

Kongsberg Maritime

Insights

Ship design expertise



KONGSBERG

Featuring

Fifty years
of excellence

Future is bright
for fishing vessels

Featuring

Looking
ahead

Protecting
coastlines

Pole position

Our ships are designed to excel in the world's most hostile waters



KONGSBERG



Welcome

Lisa Edvardsen Haugan,
President – Kongsberg Maritime



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

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Decarbonisation by design

This year, Kongsberg Maritime will mark two very special milestones in the company's long and proud history.

Firstly, it's 50 years since our original ship design teams first produced their innovative designs. We are issuing this special magazine to capture the fascinating story of how our team of ship designers pioneered vessel designs in the early 1970s and to see how, five decades on, they continue to produce some of the most advanced, environmentally efficient ships in operation today.

Our ship design portfolio is extensive, with designs for all market segments. As we reach our 50th year, we're delighted to report that we will also be delivering our 1,000th ship design. In the same way as the first UT 704 platform supply vessel ventured out into the North Sea back in 1974 as a pioneer of its time, our latest state-of-the-art wind farm service operation vessels, the UT 5519 DE, will again be pioneering operations in the energy markets offshore.

As a global technology company, we have an extensive range of innovative and mission critical products and systems, installed on more than 33,000 ships. Having our own ship design capability adds a different dimension to what we can offer our customers. We can fully integrate our equipment within our design and consider a 'whole ship' approach, working with our customers to understand their operational requirements.

There are two parts to our ship design story. The early 1970s, at the dawn of the offshore oil and gas industry, saw the very first vessels designed specifically for the harsh operating conditions of the North Sea. The 'UT-Design' range soon became the benchmark design for the industry and has remained at the forefront of the offshore industry ever since.

In other markets, covering cargo, passenger and fishing fleets, we have delivered around 200 ships from our 'NVC' family of designs. There are some impressive milestones in this backstory, with innovative ships such as car carriers and high-speed RoPax ferries, as well as an extensive range of vessels for the fisheries and aquaculture market.

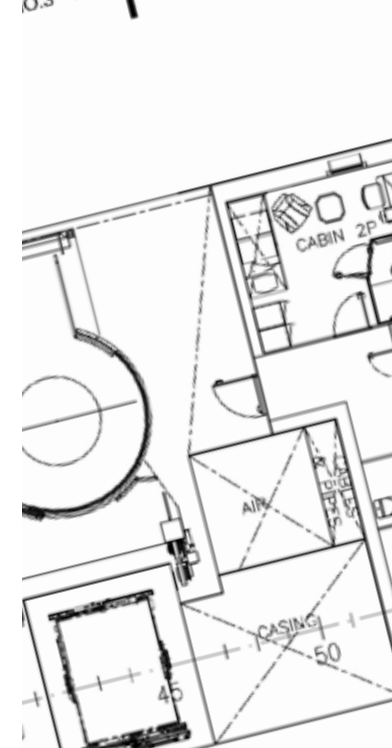
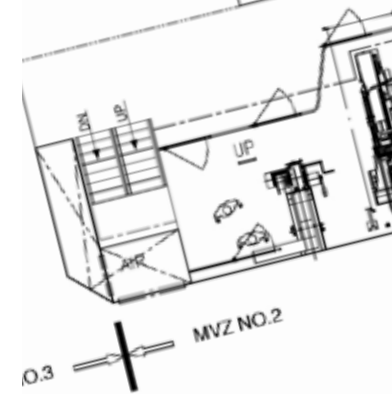
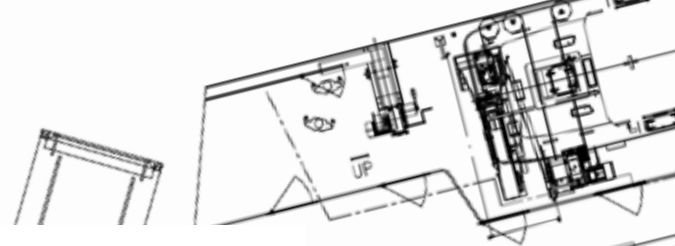
As our planet faces unprecedented challenges, I am proud that the vessels we design today are among the cleanest, most efficient in operation. Some of the most advanced are for oceanographic polar research ships, which are playing a vital role in understanding and predicting how climate change will impact all of our futures.

We have always embraced new technology. In close collaboration with ship owners and shipyards we have, over the years, been able to push the boundaries of technology, by leading the way with new features such as hybrid propulsion, fuel-saving bow designs and the ability to operate emission-free.

Today, the pace of change is much quicker than it was 50 years ago. There is a drive to decarbonise the shipping industry and there's so much more that can be done. Digital technologies play a big part in reducing emissions from ships and they also simplify and automate more aspects of ship operation going forward. This development will continue to influence how ships are designed, as will the changing availability of alternative fuels. Most of our latest designs are configured to adapt throughout the life of the ship.

It's an exciting time to develop ships for the future. We pride ourselves on the collaborative approach we take to working with our customers and equally feel great pleasure when we see Kongsberg Maritime-designed ships in operation around the world.

I hope you enjoy this look at how our ship design capability has evolved and is ready for the challenges of the next 50 years.



Fifty years young

Our story began 50 years ago and we have always strived to produce the very best ships for our customers around the world. We have designed more than 1,000 ships so far as the market leader for technical innovation and design excellence. Our range is a timeline of true achievement. We're proud of our past and excited about our future – a future that will focus on sustainability and protecting our oceans. The best is yet to come.



1974

UT 704
Anchor handler
Stad Scotsman



1974

UT 701
Pipelay vessel
Tender Ca



2015

NVC 405 WP LNG
RoRo cargo
Kvitnos



2013

NVC 386
Live fish carrier
Ronja Polaris



2012

UT 754 WP
Platform supply
Far Solitaire
(Ship of the Year award)



2010

UT 83
Seismic vessel
BGP Proteus



2017

NVC 374 WP
Trawler
Cuxhaven



2018

NVC 395 Polar
Research
Kronprins Haakon



2018

UT 540 WP
Service operation vessel
Edda Passat



2019

UT 851
Research
Sir David Attenborough



1975

NVC 361
Trawler
Hvitanes



Late 70s

UT 708
Heavy duty anchor handler
Stad Sailor



Early 80s

UT 706
Platform supply
Northern Fortress



2009

UT 761 CD
Subsea support
Far Samson



2008

UT 767 CD
Oil well service
Island Wellserver
(Ship of the Year award)



2006

NVC 810
Coastguard
Knud Rasmussen



2005

UT 512
Coastguard
KV Harstad



2019

UT 797 CX
Anchor handler
Island Victory
World record bollard pull
(477 tonnes)



2019

NVC 2140
Cruise ship
Roald Amundsen



2021

NVC 389
Live fish carrier
Ronja Vest



2021

NVC 372
Freezer trawler
Sunderøy



Mid 80s
UT 725
Service vessel
Orange XVIII



Late 80s
UT 734
Anchor handler
Star Spica



Mid 90s
First UT 755
Platform supply
(Most common PSV design. Pictured is *Dina Merkure*, built in 2006)



2005
UT 515
Tug
Abeille Bourbon



2004
UT 737 L
Oil well service
Island Frontier

2000
NVC
RoRo passenger (HS)
Olympic Champion
(Capable of 32 knots)



2000
NVC 367
Fishery
Remøy Viking
(World's first triple trawler)

Late 90s
NVC
Vehicle carrier
Autosky



2023
UT 5519 DE
CSOV
IWS Skywalker



2023
NVC 336
Trawler
Arctic Fjord



2024
UT 5208 USV
Unmanned offshore vessels
for Reach Subsea



2025
NVC 615 CT
Chemical tanker for
Terntank (wind assist)

Our philosophy

Kongsberg Maritime has a proud heritage of designing pioneering vessels that are at the leading edge of technological developments. From setting the benchmark that set the standard for offshore supply vessels in the 1970s, to advanced anchor handlers that transformed the oil and gas industry, and a growing reference list in fishery and merchant ships, the range of designs has continued to evolve.

Einar Vegsund, Vice President – Ship Design, explains the Kongsberg Maritime ship design philosophy that has underpinned 50 years of progress.

Continuous innovation

There are three main parts to our ship design philosophy and the first is always **safety**. Our vessels frequently operate in the toughest conditions in the world. People go to work on these ships, whether it's servicing oil rigs, fishing or undertaking scientific research, and that's why safety remains at the forefront of our thinking, 50 years on.

Whether it's about good seakeeping, safe operations on deck or the transportation of hazardous cargoes, we have a laser-sharp focus on the safety requirements of each ship.

Operational efficiency is another crucial element. Ship owners and operators invest many millions in their fleets and they demand vessels that can operate efficiently for decades. We work with them to fine-tune specifications and develop ships tailored for their exact requirements. Designing a ship is one thing, but understanding how they are operated is another, and with 1,000 ships designed so far, we can tap into a huge pool of operational experience and data, to continue evolving our designs.

The most significant driver impacting how we design ships today is **sustainability**. It's not only regulators that are demanding ships have lower emissions. Owners, faced with higher fuel costs, want vessels that use less energy, so there is a shift towards more electrification and battery-hybrid solutions. The use of alternative fuels is another exciting area for us and we've already had approval to proceed with ships using methanol and ammonia fuels.

Integrating innovation

We have a very experienced team with access to world-class design tools and engineering services. Our team includes naval architects and technology specialists within all disciplines, including extensive experience and understanding of hydrodynamical optimisation, which has been one of our key success factors over many years. Also, we are part of a global technology company which gives us access to a wealth of innovative solutions, which can be incorporated into our ships. That combined knowledge, together with more than 1,000 ship references and deep and lasting relationships with many customers, gives us a unique capability to offer modern solutions in an efficient way.

Perhaps we are often most recognised for our system integration capabilities but, in terms of ship design, that's not the full story. While Kongsberg Maritime produces a large range of products and systems, from highly efficient propulsion to deck machinery and advanced bridge systems, naturally we look at how we can best combine our equipment into our ship designs.

“Designing a ship is one thing, but understanding how they are operated is another”

Sometimes that means we provide a ship with a lot of our equipment into an integrated solution, such as the oceanographic research ships, or large anchor handler designs. Other times we work with customers to incorporate other technology in a way that can operate within our designs.

A great recent example of this approach is with our customer Terntank, who to date have ordered nine chemical tankers with our design. With the latest batch of ships, they have opted to use wind-assist technology. We don't produce these sails, but we work closely with other providers to offer advice and integrate the latest technology. These vessels are the next generation ship and, through a progressive approach to introducing new technologies, we are delivering ships with an energy efficiency index 40 per cent lower than the current IMO requirements.

Today, our latest ship designs for the offshore energy market address the demanding future requirements of the industry, be that oil and gas or the high-growth arena of offshore wind. Our new range of platform supply vessels and anchor handlers have been designed with a range of features to enable future transition from operating in oil and gas to offshore wind. This means our latest designs are adaptable, enabling owners to respond quickly to changing markets.

The past 50 years has seen major steps forward in terms of safety, technology and the operational capability. The years to come will see an even faster rate of change amid fuel transition and the growth in clean energy sources. Electrification of ships is becoming more common, and the role of digitisation will play an increasing part in transforming how ships operate. We've already designed ships with alternative fuels, battery-powered propulsion and even technology to allow unmanned remote and autonomous operation.

In addition to our focus on technology and operational aspects, we are passionate about the look and feel of our vessels and challenge ourselves every day to develop vessels that are both attractive and functional.

It really is an exciting time to be a ship designer, and a unique opportunity to help shape the future of ship design and operation. ●

“We work closely with other providers to offer advice and integrate the latest technology”

Einar Vegsund is excited by what the future has in store for Kongsberg Maritime



Wind Farm
Commissioning/
Service Vessel (CSOV)

Polar Research
Vessel

Chemical
Tanker

Anchor Handling
Tug (AHT)

Stern Trawler

Portfolio

A fleet packed full of flexibility



Subsea Vessel

Live Fish Carrier

**Exploration
Cruise Vessel**

**General
Cargo Vessel**

**Platform Supply
Vessel (PSV)**

**Unmanned Surface
Vessel (USV)**

Kongsberg Maritime is a technology pioneer, enabling a more sustainable future for our oceans. Our zero-emission integrated technologies advance the maritime industry and solve our customers' toughest problems. We combine our world-renowned UT-Design and NVC-Design brands to offer an unrivalled range of ship designs. With more than 1,000 vessel designs delivered, our portfolio includes wind farm service vessels, offshore service vessels, fishing vessels, aquaculture service vessels, passenger vessels, cargo vessels and specialised vessels tailored to our customers' needs.



50 Fifty years young

The UT 722 *Far Sailor* is an example of innovative and popular ship design

The UT story

The iconic UT-Design vessels trace their origins back to the mid-1960s and the Norwegian fishing industry, and early 1970s for the international offshore industry. Years of expertise in operating ships in the harsh conditions of the North Sea paved the way for what would become the benchmark design for the offshore industry.

Kongsberg Maritime's ship design history goes back 50 years with its origins in the heart of what is today's maritime cluster on the west coast of Norway.

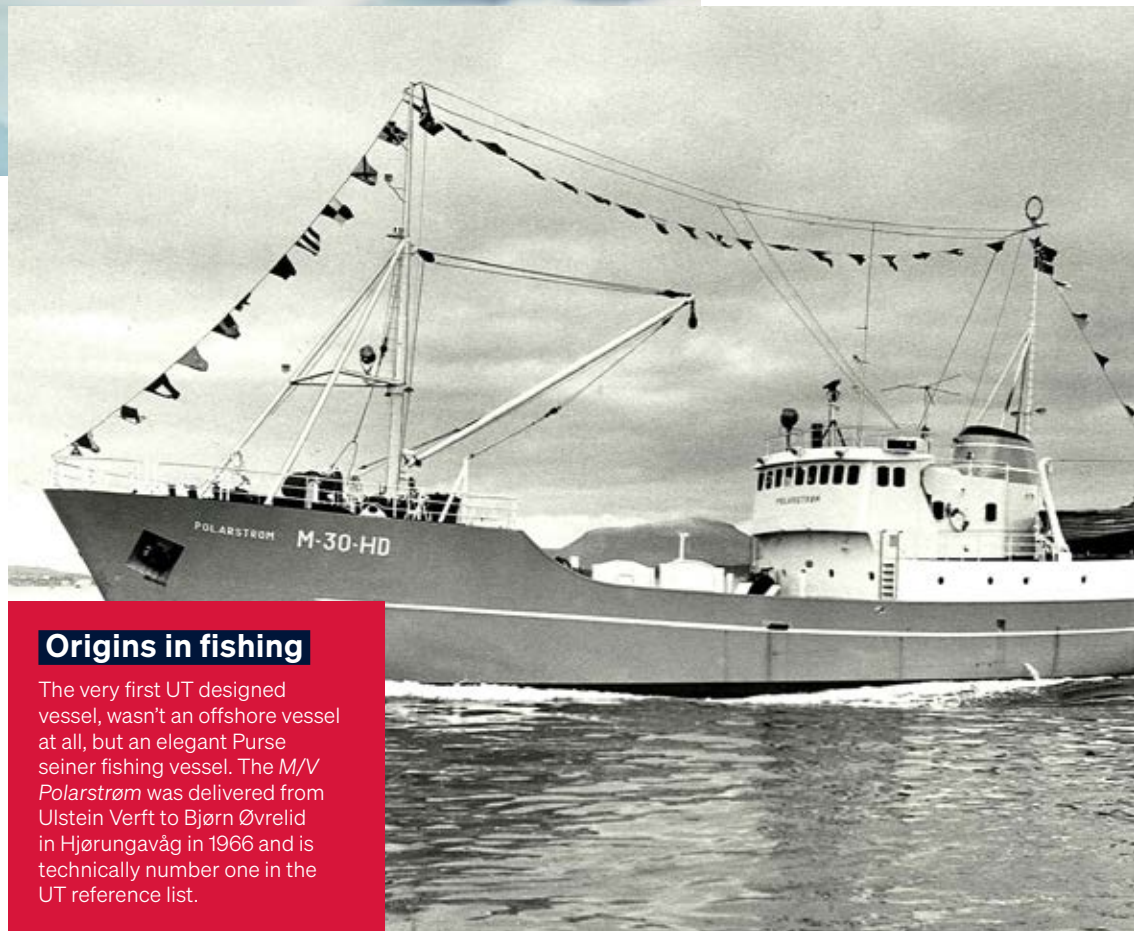
Today, the company offers some of the most advanced vessel designs available, across a wide range of market segments to customers across the world. From the early 1970s, ship designs were developed for the offshore, fisheries and merchant markets, but since then the portfolio has expanded significantly.

The UT-Design, which takes its name from the company where it all began, Ulstein Trading, is a benchmark for offshore vessels, with the early designs setting the standard for the latest vessels we see today, with more than 800 UTs built to date.

Another Norwegian company, Nordvestconsult, which also started in the early 1970s was designing cargo and fishing vessels, and later moved on to larger RoRo ships. Today, Kongsberg Maritime's designs for merchant, passenger, fisheries and some special purpose ships have the NVC prefix in their model numbers.

Between UT and NVC designs, Kongsberg Maritime has designed more than 1,000 ships.

Jørn Heltne, Vice President – Sales, in the Ship Design team, and Per Egil Vedlog, Chief Designer, recount the fascinating story over the next five pages.



Origins in fishing

The very first UT designed vessel, wasn't an offshore vessel at all, but an elegant Purse seiner fishing vessel. The *M/V Polarstrøm* was delivered from Ulstein Verft to Bjørn Øvreliid in Hjørungavåg in 1966 and is technically number one in the UT reference list.



Jørn Heltne, Vice President – Sales

At the dawn of North Sea offshore oil and gas in the early 1970s, the choice of offshore vessel was limited, with the only options being simple service vessels used in the relatively shallow waters of the Gulf of Mexico. They were soon found to be lacking in capability, particularly enough freeboard, and seakeeping.

The solution to these early challenges came from a small shipyard group on the west coast of Norway. Ulstein Trading (UT), formally set up in 1967 as the sales and ship design company within the Ulstein Group, set about designing what would become the vessel of choice for the offshore industry.

The team at UT began a study of the requirements for this new class of ship. They looked at specific requirements for the emerging oil and gas operations between Norway and Scotland. They also looked at service vessels then available and, importantly, consulted with Norwegian fishing fleet owners, who had vast experience of working in the North Sea.

The specification centred around three key elements: good sea keeping, a large freeboard and cargo capacity,

and a design that came in under the 500GRT tonnage rule.

In 1974, the first UT offshore supply vessel, a platform supply vessel (PSV) labled UT 705, went into service, along with the first UT 704 anchor handling tug supply vessel (AHTS). The impact was immediate. In the past, oil companies had issued long and complex specifications, but from now it was the UT 704 that defined the specification. The UT 704 and UT 705 soon established the UT reputation around the world, with 91 and 31 of each design, respectively, built.

Developments in efficient propulsion have been rolled out on many UT vessels over the years. The UT 709 *Wildrake*, a diving vessel delivered to Norwegian owner Anders Wilhelmsen was the first to feature diesel-electric driven CPP azimuthing thrusters, while the UT 705 *Stad Ulstein*, pioneered the use of a swing-up thruster in the bow.

Following initial success, the UT evolved through two approaches to supporting the growing offshore market. First, the Ulstein design team would evaluate the market and develop general designs to meet demand. For example, almost standardised designs for the PSV market with the UT 745 and the smaller UT 755, which would go on to be the most popular UT design, with 179 vessels built.



UT 704 – an offshore pioneer

The first UT-Design ship for the emerging North Sea offshore market was the UT 704 *Stad Scotsman*. This pioneering ship is still in service today, having gone through many changes of ownership and names – it became the *Red Condor*, then *Seabulk Condor*, and today the *Reliance Star 1*.

Below: UT 704 *Balder Torungen* is a successful ship design that dates from the 1970s

Another high-volume design is the UT 722 AHTS, which is still attracting interest today. This proven, robust design was recently selected for a pair of powerful tugs currently in build for the Suez Canal Authority.

The other approach was a more bespoke and collaborative one, where the team would work with individual ship owners, developing ship designs suited to their specific needs, in order to meet the demanding requirements of the contracts let by oil companies.

Big change on the horizon

The late 1990s would see major change for Ulstein Trading, and it would impact the future development of the UT-Design. In 1997, the family-owned Ulstein Group was listed on the Oslo Stock Exchange. Two years later the equipment and ship design parts of the group, but not the shipyard, were acquired by Vickers plc. Within a few months the expertise in ship design, together with an expanding range of ship equipment, would again change hands, as fellow UK engineering company Rolls-Royce acquired Vickers.

By the time Kongsberg Maritime acquired the Commercial Marine division of Rolls-Royce, two decades later in 2019, more than 800 UT-Design vessels had been delivered, with many ground-breaking technologies debuting as the design portfolio expanded.

Extensive design portfolio

Over the last 25 years, the UT-Design continued to develop, often first to market with new technological enhancements. The PSV and AHTS market remained the core business for the design team, but other markets were developing.

Subsea construction was one area where the UT would become established. These vessels would be equipped with offshore cranes and other equipment to enable them to accurately position heavy modules on the seabed. A new series of vessels with a crane capacity ranging from 150 to 600 tonnes was launched.





Record-breaker

Delivered in 2020, Island Offshore's special purpose UT 797 CX *Island Victory* holds the world record for bollard pull – an impressive 477 tonnes. It features a comprehensive range of Kongsberg Maritime technology, performing heavy anchor handling operations and deep subsea installation work. Senior Ship Designer Stig Ole Borgundvåg played a leading role in this project. He says: “*Island Victory* is a special ship. It incorporates market leading pulling power, along with impressive crane capacity and it's adaptable for critical offshore duties. It was a challenge to design, and my father worked on this project up until his retirement, then I took over, so it has a special personal connection, too. It's in very high demand, attracting high day rates. A vessel like this is the perfect example of Kongsberg Maritime's competency as a world-leading ship designer in the global offshore market.”

Read an interview with Stig Ole on pages 20-21

In 2004, one of the most advanced UT vessels was delivered to owner Island Offshore. The UT 737 CD, *Island Frontier*, was a ground breaker followed by the UT 767 CD in 2008. These vessels were a pair of Riserless Light Well Intervention units, and proved that cost effective and safe well intervention could be carried out from a mono hull vessel platform just as effectively as from rigs.

Above: UT 797 CX, *Island Victory*, provided advanced ship technology for its owner

Over the years, the UT has not only kept pace with technology, but led the way, and one thing has remained a priority in all designs – safety. A range of Safer Deck Operations equipment was developed, that reduces the exposure of the deck crew when handling wires and chains and eliminates much heavy manual work, a feature that is common on today's ships.

The UT-Design has been deployed into other specialist roles. They have included seismic survey vessels and offshore vessels with icebreaking hulls. Ocean-going tugs, capable of a range of critical duties are in service with several coast guards and navies, and among their key duties are, deep-sea towing, firefighting and anti-pollution duties.

Oceanographic research ships are some of the most technologically advanced to date. Built with polar ice class capabilities, they are crammed with high-tech equipment and have strict operational requirements

– read more about the range of Kongsberg Maritime designs for polar operations on pages 16-19.

Today, the UT-Design is moving in a new direction, but one that's true to its roots in the offshore industry. As the world shifts towards greener technologies, the UT offers advanced solutions for the rapidly developing offshore wind market (see pages 22 and 23), and with tougher environmental regulations ship owners are demanding green solutions. The UT has continued to evolve and is equally suited to the workhorse routine duties, or the more complex missions we see today. The years to come will see more exciting developments, with alternative fuels, more digitalisation and electrification becoming the norm. One thing is certain, in the world of ship designs, the UT, never stands still. ●

UT 755 – the most popular

The UT 705 supply vessel design had helped to establish the UT-Design reputation, but the need for a smaller PSV workhorse was identified and the UT 755 was born. First developed in the 1990s, the UT 755 became the most popular design, with 179 delivered. A true workhorse of the offshore industry, it was initially introduced in short (67-metre) form. Later, longer (UT 755 L) versions followed, and its Kongsberg Maritime propulsion system, including CPPs, tunnel thrusters at each end and a swing-up azimuth thruster under the bow, gave the UT 755 economic operation and excellent manoeuvrability and position-keeping.



Merchant and PAX

Merchant and passenger vessels feature in Kongsberg Maritime's ship design portfolio, and like the UT, their origins go back 50 years.

Per Egil Vedlog, Chief Designer, Ship Design Solutions, has been part of the company for almost 40 years and has seen merchant and passenger ships embrace new technologies and adapt to changing market requirements along the way.

We're better by design



Image: Cecilie Hatloy

What are the origins of the Kongsberg Maritime merchant ship portfolio?

It began with a Norwegian company called Nordvestconsult, a design house initially working on fishing vessels and a variety of dry cargo vessels. In the late 1990s, the company was acquired by the Ulstein Group, which was already designing and building vessels for the offshore market, with an established reputation. The coming together of the two companies offered a broader range of ship design expertise to the market. Ulstein Group was then sold to Vickers, and Rolls-Royce in 1999, then in 2019 it became part of Kongsberg Maritime.

What were the early significant merchant ship designs?

Nordvestconsult was experienced in cargo and fishing sectors, but the early 1990s was an exciting time as we worked on a range of projects for much larger RoRo ships. The first project was for a series of RoRos for transporting paper rolls from Finland. Following the success of these designs, further series of RoRos were built at the Fosen Yard in Norway for Finnish customers, based in the Baltic. The mid-1990s also saw a move into a new market of car carriers. The first were for United European Car Carriers (UECC) built in Brattvåg, Norway. In total we delivered eight car carriers.

“There had to be a strong focus on passenger safety, passenger capacity and hull performance, particularly as ship speed increased”

The NVC2140 for Hurtigruten is a showcase for our strengths as a business



Image: Oscar Ferreira

When did the first large passenger designs arrive?

After pure cargo, we moved into RoPax designs, with the *Stena Challenger*, and sister ship *Stena*

The latest chemical tanker design for Termtank



Traveller. These were a success and were soon followed by larger vessels, including our first for a Greek owner, with Minoan Lines' *Aretousa*, *Ikarus* and *Pasiphae*. These 200-metre, 1,500-passenger ships served the Piraeus-Heraklion route for many years. These were followed by Anek Lines ordering the 210-metre cruise ferries *Olympic Champion* and *Olympic Spirit*, which were extremely fast ships capable of 31.6 knots. These vessels served the Piraeus-Chania and the Patras-Igoumenitsa-Corfu-Venice route. There had to be a strong focus on passenger safety, passenger capacity and hull performance, particularly as ship speed increased.

What were the next design milestones?

That really came in the late 2000s, as there was a growing focus on efficiency and the environmental performance of ships. We delivered a pair of LNG-powered, 5,000 DWT coastal cargo ships to Norwegian owner, Nor-Lines. These vessels incorporated a range of energy efficient technologies that reduced CO₂ emissions by up to 40 per cent compared to similar diesel-powered vessels. The *Kvitnos* and sister ship *Kvitbjørn* were delivered from 2015.

With 40 years in the job, which has been your most rewarding project?

Our first exploration cruise vessel design, the NVC 2140 for Hurtigruten, was a real showcase for our equipment and system integration strengths. The ships now undertake adventure-rich expedition voyages in the polar regions,

“We are embracing the fuel transition and a big desire to adopt sustainable technologies”

as well as traversing Norway's long coastline, offering their lucky passengers the chance to explore these precious environments in great comfort and safety. The *Roald Amundsen* and *Fridtjof Nansen* feature advanced technology to minimise emissions, underlining Hurtigruten's commitment to sustainability. The battery-hybrid propulsion system enables the ships to operate emission-free for periods of their voyages, in the most environmentally sensitive areas. To fit all of this into a ship length of 150 metres, and

accommodate 530 passengers, was a big challenge – it's definitely been a favourite project of mine!

What's coming next?

We are embracing the fuel transition and a big desire to adopt sustainable technologies. Our new chemical tanker design has now received combined orders for 11 ships, and these really are the next generation of cargo ships, with a combination of energy saving technologies. The first nine ships, ordered in three batches, by owner Termtank, are based on our super-efficient hull form, and feature progressive steps to improve efficiency, through the use of methanol fuel, batteries and even wind assisted propulsion on the final three. These will be highly efficient ships and will have an Energy Efficiency Design Index above 40 per cent below the 2025 Phase 3 requirements.

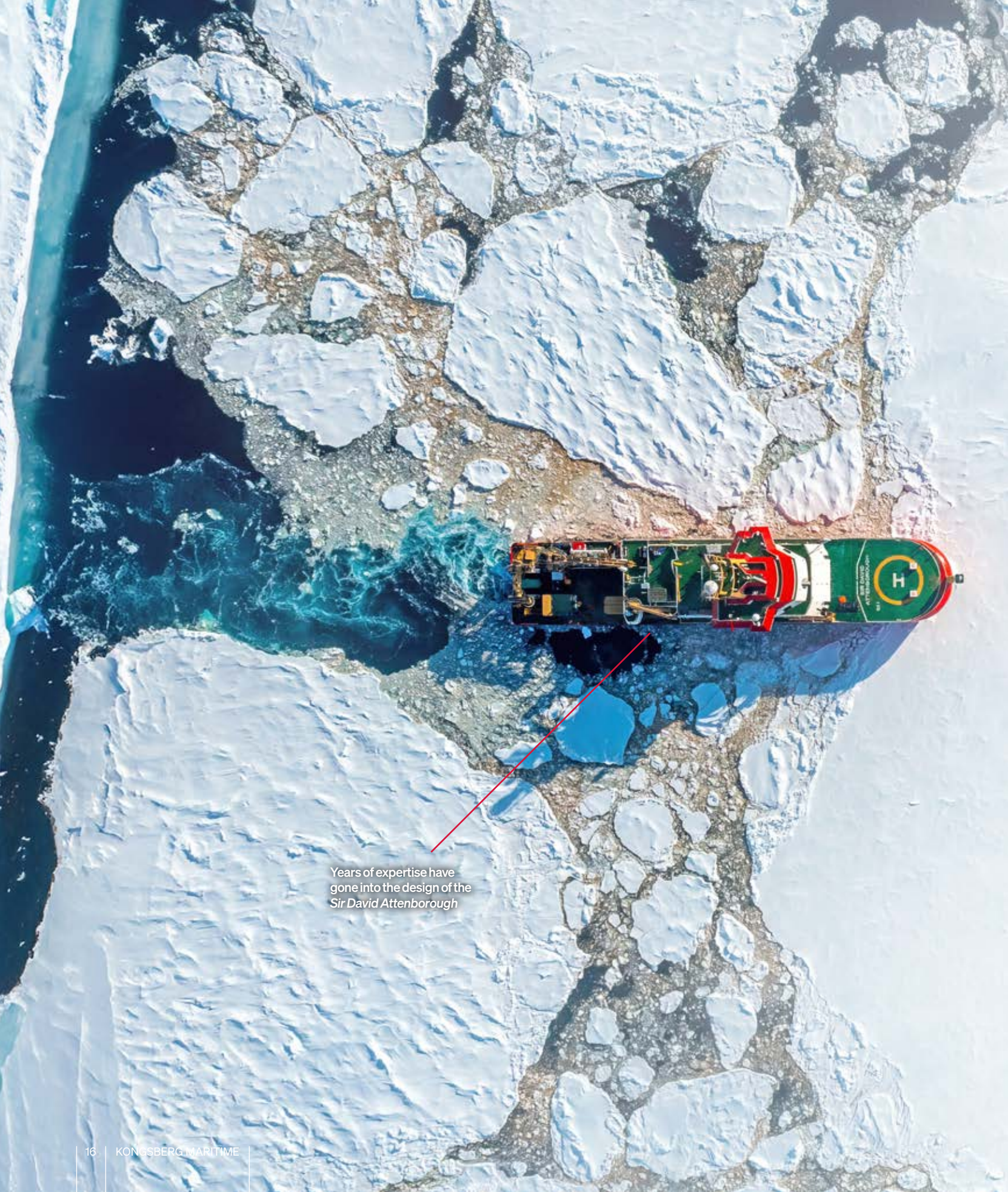
This series has also been followed by a further order from Sirius Redri AB, for two more vessels of a very similar design, without suction sails.

What about ammonia as a fuel?

We also have ammonia-ready designs, and we have received Bureau Veritas and DNV 'Approval in Principle' for a new, bulk carrier design for an exciting project for owners Viridis, with the support of funding from Enova (a state enterprise owned by the Norwegian Ministry of Climate and Environment) and great collaboration with a variety of cargo owners. The first orders are expected in 2024. ●



The *Kvitbjørn* was delivered, along with its sister ship *Kvitnos*, to Nor-Lines



Years of expertise have gone into the design of the *Sir David Attenborough*

Polar operations

The *Sir David Attenborough* has been creating waves around the world since its maiden voyage. Developed for the British Antarctic Survey, it's the latest in a line of polar vessels designed by Kongsberg Maritime, and is an extraordinary showcase for our exceptional expertise. Senior Ship Designer **Erik Leenders** explains the challenges and complexities faced when designing such special-purpose ships.

Pole to pole

The *Sir David Attenborough* has attracted worldwide attention for all kinds of reasons – but for Kongsberg Maritime, it's the expertise she exemplifies that makes her a stand-out ship.

Decades of experience and learning went into her design, which has to withstand extremes of heat and cold and perform at her best in the world's most hostile waters.

That's an area in which Kongsberg Maritime excels. "The polar vessels we design include cargo, expedition cruise, offshore, fishing and research vessels," says Senior Ship Designer for Research Vessels, Erik Leenders.

"Of the 1,000 ships we've designed, many are still in operation, including three research vessels, two expedition cruise vessels, three polar class and two ice-class platform supply vessels and a number of anchor handling and towing vessels.

"They all have certain factors in common, such as the extreme conditions they'll be operating in. We have to meet



Kongsberg Maritime's polar vessels are a great example of our quest for excellence

Image credit: Jamie Anderson, British Antarctic Survey

Image credit: Ted Gatlin



the Polar Code, which means a reinforced hull and propulsion systems, as well as anti-icing on decks and outside equipment.

“We also have to think about comfort for passengers and crew and, for research vessels especially, how operations and operating conditions might impact on research activities.”

Nowhere is the complexity of polar design more evident than in Kongsberg Maritime’s research vessels, the *Kronprins Haakon* and the *Sir David Attenborough*.

A new era in ship design

With the design commissioned in 2008, *Kronprins Haakon* was the first Norwegian icebreaker designed for polar research, and the first purpose-built polar research vessel since Roald Amundsen’s *Maud* more than 100 years before.

Built according to Polar Class 3 and meeting the Polar Code, the ship is used jointly by the Norwegian Polar Institute, the Institute of Marine Research, and the University of Tromsø, in the Arctic and Antarctic.

“Designing a research ice-breaker is not an easy task,” says Erik. “On the one hand, you need a silent vessel with

Erik Leenders admits that there are many challenges in designing polar vessels

minimum underwater radiated noise (URN) and bubble-free zones. On the other, you need to be able to break ice.

“As ship designers, we have to balance contradictory requirements and find the optimum balance between efficiency, noise, ice-breaking capability, redundancy, reliability, manoeuvrability, seakeeping, and more.”

The reason the design is so complicated is simply that scientific research, to be effective, must be accurate. Research vessels can’t interfere with measurements, which means controlling underwater noise, exhaust emissions, anything being discharged into the sea, even the way bubbles flow under and around the hull.

Because scientists need clean samples, design also has to consider how wind flows around the vessel, so it can be designed to avoid the exhaust venting into the measuring

“We learned a lot about how to design the hull and the extra space polar research vessels require”



Hurtigruten takes tourists on polar adventures



The *Kronprins Haakon* was a new type of ship for Kongsberg Maritime's designers

Comfort is key at sea

equipment. Similarly, if water sampling and intake are on the starboard side, anything being expelled into the water must be on the opposite side.

Lessons learned during the *Kronprins Haakon* design process were helpful when the time came to consider the design of the *Sir David Attenborough*. "We learned a lot about how to design the hull and the extra space polar research vessels require," says Erik.

"However, the *Sir David Attenborough* had its own requirements too, and these needed slightly different solutions.

"The hull form, for example, is larger than a normal vessel because it has to accommodate so much equipment, because the ship is actually doing the combined roles of the two ships she replaced, the *Ernest Shackleton*, and the *James Clark Ross*. These ships were each focussed on supply and research, respectively. At the same time, some polar bases have draught restrictions, so the *Sir David's* maximum draught is 7.5 metres, which is lower than a standard ice-breaking vessel. It also has to cope with ice up to one metre thick.

"We paid a lot of attention to the twin skegs to meet underwater noise requirements. And finally, we had to think about keeping bubbles away from the sensors. On a normal research vessel, we use gondolas sticking out from the hull. That's not possible on an ice going vessel. We designed the bow to make sure bubbles in the water are, as far as possible, directed away from the sensors."

Designing for the future

Insights gained from the *Sir David* are proving invaluable in the development of designs for future research vessels. Deck layouts, for example, need to be flexible, in order to accommodate different set-ups for geological and biological surveys, and other duties including meteorological and environmental research.

For that reason, decks are being designed with a lot of container sockets and a special bolting matrix, allowing scientists to bolt whatever they need on to the deck. In the new vessels these bolting matrices are also in the laboratories, so science teams can make their inside arrangement any way they want. ●

Designing to suit the ship's purpose may be more complex on a research vessel, but it's an equally important first principle for any ship. On a tug, for example, design will be led by the towing winch, bollard and propulsion configuration. On a cargo vessel, it's built around where and how the cargo will be stored.

On a CSOV (for wind farm support) the primary consideration is the walkway, and safety is of course a key consideration in every case. For polar vessels, which operate in high seas and incredibly challenging conditions, there's one other thing that needs to be remembered – comfort for passengers and crew in working, recreational and rest environments.

Roll reduction tanks to reduce roll to a few degrees, for example, improving safety keeping

seasickness at bay. There are also considerations around noise, vibration, ventilation, temperature control, and storage and preparation of provisions.

"Comfort is very important," says Erik. "Scientists and tourists are not necessarily used to being at sea, so we need to consider how to make their environment as comfortable as we can, so they can enjoy the trip and perform their work effectively.

"That might include an anti-roll design, large mess areas, built-in lounges with bars, gymnasiums and saunas. Where needed, we'll create an on-board hospital, and for polar operations these are much more extensive. Cabins are spacious, with their own TVs and bathrooms. It all makes a difference to life on board, especially in the wildest seas on the planet."



The *Sir David Attenborough* is designed to operate in extreme conditions

Our latest family of ships, the anchor handler (AHTS) and platform supply vessels (PSV), are designed with sustainability in mind

Oil and gas

Family values

It's no surprise that **Stig Ole Borgundvåg** designs ships for a living. Today, he's a Senior Ship Designer with Kongsberg Maritime, but Stig Ole's father, Sigmund, was the inspiration behind the very first UT designs which went on to shape ship specification for the global offshore industry for five decades.

Fifty years on from the ground-breaking UT 704, Stig Ole Borgundvåg is maintaining a proud family tradition, leading some of the most significant projects for offshore customers.

"My father Sigmund inspired me, but so have so many other people involved in creating amazing ships, maintaining that approach to produce innovative designs that are always focused on safety, efficiency and operational capability."

Senior Ship Designer Stig Ole started his career in 2000, after studying naval architecture at NTNU in Ålesund, and time on military service. During his studies he spent every vacation working in different departments at Ulstein shipyard, ranging from machinery installation to building steel hull modules and crawling tanks, and later doing engineering work. This



Image: Cecilie Hatløy

Stig Ole Borgundvåg enjoys being part of Kongsberg Maritime's development

are seeing a slight increase in vessel size to incorporate new technology, hydrogen derivate fuels and stricter damage stability requirements," he says.

Perfecting the hull form

With advanced design tools and the recent addition of AI, the team has an effective way of calculating the key elements of a ship's design, especially hull form. He adds: "We carry out detailed hydrodynamic analysis using our parametric design tools and can identify where even small changes to the hull shape can make big savings in efficiency. With some simple vessel particulars, such as length, beam and deadweight, we can produce an initial hull form proposal in minutes. It's a real springboard in the design process."

The next generation

Kongsberg Maritime recently unveiled a new range of designs for the offshore market. The new anchor handler (AHTS) and platform supply vessels (PSV) have the option to include alternative energy sources and fuels, such as methanol, ammonia and hybrid-battery power.

These next generation designs share a range of innovations to help owners address current and future challenges around efficiency, emissions reduction and developing market requirements.

"One of the great innovations of the anchor handler design (UT 7800) is that it offers significantly reduced energy consumption and emissions during anchor operations. This is achieved with Kongsberg Maritime's cross-tensioning system

where the load testing of anchors will use the power of the winches rather than the traditional approach of one or more vessels using bollard pull and engine power. This approach will lead to significant cost savings, enabling this crucial task to be handled by a single ship, but also with significantly less use of engine power.

"The deck equipment and arrangement has been optimised for the larger dimensions and weights of the rope, chain and equipment than is typical within oil and gas, enabling operations outside these traditional markets, such as floating wind farms."

The new PSV design range (UT 7400) has all the necessary features to address the latest regulations for the transport of the liquid products and the growing requirement for lower emissions and environmental footprint, including energy consumption reduction and readiness for future fuel transition.

"Our ship designs continue to evolve, and changes to regulations and uncertainty around preferred fuels have driven the demand to create ships that are ready for the future and give owners the confidence to invest, knowing their ships can adapt to meet future requirements," adds Stig Ole. ●

[Read more about our UT-Design history on pages 10 to 13.](#)

was the perfect way to to get some hands-on production experience. Then, after graduation, he began working in the company as a discipline leader in structural design.

He says: "Initially I didn't really have a clear plan to go into ship design, but focused on structural engineering and outfitting arrangements, getting involved in some of the basic and detailed engineering to get a deeper understanding of the ship-building process."

Gradually, Stig Ole found his deepest passion was in the creative phase developing tailored ship designs, and since 2009 he has been working as Naval Architect/Ship Designer.

"I had an opportunity to join the company at a really transformational time. We were just starting out using 3D computer aided design, so we were putting this pioneering technology to good use, at a time when ships were starting to become more complex and global demand was high.

"Our company has long had a reputation for designing robust, reliable and very capable ships, and we have been pioneers when it comes to matching the demands of our offshore customers. It's a hard-earned reputation and it's something we strive to uphold as we continue to innovate today."

"Our company has long had a reputation for designing robust, reliable and very capable ships"

Green shift

Over the past 10 years, the main drivers of design have been reducing fuel consumption and environmental emissions. A lot of vessels have had battery power installed, and today every Kongsberg Maritime vessel design has some form of battery or hybrid system on board. Electrical systems, together with those to support alternative fuels, put pressure on the available space on board, and can have an impact on cargo capacity, accommodation, and machine spaces. "We



Offshore advances

Offshore wind power is a growing sector, which has seen the way Kongsberg Maritime works within it change. Chief Designer **Martijn de Jongh** explains how we're keeping pace.

O

ne of the major shifts in the past five years in offshore wind is in a more speculative approach to design.

"We approach things differently than we did when the first wind farm vessel tenders came out," says Chief Designer Martijn de Jongh. "Individual tenders for specific wind farm service contracts aren't efficient. A lot of time is spent to create the tender-specific documentation. You have multiple bidders for one tender, and there's only one winner.

"It's better to develop a project together with a shipowner on speculation and to have vessels already under construction or afloat to offer to the various service tenders. But that requires investment beforehand.

The *IWS Skywalker* is the first of six CSOVs and was delivered in late 2023

“Vessel specifics can be challenging. If you build for one wind farm, it might be a small vessel. But that might not work for owners sharing assets, or for large wind farms. That’s why we design commissioning service operation vessels (CSOVs) to be usable for other purposes.”

Keeping pace with the industry

Early wind farm service vessels were created by converting existing vessels. In 2015, the dedicated Service Operation Vessel (SOV) design, UT 540 WP, was developed.

The first dedicated wind farm vessel designed by Kongsberg Maritime was the *Edda Passat*. This was followed by *Edda Mistral* for the Race Bank and Hornsea wind farms in the UK. They were well received and are still in use today. There are elements of flexibility, but the basic design remains much the same with the current portfolio.

Data and feedback from those first two ships, collected as part of the EU-funded Nexus research project, also resulted in a new vessel range that implemented new and innovative solutions while maintaining the proven design elements.

“We spent time visualising operation, power consumption and other operational parameters, with a view to increasing efficiency,” says Martijn. “One of the outcomes was the basis for a fully double-ended design with a hybrid power system of which six vessels were contracted in 2021. The Nexus research programme also provided alternative fuel solutions and concepts for fully electric operation.”

“Our main operational challenges relate to understanding types of maintenance and turbines, combined with considerations around energy and fuel consumption. We’re now also having to think about floating wind farms. As that technology develops, requirements will change again.”

Future-forward fuels

As with all Kongsberg Maritime operations, ship design for CSOVs and SOVs must consider sustainable fuel and energy systems. That brings its own challenges.

Even a fuel like methanol, already a known product, comes with uncertainties, with suppliers, regulators and equipment designers working at different speeds. Nonetheless, says Martijn, it’s a good crossover.

“You can convert, or plan to convert, to methanol without too many problems,” he notes. “You can



Martijn de Jongh

“Wind farm operation is one of the few areas where we could achieve net zero emissions”

also clean the tanks and use them for diesel. Other alternative fuels present more difficulties.

“Ammonia, LNG, biogas and hydrogen all need special tankage that can’t be used for anything else. Added to that, the application of each fuel for each vessel type can be very different. Certain vessels

might be able to use ammonia or hydrogen, on others the compromises needed are just too great. But technology development may bring new opportunities. It requires a constant technology watch.”

One of the major developments in offshore wind service operations, however, is the potential for battery-powered vessels that can be charged offshore. Nexus showed the technology is feasible.

“Wind farm operation is one of the few areas where we could achieve net zero emissions, by using locally produced wind energy,” says Martijn. “We could do the whole operation on stored energy, and charge vessels locally. But we have to work with wind farm owners or operators to understand operational and maintenance profiles.

“Will the vessel rest at night? Do you charge once a day or twice? How many charging points do you need? What kind of system are you using? There are a lot of things to settle.

“As ship designers, we need a solution, because our customers want it. So, we need to work together to get it right.”

Nexus: Implementing a collaborative approach

Martijn was heavily involved in the Nexus project, which looked at the wider picture of wind farm maintenance operations.

“It was incredibly useful,” he continues. “There were elements we examined in detail and incorporated into our sales process. For example, the double-ended vessel concept that gave us the contract for six vessels of UT 5519 DE design for Integrated Wind Solutions wouldn’t have happened without Nexus.

“From a design point of view, we were able to try out concepts and determine that they were feasible. That’s how we develop new designs and solutions with real potential.

“I would love to continue a project like that. I believe it’s the right approach if we’re to continue to lead the way in the new technologies and developments our customers need.” ●



The *Edda Mistral* was the second vessel of its kind to be designed by Kongsberg Maritime
Image: Nicki Pløek

Living legacy

Kongsberg Maritime's story began with the design and supply of fishing vessels, and it remains a major part of our business today. **Monrad Hide** and **Robert Vorren** explain the latest advances in fishing vessel design and technology and where we plan to take that in the future.

Kongsberg Maritime's first major vessel design projects took place in the 1970s, developing fishing vessels in collaboration with Langsten shipyard. Today, as one of the world's leading fishing vessel designers, the company has approximately 170 ships under design, in the build process or already delivered. From bottom and pelagic trawlers to live fish carriers, our vessels have been designed to operate in all kinds of conditions. And with increasing complexity of function, comes increasing complexity in the design process.

"The biggest change in the last 50 years is that back then shipbuilders needed far less information from us to build a vessel," says Monrad Hide, Fishery and Aquaculture Sales Director. "Today we need to describe everything in absolute detail."

Chief Designer Robert Vorren agrees. "Back then, we'd provide maybe 50 to 100 drawings to the builders," he says. "Today, it's more like 3,000 to 5,000, including 3D detail design."

"That's partly because of specialisation: different workers in the yards specialise in different aspects of the build. We must think about the whole picture and create designs with the build in mind. But it's also a cost saving. It makes sense to have the design as complete as possible before building begins."

We have a proud track record of designing increasingly sophisticated fishing vessels for our customers

Image: Cecilie Hatløy

Meeting customer needs

Economy is a driver for customers, too. Today's main customer requirements relate to efficiencies in loading, fishing and harvesting capacity, as well as fuel efficiency.

"Efficiency of the vessel is key," says Monrad. "Customers want us to help them improve fuel efficiency as well as meet new regulations and legislation about emissions and so on.

"Electrification is important to them, in terms of running and logging operations, however it's not feasible for all systems. Actually, in the world of fishing, electrification can add fuel costs, so we monitor the performance of our vessels and consider those kinds of technologies where we know they will be suitable."

Developing designs

While the key area for development over the last couple of decades has been stern trawlers, Kongsberg Maritime was recently involved in delivering some of the fishing industry's most innovative and advanced vessels.

Along with the fishing vessel team, Robert and Monrad were involved in the design of the *Arctic Fjord* trawler – at that point the company's largest ever fishing vessel contract, and the first to be built with partners in the United States. At 100 metres long, with a beam of 21 metres, the trawler was designed for pelagic operation in North Pacific waters, drawing from the proven designs and technologies used throughout Europe.

The most notable difference in working with a US partner, Robert says, was that it was a relatively new experience to the American shipyard, compared to its European counterparts. "The builders in America hadn't worked on this kind of ship for decades," he says.

"It wasn't an issue, we simply had to provide more information as designers – so the scope of what we supplied was probably a little bigger than we'd have to give most European shipyards."

Since the *Arctic Fjord* project, the team has designed a 120 x 22-metre trawler currently under construction for Rimfrost and the largest fishing vessel Kongsberg Maritime has designed to date.

In 2015, Kongsberg Maritime signed the first contract in partnership with Myklebust Verft to design and equip a new vessel for live fish transportation company Sølvrans. So far this has resulted in six vessels for Sølvrans built at Mykelbust Verft using the Kongsberg Maritime design.

Everything on these vessels had to consider not only the transportation of live



Monrad Hide (left) and Robert Vorren are committed to producing the most efficient vessels for our customers



The *Arctic Fjord* was built with partners in the United States

“The key to our business is taking care of both the fish and the ocean”

animals, but also the health and welfare of those animals and the rest of the ocean.

"The key word here is 'live,'" says Monrad. "Everything on this vessel has to reflect that. Design approach, cargo systems, everything. Redundancy is a key feature of these vessels. It's not as important on regular fishing vessels, but here it's very important indeed."

For Sølvrans, there's one further consideration, and it's an absolute: sustainability. "The key to our business is taking care of both the fish and the ocean," says Global Marketing and Communications Manager Harald Nesvik. "We want to keep the fish calm and healthy, and operate with complete sustainability.

"Our goal as a company is not to be the biggest — we already are. It's to be the best. And that's why we want to work with the best. That's what we get from Kongsberg Maritime." ●

Protection for our coastlines

With many countries becoming increasingly aware of potential threats to their coastlines, Kongsberg Maritime's UT range of ships has been designed specifically to tackle the many and varied challenges that may emerge.

One area where the Kongsberg Maritime ship design team has been able to transfer technology and experience into a relatively niche segment, is in a range of governmental and special purpose ships, which draw on the robust capabilities of the company's design portfolio. With around 30 references, a range of Kongsberg Maritime designs with specific mission critical requirements are in service with navies, coastguards and other government departments.

The UT range was expanded to include three designs suited to coastguard and naval duties. The UT 512, UT 515 and UT 517 have been delivered since 2005 and are suited to a variety of duties.

Einar Vegsund, Kongsberg Maritime's Vice President – Ship Design, says: "Many countries are increasingly aware of potential threats to their coastlines and the area within their exclusive economic zones (EEZ). Those threats vary, so there's a real need for adaptable and multi-purpose ships, and we have a broad portfolio of adaptable designs to meet the demanding requirements of our governmental customers."

The KV Harstad entered service in 2005



“This can include fisheries protection, emergency towing of ships which represent a pollution hazard, especially if there’s a risk of them drifting ashore, as well as pollution control and clean-up operations. These ships have a pedigree of operating in the harshest environments, so are perfect in performing critical roles not only in defence, but environmental protection, particularly through their impressive towing power.

“Our extensive experience of commercial shipbuilding standards means we can give our naval customers fully capable vessels with the latest, proven technology for a lower cost than traditional navy-classed vessels.”

“These threats vary so there is a real need for adaptable and multi-purpose ships”

UT design evolves for crucial missions

The first UT design, specifically for coast guard operations, was the Norwegian vessel *KV Harstad*. Entering service in 2005 and designated a UT 512, the polar ice class vessel has proved very successful.

One of the *Harstad*’s most important duties is pollution prevention. For towing and emergency work it has an optimally located towing winch, a reinforced pushbow, FIF1 firefighting capability, a hospital, and extensive equipment including line throwing gear, a harpoon system for attaching the tow wire to stricken vessels, oil spill booms and skimmers and 1,000m³ of tankage for recovered oil. The vessel is also able to support the NATO Submarine Rescue System.

Iceland, with similar operational requirements to Norway, followed suit, but with a larger ship, adapted for the country’s requirements. The ship, a UT 512L design, named *Thor*, is 10 metres longer (93 metres) than the Norwegian ship, and accommodates a range of additional features. The *Thor* is

capable of more than 20 knots and has accommodation for 48 people. One of the ship’s key roles is to provide on-scene command and coordination in the event of natural disasters, such as volcanic eruptions, where sea and air rescue is a crucial part of Iceland’s emergency response.

Operating over a very large area in a region with challenging weather conditions, the *Thor* has a critical role. Its duties cover fishery control, standby and rescue, emergency towing, pollution prevention, oil recovery and firefighting. *Thor* is a powerful ship with a bollard pull of 110 tonnes, which was specified so it is able to tow stricken tankers of up to about 200,000dtw.

The Indian Coast Guard was a key customer for the UT, and one of the first to order multiple ships. With a significant increase in tanker traffic expected in India’s waters, Kongsberg Maritime’s UT 517 designs were the ideal solution to match emerging requirements.

Known as the Samudra-class, the three ships are deployed on a wide range of duties around India’s coastline. They are equipped with oil booms and skimmers and will have the ability to either hold about 300 tonnes of recovered oil on board or transfer it to barges towed astern. The vessels are armed and carry a helicopter.

The UT governmental ships in service in the UK, France, Spain and Algeria all have a common role, and that’s a powerful towing capacity. The NVC design range includes options for naval craft. The Royal Danish Navy operates two NVC 810 offshore patrol vessels – *Knud Rasmussen* and *Ejnar Mikkelsen*. Primarily operating off Greenland, the 71.8-metre vessels have a top speed of around 17 knots and are designed for a wide range of Arctic and coastal operations. ●

The Danish Navy operates two NVC 810 offshore patrol vessels



Open to question

In his role as Senior Vice President, Solutions, in Kongsberg Maritime's Integration & Energy division, **Svein Kleven** has a full appreciation of the company's extensive range of technology and its continuous drive for innovation. Here, he gives his views on how our experience and approach to designing pioneering ships is already shaping the future of ship design.

What is your background in ship design?

I first came to Ulstein International Trading in 1994. At first, I worked on structures, classification drawings, and later, electrical installations and hydrodynamics. I learnt a lot about the key disciplines of design and construction. I later joined the ship design team, as I wanted to get involved in creation – I always got a buzz from seeing a ship go from an idea to going to sea, and it's no different today. In 2003, I stepped up to become deputy to our Head of Ship Design, Sigmund Borgundvåg, who was a real mentor to me, and a true pioneer of naval architecture. In 2005, when Sigmund changed roles, I took over and led the team until 2011.

How would you describe the boom years of the 2000s?

Demand for ships was high, and as the offshore missions became more complex, this was a big opportunity to offer extensive equipment packages within our designs. We worked with customers to develop pioneering vessels for roles including anchor handling, subsea construction and well intervention. There was also a growing focus on efficiency and emissions, so we started to introduce cleaner technologies, such as batteries and LNG.

Any pioneering designs that stand out?

A personal highlight was my first design project, to develop a series of cable layers, in response to the global demand for laying fibre optic cables for the web. These were large, complex

ships that had to carefully handle the cables and precisely position them on the seabed, while maintaining heading at just two to three knots. Six were built, and this was my breakthrough project as a designer.

What do customers tell you about our ship designs?

When I led ship design projects, I always made a point of going to sea on the first ship of any design series. I would spend time with the Captain and Chief Engineer, but also perhaps the most important feedback was from my discussions with those people working on deck or in the engine room. Capturing that feedback from the frontline is crucial and it's something we still do today and build this into the continuing cycle of innovation.

The ship design team is part of a global technology company – what does that mean for the future?

We have a fantastic breadth of technology – mechanical, electrical and digital – across the KONGSBERG group, but also the ability to integrate. The technology enablers are there, so it's already influencing our future designs. Just look at the autonomous solutions [see opposite] we are developing, or the way we're embracing new fuel and energy sources. These are driving the next decades of ship design, and we are helping our customers navigate the complexities of tighter regulations with help, for example in selecting fuel types or managing and storing energy on board. ●



The future

REACHing new waters

In April 2022, Kongsberg Maritime signed a contract with Reach Subsea ASA for the construction of the first two in a series of unmanned offshore surface vessels.

In the first project of its kind for Kongsberg Maritime, the company will be the prime contractor on two autonomous vessels for the REACH project. Senior Ship Designer Erik Leenders describes the project as “uncharted ground”, saying: “Normally we design and supply equipment, but here we are also hiring a yard to build and assemble the vessels.

“This is uncharted ground. We don’t know yet how the International Maritime Organization will treat this kind of vessel. For now, local flags and classification societies will decide how to handle them. It’s a completely different way of thinking.”

The vessel is designed around a moon pool, from which the ROV is launched. It will be controlled from a remote operating centre, where one captain will be able to control several vessels at the same time. Other operators will monitor the vessels’ machinery and electrical systems.



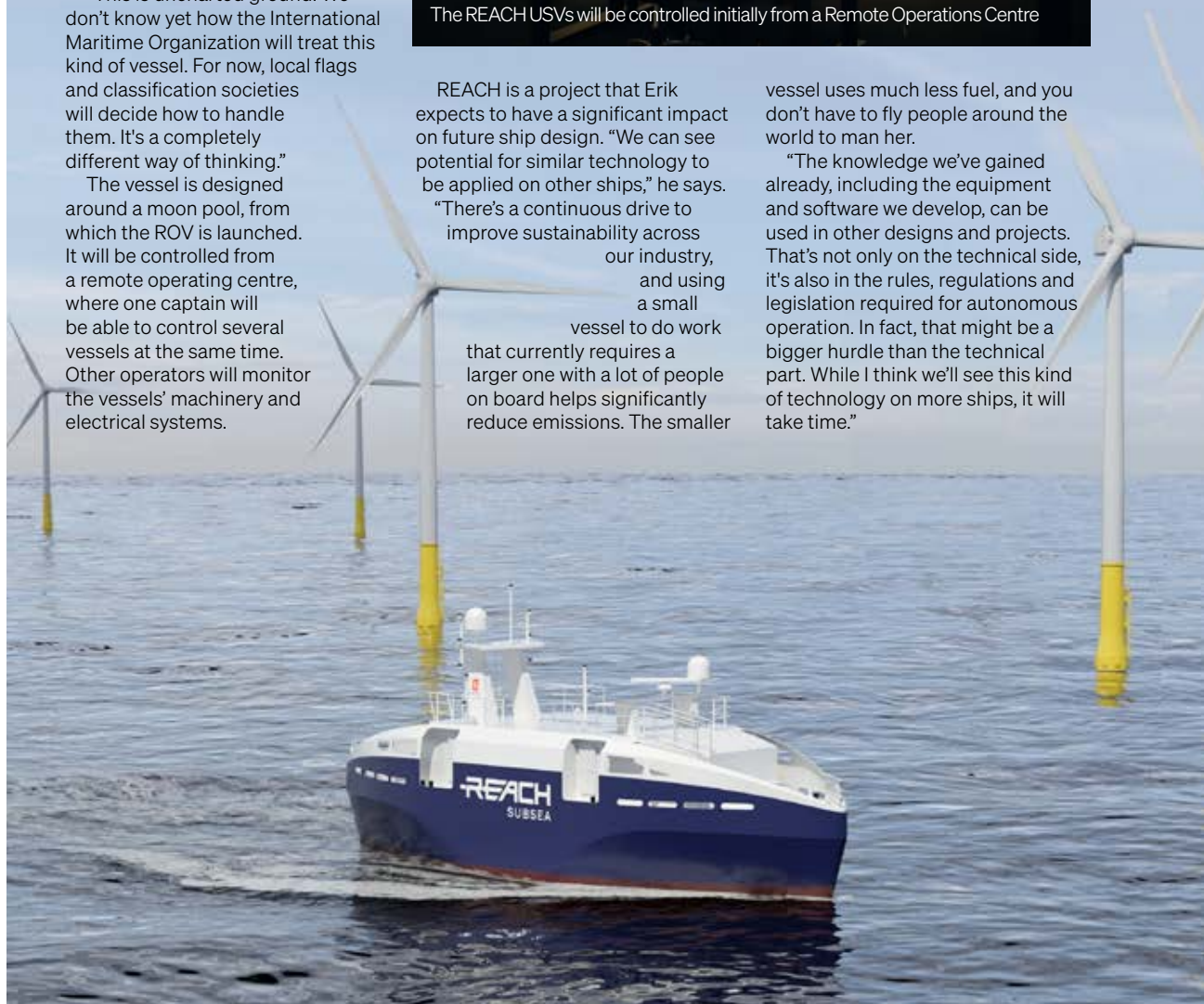
The REACH USVs will be controlled initially from a Remote Operations Centre

REACH is a project that Erik expects to have a significant impact on future ship design. “We can see potential for similar technology to be applied on other ships,” he says.

“There’s a continuous drive to improve sustainability across our industry, and using a small vessel to do work that currently requires a larger one with a lot of people on board helps significantly reduce emissions. The smaller

vessel uses much less fuel, and you don’t have to fly people around the world to man her.

“The knowledge we’ve gained already, including the equipment and software we develop, can be used in other designs and projects. That’s not only on the technical side, it’s also in the rules, regulations and legislation required for autonomous operation. In fact, that might be a bigger hurdle than the technical part. While I think we’ll see this kind of technology on more ships, it will take time.”



Svein Kleven enjoys seeing a ship’s journey from the idea to going to sea



KONGSBERG

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From drawings to delivery, our UT-Design and NVC-Design ranges include the most technologically advanced vessels for:

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 - offshore wind
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 - cargo and passenger
 - scientific research
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