British Antarctic Society and Cammell Laird

UK Maritime

Technology Capabilities

Department for International Trade

GREAT
BRITAIN & NORTHERN IRELAND

Shaping the future of ship technology

As global shipping faces unprecedented change, UK's marine technology suppliers are developing innovative solutions that will help shipowners navigate tomorrow's challenges.

Whether designing cutting-edge technologies for zero-emission transport, autonomous vessels and ocean exploration, or revolutionising rapidly growing sectors like renewable energy and aquaculture, pioneering UK companies are helping global leaders maximise their opportunities in a changing world.

The UK's thriving marine technology and engineering market includes the biggest global players as well as thousands of highly specialised small-to-medium sized businesses. Here you will find a diverse range of engineering experts, from designing zero-emission ferries to building the world's most advanced scientific vessels, as well as supplying systems and equipment for vessels from leisure boats to tankers.

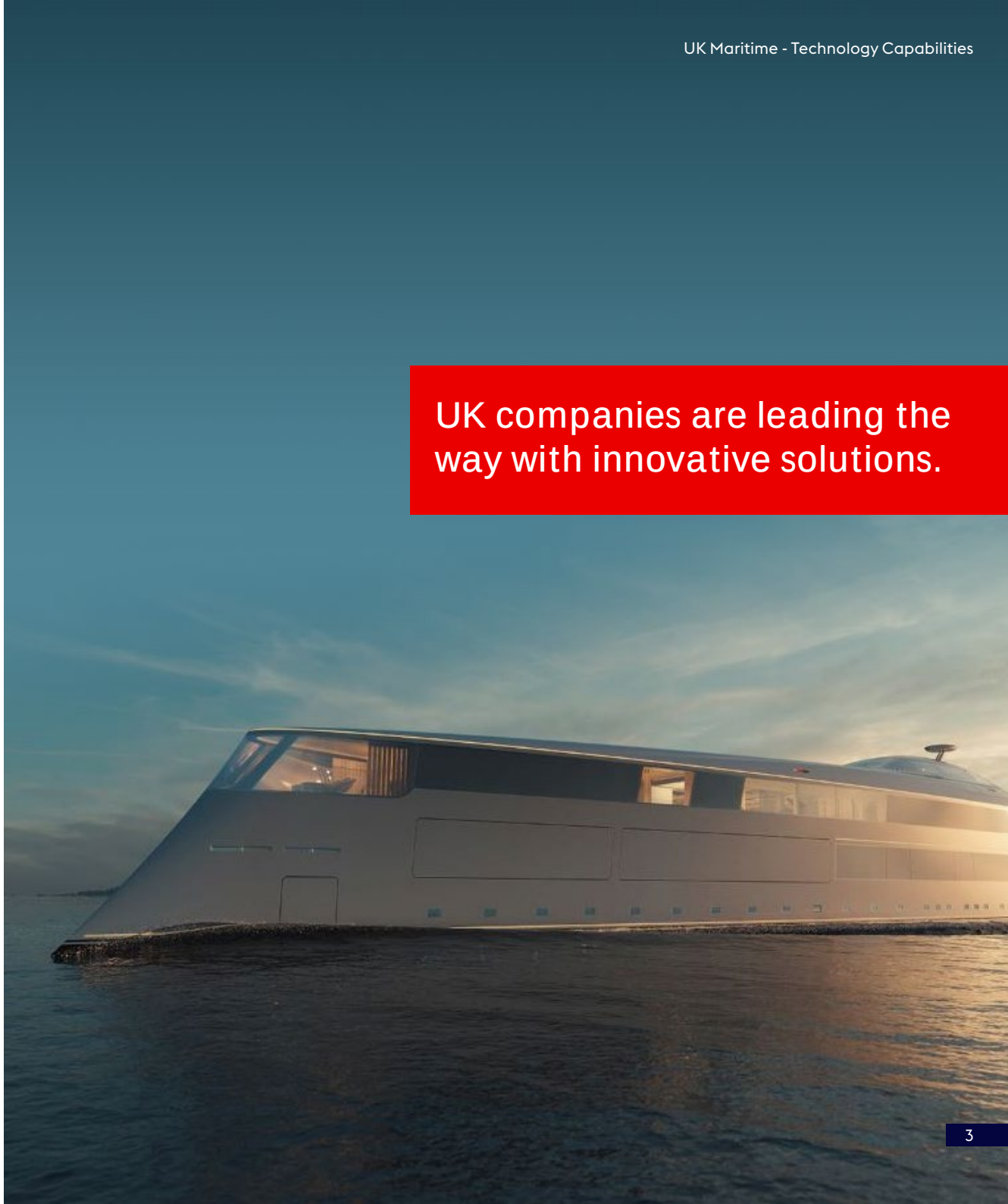
Supported by a government committed to further developing the competence and global competitiveness of its maritime sector, the UK's marine engineering and technology companies are ready to unlock even greater value in your project.

A voyage into the future

Like other sectors, shipping is grappling with issues that are changing how business is done today - and will affect it even more over the coming decades.

With the right approach companies can turn these challenges into opportunities. From the demand for better environmental performance comes the need to use cleaner power – but also the chance to support the growing renewables sector. From the requirement for more joined-up, just-in-time logistics comes the need to modernise ship systems and fleet operations – but also the opportunity to run more efficient and profitable vessels.

Across several challenges facing the industry, UK companies are leading the way with innovative solutions.



Decarbonisation

As global society responds to climate change concerns by reducing greenhouse gas emissions, shipping must also adapt. The IMO is targeting at least a 50% reduction in emissions from international shipping by 2050 (based on 2008 levels). To reach that target, ships will need to use new fuels and engines, energy storage technologies, hybrid power sources and all the systems that accompany these developments.

The UK is home to several companies addressing shipping's journey to lower greenhouse gas emissions. Whether it is the design of new zero emission vessels, pioneering work on fuel cells for maritime use, or innovative solutions to reduce emissions on today's vessels, UK marine engineers and naval architects can help plot your path to reduced environmental impact.

Other UK companies active in this area include:

Silverstream

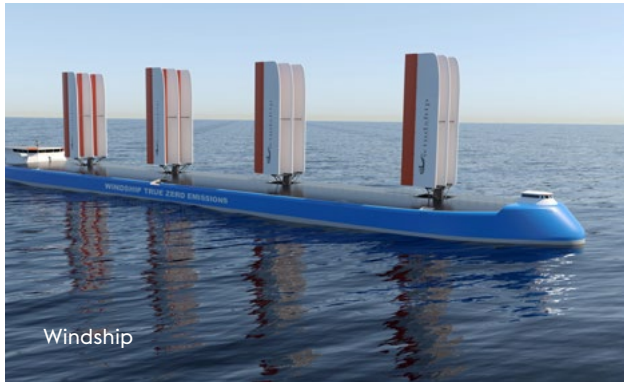
Houlder

Artemis Technologies

Artemis Technologies

A consortium of Northern Irish companies led by Belfast-based Artemis Technologies have been awarded £33 million funding to develop a zero-emission fast ferry to serve the city. The project will bring more than 125 research and development jobs to Belfast and lend new momentum to the maritime technology sector in the historic shipbuilding city. The technologies developed will be applied far beyond the city, eliminating emissions for high-speed vessels in several sectors.

artemistechnologies.co.uk


Windship

Windship

The solution to carbon-neutral shipping does not rely on one system but multiple technologies working to combine savings. Windship's patented wing technology offers a wind-powered solution for bulk carriers, tankers and some ferries – either newbuild or retrofit – to help reduce or eliminate carbon footprint. A wind and electricity powered ship has already been designed and computer tested and discussions with partners around the first demonstration concept are well advanced.

windshiptechnology.com

Clean Energy Transition

The global effort to reduce emissions includes an increasing focus on harnessing renewable energy sources including wind, tidal and solar energy. Many of the world's renewable energy production facilities are located offshore, offering new opportunities for ship owners to support these sites. New types of vessels are required for crew transfer and new technologies are needed to enable safe and efficient operation of renewables.

With a long-established offshore energy sector, the UK industry has quickly mobilised its expertise to address the growing demand for offshore renewables. The UK has been an early leader in the development of offshore wind farms, giving marine suppliers the opportunity to develop industry-leading solutions for windfarm installations and the vessels that serve them.

Other UK companies active in this area include:

Babcock LGE
BMT
Bruntons Propellors
Eminox
GE Power Conversion

BAR TECHNOLOGIES

BAR Technologies

BAR Technologies

Marine engineering consultancy BAR Technologies will deliver highly efficient crew transfer vessel (CTV) designs to operators Seacat and High Speed Transfers. The unique vessels will feature BAR's foil optimised stability system, which minimises vertical acceleration during transfer to ensure year-round access to offshore windfarms. The designs will also deliver fuel savings (and therefore reduced CO2 emissions) of 30% compared to conventional CTVs. A hybrid version will be offered to the market in Q2 2021.

bartechnologies.uk

Autonomous systems

Advances in digital technology, including processing power, connectivity, sensor technology and big data analytics, are driving many changes in the shipping business.
One of the most exciting is the journey towards more autonomous vessels. Although self operating or remote-control vessels may be many years away, development of the systems they will need is progressing quickly.
In the process, systems are being created that can dramatically improve the safety and efficiency of ship operations today.

An abundance of top tier universities and research institutions and a regulatory regime that encourages pilot trials have made the UK a fertile environment for companies developing advanced marine systems. Progress in vessel autonomy is particularly rapid and UK companies lead the international field in their offerings.

Other UK companies active in this area include:

BMT
Horizon Technologies
MSubs
Seakit
Solis Marine Consultants

OCEAN INFINITY®

Ocean Infinity

Ocean Infinity

Ocean Infinity, the University of Portsmouth, Airborne Robotics and Bentley Telecom are developing an autonomous offshore wind farm inspection capability utilising aerial droneswarms deployed from an uncrewed marine robotic vessel.

A 36m Armada uncrewed robotic vessel will act as the host vessel for the aerial drones, facilitating launch and recovery, recharge, data download and transmission to shore via satellite. The £1.67 million project will culminate in a system demonstration in 2022.

oceaninfinity.com

Ocean science

As the ocean is exploited for a wider range of society's needs – including energy, aquaculture and mineral resources – understanding the ocean and the seabed is becoming ever more important. The UK has committed to being at the forefront of international efforts to chart the international seabed area and can call on several providers of specialist hydrographic and oceanographic equipment to support that effort.

Other UK companies active in this area include:

AST Group
British Antarctic Society
Pelagian
RS Aqua
Valeport

AutoNaut USV

AutoNaut USV

AutoNaut USV designs, builds and operates unmanned surface vessels (USVs) from facilities in Sussex and Devon. One of its vessels, a five-metre AutoNaut, accompanied The Ocean Cleanup project in a series of environmental monitoring missions of up to 50 days duration in the Pacific Ocean. The versatile vessels have been used for a wide variety of monitoring tasks including noise monitoring, collecting meteorological data and to monitor wildlife.

autonautusv.com

Sonardyne

Sonardyne

In 2020, sonar specialist Sonardyne launched its latest obstacle avoidance sonar, Vigilant. The forward-looking sonar enables navigation in challenging environments, such as uncharted or dynamic waters. The system has already been put to the test via the Stiletto Maritime Demonstration Platform at the US Naval Surface Warfare Center Carderock Division (NSWCCD), which was looking for real-time obstacle avoidance capability for high-speed landing craft in shallow waters, using vessel-mounted surveillance systems.

sonardyne.com

Building from a strong foundation

For the UK's marine technology companies, innovation is not new. They are part of an unparalleled network of maritime businesses in the UK whose expertise and global outlook has emerged across a maritime heritage spanning centuries.

London has long been the commercial heart of shipping. But the UK is more than London and more than a business service hub. The marine engineering expertise of UK companies is the result of sustained investment in the shipping economy. Key elements include:

- **An unparalleled pool of maritime education and training** – providing skilled engineers and leaders for companies in the UK;
- **Top-rated maritime research and testing facilities** – where companies can develop cutting-edge technologies and systems;
- **Multiple regional maritime clusters of shipbuilding, design and engineering expertise** – offering opportunities for collaboration in the develoment of new systems, products and services.

This combination of factors has helped to forge a marine engineering and technology market that is diverse, innovative and globally competitive.

Cast Iron Welding Services

ACM COMPOSITES

Advanced materials research for better bearings

After an extensive research and development programme, ACM Bearings has deployed its low-friction, marine-grade L2Marine bearings on 7,500 vessels, including surface and submarine vessels in 20 navies. Originally designed for rudders, the low-friction, water-lubricated bearings have since been used for stern tubes and several offshore and deck applications.

The research programme aimed to apply a ‘wet and dry’ fully approved marine grade for rudder and stern tube bearings. The materials developed allow less than 0.1% water absorption, which makes it easy to calculate clearances and margins when fitting bearings. They are also approved for use with Environmentally Approved Lubricants (EAL), allowing vessels to meet the requirements of US and other regulators.

acmbearings.co.uk

Ad Hoc Marine Designs Ltd.

Keeping windfarms crewed in all weathers

Conventional crew transfer vessels (CTV) have to be less than 24m long at their loadline and carry fewer than 12 passengers to avoid onerous 'big ship' legislation. Although these limits are evolving, the challenge remains; smaller vessels typically have a narrower weather and sea state window in which they can operate.

Conventional vessels are not suitable for windfarms currently being built in the UK with a wave height of around three metres. A naturally low-motion and low-acceleration vessel is needed. The 26m Typhoon Class SWATH (small waterplane area twin hull) vessel designed by Ad Hoc Marine Designs has outperformed expectations, managing successful crew transfers at sea states higher than any similar-sized conventional vessel.

Maritime Craft Services (Clyde), which has been operating a Typhoon Class SWATH since September 2016 at various locations in the North Sea, praised the vessel's ability to retain full cruising speed at high sea states (exceeding 2m) while allowing passengers to move freely onboard. The low motion design also allows for safer and more efficient pushing on to the tower, enabling safer transfer of technicians from the vessel to the windfarm facility.

adhocmarinedesigns.co.uk

ANEMOI

Driving a more sustainable future for the global shipping industry

A British engineering company providing proven wind propulsion technology driving a more sustainable future for the global shipping industry.

Anemoi Marine Technologies Ltd (Anemoi) is a British engineering company producing Anemoi Rotor Sails, also known as Flettner Rotors, which are an energy saving technology. These modern mechanical sails are comprised of tall cylinders which, when driven to spin, harness the renewable power of the wind to provide auxiliary propulsion to vessels which significantly reduces fuel consumption and lowers harmful emissions entering our atmosphere by 5-30%.

To address the complex port operations typically undertaken by bulk carriers, Anemoi has developed innovative deployment systems. Anemoi's unique Rail Deployment System allows Rotor Sails to easily move transversely or longitudinally on the ship, ensuring uninterrupted cargo loading and unloading. Anemoi also offers a Folding Deployment option, whereby the Rotor Sails can 'fold' from vertical to horizontal.

Having successfully developed the technology for commercial use, Anemoi is rolling out adoption of its award-winning technology to clients across the globe. The installation of three Rotor Sails on Tufton's TR Lady, an 82,000DWT Kamsarmax bulker is due for completion in 2022. A further two commercial installations are also in development.

Anemoi is headquartered in London with a branch office in the Southampton, UK, a full-scale test facility in Blythe, UK and production capabilities in Jiangsu, China.

Anemoi is a fast-growing business, incorporated in 2015, with 37 permanent employees and various new positions to be filled in 2022.

www.anemoimarine.com

AST Enabling Global Connectivity

High bandwidth communications in Arctic conditions

The largest Arctic expedition in history to track the annual cycle of the drifting polar ice – and help better understand climate change – relied on technology from AST Group to maintain reliable communications in one of the world's most challenging environments.

In October 2019, the German research icebreaker Polarstern set sail from Tromsø in Norway to spend a year drifting through the Arctic Ocean, trapped in ice. The vessel will be at the centre of a constellation of buoys, ice-tethered profilers, remote stations, underwater drifters, and unmanned aerial systems. More than 600 scientists operate in shifts throughout the year, collecting and sending data back to base. The need for reliable communications is crucial.

AST provided Iridium Certus broadband connectivity delivered through Thales Vesse LINK terminals. Combined with AST's INTEGRA global IP network to monitor and control data usage, the package guaranteed secure, high-performance connectivity for crew and scientists.

Andreas Nil of German satellite communications provider MediaMobil said: "We chose AST as the Iridium Certus airtime provider because of their close integration with Iridium, both network and know-how wise, and their approach in supporting us to provide the hardware and service for this challenging project."

theastgroup.com

babcock™

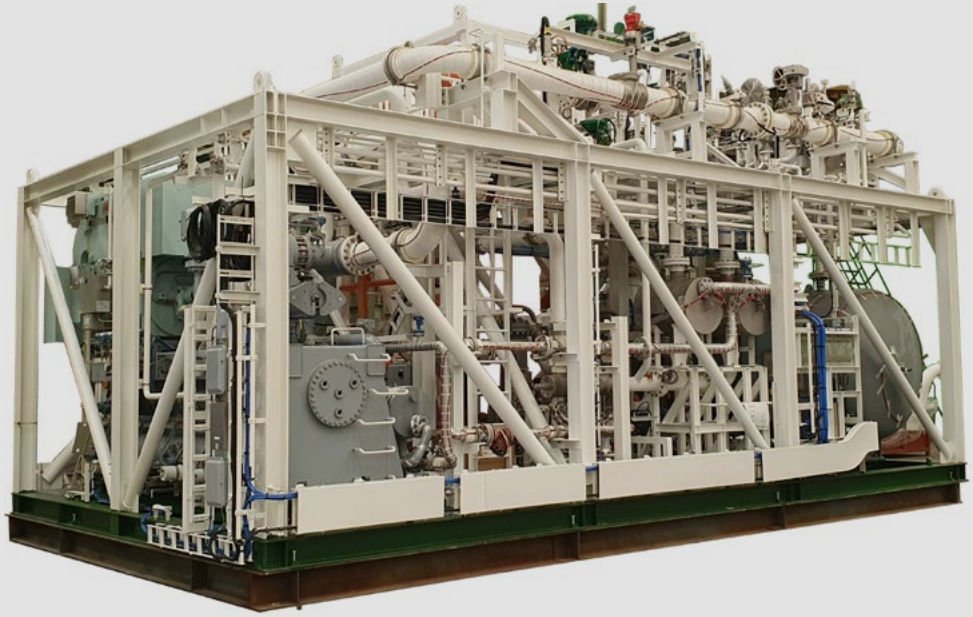
Minimising emissions from LNG cargoes

Managing the gas that evaporates from liquefied natural gas (LNG) cargoes is an important function for the world's rapidly growing fleet of LNG carriers. A large portion of this 'boil off' gas has traditionally been burned off to prevent dangerous pressure building in the tanks, meaning greater emissions and less profit from the cargo. Babcock LGE's ecoSMRT reliquefaction plant allows ship operators to return the boil-off gas back to the cargo in a liquid state, reducing the amount of gas that is wasted during a voyage.

The system's main innovation compared to other plant is an external precooling stage integrated into the LNG heat exchanger. This means a secondary refrigeration loop is not required, improving the overall cost of the overall reliquefaction system. The result is a 40% reduction in the overall system footprint, a 50% reduction in maintenance and 20% more reliquefaction capacity per kilowatt of absorbed power.

Each ecoSMRT plant in service on an LNG carrier will save the equivalent of up to 19,000 tonnes of CO2 emission per year, compared to burning off the gas – helping to reduce the carbon footprint not just for each vessel but for the LNG and shipping industries as a whole.

babcockinternational.com



Exporting UK ship design expertise

International design, engineering and risk management consultancy BMT designs and supports vessels that lower environmental impact, working towards more sustainable designs and solutions and using alternative fuels for the future. This was demonstrated in 2020 by the successful sea trials of a fully LNG-fuelled ropax ferry designed for Rederij Doeksen in the Netherlands. A research project led by BMT has also received a funding grant, investigating asset leasing models that could be used to accelerate the adoption of energy saving technologies.

In the UK, BMT is part of the Team Resolute bidding team hoping to secure the right to build the country's next Fleet Solid Support ships. It is also partnering Marine Specialised Technology, which was selected by the Ministry of Defence to provide two fast patrol vessels; BMT will provide the design and logistics support.

BMT is a good example of how the UK's maritime sector harnesses local competences to add value to international projects. The company recently designed its first wind farm support vessels, for operation in Japan. And in Taiwan, a BMT-designed service accommodation transfer vessel for the Formosa 1 Offshore Wind Farm Project has been commissioned and has commenced its first long-term charter for Siemens Gamesa Renewable Energy.

bmt.org

CYBEROWL

Enabling a fleetwide view on cybersecurity

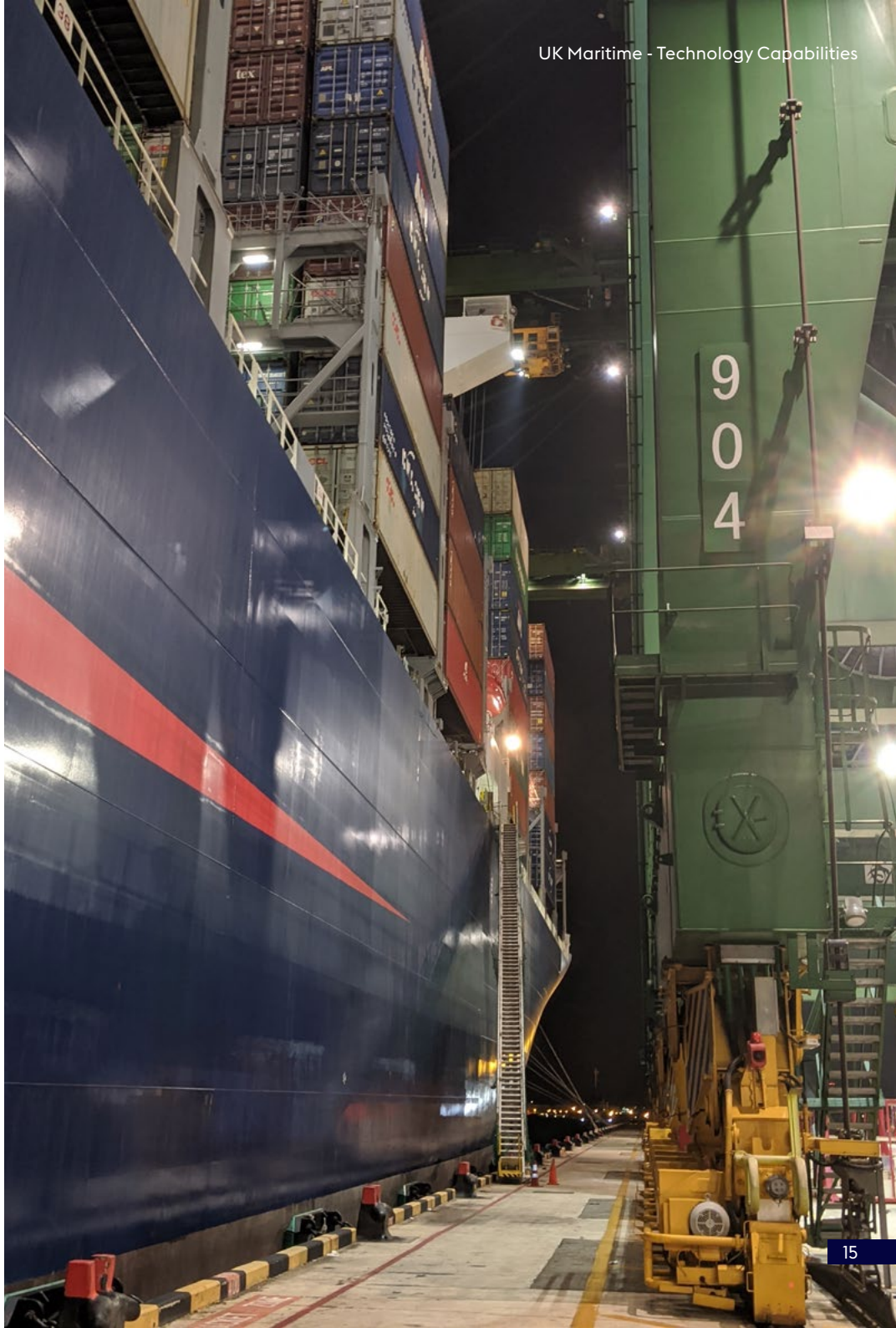
When Eastern Pacific Shipping (EPS) were exploring their compliance options for IMO's recent cybersecurity regulation (known as IMO 2021), they turned to CyberOwl's maritime cybersecurity monitoring and analytics system Medulla. The regulation requires that shipowners detail the cyber threats across their vessels and systems as well as identifying potential mitigation measures. Together with managed services provided by CyberOwl's maritime cybersecurity experts, Medulla has helped EPS gain visibility, security and compliance for their shipboard assets and networks.

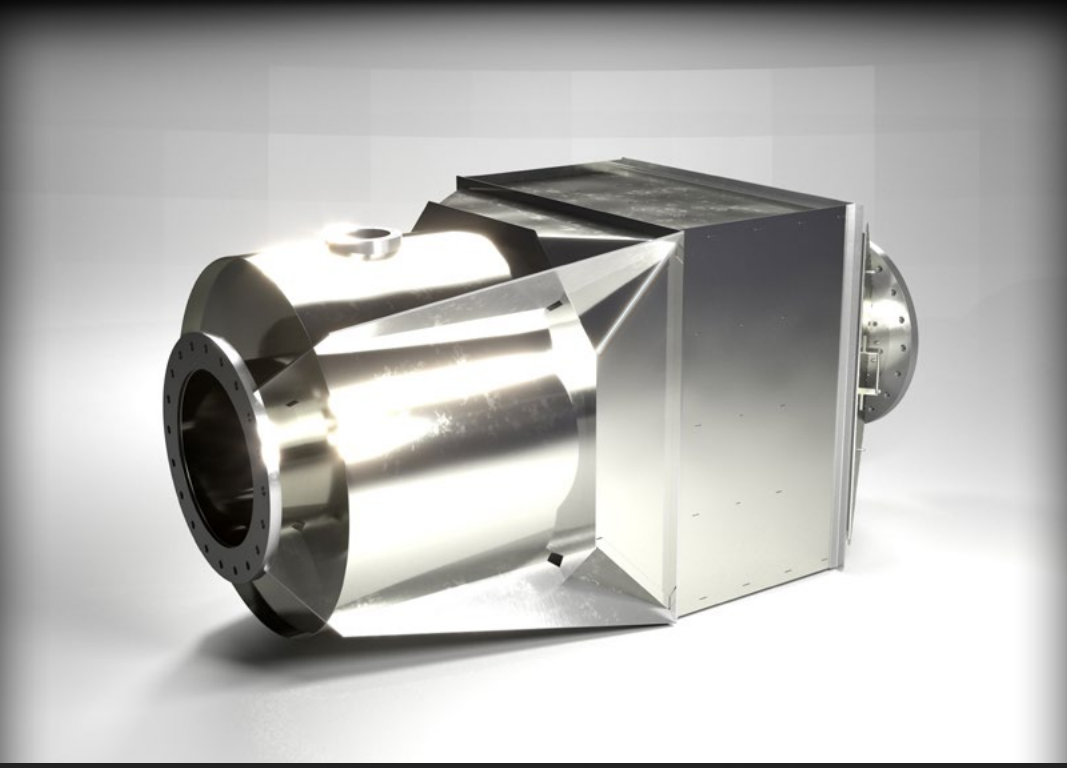
Medulla enables shipowners and operators to maintain an updated understanding of the critical assets and networks onboard vessels, in order to assess and address their associated cyber risk. By deploying the system across several segments within its 160-strong fleet, EPS was able to proactively identify cyber risks to onboard systems and address them before any losses or interruptions.

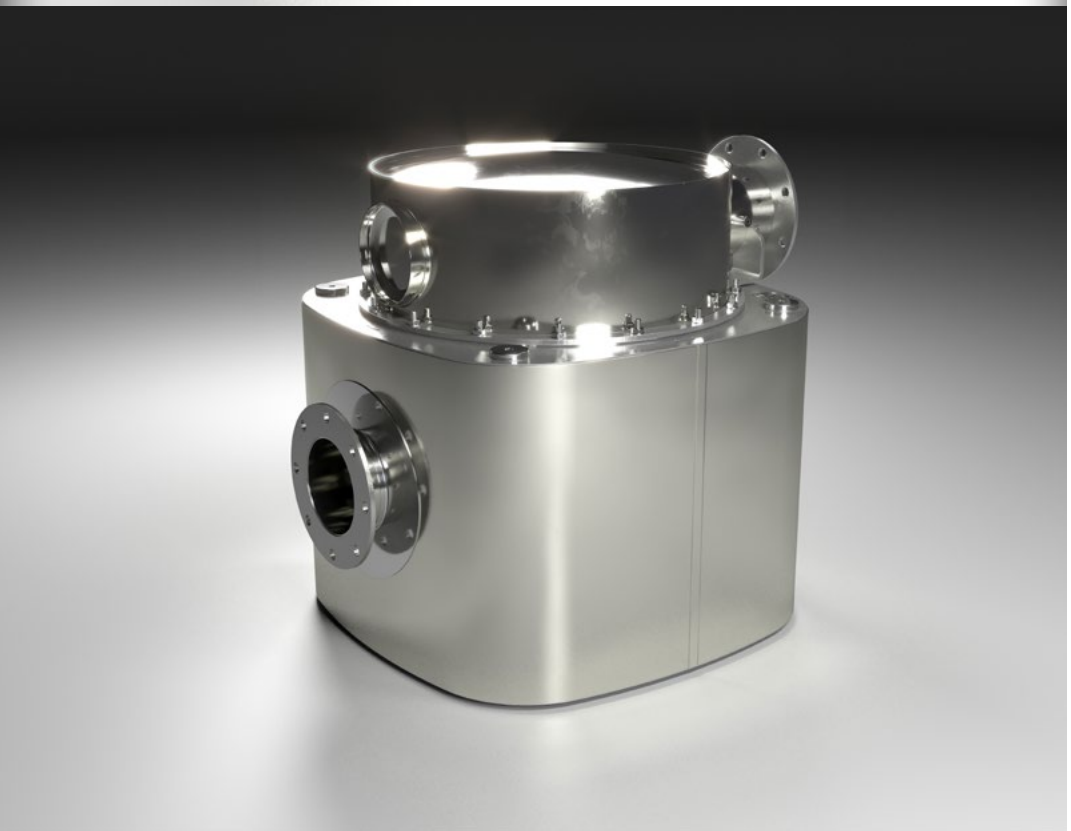
As well as improving asset discovery – identifying where onboard equipment deviates from documented inventory – Medulla enables focus in mitigating risks and protecting high-value assets onboard. If an issue requires attention, an incident report is received with detailed analysis of what has happened and guidance on next steps. This makes it efficient in investigating and resolving.

By using monitoring data to measure the performance of procedural and technical security controls, the system affords visibility of controls which are not performing as expected and can also be used to provide evidence of effective security management to inspectors.

cyberowl.io







Eminox

Helping modern engines meet emissions targets

Eminox has 42 years of experience designing and manufacturing exhaust aftertreatment systems. Its emissions reduction technologies enable marine engines to comply with stringent global controls such as IMO Tier III and Inland Waterways (IWW) Stage 5 standards.

Using state-of-the-art inhouse facilities, Eminox delivers complete, integrated solutions – from design and prototyping to testing and production – that are tailored to multiple vessel types and supported by a complete lifecycle service. This end-to-end solution shortens service time, reduces costs and provides increased speed to market.

Eminox's in-house team has used its years of experience in exhaust technology to develop selective catalytic reduction (SCR) and diesel particulate filter products for the marine sector. These systems are designed to reduce nitrogen oxides, particulate matter and particulate number levels.

Swedish engine manufacturer Volvo Penta is a long-standing customer. Volvo Penta's IMO Tier III-compliant emissions control system is designed to handle high-sulphur fuel and the toughest operating conditions while maintaining engine durability and efficiency. Eminox's expertise in SCR muffler design helped Volvo Penta to fulfil IMO III targets.

Eminox's service to marine customers including Volvo Penta includes adapting systems depending on spatial constraints, working to maintain the optimum thermal properties of engine systems and developing efficient mixing techniques optimised for the greatest uniformity indices.

eminox.com

GE Power Conversion

Specialising in electrification, electric propulsion, energy management, and automation and control systems for marine, energy, infrastructure and industrial applications, GE works with customers who need electric power solutions for energy-intensive operational processes and mission systems, and to improve energy efficiency as part of a decarbonisation roadmap.

GE Power Conversion works across naval, offshore energy, marine transportation and ports domains. The company's Ship's Electric Grid provides complete power for electric propulsion and on-board operations from one flexible, scalable, energy-sharing power network. These benefits are proven to be cost-effective across surface and subsea fleets, from small, specialist vessels to the largest military and commercial ships, including those with high voltage power needs.

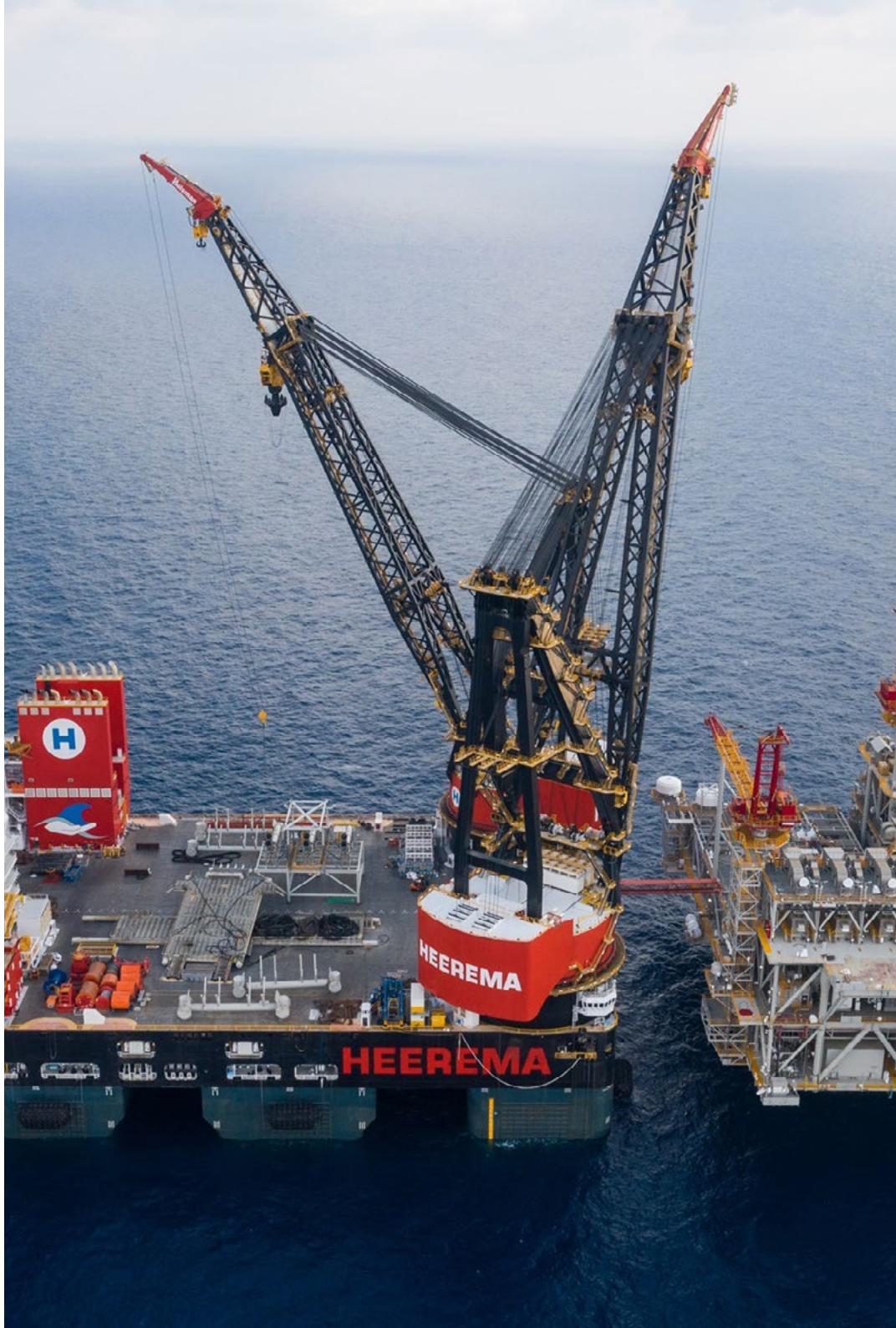
GE Power Conversion make a difference by being able to provide a truly integrated system, optimised architectures and full load and scale testing at GE's Marine Power Test Facility. Test and emulation at this level significantly supports de-risking ahead of sea trials, crew training, through-life technology insertion updates, and integration of new, cleaner energy sources within the ship's power network.

Electric ship propulsion and GE's electric grids are designed to marine and naval standards and based on extensive knowledge of maritime applications. Naval sector capability includes fully shock-rated products and reduced acoustic signatures. Ice-class and ice-breaking ships benefit from podded propulsion.

Flexible, efficient, cleaner propulsion technology: GE's electric and hybrid-electric propulsion systems can enable up to 10% greater fuel efficiency than traditional mechanical drive systems. Architectures range from LV to MV/HV, scalable from 1MW to over 100MW.

GE Power Conversion products include high-performance electric motors, generators, PTO shaft generators, podded propulsion, drives and converters, switchboards, automation and control, dynamic positioning, energy management and energy storage systems, and shore-ship connections.

www.gepowerconversion.com



GRIFFONHOVERWORK
A member of the Bland Group. Est.1810

Wide deployment for amphibious workhorse

The Griffon Hoverwork 8000TD has been described as the ultimate logistical workhorse. Capable of travelling at high speeds over both land and sea, these hovercraft are favoured by military, paramilitary and naval forces as a logistic or amphibious operational support craft.

The craft is capable of carrying up to 75 passengers plus two crew, and can also accommodate a light armoured vehicle or a 20-foot container. The design permits many possible superstructure options with the same standard hull and machinery installation.

The Swedish Amphibious Battalion contracted Griffon Hoverwork to build three 8100TD hovercraft for use in their military operations in the Baltic Sea, operating from the amphibious unit's base at Berga, Muskö. The 8100TD is designed to meet the Swedish Amphibious Battalion's requirement to carry a variety of alternative military payloads over water, ice, and tundra.

The craft for Venezuela meanwhile was built for use in agricultural logistics operations. Due to the amphibious geography of the region, with shallow jungle river banks and changing tidal activity, the transportation of farming machinery and vital supplies was made more efficient through the use of hovercraft.

griffonhoverwork.com

HENSOLDT
Detect and Protect.

Marine technical innovation for more than 250 years

A company that has been at the forefront of marine technical innovation for more than 250 years, with an unprecedented list of technology firsts – from the first type approved radar in 1947 to the world's first commercially viable, affordable and multipurpose solid state radar for maritime navigation, port vessel traffic services, coastal surveillance and ground and marine security applications

Headquartered in Enfield, North London, HENSOLDT UK is an advanced electronics company employing over 180 people. The company has an annual turnover of £35 million and operates a worldwide support network meeting customer requirements 24/7.

Focussing on navigation radar solutions for the commercial shipping and workboat market, HENSOLDT UK provides state of the art navigation radar systems, ECDIS and Voyage Data Recorders (VDR). Core technologies include magnetron free S-band SharpEye solid state radar transceivers, X-Band Radar and integrated Multi-Function Navigation Display solutions, all to IMO approval.

The core design philosophy is to reduce operation workload by automating the majority of controls. All radars include automatic continuous performance monitoring and state-of-the-art detection performance meaning that Kelvin Hughes radars can detect small targets in rain and sea clutter which are invisible to other radars.

In addition to radar, ECDIS and VDRs, Hensoldt has developed its next generation Integrated Navigation System (INS) designed for all types of vessels including the largest cruise ships and offering an IMO approved market leading user interface, with full integration to all existing navigation equipment and sensors. Kelvin Hughes Multifunction Displays (MFDs) provide configurable access to all tasks critical to navigation including radar, ECDIS, conning displays, bridge alarm management, and a host of additional information, whilst also maintaining the ability to view external systems all from a central used focussed console.

Through its global service and support network, Hensoldt provides a full range of customer and product support and operator training.

www.uk.hensoldt.net

Major makeover for signature cruise liner

Belfast-based joinery and interior fit-out company Mivan Marine was awarded a major project on Royal Caribbean Cruise Line's Freedom of the Seas in mid-2019. The scope consisted of sixteen different public areas - ranging from kids' areas to bars, restaurants, outer-deck areas as well as the first roll out of the new Giovanni's Italian Kitchen concept - and was designated as one of RCCL's signature 'Amplification' projects.

Preconstruction works were scheduled for six months prior to boarding the ship in Puerto Rico. At the beginning of 2020, the Mivan Team joined the ship for a gruelling six-week non-stop refit journey, combining periods at sea and in drydock. The main drydock part of the project was in the Navantia shipyard in Cadiz. The project management team was 12 strong with a labour force of 400 workers.

Logistics is the backbone of the process and the key to a successful project. Materials and supplies were required in San Juan and Cadiz. Bespoke joinery items were manufactured in Mivan's 110,000-square-foot factory in Antrim.

The project was completed on time, within budget and was well received by the client, with outstanding venues for passengers to enjoy for years to come.

mivan.com

A leading global marine outfitting specialist

Combining traditional craftsmanship with the latest technology to create bespoke joinery and world class outfitting solutions.

With key benefits including high quality products, innovative solutions, and advanced manufacturing capabilities, MJM Marine foster a reputation of delivering a unique project approach with tailored solutions to suit individual client's requirements. Working collaboratively in the design, build and delivery phases, the company provides a full project management service, enabling the execution of a more challenging and intricate range of project offerings.

Established in 1983 in Northern Ireland, MJM Marine draws on over 38 years' experience, to offer a complete turnkey solution for any cruise ship or ferry interior.

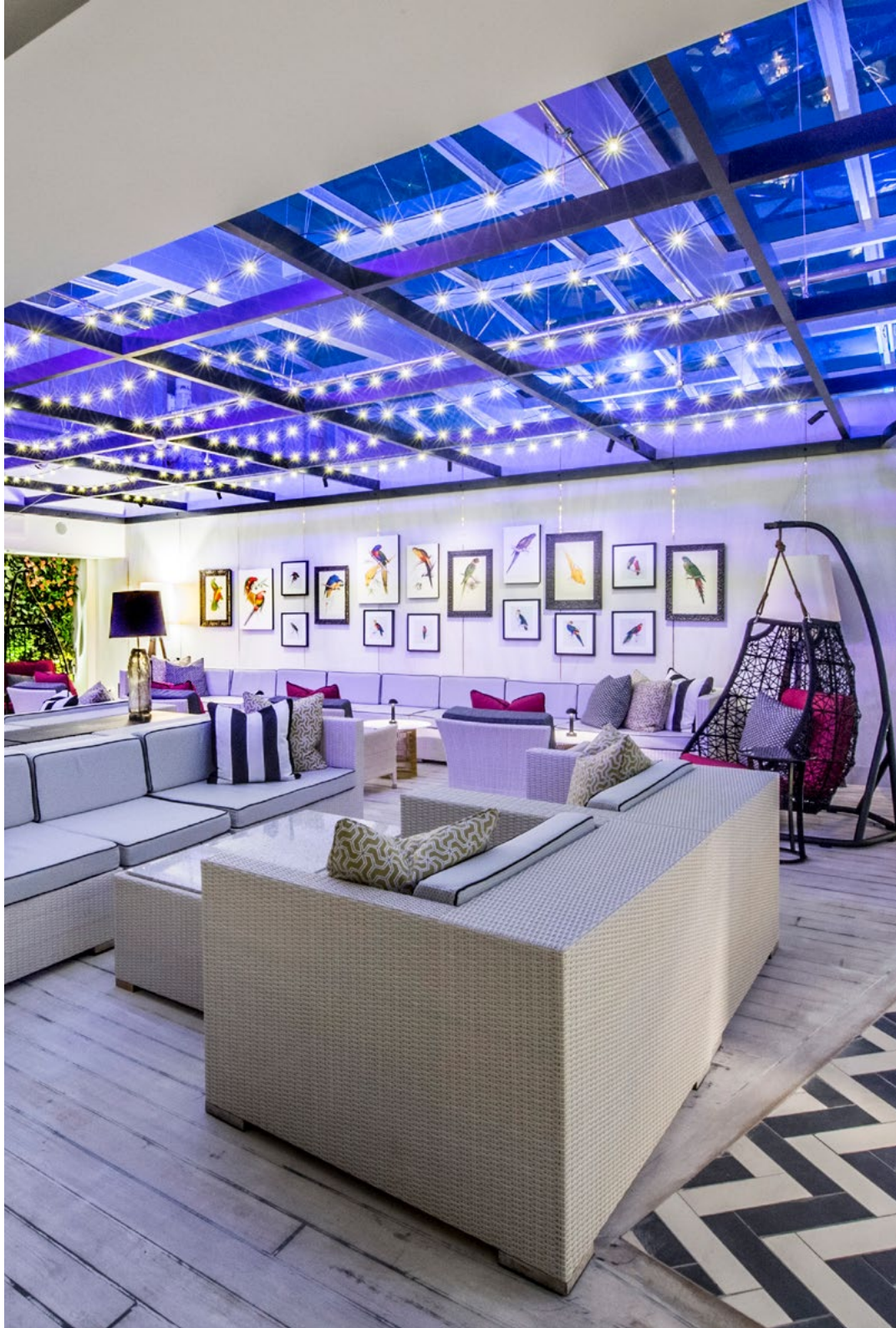
MJM directs operations out of a 100,000 sq. ft. factory with the state-of-the-art facilities utilising the latest in joinery manufacturing equipment and spray booth technology alongside a recently launched carpet and upholstery division to service the furniture and flooring needs of clients.

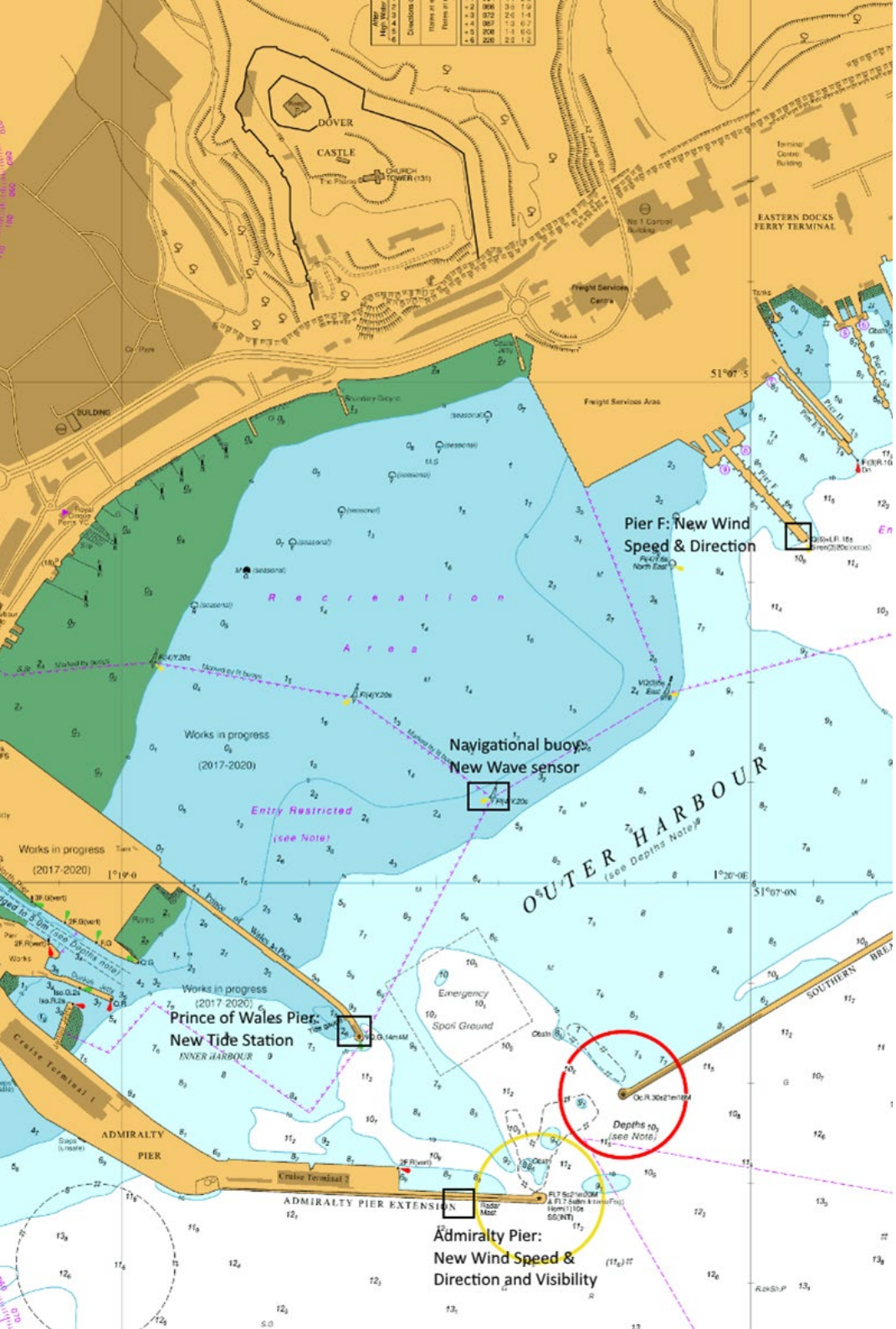
Headquartered in Newry, MJM Marine is a major employer with over 300 workers at its peak. Following a new period of growth and to service heightened demand, staff levels have increased by 39% and a secondary office in Gdansk, Poland was opened to support MJM's operations, with a focus on design and administration.

MJM Marine is at the forefront of award-winning research and innovation, adopting partnerships with Vyv and Ilimex to offer antimicrobial lighting and air purification system solutions to enhance environmental wellness and safety onboard cruise ships.

In 2021 MJM Marine fuelled a period of growth, providing outfitting works for Royal Caribbean International's Wonder of the Seas, the biggest cruise ship in the world, and diversifying portfolios with new clients such as Virgin Voyages. Over 30 new outfitting contracts were secured in 2021 across Europe including fleetwide upgrades to medical facilities onboard a number of ships for clients such as Royal Caribbean International and Celebrity Cruises. The company also secured a three-ship deal with Azamara and work onboard Carnival Cruise Lines' Carnival Legend and Silverseas Silver Wind.

www.mjmmarine.com





OceanWise

Staying wise to Dover's shifting waters

OceanWise contributed its environmental monitoring expertise to the installation of a new vessel traffic service (VTS) system at the Port of Dover. The system was designed to improve port operations, support decision making and enhance efficiencies at Europe's busiest ferry port.

The project included the supply of new VTS operator workstations, a port management information system, radars, a VHF system, radio direction finders (RDF), an Automatic Identification System, and CCTV. The port also required systems to monitor the changing environmental conditions at the port.

Environmental monitoring specialist OceanWise delivered a system which met the port's unique data requirements. Various sensors were installed across the port, both onshore and offshore. The complex data from the new sensors as well as existing meters was carefully integrated by experts at OceanWise to create a modern, optimised system.

The essential real-time data produced by the network of sensors is transmitted, digested and stored in Port-Log – the OceanWise data platform which manages and publishes environmental data. Historical and real-time data will be published via Port-Log, which is designed to display the complex range of sensor data in an easy-to-use web page and publish the data more widely to multiple users, including maritime pilots.

oceanwise.eu

pelagian

Subsea services support transatlantic cable project

Pelagian provided consultancy for the first transatlantic telecom cable to be installed for over 10 years. The Hibernia Express fibre optic cable used a unique low latency route laid in very challenging seabed conditions.

The shore end landings were in challenging locations, requiring in-depth planning to ensure all environmental aspects of the project were adhered to. Once the shore end had been completed the cable was installed into the seabed using a plough. Finally, remotely operated vehicles were used to ensure that the cable was buried to the correct depth.

Pelagian's services included management of the survey and installation programs, permit research and stakeholder management, including the preparation of notices to mariners and information for the public. During the two-year project, Pelagian provided personnel for several critical functions including survey, cable load, installation, pre-lay grapnel run, post-lay inspection and burial, shore end and Marine and Maritime Organisation liaison.

pelagian.co.uk

SILVERSTREAM TECHNOLOGIES

Award-winning clean technology company

Silverstream has pioneered air lubrication technology to generate fuel and emission savings for vessels worldwide. Since 2010, London-based maritime clean technology company, Silverstream Technologies has pioneered air lubrication technology within shipping, optimising and rapidly scaling the Silverstream® System for application across the global fleet.

Silverstream's Air Lubrication System fundamentally changes the interaction between water and a vessel's hull, shearing air from air release units in the hull to create a carpet of microbubbles that coats the full flat bottom of a vessel.

Independent third parties including Lloyd's Register, HSVA and the University of Southampton have verified that the Silverstream® System generates between net 5-10% fuel and emissions savings, depending on vessel type.

Silverstream has a rapidly growing orderbook for its System – now surpassing $100 million in order intake – on both retrofits and newbuilds, from the leading names in the sector including MSC, Shell, Maersk, Grimaldi, Hyundai Heavy Industries, Carnival, Vale and others.

In addition to Silverstream's London office, the company opened a new office in Shanghai in January 2022, enabling it to be at the heart of the shipping industry and near some of its most important partners and customers.

Silverstream's agile business model and team of maritime experts – which now stands at 60 people across London, Shanghai and the Middle East – are focused on results-driven, tailor-made installations of its air lubrication technology.

The company exports its services to partners across Asia, the Middle East and Europe, with an anticipated 500 System orders by 2025.

In 2021, Silverstream was awarded RINA's QinetiQ Maritime Innovation Award, alongside Shell Shipping & Maritime, for the retrofit installation of the Silverstream System onboard the Shell-chartered LNG carrier Methane Patricia Camila.

In 2022, Silverstream was awarded The Engineer's Collaborate to Innovate Wildcard Award for the same project with Shell.

www.silverstream-tech.com

SONIHULL
ULTRASONIC ANTI-FOULING SYSTEM

World leading green technology for the prevention of biofouling on ships and boats, as well as pipework and cooling systems in industrial settings.

NRG Marine's Sonihull ultrasonic antifouling system is the world leading green technology for the prevention of biofouling on ships, boats, propellers, water jets, hulls, cooling systems, pipework and other niche areas. Sonihull is suitable for retrofit and newbuild vessels.

Sonihull uses ultrasonics to agitate surfaces preventing development of biofilms and growth on vessels and in pipework, reducing build-up of materials that cause blockages and impede flow or cause drag. It does this without chemicals or harmful toxins associated with traditional antifouling methods.

Effective biofouling management on vessels reduces invasive species which damage marine ecosystems globally. The reduction in drag dramatically improves performance, reducing fuel consumption and creating a significant saving in CO2 emissions.

In addition to these environmental benefits, unlike traditional biofouling methods, Sonihull does not leach toxins and microplastics into the ocean, unlike toxic biocidal paints or sacrificial anodes.

Sonihull is UK based with offices in London, Coventry and an Operations and R&D centre in Abu Dhabi.

With its 20 strong team and 54 fully trained distributors around the world Sonihull deals in over 75 countries and has reach on every continent for sales and support.

Sonihull currently supplies some of the biggest fleets in commercial shipping and offshore support vessels as well as Navies around the globe.

www.sonihull.com

STONE MARINE PROPULSION

Optimising propellers for efficiency and power

Maximum propulsive power used to be the main criteria for designing propellers. In today's marine environment that has to be balanced against a second requirement; to produce that power whilst reducing fuel consumption and emissions as much as possible.

Stone Marine Propulsion's NPT propeller was designed to address this demand. It has now been fitted to over 200 ships, many of them operated by the world's largest shipping companies. In every case the reductions required in both fuel consumption and emissions have been exceeded, often by significant amounts.

An NPT propeller was recently fitted to a 35,000 deadweight tonne bulk carrier. At the completion of sea trials it was shown that the vessel had exceeded performance requirements built into its contract. Computer modelling anticipated that the vessel would achieve savings of 3.5% with an NPT propeller fitted. In the trials, savings were around 8%.

There are other benefits to NPT propellers too. One is the smaller optimum diameter compared with a conventional propeller, meaning a more efficient, slower turning propeller is often possible without exceeding the maximum allowable diameter. This is also advantageous for retrofitting to a de-rated engine, as the number of blades and blade surface area can be lower without increasing propeller diameter – bringing further efficiency gains.

smpropulsion.com

survitec

Pioneers of survival technology, equipment, survival craft solutions and fire protection technology

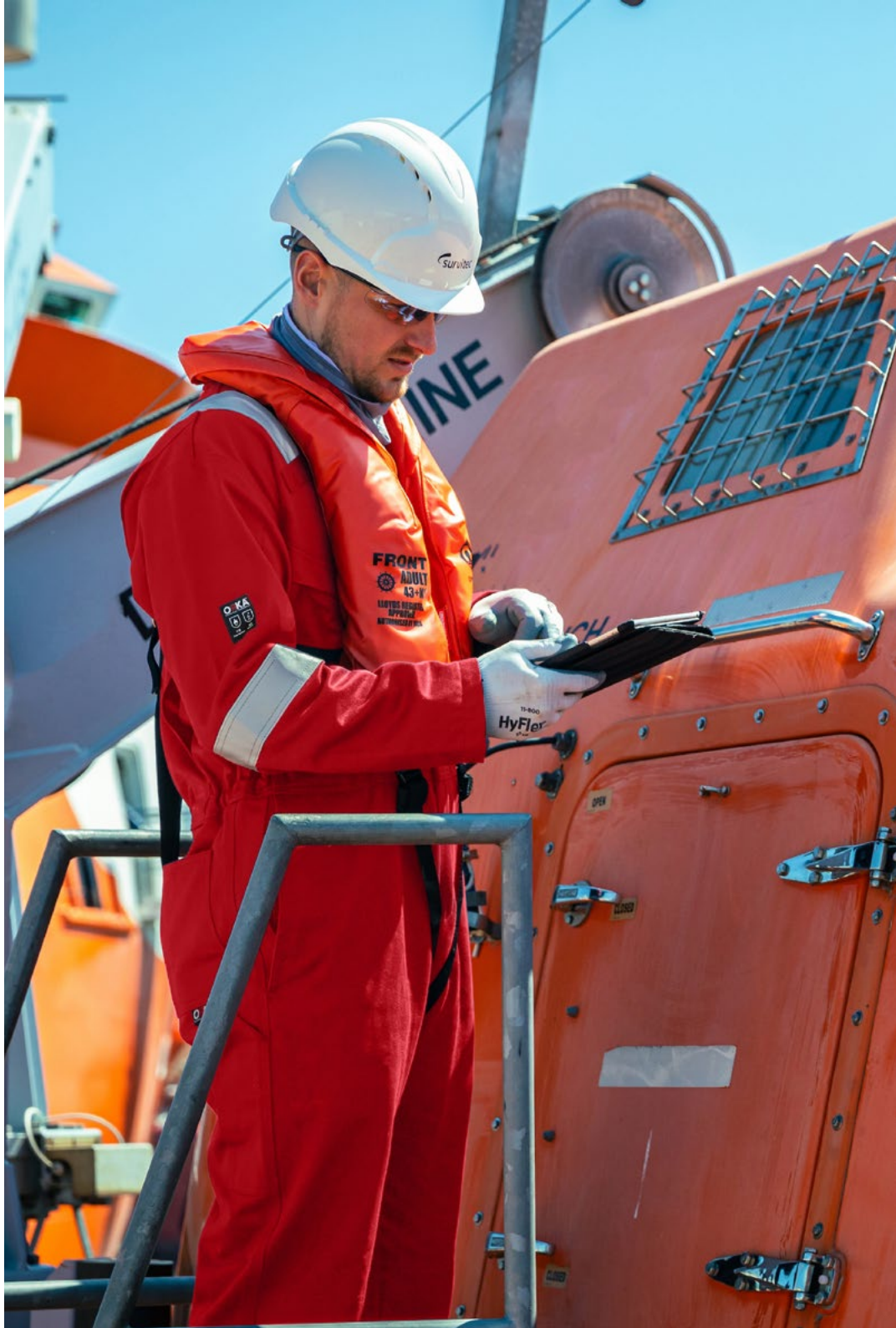
The origins of Survitec date back to 1854 and throughout its 168-year history the company has been trusted to protect lives. Today, Survitec protect over one million lives every day and partner with stakeholders to provide trustworthy solutions that reduce risk and help save lives. The company continues its drive for innovation and continuous development, with a history of market firsts, and a series of successful acquisitions and mergers.

Survitec's wearable survival equipment, survival craft solutions and fire protection technology are supported by a community of 3,000 experts across 96 countries, covering more than 2,000 ports worldwide.

Survitec's facilities are strategically located for the convenience of its customers. The company operates eight world-class manufacturing facilities, three accredited training centres, 70 locations, and a support network of more than 400 accredited service stations. The company has grown through the passion and commitment of a dedicated global workforce.

At the prestigious HIS Markit Safety at Sea awards, Survitec was awarded the Best Emerging Safety Solution accolade for its revolutionary Seahaven Advanced Evacuation System, a slide-based rigid inflatable life raft for the mass evacuation of passengers and crew from cruise ships. Seahaven will transform and revolutionise not only the way passengers are evacuated in an emergency, but also how cruise ships are designed.

www.survitecgroup.com



The largest manufacturer of quality propellers and stern gear in Europe

Teignbridge is a world-leading designer and manufacturer of precision performance propellers, stern gear and propulsion products. Employing Computational Fluid Dynamics (CFD), simulation software and finite element analysis, the company guarantees the optimum design and performance for every project - whether a motor yacht, fast patrol boat, pilot boat, super yacht or tanker.

With over 45 years of experience, Teignbridge uses the latest Computer Numerical Control (CNC) machinery to produce the finest bronze propellers and stern gear from raw materials to the finished article at its UK-based world-leading facility. The company ensures it retains a unique combination of tools to supports its customers including a highly experienced and qualified design team, world-leading design software and CFD capabilities.

Teignbridge is the only propeller designer and manufacturer with its own purpose-built test boat. Its designs are supported by a modern foundry and factory populated with the latest CNC machines to guarantee the accuracy of the finished products. With over 6,038 square metres (65,000 sq. ft) of floor space and over 110 employees, Teignbridge is the largest propeller and stern gear producer of its kind in Europe. Its manufacturing capabilities are extended by Teignbridge's factory in India, with over 30 staff and workshop, and a sales office and warehouse in Dubai, employing a further 15 staff.

Customer support is enhanced with its offices in Mumbai, Dubai, Italy and Malaysia and a network of agents across the globe.

The company is continuously innovating with products such as the DAME award nominated Clamp-on Blade (CoB) propeller and other recent innovations include velocity aligned rudders and brackets to increase efficiency.

www.teignbridge.co.uk

windship
powered by nature • proven by technology

A provider of emission reduction technology combining wind technology, innovative drive train, solar power and carbon capture which together create a zero CO2 emission ship

Established in 2012 Windship Technology was set up to utilise wind to power ships. Using experts on its Board from within Commercial Shipping, Law, Naval Architecture, Design and Composite Engineering, its mission was to create a solution that was significant and robust enough to be an obvious choice for owners and operators. The process culminated in a patented tri foil rig system capable of powering bulk carriers and tankers.

Having devised a system providing the highest power density for wind assist shipping projects, Windship realised that to truly save fuel the whole 'drive train' of the ship needed to be redesigned. The company also adopted a range of other technologies to design a completely CO2 free ship.

As validation is paramount with all new inventions, Windship Rigs have been independently tested using computer fluid dynamics (CFD) by Lloyds Register, Delft University, and DNV classification society. Windship Rigs and the whole drive train have undergone a full HAZID test and been given an Approved in Principle (AIP) by DNV. A 1/20th scale model has been built and tested by the Wolfson Unit at Southampton University.

www.windshiptechnology.com

Ready to trade

The UK government already offers strong support to international companies working with UK marine technology suppliers and is stepping up investment in the sector.

As part of its National Shipbuilding Strategy, the government aims to make the maritime industry more competitive, export British ships overseas and boost innovation, skills, jobs, and productivity across the UK.

The UK Department for Transport has also launched the £20 million Clean Maritime Demonstration Competition to support development of UK expertise in green shipping technologies and components. This programme aims to accelerate the design and development of zero emission vessels in the UK.

UK Export Finance (UKEF) can offer substantial support for overseas companies buying from UK marine technology suppliers providing goods and services. The export credit agency can guarantee commercial loans to overseas buyers for up to 85% of the value of eligible goods and services purchased under a contract. Support can be provided for contracts with a lower UK content (to a minimum of 20%), offering greater flexibility to exporters and buyers. UKEF may be able to offer direct loans to buyers at competitive fixed interest rates, on a case-by-case basis.

The government's commitment to building sustainable business is reflected in a separate £2 billion fund earmarked for direct lending from UKEF to green growth projects. UKEF will consider support under this initiative on a case-by-case basis and in line with the Green Bond Principles.

A wide range of maritime-related businesses are eligible to apply for this additional funding, including projects to deliver or support offshore renewables or to reduce emissions through clean transportation technology. For example, in February 2021 UKEF provided a £200 million buyer credit guarantee to help finance the Greater Changhua 1 Offshore Wind Farm in Taiwan, unlocking the export potential of the UK's offshore wind sector.

Two UK renewable energy companies have already capitalised on UKEF's latest support by winning multi-million-pound export contracts with Ørsted in Taiwan. Seajacks, an East Anglia-based company, will ship the material needed to install the turbines. Trelleborg's applied technologies operation in the West Midlands, will provide protection systems for the cables which connect the turbines to the mainland.

For more information on UK Export Finance, visit
www.gov.uk/government/organisations/uk-export-finance

For more information on the UK maritimemarket, visit
www.maritimeuk.org/

UK marine technology supplier directory

Please find below a selection of the UK suppliers operating in the marine technology sector.

ACM Bearings
www.acmbearings.co.uk

Ad Hoc Marine Designs
www.adhocmarinedesigns.co.uk

Aluminium Marine Consultants
www.aluminium-boats.com

Ambrey
www.ambrey.com

Artemis Technologies
www.artemistechnologies.co.uk

AST
www.theastgroup.com

AutoNaut USV
www.autonautusv.com

Babcock LGE
www.babcockinternational.com/lge

BAR Technologies
www.bartechnologies.uk

Bibby Marine
www.bibbymarine.com

BMT
www.bmt.org

Bruntons Propellers
www.bruntonspropellers.com

Cammel Laird
www.clbh.co.uk

Cast Iron Welding Services (CIWS)
www.castironwelding.co.uk

Cox Powertrain
www.coxmarine.com

CyberOwl
www.cyberowl.io

Darglow Engineering
www.darglow.co.uk

Diverse Marine
www.diversemarine.co.uk

Eminox
www.eminox.com

GE Power Conversion
www.gepowerconversion.com/industries/marine

Griffon Hoverwork
www.griffonhoverwork.com

Harland & Wolff
www.harland-wolff.com

HENSOLDT UK
www. uk.hensoldt.net

HFW
www.hfw.com

Horizon Technologies
www.horizontechnologies.com

Houlder
www.houlderltd.com

Inmarsat Global
www.inmarsat.com

Lloyd's Register
www.lr.org

Manor Renewable Energy (MRE)
www.mreltd.co.uk

MarineDash
www.marinedash.com

Maritime Testing and Training Alliance
www.linkedin.com/company/maritime-testing-training-alliance/

Mivan
www.mivan.com

MJM MARINE
www.mjmmarine.com

mSubs
www.msubs.com

Ocean Infinity Group
www.oceaninfinity.com

OceanWise
www.oceanwise.eu

P & S Automation
www.pandsautomation.com

PAKA
www.paka.group

Parkol Marine Engineering
www.parkol.co.uk

Pelagian UK
www.pelagian.co.uk

Port of Blyth
www.portofblyth.co.uk

Rivertrace
www.rivertrace.com

RS Aqua
www.rsaqua.co.uk

SEA-KIT International
www.sea-kit.com

Solarglide
www.solarglide.com

Solis Marine Consultants
www.solis-marine.com

Sonardyne International
www.sonardyne.com

Stone Marine Propulsion
www.smpropulsion.com

SubSea Craft
www.subseacraft.com

Survitec Group
www.survitecgroup.com

Theta Marine Consulting UK
www.thetamarine.co.uk

Topglass Contracts
www.top-glass.com

Tugdock
www.tugdock.com

Tyne Gangway (Structures) www.tynegangway.com

Valeport
www.valeport.co.uk

VIRSEC
www.virsec.org

Windship Technology
www.windshiptechnology.com

Disclaimer
Whereas every effort has been made to ensure that the information in this document is accurate the Department for International Trade does not accept liability for any errors, omissions or misleading statements, and no warranty is given or responsibility accepted as to the standing of any individual, firm, company or other organisation mentioned.

This document is also available on our website at gov.uk/dit.
Any enquiries regarding this publication should be sent to us at **enquiries@trade.gov.uk**

Published September 2022.

Department for International Trade

GREAT
BRITAIN & NORTHERN IRELAND