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CONTENTS

July / August 2024

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FEATURES 24-42

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NEWS

YACHT CONSTRUCTION

SAXDOR MOVES INTO LARSMO

Saxdor Yachts has moved into the Larsmo facility in Finland, previously occupied by Baltic Yachts

Saxdor Yachts has moved into a new shipyard in Larsmo, Finland, as part of an expansion drive to boost its production capacity. The boatbuilder describes the move to Larsmo as a "long-term investment" and one that could see the creation of more than 100 local jobs, "starting with approximately 50 professionals", the company states. As of late June, key positions at the yard have already been filled, Saxdor adds.

The Larsmo facility, based on Finland's west coast, was previously occupied by Baltic Yachts – a factor that apparently inspired Saxdor to acquire the space to build its larger, higher-end models there, citing good "Finnish craftmanship". Production at Larsmo is scheduled to begin in autumn.

Erna Rusi, Saxdor CEO, remarks: "Besides additional production capacity to meet the high global demand, it also gives us the opportunity to have another innovation hub for R&D." New models are planned soon, he hints. Saxdor will retain its 10,000m² yard in the Polish city of Elk, which employs 550 workers at present.

Meanwhile, June saw Saxdor secure a high-profile sale in the Middle East, with the delivery of a brand-new Saxdor 400 GTO-class yacht to the Crown Prince of Dubai. The 12.4m x 3.55m vessel features a 0.75m draught, a forward double cabin and an aft cabin, plus a bow seating area. ■

INDUSTRY NEWS

GREEN LIGHT FOR SCOTTISH MARINE HUB

The Scottish Marine Technology Park has received planning permission in principle

Malin Group has received planning permission in principle for its proposed Scottish Marine Technology Park (SMTP), which is intended to provide a hub for shipbuilding, offshore renewables, research and marine industry collaborations, all in one location.

According to Malin Group MD John MacSween: "We are excited about the potential that [the SMTP] offers Scotland's marine industry." In his view, the park will serve as a catalyst for industry growth, creating "hundreds of jobs" and boosting the local economy by a predicted £125 million each year. "The maritime industry...represents a sleeping giant in our economy and we need to create space for small- and medium-sized marine companies to flourish," MacSween comments.

The SMTP site comprises approximately 121,000m² of developable space, located on the north bank of the River Clyde and about nine miles west of Glasgow's city centre. A 130m quay will provide direct access between the site and the Clyde. The SMTP will also be equipped with a 1,100tonne ship hoist for large-scale marine projects.

The plan is for the SMTP to use alternative heating methods for its buildings, as opposed to mains gas, and to incorporate eco-friendly technologies including solar panels, electric car-charging points and rainwater capture/reuse systems. The project has been valued at £80 million and is scheduled for completion in 2026. ■

PATROL AND RESCUE BOATS

FIREFIGHTING DUO FOR HONG KONG

Chinese boatbuilder AFAI Southern Shipyard has delivered the first of two emergency response vessels to the Hong Kong Fire Services Department, which is currently replacing vessels in its ageing fleet. The two newcomers will be stationed at Hong Kong International Airport, tasked with fire response and search and rescue duties in both near-shore and deep-sea environments, as well as with responding to emergency on-water aircraft landings. AFAI Southern Shipyard is currently building the second vessel, and both are expected to enter service by 2025.

Designed by Incat Crowther, each vessel features an overall length of 35.95m, an overall breadth of 11.5m, a depth of 3.65m and a draught of 1.8m. Arranged for an 18-person crew and up to 300 casualties, each vessel is fitted with four MTU 16V2000 M96L engines, each rated 1,939kW at 2,450rpm, driving as many Hamilton HTX52 waterjets through ZF 5050 D gearboxes. This arrangement enables a top speed of 41knots.

Both boats can store up to 7,600litres of firefighting foam, dispersed by two dual fire monitors. Additionally, each boat features: a treatment room on the main deck; a Palfinger hydraulic automatic fast rescue slipway system, enabling the launch of a rescue boat; and telescopic flood lights, to assist nighttime rescues. The main deck has been arranged with spacious equipment storage areas and four bathrooms. ■

The AFAI-built emergency response vessels will be stationed at Hong Kong International Airport

FISHING VESSELS

VARD STERN TRAWLER DUE IN 2026

The forthcoming newbuild will be based on VARD's 8 02 class

VARD has secured an order to design and build a stern trawler for Norwegian fishing company Havbryn. According to VARD: "The hull will be built at one of our yards in Romania and the vessel will be outfitted, commissioned and delivered from one of our yards in Norway."

The newbuild will be based on VARD's 8 02 class, outfitted for semi-pelagic and bottom-trawling operations. The trawler will feature an overall length of 80.4m, a moulded breadth of 16.7m, a depth of 6m and a maximum draught of 7m, plus an ice-strengthened (Ice 1-A) hull to help it power through winters in Norway's north. The boat will also host an advanced heading and gutting (H/G) processing factory, plus a cargo hold for both refrigerated and frozen products and featuring ensilage tanks. Onboard facilities will include a gym and day rooms.

Seaonics has been commissioned to provide the trawler's cranes and electric trawl winches. VARD says: "During shooting or paying out wire, all winches regenerate power back to the SeaQ energy storage system" – a process expected to reduce overall power consumption. Delivery is slated for Q3 2026, whereupon the newbuild will replace the owner's 69.9m x 15.4m trawler *Havbryn*, which was constructed by Tersan Shipyard, Turkey in 2013. ■

PASSENGER CRAFT

FLUID TAXI BUILDS UP FLEET

Water taxi start-up Fluid Taxi reports that it is using a customised version of boatbuilder Cheetah Marine's Walk-Around Cabin boat class to provide short-hop charters across the Solent, connecting the UK mainland to the Isle of Wight.

The first boat in the fleet, *Fluid Taxi 1*, has been accepting private charters since May. Edward O'Kane, Cheetah Marine general manager, tells *Ship & Boat International* that the Walk-Around Cabin class has been made available in two versions, with varying beams. "The 11.2m x 3.7m model has a maximum capacity of 12 passengers and two crew, all seated on shock-mitigation seating," says O'Kane. *Fluid Taxi 1* comprises this larger model. O'Kane continues: "The 9.5m x 3.4m version will be available with a capacity of six passengers and two crew."

Both types draw 450mm and, with crew and passenger safety in mind, feature watertight weather decks, reinforced hulls and guardrails. *Fluid Taxi 1* is fitted with twin Honda 250 outboards with 30" shafts, which grant the boat a cruising speed of between 25-30knots and a fuel consumption rate of 3.5litres per minute, depending on load.

The 11.2m *Fluid Taxi 1* can be booked for trips across the Solent

At present, passengers can book the craft by emailing the Fluid Taxi charter team with their journey requirements, though a smartphone booking app is in development. ■

TUGS

TUG DUO FOR PHILIPPINE NAVY

Josefa Slipways, a boatbuilder in Sual, the Philippines, has delivered a pair of tugs to the Philippine Navy. Both tugs were designed by Canadian naval architect Robert Allan Limited (RAL) and have been outfitted for a 10-strong crew.

The first newbuild, referred to as *YT 027*, is a RAmparts 2700 harbour tug model featuring an overall length of 27.6m, a moulded beam of 10m, a moulded depth of 4.17m and a draught of 4.35m. It is powered by two MTU 12V4000 M53 diesel engines, each rated 1,380kW at 1,800rpm, which work with Schottel SRP 340 Z-drives with 2.1m-diameter fixed-pitch propellers. Onboard capacities include 71m³ of fuel oil, 31m³ of fresh water and 25m³ of firefighting foam.

The second vessel, *AT 010*, is a RAmparts 3000-W ocean tug, measuring 30.25m x 11.75m, featuring a moulded depth of 5.44m and drawing 4.67m max. This 452gt tug can store up to 153m³ of fuel oil and 14m³ of firefighting foam, and is powered by two MTU 16V4000 M63 diesel engines rated 1,920kW at 1,600rpm, driving fixed-pitch, nozzled props through ZF W10230 reverse reduction gearboxes. This tug is also fitted with a Veth bow thruster with a 600mm-diameter propeller.

Both tugs are fitted with Palmarine aft towing winches. In sea trials, *YT 027* achieved a bollard pull of 45.8tonnes and a speed of 13.1knots ahead, while *AT 010* recorded a bollard pull of 61.1tonnes and a speed of 13.8knots ahead. ■

The RAmparts 2700 harbour tug *YT 027* is one of two tugs delivered to the Philippine Navy

EQUIPMENT

PROPELLERS AND THRUSTERS

ZF LAUNCHES SMALL TUG THRUSTER

Marine thruster manufacturer ZF has launched a new azimuth thruster targeting vessels with outputs of up to 815kW. Available as an L-drive or Z-drive, the ZF AT 50 can be installed as a well-mounted, deck-mounted or stern-mounted tunnel or retractable thruster, to suit various vessel types and shapes.

The new thruster also offers a maximum bollard pull of 28tonnes in a twin configuration, which could make it suitable for installation aboard tugs, dredgers, icebreakers and offshore support vessels. Optional add-ons include ZF AutoTroll, enabling "precision adjustments to thrust when manoeuvring, even below the engine's idle speed", ZF says. The company can also provide a "special seal arrangement" for enhanced environmental protection, as well as its ZF ProVID condition monitoring system.

The ZF AT 50 follows on from previous models, namely: the ZF AT 80, introduced in 2021, which is suited to vessels with outputs spanning 1,380-1,585kW; and the ZF AT 90, launched last year, which was developed to support vessels with a maximum power rating of 1,978kW, including larger tugboats and ferries. Jeroen Vedder, business development manager of the company's ZF Crimpen division in the Netherlands, comments: "Great design also encompasses scalable solutions, which is why we are currently working on the ZF AT 40, to be released by the end of 2024." ■

The ZF AT 50 is designed or vessels with outputs of up to 815kW

MONITORING SOLUTIONS

DIRECT ACCESS TO MOTOR DATA

Boaters will be able to directly access data from ePropulsion's electric motors via Raymarine's Axiom displays

A collaboration between electric propulsion specialist ePropulsion and marine electronics firm Raymarine will enable boaters to directly access data from ePropulsion's electric motors via Raymarine's Axiom-series displays, removing the need for additional gateways or interface boxes.

This access will be enabled by Raymarine's LightHouse 4.6 operating system, which has been developed to support NMEA 2000 parameter group number (PGN) messages for its Axiom chartplotters. The PGN is a special code that enables devices on a boat (for example, the engine and GPS) to talk to each other, sharing important operational information. According to ePropulsion: "This seamless integration allows boaters to monitor data and status updates – such as battery level, speed, gear and estimated range – directly on Axiom's engine dashboard application."

Additionally, end users will be able to access 'dynamic range ring overlays' on the chartplotter displays, and this should help them to visualise the boat's current cruising range and energy consumption levels, the partners state. At the time of writing, this new functionality is being rolled out across ePropulsion's X Series outboards, spanning outputs up to 40kW, and its I-Series inboard motors, which are claimed to offer "65% less weight than typical combustion engines", ePropulsion says. ■

WATERJETS

CASTOLDI UNVEILS 400 H.C.T.

Waterjet manufacturer Castoldi has launched its Turbodrive 400 H.C.T. model, which derives its name from its 400mm jet housing and 'hydraulic gearbox/clutch and high thrust efficiency' properties. Weighing 509kg and capable of handling up to 882kW of input power, the new unit's hydraulic gearbox has been integrated into the jet casing, resulting in an underslung driveshaft.

This, Castoldi says, ensures a low centre of gravity and enhanced efficiency, "because the water that the jet pumps is neither lifted as far nor requires such sharp changes in its direction of flow", in comparison to some other waterjet designs.

The gearbox and multi-disc clutch permit the user to engage or disengage the drive without having to stop the engine, which Castoldi hails as an "important consideration", particularly for ferries and patrol and rescue boats. The company adds: "The integrated gearbox offers 21 gear ratios, allowing for precise matching with a variety of engines in its power range."

Castoldi says that it used CFD to reshape the jet's reversing bucket geometry and remodel its steering system to reduce speed loss during sharp turns – resulting in a claimed 12% efficiency boost compared to the previous Turbodrive 400 H.C. jet,

The Turbodrive 400 H.C.T. waterjet can handle up to 882kW of input power

comments company owner Giacomo Castoldi. The new jet is also designed to simplify upgrades from the previous model, he says, adding: "The bolt patterns have remained the same, removing the need for costly structural work around the duct and transom." ■

FIRE SAFETY SYSTEMS

SURVITEC: DON'T SKIMP ON FIRE SAFETY

A white paper issued by Survitec warns that port state control vessel inspections post-COVID are revealing an "alarming increase" in fire safety-related deficiencies. The economic downturn and resulting "emphasis on cost reduction" may be prompting some vessel owners and operators to maintain and inspect onboard fire safety systems and equipment themselves, Survitec claims.

Metkel Yohannes, director of service and rental solutions at Survitec, says: "We're finding basic errors and oversights that do not become apparent until either the ship fails an inspection and is detained – or there is a fire. Analysts report a 17% year-on-year rise in shipboard fires, which correlates with an increasing number of reports and testimonies from our network of certified service technicians and engineers that document serious faults requiring immediate corrective measures."

One problem is poorly fitted parts; another, the use of wrong or low-quality parts. "For example, in CO_2 firefighting systems, hydraulic hoses are often mistaken for high-pressure hoses – but they are not designed for CO_2 applications and may burst under pressure," Survitec says. Yohannes continues: "The development and introduction of alternative fuels, including the use and transportation of lithium-ion batteries, brings new fire risks and safety challenges that can't be ignored. Fire systems and equipment must be maintained and tested as mandated by SOLAS, the IMO and the FSS code."

The white paper, which was released at the Posidonia trade show, highlights several case studies, including one related to a lack of internal inspections for breathing air cylinders. "Cylinders may be continually topped up, rather than drained and inspected," the paper states. "Air will collect in the cylinder, and the water vapour present in the air will cause the cylinder to rust. The risk is that particles of rust will then be inhaled into the lungs. Best practice is therefore to empty the cylinder and inspect it before refilling, even if the cylinder is half full, but not all service providers do this."

Yohannes comments: "As an industry, current practice should be reviewed to determine if more oversight and governance, and more quality control procedures, are required to protect crew and vessel safety." ■

DRONE TECH

INDUSTRY NEWS

GLOBAL GROWTH FOR DRONE MARKET

A report issued by Mordor Intelligence suggests that the global ROV and AUV market, which has a current estimated value of US$2.63 billion, could reach US$3.81 billion by 2029, representing CAGR growth of 7.69% between now and then. The analyst credits an anticipated rise in offshore oil & gas production and decommissioning activities, plus further developments in offshore wind and subsea research, as key drivers for this growth.

The report highlights that North America will witness "significant growth", mostly spurred by demand within the US and Mexico. "Major players" in this sector currently (and will) include Saipem, Subsea7, Fugro, Oceaneering and DOF Subsea, the report notes.

Of this global growth, the European AUV sector alone is predicted to register a CAGR of 6.9% during the forecast period, partly due to the creation of new opportunities in the deepwater and ultra-deepwater segments within this territory. Norway will dominate the European market, the analyst claims.

The ROV and AUV market will grow to US$3.8 billion by 2029, Mordor Intelligence forecasts (image: Blue Ring)

However, Mordor Intelligence warns: "Countries planning to increase their focus on climate change and banning offshore exploration activities in the future are expected to restrain market growth." All the same, the analyst concludes: "The technological advancements in AUVs and ROVs are expected to offer a considerable opportunity for companies in the long term." ■

SUBSEA INSPECTIONS

FREEDOM WRAPS UP PIPELINE PILOT

The Freedom AUV inspected more than 120km of subsea pipelines in the North Sea

Oceaneering has used one of its Freedom AUV units to complete a pipeline inspection industrial pilot scheme in the North Sea, hosted in partnership with multi-energy major TotalEnergies. The pilot, which saw the AUV inspect more than 120km of subsea pipeline, recorded a 50% reduction in both time and emissions compared to more conventional inspection techniques, Oceaneering reports.

Oceaneering says that the Freedom used autonomous technology to detect and track the pipeline while maintaining "a defined flight envelope directly above the pipeline at low altitudes". The AUV successfully gathered its required data "in a single pass of the pipelines", using a payload comprising a laser-scanning system and various multibeam sonar instruments, the company adds.

The Freedom measures 4.5m x 1.2m x 0.8m, has a payload capacity of 136kg and is rated for depths down to 6,000m. Propelled by four horizontal and four vertical vectored thrusters, the AUV has a top speed of 6knots moving forward (or 2knots moving vertically) and can stay on station for extended periods of up to 87 hours at 0.5knots.

Andy Gower, R&D subsea robotics project lead at TotalEnergies, says: "The deployment of AUVs is an important part of reducing the impact of using large vessels to conduct inspection, maintenance and repair [IMR] activities. The capabilities of the Freedom AUV offer the opportunity to conduct wider-ranging missions in our current and future projects, including offshore wind, with the potential for integration with lighter USV support to reduce the environmental impact even further." ■

PILOT BOATS

RAISING THE BAR

New environmental regulations affecting vessels in the State of California have prompted naval architect Glosten to reconsider the design for one of its popular pilot boat types. Stevie Knight reports

On one hand, this story is about a very specific case. On the other, though, there's a broader lesson about what to do when you lose your chosen and proven solution to a changing regulatory environment – and how to get a good night's sleep.

Since pilotage for vessels sized 750gt and over is mandatory in California, the San Francisco Bar Pilots (SFBP) accompany nearly 8,000 ships in and out of the state's ports each year. It's a demanding service: there are narrow channels with fast-running currents, fog, plus all the traffic, bridges and other infrastructure that typically surrounds a large commercial seaport. There's also the San Francisco Bar itself: here, outflow sediment tends to form shallows and, despite regular dredging, can become treacherous in heavy weather.

Altogether, the demands are such that these pilot vessels are required by law to stand 'on station' outside the Golden Gate Bridge, roughly 12nm away from the SFBP pilot station, for six days at a time. It's a challenging ocean environment and these vessels must cope with occasional 6m seas with 10-second wave periods.

That puts a lot of pressure on the SFBP and its boats. "They need to go out in almost all weathers to keep the port open, but still be safe for pilot transfers," says Jeff Rider, senior marine engineer for naval architect Glosten.

While pilot boats aren't uncommon, these vessels must fulfil rather different roles: operating on station and serving as a comfortable floating platform for the pilots and crew to rest. These station boats don't simply sit there while smaller launches carry out the transfers; they are also tasked with boarding and disembarking pilots from the ships.

To do this, they need to be able to increase their pace to 15knots to catch the big ships. And, because these boats must be able to accommodate eight pilots along with four crew, they cannot take advantage of a more compact design.

The CARB conundrum

Over the past 20 years, the SFBP has been extremely pleased with its three, almost identical 32m-long pilot vessels: P/V *San Francisco*, P/V *California* and P/V *Drake*. However, last year, the game changed around the California Air Resources Board's (CARB's) new rules for harbour craft. As reported in *Ship & Boat International* March/April 2024 (page 24), the new rules mandate cleaner engines and the use of diesel particulate filters (DPFs) on existing vessels – although the requirements have sparked controversy, with many tug operators (plus the US Coast Guard) pointing out that some of these DPFs may prove difficult to retrofit, and could present an onboard fire risk.

Glosten's new pilot boat design for the SFBP has extended the length by 1.8m, creating room for the installation of batteries (image: Glosten)

The SFBP knew it would be a tough call for a refit strategy: the CARB-mandated after-treatment technology and DPFs simply wouldn't fit the boats' original footprint and would substantially increase each boat's weight. Therefore, a new design had to replicate the originals as far as possible while keeping within the 200tonne limitation, as that has implications for crewing.

A lot of deliberation followed, including a proposal to 'build upward,' installing additional equipment above the superstructure. That came with another set of challenges; so, Rider explains, the team finally decided the best option was to lengthen the new design by 1.8m to 33.5m, while retaining both beam (8.5m) and draught (2.7m).

The SFBP's current boats were unable to accommodate the engine after-treatment systems necessitated by CARB's new harbour craft rules

Hybrid option

One of the big wins from this extra volume was the creation of enough space for batteries, enabling a hybrid configuration. "These boats loiter a lot of the time because, if you drift, you're bobbing all over the place," says Rider. "So instead, they keep their bow into the weather – that maintains a more acceptable motion for pilots on board, and especially for the crew during rest hours." Sleep is, of course, a necessity given the intensity of the operations.

After some investigation, Glosten settled on a 271kWh energy storage installation, configured on a DC distribution, to provide the design with a couple of knots loitering on battery power.

The batteries are either charged at berth or via a PTO/PTI on the gearbox behind the main engines. Usefully, these Tier 4-compliant MAN 882kW models have a very compact SCR after-treatment system, and its DPFs have just been approved by the US' Environmental Protection Agency (EPA).

The batteries will take over and drive the five-bladed propeller at very low speeds, allowing the crew to shut off the main engines. The PTO/PTI also allows the gensets to provide propulsion power to supplement the batteries. Hotel loads can be provided by the main engines when they are running.

Arranging the layout

Rider remarks: "The design has been significantly updated and it's pretty different from the original, but we've tried to maintain the aesthetic – so the layout is roughly the same." The main deck has a large superstructure holding the galley and lounge, with a raised wheelhouse sitting above an anti-roll 'U' tank. Below deck, the pilot rest area is located forward of the engine room, while the crew have staterooms aft.

Still, "the ride" is all-important, he adds. "The waves can be substantial – and in certain wind directions, they can get shorter and steeper, which makes it pretty rough."

Although different from its predecessors, the new 33.5m design is "roughly the same" in layout

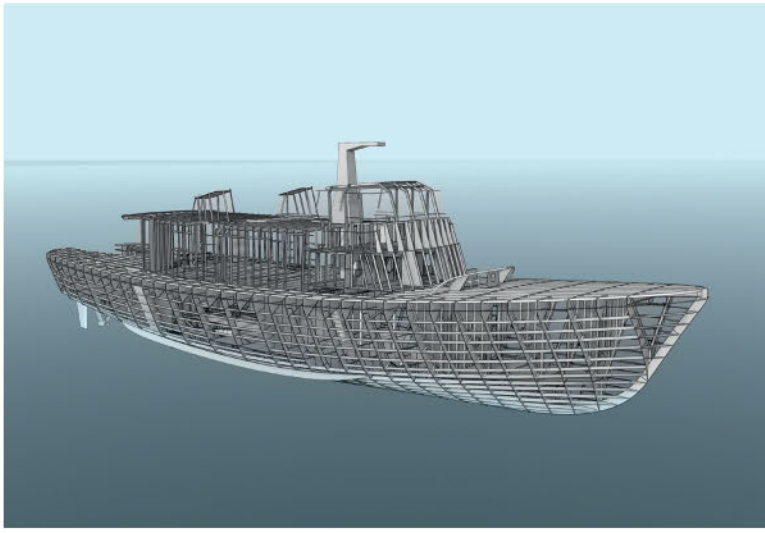
It's not a given that, having gotten all the equipment in, the boat will still handle well enough for the job, Rider points out. "It was an interesting puzzle to figure out where the battery rooms made sense; where all of the after-treatment kit needed to be placed; and to be sure that everything fit," he says. "But we also spent a lot of time looking at draught, weight and trim, specifically the impact of where all this weight lived. In general, motion gets better with additional length, but we were particularly concerned about acceleration at the pilot boarding location itself because that's far forward of the vessel's centre of gravity."

As a result, the design called for repositioning some of the supply tanks to the area below and forward of the engine room. Those for the SCR are in the aft 'wings' nearby, while the fuel tanks are outboard of the staterooms.

Noise damping

When it comes to making the new boat design liveable, there were also concerns about noise and vibration levels. So, the entire engine and gear system are installed on a resiliently mounted frame, while damping tiles have been laid on certain sections of the hull. Also, various layers of insulation and floating floors have been laid under the entire lounge area.

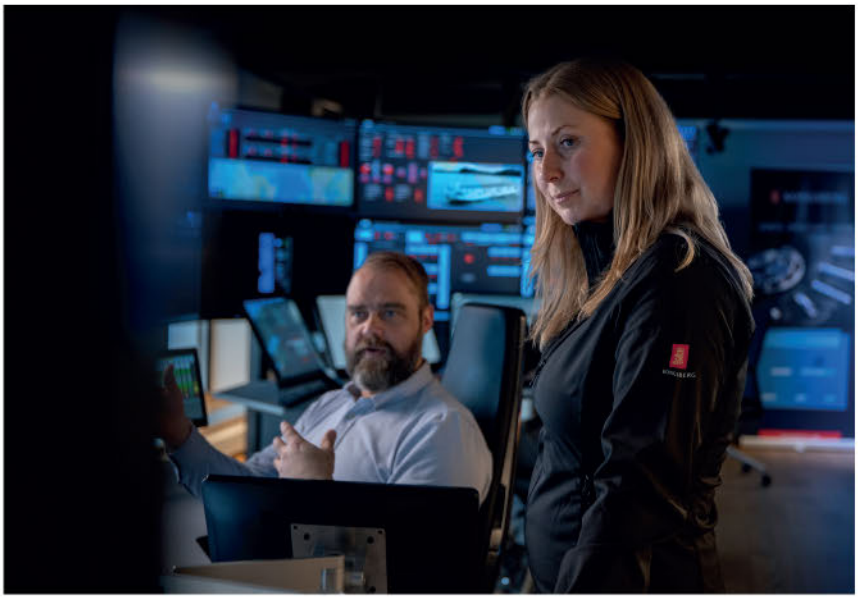
The first two station boats are expected to be in service by the end of 2024, with the third due to enter service by the end of 2025. It has been a substantial amount of work that has shaped a design "comparable with or even better than the originals", both in the given weather conditions and for comfort, says Rider. And finally, the age-old need for familiarity has been merged with not just meeting but exceeding the regulations. That should help everyone sleep easier. **SBI**



UNCREWED VESSELS

FROM SHIP TO SHORE

Kongsberg Maritime hopes to secure full DNV approval for its "chief-to-shore functionality" proposal, which recognises the ability of chief engineers to work safely in its remote operation centres



DNV approval would boost Kongsberg's ROC concept, where traditional chief engineer duties "can be carried out from a desk-based workstation instead of on board a vessel"

As reported in the previous issue (*Ship & Boat International* May/June 2024, pages 16-19), Kongsberg Maritime's development of remote operation centres (ROCs) for uncrewed (or minimally crewed) vessels has seen the company work to bring traditional crewing roles onto shore – "starting with the chief engineer, then the navigator, then the master," Ville Vihervaara, Kongsberg VP for Remote Operation Solutions, told us then.

Since that interview, Kongsberg has secured approval in principle from classification society DNV to transfer the role of chief engineer to within Kongsberg's ROC structure – "where the duties can be carried out from a desk-based workstation instead of on board a vessel", the company says. The chief engineer will be able to monitor and control all shipboard systems (including the power management and ballast water systems), as well as the deck machinery, from his/her workstation, in real time.

Kongsberg now aims to obtain full approval for this new ROC role, described by the group as "chief-to-shore functionality", following a two-year trial period that commenced in summer, overseen by both DNV and the Norwegian Maritime Authority.

"Set of increments"

Pål André Eriksen, Kongsberg Maritime SVP for remote and autonomous solutions, explains: "The journey towards autonomous and uncrewed operation of vessels is defined by a set of increments. To get there, we must take each step in turn and prove the functionality and value before moving to the next.

"The role of chief engineer is one that already involves a lot of monitoring of automation and control systems on board. For this trial, moving this functionality to the shore-based ROC will see one person now managing a range of systems across three vessels, rather than one." These three vessels include the 80m, electric container vessel *Yara Birkeland*, which has undergone autonomous trials since its delivery in 2021; and the 66m, ASKO-owned, battery-electric freight barges *Marit* and *Therese,* which currently operate on the Oslo Fjord.

During the trial period, Kongsberg will follow DNV's class guidelines for autonomous and remotely operated vessels (DNV-CG-0294) and remote engineering, monitoring and control systems (REMC), to gain full approval. Jarle Coll Blomhoff, DNV head of digital ship systems, comments: "Developing new vessel systems that will support autonomous and remote operation of vessels is a challenging task...we are happy that Kongsberg Maritime has decided to team up with DNV to ensure that safety of the new solution is thoroughly verified.

"Remote machinery support is a first natural step on the path to autonomy, as the engineering functions on board a vessel are in many ways already automated.

We believe this is a key step for Kongsberg Maritime's pathway to fully autonomous vessels, but also a technology that could contribute to a safer and more efficient world fleet by providing remote support for maintenance, troubleshooting [and] expertise on new alternative fuels that may be hard to get on board every vessel." Another key benefit, of course, is that the transition of traditional crew roles from ship to shore may help to counter the industry-wide dearth of seafarers.

Live from Horten

At the time of going to press, these trials were just about to commence. All three vessels will be physically crewed by a master and navigator, who will remain in contact with the ROC-based chief engineer via shipboard video and radio connections throughout the trial period. Kongsberg adds: "From the ROC, an 'aggregated view' of the three vessels will be visible at all times. If an issue arises or an intervention is required on one of the vessels, the system will manually switch to 'high attention mode', focusing operator attention where support is needed."

The chief engineer will be located at the ROC in Horten, which was formally opened by Massterly (a collaboration between Kongsberg Maritime and the Wilhelmsen Group) in March this year. Since its launch, the Horten ROC has been expanded to accommodate five remote operator workstations. The facility has also been tested by Massterly COO (and ex-mariner) Roger Holm, who describes himself as "a captain on land since 2008".

An-Magritt Tinlund Ryste, director of next-generation shipping at Konsgberg Maritime, tells *Ship & Boat International*: "The three vessels will continue to operate in their normal operating areas: for *Yara Birkeland*, between the quay at Herøya and the port in Brevik, while the ASKO barges will operate between Moss-Horten and Langøya." A notable element of the trials is that both areas are "crowded with commercial vessels and pleasure craft", she adds – meaning that the pressure will be on to ensure that the boats can demonstrate safe sailing in busy waters, while avoiding collisions, allisions and disruption to other vessels.

Should Kongsberg gain full DNV approval to bring the chief engineer role onshore, it follows that the group will look to move across the master and navigator roles too. Anticipating a future where varied traditional crew roles can be performed remotely, Kongsberg opines: "Going to sea is neither as simple nor as popular as it used to be. Autonomous ships create new onshore roles, including for those who, for various reasons, cannot work on a vessel, such as being in a wheelchair or needing to pick up children at 4pm." **SBI**

TENDERS AND TOYS

JET SKI TO BOAT IN 60 SECONDS

Jet ski users may now be able to take guests and friends along for the thrill ride, thanks to ONE Water Toys' new 'clip-on' six-person tender concept

The ONE 16 has a length of 6m when connected to a jet ski

Zipping across the water at high speeds, feeling the spray and the wind in your face, is an unmatched sensation, and perhaps the most obvious reason for the enduring popularity of jet skis. Whether owned or rented, their beginner-friendly, intuitive controls and operational versatility has made them a hit with adrenalin junkies for decades.

There comes a time, though, when even the most ardent speed freak would prefer to relax with friends and catch some rays in a marine setting, prompting the question: jet ski or boat? Now, a new prototype tender concept, launched and tested in Spain, seeks to offer both choices in one package.

As Amor Jiminez Chito, CEO of ONE Water Toys and design engineer at LoveWorks Design, puts it: "While many jet ski users enjoy the thrill of riding a jet ski, a significant share of them also seek a more relaxed experience with friends and family. As a result, many owners sell their jet skis after a couple of years as they look for an alternative way to enjoy time on the water."

'Clip-on' concept

Chito's solution is the ONE 16, described as a hybrid solution that combines "the excitement of a jet ski with the comfort of a boat", he adds. And, with prices starting at €40,000, the hope is that the ONE 16 will appeal to a wide range of first-time boaters, not to mention beaches and resorts offering competitive jet ski rental options.

To put it very basically, the ONE 16 is like a 'clip-on' tender, designed for six people, that can be added to the front of a jet ski. The jet ski drives into the back of, and connects with, the ONE 16, and then the coupling is secured with a BoatBuckle system.

The concept for the tender was drawn up by Chito, who has previously worked on superyacht projects with Norwegian naval architectural firm Coase Design. This rough draft was then passed on to Cadiz-based Visma Naval Architects, which engineered the hull and structure to ensure the tender's performance and safety. The physical prototype, launched this year, was built in GRP by KDKomposites in Málaga – the yard responsible for the TOM 28 Max race training boat – and features clean lines in a sleek, minimalist style.

Engineering challenges

Chito says: "The hull has been optimised for cruising speeds of around 18-20knots, with a top speed of 30knots when using a 170hp [127kW] jet ski. The weight distribution was optimised to ensure that the jet ski can be easily inserted into the hull of the ONE 16 and that the boat remains stable, even when all six people on board are on the same side.

"As the ONE 16 can be coupled with the jet ski but also decoupled, all required calculations and analyses were doubled: the naval architects studied the behaviour of the hull with both the jet ski and the hull alone."

Further structural and hydrodynamic challenges involved the interface between the ONE 16's hull and the jet ski, highlights Manuel Viseras, CEO of Visma Naval Architects. "We had to ensure continuity with the design of the hull, maintaining the waterlines unaffected and avoiding unnecessary resistance,"

The tender can host six people, enabling jet ski users to socialise with guests 'small craft-style'

The ONE 16's hull has been optimised for cruising speeds of around 18-20knots

Viseras says. "It was crucial to keep the flow within the boundary layer, maintaining laminar flow and preventing turbulence around the interface between the jet ski and the hull."

For the builder, meanwhile, the main challenge was to build a boat with "the exact draught to ensure an easy connection with the jet ski...and to ensure the required buoyancy and optimal stability", states Oscar Bustos, CEO of KDKomposites and a former professional sailor. The yard was able to draw on a longstanding relationship with the El Pardo Centre for Hydrodynamic Research (CEPIHAR) to run scale-model tank tests at CEPIHAR's facility in Madrid.

Plug-and-play

The ONE 16 can be offered as a rental solution, or as a tender for yachts starting from 20m, which can use it to transport guests ashore or from the marina to a moored vessel. The bow features a table, which can be lowered to convert this area into a sunbathing spot, or guests can sit back on a forward-facing seat concealing a 12V portable refrigerator. The tender's anchor is stowed inside a reinforced bow hatch.

Chito adds that the layout was arranged to make it as easy as possible for the guests to move around the boat. "When the jet ski is removed, the slide that houses the front of the jet ski transforms into a pool, gently gliding into the sea," he says. Depending on weather conditions and the sea state, it is possible for the jet ski to safely disconnect at sea – temporarily leaving guests free to drink and chat around the table while the jet ski rider separately enjoys a white-knuckle ride, before returning. The ONE 16 has been certified to CE Category C for coastal and inland use.

"The platform is plug-and-play, easy to connect via the BoatBuckle in just one minute, and compatible with major jet ski brands, such as Sea-Doo and Yamaha," Chito says.

The ONE 16 comes with a Hertz or Fusion audio system, plus a removable bimini for sun protection, as standard. However, customers will also be offered options including a rigid bimini, a wakeboard rack and a premium audio system with a subwoofer. Buyers will also be able to pick and choose from various colour, custom-printed and fabric options. Chito says that he has deliberately selected "bold colours that invite a sense of adventure" to get away from the more conventional white and blue boat designs that can become a little staid – though it's all a matter of taste, of course.

Málaga trials

The first prototype of the ONE 16 is currently available for sea trials, which are being hosted in Puerto de la Duquesa in Málaga throughout the summer, giving potential thrill-seekers, boat dealers and charter companies the opportunity to sample the jet ski-tender combo for themselves.

Chito is now looking to further evolve the design and the ONE Water Toys brand, commenting: "We are waiting for electric jet skis to become widespread in the Mediterranean and are closely monitoring the evolution of EV charging infrastructure in marinas."

Meanwhile, construction of the second ONE 16 unit is underway, this time "using vacuum infusion methods, which will help us to lower the weight of the hull, further improving performance", Chito says. "Once ready, this second unit will be designated for charter use." **SBI**

TECHNICAL PARTICULARS

ONE 16

Length	4.98m (hull only) 6m (when connected to jet ski)
Breadth	2.8m
Passengers	6
Recommended power	127kW
Max power	239kW
Cruising speed	18-20knots
Max speed	30knots
Notations	CE Category C

DESIGN HERITAGE

50 YEARS OF CRAFT DESIGN

UK naval architect Ian C Darley recently celebrated half a century of producing designs for various workboats, passenger boats, patrol boats and fishing vessels sized up to 40m

This year marks 50 years since the launch of the first vessel designed by UK naval architect and maritime consultant Ian C Darley, a well-known name within British boatbuilding circles. The 1974 launch of the Darley-designed harbour tug *Vera Lockhart* was to spearhead five decades of designs for new workboats, patrol boats, fishing vessels and small passenger craft.

In 2017, Darley teamed up with fellow UK naval architectural firm H2NA – a Chippenham-based company established in 2014 – to further his vessel designs, while helpfully providing a form of mentorship to the then-fledgling company.

Ship & Boat International caught up with Darley shortly after Seawork – coincidentally also celebrating its 25th anniversary this year – for a quick overview of his career so far.

***SBI:** Did you have a maritime background prior to becoming a naval architect?*

Ian C Darley: The family has been associated with ships and boats for many years. Captain John Darley was master of one of King Charles II's royal yachts, *Fubbs*; my grandfather was a coal merchant with ships transporting coal from Newcastle to Itchenor on the Chichester Harbour, where he had a small boat yard and, latterly, a yacht chandler. On the passing of my father, the yard was sold – so, apart from my work, the family has no connection with shipping.

***Vera Lockhart*, built for David Ferran & Sons in 1974, still operates in Belfast to this day**

***SBI:** How would you describe the UK vessel design and shipbuilding scene back in the 1970s, when you started?*

Ian C Darley: My first employer, after completing a shipwright's apprenticeship and college, was Camper & Nicholson in Southampton. Drafting was on flat tables about 8' x 3' (2.44m x 0.91m) on tracing paper, although drawing film was introduced soon after. Lines were then passed to the mould loft for fairing and pattern making.

Accuracy then was much less than today, as you could be drawing at scales as small as 1:50 using a scale

***DC01* and *DC02* (pictured) were constructed as subsea intervention daughter craft for KD Marine, initially for operations around North Sea offshore platforms: the 11.9m x 3.6m sisters were delivered in 2010**

The 15.3m x 6m oyster-harvesting boat *Triploid*, delivered in 2016, was tailored for the shallow 2m depths of the oyster beds in Poole Harbour, UK

rule. Computers did not exist and setting up a ship was done by spirit level and plumb bob – plus a good eye.

SBI: *What would you identify as the most significant differences in vessel design that have occurred since the 1970s?*

Ian C Darley: Computer-aided design (CAD) has been a significant development both for design and shipbuilding, along with kitting of steelwork. With 3D modelling, systems installation has become much easier for the shipbuilder.

SBI: *How many vessels have you been involved in producing since the company's formation?*

Ian C Darley: I have not been a prolific designer as I have always had other work, such as structural surveys, stability assessments, valuations, etc. I would guess that that I have designed 100 to 120 vessels ranging in size from 5m to 40m. The company has always been small, which is my preference. Subcontractors have been employed throughout for specialist subjects, such as electrics and hydraulics.

SBI: *What were some of the highs of your career?*

Ian C Darley: I think there is a high every time a successful design is launched and put into service. The first vessel I designed in 1974, a mini-tug named *Vera Lockhart* that still operates in Belfast, has always invoked good memories of my career.

Some seven years ago when I decided to step back a little, I went into partnership with H2NA Ltd, an arrangement that has worked very well. For projects that involve me, we trade as Darley H2NA.

SBI: *What are you currently working on?*

Ian C Darley: I am working on the design for a 26m multipurpose work vessel (M-PWV). This is a multi-cat-style, 3,000hp, triple-screw vessel with a bollard pull of around 35tonnes. I am also involved in the upgrading of a number of River Thames passenger craft, plus arranging various valuations for banks and financial institutions.

SBI: *What are your thoughts on 'green' propulsion? Do you think that the small-to-medium-sized vessel sector is fully ready for batteries and alt-fuels?*

Ian C Darley: The few investigations I have carried out with electric and hybrid vessels seem to have resulted in the client sticking with diesels; the environment in which heavy-duty workboats operate does not yet benefit from electric propulsion, primarily because of the size and weight of the batteries. Alternative fuels are now quite common, but a lack of infrastructure for electric charging is still a drawback.

SBI: *What advice would you give to today's new breed of naval architects, coming through college and/or apprenticeships and looking to enter our sector as a long-term career path?*

Ian C Darley: My only comment is to ensure students have a good grounding in shipbuilding; if you do not know how to construct a ship, how can you design one? There are many challenges for the industry in the future but shipbuilders and designers have always been great innovators, so I think the future is bright.

SBI: *What are your plans for the future?*

Ian C Darley: My plans going forward, aged 77, are to slow down more, but I have no immediate plans to retire completely. **SBI**

LAUNCH AND DELIVERY

ON THE WESTERN FRONT

High-tech research vessel *Djildjit Kaartadjiny* has been custom-designed and built to support governmental efforts to monitor fish and ocean health in West Australian waters

RV *Djildjit* was designed to stay out at sea for up to 15 days at a time

Western Australia has become the recipient of a brand-new research vessel, designed and purpose-built to study fish and ocean health. This 18.6m, aluminium monohull, christened *Djildjit Kaartadjiny* (which very roughly translates as 'the knowledge of fish' in the indigenous Noongar language), or RV *Djildjit*, will be used by the Australian government's Department of Primary Industries and Regional Development (DPIRD) to survey and monitor the health of the region's valuable fisheries, including rock lobsters, crabs and demersal fish, to support sustainability.

In fact, RV *Djildjit* is akin to a Swiss army knife for ocean research: the vessel will also be used to support shark monitoring, track fish populations and assist other science projects, thanks to its ability to travel up to 200nm offshore, giving the boat a significant footprint in the waters around Western Australia. What's more, RV *Djildjit* is just the first in a series of new boats being built for the government: a special trailer boat for fisheries research and a 25m patrol RIB are also on the way, with deliveries scheduled for late 2024 and the second half of 2025 respectively.

Main helm

RV *Djildjit* is a joint production from Southerly Designs and Geraldton-based shipbuilder Dongara Marine, the duo behind the design and construction of the commercial fishing vessel *Raging Bull* (see *Significant Small Ships of 2021* for a detailed look at that vessel). In fact, the partners used *Raging Bull* as something of a template for the development of RV *Djildjit*; for example, the newbuild features a low profile and an extended wheelhouse situated forward of the aft work deck.

The vessel's main helm is situated in the port-aft quarter of the wheelhouse. Dongara Marine tells *Ship & Boat International*: "The main reason is so that the skipper and/or master is close to the work deck and can see what is happening. It is pretty common on rock lobster fishing vessels here to have the helm aft, so the skipper can easily see and communicate with the deckhand, especially when hauling pots and traps on board – the pot hauler and tipper is port-side, at the forward end of the work deck."

The design includes a window in the aft bulkhead, which opens upwards and outwards, to help with that communication. "Being further aft also means the motion is a bit less than for a forward helm," the builder says. RV *Djildjit* also features an external control station and has been equipped with a Vision Pro CCTV system for visual monitoring around the vessel. Meanwhile, an IP68-rated Vision Precision camera will permit crew to monitor anchor recovery.

Deck gear

The aft deck spans roughly 34m² and offers a maximum cargo capacity of 5.5tonnes. This area is equipped with an A-frame, a deck crane, a pot winch and a pot tipper. Dongara Marine adds: "The deck structure and hydraulic systems also enable DPIRD to fit other deck equipment, such as trawl/wire drum winches and longline drums, when research needs require."

The A-frame is a hydraulically operated unit, which was custom-designed to deploy heavy equipment and nets weighing up to 3tonnes. Additionally, a removable folding stern launch and recovery ramp has been fitted at the transom. Regarding this feature, Rohan Warr, Dongara Marine MD, remarks: "Along with the generous clear deck length and width, this stern launch arrangement provides RV *Djildjit* with the capability to deploy and retrieve a variety of auxiliary vessels up to 6m in length."

The starboard side of the wheelhouse offers a seating area for up to seven people, and this space can be used as a mess or as an area for team meetings and briefings. A Fusion MS-RA55 marine entertainment system and Samsung television are fitted here.
The sleeping accommodation is located below the wheelhouse, accessible by stairs, and includes a total of five berths, including a dedicated master's cabin.

The vessel will typically be operated by two crew members, though the accommodation spaces meet Australian Maritime Safety Authority requirements for the accommodation of up to four persons for

TECHNICAL PARTICULARS

Djildjit Kaartadjiny (RV Djildjit)

Length, oa	18.6m
Breadth	5.5m
Draught	1.8m
Deck cargo capacity	5.5tonnes
Service speed	18.5knots
Max speed	24.5knots
Fuel	7,600litres
Fresh water	500litres
Live tanks	2 x 680litres
Crew	2
Scientists/researchers	6

unlimited durations. Dongara Marine adds: "Larger complements can be carried for shorter-duration voyages – up to two crew and six additional personnel for day trips."

Vessel endurance

RV *Djildjit* was designed to stay out at sea for up to 15 days at a time, as per DPIRD's request. Therefore, various features have been factored in to ensure onboard comfort for both crew members and researchers. Warr elaborates: "These include maximised use of all spaces, including extensive storage throughout; excellent natural and artificial lighting; a high-capacity Webasto water-cooled marine air conditioning system with separate self-contained units for the wheelhouse and lower deck accommodation; and application of noise abatement materials to produce very quiet living and working spaces."

Endurance-wise, RV *Djildjit* has sufficient tankage for 7,600litres of fuel – which, Dongara Marine predicts, will allow a range of more than 800nm at 16knots. The research vessel will also carry 500litres of fresh water, to be topped up by an Idromar Mini Compact Junior water-maker with a capacity of 130litres per hour. A pair of 680litre-capacity tanks are located aft, one on each side, which can be accessed by the deck: these can be used to store containerised fuel for the auxiliary vessel's outboards, but they have also been plumbed for use as live rock lobster tanks.

The vessel is powered by a single MAN 2862 LE426 diesel engine, rated 1,140kW. This unit drives a five-bladed Veem propeller via a ZF 3000 gearbox – the latter fitted with trolling valves to support extended low-speed operation. Sea trials saw a loaded RV *Djildjit* achieve a comfortable cruise speed of 18.5knots, increasing to 24.5knots max.

RV *Djildjit* has been kitted out with high-tech navigation and communications systems

Sea trials saw the research vessel reach a top speed of 24.5knots

A Mase Mariner 3000 genset, rated 31kVA, has also been fitted on board, and the vessel will make use of two 1kW/24V solar panel arrays on the wheelhouse roof – each array comprising five panels – to charge the vessel's hotel loads.

RV *Djildjit* has also been fitted with a large rudder and two Sleipner side thrusters, including an SH320 unit forward and an SH240 aft. These are intended to bolster manoeuvrability, as well as to work with the vessel's dynamic positioning (DP) system to maintain position for extended periods.

Both thrusters, plus the MAN main engine, are controlled by an Aventics Marex 3D three-axis joystick system, with connected joysticks fitted at the main and external helm positions. Dongara Marine explains: "With the system in 3D mode, the vessel can be steered in any direction simply by pushing or turning the joystick... the Marex OS control system coordinates the drives and holds the heading by compensating for the yaw caused by wind or current." The cox can change the heading by rotating the top part of the joystick.

Warr adds: "The system also enables direction and/or position to be automatically maintained at the push of a button, providing DP/virtual anchor capability." For roll stabilisation and enhanced lift force, the vessel is also fitted with a full Humphree active ride control system, and Dongara Marine has provided the option for the fitting of a gyrostabiliser.

Bridge kit

RV *Djildjit* will manage a diverse network of onboard research equipment, ranging from fish traps and crustacean pots to ROVs, baited remote underwater video (BRUV) systems and towed underwater survey cameras. For example, the boat's underwater tools include a Furuno BBDS1 bottom discrimination sounder (which uses bouncing soundwaves to identify seabed materials) and a Furuno DFF-3D multibeam sonar.

Furuno also supplied the vessel's TZT3 internal fish finder and DRS4D-NXT solid state doppler ultra-HD radar, which provides coverage out to 48nm. A Furuno SCX-20 quad antenna satellite compass, meanwhile, provides info related to speed, heading, pitch, roll and heave.

The boat's high-tech bridge kit includes a Simrad A2004 autopilot, an Icom VHF radio, an Iridium satphone and a Starlink terminal. Geraldton Marine Electronics supplied and installed Airmar's compact 120WX WeatherStation, designed to provide wind, air temperature and barometric pressure readings, as well as three 19" Simrad displays and a 16" Furuno TZT3 multifunction display inside the wheelhouse. Dongara Marine adds: "Central to the system is a navigation computer running TimeZero Professional, complete with MaxSea charts and the Personal Bathymetry Generation [PBG] module, which enables 2D and 3D depth information to be collected and recorded in real time."

DPIRD has wasted no time in putting RV *Djildjit* to use: the vessel has already completed its first voyage off the coast of Western Australia's Mid West region, with researchers using the boat to launch ROVs and BRUVs. Meanwhile, Dongara Marine is working to complete the aforementioned 25m patrol RIB for DPIRD, which will feature a 6.8m beam, a 1.8m draught and the ability to conduct extended voyages of up to 14 days, with accommodation and food storage for 10 persons. Upon delivery next year, the aluminium RIB will replace DPIRD's long-serving, 23m patrol boat *Walcott*, which was originally launched in 1998. **SBI**

The aluminium vessel will also be used to support shark monitoring, track fish populations and assist other science projects

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FERRIES

RIDING HIGH

The hydrofoiling VS-9 is expected to decarbonise ferry operations through battery-electric power, while giving passengers smoother, stable rides above the waves

The first VS-9 hydrofoiling ferry has undergone 24 evaluation tests since its launch

Auckland, New Zealand is about to welcome its first all-electric passenger ferry, developed to use a combination of batteries and hydrofoils to 'fly' above the waves, reducing impact and drag for a smoother and more energy-efficient ride, its developers claim.

The VS-9 has been produced by Vessev (formerly Seachange), which aims to roll out electric foiling vessels for "premium tourism services" while utilising state-of-the-art tech developed for sport sailing, the company says. The first VS-9 unit has undergone 24 evaluation test sessions since its launch in mid-May, and, at the time of writing (late June), was about to undergo final cabin and interior outfitting before relaunch in August. What's more, a commercial application of the VS-9 already has the go-ahead, with domestic ferry operator Fullers360 signing up as the vessel's first customer.

Eric Laakmann, Vessev CEO, comments: "There are 33 million vessels in the world today, with sustainable vessels representing the smallest fraction. Through significant enhancements in efficiency, hydrofoiling will play a key role in this once-in-a-generation shift."

"Traditionally, larger vessels are required to deliver a comfortable passenger experience as they can handle the impact of waves and wake. By flying above the waves, the VS-9 delivers a large vessel experience on an agile platform that can be berthed and charged in nearly any marina. The VS-9 will enable thousands of new routes around the world that are currently impractical for traditional vessels." And, with vessel certification expected in the coming months, the 9m-long VS-9 will transport up to 10 passengers at a service speed of 25knots, with motions so smooth the experience will be more akin to "flying in a quiet airplane than sailing", Laakmann says.

High-precision flaps

Vessev was founded in 2018 by Max Olson, now CTO. His team comprises engineers and boatbuilders with experience in the production of small electric craft, America's Cup-winning racing yachts and even orbital space rockets. For the VS-9 project, Vessev teamed up with NetZero Maritime, a division of Fullers360 dedicated to green propulsion solutions, which was able to supply with Vessev with important first-hand information relevant to the ferry's typical operational requirements.

Fullers360 has stated its intention to make its fleet 100% electric- or hydrogen-operated by 2040. According to Mike Horne, Fullers360 CEO: "Auckland is quickly becoming a case study for the adoption of green technology. Our understanding is there are

The ferry transitions from 'foil assist' to 'full foiling' mode at 18-19knots, before settling on a cruise speed of 22-25knots

Eric Laakmann (left) and Mark Olson, Vessev: "Our objective is to break down the barriers to adopting electric vessels"

currently no electric hydrofoiling vessels certified for commercial tourism use in the world...the testing done here in New Zealand will set a new standard for bringing this new class of vessel into service globally."

Olson says: "We use many of the same techniques used by winning America's Cup teams, such as high-precision flaps which change shape below the water to optimise the angle of attack. The flaps can move very quickly: end-to-end in less than half a second. They really give the VS-9 so much authority in waves to react to them and maintain an incredibly stable platform." This resilient system should widen the ferry's operational window, permitting it to offer a stable and dry ride to passengers even in foul conditions.

Retractable foils

Carbon-fibre laminates were used in the VS-9's build. Its foils are fully retractable, so the ferry can enter shallow waters without issues, or be transported on

The VS-9's electric hydrofoiling system was inspired by those used for America's Cup-winning racing yachts

a trailer. Laakmann says: "The ability to remove the foils from the water completely is a design element we're particularly proud of. We were told it would be impractical, but we've delivered a system which makes it easy for operators to maintain pristine foils for maximum efficiency."

The vessel transitions from 'foil assist' to 'full foiling' mode at a speed of 18-19knots, before settling on an optimal efficient cruise speed of 22-25knots. Vessev explains: "The foil stabilisation systems enter operation at 12knots – actively reducing pitch and roll motion, even when not fully on foils and 'flying'."

Olson adds: "One of the great features of these hydrofoiling vessels is their ability to handle waves in a totally different way to a conventional vessel. By riding above them, we create a vessel that can operate throughout a wider range of sea states than ever. That rolling sensation you feel on traditional boats just disappears when the VS-9 enters foiling mode...the more challenging use cases that the VS-9 will operate in would not be possible with a similar non-foiling vessel."

This ties in with Laakmann's prediction for the future of maritime passenger transport, which he envisions as comprising "smaller, more nimble vessels delivering point-to-point services alongside traditional ferry fleets".

Test results

The ferry's recent evaluation tests were conducted at Westhaven Marina in Auckland, supervised by certifying body Maritime New Zealand. The VS-9 was accompanied by a 9m, petrol-fuelled chase boat, which undertook the same manoeuvres and distances as the ferry, thus enabling the Vessev team to compare the two very different craft types.

Recalling the weather and wave conditions, Laakmann says: "On some of our test sessions, we had [wind speeds of] 25knots/gusting 35knots with wind waves to match. The sea state had waves averaging 0.75m but a few wave faces were over 1m". He adds: "While the VS-9 didn't have any issues operating in these sea states, it was next to impossible for the chase boat to follow along without slamming through wave after wave."

The tests also allowed the team to compare energy consumption and costs. Vessev claims that, based on two weeks of sea trials, running up to three test sessions a day using a standard AC 3-phase connection, the VS-9 could reduce energy consumption by up to 95%, "facilitating a range of up to 50nm at 25knots and significantly reduced operational costs".

Laakmann adds: "At the end of each day, the cost of the petrol fuelling the chase boat is 25 times the cost of the electricity used to charge the VS-9. We expect that in almost any commercial application, the lifetime cost of ownership of these vessels will be substantially less than that of comparable fossil fuel vessels."

Scaling up

The test sessions also demonstrated that the ferry's batteries could be topped up via the existing electric chargers available at most marinas, and Vessev predicts that once high-speed DC charging points are thrown into the equation, operators may be able to gain 0.8nm of range per minute of charging time.

The future could see the hydrofoiling technology scaled up for larger ferries, Laakmann says, revealing that Vessev is looking to put together an 18m version of the boat, to be called the VS-18, which could carry 100 passengers. That model would use the same technology and design as the VS-9 while augmenting its seakeeping capability and increasing the route opportunities available to owners and operators.

"In our local area in New Zealand, there are some ferry routes with more exposure to wind and waves, which are often cancelled due to weather," Laakmann remarks. "The VS-18 and vessels like it will be able to ride above the waves and deliver a more consistent and pleasant service than what exists today."

While the VS-9 and VS-18 are intended as 'commercial-first' units, Laakmann also sees potential applications in the recreational boat market, covering "everything from private boaters to superyacht owners". He optimistically adds: "Our objective is to break down the barriers to adopting electric vessels. I'm anticipating that we will be announcing several different variations of the VS-9 sooner rather than later." **SBI**

TECHNICAL PARTICULARS

VS-9

Length	8.95m
Weight	4tonnes (fully loaded)
Crew	1
Passengers	10
Cruise speed	25knots
Max speed	30knots
Range	50nm@25knots

OFFSHORE SUPPORT

THE NOW GENERATION

The Gen 4 fast crew boat concept developed by Southerly Designs and Strategic Marine has achieved admirable gains in efficiency – but upsizing the design inevitably involves trade-offs, writes Stevie Knight

The first of two of the new 42m Gen 4 fast crew boats was delivered to Thailand's TMS in Q1

The story of Thailand's first pair of gyrostabilised, 42m-long fast crew boats (FCBs) conceals another: how did Southerly Designs' FCB concept establish a perpetual offshore presence from 2001 to today's Gen 4 models? And how is the design faring with the push toward new technology?

As MD Andrew Taylor reveals, Southerly's FCB concept has seen a 23-year run, with no sign of stopping. "We're up to 80+ builds now...and, at the moment, there are another eight under construction," he tells *Ship & Boat International*. While many of these have been delivered internationally, most have found homes around Southeast Asia, with some landing in Malaysia, Indonesia and Brunei – and, more recently, in Thailand, following the Q1 delivery of the first of two Gen 4 FCBs to Thailand's Truth Maritime Services (TMS). The latter company owns a fleet of crew boats dedicated to shuttling technicians to and from offshore petroleum exploration and production platforms within the region. All of these vessels have been delivered by Singaporean boatbuilder Strategic Marine.

So, why are the FCBs perennially popular? "People sometimes think that these crew boats are not as sexy as the big OSVs, since they are basically produced for platform maintenance," says Wayne Poh, Strategic Marine GM for commercial. However, their lack of pretension may have proven a saving grace, as these vessels' roles are relatively unaffected by oil prices. "Whether it's a good time or a bad time in the industry, you still have to send technicians to the platform for servicing duties," Poh comments.

Hullform efficiency

This underlying, stable demand means that any changes to the design, resulting in the new Gen 4 concept, have been carefully considered for what they would yield, and against what could be lost.

For example, Taylor explains: "In moving from Gen 3 to Gen 4, we tried to make the hullform a little bit more efficient to get the most out of the seakeeping. While these boats aren't generally exposed to open ocean swell, the daily wind chop can still make things quite rough...for example, off the west coast of Borneo, out in the South China Sea".

Taylor says that hullform efficiency can be achieved by maximising the vessel's waterline length. Quite a few FCB designs have tried to achieve this with a completely vertical bow, but there's a drawback to this approach, he claims. "We found that this makes it much more difficult to achieve some of the other characteristics: the flared bow, a curvature in the top side shape and a fine entry that's still not going to dive in too far," he says.

The answer, then, was a Z-bow: beyond the advantage of the longer waterline, it still allows the retention of Southerly's signature flared hull. This is an important element as it yields a drier deck and more forward space for anchoring arrangements, while contributing significantly to good seakeeping qualities.

Energy storage

Various iterations of this design have had different engine combinations feeding the fixed-pitch propellers. For example, each of the two FCBs delivered to TMS have a pair of Cummins KTA 38 units and a larger KTA 50, yielding a transit speed of around 27knots and a top speed of 29knots. Faster versions of the Gen 4, some reaching 32knots, are possible – but these are usually the result of a "market differentiator" request by the service company, Poh says.

Each recent TMS boat was also awarded a Hybrid(+) notation from class society Lloyd's Register. Shaft generators on the port and starboard engines are directly linked to a DC-bus feeding a 120kWh energy storage module. Poh points out that these batteries can be a fairly modest size yet still supply the boat's onboard requirements, as the battery is constantly being fed by the PTOs – "so it's like talking on your phone while it's on charge", he says.

Although it doesn't contribute to the propulsion, the energy storage means the onboard generators can be turned off while cruising and during limited stand-by and short harbour visits. They can then be switched on again for extended stand-by when close to the rig, and used to power the bow thrusters and other demanding machinery such as cranes or gangways.

Enlarged dimensions

In contrast to the 40.3m x 7.9m Gen 3 models, the Gen 4 features enlarged dimensions of 42m x 8.2m (see Technical Particulars). This size increase assisted another evolution, one of the interior.

The challenge was that demand for extra kit increased in tandem with the Gen 4 design. For example, one of the TMS vessels is fitted with a Veem gyrostabiliser. These mostly work by minimising roll. "When the FCB is pulling up to the oil rig to carry out crew transfers, the gyrostabiliser eliminates a degree of freedom from the boat's motion," says Taylor. "That makes everything a little bit easier, and it also has a noticeable impact on the seasickness of the passengers."

While that's good enough reason to install a gyrostabiliser, it does have a knock-on effect: they tend to be large, measuring 2.1m on each side and about 1.2m in height. So, one of Strategic's roles in the Gen 4 redesign was to work with Southerly around the demands of the new equipment. Reorganising the various tanks – making them shorter and wider – and relocating some of the other auxiliary equipment helped to free up space while retaining the necessary volume of fuel and fresh water for prolonged offshore endurance.

Even though only one of the TMS duo has a gyrostabiliser at present, it's a question of future-proofing the design, says Poh, as without reserved space for new equipment, retrofits become particularly challenging. Not only are there electrical and coolant lines to integrate, but chunky new technologies are usually "an afterthought" which end up installed on deck, impacting working areas, he explains. By contrast, when one of the TMS Gen 4 boats recently returned to Strategic for the retrofitting of a gyrostabiliser, the job was completed in around a week. So, the door is open to the other boat in the duo.

Designing the personnel space was also a picky business, right down to the seats. That's because each region has different seas and varying requirements for size, recline, pitch, spacing and so on, Poh explains.

This matters: while there are platforms located 40-50nm from shore, "sometimes the transit can be 100nm, which is five hours of continuous steaming", Poh highlights. The Gen 4s can accommodate 100 personnel (plus 12 crew) though, as with the TMS deliveries, these are largely being configured for 70 or 80 business-class seats and facilities, with room to adapt to client requirements.

Gains and pains

Southerly and Stategic estimate that they have achieved an 8% reduction in hull resistance between the Gen 3 and Gen 4 designs, following a round of model testing at the Australian Maritime College. "Actually, we're hearing feedback from the first Thailand delivery that they can see a significant fuel saving - up to 30% - between the new Gen 4 and the older-generation FCB they currently have working," says Poh.

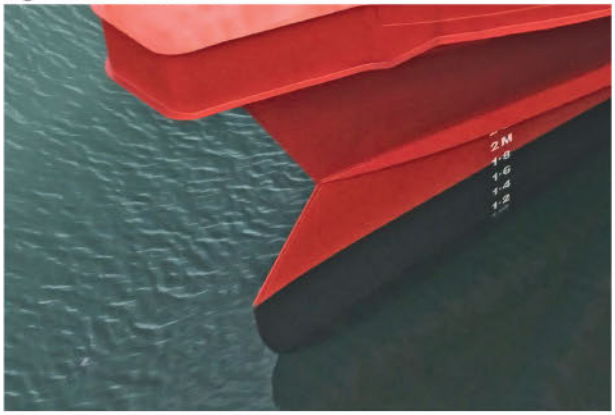
TECHNICAL PARTICULARS

Gen 4 FCB

Length	42m
Breadth	8.2m
Propeller draught	2.1m
Gross tonnage	317tonnes (approx.)
Clear deck area	140m² (115m² with crane and gangway)
Top speed	≈29knots (deliveries to TMS)
Fuel capacity	84,220litres
Fresh water capacity	33,000litres
Crew	12
Offshore technicians	>100
Cabins	2 x single berths 5 x double berths

The Gen 4 is described as a larger, more efficient evolution of Southerly's and Strategic's previous Gen 3 (pictured) design

The Z-bow granted the advantage of a longer waterline while allowing retention of Southerly's signature flared hull



The Gen 4 FCB has achieved an 8% reduction in hull resistance over the Gen 3

It should be noted the additional bells and whistles are not just large, they're hefty: Taylor's rough estimate is that, while the total hybrid package contributes around 3tonnes to the weight of the vessel, the gyrostabiliser weighs in at about 6.5tonnes.

Although the design has been developed with these add-ons in mind, there's another large piece of kit occasionally demanded by the rig operators. While the rear deck has been structurally prepared for motion-compensated gangways, these (and their accompanying accessories) can push another 11tonnes onto the weight budget. That's enough to impact efficiency, Taylor admits – but he counters that development of the FCB concept is far from over.

"When Gen 5 comes around, we'll have another go at raising efficiency," says Taylor. "I'm sure there'll be some tweaks and lessons learned...and we might start looking into different kinds of propulsion, such as pods."

While it might be time for Southerly to consider electric drives and alternative power arrangements, there's another caveat. "As soon as you move to a full diesel-electric configuration instead of having an engine hooked up to a propeller, you've put an electrical system in the middle," says Taylor. "Does that create an efficient crew boat? No, because 90% of your fuel consumption is just about making it go fast. These boats don't operate massive deck cranes, thrusters for station-keeping or other things like that: they spend most of their lives simply driving forwards."

So, although he hopes that future technology will create a viable, clean alternative, he concludes: "It's really hard for high-speed boats like these because at the moment pretty much everything you could do involves adding extra weight, and weight is the enemy of efficiency and speed." **SBI**

THE BIGGER PICTURE

A year on from the launch of its first 26m CTV, NAV Engineering & Technology has unveiled plans for a larger, 35m variant. But why go bigger on a proven design, and what's in it for offshore operators?

The HybriNav35 is intended to boost inter-wind farm logistics, with an offshore endurance of two weeks

NAV Engineering & Technology has added a second CTV design, the HybriNav35, to its growing portfolio of offshore wind crew carrier options – and this newcomer is notably larger than its predecessor.

Formed last year as a subsidiary of Newport Shipping, NAV's first offering was the HybriNav26 design (see *Ship & Boat International* November/December 2023, pages 42-45): a 26m x 9.2m CTV with waterjet propulsion, targeted at the European offshore wind sector. Subsequently, the 35m x 11m HybriNav35 has been developed following testing, market observations and feedback – although Kris Benne, NAV manager for offshore wind, explains that the newcomer has not been made longer and wider for the sake of it.

"From a charterer's perspective, smaller CTVs are really good at going out in the morning, putting technicians onto the turbines or service operation vessels [SOVs], then going back in the evening," Benne tells *Ship & Boat International*. "However, the current generation of wind farms is located further out offshore. Transfer times are getting too long and uncomfortable for daily transits to the site, especially during the operations phase following construction. It's not feasible if you're stuck on a boat for five to six hours a day."

Wind farm dilemmas

Hence the offshore renewable energy sector's reliance on SOVS, which remain on site and provide berths for crew. These vessels, typically sized 70-80m, can be expensive to operate and maintain, however, and SOV day rates are on an upward trajectory, fuelled by strong demand for available new vessels and a limited supply of SOVs. Edda Wind, for instance, has predicted that SOV and commissioning SOV (CSOV) day rates may increase from the €35,000 recorded in 2023 to €44,000 by Q4 2026.

The logical way forward, then, would be for operators to share SOVs between sites: if there is not enough money for each single wind farm to have its own dedicated SOV, why not use one SOV to serve multiple wind farms at the same time?

The problem there, Benne points out, is that "the sites' effective owners may be different banks or pension funds; Wind Farm A might be owned 50% by Pension Fund UK, while Wind Farm B might be owned 50% by Pension Fund Netherlands". Naturally, this presents plenty of scope for conflicts of interest.

"For example, Wind Farm A may be located 60km away from Wind Farm B," Benne continues. "If something goes wrong at Wind Farm A – say, a turbine breaks down or there is an outage somewhere that is really costly – and the SOV is currently at Wind Farm B, the owner of Wind Farm A will tell the SOV operator, 'I don't care – you promised me logistics, you promised me a certain uptime – I want that SOV back right now!'. And, Wind Farm B will say, 'I don't care what happens at Wind Farm A: I'm only invested in Wind Farm B and I need that vessel here now, doing my maintenance'."

Shadowing the SOVs

While SOVs carry daughter craft, which enable technician and cargo transfers, these small boats are impractical for travelling far-flung distances such as 60-70km, Benne says. He adds: "This is where our 35m CTV comes in – it can do everything a normal CTV can do but

is big enough to stay out offshore for up to two weeks, comfortably; it doesn't need to return to base every time there's a storm with significant wave heights of 2m.

"We realised we needed this vessel length to accommodate everything we required for extended operations offshore, and for crew comfort. The new size enables offshore wind farm operators to say, 'I have an SOV that only goes from turbines 1-100 in a very planned manner throughout the season, and which doesn't do anything else: it doesn't deviate from course or go to another wind farm. But this fast CTV can take whatever comes up around it – it can do inspections and transfer turbine or substation technician teams to far-away wind farms, stay there until they're done, then bring them back to the SOV to sleep'."

In this way, the CTV would guarantee swift cargo transfers and an instant response to any required troubleshooting or minor work. "This allows the most optimal use of the most expensive assets while safeguarding fast response to all sites sharing the SOV," Benne adds.

However, Benne is keen to stress that the 35m CTV should not be confused with the emerging mini-SOV (or 'midi-sized' SOV) concept that has been mooted by some naval architects and designers over the past 12 months or so. "In comparison to the current trend towards mini-SOVs, we believe that the gap in performance is negligible when compared to operational costs and the reach of our design in combination with a more standard SOV," he says.

Future-proofed

The design of the HybriNav35 shares some similarities with the previous HybriNav26 model, most notably when it comes to the hullform. It also incorporates a high degree of flexibility, enabling NAV to tailor onboard layouts to clients' specific requirements, Benne says. It will host a fully separated crew area, built for an endurance of two weeks.

"The CTV can comfortably mirror the offshore weather endured by SOVs before returning to shelter, allowing for swift pick-up of operations after a bad weather period," Benne says. The HybriNav35 will be able to transfer a maximum of 30 technicians, with the standard configuration supporting 24 seats available for charters. "Separating the crew and charterer areas allows for a more private service onboard and increased crew welfare," he comments.

The new vessel's increased deck area, plus the addition of a dedicated drone area, should allow for a wide range of operations beyond traditional cargo transport, Benne adds. Other details, including onboard fuel oil, fresh water and sullage capacities, were still being finalised at the time of going to press. With environmental regulations in mind, the HybriNav35 will also be 'future-proofed' for emerging alternatives to diesel propulsion. The CTV's current set-up, for instance, includes the provision of dual-fuel (MGO/HVO) engines and 300kWh of battery power, as well as "retrofit-ready spaces" for offshore charging installations, increased battery capacity or hydrogen fuel-cell technologies.

TECHNICAL PARTICULARS

HybriNav35

Length, overall	35.4m
Breadth, overall	11.4m
Depth	4.5m
Draught	1.9m
Deadweight	55tonnes
Speed	25knots

(Particulars may be subject to change)

Propeller selection

While the original HybriNav26 was propelled by waterjets, "different propulsion systems are available on the market, each with its own unique benefits," Benne says. "For the HybriNav35, we considered IPS, waterjets and fixed- and variable-pitch propellers, and came to the conclusion that, for the envisioned profile of the first vessels, we needed the most flexibility in terms of optimal speed.

"Therefore, we have chosen variable-pitch propellers for this design as we believe this gives us and our future clients the most flexibility in choosing the right speed and consumption profile for their operations. However, NAV can adapt the design at any time and for any specific project". With the current arrangement, the HybriNav35 should be able to achieve a speed of 25knots in realistic wave and wind conditions and when fully loaded for turbine-servicing operations, he notes.

"The owner of Newport and therefore NAV is convinced that this design will be a valued edition to the market," Benne concludes. "Therefore, he has partnered with a vessel operator to co-invest, co-own and operate the HybriNav35 vessels. We are currently undergoing fruitful discussions with potential builders and co-investors to realise a sizeable fleet of HybriNav35 vessels that are planned to go into operation in early 2026." This new operator will be independent of NAV, he says, thereby freeing up NAV to concentrate on developing "customer-focused designs and solutions". **SBI**

The new CTV shares a similar hullform to NAV's HybriNav26 concept, unveiled last year

WING WATCH

The Ecowende offshore wind farm, off the coast of the Netherlands, will incorporate a floating radar to help prevent seabirds and bats from fatally colliding with the turbine blades

Offshore wind turbines are the picture of clean energy, but these modern windmills are also proving a deadly hazard for birds and bats. Opponents of wind farms argue that the massive blades slice through countless birds each year, raising the question: can wind energy truly be eco-friendly if it comes at the cost of so many birds? The wind industry, eager to tout its green credentials, is grappling with this sticky issue.

Establishing a definitive number for avian fatalities is difficult, though, as the figures tend to vary. For example, studies published in the US in 2013 and 2014 suggest that the number of birds killed in wind turbine collisions could range anywhere from 140,000 to 679,000 per year (in contrast, other studies have estimated that household cats alone kill at least a billion birds annually, not to mention collisions with buildings and cars).

Meanwhile, a 2024 study put together by Erik Katovich, a researcher at the University of Geneva, claims that wind turbines have "no measurable impact" on bird population counts – whereas, he writes, shale oil and gas production could be reducing these population counts by 15%. The truth is that we simply don't know enough yet: another study by the International Union for Conservation of Nature (IUCN) points out that most bird collision estimates are based on theory rather than empirical evidence, due to a lack of adequate monitoring and onshore carcass collection.

Ecowende project

On the surface, this doesn't look like the most pressing problem for the offshore wind sector. However, Sibylle Giraud, VP for wind, environmental and civil aviation practices at radar tech developer Robin Radar Systems, argues that higher numbers of bird collisions can be expected as offshore wind parks spring up across Europe, the US and Asia.

"More wind farms are being built than ever before," Giraud says. "In the Dutch part of the North Sea alone, at the end of 2023, a total capacity of 4.7GW offshore wind farms were operational. The exponential growth of wind farming in the Netherlands is huge. The amount of investments is unseen in Europe and worldwide.

"There is a high risk of collision. Many birds migrate at night, have no visibility and fly at the level of the turbines. That's when collisions can happen, also [involving] protected species."

Robin Radar is now engaged in a project at the 760MW Ecowende offshore wind park, located some 53km off the Dutch coast, to test whether a radar-based platform can be used to detect incoming migratory flocks and shut down (or slow down) the wind turbines for temporary periods, to prevent fatal collisions. The group is working alongside DHI, which is contributing an alert system, camera, sensors and AI species recognition software to the scheme, and MIDO, which will provide its FLORA 1 floating platform, converting wave energy into power for the above systems. The floating platform will be operational by the end of 2024.

Radar and AI

Giraud says: "During high peaks of bird migration, [offshore personnel] can shut down the turbine in real time. These tools allow operators to find the right balance between maximising the energy production of the wind farm and, at the same time, minimising the risk of collision with birds or bats."

She cites previous radar-based trials conducted at the Barão de São João wind farm in Portugal's Sagres region – sited on a bird migration path, crossed by 30 different species each autumn. Incorporating the radar-assisted shutdown on demand (RASOD) protocol, the Portuguese project found that no soaring birds died from turbine collisions in five consecutive autumns. The participants used radar to 'see' the birds coming and stopped the turbines in good time.

The MAX bird detection radar is capable of 360° coverage and multi-target tracking

The floating, AI-assisted detection platform will be trialled at the Ecowende offshore wind farm from late 2024 (image: Jan van Gent)

Overall, the combined shutdown periods amounted to only 0.2-1.2% of the wind farm's annual activity, highlighting that the RASOD process need not incur significant disruption or outages. Consequently, IUCN has come out in favour of RASOD as an effective means of mitigating bird and bat deaths at offshore wind farms.

The combination of Robin Radar's MAX radar and DHI's MUSE AI solution will identify and monitor birds and bats across the Ecowende airspace. The MAX offers 360° coverage and multi-target tracking, and has previously been used to safeguard operations at airports and onshore wind farms, as well as enabling migration tracking of fruit bats in New South Wales, as part of a study on habitat loss and zoonotic viruses.

The MAX has been developed with a fast rotation speed, enabling track updates every second. "This allows uniquely detailed 3D visualisation of bird flight paths, including exports to Google Earth," Robin Radar states.

"Our radar sends a signal; we can detect a signal down to a bat level," Giraud explains. "We can provide a complete understanding of bird and bat behaviour, and track bird patterns in a specific area, allowing wind farm operators to take action. We create the alert so they can shut down the turbine."

This decision will depend on the number of bird and bat tracks. "You are not going to stop the turbine because there is one bird coming during high migration flux," Giraud continues. "What is an acceptable risk level is decided by governments or the wind farm company. In general, the main risk is migration and that is pretty easy for the radar to observe and track."

Floating challenge

The ability to detect whether approaching birds belong to protected species could also help researchers to compile more concrete collision statistics in future, removing ambiguity from bird mortality reporting, Giraud opines. "Basically, the system reflects the body mass of the target," she says. "A small songbird can be detected at a distance of 2-3km; a goose, 5-6km from the radar, depending on weather conditions." This radar-sourced data will be combined with the info captured by the DHI camera, providing double validation on the identification of different bird species.

At present, Robin Radar tells *Ship & Boat International* that it is too early to disclose further details regarding the project's planned distances and workflows. Giraud comments: "The level of data we should get from our MAX system should be pretty impressive." As something of a first for Robin Radar, however, she acknowledges: "It's also a challenge because radar and movement don't go hand in hand. You need a very stable platform. We've worked on floating turbines before, but never on floating platforms."

A spokesperson for Robin Radar adds that the floating platform at Ecowende will be used for baseline monitoring until 2026. Thereafter, when the wind farm has been commissioned and is fully operational, the monitoring system will be attached to the site's wind turbines themselves. "We're also working on a pilot to mount the MAX radar on an actual ship," the spokesperson tells *Ship & Boat International*. Should the Ecowende trials yield a notable decline in bird/bat collisions, Robin Radar hopes to market the solution to offshore wind farm developers around the globe. **SBI**

From airports to offshore

Robin Radar's MAX radar system has been installed at various airports, including London's Heathrow and Amsterdam's Schiphol, to help prevent bird strikes on aircraft. These collisions can damage plane components, cause engine failure if the bird is ingested into the engine and injure the flight crew should the bird penetrate the cockpit at high speed. Robin Radar's avian radars track the flight paths of both flocks and individual birds up to 10km away, and can automatically detect and log hundreds of birds simultaneously, including details of their size, speed, direction and flight path.

"The longer you operate our bird radars, the more useful your data will become," the company says. "You'll be able to identify key areas on and around your airport, for breeding, feeding, roosting and wintering." If the Ecowende trials prove successful, this info may also help when surveying potential offshore wind farm sites and maintaining eco-friendly practices at existing turbine arrays.

ROVS AND AUVS

ROBOTS AGAINST REFUSE

A trio of USVs will be used to monitor water quality in lakes and estuaries across South West England, as public outrage mounts over raw sewage discharges

A HydroSurv REAV-16 on the River Dart: three USVs in total will harvest crucial data on regional water pollution in South West England (image: Daniel Rasmussen)

In the UK, raw sewage spills are no longer a rare occurrence: they're an ongoing national scandal. Since 2020, news outlets have been flooded with stomach-churning images of untreated waste pouring directly into British waterways – and the problem only seems to be getting worse.

According to conservation experts The Rivers Trust, only 14% of rivers in England can be considered to be in "good" ecological health. As if that wasn't damning enough, a 2022 House of Commons committee report described England's rivers as being "in a mess" and concluded that *not a single river* in the country remains untainted by chemical contamination, including the presence of pesticides and plastics.

Meanwhile, statistics published by pressure group Surfers Against Sewage indicate that more than 584,000 discharges of raw sewage entered UK rivers in 2023. Incredibly, the group reports, only 4% of sewage overflows in Scotland last year were actually monitored.

It's a dire and disgusting situation, but hope may be at hand. A consortium of British marine tech companies is preparing to launch a water quality-monitoring project across three key regional ports in South West England, with a trio of uncrewed surface vessels (USVs) providing the means of obtaining crucial pollution data.

Monitoring project

The project, dubbed 'Smart Ports, Clean Waters', will see the USVs deployed across rivers and estuaries in three port locations, namely Dartmouth, Falmouth and Plymouth. By sending the drones out into these waters, the consortium hopes to build up an accurate picture of the extent of the local pollution problem.

The initiative is being led by Somerset-based environmental services company MSeis, with the long-term aim of raising public awareness of the threat posed to regional ecosystems. The other two project partners include Chelsea Technologies, a provider of water quality-monitoring services, which will supply the necessary sensors for the project, plus Exeter-based USV developer HydroSurv, which will supply a single REAV-16 USV to each of the three ports. The 12-month project will officially commence in late October, although the partners are currently engaged in pre-campaign testing at the designated sites.

Compact USVs

The REAV-16 is HydroSurv's first and smallest USV type, originally launched in 2020. Measuring 1.58m in length by 1.17m in breadth, and featuring a dry weight of 60kg, the zero-emissions, battery-electric drone can be carried and deployed by two people. This portability makes it an ideal fit for the streamlined MSeis team, which will deploy each USV once a week throughout the year-long programme.

At present, the partners are working with the three port authorities to pin down the best river and estuary locations for their monitoring activities – decisions that will largely depend on each port's individual ecosystems and their specific pollution concerns.

The MSeis team will initially comprise four people, though the company will likely take on more personnel, on a full-time or part-time basis, to assist with the project as it progresses, owner Mark Higginbottom tells *Ship & Boat International*. All three USVs will also be overseen by personnel in a dedicated remote operation centre situated at HydroSurv's Exeter facility, accessed via a 4G connection.

Technical benefits

There are several benefits to using USVs for this project. David Hull, CEO and founder of HydroSurv, adds: "These uncrewed vessels use relatively high-grade GNSS positioning systems and, through those systems, they can follow waypoint tracks to ensure mission repeatability. This means that the data we're collecting is truly representative of the same geospatial locations visited in previous deployments."

Another benefit of using electric USVs for this task, of course, is that the team does not need to rely on diesel-powered, crewed vessels. The connection

with the remote operation centre also means that the project can progress with a relatively lean crew, compared to the manpower that would be involved in hiring out boats and arranging day charters.

Each REAV-16 is equipped with two Torqeedo Ultralight 403 electric outboard motors, powered by 915kW lithium-ion batteries. The batteries are positioned above deck to make it easier for the users to hot-swap them – either when the USV returns to shore, or from over the side of a small boat. Each REAV-16 has an endurance of 4.5 hours between battery charges and moves at approximately 3knots – "a speed at which you can cover a fairly wide spatial area", Hull says.

Sensor types

The remotely controlled USVs will gather a wide range of water quality and eutrophication data on their weekly deployments on the inland waterways. This process will be enabled by various sensor types, supplied by Chelsea Technologies and installed on the USVs.

These tools include a tryptophan sensor. High levels of tryptophan (an amino acid) in water are a good indicator of organic pollution, which would cover sewage contamination. Next up is a chlorophyll sensor, developed to detect the presence of algal blooms, which can deplete oxygen in the water, suffocating fish and other creatures (additionally, some algal blooms are toxic).

Another sensor specifically detects fluorescent dissolved organic matter (fDOM), or broken-down vegetative matter. Although not inherently harmful to the environment, a significant presence of fDOM can indicate excess pollution or agricultural runoff. Hull comments: "The intention is that, by the end of the project, we get to use a single instrument with the different sensor types combined, to optimise weight."

The sensors will help the team to increase its pollution-related knowledge, which would be difficult or impossible to achieve via the naked eye. For example, Hull mentions, the River Dart has a lot of peat that runs into the river body, which, after heavy rainfall, can alter the colour of the river. It would be a mistake, therefore, to credit this colour change to sewage. It is important to be able to tell the difference, especially as the River Dart recently became the first river in the UK to attain Designated Bathing Water status from the Environment Agency.

The 'Smart Ports, Clean Waters' project will span 12 months, concluding in October 2025 (image: Daniel Rasmussen)

Cloud-based mapping

The project will be divided into four phases. The first three-month phase will see HydroSurv provide training to the MSeis team, as these personnel get up to speed on both the USV technology and the specifics of each working area. The USV deployments will take place in sheltered waters, which should help to minimise metocean hazards that could potentially disrupt the surveys, and which will help to keep the team working throughout the winter months.

As the project progresses, HydroSurv will upload data gathered by the USV trio to a cloud-based geospatial data-viewing platform. This will include detailed weekly datasets from each harbour, and the findings of evaluation workshops involving the port partners, Hull explains.

With all this info contained in one place, interested parties – from regulators and researchers to the public – will be able to access the platform over the course of the 12 months, to keep up with developments from each of the three ports as the USVs return more information week-on-week. With time, the platform will provide a reliable overview of the worst-polluted areas, hopefully helping the authorities to determine which actions to take.

Hull says: "A lot of decision-makers involved in hydrospatial and geospatial data don't necessarily have specialist software skills. With the cloud-based platform, we're trying to make the data-processing pipeline a really seamless experience for the very end user."

Positive feedback

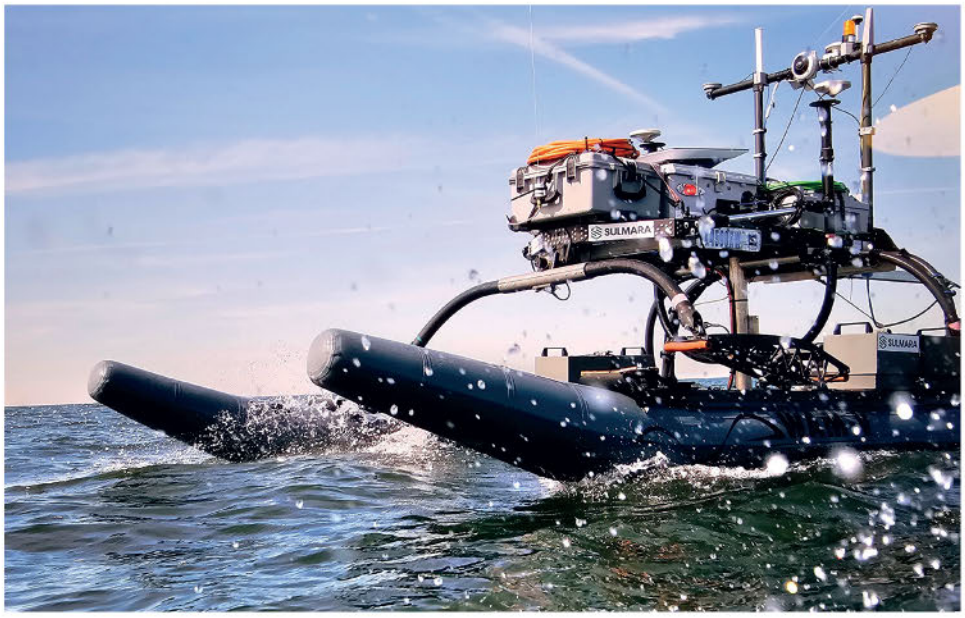
Even at this early stage, 'Smart Ports, Clean Waters' is proving popular. "It's been well received by the locals…there's lot of good will towards the project," Higginbottom says. "We've kicked off a stakeholder campaign to raise more awareness, reaching out to community and conservation groups, and this campaign will be extended to ports and harbours, regulators and the Environment Agency in the coming months."

While this particular project is South West England-specific, the partners intend to share their data with other researchers on a national level, before possibly taking their findings to the global stage. As useful as the pollution data should prove to be, though, there's another benefit to be gained from the process: it will enable HydroSurv to build up experience that it can use to improve and hone the USV technology itself to handle similar and more complex future projects.

"There's a huge amount of intelligence that comes along the way," Hull notes. "It's about how we refine the technology and tactics to improve the solution over time." For England's river users, however, any measures taken to clean up the country's sewage-riddled waterways will probably be good enough for now. **SBI**

AI GOES OVER THE HORIZON

Matthew Ratsey, MD of high-endurance USV charter firm Zero USV, shares his thoughts on how AI is creating new survey opportunities for uncrewed vessels



The appetite for AI and uncrewed surveying is growing (image: Sulmara)

With its projected value of £3.2 billion (US$4.05 billion) by 2050, it's easy to see why the 'blue economy' is spawning a race to deliver smarter, safer and more efficient ways to monitor our oceans.

The offshore renewables sector (wind, tide, wave and thermal) is growing to augment, and potentially replace, existing hydrocarbon energy production. According to a report by Wood Mackenzie, global offshore wind capacity alone is projected to increase from 34GW to 330GW over the next 10 years, driving the installation of more than 80,000 new fixed or floating moored turbines. Each of these will require accurate seafloor data for the life of their installation, potentially for up to 30 years.

The marine survey and mapping industry is set to remain in rude health for some years to come. Additionally, many other sectors require hydrographic and geophysical surveying, including seabed extraction, utilities, biotechnology, telecoms and subsea wrecks.

Crewed or uncrewed?

Traditionally, marine surveying has relied heavily on crewed vessels for deployment/recovery of sensors and data collection. The complexity of these tasks, combined with physically challenging environments, might lead one to rule out USVs – yet the opposite is true, as autonomy proves itself increasingly capable of boosting productivity, safety and economy of physical, financial and human resources.

As with all disruptive technologies, the true extent and potential of autonomy in the survey industry is still being revealed, and this will continue as new systems, along with AI and machine learning (ML), enable more human-dependent processes to be completed by machines. We are already quite a long way down that track, not least around the UK and UK Continental Shelf. Similarly, the barriers to operating over-the-horizon USVs for offshore hydrographic and geophysical surveys are rapidly being overcome. Regulatory codes of practice are being adapted and developed, while forward-thinking manufacturers are coming up with technical solutions on a pathway to ever greater autonomy and efficiency.

My own company, Zero USV, has been at the forefront of this against the backdrop of what already exists on the market: vessels operated substantially, or only, by remote control from the shore. This is not the same as a vessel that's independently capable of maintaining its operational functionality in the absence of any form of connectivity, while also avoiding shipping, marine mammals and other obstacles.

Break with tradition

Significant advances in graphic processor unit (GPU) technology over the past few years have enabled AI software – the same software that controls our Oceanus12 USV class (see *Ship & Boat International* May/June 2024, pages 20-22) – to be deployed 'on the edge', meaning the AI models can be deployed on physically small GPUs, mounted on the boat. These are roughly the size of an A5 box, with low electrical consumption – but extremely powerful. This is the significant step change in chip technology led by NVIDIA, which three years ago would still have required a server rack level installation. The edge compute

devices with the AI models installed on board ensure enough intelligence is built into the vessel to be able to carry out missions without having to rely on, or constantly revert to, an 'always-on' satellite connection.

While some may argue that USV use is restricted to areas away from structural or geophysical 'hazards', I'd strongly argue that this isn't the case given advances in AI and connectivity technology, particularly in providing robust communications 'over the horizon'. With the ushering in of low earth orbit (LEO) satellites such as Starlink, and hybrid connectivity solutions which bond multiple bearers (4G, LTE, satellite, etc) hitting the market, autonomous navigation and edge collation of survey data are becoming much less of an issue.

AI benefits

Extensive R&D and innovation, aligned with robust engineering and planning, will help to overcome the physical challenges associated with autonomy in marine surveying, including towing. Hull-mounted multi-beam echosounders (MBES) are part of the solution, but AI is emerging as the real game-changer.

With AI, survey companies can automate and optimise speed, in addition to immediate-course and whole-voyage routing for fuel optimisation and vessel safety. This yields cost-saving benefits for vessel owners, fleet managers, insurers and cargo customers. Commercial performance and resultant job security will follow quickly. AI promises immediate improvements to marine data acquisition and comes at a time when scarcity and cost of human skills and experience are significant factors.

That AI will increase job security at a time when skilled resource is low – partly down to the rapid growth of offshore wind, discussed above – is another story for another day, and one I'll not go into here. However, the appetite for AI and uncrewed surveying is growing. AI will not replace skilled surveyors but will help to streamline operations and the collation of accurate data, and ultimately reduce human error and risk. Furthermore, with AI, survey companies are ingesting data the entire time and, whether it is object data from the computer vision (CV) system or the data from the radars and AIS, all of it can be used to train the AI datasets for improvements in the field.

By dint of their much lighter payload (no crew with all their attendant food, water and accommodation needs), USVs help to reduce carbon emissions, so they are greener (as is their energy source, the sun), meaning that they can travel further and longer without shifts and other human dynamics. USVs can also work in pairs or even fleets, looking out for out each other, or in tandem with crewed vessels if needs be. Whatever the future, get ready for more computers to take the helm of survey vessels. **SBI**

SAFETY

DEFINING THE PROBLEM

With enclosed space fatalities proving a perennial problem for the maritime and offshore sectors, operators need to drive home the importance of defining what constitutes an 'enclosed space' and ensuring that crew understand the distinction, IMCA has argued

It seems that, no matter how many times the maritime and offshore sectors flag the problem, or how many conferences are dedicated to the subject, enclosed space fatalities just won't go away.

A recent report from the International Marine Contractors Association (IMCA) reveals that, of 1,611 standard vessel inspection reports uploaded to its Common Marine Inspection Documents (eCMID) and Common Marine Inspection Documents for Small Workboats (eMISW) databases between 1 April 2023 to 1 April 2024, 9%, or 70 vessels, lacked adequately controlled enclosed space entry procedures.

Unsurprisingly, these findings have disappointed Mark Ford, marine and quality manager at IMCA, who comments: "From the beginning of all seafarers' basic training, we are instructed on the hazards and procedures around confined spaces. Yet, sadly, we are continuing to hear of unnecessary fatalities.

"No one should lose their life doing their job; however, more than 300 are known to have died in enclosed spaces on ships since 1996, including 31 in 2023."

The IMCA report – which breaks down the tally of analysed ships into 848 smaller workboats, all sized below 500gt, and 763 larger, mostly offshore vessels – also highlights some worrying safety flaws. For example: 12% of vessel operators reported not inspecting the pilot ladder before use; 10% did not have adequate procedures in place for the handling of chemicals and flammable materials; 11% lacked cybersecurity measures; and 5% did not carry sufficient medical supplies on board. Additionally, the report indicates that 7% of all vessels covered had not had a technical inspection by the vessel operator.

"Still concerning"

Reflecting on the enclosed space entry findings, Ford tells *Ship & Boat International* that the results reveal a near-repeating trend. "The 2022/2023 report showed that 66 vessels did not have adequate enclosed space entry procedures in place," he says. "In the 2023/2024 report, this number has risen to 70. This is not a massive increase, but it is still concerning that you have 70 working vessels with no adequate procedures. That's 70 chances for a potential fatality due to ignoring well-known enclosed space protocols."

And these protocols *are* well-known: "cast in stone", as Ford puts it. He explains: "Enclosed space entry is something that is embedded in a vessel's safety management system, as part of the ISM Code. Section 1.2.2 of the ISM Code clearly states that its objectives are to ensure safety at sea and prevention of human injury, loss of life and damage to the environment. Ships are continuously audited on their compliance and, if you look deeper, you will find enclosed space entry procedures are present. It's just that they are not being effectively applied, or indeed followed."

Ford adds that he recalls several shocking incidents from his own first-hand experience as a ship inspector, including the time when, conducting an inspection on board a timber carrier, he observed a crew member preparing to enter the hold without breathing apparatus. It was only when Ford attached his gas detection meter to a rope and lowered it into said hold that the crew member understood the close call he'd just had – the meter had recorded an oxygen content of 12%, markedly below the minimum acceptable level of 19.5%.

"You have cases where crew enter spaces in which they feel safe, such as battery lockers or CO_2 rooms," he continues, "but they don't turn on the fan because their intention is to just 'pop in and out' of the space." Sometimes, they get away with it; sometimes, as the IMCA report underlines, they don't.

A proper definition

A significant number of enclosed space incidents, Ford suggests, "are due to people not properly recognising that a space should be classed an 'enclosed space'". He adds: "I see human factors as playing a big part in this, especially during attempted rescues."

As pointed out in previous issues of *Ship & Boat International* and *Offshore Marine Technology*, going back to at least 2012, the offshore sector's adage that 'trouble comes in threes' reflects the fact that many enclosed space incidents result in three fatalities. Typically, the first crew member to enter the enclosed space collapses as a result of lack of oxygen (typically caused by a build-up of toxic gases, rust, paint fumes or cargo that consumes oxygen); a second crew member attempts to rescue the first, but is also overcome by the atmosphere and collapses; and a third observer then attempts to rescue both stricken colleagues, before also succumbing to the atmosphere. Classification society DNV has estimated that more than half of all enclosed space fatalities occur when one crew member is attempting to rescue another. Perhaps needless to say, it can be extremely difficult

to extract three unconscious bodies from a confined space, especially one surrounded by pipework.

An important step, then, may be to clearly define what constitutes an onboard 'enclosed space' so that crew members remain aware of the differences between these hazardous spaces and other, less challenging onboard areas. Ford describes an 'enclosed space' as one featuring "limited openings for entry and exit" as well as "inadequate ventilation". However, he argues, the definition must go further than this: the term should describe a space "not designed for continuous worker occupancy, including but not limited to cargo spaces, double bottoms, fuel tanks, ballast tanks, cargo pump rooms, compressor rooms, cofferdams, chain lockers, void spaces, duct keels, inter-barrier spaces, boilers, engine crankcases, engine scavenge air receivers, sewage tanks and adjacent connected spaces".

So, the term covers more than cargo holds and tanks – but even then, Ford emphasises that the above list is not exhaustive. "A list should be produced on a ship-by-ship basis to identify enclosed spaces," he advises: after all, the risk hotspots on a trawler may differ significantly from those on a jack-up rig.

Human factors

In an article on this topic in *Ship & Boat International* July/August 2022 (pages 43-45), InterManager secretary-general Captain Kuba Szymanski appeared to lay a portion of blame for enclosed space incidents on naval architects. Szymanski implied that naval architects should take risk "out of the equation" through better enclosed space design, and base their vessel plans on a "human-centric approach".

However, Ford takes a different view, commenting: "It would be nigh on impossible to design out the need to enter an enclosed space on board a ship" – especially given the number of vessel areas mentioned above that fit the description. If enclosed space fatalities could be attributed strictly to poor design, this may be a preferable problem: then, at least, naval architects could reassess their plans and devise a workable fix. Far harder to predict and monitor are human factors and crew attitudes, or how any one seafarer interacts with his or her environment.

All the safety training in the world cannot guarantee that a crew member won't decide to enter an enclosed space without adequate PPE, either to save time or because they consider wearing/carrying PPE an inconvenience. Indeed, the crew member may have entered the space without PPE on many occasions before, and without any harmful consequences to themselves, thereby giving them a false sense of security – and perhaps making it harder to convince them of the importance of adhering to safety management plans.

Some of the responsibility must also be shared by the operator. Ford says: "As part of the safety management system, the owner/operator of the vessel needs to ensure that any potential enclosed spaces are identified and that the appropriate controls are put in place for entry."

'Shock' tactics?

One tactic, Ford ponders, could be to alert crew to the grim reality of enclosed space facilities, without any sugar-coating. This strategy might include the production of posters and videos depicting stills and footage of the last moments of crew members who perished in enclosed space incidents. Although this is an extreme approach, with the potential to cause distress, it may nonetheless be one worth pursuing: it has certainly been deemed fit for use by governments and their health and safety agencies, particularly in promoting road safety and smoking cessation. "If an image upsets people, there's a good chance it will also stick in their minds," Ford says. Given how little attention enclosed space safety generally receives in the press, compared to issues such as fire safety, environmental pollution and cybersecurity, that mightn't be a bad thing.

Either way, IMCA hopes to use the latest report to share lessons and initiate new conversations with industry stakeholders. For example, the association will raise the issue at a London event on 8 July, hosted by the Oil Companies International Marine Forum (OCIMF). Anticipating this meeting, Ford says he is determined to "avoid the usual 'isn't it bad?' platitudes and instead come up with a plan of action".

IMCA will also continue to share its 'Safety Flash' reports with the industry, providing summaries of incidents and accidents and indicating the vital safety lessons to be learned from such events. The association's report, however, serves as a stark reminder that there is still plenty of work to be done in safeguarding the lives of seafarers and shore workers – primarily through education and training, but also, as Ford suggests, by clearly defining enclosed spaces, helping crew to understand that these zones should not be treated in the same light as the galley, the mess or well-ventilated storage areas. **SBI**

Mark Ford, marine and quality manager, IMCA: "No one should lose their life doing their job"

VR IN THE DANGER ZONE

Could the use of virtual reality help to boost seafarer safety training when it comes to operating within enclosed spaces?

In late June, Warsash Maritime School reported that it is collaborating with the Centre for Factories of the Future (C4FF) on a virtual reality (VR) maritime safety training package for enclosed space operations. The package, which is being funded by Innovate UK to the tune of nearly £340,000, will create VR simulations of engine rooms, cargo compartments and various tank types, enabling trainees to encounter virtual fires and gas leaks from a safe real-life environment.

The school, which is part of Solent University, says that the VR course will also cover aspects of training related to: the monitoring of air and atmospheric quality; firefighting techniques in enclosed spaces; emergency communications and response coordination; and the application and use of PPE. Once all of the parameters have been finalised and validated, C4FF will create and roll out the VR training packages.

The project is being headed up by Captain Nadeem Anwar, senior lecturer for petrochemical at Warsash Maritime School. "Operations in enclosed and confined spaces are associated with lots of risks stemming from multiple hazards," Anwar comments. "Injuries and fatalities are frequent. Mostly, the root causes are human error and lack of training.

"Though there are training requirements in place, training is limited in terms of envisaging all the threats realistically. Apart from a few training courses, like firefighting, the training remains primarily theoretical, and audio/video-based at best." Instead, the VR training package is expected to create a more immersive experience to stimulate a greater awareness of these hazards, and a greater appreciation of how to handle them, among trainees.

Pros and cons

The jury is still out on the effectiveness of VR-enhanced training, which remains at a relatively early stage of development. There have been encouraging signs: as an example from another industry, a study published by *ScienceDirect*, focusing on the benefits of VR in healthcare, found that VR's immersive nature can lead to higher engagement with trainees, resulting in better recall of learned information compared to traditional classroom methods. Another study, involving the participation of 160 students from Stanford University, California and the Technical University in Denmark, claims that use of VR led to a 76% increase in learning effectiveness over traditional teaching.

Analyst MarketSplash predicts that the global VR market, valued at US$22.9 billion in 2020, will grow to reach US$50.3 billion by 2028. However, not everyone has been won over – at least, not yet. Some early adopters have found VR headsets (when used) uncomfortable, and have reported feelings akin to motion sickness when wearing them for extended periods. Critics also point to the lack of sensory cues one would pick up from real-life exercises (including smelling odours and/or feeling changes in temperature) as a drawback. Meanwhile, the current pricing of VR headsets and software can make them particularly expensive for businesses that need to train a large number of employees.

Mark Ford, marine and quality manager at IMCA (see pages 38-39), also sees potential flaws in VR training. One possible problem, he highlights, is that such courses can be "too staged" and fail to adequately duplicate the realities of operations under pressure – including unexpected captain's orders, diversions and distractions and/or feelings of fear and panic.

Rise of VR

Still, VR safety training packages are gradually finding a home in the marine sector. Other examples include VR-ME, a VR simulator specifically designed for emergency training on fishing vessels, covering fires, man overboard incidents and hull breaches. Meanwhile, digital learning platform provider 3t Digital is now offering bespoke VR courses to replicate maritime-specific scenarios, including navigating rough seas and abandoning ship, and a collaboration between FORCE Technology and Varjo aims to use industrial-grade virtual and mixed reality hardware and software to deliver enhanced safety training to seafarers.

The Warsash/C4FF project was formally launched on 1 April and will run for a period of 18 months. Anwar tells *Ship & Boat International* that more details will be released as the project progresses and as the VR package is validated. If all goes to plan, the package could provide some interesting insights into enclosed space manoeuvres and hazards. **SBI**

Warsash and C4FF aim to develop a VR training package for enclosed space safety over the next 18 months (image: Warsash Maritime School)

BANNA FLYING HIGH

Ireland's oldest independent lifeboat association is set to elevate its rescue missions with the arrival of a customised, modern and nifty new Ribcraft model

Founded in 1983, Banna Rescue has the distinction of being Ireland's oldest independent lifeboat association, coming under the umbrella of the nationwide Community Rescue Boats Ireland (CRBI) network. Over the decades, the Kerry-based, volunteer-staffed group has responded to more than 276 callouts and saved 78 lives, both independently and in cooperation with other emergency response services, including the Irish Coast Guard (IRCG) and the Royal National Lifeboat Institution (RNLI) among others.

Banna Rescue covers Tralee Bay, an area spanning some 200m² off Ireland's West Coast. "This is a notoriously wild environment, containing steep cliffs, rock faces, beaches, dunes, shallow sandbanks and river mouths," Brian Crean, Banna Rescue unit secretary, tells *Ship & Boat International*. This area includes Akeragh, Banna and Barrow, which have been deemed special areas of conservation and special protection areas (SACs/SPAs) under the EC Habitats and Birds Directives.

Such features have made Tralee Bay a tourist hotspot, drawing swimmers, surfers, kayakers and watersports enthusiasts – all of whom "have increased casualty potential" in the vicinity, says Crean. Additionally, the area is home to a small but busy crab and oyster fishing vessel fleet.

The team's rescue centre is located behind the dune system at Banna Strand, and can call on 30 volunteers. "Due to the geographic nature of Banna Strand, the unit is a 'beach station' and is obligated to launch/recover and operate in surf," Crean explains. "Critically, it is one of the 11 independent lifeboat teams in Ireland identified as a 'Declared Resource' to the IRCG and is authorised to conduct 999/112 or VHF Ch 16 emergency response, 24/7/365."

Ageing assets

However, raising funds to meet operational costs is an ongoing challenge. "Volunteers must raise enough funds to upkeep two boats, service equipment, provide training and meet running costs," Crean says. "Annually, this is approximately €25,000: however, it does not include renewing equipment, replacing boats or maintaining the rescue facility, all of which is necessary to provide a professional and safe rescue service."

State funding covers approximately 25% of these overheads, but public support is crucial to meet the rest. It's an essential service, Crean points out, as, on average, 115 people die from drowning in Ireland each year.

Until recently, Banna Rescue has relied on two boats, *Tom Crean* and *Suzie* – both EA-16 D-Class RIBs, built by Avon Inflatables – for its rescue missions. "All of Banna Rescue's D-Class craft had previously been released by the RNLI and would have been purchased from other rescue team, both in Ireland and the UK," says Crean. For example, the 1998-built *Tom Crean* was a former frontline rescue boat with both the Stranraer and Skegness RNLI units, and has been on active duty with Banna Rescue since 2020.

The D-Class design includes an overall length of 4.9m, a breadth of 2m and a draught of 0.52m, and can carry up to four rescuers (including senior crew and trainees) and three casualties. Typically powered by a single 4-stroke, 40hp (30kW) engine, the vessels in this rescue boat class can achieve a cruising speed of 18knots, increasing to 20knots max, and have an endurance of three hours.

Modernisation drive

While both boats have served Banna Rescue well, the organisation was aware of their ageing status. What was required, Crean says, was "a modern, faster and more capable vessel, incorporating the latest technology" and able to perform a wider range of tasks than before. Another key factor was that Ireland's forthcoming National Search And Rescue (SAR) Plan will require all national sea rescue teams to adopt new standards with regards to safety procedures and equipment.

"The primary requirement was for a modern vessel that could conduct emergency marine-based inshore SAR and search and recovery operations, intervention patrols and environmental monitoring," Crean explains. A new rescue boat was required to replace the ageing D-Class duo - but "the vessel would have to meet the regulatory and operational changes that Irish boat teams will face in late 2024", he adds.

So, with the aid of funding from the Department of Rural and Community Development and money raised

Banna Marine's new Ribcraft 4.8 PRO has a top speed of 35knots

The 4.8 PRO, pictured during its May handover. From left to right: Roger Craddock (Banna Rescue), Charlie Chan (Ribcraft), Thomas Ward (Banna Rescue), Diyana Dimitrova (Banna Rescue)

by the Ring of Kerry Charity Cycle, Banna Rescue has acquired a brand new rescue RIB, complete with state-of-the-art onboard systems, for a reported price of €130,000. The rescue team opted for a customised version of Ribcraft's 4.8 PRO model, fine-tuned to meet its operational needs.

Custom features

Construction began on the RIB in January 2024, and the boat was delivered to Banna Rescue in May, following sea trials. Ribcraft tells *Ship & Boat International*: "The 4.8m vessel has the dimensions of a standard Ribcraft 4.8 PRO, but there is a unique specification: the design incorporates advanced communication and navigation systems. These systems are conveniently housed in a bow box for easy access and operation." Other mods include a self-righting bag, to ensure that the RIB returns to an upright position following a capsize. "The self-righting bag is secured to the boat's A-frame and offers both manual and automatic activation options, providing flexibility and reliability in emergencies," Ribcraft explains.

The fibreglass-hulled RIB also features a custom-built bow pod, included to maximise deck space, which houses the boat's electrical system and navigation gear, plus waterproof lockers for safe, dry storage of first aid kits, manual navigation aids and distress flares. The boat's Yamaha F60 engine grants the boat a top speed of 35knots: a considerable speed advantage over its D-Class predecessors, permitting swifter response times.

"The fuel bladder is integrated into the structure of the boat by being bonded to the inside of the tube," Ribcraft adds. "By incorporating the fuel bladder directly into the tube, the boat eliminates the need for additional support structures or separate fuel tanks" – a smart way of reducing overall weight, as well as lowering the centre of gravity for improved stability.

Meanwhile, the boat's cutting-edge tech includes a Raymarine CAM220 dome-shaped HD camera, providing all-round visibility for enhanced surveillance operations. Other kit includes: an Icom VHF/DSC marine radio; a Plastimo illuminated compass; a Raymarine AIS700 Class-B transceiver; LED navigation lights; three blue LED flashing strobes; and an Echomax midi radar reflector, mounted on the boat's A-frame. To help the boat to hold its own in rough seas, Ribcraft's Toughtec Keelguard application provides additional protection to the hull.

Frontline asset

This is Banna Rescue's first experience with a Ribcraft RIB. Crean adds: "The Ribcraft 4.8 PRO is an extremely nimble vessel and has a clear pedigree for operating in surf conditions, with the added strength to withstand the punishment and extremes of harsh Atlantic seas. The vessel is tiller-driven, creating an 'open-style' deck with easy access for crew, 'beached' entry/exit and loading/unloading equipment, casualties and stretchers."

He continues: "Certain operational conditions must be assessed before proceeding with a launch." These conditions include: winds up to and including Force 6; significant wave and surf heights up to 2.5m; operations 5nm from the nearest safe harbour; and restricted visibility of no less than 2km. The new RIB is well-equipped to handle all of these conditions, he adds.

While the Ribcraft 4.8 PRO is fairly similar to Banna Rescue's previous craft in terms of design, the group has introduced a phased training programme to help volunteer crew become completely familiar with the new vessel, its equipment and layout. "The deployment of the new vessel will require amendments to the team's local operating procedures and maintenance schedules," Crean adds. "On the water, it will be necessary for crew to modify their dynamic scene risk assessment. The team is also taking this opportunity to move to video-based training for future volunteers."

The 4.8 PRO is intended to serve as Banna Rescue's "primary frontline asset" for at least 10 years, Crean says – adding that he expects a number of other Irish SAR teams will be keeping a close eye on the new vessel's performance, "evaluating it as a potential replacement for other craft". **SBI**

TECHNICAL PARTICULARS

Ribcraft 4.8 PRO

Length, oa	4.8m (oa)
	3.9m (internal)
Breadth	2.1m (oa)
	1.2m (internal)
Weight	275kg (hull only)
Tube diameter	460mm
Propulsion	1 x Yamaha F60 outboard
Max speed	35knots
Max POB	6 (incl. 2-4 crew/2-3 casualties)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