

"I'm off to Kämp again"

So said Jean Sibelius to his wife, Aino, when she criticised the composer's long evenings out in the town. Hotel Kämp was a popular gentlemen's hang-out at the beginning of the last century. Many shipbrokers also spent time there prior to it becoming the

official meeting place for their own association starting on 18 March 1920. Three of the companies currently operating in the industry, namely Herman Andersson, John Dahlberg and Victor Ek were present for the founding meeting of the Finnish Shipbrokers Association (Suomen Laivameklari Yhdistys).

When the association was founded, all port operations were carried out by hand. The port operations were handled in their entirety, albeit on a smaller scale; the ships, stores, ports and quays were all much smaller than they are today. The companies in the industry were generally family businesses and the common language was Swedish. Everyone in the industry knew one another and personal relationships facilitated the work and co-operation. Some of this tradition still remains an integral part of the company activities within the industry.

Aspects of influence

General tariffs, fairway fees, co-operation with customs and pilotage. For nearly 100 years, these tasks have been on the agenda of the shipbrokers' association. Only the matter of tariffs has actually been completely finalised. They have not been permitted since Finland joined the EU in 1995.

Instead, the EU brought with it a lot of new reporting obligations. To meet these obligations, Finland worked together with different parties to build the Portnet system. Now, we are in a situation in which the EU is optimising a method of harmonised reporting through the EMSW regulation. Thus, shipbrokers are once again working with the authorities to build a new reporting system!

Despite the resistance expressed by the business sector, fairway fees have remained a feature of Finnish navigation. Due to the corona situation, we may be able to forgo these for at least the year 2020. Shipbrokers are following the development of remote pilotage with great interest.

From the start, the basic idea behind the activities of the shipbroker or modern-day agent has been to provide as convenient and prompt a service as possible for customers looking to transport products from sellers to purchasers by sea. The conditions surrounding that idea have changed throughout the years of operation, but the basic idea and objective have not.

International dimension

Finland is a founding member of the Federation of National Shipbrokers and Agents (FONASBA), founded in 1969. The organisation, which has been in operation for more than 50 years, has members from more than 60 countries and serves as a vital actor within the global maritime sector.

Gunnar J. Heinonen, who has served as head of Transfennica, Finnlines and Finncarriers, has had an active role in the Federation's activities within Finland and abroad. 'The differences between members serve as both an asset and a challenge. Our task is to drive the interests of all the members. Training, networks and common game rules are key factors. It is extremely important to actively communicate about activities and achievements. To this end, the Federation is currently doing an excellent job."

We are part of the Finnish Maritime Cluster

The 100th anniversary meeting of Shipbrokers Finland was held in Hotel Kämp in Helsinki on 6 February 2020. **Tomi Rautio** (Saimaa Terminals-Steveco) was appointed as the new Chairman of the Board. 'Our association provides its members with a great opportunity to play a role in the future of Finnish sea transports. Our industry is currently undergoing the largest change in decades and we need to be an active part of that process We provide vital information for the maritime cluster and the significance of our role will only increase as technologies develop," states Tomi Rautio. ✖

TEXT SARI TURKKILA
GENERAL MANAGER, SHIPBROKERS FINLAND

The Annual Meeting 2020 of Shipbrokers Finland was arranged in the hotel Kämp Helsinki, the same place where the Association was founded 100 years ago. The purpose is still the same – the association provides its members a great opportunity to play a role in the future of Finnish sea transports.

Shipbrokers Finland

• 40 member companies: Ship Agents and Port Operators, Chartering Brokers, Liner Agents and Container Shipping

• Finland-based companies that serve as contracting partners for international shipping companies or Finnish subsidiaries of international shipping companies

• members operate in all ports in Finland from the Bothnian Sea to the Saimaa Lake region.

• members manage transportation assignments for Finnish exporters within the Baltic Sea region, and further to ports in the USA and Asia.

• Read more: shipbrokers.fi

Hamina-class missile boat PGG Tornio.

Commander of the Finnish Navy Jori Harju:

The Baltic Sea's strategic significance has increased

Security in the Baltic Sea region has deteriorated in recent years. More operators have entered the region, making it even more important to safeguard Finland's sea lines of communication. The Finnish Navy is responding to these challenges with new acquisitions and closer cooperation with Sweden.

Rear Admiral **Jori Harju**, Commander of the Finnish Navy, points out the ever-increasing military and economic activities that are impacting security in the Baltic Sea.

"Shipping is vital to Finland, as it cannot be replaced by other modes of transport. Without functional sea transport, our welfare and social order would quickly fall under threat. That is why all Finns need to work together to ensure security of supply," he says.

The sea itself has, of course, remained the same. Yet there are currently many new operators in the Baltic Sea who are following the security situation in Northern Europe extremely closely.

"The Baltic Sea has always been a strategic region for Russia, and it is also becoming increasingly important for NATO. By new countries and operators, I mean not only military but also commercial projects that have increased various parties' economic interests in the area," says Harju.

Many cables and gas pipelines have been laid in the Baltic Sea. Traffic volumes are rising, windfarms have been built, and even tunnel connections are being planned. With all these changes going on, the authorities have more than enough supervisory tasks to attend to.

The Finnish Navy's main tasks remain unchanged under these new circumstances: safeguarding territorial integrity, crisis management, rapid response preparedness, inter-authority cooperation, and security of supply.

Procurement looking shipshape

Squadron 2020 – the Navy's largest acquisition of vessels and weapon systems in a long time – is progressing on schedule. Agreements worth approximately EUR 1.3 billion were signed with several parties in autumn 2019.

"Construction of the first Pohjanmaa-class vessel will begin at RMC's shipyard in 2022, with the entire series entering service in 2028," says the Rear Admiral.

Until then, the Finnish Defence Forces Logistics Command will continue designing the vessels and the Rauma Marine Construction shipyard will

Commander of the Finnish Navy Jori Harju.

”The vessels will safeguard Finland’s aforementioned vital sea connections.

prepare to start construction. Other major partners include the propulsion system suppliers Aker Arctic Technology Oy and the Swedish company Saab.

“Thanks to the Pohjanmaa-class vessels, Finland will have four modern multipurpose corvettes that can operate in all conditions – something that no one else has. This is a strategic Finnish acquisition aimed at safeguarding everyone’s security,” says Rear Admiral Harju.

The corvettes will have an estimated lifespan of 30–35 years, and during this time the vessels will safeguard Finland’s aforementioned vital sea lines of communication. In addition to new vessels, the Navy has also begun to acquire battle systems. The Navy’s main partner in this, Saab, has already supplied Finland with torpedoes. The Navy has also been acquiring Gabriel anti-ship missiles from Israel, ESSM surface-to-air missiles from the USA, and new kinds of naval mines.

The torpedoes will be installed not only in the Pohjanmaa-class corvettes, but also in the Hamina-class fast attack crafts that are currently being refitted. These brand-new, fast torpedoes are excellent for both anti-submarine warfare and in coastal defence.

“Both our missile and torpedo acquisitions have progressed according to schedule. We have already had the first test firings of the torpedo system and we are very satisfied with the outcome,” says Harju.

Closer cooperation with Sweden

As the Rear Admiral has previously said, no country in the modern world can succeed by turning in on itself. Cooperation is vital, but military collaboration is different to allying with another country.

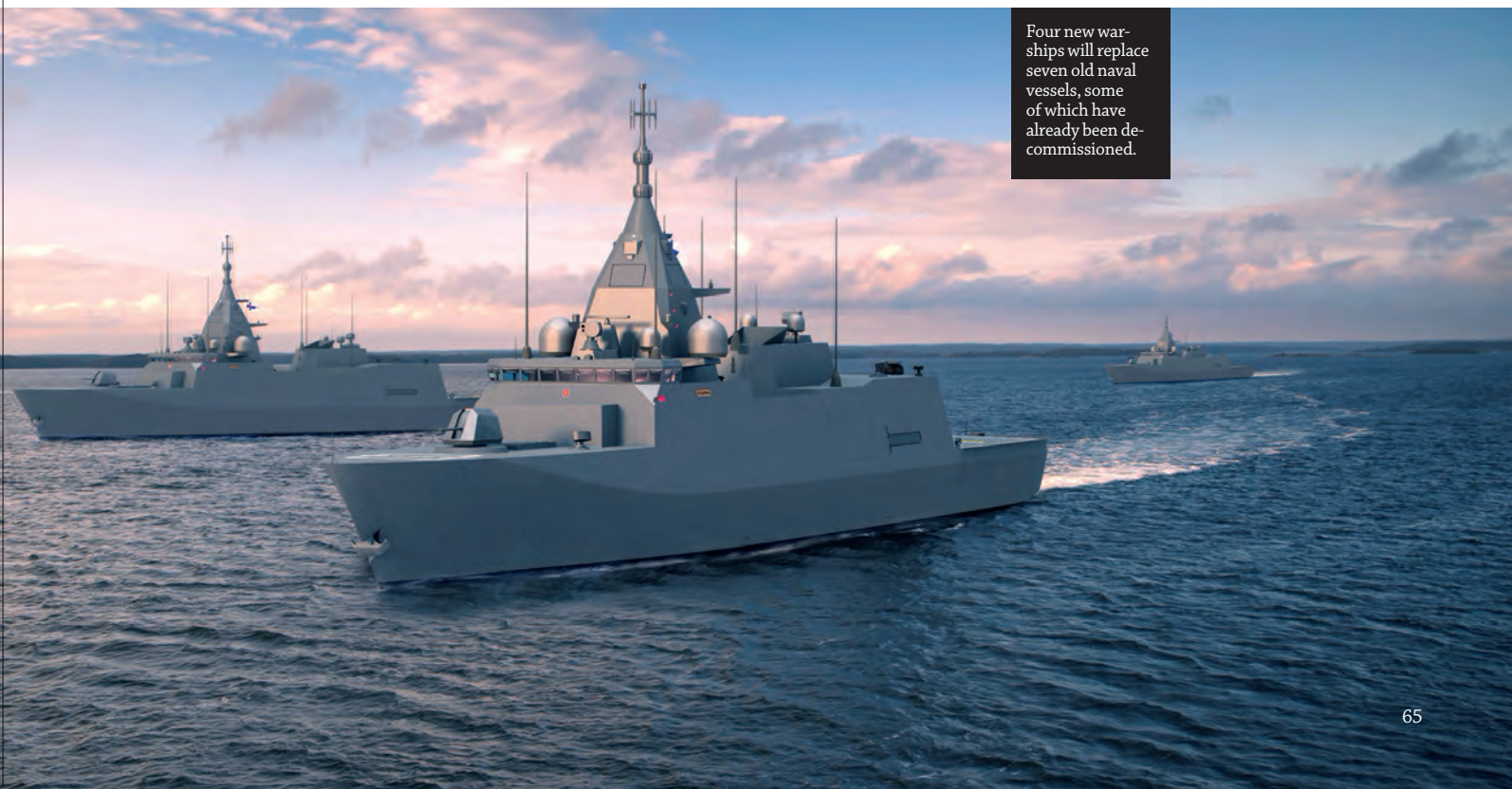
Finland and Sweden have already been deepening their naval cooperation for decades. At the end of February, the countries’ naval navy commanders signed a long-term cooperation plan that will strengthen both countries’ defence and support the security of the maritime operating environment.

“Our goal is to develop all aspects of warfare together. In practice, this means a shared recognized maritime picture, surveillance and operational activities. That is, ensuring that both navies are able to work together,” says Harju.

It is vital to harmonize command and control systems and communication channels. This was tested for the first time in March when the Swedish Navy’s HMS Helsingborg sailed under Finnish command.

“It was a good exercise that demonstrated the compatibility of our command and control systems and communication devices, that is, that we don't need to lead military exercises using mobile phones. We intend to continue running similar operations.”

According to Rear Admiral Jori Harju, the Finnish Navy will take part in the Swedish Defence Forces’ main exercise in the early summer. ✖



Four new warships will replace seven old naval vessels, some of which have already been decommissioned.

Inland waterways should be seen as a part of the supply chain where the use of IWW system is appropriate and reasonable.

Climate Work – Waterways an Ecological Transport Mode

The European Green Deal agreement aims to ensure carbon neutrality by 2050. Climate action is essential to ensure that EU Member States live up to the commitments made in the Paris Climate Agreement, December 2015.

The EU aims to cut transport emissions by 60% compared with 1990 levels. Finland has set even stricter goals and the aim is to halve the transport emissions by 2030. Furthermore, the carbon-neutral society has also been included in the inland waterway development program of Finland.

These are very ambitious tasks and in order to meet them actions are needed from everyone.

Through its activities, the Association of Finnish Waterways aims to make waterborne transport an equal and meaningful mode of transport alongside road and rail transport. Inland waterways should be seen as a part of the supply chain where the use of IWW system is appropriate and reasonable.

Pragmatic solutions to cope with the future transport requirements are needed. Inland waterway transport is a great option and has great potential and plenty of unused capacity. Inland waterways are sustainable and environmentally friendly alternative for transporting goods and passengers.

Waterborne transport accounts for 13.6% of CO2 emissions in the EU. When looking at the total transport emissions, statistics inevitably show that the carbon dioxide emissions of cargo ships per tonne transported are lower than other modes of transport.

Developing Inland Navigation

The aim of the Association is to highlight the needs of both industry and tourism in the development of waterborne traffic, without neglecting environmental and safety issues. The cost of maintaining waterways is low, but the socio-economic impact is positive and remarkable.

Commercial sustainability of inland waterways depends also on infrastructure; fairways and ports. Technical solutions, digitalization and best practices focus on efficient and safe navigation. In addition, navigation in the northern waterways can sometimes be challenging due to the ice conditions. The Association is also working to make the fairway network more competitive

In the development of waterborne transport, it is essential to focus existing resources on concrete areas of development for the benefit of regions and operators, which the Association of Finnish Waterways highlights in its activities and discussions, such as increasing the transport efficiency of Saimaa by extending the Saimaa Canal lock chambers.

Saimaa Canal – the Waterway to the World

The Saimaa Lake and Canal area are the only inland waterways in Finland where there is cargo transportation. This inland waterway connection to the sea is vital for the area. It runs from Lake Saimaa to the Gulf of Finland via the City of Vyborg, Russia. Finland has rented the Canal area from Russia until 2062.

The total length of the Canal is 43 km. There are eight locks; three on the Finnish side and five on the Russian side. The average drop is 75,7 metres. The annual traffic volumes at the Saimaa area are approx. 2 million tons. There is capacity to double today's volumes.

There are plans for significant improvements at the Saimaa Lake and Canal area on prolonging the

lock chambers by 10 meters in order to receive bigger vessels and larger shipments. This would be a significant step forward for sustainable development since it would reduce the carbon footprint per tonne.

International Co-operation

The Association of Finnish Waterways is actively looking for international co-operation possibilities. One example of this is the three-year long INFUTURE Project, approved by the ENI CBC Program 2014-2020 and funded by the European Union, the Russian Federation and the Finnish Government, where the Association acts as a Project Partner.

The aim of the INFUTURE project is to find new profitable business opportunities for freight traffic utilizing the waterways of Saimaa and the Volga-Baltic Sea. The project aims to identify and develop new eco-friendly, cost-effective and sustainable waterborne innovations, including fairway technology and new vessel types for this waterway connection.

Travel is one of the biggest and fastest growing industries of the blue economy. The need for development of waterborne tourism has been highlighted in several discussions both in Finland and in Russia. The Association is working with Merikotka, Kotka Maritime Research Association, and Admiral Makarov State University on Maritime and Inland Shipping to launch a project to develop a new kind of water tourism concept for the inland waterway system between Finland and Russia.

Organisation of excursions to other countries and areas is one example of Associations activities in building up international connections and co-operation. The aim of these educational visits is to learn about the best practises in the field of inland waterway systems and services.

Members – Inland Waterway Experts

The members of the Association represent widely inland waterway knowledge and know-how. Among the Members we have regions and cities, other associations and organizations, individual private people and companies; shipowners, cargo owners, ports, port operators as well as other stakeholders. Our members with their know-how create the strength of our Association.

Means of working and fulfilling our activities are expert forums and round table debates on topical issues, seminars and networking events, where members and stakeholders are invited. One important purpose of the Association is the promotion of interest and giving statements of waterway related issues.

Valued Inland Waterway Expert

The Association of Inland Waterways of Finland objectives are to promote and develop the waterway traffic and transport, as well as the prerequisites for its operations as a part of the whole transport network of Finland. The Association is one of the key partners in national and regional waterborne development events and discussion forums. ✖

The Waterway Does Not Wear Out!

For further information www.vesitiet.org

PHOTOS HANNELE KOSKINEN AND HELI KOUKKULA-TEIXEIRA

The Association of Finnish Waterways Annual Winter Seminar 2020.

The Port of Turku offers a competitive route for the most demanding industrial shipments. Quick and congestion-free land transports to the port can be arranged by both road and rail. Regular liner traffic reaches key export markets and links the shipments to ocean lines. Fast and careful load handling ensures safe shipping of valuable products. In addition to precision and efficiency, the Port of Turku's services emphasise flexibility. The Port responds quickly to its customers' needs when changing conditions require new solutions for ensuring their supply chain.

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