

Kongsberg Maritime

Insights

Technology and innovation



KONGSBERG

Featuring

Sixty years of
azimuth thrusters

Ferries make the
switch to electric

Featuring

The future's
bright in Brazil

Digital journey
of discovery

Positive energy

Introducing K-Sail, our new solution for wind-assist technologies



Bibby Marine's new all-electric vessel is an exercise in excellence. See pages 28-29



KONGSBERG



Welcome

Lisa Edvardsen Haugan,
President – Kongsberg Maritime

This sea change is to be savoured

Welcome to the latest issue of our customer magazine, *Insights*.

I am excited to share some of our latest technology and product updates, as well as bring you valuable insights from a range of customer projects. Our commitment to energy transition and decarbonisation remains at the forefront of our strategy and, in this issue, we will look at some of the ways in which we're helping our customers address these challenges.

We completed the integration of Kongsberg Digital's maritime products and people into Kongsberg Maritime. This move marks a significant step forward in our digitalisation journey. There is no doubt that digitalisation is becoming an integral part of everyday maritime operations, and we're investing in the digital future.

By expanding our digital offerings, we are able to provide a broader range of innovative solutions that enhance efficiency, safety and sustainability. You can read more about our role in the digital space on pages 16 and 17.

The challenges and opportunities around decarbonisation are significant, but with a blend of innovation, determination and extensive domain knowledge, we are making solid progress, providing customers with a range of options to suit their diverse operations.

Our collaboration with Bibby Marine is just one example of this. Their new electric service offshore vessel is the first such vessel capable of operating for an entire day on battery power alone. This pioneering vessel showcases our commitment to developing green technology solutions and also demonstrates how a progressive customer is taking battery-powered propulsion to new levels.

We also hear from the CEO of Tärntank, a Swedish shipowner. Tärntank has developed a fleet of highly efficient chemical tankers with our support, and they are eagerly anticipating the launch of their first ship to feature wind-assisted technology. This collaboration exemplifies how our innovative solutions are helping to shape a more sustainable future for maritime operations.

This summer we're pleased to unveil two new products: an all-electric towing winch and K-Sail, an innovative solution designed to integrate various types of wind power into ships' systems. Tärntank's new ship will be the first to utilise K-Sail, showcasing our continuous efforts to lead the way in maritime innovation.

While we celebrate these advancements, we are also mindful of the geopolitical challenges that lie ahead. As a global company with 117 locations in 34 countries, Kongsberg Maritime remains a reliable and trusted partner, committed to navigating these complexities with resilience and foresight.

I hope you find this issue both informative and inspiring. Together, we are charting a course towards an exciting, sustainable and prosperous future for the maritime industry.

3,000

Anchor handling tugs are deploying lines at depths of up to 3,000 metres.

See pages 14-15

60

The number of years that azimuth thrusters have been a source of power.

See pages 24-27

100

Brazil workshop's loading/lifting capacity is an impressive 100 tonnes.

See pages 32-33



Scan the QR code to find out more about Kongsberg Maritime.

Contact

If you're interested in talking to us about our products and systems, please contact us:

General sales

enquiries

km.sales@

km.kongsberg.com



Cover image: K-Sail technology is explored on pages 20 and 21

Publisher

Kongsberg Maritime

Kirkegårdsveien 45
3616 Kongsberg
Norway

Editorial Team

Craig Taylor
Ryan Swift
Nigel Allen

Design and print

Connect Media



© Kongsberg Maritime, 2025

Kongsberg Maritime Updates



Award for ship design

There was cause for celebration when Kongsberg Maritime was awarded the 2025 Offshore Energy Vessel of the Year Award for its 1,000th ship design, the *IWS Seawalker*. This 90-metre commissioning service operation vessel (CSOV), owned by Integrated Wind Solutions, was recognised during the Annual Offshore Support Journal Conference in London in February 2025.

The *IWS Seawalker*, part of the Skywalker Class, is designed for offshore wind operations and features a novel double-ended hull form and propulsion setup. This design minimises emissions and maximises efficiency, setting new industry benchmarks. The vessel is equipped with Kongsberg Maritime's advanced technology, including a fully symmetrical propulsion and manoeuvring system, and a 2.2MWh battery pack.

Ronny Pål Kvalsvik, Kongsberg Maritime's Vice President of Ship Design, said: "We appreciate the good cooperation with IWS and receiving this award together is amazing. This series of vessels is a game changer in offshore wind."



The DC electric system is among many standout technologies on the OSV

Equipment for vessel is the complete package

A contract has been secured by Kongsberg Maritime to supply an integrated package of equipment for a new offshore support vessel (OSV) being built for ship owner DOF. The 110-metre vessel, designed by MMC Ship Design and constructed at CRIST shipyard in Gdynia, Poland, will operate offshore Newfoundland, known for its harsh environmental conditions.

The vessel will be equipped with a comprehensive range of Kongsberg Maritime systems, including a DC main switchboard, battery hybrid system, main power generator, thruster induction motor and distribution transformer.

One of the standout features is the DC electric system, which offers enhanced energy efficiency, reduced space and weight requirements, improved power quality and better dynamic response. These

benefits make DC electrical systems increasingly favoured for modern offshore vessels, particularly those focused on energy efficiency, hybrid propulsion and advanced operational capabilities.

Kongsberg Maritime's battery-hybrid propulsion system will comprise two 1MWh battery packs, complemented by a DC electric system designed to ensure the highest operational efficiency.

With these innovations, the new ship is set to achieve fuel savings of up to 35 per cent compared to similar vessels, marking a significant step forward in sustainable maritime technology.

DOF has also selected a range of Kongsberg Maritime technology to support its offshore operations, including navigation, automation and control systems, as well as the K-Pos Dynamic Positioning system (DP-3).

Hybrid upgrade leads the way in innovation

A major upgrade of the Norwegian Coastal Administration's (Kystverket) hybrid vessel, *OV Bøkfjord*, will be led by Kongsberg Maritime.

The project will enhance the vessel's hybrid capacity and propulsion systems, demonstrating how far hybrid technology has advanced over the past 10 years.

The *OV Bøkfjord*, delivered in 2016, was Kystverket's first hybrid vessel and a pioneer in battery hybrid technology.

"Back then, it [*OV Bøkfjord*] was a pioneer of its time and it remains so today through this range of upgrades. We are ensuring it will have even better environmental performance for many years to come. Through

our detailed analysis, we have been able to expand the battery capacity by four times compared to the original design," said Eivind Midtli, Kongsberg Maritime's Sales Manager Offshore Integration & Energy.

The upgrade includes the installation of Kongsberg Maritime's electric rim-drive azimuth thrusters, which will allow the *OV Bøkfjord* to operate for extended periods on emission-free energy. This innovative technology, combined with an expanded battery capacity, will significantly improve the vessel's environmental performance.

Read about 60 years of azimuth thrusters on pages 24-27.

The environmental performance of the vessel will be improved

New winch will be a winner

The Kongsberg Maritime winch product range is being expanded with the launch of a new electric towing winch for the tug market. The new winch features a frequency converter-driven electric motor, offering several advantages over traditional hydraulic winches, particularly in terms of operational efficiency and environmental impact.

One of the key features of the new electric towing winch is its ability to significantly reduce the amount of hydraulics required on tugs' decks. This reduction minimises the risk of oil spills, aligning with the industry's move towards more sustainable maritime operations. The winch's design ensures high efficiency with low power consumption, making it a suitable choice for modern tug operations.

An electric motor combined with induction-hardened gears and high-quality bearings provides a long-lasting drive line solution suitable for harsh conditions on board a tugboat. The electric

towing winch is designed for tugs operating in harbour areas, with a pulling force of up to 35 tons and brake holding loads suitable for selected towing rope. Frequency converter technology offers stepless speed control when reeling the rope in or out and comes with various drum configurations, including single, double and split drum options.

The winch can be equipped with a mechanical spooling device for wire winch applications and features a quick release functionality under three seconds, which is compliant with International Association of Classification Societies (IACS) rules.

Kongsberg Maritime's extensive experience with frequency converter-driven winches and hydraulic towing winches ensures that this new product is both reliable and well-proven.

The winch also boasts a user-friendly interface, with local control

stands and bridge main controls displaying key operational data such as rope line tension, length, speed and system alarms.

Kongsberg Maritime is unique in offering ergonomically combined winch controls with the Aquapilot thruster control system lever. Designed to improve operational safety as well as user-friendliness by having critical controls combined side-by-side, enhancing safety for captains by enabling full control over their winches while maintaining thruster control.

Through its global support network, Kongsberg Maritime is committed to full lifecycle support for the new product, which is also enabled for future upgrades. Kimmo Haula, the company's Vice President Merchant, said: "We know that tug operators need to have round-the-clock availability for towing operations, so with our global support network and product centre expertise we can ensure that when our customers need support, they get it.

"The control system for the new winch will also enable future upgrades on remote service and connectivity to the KONGSBERG ecosystem. With its launch, tug operators can look forward to enhanced performance, reduced environmental impact and lower operational costs," he added.



Kongsberg Maritime Updates

Work will propel navy to new heights

Innovation is to the fore in a contract that's been secured to supply propulsion and manoeuvring technology for two new KCR-70 fast attack craft for the Indonesian Navy. These vessels are currently under construction at the Sefine Shipyard in Türkiye.

The Kongsberg Maritime equipment package includes an innovative propulsion system that combines Promas twin controllable pitch propeller (CPP) systems for high efficiency at patrol speeds, with a single Kamewa waterjet to provide boost power for high-speed operation. This configuration optimises propulsion power, speed and manoeuvrability, ensuring superior performance and efficiency for these new craft.

The vessels will have combined diesel and gas turbine (CODAG) propulsion. This comprises twin diesel engines and a centrally positioned, 23-megawatt gas turbine to directly drive the 160-centimetre diameter waterjet, which is capable of discharging more than 30 cubic metres of water per second. The use of twin Promas CPP for main propulsion, at speeds over 40 knots when the waterjet is used for boost power, is an innovative approach. Kongsberg Maritime carried out extensive hydrodynamic analysis to integrate the hull form and two different types of propulsor into one system.



Partnership cruises to the next level with stabiliser deal

A partnership of 15 years between Kongsberg Maritime and Chesapeake Shipbuilding in the United States will continue with a deal to supply the US firm's Aquarius retractable stabilisers.

The stabilisers will be installed on the latest newbuild cruise ships for American Cruise Lines (ACL), a leading operator in the US cruise industry. The Aquarius retractable stabilisers offer high-performance roll damping, compact and lightweight design and advanced control systems. They are specifically engineered for smaller vessels, and feature a one-piece high-lift fin, low installation costs and ease of integration with the ship's alarm and monitoring systems. The stabilisers come with a fin-box and necessary local stiffening, ready for seamless installation at the shipyard.

With more than three decades of industry experience, Chesapeake Shipbuilding has established itself as a designer and builder of commercial ships up to 450 feet in length. Specialising in passenger vessels, tugboats and ferry boats, the shipyard has developed expertise in maritime construction.

The yard is currently constructing the *American Patriot*, *American Pioneer*, *American Maverick* and *American Ranger*, along with other vessels for ACL.

Set to begin cruising in June 2025, these vessels will accommodate 130 guests in staterooms with private balconies and a deck of suites. Fully stabilised with Kongsberg Maritime's Aquarius retractable stabilisers, these new ships will enhance the cruising experience along the Eastern Seaboard of the US.



Steven McGee, President of Chesapeake Shipbuilding (pictured), said: "Kongsberg Maritime has consistently provided a quality product that meets our niche needs. Their engineering department has provided spot-on computational fluid dynamic resistance results, and their structural designs are easy to incorporate into our vessel designs. Their on-site technicians are outstanding during each commissioning and subsequent maintenance periods. We expect Kongsberg Maritime to be integral to our continued growth."

Paul Crawford, Kongsberg Maritime's Sales Director, added: "Our long-standing relationship with Chesapeake Shipbuilding demonstrates the importance of effective stabilisation systems on board cruise vessels. We are proud to see our Aquarius retractable stabilisers helping to provide American Cruise Lines' guests with a comfortable, smooth sailing experience in the coastal and river waters of the United States."

Olympic gains: contract is signed for two new construction vessels

A first-place finish was secured after Kongsberg Maritime signed a contract with Olympic Group to design and equip two multipurpose subsea construction vessels, designated as UT 7623 sustainable energy vessels (SEVs).

These vessels will be methanol-ready and feature battery hybrid technology, marking the first references for Kongsberg Maritime's latest subsea construction designs.

The UT 7623 SEV vessels will incorporate a comprehensive technology package, including rim-drive electric azimuth propulsion, retractable azimuth bow thrusters, switchboards, thruster drives, hybrid battery power, an integrated bridge system, automation and control systems, dynamic positioning, tank sounding, mooring winches and an overhead ROV launch and recovery system. Construction

will take place at the CMHI shipyard in Shenzhen, China, with delivery scheduled for the summer of 2027. The vessels will operate in both the renewable energy and oil and gas sectors.

Olympic Group, headquartered in Fosnavåg, Norway, is a major offshore service provider focused on sustainable maritime operations.

Stig Remøy, CEO & President of Olympic, said: "We have always been at the forefront of innovation, setting new standards for sustainable offshore operations. The UT 7623 SEV vessels build on our long-standing experience in renewable energy and oil and gas, offering unmatched flexibility and efficiency. With Kongsberg Maritime's cutting-edge technology, we are once again delivering vessels that lead the industry forward."

Per Kristian Furø, Kongsberg Maritime's Sales Director – Ship Design, added: "We are excited to deliver these vessels to Olympic. These vessels represent the latest offering from our extensive ship design portfolio.

"They are methanol-ready dual fuel and have a fully electric propulsion system, setting new benchmarks in the industry for energy efficiency and environmental sustainability.

"They are vessels that not only meet but exceed the demands of modern offshore operations and will do so with extremely low fuel consumption."



Making people the top priority

In another impressive business win, Kongsberg Maritime will supply the design and integrated equipment package for a new walk-to-work offshore service vessel (OSV), to be built by ST Engineering Marine in Singapore for a leading oil and gas company.

The 97-metre vessel, based on Kongsberg Maritime's UT 5520 design, will accommodate 106 people and feature a motion-compensated gangway to enable



safe transfer of personnel to and from offshore installations.

This new design is a further development of Kongsberg Maritime's extensive range of vessel types for the offshore energy market.

It builds on recent experience with the successful UT 5519 DE commissioning service operation vessels (CSOVs), which are deployed on offshore wind projects in the North Sea. Designed for oil and gas operations, the vessel will

have a greater endurance of up to nine weeks away from shore, compared to a CSOV industry standard of four weeks.

Per Kristian Furø, Kongsberg Maritime's Sales Director – Ship Design, said: "We are delighted to have been chosen by ST Engineering Marine to supply our latest UT 5520 vessel design and an extensive range of our technology for this new vessel.

"Our design teams have drawn on our extensive know-how from decades of offshore operations to provide a vessel that is optimised for long-distance offshore operations, where efficiency, operational reliability, safety and crew comfort are key considerations."

The green journey is no emission impossible

As decarbonisation in shipping gathers pace, there are more rules and regulations to consider. This may sound daunting, but Kongsberg Maritime's expertise means smooth sailing all the way.

Key steps for successful decarbonisation planning

Navigating the energy transition in the shipping industry brings challenges – but a well-planned and carefully executed decarbonisation plan can help ensure success.

Ship owners are facing choppy waters as they try to traverse the energy transition, with challenges including ever-evolving environmental regulations, the costs of compliance, and understanding the various technological and fuel advancements required to be future-ready.

However, adopting smarter, sustainable, and more efficient operations need not be a headache. Kongsberg Maritime is at the forefront of decarbonisation developments, and able to advise customers on options to achieve compliance and optimise efficiency for existing fleets and newbuilds.

The regulatory landscape

Two key regulations currently shaping the landscape are the Emissions Trading System (ETS) and the Carbon Intensity Indicator (CII) Index rules.

The ETS, a key part of the European Union's climate policy, aims to reduce greenhouse gas emissions by setting a cap on the total amount of emissions and allowing the trading of emission allowances. It began last year and means ships of 5,000 gross tonnage or above must monitor their greenhouse gas emissions on voyages to EEA ports.

By 2025, these ships must account for 70 per cent of their verified emissions, increasing to 100 per cent by 2026. This system encourages ship owners to invest in cleaner technologies to minimise their carbon footprint.

The CII Index, introduced by the International Maritime Organization (IMO), measures the carbon intensity of ships, encouraging operators to enhance energy efficiency and reduce emissions. The CII rating system aims to reduce

carbon intensity by 40 per cent by 2030 compared to 2008 levels.

Oskar Levander, Kongsberg Maritime's Vice President Strategy and Business Development, says: "Compliance with ETS and CII not only ensures environmental responsibility but can also position ship owners competitively in a market where there is a growing focus on sustainable operations. Understanding and adapting to these regulations is essential for maintaining operational efficiency and long-term viability for ship owners."



Oskar Levander

Latest maritime regulations: shaping future energy choices

The FuelEU Maritime Regulation, effective from January 1, 2025, marks a significant step in the European Union's efforts to decarbonise the maritime sector. FuelEU aims to reduce greenhouse gas (GHG) emissions from marine fuels, driving the transition to low-carbon and renewable energy sources. Under the FuelEU Maritime Regulation, all commercial ships above 5,000 gross tonnage – the same threshold as ETS – calling at EU ports must reduce the GHG intensity of the energy used by 2 per cent compared to the baseline – an average intensity of the fleet in 2020.

"Compliance... ensures environmental responsibility but can also position ship owners competitively in a market where there is a growing focus on sustainable operations"

These reduction targets will increase every five years, aiming for an 80 per cent reduction by 2050. Compliance involves collecting and reporting data on fuel usage and adopting Onshore Power Supply (OPS) technology at major EU ports by 2030.

In April 2025, the International Maritime Organization (IMO) also approved new net-zero regulations aimed at drastically reducing GHG emissions from the global shipping industry. These regulations, set to be formally adopted in October 2025 and enforced by 2027, represent a significant step towards achieving net-zero emissions by 2050. The IMO Net-Zero Framework introduces mandatory emissions limits and a global pricing mechanism for GHG emissions, making it the first of its kind to encompass an entire industry sector. Key elements include a new fuel standard for ships and a global economic measure, requiring ships to reduce their annual greenhouse gas fuel intensity (GFI) over time.

Oskar Levander adds: "The new IMO regulations set a clear cost on using fossil fuels and will be an essential driver for achieving the IMO GHG reduction targets. At Kongsberg Maritime, we are committed to supporting our customers in navigating these changes and adopting innovative technologies that meet these stringent standards."

These measures will also apply to large ocean-going ships over 5,000 gross tonnage, which account for 85 per cent of total CO₂ emissions from international shipping. The framework aims to accelerate the introduction of zero and near-zero GHG fuels, technologies and energy sources.

Oskar continues: "While not a supplier of engines, Kongsberg Maritime can play a pivotal role in helping ship owners navigate these new regulations through the provision of integrated systems and alternative energy



Karl Alexander
Wirén

sources like batteries and wind-assisted propulsion. As a technology integrator, we offer consultancy services to guide owners in making informed decisions about energy choices and investments."

Key elements in decarbonisation

One way in which Kongsberg Maritime visualises the challenge of reducing GHG emissions is to consider a triangle shape. In each corner lies a key element of the decarbonisation process: reducing energy consumption, maximising energy conversion efficiency and using clean energy sources and fuels.

Karl Alexander Wirén, Kongsberg Maritime's Vice President, Aftermarket Sales, explains: "You cannot be in only one corner to solve the decarbonisation challenge," he says. "We work with our customers in all three."

"By reducing the amount of energy you use, you will produce fewer emissions," says Karl.

Selecting a clean energy source also helps cut emissions. In the third corner of the triangle, Kongsberg Maritime helps ship owners maximise the energy efficiency of their chosen power source.

Reducing energy consumption can involve "simple things like cleaning the hull and operating at lower speeds," Karl adds.

However, there is no one-size-fits-all for vessels and operators, and this is where Kongsberg Maritime experts can really help ship owners by advising on the optimal solutions and fuel options for their specific vessels and budgets.

Karl continues: "The energy transition is as much about enhancing the energy efficiency of ships as it is about transitioning to alternative fuels."





Compliance and income generation

Becoming compliant with regulations means ship owners are having to improve their energy efficiency and reduce emissions. This can be achieved through the integration of technologies and solutions – a key strength of Kongsberg Maritime.

Additionally, the company's knowledge of the regulatory landscape can help offer ship owners the opportunity to generate income from compliance.

This income stream stems from flexibility around compliance with the FuelEU Maritime Regulation. Owners have the option to pay the required penalties if they do not want to, or cannot, reduce their emissions. This

The shipping landscape is evolving

becomes more expensive, over time, so if owners become over-compliant, “they can bank any surplus” to offset future deficits. By pooling surplus, an over compliant vessel can earn additional revenue from other pool members that do not reach the target.

The FuelEU regulations set maximum limits for yearly average GHG intensity of energy used by ships and mandate a gradual reduction in GHG intensity over time. The rules also state that container and passenger vessels must use onshore power supply or zero-emissions technologies while in ports from 2030.

This makes shore power a much more attractive proposition. However, a challenge today, and towards 2030, is the onshore power infrastructure, so an initiative for zero emissions in port relies on the availability of the onshore power grid.

Karl says: “This is an area where owners may need some clarity. FuelEU Maritime says a fuel with lower carbon intensity needs to be used. It's a slow uptake – just 2 per cent lower than before [from 2025]. Gradually this requirement will increase and become quite steep, and this applies to all ships coming in and out of the EU.”

To comply, clean fuel or a clean energy source can be bought, but that is an expensive route. Most ship owners use blending, when renewable diesel is used with their other diesel or biogas with the LNG they use. Ship owners can also use wind propulsion or shore power, and if they charge from the grid or batteries it's zero emission.

“Our experts can advise on future fuels and technological solutions to help owners increase efficiency, reduce fuel consumption and ensure compliance,” Karl adds. “If owners can reduce fuel consumption through efficiency, then it will be cheaper to comply with the regulations. That's a cost benefit from day one.”



Hybrid vessels are among future options for ship owners.
Read more on pages 22-23

Upgrade solutions

The best approach for ship owners is to start conversations with the Kongsberg Maritime experts as soon as possible. "Every owner has different requirements, and every vessel has its specific operation profile," Karl adds. "That's why we take a big-picture view of solutions and upgrades – to ensure value for money."

"When retrofitting vessels, we start with the hull and propeller, look at the shaft-line and generation of electricity that can be optimised," Karl explains. "Can we turn off the auxiliary? Can we produce power with lower emissions?"

"We have a wide range of technology that comes with great benefits for our customers. We see there is an increased interest in the market for installing hybrid shaft generators, both for new builds and upgrades. This is a great way to reduce the emissions for the electricity produced onboard."

Hybrid shaft generators allow ships to draw power from the main engine's propeller shaft to generate electricity while allowing the shaft speed to fluctuate. Kongsberg Maritime was an early pioneer of innovative hybrid shaft generators (HSG) and has been offering this, and ever-improving advancements, to customers for many years.

"The old, simple shaft generator worked at the same frequency as the propeller," Karl explains. "So, to feed the right frequency to the switchboard there needs to be a constant speed, but that's not the most efficient way of running the propeller in all conditions."

A Kongsberg Maritime HSG contains a frequency converter so the propeller can be operated at variable speeds and still feed in the right frequency to the switchboard. Some energy transition technologies such as installing wind propulsion or air lubrication will increase the electrical demand in the ship, making the case for HSG even stronger.

After evaluating power generation, Kongsberg Maritime's team extends their focus beyond the engine room to include the control room and bridge. They explore all options from their portfolio, ranging from standard lifetime extensions of vessel automation to modern digital applications and smaller autonomy functions from larger development programs. This comprehensive support aims to optimise operations and enhance efficiency for customers.

"It's a whole-vessel approach to efficiency," Karl concludes. "Owners can't just fix one propeller and be compliant for the next ten years." ●

"We see there is an increased interest in the market for installing hybrid shaft generators, both for new builds and upgrades"



Kongsberg Maritime is helping customers with the transformation to better ways of working

There's more, offshore

A new era of opportunity is on the horizon

Throughout more than 50 years of North Sea energy, Kongsberg Maritime has been a key player, leading many of the mission critical technologies that set the standard for global offshore operations today.



Trond Brage Jakobsen, the company's Senior Vice President, Offshore Energy (pictured), has spent his career in the maritime and energy industries and believes that a new period of innovation and investment is dawning, which will see big leaps forward in the way our energy resources are developed. Trond shares his thoughts with *Insights*.

Our strong foundations in Norway have been instrumental in our development and growth in the offshore sector, globally. With many of our customers pioneering those early days in the North Sea it allowed us, as a technology company, to follow them as they expanded into new markets.

I would say that our customers have consistently demonstrated bravery – offshore is that kind of industry. Whether that's by adopting new operational methods, embracing cutting-edge technologies or venturing into challenging overseas markets, there's an element of risk and uncertainty.

The initial risk of offshore drilling was considerable. Harsh environments and unknown territories required innovative solutions and robust vessels to withstand the challenges. Our journey alongside our customers and their clients, the energy companies, has been one of mutual growth, innovation and shared risks. As a technology provider, we have been integral to the offshore industry's development, continuously pushing the boundaries of what is possible.

We all know that this is a cyclical industry, and I have experienced several of the ups as well as the downs. But there is always opportunity to evolve and to innovate, and to be ready for what comes next.

From a strategic point of view, KONGSBERG's acquisition of Rolls-Royce Commercial Marine in 2019 was significant. Combining competencies from both companies strengthened our ability to develop future-proof solutions for customers, including for new builds and vessels in operation. This investment brought a new

The background of the page features a large-scale image of two offshore oil and gas platforms. The platforms are dark blue and black, with complex scaffolding and cranes. Overlaid on the image are numerous glowing blue lines and nodes, resembling a digital network or data flow, which adds a technological and futuristic feel to the scene. The sky is a pale, hazy blue, and the water at the bottom is dark and textured.

An upturn in oil and gas will mean new and lucrative openings

range of products and technologies, perfectly complementing our established capabilities.

Today, we have unrivalled scope across offshore, continuously exploring and developing new technologies and customer-centric solutions. Despite the oil and gas sector's downturn over the past decade, we invested in technologies to support offshore wind and renewable industries, resulting in innovations now applicable to oil and gas operations.

Our brave customers who ventured into renewable investments are now well positioned to benefit from the upturn in oil and gas. Their foresight and willingness to embrace new ideas have set the stage for a prosperous future.

Technology is at the heart of what we do. Known for pioneering Dynamic Positioning (DP), we have integrated DP with advanced energy management systems, enhancing safety and efficiency in operations.

Our intelligent power management systems are closely connected with various configurations of electrical systems, ensuring optimal energy consumption during DP operations. This integration allows for more efficient and safer operations while maintaining precise control.

As the offshore industry navigates the complexities of energy transition, Kongsberg Maritime stands out as an ideal partner. Ship owners face a host of challenges and have a range of choices, from alternative fuels and legislation to costs and new ways of working. We can help navigate the complexity and data is a key factor.

“We’re in an exciting period and things are moving quickly. In recent months, we have seen many new developments”

Our advanced digital applications and expertise enhance offshore operations by providing real-time data, predictive maintenance and optimised performance, and this will play a big part in the fleets of the future.

We’re in an exciting period and things are moving quickly. In recent months, we have seen many new developments, where new ideas are becoming reality to tackle the industry challenges and open up opportunities.

For example, our customer REACH SUBSEA ASA has deployed its first remotely controlled USV, carrying out tasks previously handled by much bigger vessels. That’s a truly transformational opportunity and certainly one to watch.

We have worked with Olympic Group on their newly-ordered construction vessels – ships that really push the boundaries of what’s possible from an efficiency and capability perspective and bring together technologies that drive the shift towards smarter ships, capable of managing energy and reducing emissions.

The recent development of our cross-tensioning technology for anchoring and mooring operations allows a single vessel to perform tasks traditionally requiring multiple vessels, using winch power instead of thruster pull. This novel approach highlights our ability to drive energy transition, not to mention save a lot of fuel.

These are just a few examples of how we are helping to shape the future of offshore operations.

Our customers’ pursuit of more efficient, safer and cost-effective operations aligns with the broader industry trend towards decarbonisation and reduced emissions. The lessons learned from the renewable sector are now being applied to oil and gas, driving advancements that benefit both sectors. As we move forward, Kongsberg Maritime remains committed to delivering innovative solutions that meet the evolving needs of our customers and the energy market. ●



Global groundbreaker is anchored in excellence

Kongsberg Maritime has a proud history of delivering for customers and the range of products and services on offer will continue to grow. Standing still is not an option.

For more than 50 years, Kongsberg Maritime, together with our partner IP Huse, has been at the forefront of innovation in the anchor handling tug (AHT) market, pioneering the design of vessels as well as the delivery of integrated deck systems for these vital supply ships.

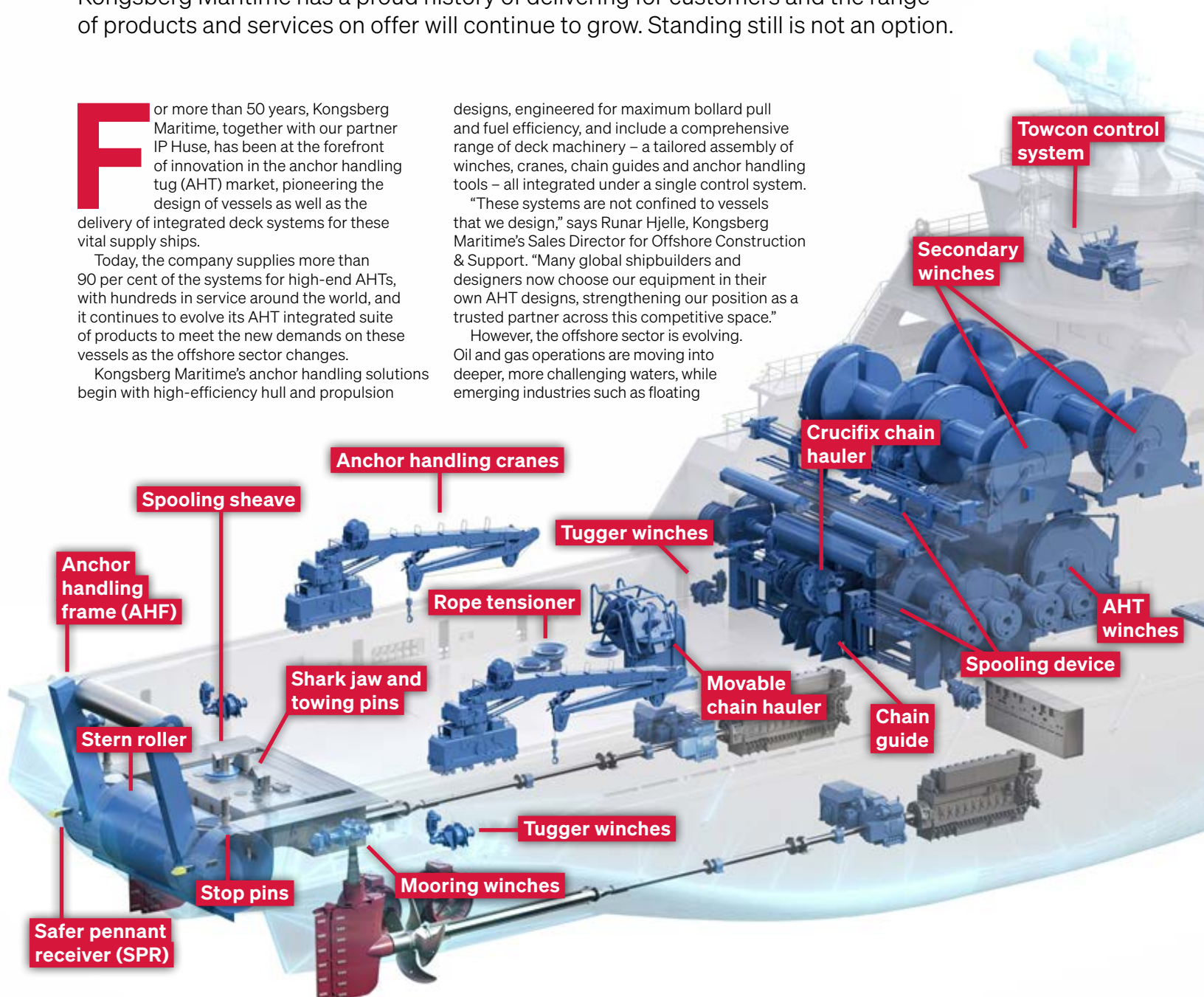
Today, the company supplies more than 90 per cent of the systems for high-end AHTs, with hundreds in service around the world, and it continues to evolve its AHT integrated suite of products to meet the new demands on these vessels as the offshore sector changes.

Kongsberg Maritime's anchor handling solutions begin with high-efficiency hull and propulsion

designs, engineered for maximum bollard pull and fuel efficiency, and include a comprehensive range of deck machinery – a tailored assembly of winches, cranes, chain guides and anchor handling tools – all integrated under a single control system.

"These systems are not confined to vessels that we design," says Runar Hjelle, Kongsberg Maritime's Sales Director for Offshore Construction & Support. "Many global shipbuilders and designers now choose our equipment in their own AHT designs, strengthening our position as a trusted partner across this competitive space."

However, the offshore sector is evolving. Oil and gas operations are moving into deeper, more challenging waters, while emerging industries such as floating



A versatile approach brings solutions to every area of vessel design

Anchor/mooring winches

ROV launch and recovery system

offshore wind and aquaculture are creating new operational demands. In the oil and gas sectors in Australia, Brazil and West Africa, AHT vessels are now deploying anchor mooring lines at depths of 1,000-3,000 metres – far beyond the 300 metres depth of traditional North Sea operations. This evolution has brought about a need for larger, heavier equipment and more sophisticated handling systems.

Lars Petter Tennfjord, Kongsberg Maritime's Product Manager – Emerging Markets, adds:

"We have been the leader in the high-end market for big, heavy moorings for a long time but as industry evolves, we have been busy creating a new generation of AHT-integrated systems that can take bigger chains and deck systems that can make it more efficient and safer for the crew while working in this difficult environment."

Kongsberg Maritime has responded to the changing market by developing new hydraulic and electric winch systems with enhanced load capacity and greater spooling capabilities, including pulling forces exceeding 600 tonnes. Its solutions are engineered to handle larger chains, more complex mooring configurations and higher tension loads – all while maintaining safety and precision.

Anchor handling decks were once among the most hazardous workplaces at sea, with constant motion, high tensions on wires and chains and heavy machinery creating a challenging environment. However, Kongsberg Maritime's Safer Deck Systems have been designed to automate and reduce the risk of operations when possible. One innovation is the shark jaw, a powerful chain-locking device that secures heavy mooring chains up to 220mm while the crew performs front-end connections safely. The new system even allows operators to adjust chain sizes remotely from the bridge, eliminating the need for physical adjustments on deck.

The new generation of cranes also comes equipped with specialised manipulators – not just hooks – capable of unbolting shackles, securing wire twists and positioning components with a joystick from a safe distance. These cranes reduce the physical strain on the crew and improve overall operational efficiency.

At the stern of many AHT vessels lies another essential Kongsberg Maritime product: the Anchor Handling Frame (AHF). This critical system, engineered to support today's heavier anchors, increasingly complex mooring systems and deployment of jewellery without contact to the stern roller, assists in the controlled deployment and retrieval of anchors, dramatically reducing wire tension and stress loads during handling. Other similar handling frames are the Anchor

Recovery Frame (ARF) and the Anchor Launch and Recovery System (A-LARS).

Such is the versatility of these powerful AHT vessels that they are expected to do more than just tow and deploy moorings. Kongsberg Maritime is helping drive this multi-role vessel trend with designs that allow for increased deck space, extended range and hybrid energy-efficiency systems to allow them to provide other roles, such as transport equipment, tow rigs, act as emergency response platforms and support subsea construction.

Lars Petter says: "The AHT market really showcases our integrated approach to enhancing our suite of AHT products and systems which combines deep product knowledge with insights into vessel operations, energy systems and offshore anchor handling strategies. This allows us to offer comprehensive support from concept to execution and to ensure that its systems are fit for the challenges ahead."

Such is Kongsberg Maritime's expertise in the AHT market that they see they have a role to play as 'consultants' to their customers, as Runar explains: "We aim to be more than a supplier – we are a trusted partner dedicated to providing our customers with complete and integrated solutions that address their specific operational challenges. We want ship owners and designers to come to us not just for products but for complete solutions. They tell us what they want to achieve – and we build the system that gets them there."

Lars Petter concludes: "From hull design to propulsion, from winches and cranes to full automation systems – we deliver the entire ecosystem that empowers these vessels to perform the toughest offshore tasks. We are at the heart and brain of these vessels that make it all possible." ●

"We want ship owners and designers to come to us not just for products but for complete solutions"

A digital driving force

As shipping technology becomes more sophisticated, Tejbir Singh is a man with a plan to create a successful digital future for Kongsberg Maritime.

Kongsberg Maritime is on a digital journey. A voyage of innovation and transformation that will deliver fresh new solutions for its global customers.

Innovation is nothing new to a business that has been delivering quality products for more than 50 years. But our people never stand still – and this latest journey is special.

At the beating heart of the transformation is Tejbir Singh, Kongsberg Maritime's Senior Vice President – Digital.

Tejbir says: "The maritime industry has made meaningful strides in digitalisation, but we're still at an early stage. While leading shipowners and newbuilds are adopting high-frequency data collection and advanced analytics, the majority of the global fleet still relies on digital noon reports and manual processes.

"This creates a digital divide that's driven by factors such as vessel age, owner size and region. The biggest challenge isn't just technology – it's interoperability, data-sharing reluctance and organisational readiness for change.

"Currently, monetary incentives and regulatory pressure are still the key driver for ship owners to adopt digital tools and we expect that this won't change any time soon, so providing clear tangible value is key."

This will be a journey that takes our workforce through uncharted waters. To succeed, Kongsberg Maritime will harness the power of the latest technologies to support crews and shore teams alike in navigating increasing complexity in operations. New tools and technologies can often feel daunting – stories of disruption and rapid change are everywhere.

But Tejbir sees things differently. He is a people person, and his vision puts our people at the centre of future



Tejbir Singh

planning. He explains: "Digital tools are starting to empower crews and shore teams alike, with support to make decisions unimaginable a decade ago. Ultimately, digitalisation allows us to unlock better ways of working onboard and onshore."

Kongsberg Maritime does things the right way. That means adhering to industry best practices and rules and regulations. This is where the company's digital expertise makes all the difference.

Tejbir says: "Regulations around emissions, energy efficiency and reporting are becoming stricter and more complex. Our digital solutions are built to help operators stay ahead.

"We offer compliance-ready monitoring, reporting and analytics tools that reduce manual workload and increase accuracy, helping customers meet evolving requirements without friction."

An improved digital offering also brings faster response times and the ability to adapt to situations in real time. This means our customers can stay ahead of the curve.

Tejbir says: "Digital solutions enable a shift from reactive to proactive operations. With real-time monitoring and predictive analytics based on high-frequency data, crews and fleet managers can detect anomalies before they lead to failures."

The company's evolving digital strategy will involve a more joined-up approach to operations. Tejbir explains: "Bringing the maritime digital team from Kongsberg Digital into Kongsberg Maritime means we're uniting domain knowledge, digital expertise and operational excellence under one roof."

As a business, we are always alert to the threat of cyber-attacks. They are a clear and present danger. But Kongsberg Maritime's digital products are designed to stop the criminals in their tracks. Tejbir says: "Cybersecurity is a top priority. As vessels become more connected, the attack surface grows, especially in times of increasing geopolitical tension.



"As a principle, we apply secure-by-design architectures to protect the operational technology layer of the ship, enable safe data transfer and protect customer data in the cloud. We implement robust security protocols, encryption, access control and continuous monitoring."

Another area where Kongsberg Maritime is making a difference is around clients' carbon footprints. Tejbir says: "Digitalisation is a key enabler of decarbonisation. Our solutions help operators track, benchmark and optimise energy usage, enabling actionable decisions to reduce fuel and emissions."

So where does Tejbir think Kongsberg Maritime is going next? Unsurprisingly, he is upbeat about what's to come.

He says: "We aim to be the go-to digitalisation partner in the maritime space. That means continuing to lead in areas such as sustainability, automation and advanced operations. We will address the broad spectrum of the maritime markets, from specialist LNG and offshore fleets to the broader merchant markets, where we will help all customers start, and move forward, through their digital journey."

"We're investing into a scalable platform, next-gen solutions with an integrated user experience"

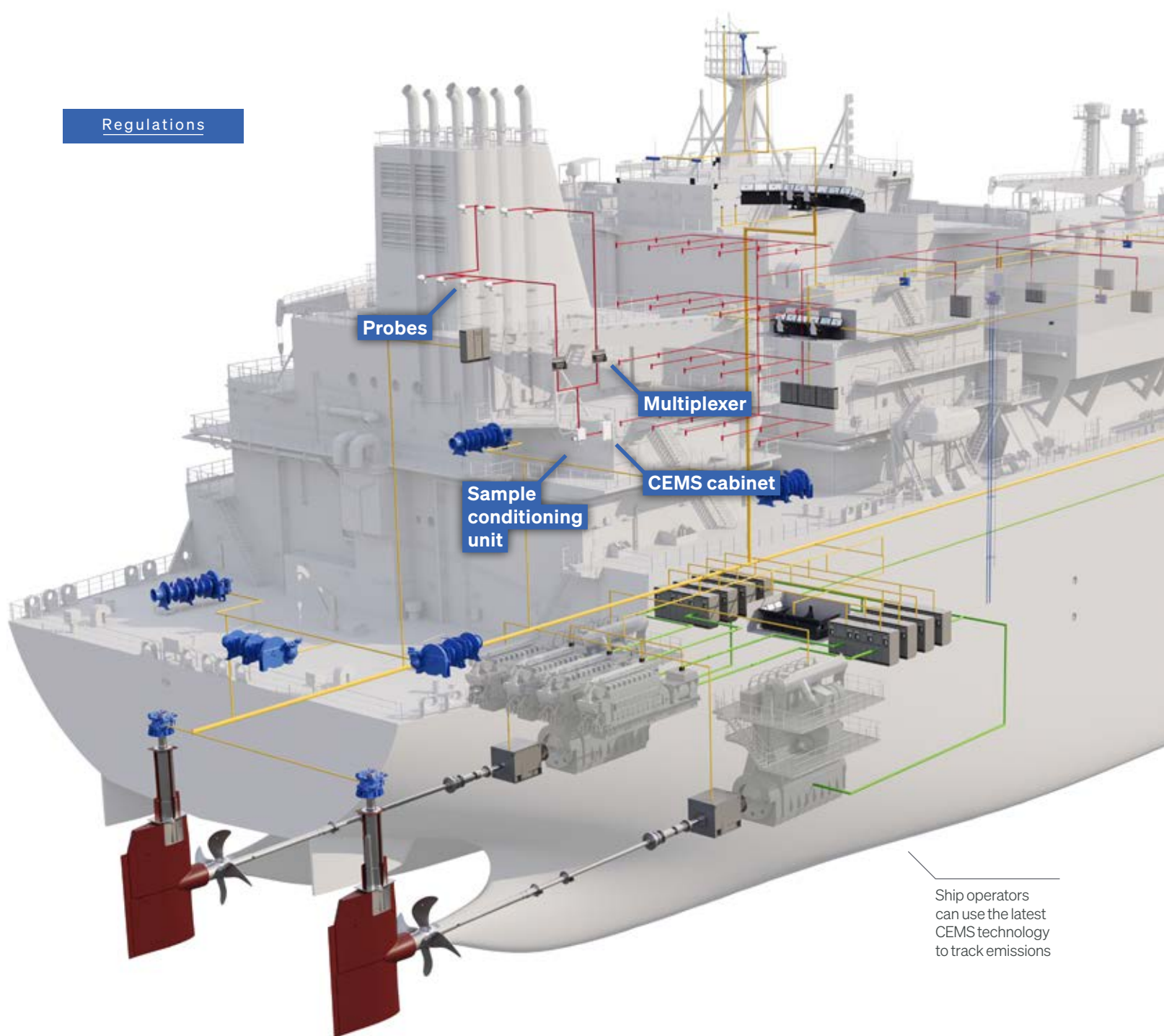
"We're investing into a scalable platform, next-gen solutions with an integrated user experience and partnerships to meet the end-to-end needs of our customers."

There will be challenges ahead, but Tejbir is looking forward to a prosperous digital future. He says: "The future of digitalisation is about convergence – between information technology and operational technology, between ship and shore and between data and decision-making. We believe the next decade will be defined by data-driven operations, tighter automation and increasingly autonomous systems – with humans still firmly in the loop."

"However, we will also see a period of transition where digital native vessels operate next to legacy tonnage for

quite a while – leading to technological challenges that need to be bridged. Kongsberg Maritime is uniquely positioned to lead this transformation process by combining deep maritime heritage with cutting-edge technology."

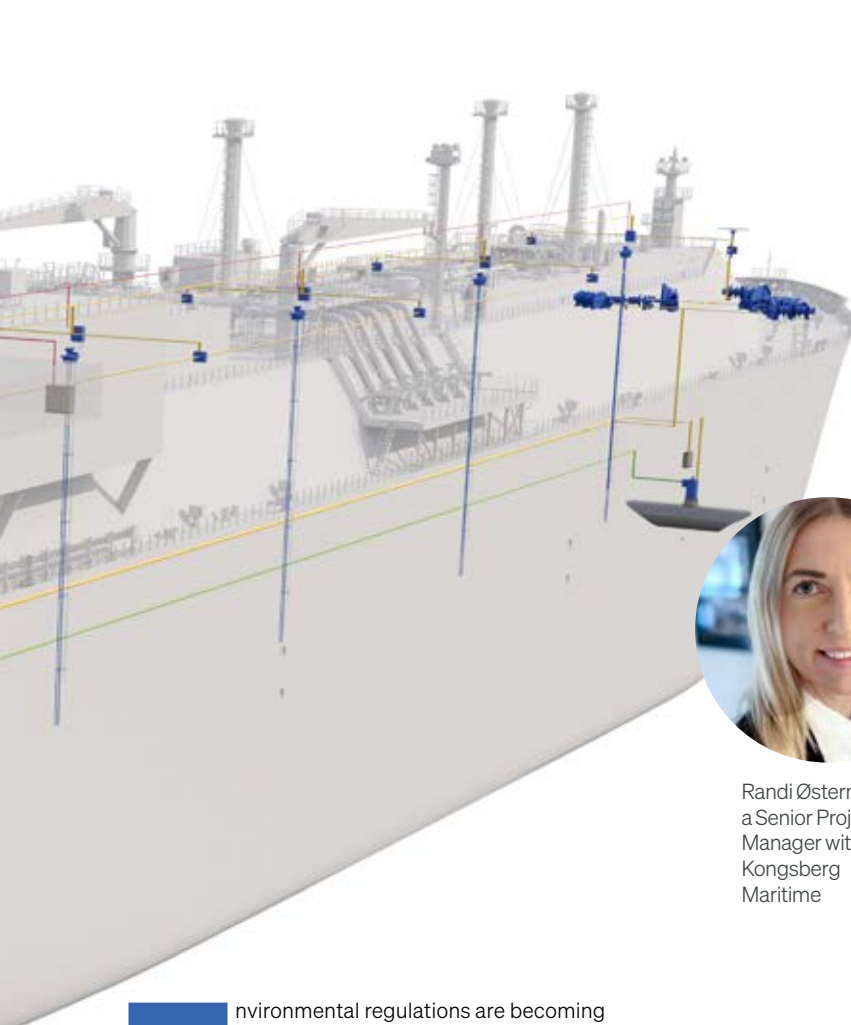
Kongsberg Maritime is proud to be the driving force behind digital excellence – and Tejbir is proud to be the captain of a shipping project that has the wind in its sails. ●



Ship operators can use the latest CEMS technology to track emissions

Emissions compliance and fuel efficiency: a double benefit

Kongsberg Maritime's new Continuous Emissions Monitoring System (CEMS) uses comprehensive data gathering combined with industry-leading integration to help ship owners and operators prepare for new environmental regulations and make future proofing fleets easier.



Randi Østern,
a Senior Project
Manager with
Kongsberg
Maritime

Environmental regulations are becoming increasingly stringent, leaving the maritime industry with the dual challenge of maintaining efficiency and ensuring compliance with international emissions standards. Kongsberg Maritime's new Continuous Emissions Monitoring System (CEMS) offers a robust solution to this challenge, providing owners and operators with the tools to prepare for the evolution of emissions regulations.

Know your emissions

CEMS uses advanced sensor technology to measure a wide range of greenhouse gases, including CO₂, CH₄, SO₂, NO, NO₂, and CO, which may be present in the exhaust. This provides accurate and continuous data so that ship operators can ensure compliance both now and in the future.

The system allows for comprehensive emission analysis and real-time monitoring which is impossible with traditional methods such as flow metering, which merely calculates emissions based on fuel consumption.

"Calculation methods are to some extent based on manual inputs and are inherently imprecise. In addition, they only give you half the picture. If the emissions start increasing with the same operational pattern, calculation methods are not able to give any insight into the combustion processes. With CEMS we can give the shipowner the full picture," says

**"With K-Chief integration,
diagnostic support can be done
remotely with full cybersecurity
protocols in place"**

Randi Østern, a Senior Project Manager with Kongsberg Maritime who led the development of the system.

"With CEMS, owners can measure how much of each greenhouse gas is in the exhaust to find out more about what happened to the fuel in the engine."

The system, which uses a cold dry extractive method, also guarantees that all emissions data from all combustion sources is accurately captured and stored for further analysis. This is vital in any decarbonisation plan.

"Ship owners need to comply with upcoming regulations that are tightening, year by year," says Randi. "The key to future proofing vessels is emissions monitoring."

Randi also points to the quality of data recorded by CEMS. "This is what our clients want – reliable data from sensor to cloud."

Future proofing made easier

Kongsberg Maritime's CEMS integrates tightly with the company's K-Chief vessel automation system, which makes it much easier for a vessel's crew to read and interpret emissions data. A single interface shows operational data along with emissions data. The system's ability to automate and streamline the monitoring process reduces manual efforts and errors, enhancing overall operational efficiency.

The system also allows vessel owners and operators to make decisions on operational efficiency and thus focus on unexplored areas of cost savings. Real-time maintenance alerts to the crew ensure that any issues can be addressed promptly.

This helps maintaining the accuracy of the emissions data and reduces the risk of non-compliance due to equipment failure. The modular design of CEMS is flexible and easy to install, making it ideal for existing vessels as well as newbuilds.

CEMS allows vessel owners to have greater confidence in their maritime assets. As environmental regulations evolve, having a reliable and advanced emissions monitoring system in place ensures that your vessels remain competitive with less stranded asset risk.

Randi notes that most vessel owners have yet to invest in CEMS. "A lot of vessel owners are considering fleet-wide installation," she says, "and we have worldwide support for this technology."

Any CEMS will require regular maintenance, and Kongsberg Maritime has a global network of support centres that can assist vessel owners. Moreover, with K-Chief integration, diagnostic support can be done remotely with full cybersecurity protocols in place.

Kongsberg Maritime CEMS is a powerful part of an owner's toolkit for future proofing fleets. By combining the data technology, integration and global support network, shipowners and operators can reliably and economically ensure emissions compliance. And that is in everyone's interest. ●



Energy solutions

The answer? It's blowing in the wind

The latest sail technology supplies customers with solutions that are built to endure. They aren't just a quick fix. Kongsberg Maritime's K-Sail system provides the power to do things differently in the global shipping industry.

A variety of wind technologies have gained popularity over the past decade, offering ship owners a relatively 'quick fix' in terms of tapping into the power nature to help reduce fuel consumption and emissions on a range of merchant ships.

Kongsberg Maritime, with its extensive experience of integrating technologies across thousands of ships, has developed a new system to integrate wind-assist solutions. More than simply enabling the 'bolt-on' of wind technology, K-Sail optimises the use of wind technology as part of a fully integrated ship system and, crucially, adds value to any investment in wind technology.

With a background in aeronautical engineering, Henrik Alpo Sjöblom, Kongsberg Maritime's Vice President Business Concepts, knows a thing or two about air flow and the forces and interactions between wind and solid surfaces. He says: "Wind-assist technologies are great way of providing thrust to boost the propulsive power of a ship. Wind is essentially a free source of energy, but managing the way it is used, alongside all the other variable systems on ship is the key to maximising the use of this natural resource."

Henrik explains: "K-Sail is a solution where we make different ship equipment play with each other, better. Putting a sail on a ship is of course not new. But the essence of using it successfully lies in the integration of these sails into the ship's systems."

Managing the unpredictable

"Consider a ship with a comprehensive range of equipment installed. If there's a good level of integration, things are connected, working well and helping to optimise the operation of that ship. Also, the crew will be familiar with how everything works together. If you then add

in something as unpredictable as suction sails, then that existing integration will be disrupted.

"You can get problems when you put the sails on. For example, extra thrust means the engine starts to run too fast, and you need to adjust the steering and power management systems accordingly."

K-Sail addresses these challenges through a holistic approach, ensuring all systems work seamlessly together. "We start planning the whole package, the whole voyage, with a fully integrated energy system according to the upcoming forecast, including wind, currents and waves.

"Ship owners can choose their preferred type of wind assist technology. There are several available and they all have their own attributes. However, to date, these technologies, whether incorporated in a new build, or retrofitted, are essentially an add-on technology. We believe they can be used in a much more effective way."



Henrik Alpo Sjöblom

Versatility and integration

One of the key features of K-Sail is its versatility. Henrik emphasises: "Regardless of the sail type that a ship owner selects, our system remains the same, it can work with them all. In fact, it can even work without sails on vessels with high windage like a car carrier, as an example."

The integration process involves analysing the vessel and its operational route, selecting the appropriate sail technology and then optimising the ship's systems around this technology. (see panel, right, for an overview of different wind technologies.)

Wind assist technology
cuts operational costs
and is better for the planet

The optimisation process for K-Sail is comprehensive and divided into five key areas.

First, the analysis phase involves understanding the vessel's operational parameters and selecting the appropriate sail technology. This step is crucial for tailoring the solution to the specific needs of the ship and its route. Next, steering optimisation is performed to adjust the steering system, accommodating the additional thrust generated by the sails. This ensures that the vessel maintains optimal manoeuvrability and control.

Following this, propulsion optimisation is carried out to ensure that the propeller operates efficiently with the added wind propulsion. This step maximises the propulsion system's performance, contributing to overall fuel savings. Power management is another critical area, where the power generated by the sails is balanced with the ship's energy requirements. This involves integrating the sails into the ship's energy management systems to ensure seamless operation.

Finally, voyage optimisation uses AI and real-time data to optimise the vessel's route and speed for maximum efficiency. By considering factors such as wind, currents and waves, this step ensures that the vessel

"The integration of K-Sail into Tärntank's vessel resulted in significant fuel savings"

operates at peak efficiency throughout its journey.

K-Sail provides real time analysis of all these variable factors.

Wind power driving Tärntank's eco journey

One Kongsberg Maritime customer that not only sees the benefit of investing in wind technology, but in full integration is Tärntank, a Swedish ship owner operating a fleet of chemical tankers. In 2025, the first of five it has on order will utilise wind power, a first reference for K-Sail (see pages 22-23).

Henrik says the project highlights the practical benefits of K-Sail. He says: "We looked at the vessel, saw how it operated, tested different sail technologies and realised that for the specific operation of the Tärntank vessels, the best solution was suction wind sails. The five tankers are also of Kongsberg Maritime design – NVC 615 – so that level of integration is definitely one of a 'whole-ship' approach."

"The integration of K-Sail into Tärntank's vessel resulted in significant fuel savings and improved operational efficiency. We achieved a net saving from 9 per cent to 15 per cent with a fairly small investment."

K-Sail is about adding value and optimising any investment in wind-assist technology, offering a sustainable and efficient solution for shipowners. Its versatility makes it suitable for various types of vessels, including cargo ships, cruise vessels and offshore platforms. Through smart integration K-Sail optimises voyages, saves fuel, cuts emissions and reduces operating costs. As Henrik aptly puts it, "Our trick is to bring added value to the investment when the shipowner invests in the sails." ●

Wind technologies at a glance

Flettner Rotors: These cylindrical sails harness wind energy through the Magnus effect, creating a force perpendicular to the wind direction. Flettner Rotors are known for their high performance on a small footprint and can be easily retrofitted to older vessels. K-Sail can integrate Flettner Rotors into the ship's propulsion and steering systems, ensuring optimal performance and fuel savings.

Suction sails: Suction sails use an aerodynamic thicker wing profile to generate lift, maximising efficiency. These sails are particularly effective for general cargo ships. K-Sail supports the integration of suction sails by optimising the ship's power management and energy systems to complement the additional thrust provided by the sails.

Soft sails: Traditional soft sails are still widely used and can be adapted for modern commercial vessels. K-Sail can integrate soft sails into the ship's existing systems, ensuring they work in tandem with the propulsion and steering mechanisms.

Rigid sails: Rigid sails, such as WindWings® and OceanWings®, offer a robust and efficient solution for wind propulsion. These sails are designed to withstand harsh maritime conditions and provide significant fuel savings. K-Sail can integrate rigid sails into the ship's energy management systems, optimising their performance and ensuring seamless operation.

Kongsberg Maritime is committed to working with sail providers to integrate their technologies into larger ship systems. By collaborating with various wind technology manufacturers, K-Sail ensures that each sail type is optimised for performance, contributing to the overall efficiency and sustainability of the vessel.

Read more about Kongsberg Maritime wind-assist technology on pages 22-23.

Sail technology brings major
benefits for ship owners

A natural partnership

Kongsberg Maritime takes pride in long-lasting relationships with customers that are built on trust. Tärntank is one such customer and these close ties are delivering greener, leaner ships.

Tärntank Ship Management AB, based in Donsö, Sweden, has long been a pioneer in integrating advanced green technologies into their fleet of low-emission chemical tankers.

The company's partnership with Kongsberg Maritime stretches back to the 1970s when the first cargo vessels, designed by Norwegian company Nordvestconsult, joined the fleet.

In 2025, Tärntank takes delivery of the most advanced vessel yet, incorporating a range of technologies, including wind power, to ensure it's ahead of the game when it comes to emission regulations.

Tärntank, and in particular its CEO, Claes Möller, has long been a fan of Nordvestconsult's 'NVC' family of cargo ship designs. They have evolved considerably in recent years and now form a key part of Kongsberg Maritime's ship design portfolio.

"We have developed a long relationship with Kongsberg Maritime, founded on mutual trust, respect and a shared commitment to tackling complex maritime challenges,"



Claes Möller

he says. "We like the NVC designs and value the close relationships we have with the ship design team and the numerous technologists across the company."

Tärntank operates a modern chemical tanker fleet, with variations of the Kongsberg Maritime NVC 615 CT design. The development of the earlier ships focused on hull and propeller performance, engine and fuel efficiency, resulting in a remarkable 38 per cent reduction in fuel consumption. The data received from Kongsberg Maritime's Vessel Insight platform offers valuable opportunities to analyse and determine the next steps in the ongoing collaboration.

Subsequent batches of the NVC 615 CT have incorporated batteries, shore power and DC-link systems, leading to an additional 8 per cent fuel saving. Kongsberg Maritime's automation systems have been key in operating these auxiliary systems efficiently, further enhancing fuel savings.

These modern, hybrid, 15,000 DWT ships, including the *Tern Island* and the *Tern Fors*, are popular with customers and crews alike, and have lived up to their performance expectations.

The newest vessel, the seventh in the series, will feature wind-assist technology, in the form of four suction sails. A total of five such vessels have been ordered to date and will play a big part in realising Tärntank's sustainability

Customers appreciate modern, hybrid ships such as the *Tern Fors*





The latest vessels will feature wind-assist technology

goals, aiming for net zero emissions by 2040. Claes says: “The reduced fuel consumption, advanced vessel design, automation systems and digital optimisation all contribute to this ambitious target. The use of electro fuel engines further underlines our commitment to environmental stewardship, and of course the addition of suction sails will make these vessels even more efficient and compliant.”

Calculating with accuracy

“The decision to integrate wind assist technology was driven by Kongsberg Maritime’s well-researched concepts, demonstrating the potential fuel savings,” says Claes.

“We have a great deal of faith in calculations, which draw on a huge amount of operational data. Over many years of collaboration, Kongsberg Maritime’s theoretical calculations have consistently matched reality and we believe in them wholeheartedly. For instance, when we ordered the first vessels, everything was calculated with the Promas propulsion system. The model tests confirmed that the theoretical figures were spot on, which reinforced our confidence in the Kongsberg Maritime team’s expertise. And today, these vessels perform exactly as predicted.”

However, the design and integration of wind technology posed new challenges, particularly in utilising robust sails capable of withstanding the harsh conditions of the west coast of Norway. Kongsberg Maritime works with all the major wind technology providers, and through its new K-Sail solution can optimise the use of wind technology as part of a fully integrated ship system (see pages 20-21).

“We have a great deal of faith in calculations, which draw on a huge amount of operational data”

Positive vision of the future where innovation continues to inspire

Looking ahead, Tärntank is preparing for the delivery of the first wind-assisted vessel, with subsequent deliveries scheduled through 2027. Claes Möller says: “The first ship with suction sails will be operational in Europe this summer and will be fully integrated into our Scandinavian trade routes. We’re very excited to embrace wind power as part of Tärntank’s vision for the future, and we’re now looking to the future to see how else we can raise the bar even higher. That includes exploring fuel cell solutions to reform methanol into hydrogen, providing auxiliary power when vessels are at anchor, so our pursuit of an even more efficient fleet never stops.”



Per Egil Vedlog
Image © Cecilie Hatloy

Claes reiterates the importance of detailed calculations in ensuring optimal performance. “Kongsberg Maritime helped us with a comprehensive feasibility study, using NASA wind data from the past 20 years to determine the best type of sails for our trading routes. In the areas we operate we have predominantly westerly winds, so we needed to select a technology suited to those conditions.”

As Tärntank takes delivery of these five new vessels, its fleet will comprise 11 Kongsberg Maritime-designed ships.

Per Egil Vedlog, Kongsberg Maritime’s Chief Designer, Ship Design Solutions, sees a growing trend for cleaner, more efficient cargo ships, and has been leading the development of Tärntank’s fleet designs.

He says: “We are embracing the fuel transition and a big desire to adopt sustainable technologies. Our new chemical tanker designs for Tärntank really are the next generation of cargo ship, with a combination of energy saving technologies.

“The NVC 615 is based on our super-efficient hull form, and features progressive steps to improve efficiency, through the use of methanol fuel, batteries and now wind-assisted propulsion on the final five. These will be highly efficient ships and will have an Energy Efficiency Design Index above 40 per cent below the 2025 Phase 3 requirements.” ●



Milestone

60

years of drive

Kongsberg Maritime's azimuth thrusters have been around for 60 years and are vital to a wide range of vessels thanks to the breakneck pace of innovation. However, it wasn't until a pair of supersized azimuth thrusters powered a Finnish icebreaker in the 1990s that the industry started taking azimuth thrusters seriously.



The largest order for UUC underwater mountable thrusters to date was for the innovative Allseas heavy lift vessel *Pioneering Spirit*. The picture shows the 13 thrusters being loaded for the voyage to the buildyard in Korea



The technology around azimuth thrusters has developed since the early years

Few revolutions in maritime technology have been as far-reaching as the azimuth thruster – so named because it features a propeller that swivels 360 degrees around a vertical axis.

Today, the applications are wide-ranging, and it is hard to imagine the commercial maritime industry without them. Azimuth thrusters are on tugboats and offshore vessels, and cruise ships use them to access tiny harbours.

Yet, the technology was largely ignored for most of its design and development history.

Patents on concepts and designs for an azimuth thruster were issued in the United States and the United Kingdom throughout the 19th century. Engineers only started to develop the technology in the 1950s. The first azimuth thrusters from Finland, built at what is now Kongsberg Maritime's Rauma facility, debuted in 1965. The power rating was just 50 horsepower (37 kW).

By 1975, azimuth thrusters were available in power ratings from 100 to 800 hp, but overall production volumes were small, and the technology was not considered appropriate for large vessels.

Developments aiming for efficiency or improved bollard pull continued and new models were launched. The Contaz thruster, which used contra-rotating propellers to recover swirl energy for more thrust, was introduced in the 1990s.

How offshore stopped worrying and learned to love azimuth

Yet, the widespread view among builders and owners at the time was that “proper”, ocean-capable vessels needed propeller-and-shaftline systems, according to Juha-Pekka Vesa, Kongsberg Maritime's Manager – Products, Thruster Systems. Ships equipped with azimuthing thrusters as their main propulsion were simply not considered “real ships”.

The big break came in the early 1990s with an order for azimuth thrusters for two 116-metre Finnish icebreakers. Each thruster weighed 240 tonnes – a massive step up in size and capacity from previous models.

“It really was the proof that a very large azimuth thruster could be built and that we could actually make a thruster that can cope with harsh conditions and be reliable,” says Juha-Pekka. These new ARC thrusters were game changers in the common perception of what azimuth thrusters could do.

“That really proved that we could make some really heavy stuff for really heavy duty. I would say that once we had that reference, it worked as a spin-off for the big boom we had on the UUC [Underwater Unit Complete] thrusters found on large drill ships and offshore rigs,” he says.

“Nobody knew whether an azimuth thruster construction could be scalable to that size,” says Tommi Pitkänen, Kongsberg Maritime's Vice President Customer &

Milestone

Delivery Operations – Thruster Systems. Nobody had ever built the components required for such large azimuthing thrusters. And yet, both vessels are in operation to this day, still using their original ARC thrusters.

Both Juha-Pekka and Tommi agree that those first ARC thrusters opened the way for azimuth thrusters to be widely adopted by the offshore energy industry in the late 1990s.

Widespread adoption led to more experimentation and innovation. In 2002, Azipull thrusters were released. These featured a propeller in front that would pull water over a specially designed pod. Azipull was suited for higher speed applications and trials showed performance gains of up to 20 per cent.

The pace of innovation quickens

The quest to reduce carbon emissions has dramatically shifted the story around the development and innovation for azimuth thrusters.

“In a way, things have changed more in the last 10 years than they ever have,” says Juha-Pekka. “The focus on electrification, environmental values, sustainability – these kinds of things – has really rocketed in the past decade.” For an azimuth thruster, that may mean ensuring clean operation, maximising bollard pull or raising fuel economy.

He estimates that azimuth thrusters are now about 10 per cent



UUC underwater mountable thrusters are removed and exchanged during a drill rig's normal docking period

60 years of azimuth thrusters

Steerable azimuth thruster no 1



Steerable azimuth thruster no 1 went into service in May 1965, propelling the mud hopper barge *Palko* with 60 kW of power.

Ice-strengthened models



Ice-strengthened models rated at 7,500 kW with DNV Polar 10 ice class were fitted to the ice-breakers *Fennica* and *Nordica* in 1993.

Underwater mountable units



Large underwater mountable thrusters, with more than 5,000 kW of power, were developed for drills ships and semi-submersible rigs.

UUC Allseas



The largest order for UUC underwater mountable thrusters to date was for the innovative Allseas heavy lift vessel *Pioneering Spirit*. More than 1,000 thrusters have been delivered to date.

more efficient overall than they were 10 years ago. For vessels that operate on their thrusters for extended periods, such as ferries, that translates into big savings in fuel and emissions.

He also points to the way in which the motors have become more tightly integrated with the thruster, whether it is an L-drive configuration, rim-drive mechanism or the new Elegance podded propulsor. The result is a shrinking footprint and more space onboard, which leads to new design possibilities. Larger fuel tanks and bigger batteries are possible or, as Juha-Pekka recalls, a cruise ship that used the extra space to store more ice cream.

The power rating for a given thruster size – the amount of power that can be ‘pushed through’ a thruster – is also rising rapidly. “Basically, from the same amount of steel, we get about 30 per cent better output today compared with what it used to be,” says Tommi.

“As we say in engineering, the amount of steel times intelligence is a constant. So, the more intelligent you are, the less steel you need,” Juha-Pekka says. “That means you can push a lot more power through the equipment if you make it intelligently.”

Achieving such targets has required a continuous process of innovation over decades, thanks to Kongsberg Maritime’s

“We see these past 60 years as a vast amount of experience and knowledge, and that’s a valuable asset”

engineering teams and in-house Hydrodynamic Research Centre, in Kristinehamn, Sweden.

Tommi and his team are hard at work raising steering speed, i.e., the speed at which the propeller pods rotate about their axis. The industry standard was two rotations per minute. Kongsberg Maritime has developed a rotation speed of five times per minute for applications in the offshore wind industry.

They are also developing azimuth thrusters that require overhaul maintenance once every 10 years rather than once every five years.

As Kongsberg Maritime engineers expand the capabilities of azimuth thrusters, so the potential range of applications grows. “A vast number of vessels can actually benefit from this technology and the span of vessels that can benefit is increasing all the time,” says Juha-Pekka.

The popularity of azimuthing solutions is indeed growing. Approximately 8,000 of the 10,000 azimuth thrusters from Kongsberg Maritime’s Rauma facility have been delivered in the last 20 years.

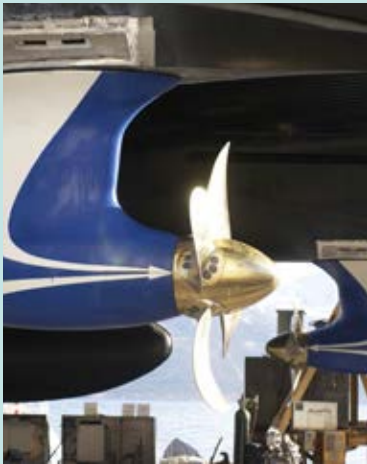
“We see these past 60 years as a vast amount of experience and knowledge, and that’s a valuable asset,” says Juha-Pekka. “It’s a big legacy that we have for the benefit of the future.” ●

US thrusters and tugs



Azimuth thrusters and tugs were an ideal match conferring new levels of precision manoeuvrability.

Azipull pulling thrusters



The introduction of the Azipull pulling thruster has improved propulsive efficiency for vessels with a high top speed. It has been selected for a number of commercial vessels where precise manoeuvring is also important.

Rim-drive azimuth thrusters



Innovative rim-drive azimuth thrusters, featuring permanent magnet technology, offer enhanced manoeuvrability, efficiency and low-noise operation.

Elegance pods



Elegance podded propulsors, incorporating permanent magnet technology, deliver superior performance, reliability and low-noise solutions, offering advanced electric propulsion technology for the future of shipping.

Kongsberg Maritime's skills and knowledge are at the heart of a vessel that will use green energy to take shipping to higher levels of excellence.

She's electric: ship project hits new heights

In a groundbreaking move for the offshore energy industry, UK company Bibby Marine is set to launch the world's first full-electric commissioning service offshore vessel, or eCSOV.

This innovative new vessel will feature a range of technologies from Kongsberg Maritime, as well as the world's largest installed battery capacity, enabling long periods of emission-free operation.

A vision for green maritime solutions

Bibby Marine's journey towards green solutions began in 2019 with the WaveMaster Zero C project, exploring alternative fuels such as hydrogen, ammonia and methanol. Through a series of funded studies, including the Clean Maritime Demonstration Competition (CMDC) and the Zero Emission Vessel and Infrastructure (ZEVI) project, Bibby Marine was awarded nearly £20 million by the UK Government (from ZEVI) in 2023 to develop a zero-emission service operation vessel.

Gavin Forward, Bibby's New Build Director, says: "We started our green journey by looking at alternative fuels and battery technology, and through various studies we realised that the best solution for an SOV was methanol as an alternative fuel."

One of the key features of the eCSOV is its 25MWh Blue Whale Battery Energy Storage System, supplied by Corvus Energy. This lithium iron phosphate (LFP) system is the largest planned maritime battery installation to date on an offshore vessel, enabling the vessel to operate entirely on electricity for up to 24 hours. The decision to go with such a large battery capacity emerged from the need to optimise the operational profile, which includes sailing approximately 14 nautical miles infield a day and making up to 10 connections to turbines, and to ensure 15-year guaranteed operational life.

Kongsberg Maritime's comprehensive equipment package is at the core of the vessel's advanced systems. It includes full-electric rim-drive propulsion with azimuth, retractable and tunnel thrusters, an automation system, a full electrical control system, Dynamic Positioning (DP) and thruster control.

"The integration of Kongsberg Maritime's equipment has been crucial," Gavin adds. "Their package ensures that all systems work seamlessly together, optimising performance and reducing energy consumption."

The rim-drive thruster system is a novel type of electric propulsion unit that mounts the propeller blades on an outer ring rather than a central hub, eliminating the need for a shaft and gearbox, reducing noise and increasing efficiency.

"The rim-drive thruster system offers significant benefits in terms of noise reduction and DP capability," Gavin says. "We hope to exceed the V2C2 requirements from DNV when operating on battery, ensuring a quiet and smooth operation, which is crucial for our offshore wind market clients. This has the potential to be the quietest vessel in the market. Rim-drive also enhances manoeuvrability and efficiency, so it's an ideal choice for this type of ship."



Gavin Forward says that Kongsberg Maritime's work has been crucial



The new vessel will be quieter and more efficient

Unlike many new vessels that are methanol-ready, the eCSOV will be capable of full operation on methanol from the start. Methanol was chosen for its energy density, compatibility with diesel and the ability to achieve true zero emissions when using green methanol.

The vessel's twin 3.5MW engines will run at constant load to charge the batteries, ensuring the most efficient operation and reduced emissions. Gavin is optimistic that offshore charging, taking power directly from the wind field, will be available by the time the vessel enters service in 2027.

"The vessel will be prepared for offshore charging. All the hardware will be installed for 11 kV AC charging up to 6MWh at 50Hz, and that means being fully charged in four to five hours.

"We will be fully tested and commissioned at sea trials, using methanol from the start of operations. If our end client wants to charter the vessel with green fuel, we can bunker with green methanol and leave the yard with zero emissions."

Unlocking the power of data

Digitalisation will also play a crucial role in optimising energy use. The integration of Kongsberg Maritime's K-IMS system and third-party AI modelling software to collect and analyse data will enable route optimisation and manage efficient battery usage throughout the vessel's life.

"We want to collect as much data as possible and use AI modelling to optimise our operations"

"We want to collect as much data as possible and use AI modelling to optimise our operations," Gavin explains. "This will help us reduce the battery pack size for future vessels and improve overall efficiency."

The eCSOV is designed to provide a high standard of living and working conditions for its crew and windfarm technicians.

"We've focused on making the vessel as comfortable as possible," Gavin says. "The accommodations are hotel-standard, with large open and bright spaces. We've also separated clean and dirty zones to keep noise and vibration down and optimise workflow onboard."

The eCSOV is set to operate in UK and European waters, aligning with Bibby Marine's commitment to green maritime solutions. Gavin is proud of the company's innovative approach and its potential to lead the market in battery-electric vessels.

"We're a UK-owned and operated family business with 200 years of history in the maritime sector. We aim to be the go-to supplier for battery-electric vessels in the SOV market, delivering high-end, bespoke assets."

Bibby Marine's new eCSOV stands as a testament to the possibilities of green technology and sustainable operations. With its groundbreaking design and advanced equipment package, the vessel is poised to set new standards for efficiency and environmental responsibility in offshore operations. ●

Digital technology is at the heart of this groundbreaking ship



Mooring innovation puts flexibility front and centre

Kongsberg Maritime has developed a mooring capable solution for offshore construction vessels that significantly enhances their operational scope.

A shortage of vessels capable of large-scale mooring installations has led Kongsberg Maritime to develop a new system that allows offshore construction vessels (OSCVs) to handle more tasks independently.

The new solution has many benefits and features, according to Runar Hjelle, Kongsberg Maritime's Sales Director for Offshore Construction & Support. He says: "Our new mooring capable solution integrates a purpose-designed anchor handling winch, shark jaws and stern rollers into OSCVs at the newbuild stage, enabling vessel owners to equip their ships for a broader range of mooring operations. It means OSCVs can handle more tasks independently.

By incorporating these relatively simple components, vessels will be able to perform pre-lay of mooring lines as a natural extension of their original subsea and suction anchor capabilities.

There are several benefits to having a mooring capable OSCV. Firstly, it allows vessels to carry out a larger portion of mooring operations, extending their operational capabilities and reducing the need for additional vessels at the field. This



Runar Hjelle

expansion of operational capabilities leads to significant synergies for the field developer, leading to cost efficiencies and easier vessel scheduling. Additionally, having winches and stern rollers enables safer and more efficient over-stern deployment of mooring lines.

The winch system can either be permanently installed or portable and loaded on board only when it's needed, offering flexible installation options. The shark jaws and stern rollers are permanently fitted to the ship, taking up minimal deck space. Therefore, there is little impact on the ability of the vessel to carry out the subsea construction tasks it is designed to do.

The subsea crane, a common feature of OSCVs, can lift and install suction piles, as well as hold the load of the mooring chain. The baseline winch package includes one drum for work wire and two cable lifters for handling chain. However, additional winch capacity, such as increased capacity and active heave compensation, can be built into the solution, if

Vessels can now carry out a wider range of mooring operations





The winch system can handle high loads



needed. In combination with superior Dynamic Positioning (DP) capabilities and a large deck area, this makes for an efficient installation vessel.

The winch system is designed to handle high loads and operate in harsh offshore environments. It includes advanced control systems for precise handling of mooring lines and anchors. The shark jaws and stern rollers are engineered to withstand the rigors of offshore operations, ensuring reliable performance and safety. The combination of the mooring capable solution and the subsea crane, which is equipped with advanced lifting capabilities to easily handle heavy suction piles and mooring chains, further enhances the versatility of OSCVs.

Addressing market challenges

"In the years to come, there will be a lack of vessels with subsea crane and sufficient deck area suited to support the planned high volume of large anchors. With the addition of this system, OSCVs become a more attractive and efficient solution," says Runar.

Several options exist for different vessel types. Firstly, for the conventional OSCV, it would be equipped with a large deck space and offshore crane, so it can install suction piles. However, connecting mooring lines to anchors often requires active heave compensation, which necessitates either an offshore crane or a heave-compensated winch.

High mooring rope capacities are also required, excluding many vessels currently in the market. A specialised mooring installation vessel, which typically features an offshore crane, significant engine power, bollard pull, and comprehensive winch and deck equipment package for mooring work, is the ultimate solution for large mooring installations. However, the building costs for such a vessel are high compared to a mooring capable OSCV.

Finally, for ad hoc OSCV mooring operations, such as hang-off frames, lay-towers and chain handled by crane, these

"With the addition of this system, OSCVs become a more attractive and efficient solution"

operations are not standardised and often carry operational risks and inefficiencies.

Key components

A large deck space is required for anchors, equipment and reels. An offshore crane is essential for installing anchors, connecting mooring lines and lifting reels. A stern roller is necessary for the mooring line to pass over. In addition, tow pins and shark jaws control and secure the mooring line.

There is a winch with chain wheels and drum for handling chain and wire, lowering or recovering mooring lines, and holding chain weight. The winch is either low pressure hydraulic or permanent magnet motor electric.

Different deck layouts can ensure substantial fibre rope capacity. While OSCVs may lack sufficient bollard pull for traditional drag embedment anchors, they are well-suited for installing suction piles. Planning marine operations can address the need to pull the inverse catenary of the pile chain, which can be managed by anchor handling vessels during the hook-up phase.

These proposed adjustments to construction vessel newbuilds will position them to take on a larger portion of mooring line installations.

Runar adds: "These vessels have synergies with other field development activities, so the message to owners who are planning newbuilds is simple – why not make your construction vessels mooring installation capable?"

With this solution, OSCVs become a more attractive and efficient option for a broader range of mooring operations, ensuring reliable performance and safety in harsh offshore environments. ●

Bright new horizons

Kongsberg Maritime Brazil, based in Niterói, has spent the past few years gearing up to fully and efficiently support the intensifying Brazilian offshore energy sector.



The outlook is sunny for operations in Niterói, Brazil

Brazil conjures images of dancing, music and beaches. But lying hundreds of kilometres offshore from Rio de Janeiro are some of the world's most potent offshore oil and gas fields, the Campos and Santos basins. The upswing in offshore oil and gas, and the new technology for deep water and ultra-deep-water exploration, promises boom times for Brazil. It's an opportunity that Kongsberg Maritime Brazil has spent years preparing for.

Kongsberg Maritime's office and workshop are in Niterói, just a few kilometres across the bay from downtown Rio. Niterói is the heart of the offshore oil and gas maritime services industry. Set amidst numerous shipyards and anchored offshore vessels, the Kongsberg Maritime team is ready to support the renewed focus on offshore energy.

Kongsberg Maritime Brazil was formally established in 2009. However, it is over the past three years that the operation has grown rapidly thanks to a core team that has supercharged operations.

Preparing for the future

In 2022, new Brazil Country Manager Cristiane de Lamare decided to ramp up her office's operations to meet growing demand for offshore vessel support.

"We decided that we needed to do something dramatic," says the ebullient Cristiane, an economist by training. Along with George Bunker, Regional Quality Americas & Operational Excellence Brazil, and Jorge Vicente, Workshop and Warehouse Manager, she initiated a complete overhaul of operations, starting with a total renovation of the workshop area.

Jorge, a constant presence on the shop floor, set high standards for protocols and procedures, even introducing a QR-code tagging system for



The Brazil base showcases Kongsberg Maritime technology and provides services solutions for customers



approximately 15,000 tools and pieces of equipment. “We’ve taken other workshop managers just to look at what he’s doing and encourage them to do the same,” says Tony Cove, who is in charge of Kongsberg Maritime workshops worldwide.

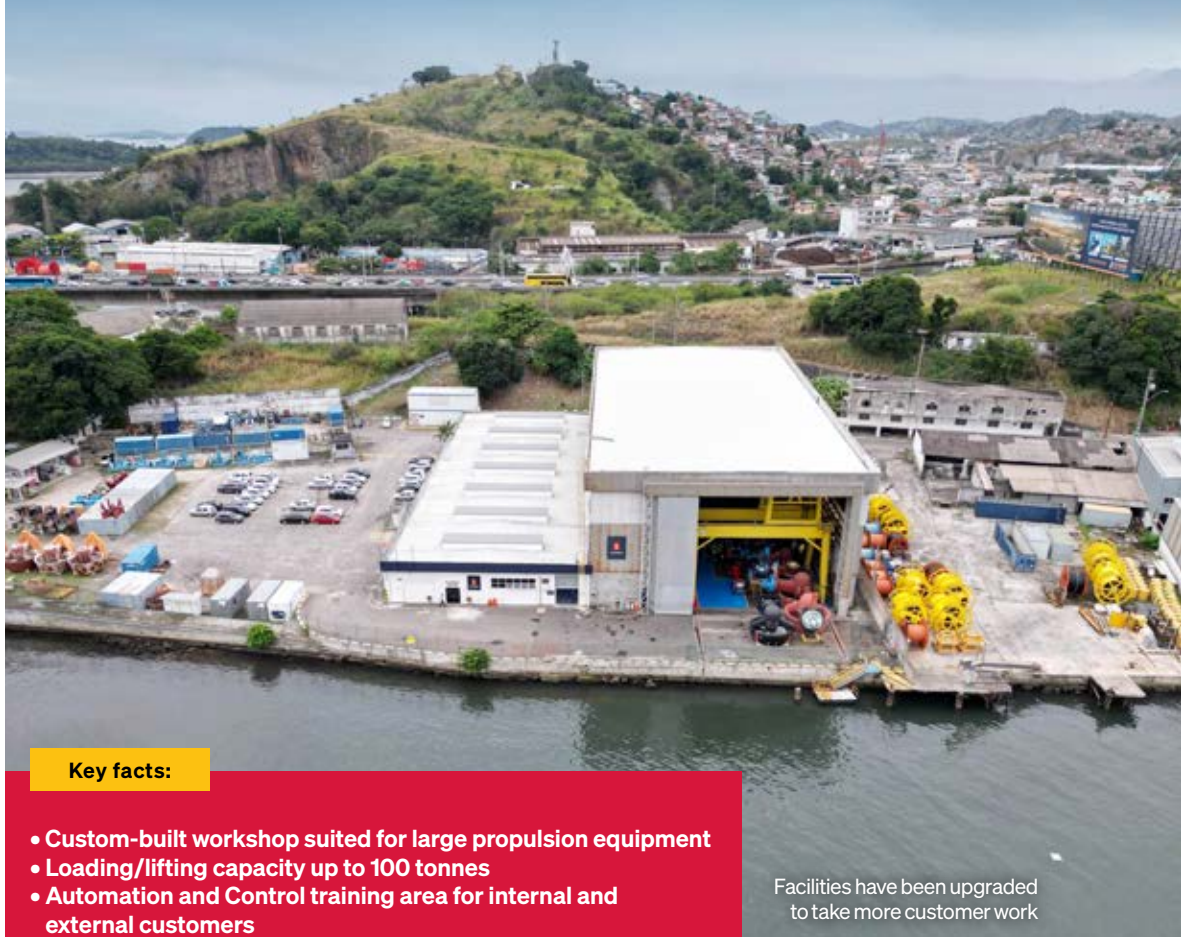
In addition, two new labs have been built using containers. These are focused on automation and control, as well as for offshore drilling operations such as riser management. Training facilities have been upgraded and certified by the Nautical Institute and DNV.

Kongsberg Maritime Brazil’s quayside currently operates with water taxis and shallow draught barges, but it can be further developed to receive other vessel types, and the team expects dredging to take place soon.

Capitalising on offshore energy

The Brazil team’s relentless focus on quality and efficiency is paying dividends. In January this year, Petrobras announced a collaboration with Compagnie Maritime Monégasque (CMM) on six, 92-metre hybrid oil spill response vessels featuring Kongsberg Maritime ship design and equipment. CMM

The workshop area has been overhauled and improved



Key facts:

- Custom-built workshop suited for large propulsion equipment
- Loading/lifting capacity up to 100 tonnes
- Automation and Control training area for internal and external customers
- State-of-the-art bridge simulations system
- Training classrooms and labs.

Facilities have been upgraded to take more customer work

Chief Executive Christophe Vancauwenbergh cited Kongsberg Maritime’s expertise and long-standing

presence in Brazil was “critical to the success” of the bid.

Cristiane says Kongsberg Maritime is “on the list” of preferred suppliers to Petrobras. “We have very good dialogue with Petrobras and this gives us opportunities in the majority of the oil and gas market in Brazil.”

Petrobras is planning to contract several FPSOs that require supporting tonnage, such as shuttle tankers, platform supply vessels, anchor handling vessels and ROV support vessels (RSVs).

The team is excited for what lies ahead, expecting future growth and increased operations, and in deeper waters and more challenging than before.

Offshore oil and gas may be the mainstay, but there are plenty of other opportunities. There is a need for pusher tugs and inland waterway vessels to explore and develop Brazil’s enormous river basins, including the Amazon. Meanwhile, the team has also been winning new contracts to support a growing Brazilian Navy. Cristiane even suggests that shipbuilding activity is starting to come back to Brazil from Asia.

Finally, offshore wind is a huge growth area that Cristiane says will probably start in the next couple of years. In January 2025, Brazilian President Luiz Inácio Lula da Silva signed a bill authorising the development of offshore wind farms. A 2024 DNV report found that Brazil’s offshore wind energy potential exceeds 1,200 GW, comparable to that of Norway.

Getting Brazil’s fleet of offshore vessels up and running will be a massive task. After years of preparation, the Kongsberg Maritime team is ready to make it happen. ●





Waterjets are powering modern vessels on the River Thames

Flexibility

Five wonders of waterjet technology

Kamewa Waterjets offer high performance and unexpected benefits beyond efficiency at high speed. They also provide tight control, extreme manoeuvrability and operational flexibility for the most demanding requirements.

Waterjets are widely known as the high-speed solution for a range of vessels, from naval landing craft to fast superyachts. However, Kamewa Waterjets have a surprising list of capabilities beyond efficient, high-speed operation that some buyers may not yet know about.

1

Shallow water? No worries Operations in just centimetres of water

Kamewa Waterjets can operate in just a few centimetres of water depth, according to Dr. Ammar Saber, a Senior Hydrodynamicist with Kongsberg Maritime's Hydrodynamic Research Centre (HRC) in Kristinehamn, Sweden. Thanks to

the intense engineering and design that has gone into the intake valves and the screening systems, vessels can operate and manoeuvre at speed in shallow waters that would clog other propulsion types or even ground vessels.

In London, Uber by Thames Clippers operates a fleet of 20 ferries, nine of which (Hunt class) are powered by Kamewa Waterjets. Uber by Thames Clippers deployed the vessels to access routes on London's western reaches, where the depth under keel is just half a metre and tidal changes can be dangerous.

Dr. Saber says that tests conducted in the HRC's state-of-the-art facilities have shown the possibility of extremely shallow water operations. For vessels operating along the coastlines of the Middle East and India, where large stretches of ocean have very shallow depths, this could be a key capability.

2 Low speed, tight turns

Turning diameter reduced by up to 50%

Tests by the HRC team show that waterjets can reduce the turning diameter by between 40 and 50 per cent on a 32-metre vessel compared to a traditional propeller and shaftline. Other tests have shown that waterjets can produce rudder forces, such as turning force, up to four times that of traditional propeller-shaftline systems.

That incredible manoeuvring ability, particularly at low speeds, is a huge advantage in a range of maritime operations, particularly in tight harbours. The 63-metre superyacht *Utopia IV*, built by Italian yard Rossinavi, has a high cruising speed of 26 knots. But in tight harbours and marinas *Utopia IV*'s low-speed manoeuvrability allows its captain and crew to moor stern-to with ease.

3 Silence is golden

Reducing underwater noise

Waterjet pumps are located above the waterline, reducing underwater radiated noise and noise inside the cabin. Reducing noise above and below the water can be vital to naval operations or to onboard comfort on passenger vessels such as superyachts or ferries. A growing awareness of the issue of noise has raised demand for quiet solutions in vessel operations.

Kamewa Waterjets offer distinct advantages. A comparison of two naval corvettes, one operating on waterjets and the other on a propeller-shaftline system, found a 13-decibel drop in underwater noise for the vessel propelled by waterjets. Decibels work on a logarithmic scale, so a drop of 10 decibels is perceived by people as halving the noise level.

Kamewa Waterjets are known for powering high-speed passenger ferries. A recent agreement will see two fast ferries built in Singapore and delivered to the UAE, equipped with Kamewa 71 S-4 units. The ferries, with capacity for up to 250 people, will connect the UAE mainland with Dalma Island, which is 42km offshore. Passengers will enjoy quick and quiet journeys thanks to reduced noise.

“Waterjet pumps are located above the waterline, reducing underwater radiated noise and noise inside the cabin”



Impressive manoeuvring ability is an advantage in tight harbours

4 Hero to zero

Emergency stops in 1.5 boat lengths at 30 knots

Vessels operating in unpredictable environments may need to stop suddenly. That could be even more true when operating near offshore structures, where safety and environmental concerns are paramount.

Kamewa Waterjets have the power to completely reverse thrust thanks to their buckets. But in a serious emergency, they can bring a vessel to a dead stop in 1.5 boat lengths at speeds of up to 30 knots. Though not something to be used all the time, this capability adds a real measure of security in vital operations.

Aircat Vessels, a French builder of high-tech crew transfer vessels (CTV), is using Kamewa Waterjets to power their vessels that feature a twin-hull design that creates an air-cushion to raise efficiency dramatically. But the waterjets aboard the Aircat CTVs will allow them to make an emergency stop in case the unthinkable occurs.

5 Sideways movement

30% sideways thrust on command

Waterjets allow vessel movement in any direction, including sideways (aka, crabbing). This contributes to the extreme manoeuvrability capability of waterjet propulsion. Vessels using Kamewa Waterjets can get up to 30 per cent of the total thrust on pure sideways motion. For fine adjustments or for station-keeping in adverse weather conditions, that capability could be vital.

For docking or undocking, navigating narrow channels or waterways, avoiding collisions, or even in marine construction or surveying, lateral movement can be critical.

The Norwegian Sea Rescue Society, which saves lives, salvages assets and protects Norway's coastal waters, has a fleet of 58 vessels, many of which use Kamewa Waterjets. In addition to the speed, the waterjets allow the Society's vessels to hold position or approach victims or stricken vessels in the water and reduce risk while doing so. ●



Underwater noise is reduced thanks to Kongsberg Maritime technology

A position of power

Kongsberg Maritime's Dynamic Positioning system makes anchor handling easier and more efficient for both crew and vessels.

Normand Drott, the 15-year-old flagship of Norway's Solstad Offshore's anchor handling fleet, relies on Kongsberg Maritime's Dynamic Positioning (DP) system to stay competitive as demand for anchor handling tug supply (AHTS) vessels heats up offshore.

The 95-metre anchor handling vessel is a byword for reliability in offshore operations as at the heart of the vessel is the K-Pos DP control system, a crucial component in stability and fuel efficiency, even in heavy seas.

Launched in 2010, *Normand Drott* has a bollard pull of 339 tonnes and a 760-sq. metre deck. It is the flagship of Solstad's fleet of 10 AHTS vessels.

Its captain, Jens Goderstad, is proud of his vessel's versatility. He says: "We mainly do anchor handling and project work related to offshore operations like moving rigs, anchoring them up, mooring up big offshore assets that are going to be used for production of oil and gas."

However, Jens also points to operations beyond offshore oil and gas, with past projects including floating wind farm installations (Hywind, 2017) and even anchoring cruise vessels.

Normand Drott shows no signs of slowing down and the key to its longevity is its K-Pos system. Reliability in station-keeping and stability during operations are vital, says Captain Jens, especially when the crew are working with heavy equipment or connected to subsea assets.

A robust and safe system

"A DP system gives a stable platform to work from. We will have full control of the vessel and

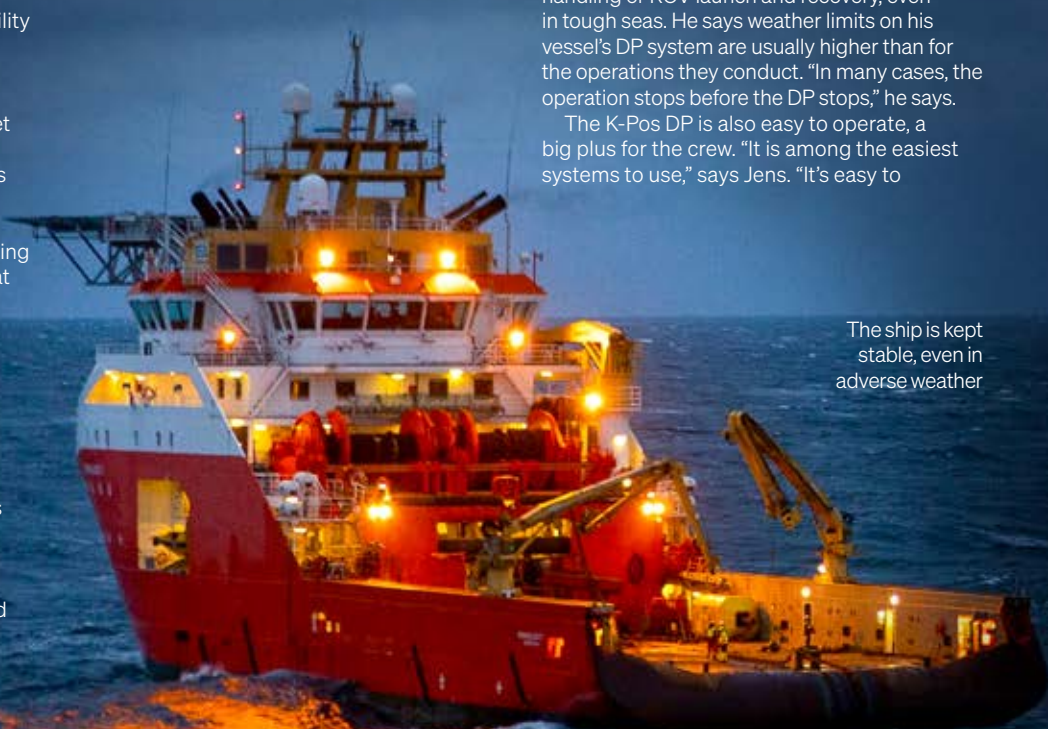
"I don't feel I will lose control of the vessel. When I tell the DP what to do, I know it will do it"

its movements, and we'll be able to keep the vessel in position, which usually can be quite critical," says Bjørnar Solås, *Normand Drott*'s second officer. "The DP system has so many redundancies that I feel safe when I'm using it... I don't feel I [will] lose control of the vessel. When I tell the DP what to do, I know it will do it."

Captain Jens also says that the DP system on *Normand Drott* keeps the vessel very stable during sensitive work such as cable and hose handling or ROV launch and recovery, even in tough seas. He says weather limits on his vessel's DP system are usually higher than for the operations they conduct. "In many cases, the operation stops before the DP stops," he says.

The K-Pos DP is also easy to operate, a big plus for the crew. "It is among the easiest systems to use," says Jens. "It's easy to

The ship is kept stable, even in adverse weather





Captain Jens says that the onboard technology is good for the environment



The system is easy to operate and the crew can put its trust in the software



Second Officer Bjørnar Solås is full of praise for Kongsberg Maritime

understand the different functions, the modes and how to operate it. It is also robust and it doesn't change too much. We don't need new things all the time."

Cutting fuel, saving the sea

One of Solstad Offshore's long-term goals is cutting emissions. In 2009, the company began a campaign to find ways to cut fuel use and emissions. Kongsberg Maritime became a partner in this plan when it signed a decarbonisation agreement with the company in 2023.

Kongsberg Maritime's DP system features a special mode, allowing *Normand Drott* to stay on station in DP while reducing fuel consumption by up to 20 per cent.

"The DP helps us to reduce the loads on the

"Kongsberg Maritime has a good service package. They visit the vessel regularly, updating all the software"



Scan here to see DP in action

engines and then the amount of fuel we are using," says Jens, who adds that in green mode, "we can see that we save some fuel every time. So, we save the environment and save running hours on the equipment on board."

Facing the future

Challenges and changes are inevitable, and Kongsberg Maritime helps customers address issues as they arise, according to Captain Jens.

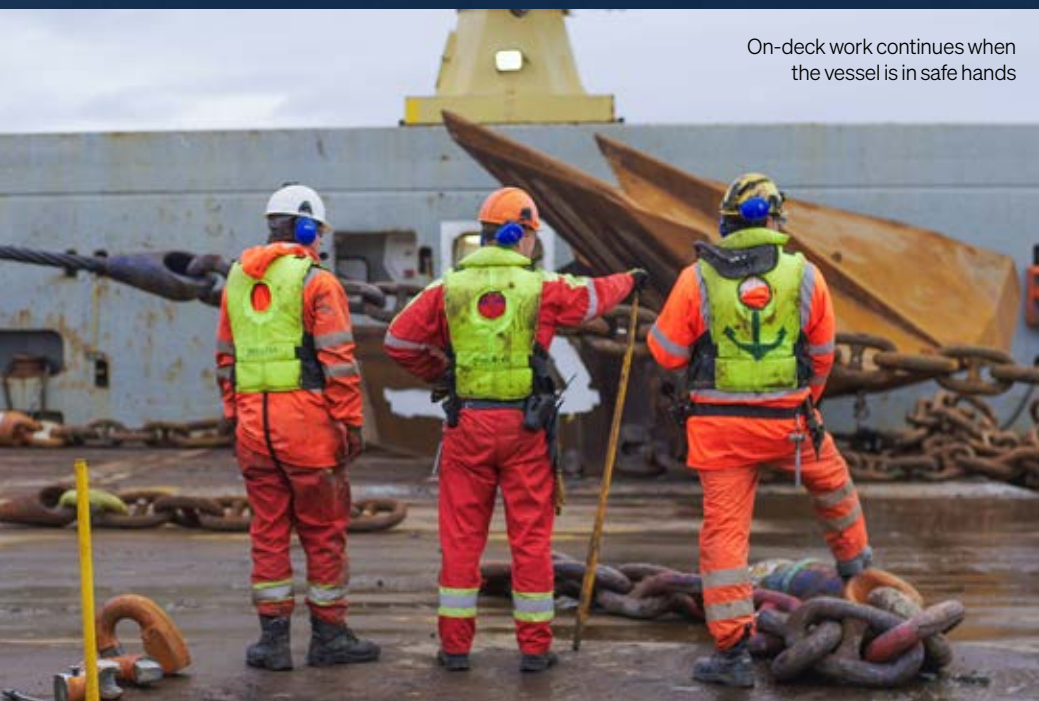
That help is vital to Solstad Offshore, as all its vessels have Kongsberg Maritime equipment onboard. *Normand Drott* has Kongsberg Maritime winch systems, cranes, steering systems and thrusters, all working together to achieve maximum efficiency.

This integration ensures compatibility and efficiency across various systems. The TowCon operating system, for instance, manages all the winches. Bjørnar describes it as "the brain of the whole winch package".

Yet, a system is only as good as the network supporting it. Solas stresses how Kongsberg Maritime keeps his vessel running at maximum capacity. "The company [Kongsberg Maritime] has a good service package. They visit the vessel regularly, updating all the software. We know we have the latest technology."

Captain Jens says it is not always easy to adapt to new technology: "As we see from the contact we have had with Kongsberg Maritime, they are good at reaching out to us and helping us with our challenges, and to try to solve them together, so that we can create the result that our customers want."

The offshore industry may be facing new challenges in efficiency, but it is collaboration between innovative companies such as Solstad and technology leaders like Kongsberg Maritime that is shaping the future of offshore operations. ●



On-deck work continues when the vessel is in safe hands



Electrification

Upgrades

When a ferry operator wanted to embark on a journey to a greener future, Kongsberg Maritime was its partner of choice. Together, the two companies are transforming a vessel to become all-electric – and that's just the beginning.



The MF Hamlet is being converted into a battery-powered ferry

Ferry hits the electric switch

Vessel upgrades are a popular choice for owners, looking to switch to hybrid or electric operation. Ferries are one sector where the benefits can be realised, especially on high frequency, point-to-point routes.

One of Europe's busiest car ferry routes is across the Øresund, a strait between Helsingør, Denmark, and Helsingborg, Sweden, and Kongsberg Maritime is playing a key role in electrifying this crucial transport link.

The MF Hamlet, operated by Øresundslinjen, part of Molslinjen A/S, will this year undergo a conversion to transform the double-ended car ferry into an emission-free, battery-powered vessel. As the third and final vessel used on the route to be converted, the completion of the MF Hamlet will result in an all-electric service for 2026.

The primary goals of this conversion are to achieve zero emissions, enable full electric operation with batteries and ensure mechanical propulsion redundancy. The ferry will utilise high-voltage charging in port, taking only eight to

12 minutes, while low-voltage charging via diesel gensets is available as a backup. This rapid and efficient charging process is crucial for maintaining the ferry's busy schedule across the northern and narrowest part of the Øresund.

Kongsberg Maritime will lead the project, which includes the installation of large battery packs and new permanent magnet (PM) motors for its azimuth thrusters.

The company will rebuild the existing thrusters to electric operation, install new PM motors for each of the four main azimuth thrusters, each rated at 1530 kW, and provide a comprehensive energy, automation and control package. This package includes interfacing with the main switchboard, retrofitting the K-Chief 600 to the new K-Chief system with an energy management system, and implementing Mcon thruster control with new pilot and co-pilot control chairs on the two bridges.

Energy storage systems will be supplied by Echandia directly to the owner, while Øresund Dry Docks in Landskrona, Sweden, will handle the mechanical conversion. The conversion is



The vessel's electrification is part of a wider green transition project

scheduled to start in November 2025 at the dry docks, with preparation work completed in March during scheduled maintenance docking.

The conversion will enable emission-free operation with powerful battery packs for each of the four thruster motors. The thrusters will be powered by electric motors, with the existing diesel gensets providing backup. This hybrid approach ensures reliability and efficiency, crucial for the ferry's regular route across the Øresund.

Kongsberg Maritime's scope includes converting the 'top gear' on the four US 3001 controllable pitch thrusters to twin input, where the primary input is driven by the new electric PM motors and the secondary is connected to the existing diesel engines. The thrusters will remain in situ during the conversion, but the top gear will be removed to enable the fitting of an additional drive shaft directly to the PM electric motors. Currently, there is a drive shaft (with clutch) from the diesel engine to the thruster. With the upgrade, the new shaft will connect to the opposite side of the thruster, linking to the motor.

The ferry will charge its batteries shoreside, connecting to the existing charging robots (10.6MW/10.4kV). Additionally, the ferry will be prepared to install Kongsberg Maritime's Auto Crossing and Auto Docking technology to automate transit and harbour manoeuvres.

The *MF Hamlet* will feature completely new deckhouses on the top deck, with Kongsberg Maritime energy equipment and Echantia batteries being key components. The two bridges will receive new console layouts to improve visibility and new control chairs for the pilot and co-pilot, enhancing ergonomic operation.

Kristian Durhuus, CEO of Molslinjen, expresses his enthusiasm for the project: "We have the strategic vision to electrify our entire fleet to secure the complete green transition and become carbon-neutral in

The Helsingør–Helsingborg ferry route is under three nautical miles and considered one of Europe's busiest ferry routes



2040. The *MF Hamlet* is an important step for us, and we look forward to welcoming our passengers to yet another fully electric ferry on Øresundslinjen."

Martin Kjæraas, Kongsberg Maritime's Head of Aftermarket Sales Seaborne, Integration and Energy, adds: "We are proud to lead the electrification of the *MF Hamlet*. The continuous collaboration between Øresundslinjen, the yard and all sub-suppliers has been exceptional in the project preparation phase, and we look forward to seeing the positive impact this conversion will have on the environment and the efficiency of this busy ferry route."

Reduced emissions, improved efficiency, lower fuel costs and enhanced reliability are just a few of the advantages that come with such upgrades. Kongsberg Maritime's role in this project is the latest example of how the company can help to transform the operation characteristics of not only an individual vessel, but an entire transport link.

Martin adds: "While this is a complex upgrade, the cooperation between the owner, yard and Kongsberg Maritime has been outstanding. By ensuring detailed planning is in place with clear responsibilities, these upgrade projects become straightforward solutions for owners considering a shift to electric operations." ●

"We have the strategic vision to electrify our entire fleet to secure the complete green transition and become carbon-neutral in 2040"



KONGSBERG



Kongsberg Maritime

Offshore life is complex, right?

That's why we simplify vessel operations,
so your bottom line sits higher.

Our smart solutions are designed to make your operations leaner and more effective. Imagine your data working together, helping you boost performance and significantly cut operational costs.

Our technology seamlessly integrates with your existing systems, enhancing your safety protocols, strengthening your resilience, and guiding you towards a more sustainable and profitable future.

For more than 50 years, we have worked directly with the offshore industry to develop effective solutions to actual challenges. Curious how we can make your operations more efficient and profitable?

Let's talk.

kongsberg.com/maritime