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SMALL SHIPS OF 2022

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Address: No.40 Xining Road, Luo Pu Street, Panyu District, Guangzhou City, Guangdong Province, PRC

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Editor:
Martin Conway

Production Manager:
Nicola Stuart

Magazine Production Assistant:
Lydia Perry

Advertising Manager:
Aftab Perwaiz

Advertisement Production Manager:
John Morecraft

Subscriptions & Publications Manager:
Tash Greene

Publisher:
Dmitriy Ponkratov

Published by:
The Royal Institution of Naval Architects

Editorial & Advertisement Office:
8-9 Northumberland Street
London WC2N 5DA, UK

Telephone:+44 (0) 20 7235 4622
Telefax: +44 (0) 20 7245 6959

E-mail: editorial@rina.org.uk / advertising@rina.org.uk

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Merthyr Tydfil, CF48 3TD, Wales.

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UK - HQ
sales@teignbridge.co.uk

Dubai
teignpro@eim.ae

India
sales@teignbridge.in

Asia
sales@teignbridge.asia

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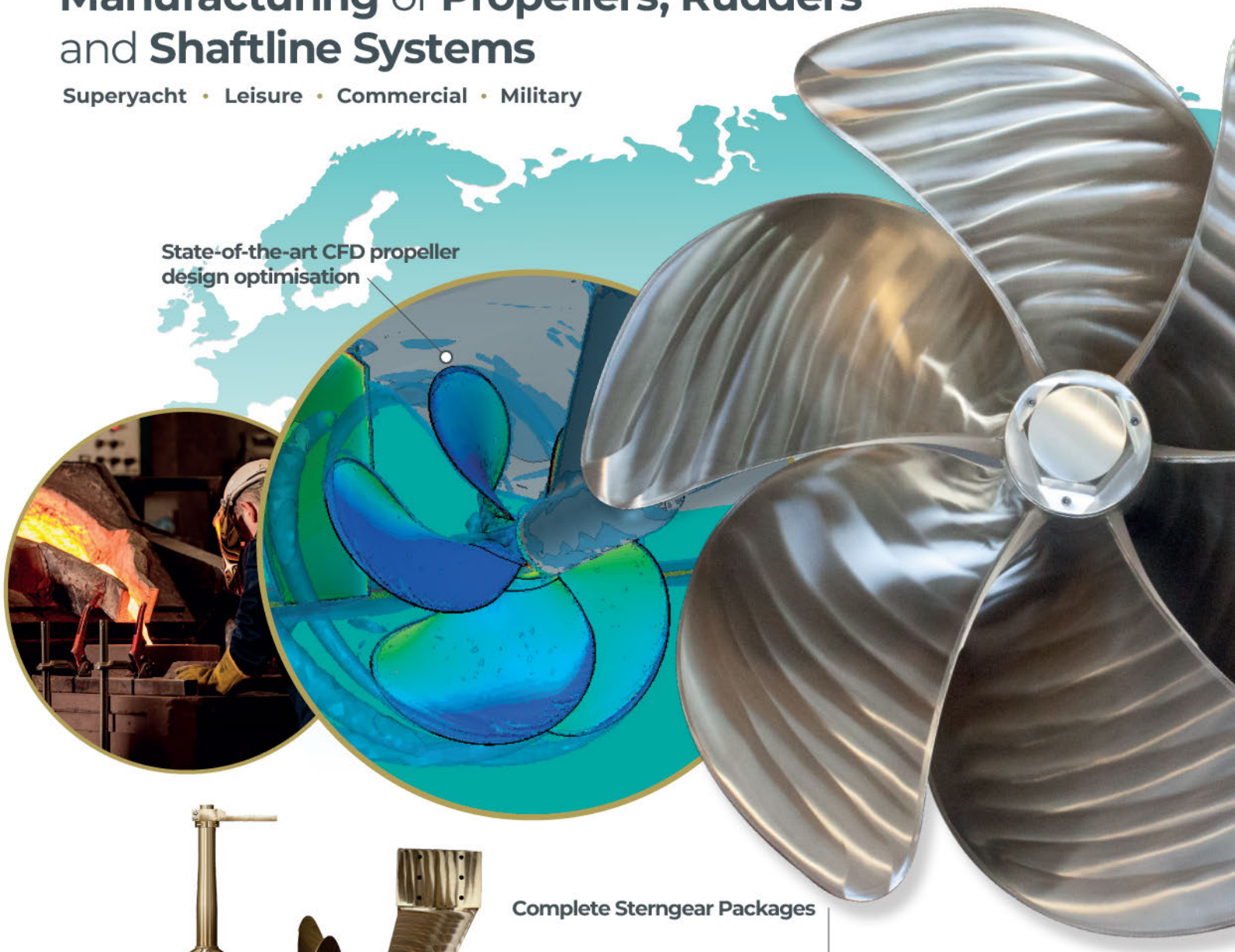

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470 REGINA – Luxury, high-performance motor yacht with a cool bow concept

Builder:	**Fabbrica Italiana Motoscafi (FIM)**
Designer:	**FIM / Ferragni Progetti**
Vessel's name:	**470 Regina**
Owner/operator:	**Confidential**
Country:	**Italy**
Flag:	**Italy**
Total number of sister ships already completed:	**0**
Total number of sister ships still on order:	**4**
Contract date:	**November 2021**
Delivery date:	**August 2022**

Produced for clients who wish to own "a high-performance boat, while still enjoying comfort and ample spaces", the debutante in Fabbrica Italiana Motoscafi's (FIM's) 470 Regina class was launched and delivered to an anonymous owner in August. The company's current boatbuilding technique is to fashion decks, hull and T-tops in fibreglass, though FIM is also considering building T-tops and hard tops in carbon fibre. Founded in 2019, FIM's first model, the 340 Regina, was launched in 2020.

Buoyed by the success of this first model, FIM went on to develop the 470 Regina, which extends the dimensions of the 340 predecessor to create more exterior and interior space, putting guests in closer proximity to the water.

The motor yacht has a distinctive bow configuration, with a movable sunbathing area and a small central pool. The bow's lounge solarium can be split into two parts and moved to the sides, to create a beach area of approximately 7-8m^2. This concept is referred to by FIM as 'BowLife', and the pool will serve as a "cool down area" for the owner and guests, the company adds. The BowLife arrangement incorporates water-resistant materials, such as fibreglass and stainless steel. Alternatively, users can add a removable table to the pool spot and utilise the bow as a dining area.

The boat's aft also features a splittable solarium, which can be opened up to create a 20m^2 beach area. The stern bathing platform houses a lifting system with a SWL of between 400-600kg (this can be tailored to the customer's preference) for the launch/towing of a tender or jet ski. Sliding benches and a folding table can be manipulated to increase the width of the aft sundeck.

Ferragni Progetti was responsible for the 470 Regina's interior layout, working collaboratively with FIM's internal technical department plus other designers when making décor choices. All furniture on board the first-in-class newbuild has been sourced domestically. Other features include stern retractable cleats and telescopic carbon fibre poles for the bow awning. Interestingly, the 470 Regina's steering wheel was built exclusively for this vessel series, featuring a totally unique mould currently unavailable on the market.

The interior layout includes two master cabins. Each accommodates two guests, features a height of 2.15m and comes with its own private toilet and shower. FIM says: "The forward owner's cabin includes a versatile area that can be configured into an office, bar or vanity console." Should the owner request it, FIM can produce the 470 Regina with a three-cabin configuration, enabling more guests to stay on board overnight.

While the first-in-class 470 Regina runs on twin Volvo Penta IPS 800 diesels, future customers will also be able to specify Volvo Penta's IPS 650 models. Additionally, FIM is planning a special outboard version for the US market, which will incorporate three or four Yamaha outboard engines, rated 425hp (317kW) each.

TECHNICAL PARTICULARS

Length, oa	15.1m
Length, bp	11.75m
Breadth, moulded	4.4m
Depth, moulded	1.4m
Displacement	17.5tonnes
Deck space	50m^2
Max speed	35knots
Range	200nm

Propulsion
Main engine(s):

Number of engines	2
Make	Volvo Penta
Model	D8 IPS 800
Output of each engine	441kW

Propeller(s):

Number of propellers	2

Winch(es):

Number of winches	1
Make	Quick SpA

Bridge electronics (make/model):

Radar(s)	Raymarine Quantum 2
Autopilot	Volvo Penta
GPS	Raymarine
Chart plotter	Raymarine Axiom Pro 16
Engine monitoring system	Volvo Penta

Onboard capacities:

Fuel oil	1,540litres
Fresh water	300litres
Sullage	60litres
Black water	80litres

Complement:

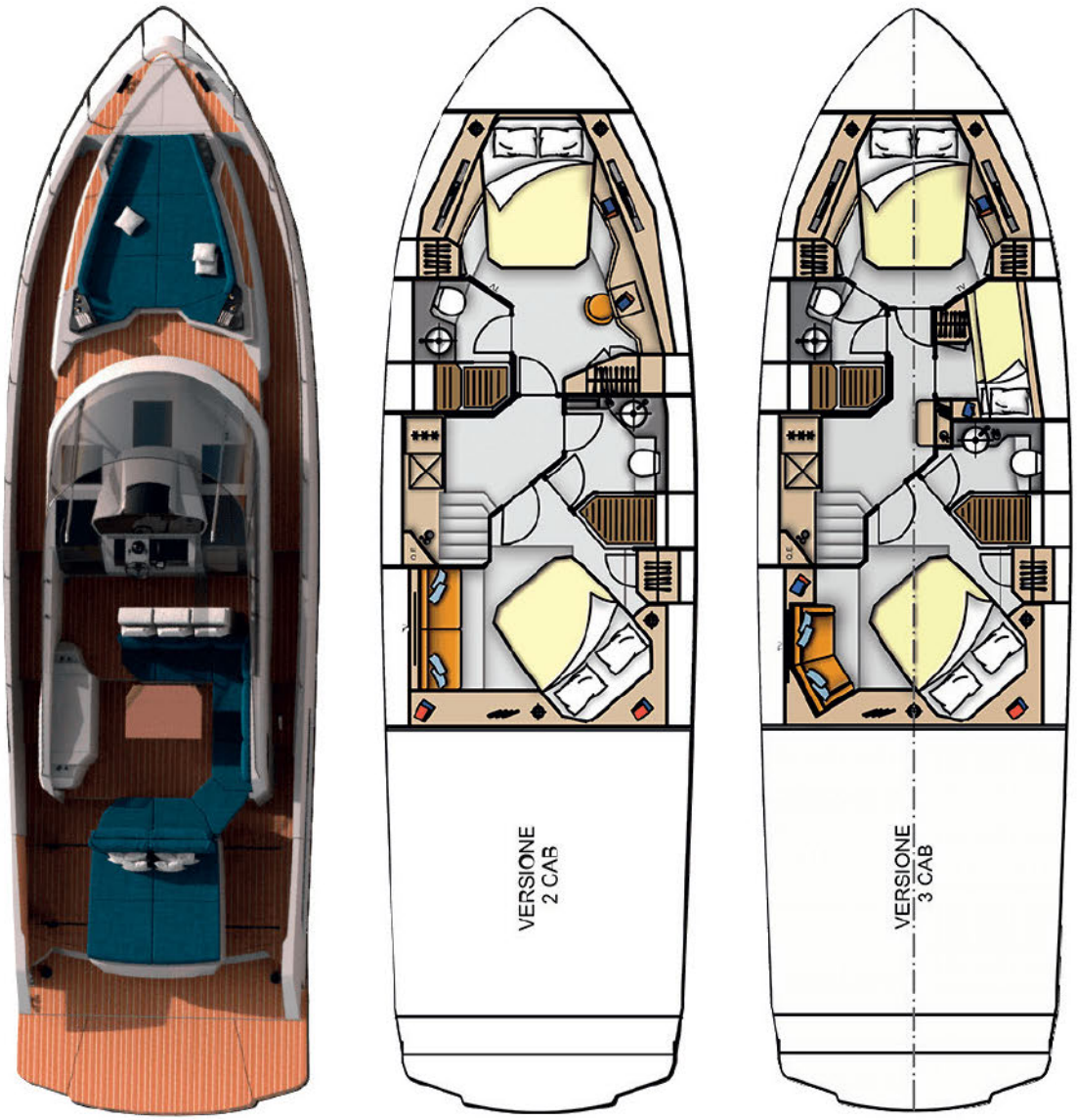
Number of crew	0
Number of passengers	14
Number of cabins	2/3

Other significant or special items of equipment:
- Bow Life concept (see description)
- Lifter platform
- Side terraces
- Transformer ladder

Classification

Classification society	Ente Navale Europeo (ENAVE)
Notations	CE Category B

470 REGINA



AQUA HELIX – Large-complement offshore crew vessel, equipped for stability

Builder: ..... **Damen Shipyards Group**
Designer: ..... **Damen Shipyards Group**
Vessel's name: ..... ***Aqua Helix***
Owner/operator: ..... **OceanXpress**
Country: ..... **Netherlands**
Flag: ..... **Netherlands**
Total number of sister ships already completed: **0**
Total number of sister ships still on order: **0**
Contract date: ..... **June 2018**
Delivery date: ..... **May 2022**

Two years into the 2020s, and demand for offshore wind farm support vessels is growing rapidly. To meet the need for offshore crew transfers, Damen's first Fast Crew Supplier 7011 delivery, *Aqua Helix*, is capable of carrying 120 technicians in comfort over long distances, at speeds of up to 40knots, across a wide range of weather and sea conditions, and then transferring them safely form the vessel to their places of work by means of a dedicated Ampelmann S-type gangway.

The large technician complement is notable in itself. Speaking after the launch of the visually striking vessel in early 2021, Damen commented: "This capacity raises the prospect of a move away from day-rate structures towards a pay-per-journey model and, potentially, vessel sharing, thereby increasing the efficiency of offshore operations" (see *Ship & Boat International* March/April 2021, page 12).

Aqua Helix incorporates Damen's Axe Bow hull design, intended to assist the vessel in cutting through waves with minimal accelerations, along with a specially designed VEEM gyrostabiliser, to maximise the stability of the vessel (especially when stationary). Additionally, dynamic positioning capabilities have been provided by Kongsberg, while Naiad Dynamics supplied the vessel's active interceptors for ride control.

Damen says: "Vital to the performance of the vessel is Ampelmann's electric S-type motion-compensated gangway, which is fully integrated with the hull structure so as to maximise strength while minimising weight." The gangway's electrically powered hexapod platform is also intended to provide stability in significant wave heights up to 3m. Damen adds: "The interior also features design and technological innovations that together ensure that personnel arrive feeling well-rested and ready for work."

TECHNICAL PARTICULARS

Length, oa 73.65m
Length, moulded 70m
Breadth, oa 11.25m
Breadth, moulded 11m
Depth at side 5.5m
Gross tonnage 1,267tonnes
Draught 4.5m
Design, deadweight 105tonnes
Deck space ..... 35m^2
Deck load (tonnes/m^2) ..... 2.5tonnes/m^2
Max speed 39knots
Range 650nm

Propulsion
Main engine(s):
Number of engines 4
Make ..... MTU
Model 20V4000 M73L
Output of each engine 3,600bkW

Gearbox(es)
Number of gearboxes 4
Make ..... Reinties
Model ..... VLI 1930

Waterjet(s):
Number of waterjets 4
Make ..... Hamilton
Model HT900

Deck machinery and bridge electronics
Crane:
Number of cranes 1

Winch:
Number of winches 1
Capacities ..... 5tonnes pull (max) 9m/min

Other deck machinery/equipment:
- 1 x VEEM VG 1000 gyroscope

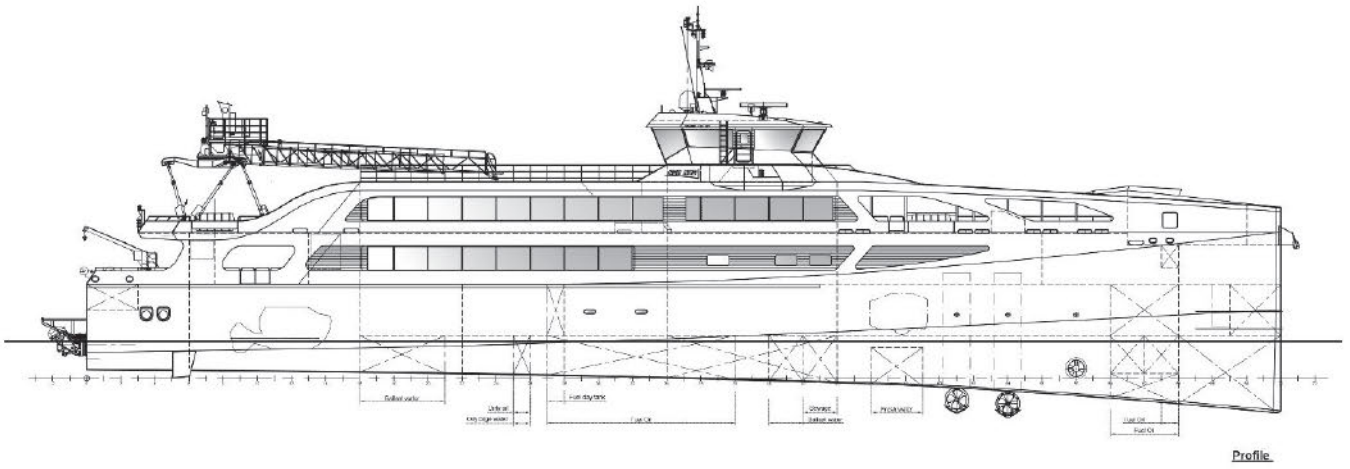
Bridge electronics:
Radars ..... 1 x X-band, 1 x S-band
Reference radar ..... Kongsberg Spot track laser
Autopilot ..... Alphatron Seapilot MFM
GMDSS A2
Gyro ..... Alphatron AlphaMiniCourse
Engine monitoring system ..... Alphatron AlphaAnnounce

Other communication systems:
Echosounder ..... JRC JFE 380
Speedlog ..... JRC JLN-740
VHF DSC-A ..... Sailor 6222
VHF slave station ..... Sailor CU6204
VHF hand-held ..... Sailor 3520
SSB ..... Sailor 6310
Navtex ..... JRC NCR-333
Inmarsat ..... Sailor 6110 mini-C
EPIRB ..... McMurdo G8
Sart ..... McMurdo S5
Voyage data recorder ..... JRC JCY-1900
Airband VHF ..... Icom IC-A6E Portable
Iridium satellite
Telephone ..... Sailor SC 4000
VSAT ..... Intellian V100
Remote monitoring ..... Damen Triton

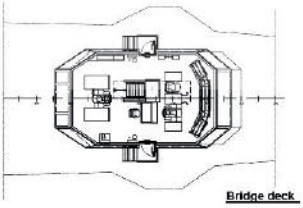
Onboard capacities:
Fuel oil 70,000litres
Fresh water 11,000litres
Sewage 11,500litres
Bilge water/dirty oil 6,000litres

Complement:
Number of crew 11
Number of passengers 120
Number of cabins 7

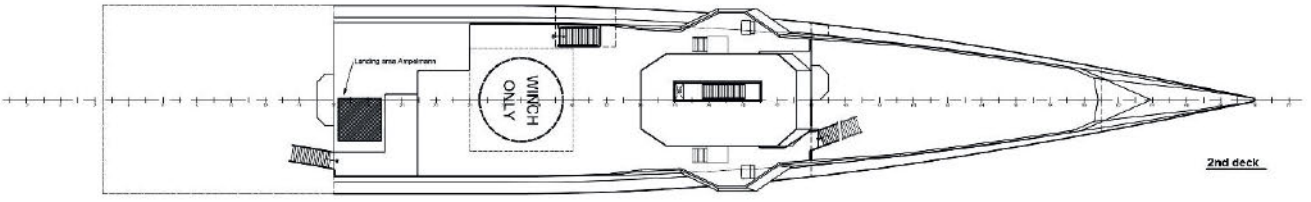
Classification
Classification society ..... Bureau Veritas
Notations ..... 1 + HULL + MACH, HSC-code-Cat A, Dynapos AM R, Sea Area 3



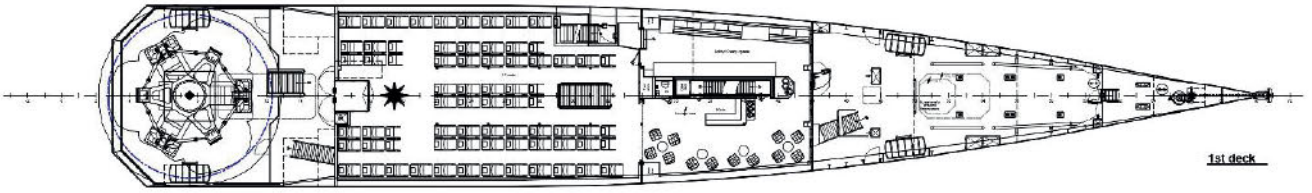
Profile



Bridge deck

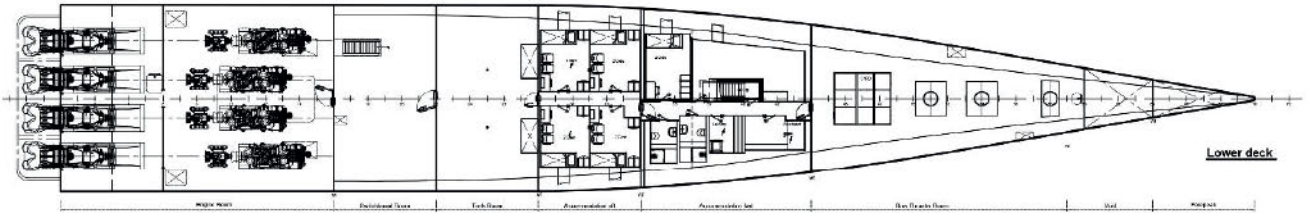


2nd deck



1st deck

Main deck



Lower deck

ASIS 8M WORKBOAT – Compact RIB offering dry rides to offshore oil & gas personnel

Builder:	**Asis Boats**
Designer:	**Asis Boats**
Vessel's name:	**Asis 8m Workboat series**
Owner/operator:	**Saipem**
Country:	**Saudi Arabia**
Flag:	**N/A**
Total number of sister ships already completed:	**2**
Total number of sister ships still on order:	**TBC**
Contract date:	**December 2021**
Delivery date:	**January 2022**

While RIBs are perhaps most commonly deployed by military and recreational users, some offshore operators are coming to view these lightweight, low-draught vessels as very handy alternatives to conventional CTVs. As such, Dubai-headquartered ASIS Boats has developed its 8m Workboat series as a solution for offshore operators.

Speaking to *Ship & Boat International* in our March/April 2022 issue, the builder explained: "RIBs have outstanding handling; from sailing in the roughest seas to close circuit manoeuvrability, RIBs will always out-perform any other type of boat. The weight savings of a RIB contribute to greater fuel efficiency, increased operational range and lower fuel consumption."

The series was also inspired by growing demand for RIBs from operators looking to circumvent restrictions on the use of petrol engines around oil and gas platforms. "As operating with petrol engines is forbidden around such platforms, and earlier diesel engines were inboards – which were difficult to repair offshore – operators are attracted to solutions with outboards, which can be easily replaced on the spot," the company added. The 8m Workboat series is also suited to patrol and search and rescue work.

This series received a vote of confidence from engineering giant Saipem, which has bolstered its activities offshore Saudi Arabia with three of these new RIBs. Each of the trio has a maximum payload of 2tonnes and draws 500mm, widening the window for personnel and cargo transfers in shallow spots. Two of the Saipem newbuilds were fitted with an 112kW OXE Diesel outboard apiece, while the third is powered by a Yanmar 4LHA-DTZP diesel engine driving a Hamilton waterjet.

Other features include a patented reversed chine hull for enhanced manoeuvrability and a dry ride, even when cornering at high speeds. The V-shaped laminated fibreglass hull has been reinforced for durability, and comes equipped with an engine guard rail for additional safety. An anti-skid boarding platform has been added to the bow. Additionally, the RIBs feature 1670 Dtex Hypalon Hyb Foam tubes: hybrid tube types comprising a combination of closed cell memory foam and air – thus "allowing redundancy and reducing the service requirement, in order to increase productivity and minimise downtime", ASIS Boats said. The tube is adorned with all-round reflective tape, for maximum visibility during night-time operations, and is protected by non-skid protective patches and a triple line of rubber fenders.

Additionally, each boat has a single-point lifting system, installed at the centre of gravity, which is connected to a safety release hook. This enables the operator to launch and recover the boats from a mothership. Each boat also has folding diving ladders with platforms, fixed to the stainless steel radar arch on the aft. The arch area can store searchlights and the radar dome, as well as a self-righting airbag. The boat also features a self-righting system.

Six straddle seats are provided for offshore personnel, while the pilot uses a leaning post with foot grab straps. During their sea trials, the three RIBs achieved a speed of approximately 31mph, or just under 27knots, and they have been certified as Category B boats for offshore use, with the capacity to carry 15 passengers.

TECHNICAL PARTICULARS

Length, oa	7.84m
Breadth, moulded	2.55m
Breadth, inside	1.54m
Tube diameter	0.48m
Design, draught	0.5m
Design, deadweight	2.1tonnes
Lightweight	2.1tonnes
Deck space (total)	7.7m²
Deck capacity	0.1tonnes/m²
Service speed	27knots@4,000rpm
Propulsion	
Main engine(s):	
Number of engines	1
Make	OXE Diesel
Output of engine	112kW
Bridge electronics	
Radar(s)	Garmin GMR 18HD
GPS	Garmin GPSMAP 922xs
Chart plotter	Garmin VAW450S
Onboard capacities:	
Fuel oil	225litres
Complement:	
Number of crew	1-2
Number of passengers	6 seated (15 per CE certificate)
Number of cabins	0
Regulations complied with	Category B

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BLUE ROTTERDAM – Waterbus with a specially developed thruster, for low vibrations

Builder: ..... **Damen Shipyards Group**
Designer: ..... **Damen Shipyards Group**
Vessel's name: ..... ***Blue Rotterdam***
Owner/operator: ..... **Blue Amigo**
Country: ..... **The Netherlands**
Flag: ..... **The Netherlands**
Total number of sister ships already completed: **0**
Total number of sister ships still on order: **5**
Contract date: ..... **November 2020**
Delivery date: ..... **November 2022**

The composite Waterbus 2907 E3 Hybrid type *Blue Rotterdam* was delivered in late 2022 to Blue Amigo, which carries nearly 2 million passengers across the Netherlands' waterways each year. The vessel was designed to be extremely efficient in terms of weight, hull design and systems, and features a hybrid-electric arrangement for peak shaving, Damen explains.

Other considerations were that *Blue Rotterdam* should be highly manoeuvrable and provide efficient boarding and disembarking. The vessel can carry up to 75 passengers (including two wheelchair spots) and boasts sufficient deck space for up to 65 bicycles.

Sustainability was a consideration throughout the design and construction phases, Damen says. Consequently, the interior incorporates recycled materials, as well as wool and wood. For the passengers' benefit, the boat offers WiFi connectivity throughout and carries two 'infotainment' displays, measuring 65" and 50". *Blue Rotterdam* is also equipped with six indoor and four outdoor speakers.

Working in collaboration with the Maritime Research Institute Netherlands (MARIN), Damen performed a parametric and hull optimisation study, to improve the performance on this low-wash catamaran so as to avoid disruption to other river users. For the Blue Amigo contract, Damen also worked alongside steerable propulsion expert Hydromaster to develop a new fully azimuthing, 360° thruster specifically for the vessels in this order.

The 375kW thruster has been described by Damen as "the kind you would expect to see on a pleasure craft…though more manoeuvrable and robust". MARIN worked with Hydromaster to develop the hydromechanics necessary to produce and fine-tune the thruster – a task that included providing detailed calculations to facilitate a CFD study, to strike a fine balance between efficiency and vibration.

Damen reports: "Using its extensive experience, and conducting a thorough assessment of [*Blue Rotterdam*'s] hull design, MARIN was able to come up with the solution – a propeller of 840mm diameter with a clearance of 23% diameter from the hull: reducing vibration to a minimum and allowing for increased efficiency." The thruster is controlled by a single joystick controller, developed in-house by Damen, which is intended to make it as intuitive to use as possible, taking pressure off the crew. This set-up will also be included on the forthcoming Blue Amigo waterbuses.

TECHNICAL PARTICULARS

Length, oa 29.6m
Length, moulded 28.65m
Breadth, oa 7.9m
Breadth, moulded 7.5m
Depth, moulded 2.6m
Design, draught 1.5m
Max speed 21.6knots

Propulsion
Main engines (electric):
Number of engines 2
Make ..... Permanent Magnet
Output of each engine 375kW

Hybrid system
Battery system ..... 2 x 83kWh Toshiba LTO
Generator ..... 1 x 522kW Scania DC16 Stage V
Main power network ..... 2 x DC-bus 750 VDC

Propeller(s):
Number of propellers 2
Make ..... Hydromaster
Model ..... D-series
Material ..... NiAlBr
Number of blades 5
Fixed/controllable pitch ..... Fixed
Open/nozzled ..... Open

Deck machinery/equipment:
- Electrical bike charging point

Bridge electronics:
Radar ..... JRC JMA-610
GPS ..... JRC NWZ-4701
Engine monitoring system ..... Praxis
Other communication systems:
- Alphatron MFV-S echosounder
- Alphatron Alphascreen electronic charts + AIS
- Alphatron Alphacall MF intercom/ loudspeaker
- Alphatron CCTV system
- AMOS IR LED aft camera
- 2x Thrane & Thrane Sailor RT-6248 VHF
- 2x Thrane & Thrane Sailor RT-6201 VHF (handheld)

Onboard capacities:
Fuel oil 2,000litres
Fresh water 150litres
Sewage 150litres
Urea 200litres

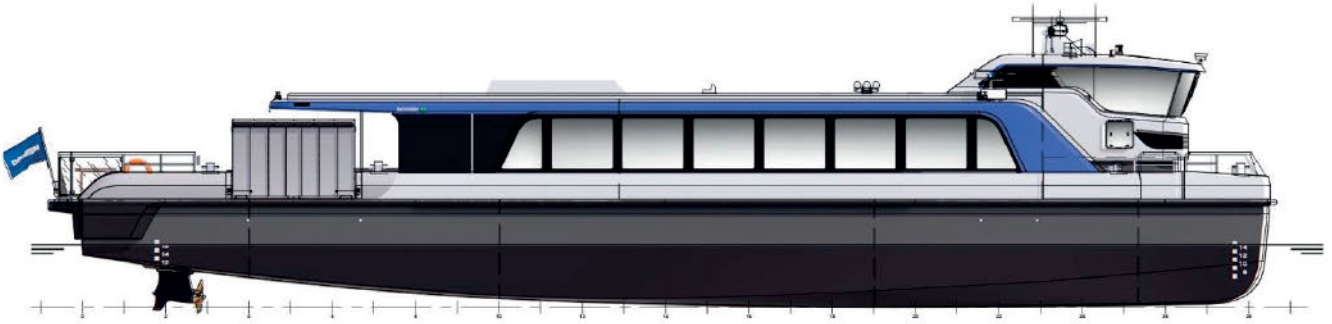
Complement:
Number of crew 2
Number of passengers 75
Number of cabins 0

Vehicles
Number of bicycles ..... >65

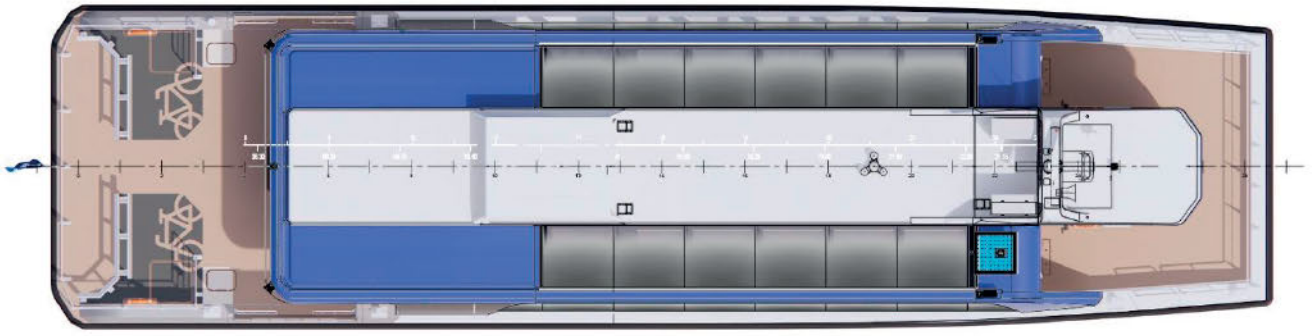
Classification
Classification society ..... Bureau Veritas
Notations ..... ES-TRIN Zone 3

Other important international regulations complied with:
- Inland navigation vessel certificate

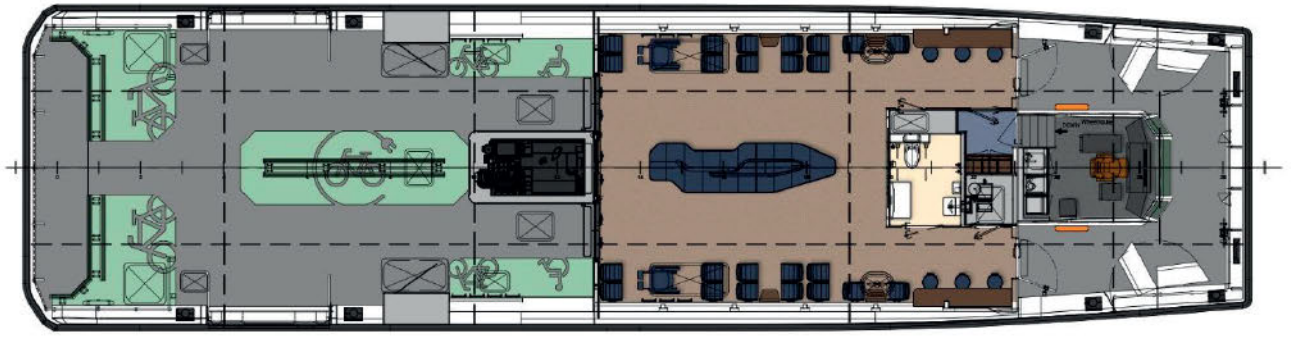
BLUE ROTTERDAM



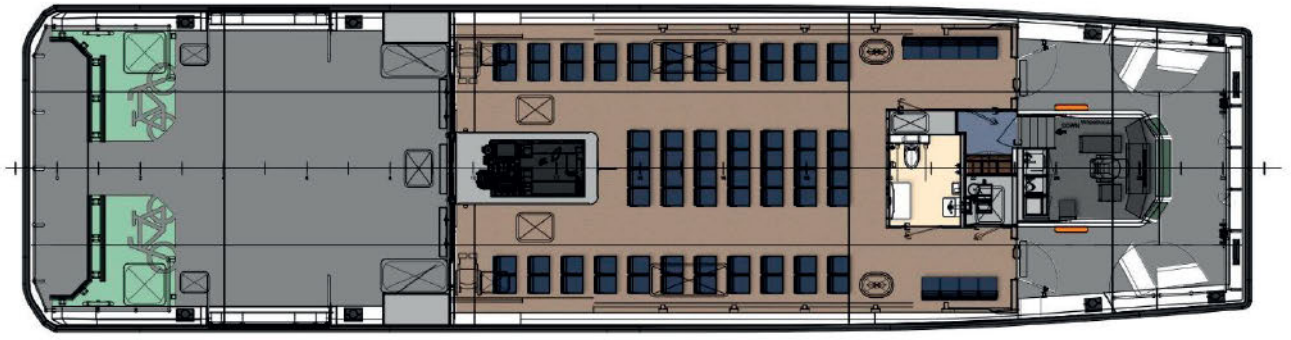
Profile



Top deck



Main deck



Main deck

CHAI JINDA – Monohull patrol boat developed for the Royal Thai Police

Builder: ..... **Seacrest Marine**
Designer: ..... **Incat Crowther**
Vessel's name: ..... ***Chai Jinda***
Owner/operator: ..... **Royal Thai Police**
Country: ..... **Thailand**
Flag: ..... **Thailand**
Total number of sister ships already completed: **1**
Total number of sister ships still on order: **0**
Contract date: ..... **June 2020**
Delivery date: ..... **January 2022**

Built domestically by Thai Ban-based shipyard Seacrest Marine, the monohull patrol boat *Chai Jinda* was developed specifically to meet the operational requirements of the Royal Thai Police, and most notably for missions related to patrol, rescue and law enforcement. The vessel is reportedly the eighth that Seacrest has built using an Incat Crowther design.

The 42m-long vessel's main deck features a full walkaround design, and houses facilities including the crew and officer messes, the galley and stores, a laundry area and the captain's cabin, in addition to the vessel's arms stores. The aft deck features a deck crane and a fast rescue vessel for at-sea boarding activities.

The deck crane, which was supplied by UK manufacturer Fassi, is rated for a SWL of 360kg at an outreach of 6.8m, or 2,000kg (2tonnes) max at an outreach of 1.5m. The foredeck also features the foundations for a remotely operated, 30mm gun, enabling onboard operatives to take offensive action when necessary.

The upper deck, meanwhile, houses the boat's radio room, in addition to a dedicated office. Deck-mounted armaments are positioned around the exterior decks. The boat also carries an engine-driven firefighting monitor, supplied by Jason Engineering, which has a capacity of 600m³ per hour and a throw rate of 100m.

Developed with lengthy missions in mind, *Chai Jinda* has an autonomy of 14 days and an operational range of more than 1,000nm. The vessel is powered by three MTU 16V2000 M86 main engines, each of which delivers 1,630 kW at 2,450rpm. These engines drive fixed-pitch propellers via ZF 3060 gearboxes, providing the vessel with an estimated enforcement speed of 35knots and a long-range patrol speed of 20knots.

Incat Crowther adds: "The propellers are housed in [our] highly efficient prop tunnels, reducing the vessel's draught." The tunnels were developed and modelled using the company's in-house computational fluid dynamics (CFD) software.

TECHNICAL PARTICULARS

Length, oa 42m
Breadth, moulded 7.9m
Depth, moulded 4.3m
Displacement 170tonnes
Design, draught 1.9m
Service speed 20knots
Max speed 35knots
Range 1,200nm

Propulsion
Main engine(s):
Number of engines 3
Make ..... MTU
Model ..... MTU 16V2000 M86
Output of each engine .. 1,630kw@2,450rpm

Gearbox(es):
Number of gearboxes 3
Make ..... ZF
Model ..... ZF3060 / ZF3060A

Propeller(s):
Number of propellers 3
Diameter 1,194mm

Deck machinery/equipment
Crane(s):
Number of cranes 1
Make ..... Fassi
Model M30a.13
Capacities/SWL ..... 2tonnes max at 1.5m

Other deck machinery/equipment
- Jason 2000K.01 engine-driven fire pump (600m³/hr)

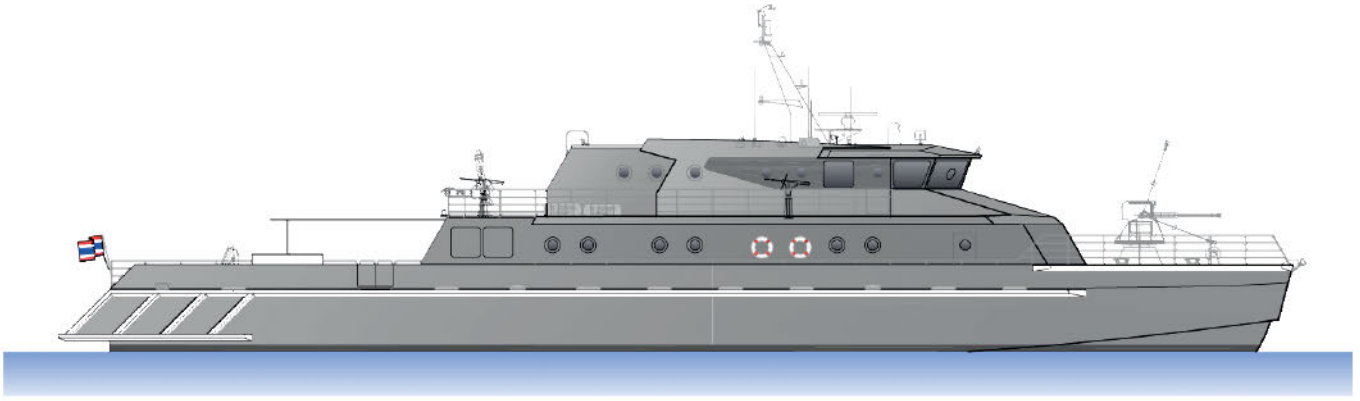
Bridge electronics:
Radar ..... 2 x Koden (ARPA) MDC-7925P
Depth sounder ..... Koden CVS-1410
AIS ..... AIS 900
Satellite finder ..... ONWA KP-1299

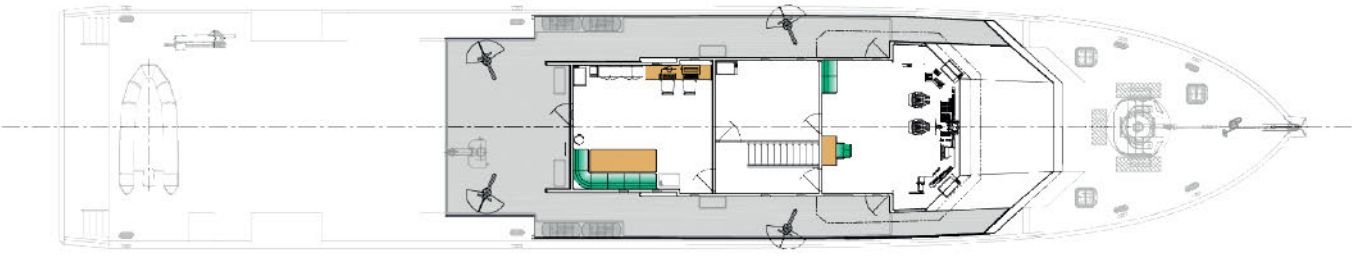
Onboard capacities:
Fuel oil 24,000litres
Fresh water 10,000litres
Grey water 1,000litres

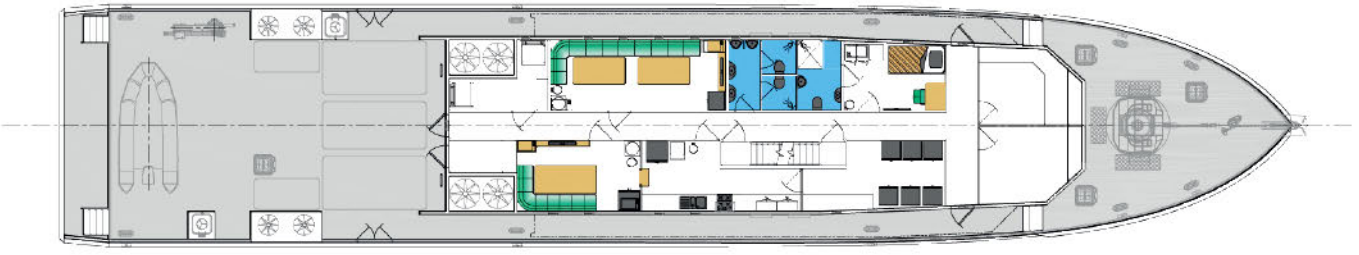
Complement:
Number of crew 5
Number of passengers 23
Number of cabins 0

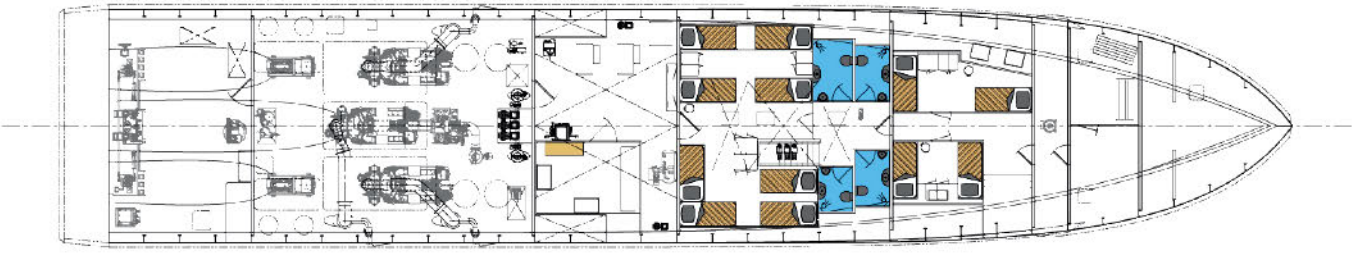
Classification
Classification society ..... Lloyd's Register
Notations ..... + 100A1, SSC, Patrol, G4

CHAI JINDA









EDDA BREEZE – Hydrogen-ready walk-to-work platform for wind farm support

Builder:	**Gondán Shipbuilders**
Designer:	**Salt Ship Design**
Vessel's name:	***Edda Breeze***
Owner/operator:	**Edda Wind AS**
Country:	**Norway**
Flag:	**Norway**
Total number of sister ships already completed:	**0**
Total number of sister ships still on order:	**8**
Contract date:	**January 2020**
Delivery date:	**May 2022**

May 2022 saw Norway's Edda Wind take delivery of its first commissioning service operation vessel (CSOV), the hydrogen-ready *Edda Breeze*. The operator, formed as a joint venture between Wilhelmsen Group and Østensjø Group, plans to introduce nine of these vessels to its fleet.

The first-in-class *Edda Breeze* has already commenced a 10-year contract with Ocean Breeze Energy at the 400MW Bard 1 offshore wind farm, which is located in the German North Sea. The CSOV was constructed by Spanish builder Gondán to a design supplied by Norwegian naval architect Salt Ship Design, and it will primarily operate as a walk-to-work platform and mothership for just under 100 offshore wind farm turbine technicians.

As such, the ship has been equipped with a 3D motion-compensated crane and a gangway, supplied by MacGregor, that extends to a maximum range of 28m. This gangway also incorporates an integrated elevator with the capacity for 26 personnel, which is intended to enable swift and efficient technician transfers between the ship and the turbines.

At present, *Edda Breeze* runs on a hybrid propulsive set-up, assisted by three Brunvoll side tunnel thrusters for manoeuvring, but the intention is that hydrogen may be added to the green energy mix in the future – possibly once the alt-fuel takes off in terms of popularity, availability and storage technology/techniques.

The CSOV's accommodation spaces include a galley, four offices, two conference rooms, a recreation room and a medical facility, while the cargo hold offers approximately 400m² of space.

TECHNICAL PARTICULARS

Length, oa 89.3m
Length, bp 88.3m
Breadth, moulded 19.7m
Depth, moulded ..... 6.2m (freeboard deck)
Gross tonnage 7,093tonnes
Displacement 6,650tonnes
Design, draught 5.4m
Design, deadweight 2,500tonnes
Deck space (total) 450m²
Deck capacity 250tonnes
Service speed 10.5knots
Range ..... 30 days operation

Propulsion
Main engine(s):
Number of engines 3
Make ..... Caterpillar
Model ..... CAT 3512E
Output of each engine 1,770kW

Propeller(s):
Number of propellers 2
Make ..... Voith
Model ..... eVSP 26x5/230
Diameter ..... 2,650mm (blade orbit diameter)
Blade length 2,300mm
Material ..... Drop-forged seawater resistant-steel
Number of blades 5
Speed 80-90rpm

Deck machinery
Crane(s):
Number of cranes:
- 1 x 3D motion compensated crane
- 1 x foldable telescopic knuckle crane
- 1 x provision handling crane

Make ..... MacGregor/Palfinger/Palfinger
Model ..... GPOK(3D) 900-20-33.5/ PK 33002 M/ PK 15500 M
Capacities/SWL ..... 5tonnes@33.5m/ 1tonne@12m/ 1tonne@10m

Winch(es):
Number of winches:
- 2 x anchor mooring winch
- 1 x mooring capstan

Make ..... DMT
Model ..... 2 x AMW-111-E50K3 1 x MC-H100KN
Capacities 120kN/100/50kN

Bridge electronics:
Radar(s) ..... Furuno FAR-3210/FAR2338S
Autopilot ..... Simrad AP-70 Mk2
GPS ..... Furuno DGPS GP-170
Gyro ..... SMS SR-01-02
Chart plotter ..... Furuno ECDIS FMD-3.200
Other communication systems ..... Furuno IMO FE-800 echosounder

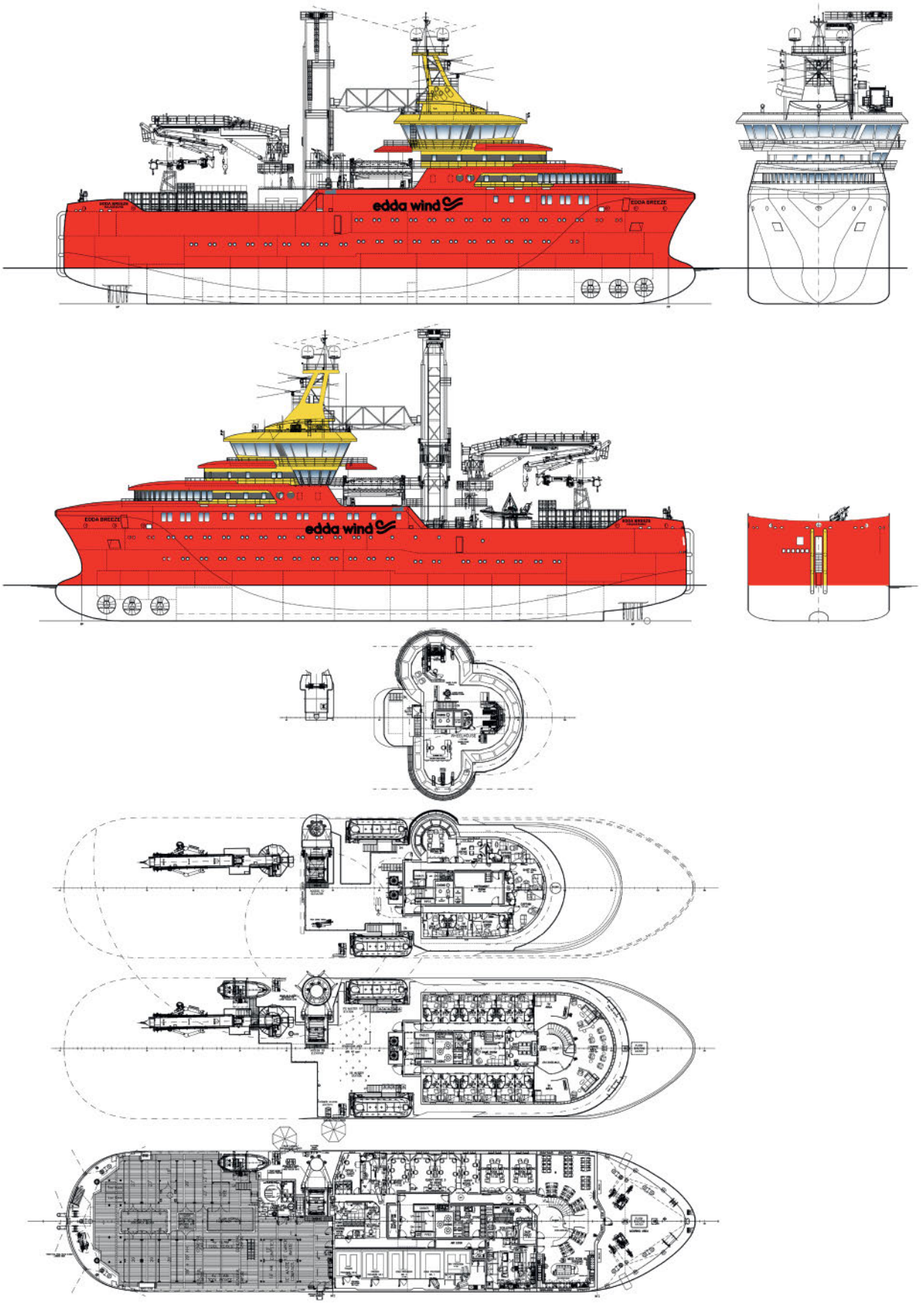
Onboard capacities:
Fuel oil ..... 1,000m³ (MGO) 1,250m³ (LOHC)
Fresh water 600m³

Complement:
Number of crew 23
Number of passengers 0
Number of cabins ..... accommodation for 97 technicians

Other significant or special items of equipment:
- MacGregor W2W crew transfer system: motion-compensated gangway (20-30m radius) + elevator (26 person-capacity);
- 3 x Brunvoll fixed-pitch tunnel thrusters, 1,300kW each

Classification
Classification society ..... DNV
Notations ..... ✠ 1A Offshore Service Vessel NAUT OSV (A)-ICS, EO, Clean Design, COMF(V3,C3), DYNPOS AUTR, SF, DK(+), SPS-2008, BWM-T, BIS, Battery Power, HELDSK-SH, Walk2Work

EDDA BREEZE



EKKO – Advanced survey vessel, devised for low noise and high data speeds

Builder:	**Tuco Yacht Værft**
Designer:	**Tuco Yacht Værft**
Vessel's name:	***Ekko***
Owner/operator:	**Kystdirektoratet (Danish Coastal Authority)**
Country:	**Denmark**
Flag:	**Denmark**
Total number of sister ships already completed:	**2**
Total number of sister ships still on order:	**0**
Contract date:	**May 2021**
Delivery date:	**June 2022**

As the current Danish Coastal Authority's 34-year-old survey vessel *Ekko* sailed into retirement last year, it was replaced by a new 15m vessel bearing the same name, built by Tuco Marine. The main function of the vessel is to monitor the movement of sandbanks and sailing routes up the side of the Danish west coast. "As this data is produced, dredging operations can be planned to ensure a stable coastline and safe entry to ports along the coastline," Tuco Marine explains.

Ekko's hull has been built in carbon composite with special reinforced sections, which allows the vessel to be beached several times a day during normal operations, and to maintain a smooth and stable ride during adverse conditions in the North Sea. Using Tuco's modular ProZero platform, the vessel has a resiliently mounted cabin for six crew members. There are three workstations, which include: the helmsman position; a small pantry; and a storage compartment. The bathroom is located in the aft technical cabin, alongside access to the multi-beam sonar equipment.

The roof of the technical room features a remote external helm station to make it easier to manoeuvre in port, and to assist man overboard (MOB) casualty recovery operations. For MOB situations, there is a dedicated telescopic crane plus emergency equipment to swiftly deal with such situations.

An electric crane is also located on the technical compartment's roof, for collecting water samples. The aft deck has an uncluttered design, to optimise the view over the stern while going astern through shallow water and sandbanks.

Ekko also features autopilot steering and the Applanix OceanMaster system, to provide accurate attitude, heading, heave, position and velocity data. This means that pre-planned survey routes can be loaded onto the autopilot system and the surveyors can focus on the task at hand. The vessel is equipped with 3G, 4G and 5G mobile internet, enabling fast access to data and the monitoring of onboard CCTV cameras from shore.

At 20knots the cabin registers a noise level of only 62.8dBA, while the boat's active interceptor tabs (supplied by Hydrotab) and active roll damping fuel tanks provide a stable ride. Interior comfort is further aided by a 16000BTU air conditioner and solar blinds for operations in the summer months, and a diesel heater and heated windows all round for the winter period.

TECHNICAL PARTICULARS

Length, oa	15m
Length, bp	14.04m
Breadth, moulded	3.86m
Depth, moulded	1.85m
Gross tonnage	10.6tonnes
Displacement	14.95tonnes
Design, draughtt	0.96m
Design, deadweight	14.99tonnes
Lightweight	11.79tonnes
Deck space (total)	22m^2
Deck capacity	2tonnes/m^2
Service speed (80 % MCR output)	20knots
Max speed	24knots
Range	400nm

Propulsion
Main engine(s):

Number of engines	2
Make	Scania
Model	DI13
Output of each engine	368kW

Gearbox(es):

Number of gearboxes	2
Make	TwinDisc
Model	MGX-5126 A
Output speed	1.2:1

Propeller(s):

Number of propellers	2
Make	CJR
Model	MKR Revolution
Material	Brass
Number of blades	5
Fixed/controllable pitch	Fixed
Open/nozzled	Open

Deck machinery:
Crane(s):

Number of cranes	1
Make	A-Frame with winch
Model	custom-built
Capacities/SWL	0.75tonnes

Other deck machinery/equipment:
- Water-sampling crane

Bridge electronics:

Radar(s)	Furuno
Autopilot	Furuno/EMRI FAP 3000
GMDSS	Furuno VHF
GPS	Furuno
Chart plotter	Furuno MaxSea Time Zero
Engine monitoring system	Scania ICAMS / Beijer
Fire detection system	Consilium

Onboard capacities:

Fuel oil	2 x 1,500litres
Fresh water	150litres
Sullage	120litres

Other capacities

AdBlue	250litres

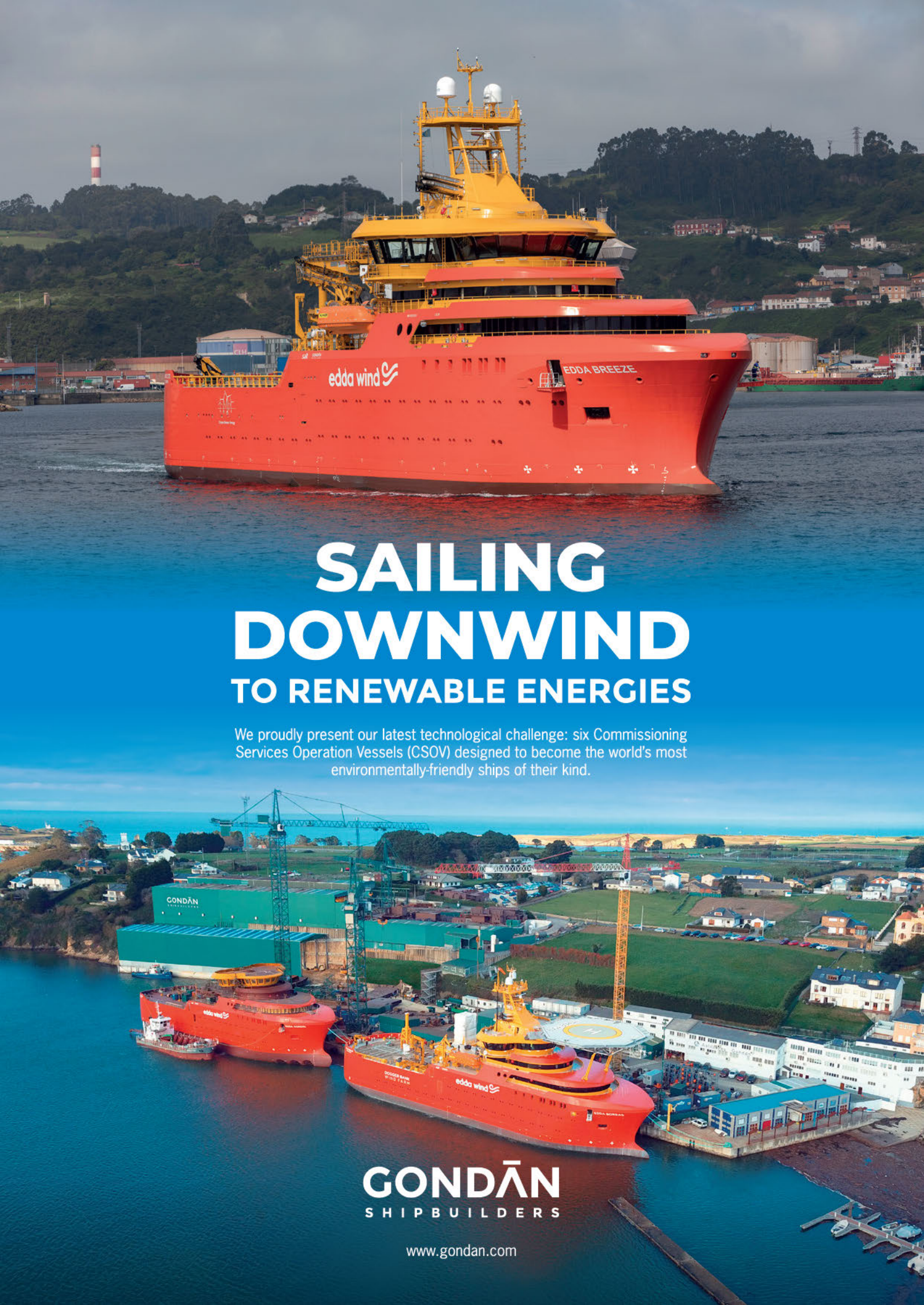
Complement:

Number of crew	6
Number of passengers	0
Number of cabins	1 x crew cabin 1 x technical room

Other significant or special items of equipment:
- SRV170 retractable bow thruster
- TeleDyne T50 Multibeam, double trimble GNSS with UHF RTK correction
- Applanix OceanMaster POS-MV, RTK including IMU
- 3 x workstations with displays for survey work

Classification

Classification society	Danish Maritime Authority
Notations	Meddelelser F


edda wind
EDDA BREEZE
SAILING
DOWNWIND
TO RENEWABLE ENERGIES
We proudly present our latest technological challenge: six Commissioning Services Operation Vessels (CSOV) designed to become the world's most environmentally-friendly ships of their kind.
GONDĀN
SHIPBUILDERS
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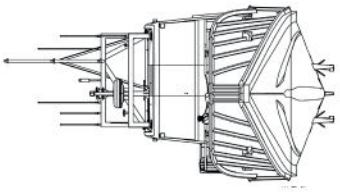
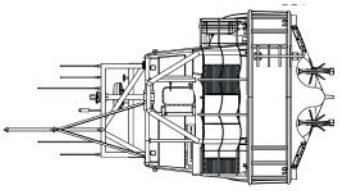
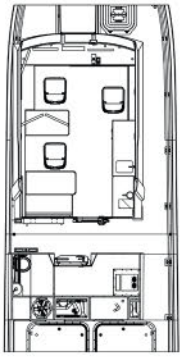
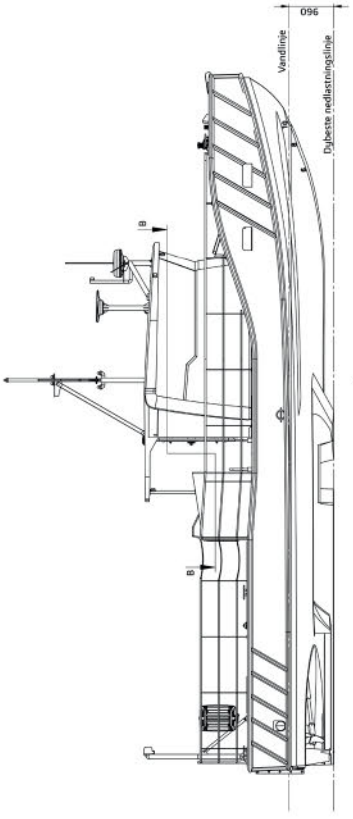
EKKO

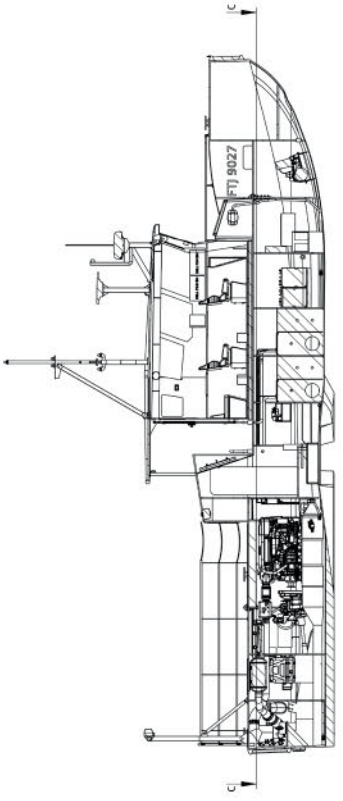


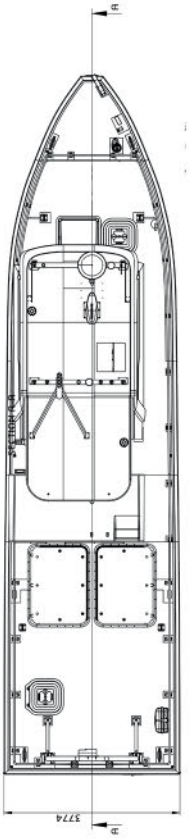


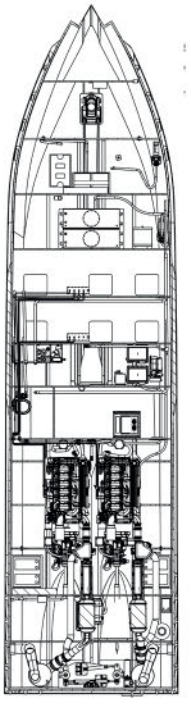


SECTION B-B









SECTION C-C

Powerful towage with zero emissions.

Pictured here:
RSD-E Tug 2513

Times are changing. Calls for sustainable shipping solutions are louder than ever. We aim to answer those calls, playing our part towards enabling maritime sustainability – so that you can play yours. That is why we have developed the fully electric RSD-E Tug 2513. With 70 tonnes BP, this tug builds on the clean and efficient foundation of Damen's Next Generation Tugs Series. It operates at zero emissions and requires just two hours of charging time. The RSD-E Tug 2513 combines decades of Damen know-how with cutting-edge innovation. A tug for the next generation.

Find out more on **Damen.com**

DAMEN
OCEANS OF POSSIBILITIES

HUNTER – Fully recyclable, multi-mission UK police boat

Builder:	**Ultimate Boats**
Designer:	**John Moxham**
Vessel's name:	***Hunter***
Owner/operator:	**Police Scotland**
Country:	**UK**
Flag:	**UK**
Total number of sister ships already completed:	**1**
Total number of sister ships still on order:	**.0**
Contract date:	**Unspecified**
Delivery date:	**June 2022**

In June 2022, ExoTechnologies launched the world's first fully recyclable, high-performance workboat for Police Scotland. The 11m vessel, christened *Hunter*, was built at the Ultimate Boats yard in Glasgow (which is owned by ExoTechnologies) from fully recyclable DANU composite material technology.

Hunter, which is in Ultimate Boats' multi-mission M-Class series, has a top speed of 50knots and operating range of 400 nautical miles. Speaking after the vessel's launch last year, ExoTechnologies owner Shane Mugan commented: "Police Scotland's boat marks a significant breakthrough in transforming boatbuilding as our DANU composite material technology of superior mechanical strength has replaced fibreglass entirely, currently the most common form of boat building substance.

"DANU has the potential to tackle the ecological timebomb which sees 250 million kg of fibreglass and thousands of boats dumped into landfill across Europe each year."

DANU is described as a bio-composite comprising styrene-free resin and sustainable fibres. The composite uses the same infusion production method as GRP and carbon fibre, but is stronger and lighter than GRP, and less brittle than carbon fibre, Ultimate Boats says.

Providing an example of DANU's comparative lightness, the company estimates that a 7.5m RIB prototype that weighed 380kg when built with GRP would weigh just 250kg when built with DANU.

Hunter will add to the current fleet capacity within Police Scotland's Dive and Marine Unit, and will be deployed across Scotland nationally, to assist local police divisions in missions such as counter-terrorism, body and property recovery, searches for missing persons, underwater photography, flood assistance and general marine policing duties.

The vessel also features ExoTechnologies' ExoHull technology, developed by internationally renowned chief designer John Moxham, which promises intuitive handling, seakeeping capabilities, directional stability and enhanced onboard comfort.

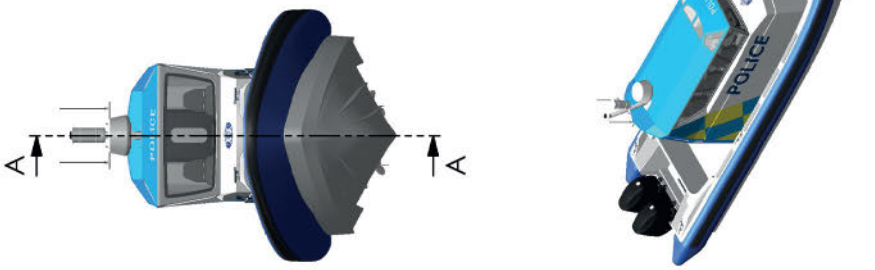
ExoHull is designed to generate hydraulic lift by modifying and manipulating the waterflow beneath the boat and across the propellers, for enhanced hydrodynamic performance, seakeeping, manoeuvrability and directional stability. Ultimate Boats adds: "It also introduces a major practical advantage by enabling the helm to easily maintain a constant visual on the horizon through its linear transition onto the plane, derived by mitigating stern squat and associated bow lift."

Other features include a fully covered seating area, for improved staff welfare and weather protection, as well as Raymarine's radar technology, which will make the boat more effective when it is searching for missing persons.

ExoTechnologies is now confident that DANU could gain popularity as a material for boatbuilders looking to produce vessels that have minimal impact on the environment.

TECHNICAL PARTICULARS

Length, oa	11m
Breadth, moulded	3.1m
Gross tonnage	4.5tonnes
Design, draught	0.6m
Deck space (total)	13m^2
Max speed	50knots
Range	400nm
Propulsion	
Main engine(s):	
Number of engines	2
Make	Suzuki
Model	DF325 outboards
Output of each engine	485kW
Bridge electronics:	
Radar(s)	Raymarine Quantum 2
GPS	2x Raymarine Axiom Pro 12"
Chart Plotter	2x Raymarine Axiom Pro 12"
Onboard capacities:	
Fuel oil	1,000litres
Complement	
Number of crew	12
Number of passengers	0
Number of cabins	0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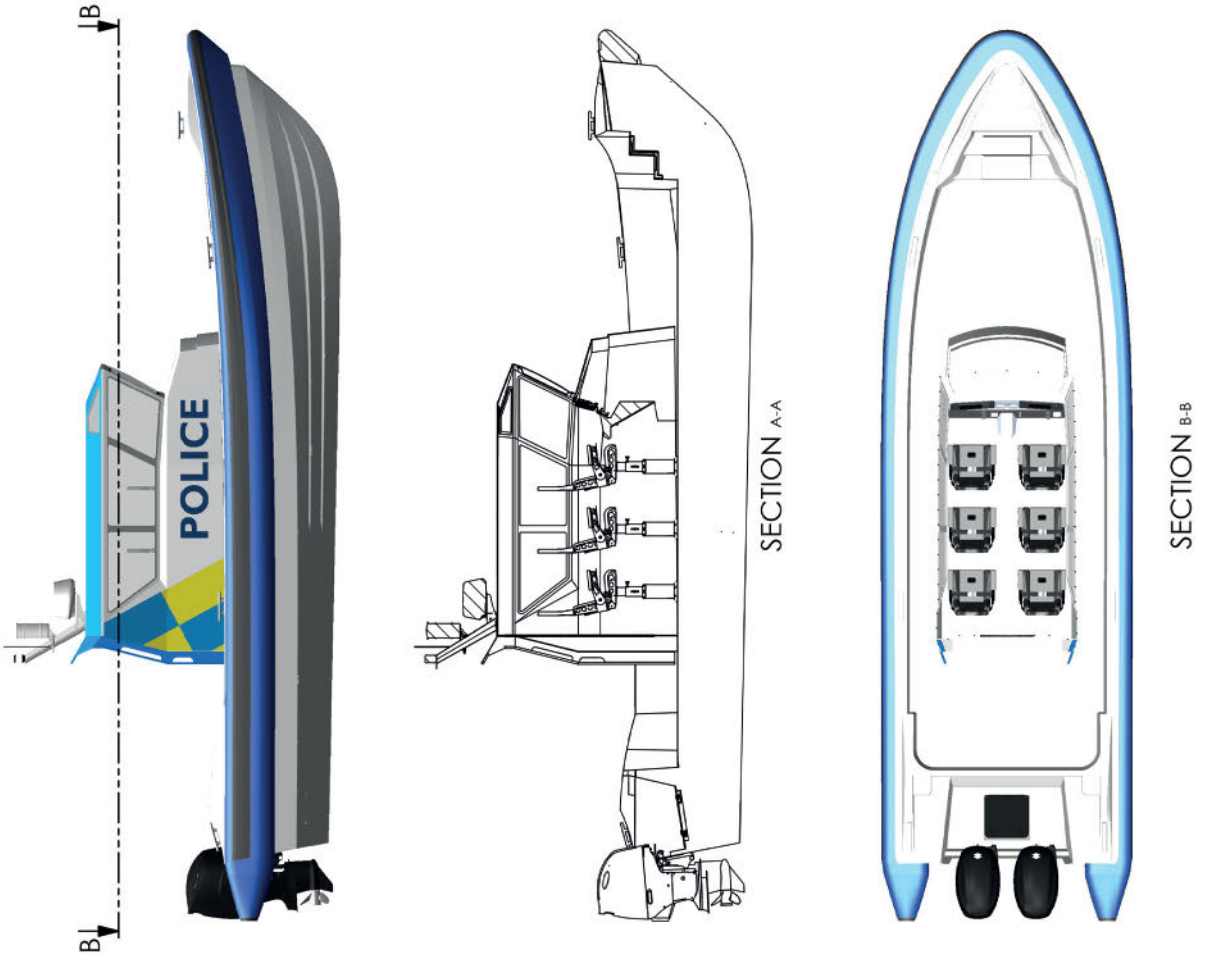

B
B
POLICE
SECTION A-A
SECTION B-B

IKAL – First superyacht in Sunseeker's "new era in flybridge design"

Builder: ..... **Sunseeker International**
Designer: ..... **Sunseeker International**
Vessel's name: ..... ***Ikal***
Owner/operator: ..... **TBC**
Country: ..... **N/A**
Flag: ..... **N/A**
Total number of sister ships already completed: **2**
Total number of sister ships still on order: **11**
Contract date: ..... **Not specified**
Delivery date: ..... **June 2022**

The first-in class 100 Yacht, *Ikal*, which was produced in 2022 by British yard Sunseeker with a price tag of around £8.3 million (US$10 million), has been described by the builder as "marking the start of a new era in flybridge design and functionality".

One of this new class' most outstanding entertainment areas is its sweeping flybridge, which offers complete, obstruction-free walkaround access from the unusually tall bow to the stern. Sunseeker says: "Its vast space is cleverly zoned to offer seamless options". For instance, the foredeck has two separate seating arrangements with cinema screen capability, while the central flybridge has L-shaped seating, a fully equipped wet bar and space aft for free-standing furniture and an optional Jacuzzi. A hydraulic bathing platform has been incorporated into the aft.

The aft tender garage can be converted into a "large and luxurious" beach club, with features including built-in BBQ and a rain shower. This garage can be flooded electronically and has the capacity to accommodate a Williams 460 Sportjet, a GTX255 jet ski and Seabobs.

The 100 Yacht's 7m moulded beam adds significant interior volume to the vessel, with the aim of making it feel much larger than a typical 30m yacht. Sunseeker adds: "The full-beam master suite, situated forward on the main deck, benefits from floor-to-ceiling windows port and starboard, as well as a glass atrium door forward that leads to a private owner's bow terrace" – all features that permit an influx of natural light.

Reflecting its enormous strength and design capability, the 100 Yacht has been awarded CE Category A/Ocean status. The vessel is powered by either MTU 12V 2000 M96X or MTU 16V 2000 M96L engines, and can achieve speeds of up to 30knots. Meanwhile, a considerable fuel tank capacity grants *Ikal* and the other vessel in this class a range of 1,300nm at a cruising speed of 12knots.

TECHNICAL PARTICULARS

Length, oa 29.85m
Length, bp 22.9m
Breadth, moulded 7m
Depth, moulded 3.5m
Gross tonnage 187tonnes
Displacement 105.7tonnes
Design, draught 1.38m
Design, deadweight 16.5tonnes
Lightweight 89.23tonnes
Service speed 19.5knots
Max speed 30knots
Range 1,300nm

Propulsion
Main engine(s):
Number of engines 2
Make ..... MTU
Model ..... 12V 2000 M96X Shaft (2 x 2000PS)
Output of each engine 1,472kW

Gearbox(es):
Number of gearboxes 2
Make ..... ZF
Model ..... 3050 V
Output speed 2.75:1

Propeller(s):
Number of propellers 2
Make ..... Rolla
Diameter 1.12m
Material ..... NiAlBr
Number of blades 5
Speed 891rpm
Fixed/controllable pitch ..... Fixed
Open/nozzled ..... Open

Deck machinery:
Winch(es): .....
Number of winches 2
Make ..... Lewmar
Model ..... V8 GD 24V
Capacities 2.27tonnes

Bridge electronics:
Radar(s) ..... Simrad
Autopilot ..... Simrad
GMDSS ..... Simrad
GPS ..... Simrad
Chart plotter ..... Simrad
Engine monitoring system ..... MTU
Fire detection system ..... Seafire

Onboard capacities:
Fuel oil 12,800litres
Fresh water 1,800litres
Sullage 1,125litres
Black water 1,125litres

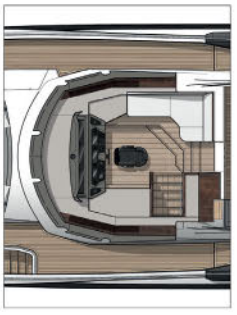
Complement:
Number of crew 5
Number of passengers 10-12
Number of cabins 5

Classification
Classification society ..... CE Category A
Notations ..... CE HULL, • MACH, Y Unrestricted (Optional RINA)

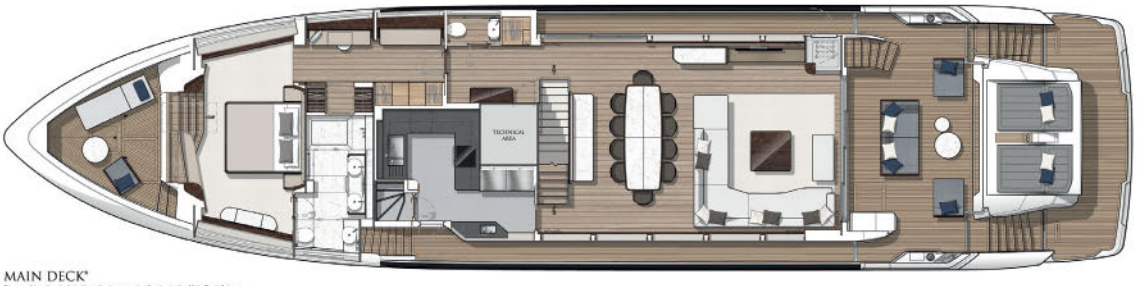
Other important international regulations complied with:
- RINA Module F

PROFILE*

FLYBRIDGE*
Shown with optional helm, upgraded wetbar with raised glass shelf & 3 x bar stools, sea-tub & sunpad arrangement, & optional forepeak furniture



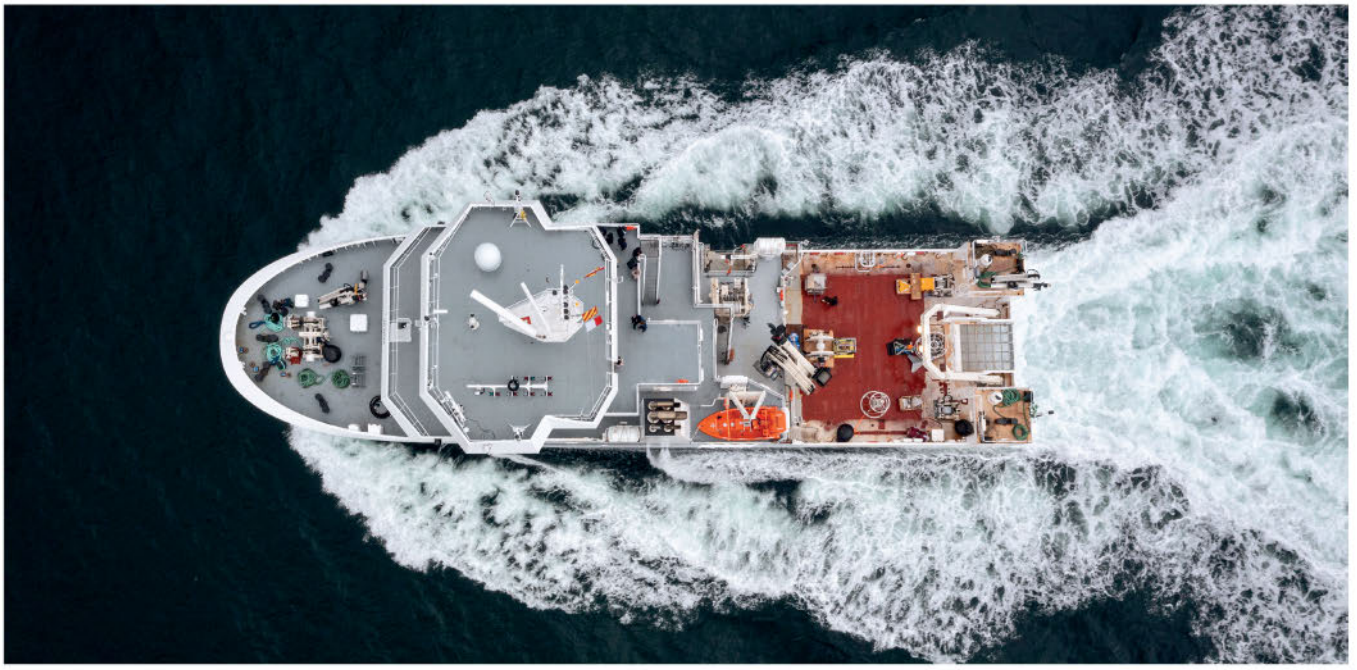
WHEELHOUSE*



MAIN DECK*
Shown with optional stbd side patio door, wooden flooring in the Main Deck Saloon, Dining, Lobby & Master Stateroom entrance, aft cockpit X-Tend system with loose furniture arrangement, & optional forepeak furniture

LOWER DECK*
Shown with optional sliding beds in Port & Stbd Twin Guest Cabins

JAYWUN – State-of-the-art oceanographic research vessel for the Gulf region



Builder:	**Freire Shipyard**
Designer:	**Freire Shipyard**
Vessel's name:	***Jaywun***
Owner/operator:	**Environment Agency-Abu Dhabi**
Country:	**UAE**
Flag:	**UAE**
Total number of sister ships already completed:	**0**
Total number of sister ships still on order:	**0**
Contract date:	**January 2021**
Delivery date:	**December 2022**

The oceanographic research vessel *Jaywun*, delivered to the Environment Agency – Abu Dhabi (EAD), was conceived specifically for maritime conditions within the Gulf region, characterised by shallow depth and high salinity. Before the ship began its journey to Abu Dhabi, preliminary sea trials were carried out off the Spanish coast to check its state of readiness. On its maiden voyage, *Jaywun* traversed three continents – Europe, Africa, and Asia – covering eight regional seas and a distance of more than 10,000km.

Lauded as one of the Middle East's most advanced research vessels to date, *Jaywun* will be central to the EAD's 'Ocean World Discovery' project, which aims to study the effects of climate change and to monitor marine biodiversity in the UAE. *Jaywun* will also support other environmental initiatives, such as the Ocean Fisheries Blue Carbon Assessment Project – the region's first blue carbon assessment study of ocean fisheries.

Sustainability remained an important consideration throughout the project. Freire Shipyard explains: "*Jaywun*'s hull lines and bow design were optimised from a hydrodynamic perspective to achieve outstanding operational performance and efficiency levels. Thanks to its low resistance, several tasks can be done under pure electrical propulsion using power take in [PTI] units run by one single generator, significantly reducing fuel oil consumption."

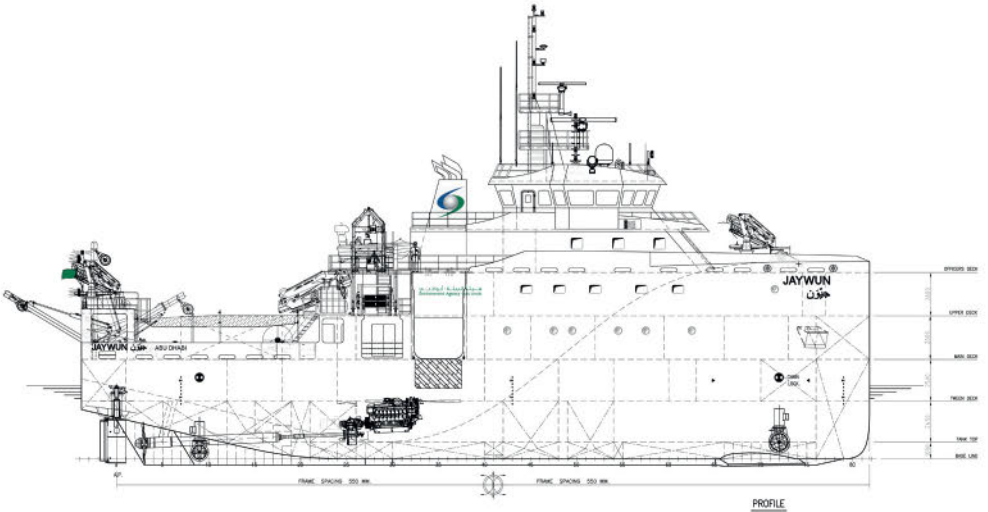
Jaywun is designed to enable multi-purpose activities for hydrographic, oceanographic, fisheries-related and seismic research-based campaigns, from very shallow waters to mid-range depths (eg, 2,000m). The vessel's twin shaft lines, each driven by an 1,840kW propulsion engine and complemented by a 200kW electric motor (PTI) – together with the hydrodynamically designed hull – grant *Jaywun* 100% electric-mode navigation at low speeds, with lower fuel consumption and fewer emissions. This also results in high onboard comfort and low noise levels for personnel. *Jaywun* is also fitted with equipment for water-cooling the propeller shaft (which avoids the use of oil, preventing any leakage).

Jaywun can accommodate up to 29 people, including 11 scientists, and hosts six laboratories and a remotely operated underwater vehicle. The vessel is fitted with several winches and gantries, as well as echosounders for scientific purposes, such as two multi-beam probes or one for fisheries monitoring.

TECHNICAL PARTICULARS

Length, oa	47.1m
Length, bp	45m
Breadth, moulded	12m
Depth, moulded	5.95m
Gross tonnage	1,250tonnes
Displacement	1,636tonnes
Design, draught	4.2m
Design, deadweight	4.4m
Lightweight	1,194tonnes
Deck space (total)	168m²
Deck capacity	5tonnes/m²
Service speed	13knots@85% MCR
Max speed	14.85knots
Range	6,000nm
Propulsion	
Main engine(s):	
Number of engines	2
Make	MTU
Model	16V4000M53
Output of each engine	1,840kW@ 1,800 rpm
Gearbox(es):	
Number of gearboxes	2
Make	ZF
Output speed	254rpm
Propeller(s):	
Number of propellers	2
Make	Kongsberg
Diameter	2,500mm
Material	NiAlBr
Number of blades	5
Speed	255rpm
Open/nozzled	Open
Deck machinery:	
Crane(s):	
Number of cranes	3
Make	Industrias Guerra
Model	M1000.24A2 / M180.20A4 / M180.20A4
Capacities/SWL	8tonnes@11m/ 1tonne@12m/ 1tonne@12m
Winch(es):	
Number of winches	5
Make	Ibercisa
Model	MAI-H/30/500-12 (x2)/ TR-H/12/1 / MO-H/30/2000-8.18/ MO-H/2x50/2000-11
Capacities:	
- 500m steel wire/	
- 2,000m steel wire/	
- 2,000m coaxial/	
- 2,000m coaxial	
Bridge electronics:	
Radar(s)	JRC
Autopilot	Simrad AP70
GMDSS	Sailor A3
GPS	Procom GPS 4
Gyro	Sperry NAVIGAT 200
Chart plotter	ECDIS K-Bridge
Engine monitoring system	Sedni Diamar
Fire detection system	Microdata MD9800
Onboard capacities:	
Fuel oil	340m³
Fresh water	69m³
Sullage	7m³
Ballast water	116m³
Other capacities	25m³
Complement:	
Number of crew	18
Number of passengers	11
Number of cabins	16
Classification	
Classification society	Lloyd´s Register
Notations	+ 100A1, UMS, DP(AM), CAC (3), BWTS + LMC

Other important international regulations complied with:
- Suez Canal regulations



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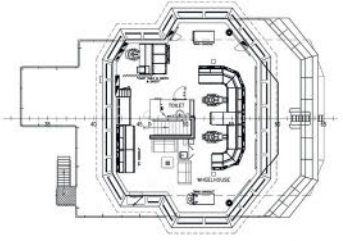
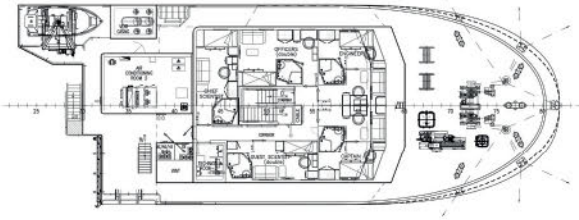
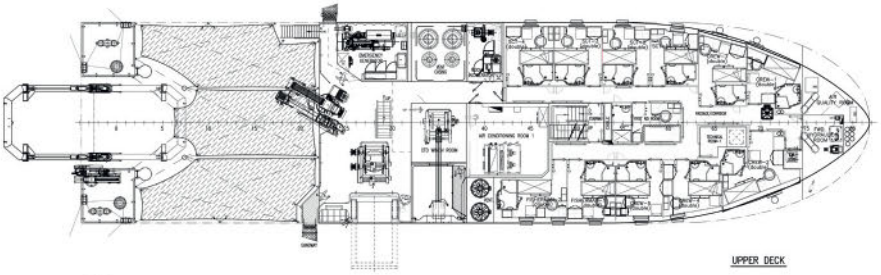


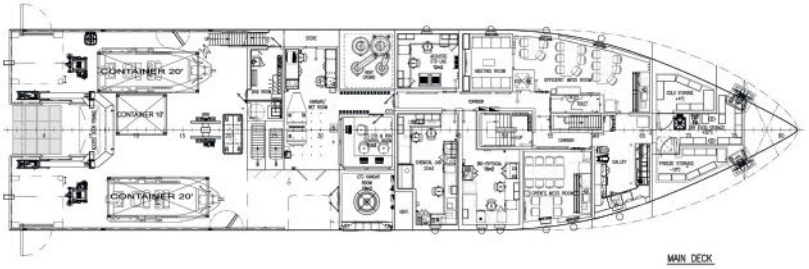
BRIDGE DECK



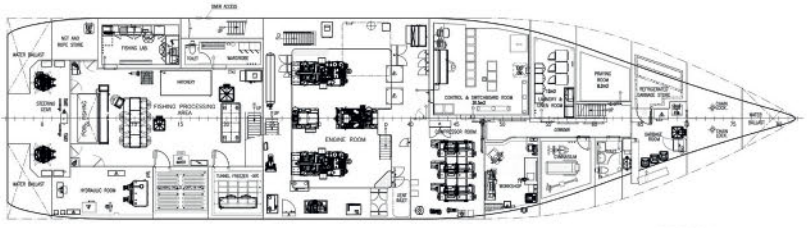
OFFICERS DECK



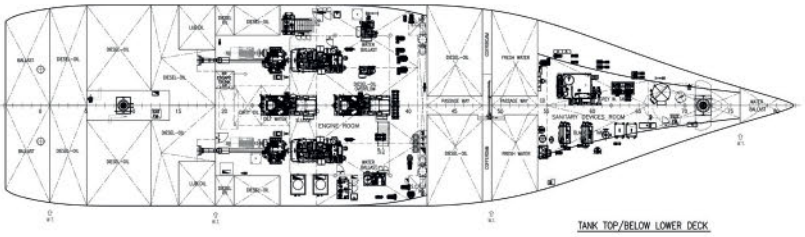
UPPER DECK



MAIN DECK



TWEEN DECK



TANK TOP/BELOW LOWER DECK

KARYA PACIFIC 2232 – First example of new steel TRAder 2700 tug class

Builder: ..... **PT. Karya Teknik Utama (KTU)**
Designer: ..... **Robert Allan Ltd.**
Vessel's name: ..... ***Karya Pacific 2232***
Owner/operator: ..... **PT. Karya Pacific Shipping**
Country: ..... **Indonesia**
Flag: ..... **Indonesia**
Total number of sister ships already completed: **0**
Total number of sister ships still on order: **3**
Contract date: ..... **December 2019**
Delivery date: ..... **October 2022**

Karya Pacific 2232 is a 27m, twin-screw tug completed by PT. Karya Teknik Utama (KTU) in Indonesia. The vessel is the first of the new TRAder 2700 class of steel tug designed especially for PT. Karya Teknik Utama by Canadian naval architect Robert Allan Ltd (RAL).

Propulsion is comprised of conventional shaft/fixed-pitch propellers, with two options available: either with or without nozzles. There are also two options when it comes to the crew accommodation: standard or MLC-compliant. RAL explains: "This was done to allow the shipyard the flexibility to offer a vessel that can be suitable for as many services as possible, including in jurisdictions requiring MLC compliance."

Karya Pacific 2232 is fitted with open screws and with standard accommodation. Three more sisters are under construction: one with open screws, and two with nozzles.

The tug is designed for towing barges in the Indonesian archipelago, where depth of water is sometimes limited. It is also fitted with a folding mast, to reduce air draught and permit access to additional ports. Towing operations are conducted via a tow hook mounted behind the wheelhouse.

RAL adds: "The bulwark is open-stern type, to reduce towline wear. The hull is single chine with fine entry and long run for efficient barge towing."

The bollard pull (bp) depends on whether nozzles are fitted to the propellers: RAL estimates that the tug can achieve a bp of 29tonnes with the nozzles, and 23tonnes without. The aft tow bitt and its foundation have been designed to suit either type of propulsion, and a bow bitt is provided to assist with barge operations in port.

The vessel's main propulsion consists of twin Yanmar 6EY17w 6-cylinder inline diesel engines, rated 837kW at 1,450rpm, and each driving a Yanmar reverse reduction gear. The 165mm, stainless steel shafts turn 2,000mm-diameter, four-bladed open propellers. RAL says: "Although the engines and gears are hard-mounted, the tug is surprisingly smooth and quiet."

TECHNICAL PARTICULARS

Length, oa 27.1m
Breadth, moulded 8.8m
Depth, moulded 4m
Gross tonnage 245tonnes
Displacement 401.89tonnes
Design, draught 3m
Lightweight 267tonnes
Max speed 12.3knots
Bollard pull 23.3tonnes

Propulsion
Main engine(s):
Number of engines 2
Make ..... Yanmar
Model 6EY17w 6-cylinder
Output of each engine 837kW

Gearbox(es):
Number of gearboxes 2
Make ..... Yanmar
Model YXH-500L
Output speed ..... 4.96:1 reverse reduction gear

Propeller(s):
Number of propellers 2
Diameter 2,000mm
Material ..... Manganese-bronze
Number of blades 4
Fixed/controllable pitch ..... Fixed
Open/nozzled ..... Open

Onboard capacities:
Fuel oil 61m³
Fresh water 51m³
Sewage 11m³
Ballast water 51m³

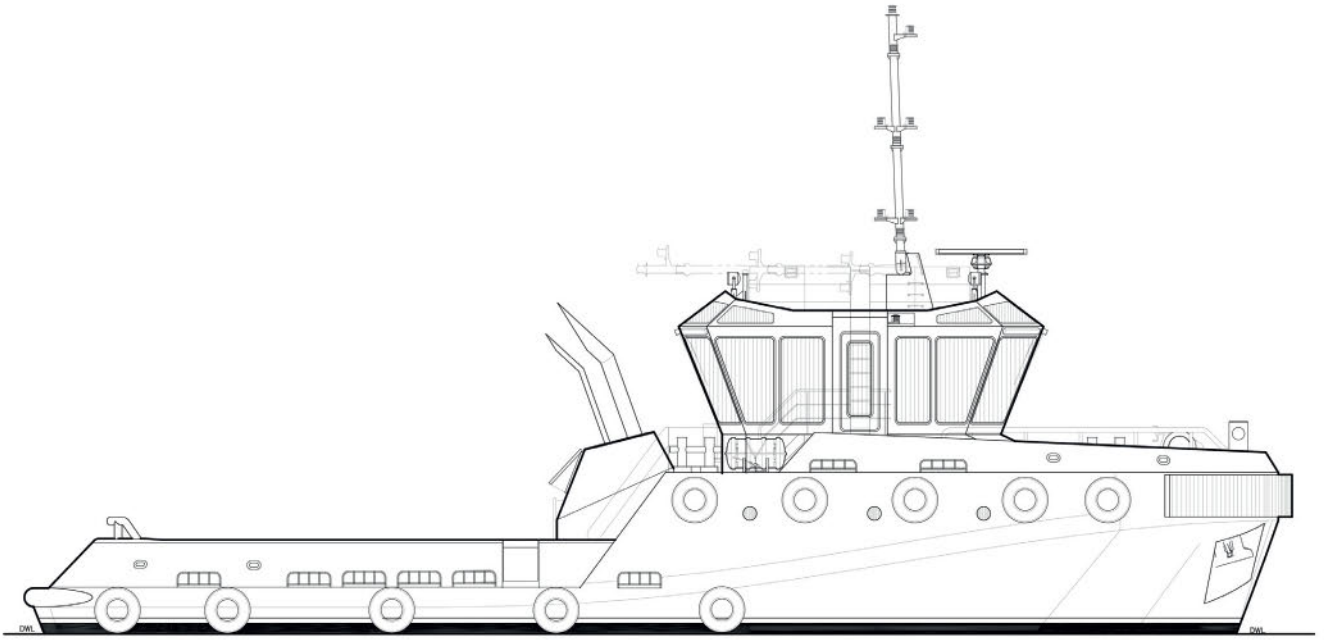
Complement:
Number of crew 12
Number of passengers 0
Number of cabins 0

Classification
Classification society ..... ABS

Notations ..... ✠ A1 Towing Vessel, Ⓔ, ✠ AMS, Unrestricted Navigation

Other important international regulations complied with ..... Built under Biro Klasifikasi Indonesia (BKI) survey

KARYA PACIFIC 2232



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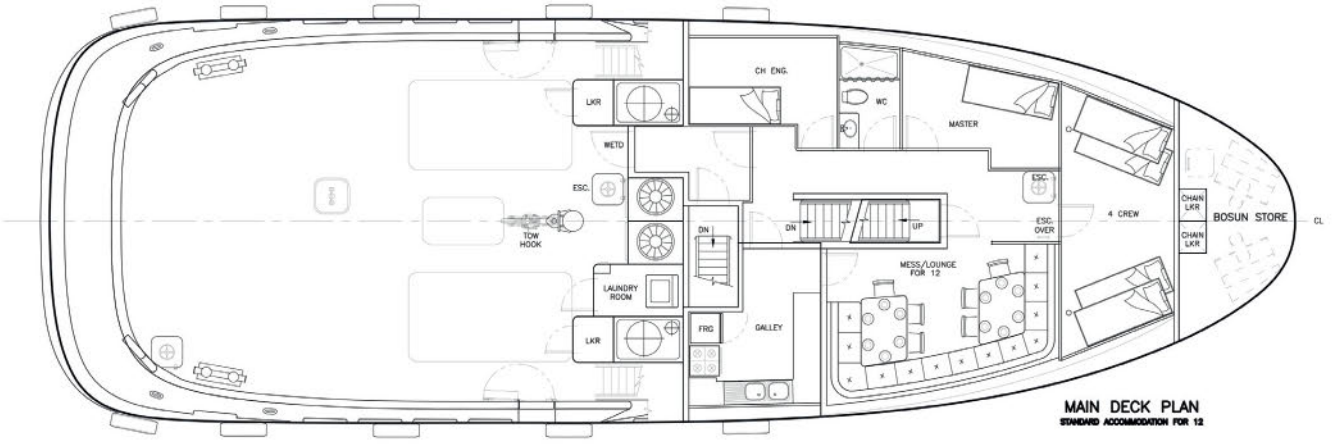
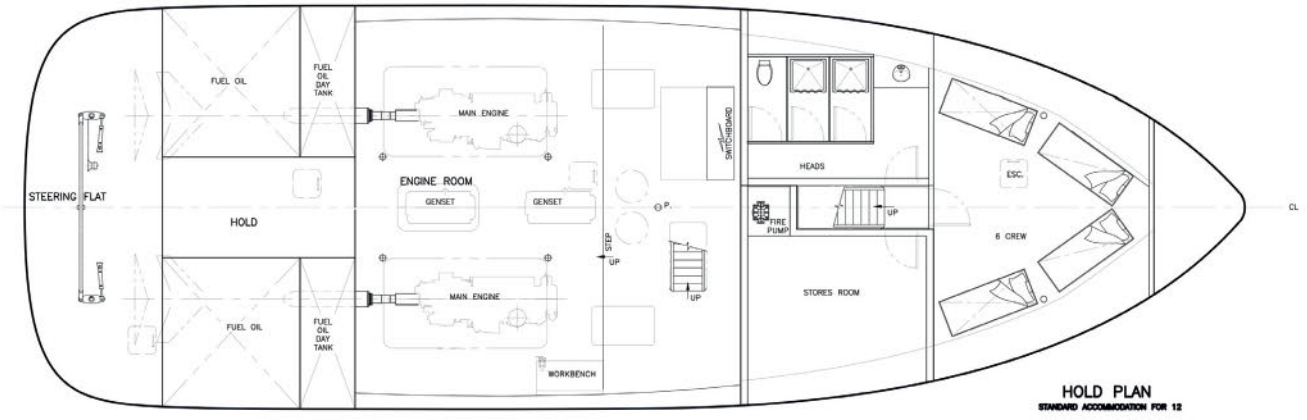
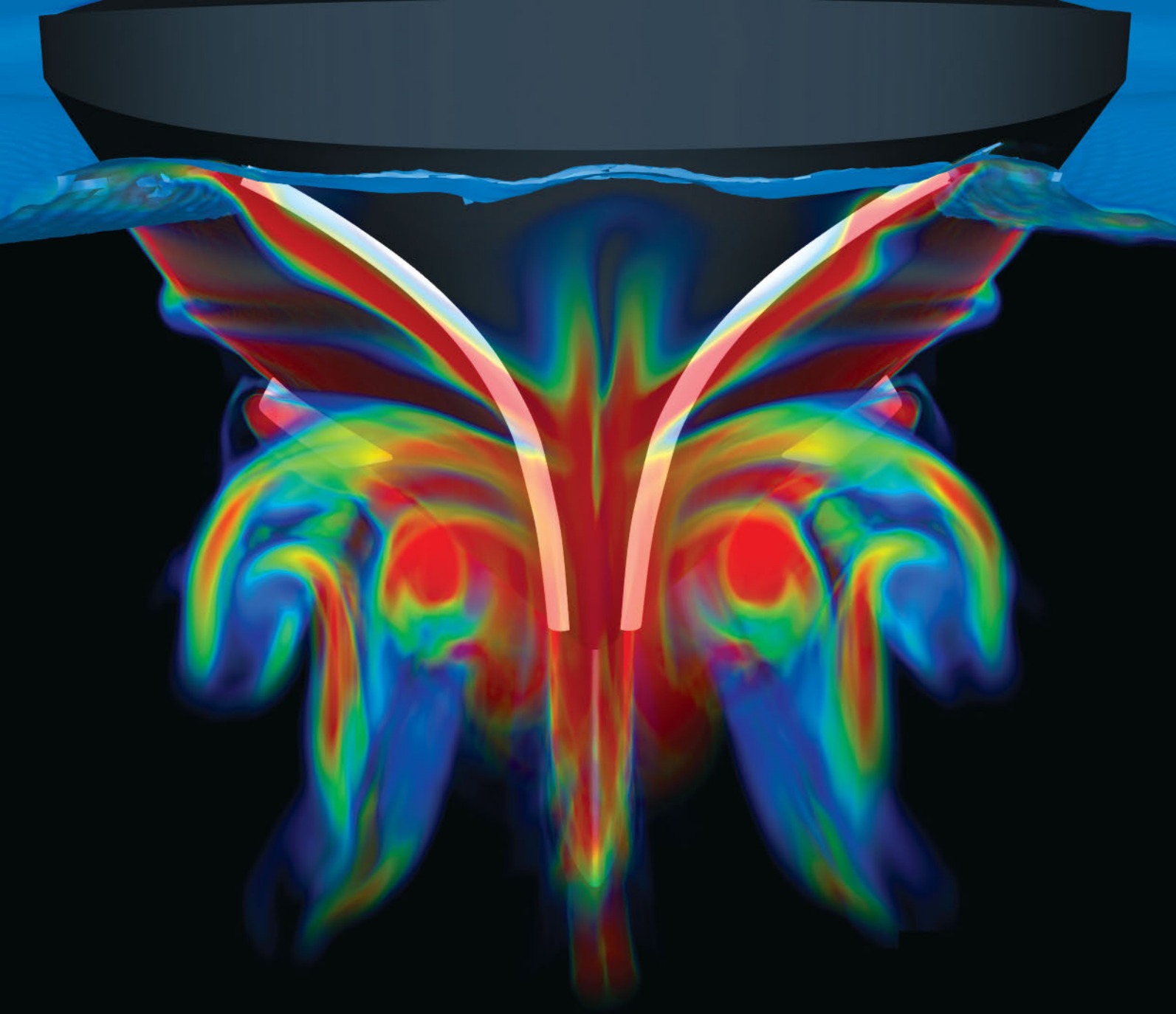


MAIN DECK PLAN
STANDARD ACCOMMODATION FOR 12



HOLD PLAN
STANDARD ACCOMMODATION FOR 12



ROBERT ALLAN

www.ral.ca

KOREA PRIDE – Single-deck ferry, one of South Korea's largest to date

Builder:	**Kangnam Corporation**
Designer:	**Incat Crowther**
Vessel's name:	***Korea Pride***
Owner/operator:	**Korea Express Ferry**
Country:	**South Korea**
Flag:	**South Korea**
Total number of sister ships already completed:	**1**
Total number of sister ships still on order:	**0**
Contract date:	**May 2020**
Delivery date:	**May 2022**

Designed with a single deck, so as to better cope with turbulent open-sea conditions such as large swell and wind chop, the aluminium-built *Korea Pride* may be one of the larger passenger ferries of its type to have been produced in South Korea to date. Designed by Australia's Incat Crowther, the catamaran was commissioned by Korea Express Ferry and will operate from the city of Incheon, bordering the capital of Seoul, providing a waterborne lifeline between the Korean mainland and island communities in the Yellow Sea.

At the operator's request, the ferry was built domestically, with Busan-based builder Kangnam Corporation handling construction, supervised by Incat. Dan Mace, Incat technical manager, explains: "The 72m platform is longer than usual for a single-deck ship: this delivers greater speed without sacrificing fuel efficiency."

The vessel has 'kick' in abundance: power is provided by four MTU 16V 4000 M73L engines, each delivering 2,800kW at 2,050rpm, prompting a pleased Sung Man Hwang, CEO of Korea Express Ferry, to comment: "We received a high-quality ship that reached an impressive 41knots on sea trials" – slightly more than its original requested top speed of 40knots. A more typical service speed for *Korea Pride* will be 36.5knots, however.

The engines drive four Kamewa S71-4 waterjets. The engine rooms were also designed along the lines of an ergonomic, "neat and tidy" layout, featuring exposed engine hatches to simplify maintenance and removal. An additional pair of generators, each rated 290kWe at 1,800rpm, provide auxiliary power.

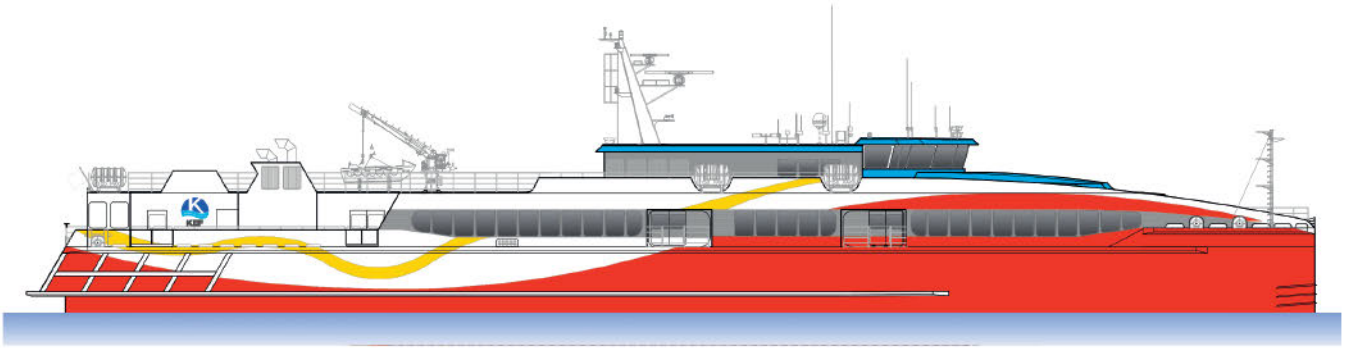
The single deck has the capacity to host up to 556 passengers, who can select from economy, business-class and first-class cabins, all of which are fitted with luggage racks. At the centre of the vessel, one finds an amenities block complete with bathroom facilities, a kiosk and a baby-change room, while the aft end of the deck houses a crew area with mess room, office and bathroom. Given the size of the ferry's passenger complement, it was also deemed prudent to outfit *Korea Pride* with a dedicated medical room.

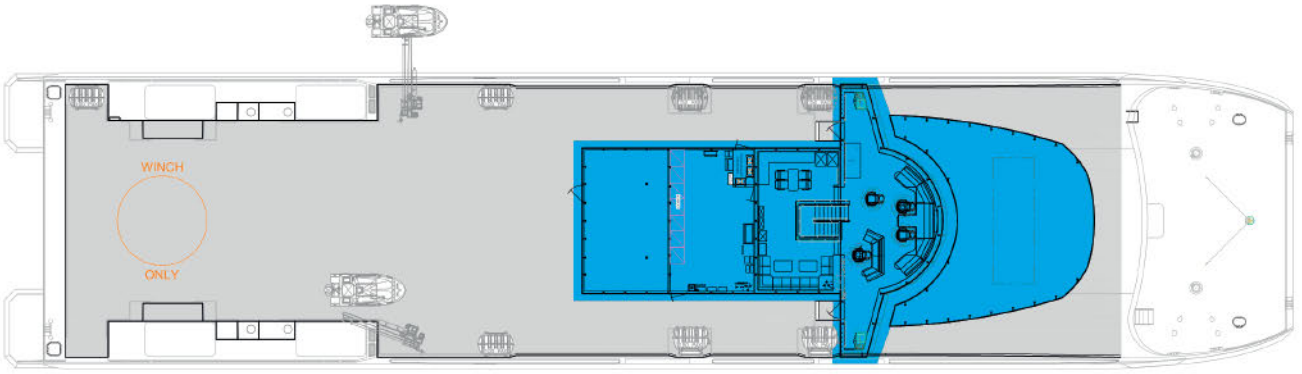
For enhanced passenger safety, and to speed up turnaround times, the deck is accessible via six boarding gates, which have been designed and strategically positioned "to integrate with shoreside infrastructure", Incat explains.

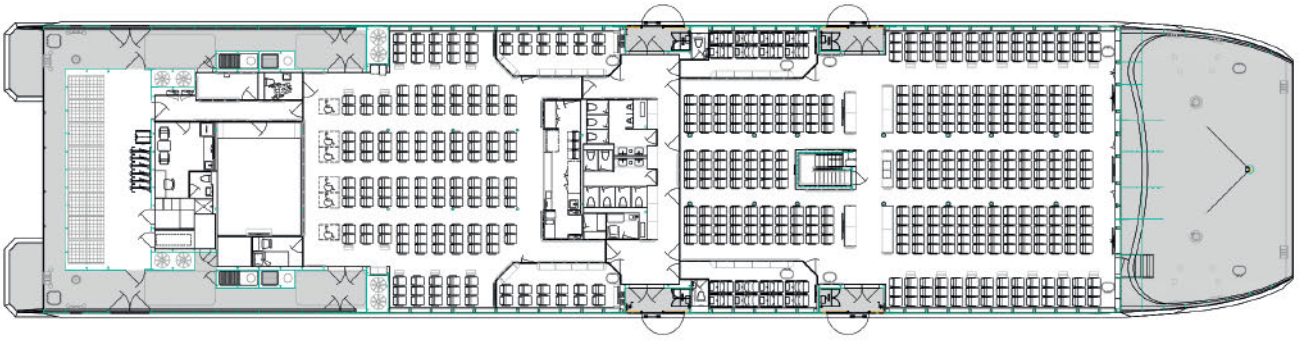
TECHNICAL PARTICULARS

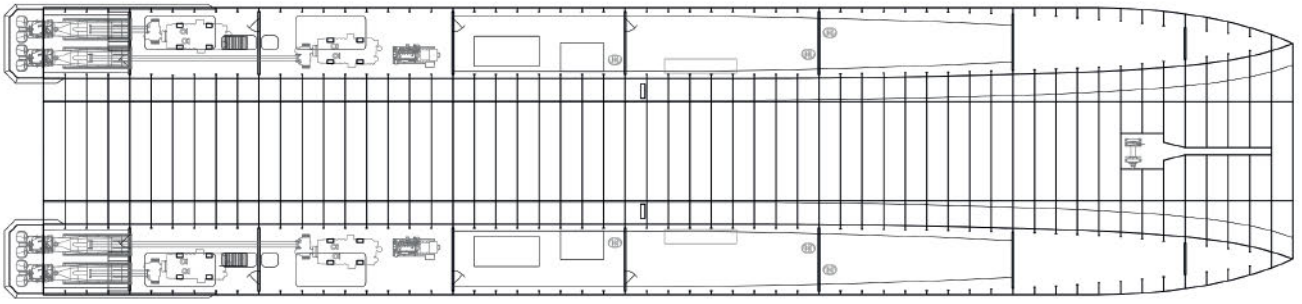
Length, oa	72m
Breadth, moulded	16m
Depth, moulded	5.5m
Displacement	507tonnes
Design, draught	1.8m
Service speed	36.5knots
Max speed	41knots
Propulsion	
Main engine(s)	
Number of engines	4
Make	MTU
Model	16V 4000 M73L
Output of each engine	2,800kW@ 2,050rpm
Gearbox(es):	
Number of gearboxes	4
Make	ZF
Model	ZF 9050 NR2H
Waterjet(s):	
Number of waterjets	4
Make	Kamewa
Model	S71-4
Onboard capacities:	
Fuel oil	30,000litres
Fresh water	4,500litres
Sullage	4,500litres
Complement:	
Number of crew	10
Number of passengers	556
Number of cabins	0
Classification	
Classification society	Korean Register of Shipping
Notations	+KRS0 Passenger Ship Catamaran (HSLC-SA2), +KRM0 UMA, 100nm from harbour of safe anchorage

KOREA PRIDE









MEDEM – Pilot vessel suited to operations in light-ice conditions

Builder:	**N Sundin Dockstavarvet**
Designer:	**N Sundin Dockstavarvet**
Vessel's name:	***MEDEM***
Owner/operator:	**Lotsbetriebsverein Cuxhaven**
Country:	**Germany**
Flag:	**Germany**
Total number of sister ships already completed:	**6**
Total number of sister ships still on order:	**0**
Contract date:	**September 2021**
Delivery date:	**February 2022**

The 16.8m loa pilot boat *MEDEM* was completed for operation by Lotsbetreibsverein at the Cuxhaven station of the Elbe-Pilots. *MEDEM*'s design was based on a series of similar boats delivered from Dockstavarvet to Norway and Germany between 2009-2011, and this newcomer has been built in aluminium, with classification by Lloyd´s Register reflecting aspects such as hull strengthening for navigation in light ice-conditions.

The craft has also been developed for positive stability in all load cases, including iced conditions. The arrangement is laid out with a raised wheelhouse offering round-the-horizon visibility for two crew and one pilot, seated in Recaro chairs. Aft of the wheelhouse at deck level is the saloon, which offers toilet facilities and seating/stowage for up to eight pilots and their gear. The entire deckhouse has been resiliently mounted to ensure a noise level inside of less than 65dbA at 90 % MCR.

The steering gear was made at the shipyard, a redundant pumps fitted to each of the main engines. The 'Quick Stick' steering lever is fitted on the port of the helmsman´s seat. A Sleipner 550 UM-SHP bow thruster derives hydraulic power from a separate system with load sensing pumps fitted to live PTOs on the gearboxes. Trim and list control is enabled by a Humphree interceptor system.

Fendering comprises a glued-and-bolted-on 400mm x 300mm polyurethan profile provided by Nord-Rep Denmark. Additional vertical fendering is fitted to protect the hull-sides when going alongside low-freeboard vessels. The transom has been fitted with an in-house-designed and -fabricated hydraulic rescue platform, as well as a manoeuvring stand to enable quick and safe recovery of man overboard (MOB) casualties. Meanwhile, *MEDEM*'s two pilot boarding platforms each feature a heated deck and railings, for the comfort and safety of personnel.

Two MAN D2676 main engines drive fixed-pitch propellers through 80mm stainless steel shafts and ZF 550 A1 gearboxes, resulting in what Dockstavarvet calls "a very sturdy propulsion package and long mean time between outages [MTBO]." The engines have been fitted with IMO Tier III exhaust cleaning systems, also supplied by MAN, and the vessel's fuel capacity is 3,700litres, with corresponding urea tanks sufficient for one week of normal operation. Vessel speed at the half load displacement of 31tonnes (and 90% of CSR) comes to 20knots, resulting in a fuel consumption rate of around 7.5litres per nm.

TECHNICAL PARTICULARS

Length, oa	16.8m
Length, bp	16.2m
Breadth, moulded	5.2m
Depth, moulded	2.63m
Gross tonnage	34tonnes
Displacement	34.5tonnes
Design, draught	1.1m
Design, deadweight	4.6tonnes
Lightweight	29.96tonnes
Deck space (total)	52m^2
Service speed	19knots@90% MCR
Max speed	21knots
Range	450nm

Propulsion

Main engine(s):

Number of engines	2
Make	MAN
Model	D2676LE 477
Output of each engine	368kW@1,800rpm

Gearbox(es):

Number of gearboxes	2
Make	ZF
Model	500 A1

Propeller(s):

Number of propellers	2
Make	Teignbridge
Model	C'Foil
Diameter	863.6mm
Material	AB2
Number of blades	4
Speed	918rpm
Fixed/controllable pitch	Fixed
Open/nozzled	Open

Bridge electronics:

Radar(s)	1 x FAR-2218 1 x FAR-2218
Autopilot	Simrad AP70 Mk2
GMDSS	1 x Sailor 6222 VHF 2 x Sailor 6210 VHF 1 x Furuno FA-170 AIS 1 x Furuno NX-700 Navtex
GPS	Furuno GP-170
Chart plotter	Tecdis T-2128, speedlog Furuno GS-100
Engine monitoring system	MAN iSea
Fire detection system	Consilium

Other communication systems: Zenitel 3101 (intercom)

Onboard capacities:

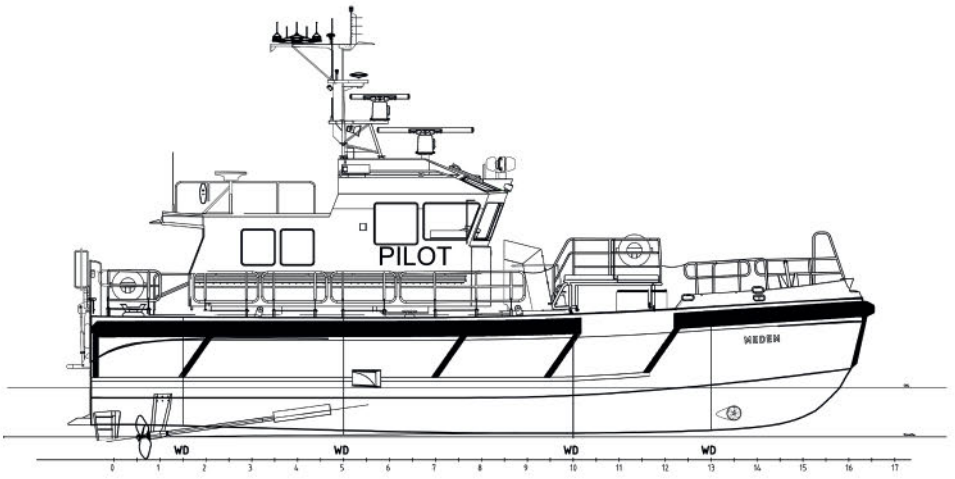
Fuel oil	3,700litres
Fresh water	200litres
Sullage	200litres
Urea	300litres

Complement:

Number of crew	2
Number of passengers	9
Number of cabins	0

Classification

Classification society	Lloyd's Register
Notations	LR (+)100A1 SSC Pilot, Mono, HSC, G2A LR(+) LMC, UMS (hull strengthened for light ice conditions)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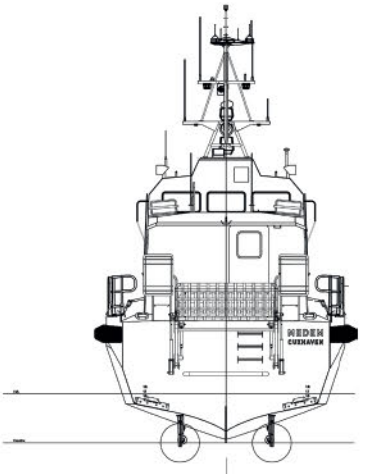
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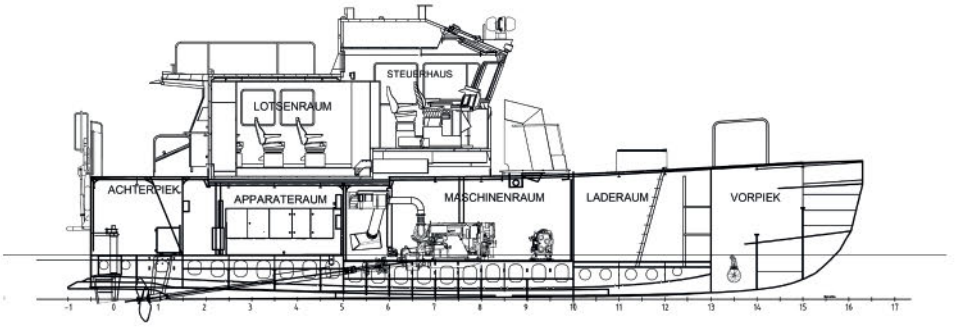
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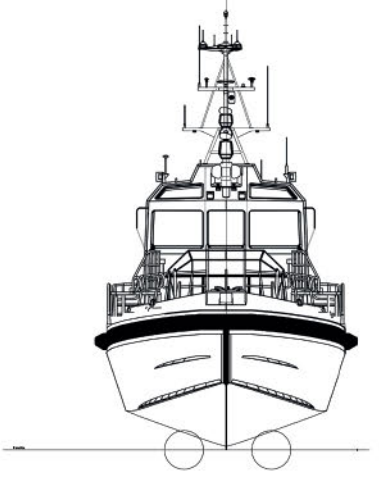

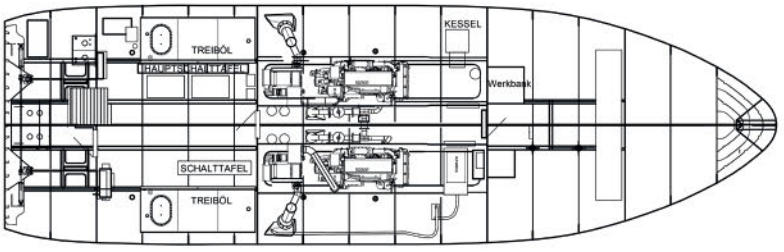
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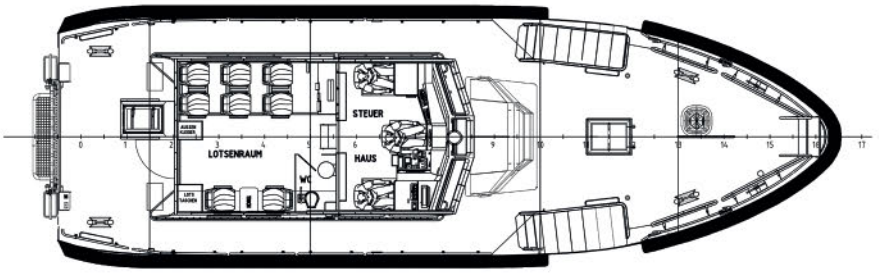
Werkbank
SCHALTTAFEL
TREIBÖL


STEUER
HAUS
LOTSENRAUM

MPA GUARDIAN – Hybrid-electric patrol boat for the Port of Singapore

Builder:	**Penguin Shipyard**
Designer:	**BMT**
Vessel's name:	***MPA Guardian***
Owner/operator:	**Maritime and Port Authority of Singapore**
Country:	**Singapore**
Flag:	**Singapore**
Total number of sister ships already completed:	**1**
Total number of sister ships still on order:	**0**
Contract date:	**Unspecified**
Delivery date:	**June 2022**

MPA Guardian, as covered in *Ship & Boat International*'s September/October issue, is Singapore's first hybrid-electric patrol boat, now in operation with the Maritime and Port Authority of Singapore. The BMT-designed vessel, developed in collaboration with Penguin Shipyard International, will conduct patrolling activities, search and rescue missions, oil spill and firefighting response, drone operations and salvage support for the port. Further extending the vessel's rescue capabilities is a 7m fast rigid-inflatable rescue boat, mated with a unique launch and recovery system (LARS) that was jointly developed by BMT and Penguin.

The vessel propulsion system is an advanced hybrid-electric system based on a combination of electric and diesel mechanical propulsion. To best fulfil its operating duty the vessel can operate in different modes. In full-electric, zero-emission mode, *MPA Guardian* can cruise silently at 6knots for up to three hours. The boat can also operate in a diesel-electric mode to achieve continuous medium speed operation. In this mode, power is drawn from one of the two main engines to propel both shafts while simultaneously recharging the batteries. This mode offers a significant advantage by way of emissions reduction and reduced wear and tear on the engines.

In conventional diesel mechanical mode, *MPA Guardian* can run at a top speed of close to 27knots. In this mode, the electric generation capability offered by the hybrid system also removes the need for diesel generators sets on board.

These features, combined with a highly efficient hullform optimised for minimal resistance across the entire operating speed range, give rise to a low-emission, future-proofed vessel that will contribute to reducing the carbon footprint of the Port of Singapore. The vessel has a custom-designed ramp for launch and recovery of the RIB for shallow water rescue operations, as well as deployable arms to spray oil spill dispersant fluid to the sides of the vessel. The rescue platform at midship is designed to allow fast and safe recovery of survivors (up to 24), with MOB recovery cranes wall mounted directly above.

The catamaran will also be used as the government's test bed for new technologies and equipment.

TECHNICAL PARTICULARS

Length, oa	34.5m
Length, bp	31.9m
Breadth, moulded	10m
Gross tonnage	320tonnes
Displacement	205tonnes (scantling)
Design, draught	2.1m
Design, deadweight	28tonnes
Lightweight	147tonnes
Deck space (total)	115m^2
Deck capacity	1.1tonne/m^2
Service speed	25knots (90%MCR)/ 6knots (full electric mode)/ 10knots (with 1 diesel engine and 1 motor)
Max speed	27knots
Endurance	3 days (vessel to operate in full electric mode in stints of 3 hours between battery recharge)

Propulsion

Main engine(s):

Number of engines	2
Make	MTU
Model	16V 2000 M96
Output of each engine	1,790kW

Gearbox(es)

Number of gearboxes	2
Make	Kumera

Propeller(s):

Number of propellers	2
Make	Helseth
Fixed/controllable pitch	Controllable

Deck machinery:

Crane(s):

Number of cranes	1
Make	Palfinger
Model	PK 23500MB
Capacities/SWL	4.5tonnes@4.5m

Other deck machinery/equipment:

- Custom-designed ramp for launch/recovery of fast RIB
- Deployable oil dispersant spray arms
- 2x firefighting monitors (600m^3/hr with 110m throw range)

Onboard capacities

Fuel oil	20,800litres
Fresh water	3,000litres
Sullage	3,000litres

Complement:

Number of crew	6
Number of passengers	24 (survivors)
Number of cabins	12 bunks located aft of the wheelhouse on the upper deck and arranged in capsules custom-designed by yard

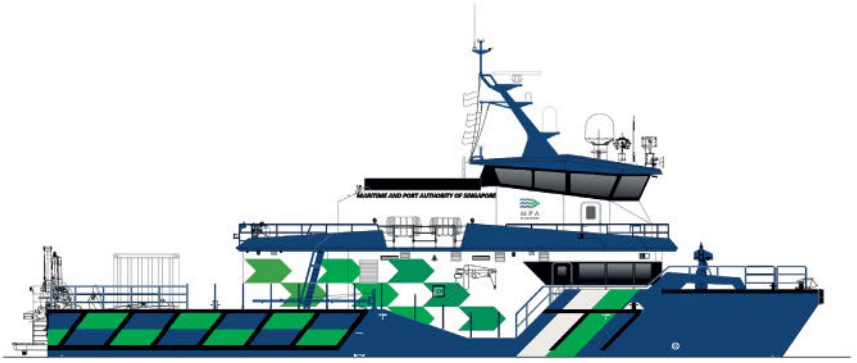
Other significant or special items of equipment:

- 480kWh total battery capacity - rechargable in 2 hours when operating in diesel-only mode or single-diesel engine mode
- 2 x 370kW electric motors connected to the gearbox PTI/PTO

Classification

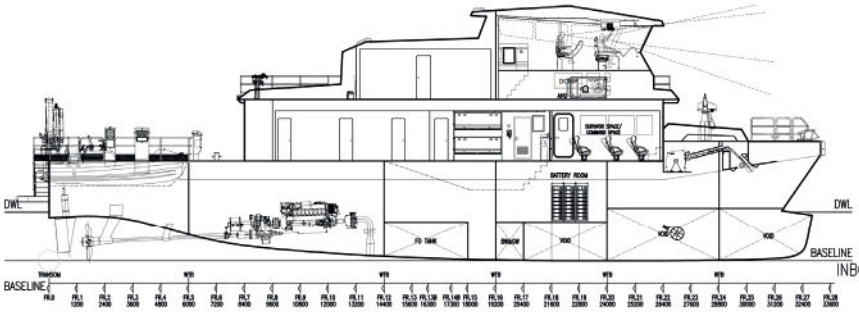
Classification society	Bureau Veritas
Notations	Hull + Mach, HSC Cargo, Sea Area 3, Special Service - Standby Rescue (24 Survivors), + AUT-UMS + DYNAPOS SAM, Electrical Hybrid (PM,ZE), Green Passport

MPA GUARDIAN



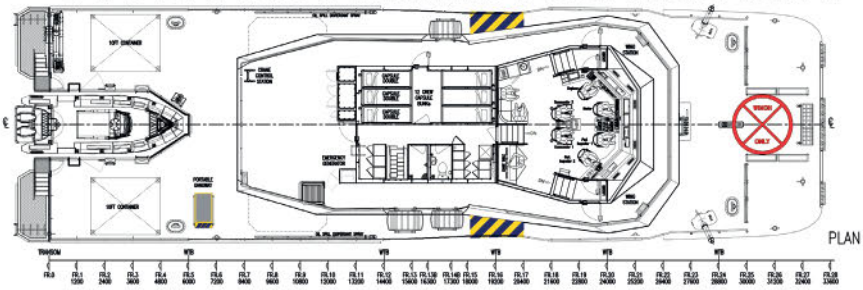
OUTBOARD PROFILE

VIEW ON BOW

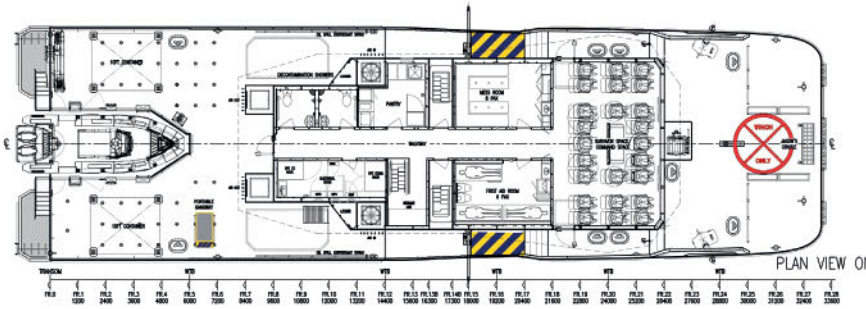


INBOARD PROFILE

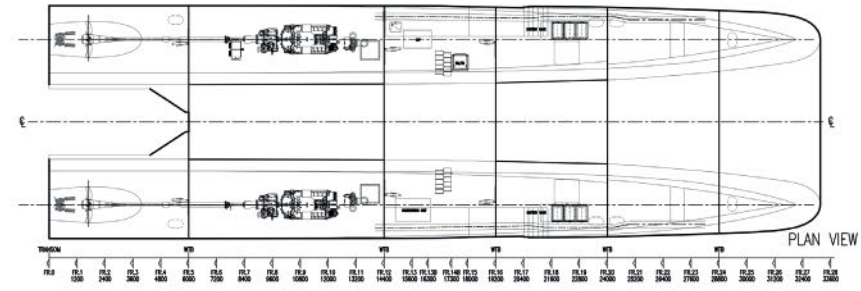
VIEW ON STERN



PLAN VIEW BRIDGE



PLAN VIEW ON MAIN DECK



PLAN VIEW ON HULL

NAVIEXPRESS 1 – Hybrid ferry helping to reduce emissions on and around Lake Geneva

Builder: ..... **Shiptec AG**
Designer: ..... **Shiptec AG**
Vessel's name: ..... ***Naviexpress 1***
Owner/operator: .... **CGN SA, Lausanne (CH)**
Country: ..... **Switzerland**
Flag: ..... **Switzerland**
Total number of sister ships already completed: **0**
Total number of sister ships still on order: **1**
Contract date: ..... **August 2020**
Delivery date: ..... **March 2023**

Tasked with shuttling passengers across Lake Geneva, *Naviexpress 1* is the first of two newbuilds (the second due for delivery in 2024) built by Shiptec with input from Van Oossanen Naval Architects (which handled the conceptual design) and Omega Architects (which oversaw all visual design aspects).

As Shiptec explains: "There is a considerable number of residents from the Evian and Thonon region in France working in the Lausanne region in Switzerland. Today, the majority travels some 70km by car, spending hours in traffic." In turn, the Lake Geneva General Navigation Company CGN SA) has decided to increase waterborne crossings between the French and Swiss shores of the lake – a move that is hoped to reduce the CO_2 footprint of each single commuter "by a factor of 30", Shiptec says, adding: "Thanks to this pioneering project, the environmental impact in the region [will be] substantially reduced."

Naviexpress 1 can carry 700 passengers and offers indoor seating for up to 600 persons. All seats have been fitted with charging facilities for electronic devices, and passengers can also access WLAN. The roof is fitted with solar panels, which are directly integrated into the main electrical supply via the related power management system. Built entirely in aluminium, the vessel's lightweight is only 350tonnes, helping to lower overall fuel consumption.

The vessel's energy and propulsion system is based on the BlueDrive Eco System, which is a further development of Siemens Energy's SISHIP EcoProp System. Shiptec describes some of the "crucial functionalities" that it co-designed into the system as including "switching under load, from electric to diesel propulsion and vice versa, as well the load sharing between different energy sources and the dynamic heavy consumer management". The hybrid concept can be used for peak shaving during high-energy demand peaks in propulsion and hotel load; additionally, though, the ship can sail on pure electric power, with the combustion engines turned off, when near to shore.

The thermal engines are Wärtsilä models that comply with Euro Stage V exhaust emission regulations. In addition, *Naviexpress 1* incorporates: two Voith Inline Thruster 380 aft thrusters, each rated 60kW; twin Voith Inline Thruster 550 bow thrusters, each rated 110kW; and two Naiad Dynamics E600C fin active stabilisers.

The ship's navigation is supported by a dynamic positioning system, to support positioning while approaching landing piers or when operating in tough conditions. Shiptec says: "The active roll stabiliser system also ensures customer comfort [in] lateral wave conditions during frequent westerly winds on standard south-north courses."

TECHNICAL PARTICULARS

Length, oa 61.7m
Length, bp 56.7m
Breadth, moulded 10m
Depth, moulded 3.2m
Displacement 422tonnes
Design, draught 1.6m
Design, deadweight 67tonnes
Lightweight 335tonnes
Deck space (total) 1,100m²
Service speed 17.8knots
Max speed 19.5knots

Propulsion
Main engine(s):
- Number of engines 4
- Make ..... Wärtsilä/Ramme
- Model ..... 2 x 12V14/ 2 x HW500_S_290_2300_A
- Output of each engine ..... 2 x 920kW/ 2 x 305kWe
- Hybrid system ..... Shiptec / Siemens BlueDrive Eco

Gearbox(es):
- Number of gearboxes 2
- Make ..... ZF
- Model ..... W 3755
- Output speed 504rpm

Propeller(s):
- Number of propellers 2
- Make ..... Voith
- Model ..... Voith Linear Jet 1140
- Diameter 1,140mm
- Material ..... Stainless steel
- Number of blades 5
- Fixed/controllable pitch ..... Fixed
- Open/nozzled ..... Nozzled
- Special adaptations ..... Stator

Bridge electronics:
- Radar(s) ..... Swiss Radar
- Autopilot ..... DMC Titan 500
- GPS ..... Simrad
- Gyro ..... Simrad
- DP system ..... Navis
- Engine monitoring system ..... Wärtsilä and Boening
- Fire detection system ..... Deckma

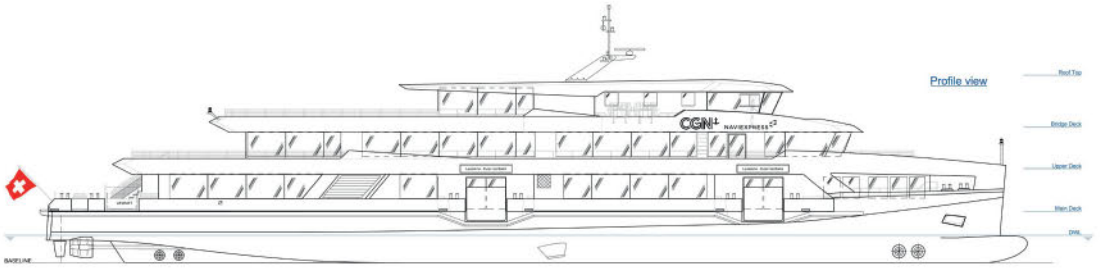
Onboard capacities:
- Fuel oil 14,800litres
- Sullage 5,200litres
- Urea 1,500litres

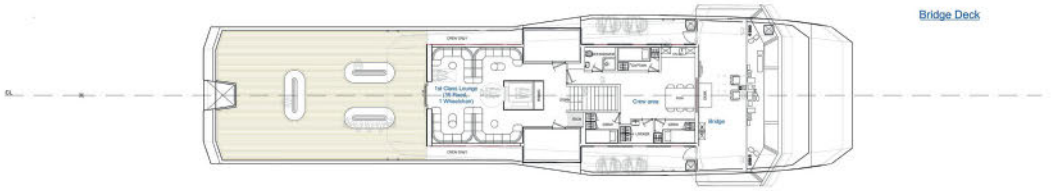
Complement:
- Number of crew 4
- Number of passengers ..... 700 (600 seated)
- Number of cabins ..... 3 (for crew)

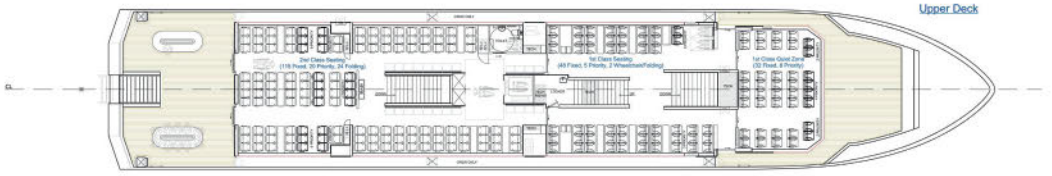
Classification
- Classification society ..... Bureau Veritas
- Notations ..... Hull Attestation: ✠ HULL IN (1.2) Z Passenger vessel AL AUT-UMS

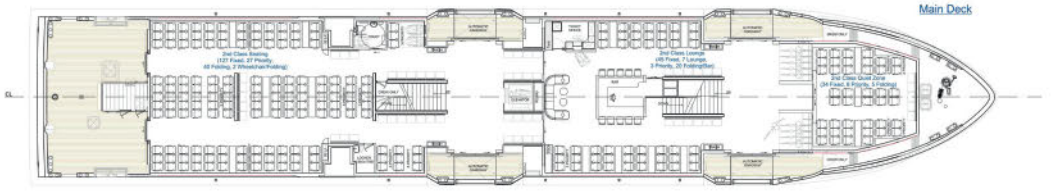
Other important international regulations complied with ..... Swiss flag regulation

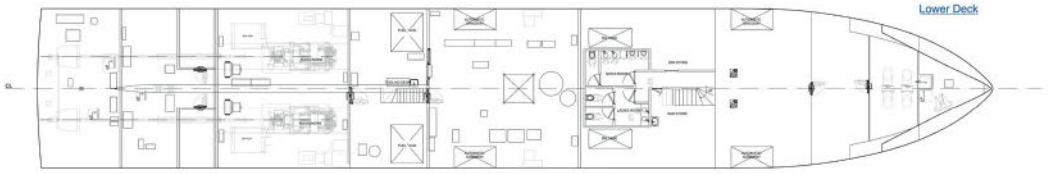
NAVIEXPRESS 1

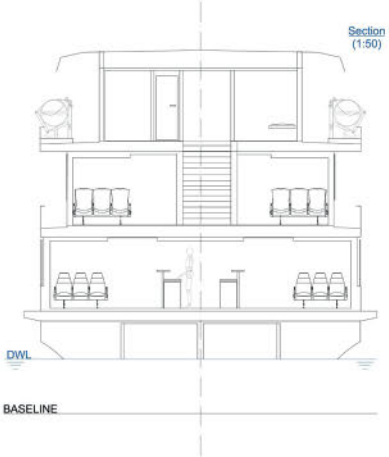












PHOENIX – Well-equipped SAR boat designed for shallow waters and rough conditions

Builder: ..... **Baltic Workboats AS**
Designer: ..... **Baltic Workboats AS**
Vessel's name: ..... ***Phoenix***
Owner/operator: ..... **Romanian Search and Rescue (ARSVOM)**
Country: ..... **Romania**
Flag: ..... **Romania**
Total number of sister ships already completed: **1**
Total number of sister ships still on order: **1 (under construction for Estonian Police and Border Guard)**
Contract date: ..... **November 2020**
Delivery date: ..... **May 2022**

Phoenix is a multipurpose search and rescue (SAR) vessel designed for salvage and firefighting operations across a wide range of environmental conditions. Built on Baltic Workboats' Patrol 19 WP SAR class, the vessel's low draught enables it to enter shallow waters, while the patented wave-piercing hull provides a smooth ride for both crew and up to 35 maritime casualties, as well as optimal seakeeping in harsh conditions.

A combination of powerful Volvo Penta engines and waterjet propulsion grant Phoenix a top speed in excess of 35knots, enabling the boat to quickly respond to reported incidents. The vessel is also equipped with a Safe At Sea GuardRunner jet ski, complete with a 'quick-launching' platform, to support the mother vessel during rescue operations in extremely shallow and restricted waters, enabling the crew is able to cover "virtually any point" across Romania's coast, the builder says.

Phoenix also features two remotely controlled fire monitors on its fore deck, should the vessel be called upon to tackle smaller fires on ships or in port areas. Other features include a lowered aft deck area and rescue davits with integrated, fast-release rescue nets on each side of the vessel, for prompt man overboard (MOB) casualty recovery operations.

A thermal imaging camera, supplied by FLIR, will help to detect persons in the sea at distances over 900m, even when weather and lighting are unfavourable, while the onboard LRAD system will make it possible for the crew to effectively deliver information and messages clearly over long distances. The vessel also features Baltic Workboats' in-house-developed Integrated Alarm Monitoring and Control System (IAMCS), which allows crew to operate all main and auxiliary systems from the same, single panel – a feature that, Baltic Workboats claims, makes "controlling the vessel during challenging rescue operations almost seamless". In all, it's an impressive tech backbone that made *Phoenix* one of the notable deliveries of 2022.

TECHNICAL PARTICULARS

Length, oa 18.6m
Length, bp 16.6m
Breadth, moulded 5.1m
Depth, moulded 2.25m
Gross tonnage 36tonnes
Displacement 34tonnes
Design, draught 1.1m
Design, deadweight 5tonnes
Lightweight 29tonnes
Deck space ..... 30m^2 (approx.)
Deck capacity ..... 1.5 tonnes/m^2
Service speed 25knots
Max speed ..... >35knots
Range ..... 300nm@25knots (approx.)

Propulsion
Main engine(s):
Number of engines 2
Make ..... Volvo Penta
Model D13 1000
Output of each engine 735kW

Gearbox(es):
Number of gearboxes 2
Make ..... ZF
Model 735

Waterjet(s):
Number of waterjets 2
Make ..... MJP
Model 350X

Deck machinery/equipment:
- 2 x remote-controlled FiFi monitors
- MARSIS MF06-EW (each 240m^3/hour) on fore deck.

Bridge electronics:
Radar(s) ..... 1 x Simrad TXL-10S + 1 Simrad Halo 20+
Autopilot ..... Simrad AP70
GMDSS ..... ICOM GM-600 + ICOM IC-M35 + OceanSignal V100
GPS ..... Simrad P3007 + HS80A
Chart plotter ..... Simrad OP50
Engine monitoring system ..... Volvo Penta + Baltic Workboats IAMCS (Integrated Alarm Monitoring and Control System)

Fire detection system ..... Esento Marine 2-4 zone system
Other systems ..... Hikvision CCTV system
FLIR M364C thermal camera
LRAD 450XL
Zenitel CIS-3100 intercom
AIS EM-Trak A200

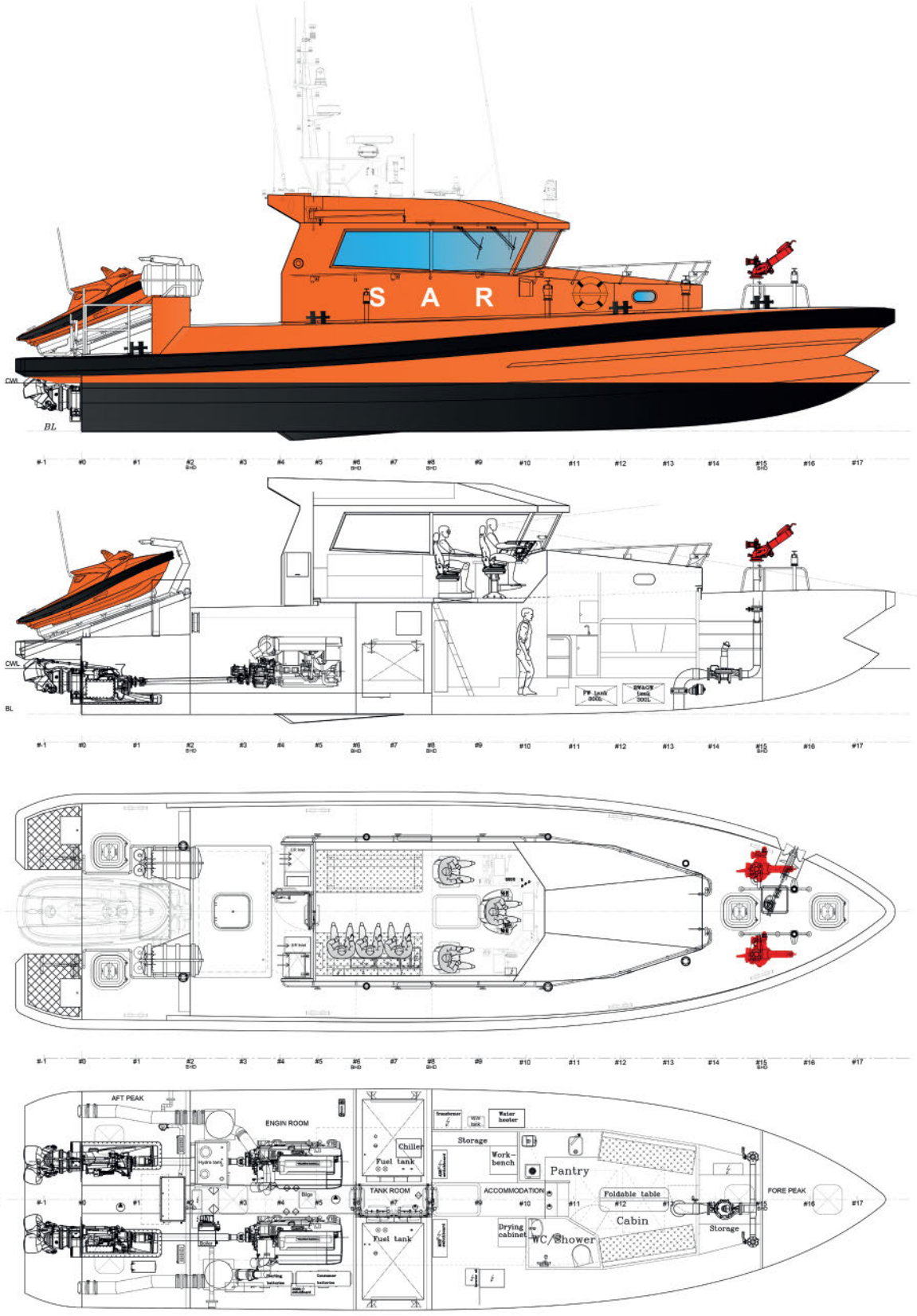
Onboard capacities:
Fuel oil ..... 2 x 1500litres
Fresh water 300litres
Sullage 300litres
Bilge water 50litres

Complement:
Number of crew 3
Number of passengers ..... 35 survivors
Number of cabins ..... 4 berths in accommodation/crew area in hull

Other significant or special terms of equipment:
- Safe At Sea GuardRunner (with quick launching/retrieving platform) for rescue operations

Classification
Classification society ..... Lloyd's Register
Notations ..... ✠100A1 SSC Patrol Mono HSC G3 MCH UMS

Other important international regulations complied with:
- Anti-Fouling Convention Marpol 73/78 Annex 1


S A R
CWL
BL
AFT PEAK
ENGIN ROOM
Chiller
Fuel tank
TANK ROOM
Fuel tank
Storage
Work-bench
Pantry
ACCOMMODATION
Foldable table
Cabin
Drying cabinet
WC/Shower
Storage
FORE PEAK
CL

PIONEER OF BELFAST – High-speed, low-wake ferry with innovative eFoiler system

Builder: ..... **Artemis Technologies Ltd**
Designer: ..... **Artemis Technologies Ltd**
Vessel's name: ..... ***Pioneer of Belfast***
Owner/operator: **Artemis Technologies Ltd**
Country: ..... **UK**
Flag: ..... **Belfast**
Total number of sister ships already completed: **0**
Total number of sister ships still on order: **0**
Contract date: ..... **N/A**
Delivery date: ..... **April 2022**

Pioneer of Belfast represents the first in Artemis Technologies' EF-12 Workboat electric foiling boat class, powered by the company's self-produced eFoiler system. The eFoiler's core technologies include hydrofoils, a flight control system, electric propulsion and fast charge battery, all developed in-house by Artemis Technologies' team of experts.

The company explains: "The Artemis eFoiler is based on the integration of a high-power density electric drivetrain into an autonomously controlled hydrofoil, [and] combining proven technologies from yacht racing, motorsport and the aerospace industry." Powered by this technology, the Artemis EF-12 Workboat offers energy savings of up to 90% and significantly lower operating and maintenance costs compared to traditional boats.

When foiling, the Artemis EF-12 Workboat creates zero emissions and minimal wake. This enables the vessel to avoid local speed restrictions and to operate at high speed in inland waterways, or in busy ports and harbours.

By effectively flying above the water, the Artemis EF-12 Workboat also ensures a comfortable ride and mitigates the chance of seasickness. "The flight control feature – a critical part of the Artemis eFoiler solution – is responsible for maintaining safe operation and stability of the vessel whilst operating in both foiling and displacement modes," Artemis explains. "During foiling, our flight control algorithms are responsible for control of roll, pitch, and ride height of the Artemis EF-12 Workboat." The flight control system is described as being just like an autopilot on an aeroplane: it removes the challenge of 'flying' the vessel, allowing the pilot to focus on heading and speed.

Pioneer of Belfast underwent rigorous testing to ensure operational capability, and efficient performance, across a range of tough conditions. The deep carbon composite V-bottom hull provides a safe and reliable base for high-speed foiling operations in coastal and offshore waters. Sea trials, conducted in the Belfast Lough in the face of 25knot winds, led to the vessel being issued a UK Loadline Exemption as a result of meeting MCA's Workboat Code.

Artemis is now working on a larger, eFoiler-powered ferry, the EF-24 Passenger – the first example of which (to be christened *Zero*) will be launched in summer 2024.

TECHNICAL PARTICULARS

Length, oa 11m
Length, wl 9.1m
Breadth, oa 3.5m
Depth, moulded 0.75m
Displacement ..... 10tonnes (max)
Design, draught 2.2m
Design, deadweight 2.5tonnes
Lightweight 7.5tonnes
Service speed 25knots
Max speed 34knots
Foiling range 60nm

Propulsion
Main Drive(s):
- Number of Drive(s) 1
- Make ..... Artemis Technologies Ltd
- Model ..... Artemis ePod (Integrated Electric Propulsion Unit)
- POD continuous power 200kW
- POD peak power 250kW

Gearbox(es):
- Number of gearboxes 1
- Make ..... Artemis Technologies Ltd
- Model ..... EF-12 Workboat

Propeller(s):
- Number of propellers 1
- Make ..... Artemis Technologies Ltd
- Diameter 0.6m
- Material ..... Bronze
- Number of blades 5
- Fixed/controllable pitch ..... Fixed

Battery Energy Storage System
- Number of batteries 2
- Make ..... Artemis Technologies Ltd
- Output (total) 300kWh
- Fast charging time ..... < 60 minutes

Bridge electronics:
- Radar/scanner ..... Garmin
- GPS ..... Garmin
- Chart plotter ..... Garmin
- Drive & battery monitoring system ..... Artemis Technologies Ltd
- Fire detection/ suppression system ..... Artemis Technologies Ltd

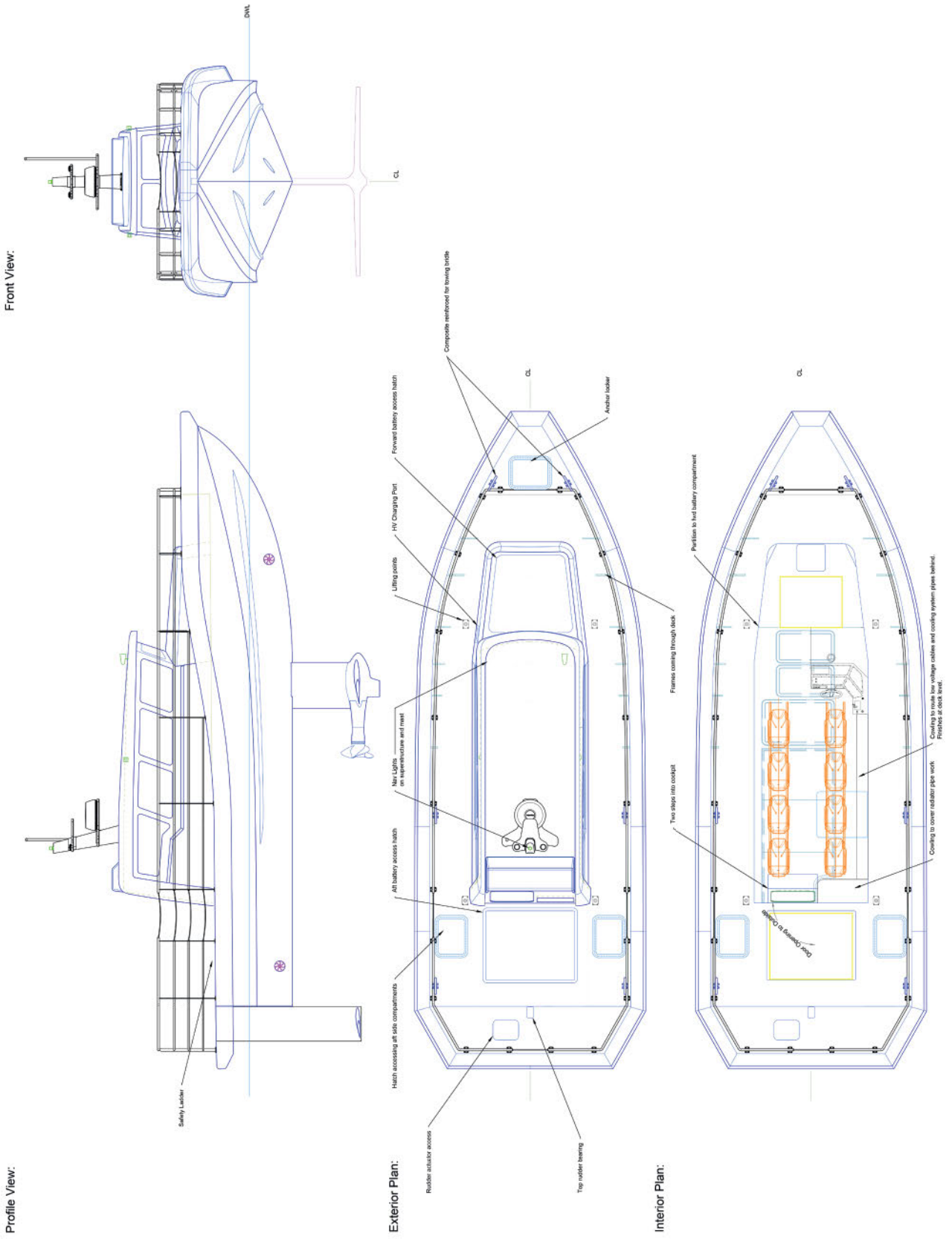
Complement:
- Number of crew 2
- Number of passenger 6
- Number of cabins 1

Other significant or special items of equipment: ..... eFoiler system

Classification
- Classification society ..... DNV
- Notations ..... DNVGL-ST-0342, DNV Technology Qualification & DNV HSLC Rules

Other important international regulations complied with:
- MCA Code – Workboat Edition 2
- UK Class - Class VIII Inc. SCV
- Operating Area – Workboat Code Cat 2

PIONEER OF BELFAST



REEF INSPECTOR – Long-range cruiser for scuba and snorkelling trips

Builder:	**Seacat Ships Co, Ltd**
Designer:	**Seaspeed Design Co, Ltd**
Vessel's name:	***Reef Inspector***
Owner/operator:	**Undisclosed**
Country:	**Australia**
Flag:	**Australia**
Total number of sister ships already completed:	**0**
Total number of sister ships still on order:	**0**
Contract date:	**October 2020**
Delivery date:	**June 2022**

The long-range cruiser *Reef Inspector* will be used to carry snorkellers and scuba divers to and from Australia's Great Barrier Reef. Having completed sea trials after her June delivery, the yacht made her way to Pattaya on her own hull, and to her new home in Cairns in Australia's northeast state of Queensland.

The 22.2m vessel features an aluminium catamaran hullform with a slightly raked bow, designed to increase the waterline length. This was based on a hullform by SeaSpeed Design, which also specialises in aluminium powercats. *Reef Inspector* has also been designed to consume 46litres of fuel per hour when travelling at 10knots in economical long-range cruising mode. A sizeable onboard fuel supply – consisting of two 5,000litre- and two 1,500litre-capacity tanks – enables an extended range of more than 3,000nm.

Reef Inspector was built in accordance with Australia's National Standard for Commercial Vessels (NSCV) criteria: both Class 1C, for up to 80 passengers and five crew during the day, and Class 2B, for 12 passengers plus four crew overnight. The hull and deckhouse were built to Lloyd's Register's SSC standard for offshore operations.

The layout includes three decks with air-conditioned indoor areas, as well as a sun deck. The main deck has an enclosed lounge that can convert to a four-berth cabin, as well as a dining area next to a custom-built aluminium galley. The deck also has three VIP cabins, each with a king-size bed and en-suite bathroom. The aft deck has a large, covered outdoor dining area, plus dive bottle storage, a davit and a dive tender.

The upper deck, meanwhile, has walk-around sides, an aft deck with seating for al fresco dining and a large forward area featuring a jacuzzi, which can be covered and converted to a large day bed. The interior includes the main helm and a lounge area featuring a large daybed/sofa on each side of the central staircase. The sun deck has an outdoor helm and an area for both deck chairs and solar panels.

Additional equipment includes a Kohler diesel generator and a 600litre-capacity water maker.

TECHNICAL PARTICULARS

Length, oa	22.24m
Length, bp	21.35m
Breadth, moulded	8m
Depth, moulded	2.24m
Displacement	46.4tonnes
Max speed	21.35m
Propulsion	
Main engine(s):	
Number of engines	2
Make	Volvo Penta
Model	D13
Output of each engine	597kW@2,300rpm
Gearbox(es)	
Number of gearboxes	2
Make	Volvo
Model	Volvo Penta IPS 1050 drives
Propeller(s):	
Number of propellers	2
Make	Volvo
Model	IPS 1050 drive
Diameter	863.6mm
Material	Copper alloys
Number of blades	6 per group
Speed	2,300rpm
Fixed/controllable pitch	Fixed
Open/nozzled	Nozzled
Deck machinery	
Winch(es):	
Number of winches	1
Make	MUIR
Model	VR 4500
Capacities	2.04tonnes
Bridge electronics:	
Radar(s)	Garmin
Autopilot	Garmin
GMDSS	Garmin 315 series
GPS	Garmin integrated in plotter
Chart plotter	Garmin Cockpit Glass 24" / C-MAP
Engine monitoring system	Garmin
Fire detection system	Fireboy USA
Onboard capacities:	
Fuel oil	13,600litres
Fresh water	600litres
Sullage	600litres
Complement:	
Number of crew	5
Number of passengers	75
Number of cabins	3
Regulations complied with	NSCV 2B/1C

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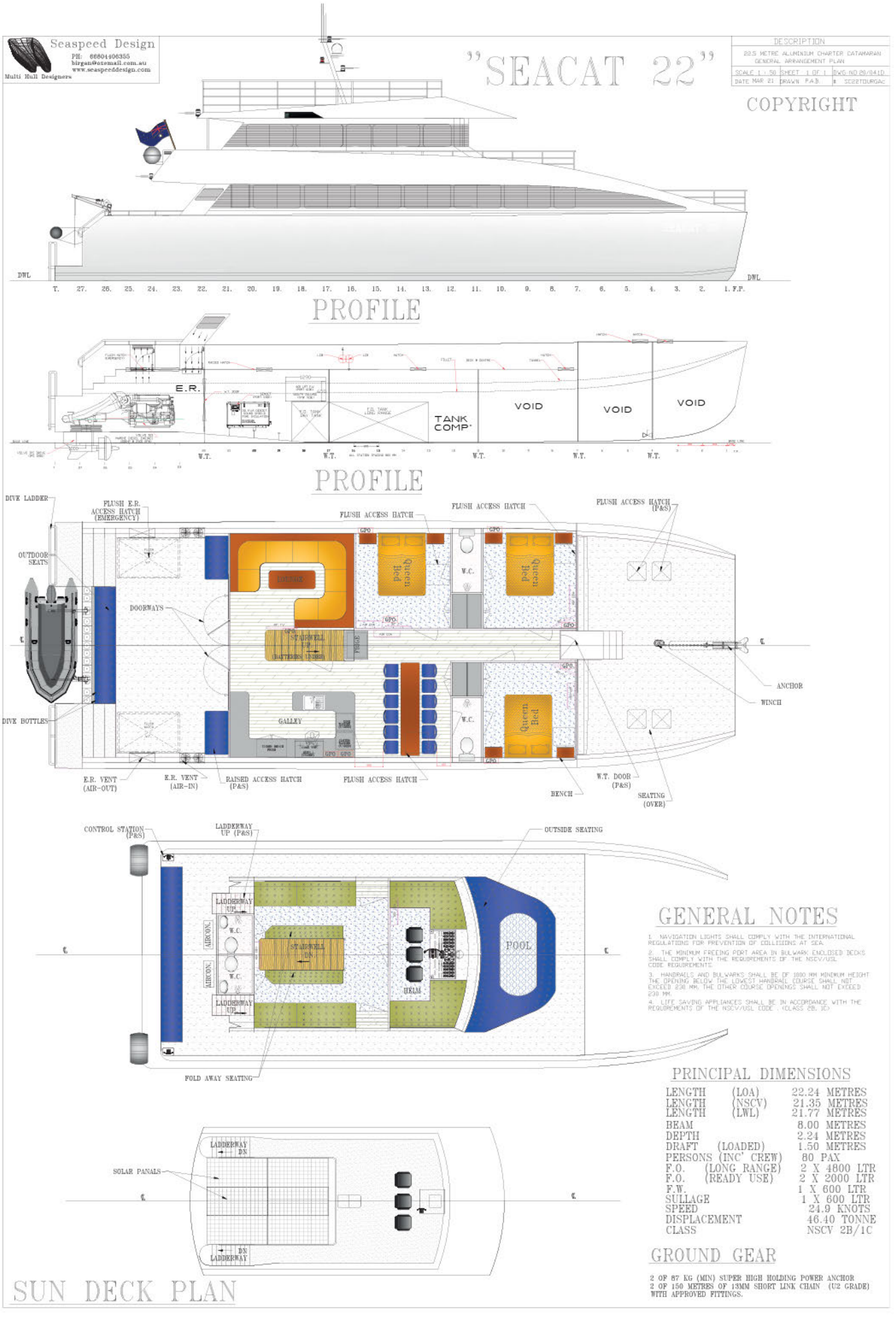
REEF INSPECTOR



CALL FOR ABSTRACTS

imc 2023

INTERNATIONAL MARITIME CONFERENCE

7–9 NOVEMBER 2023

INTERNATIONAL CONVENTION CENTRE
SYDNEY, AUSTRALIA

Organised by The Royal Institution of Naval Architects, The Institute of Marine Engineering, Science and Technology and Engineers Australia, the International Maritime Conference 2023 Program will focus on the latest developments in naval architecture, marine engineering and maritime technology; both in the areas of defence and commercial shipping.

KEY DATES FOR IMC 2023:

Call For Abstracts	**Wednesday 25 January 2023**
Abstract Submission Deadline	**Friday 28 April 2023**
Author Acceptance Notification	**Friday 19 May 2023**
Refereed Paper Submission	**Monday 14 August 2023**

IMC 2023 is held in conjunction with INDO PACIFIC 2023

For more information: **www.indopacificexpo.com.au/IMC2023**

Contact the IMC Secretariat: **imc@amda.com.au**

INDO PACIFIC 2023
7 - 9 NOVEMBER
INTERNATIONAL MARITIME EXPOSITION
INTERNATIONAL CONVENTION CENTRE, SYDNEY, AUSTRALIA

SEA TAXI – Wheelchair-friendly fleet for İstanbul

Builder:	**İstanbul Şehir Hatlari**
Designer:	**İstanbul Şehir Hatlari**
Vessel's name:	***Sea Taxi (class)***
Owner/operator:	**İstanbul Şehir Hatlari**
Country:	**Turkey**
Flag:	**Turkey**
Total number of sister ships already completed:	**45**
Total number of sister ships still on order:	**5**
Contract date:	**Unspecified**
Delivery date:	**January 2022**

İstanbul's water taxi network underwent something of a shake-up in 2022. A project initiated in December 2021 by Şehir Hatları, a subsidiary of İstanbul Metropolitan Municipality (İMM) specialising in passenger boat services, is putting 50 new water taxis into service – five of them hybrid-electric – as a fast alternative to journeys by road. The new fleet can dock and launch from "any port or pier" in Istanbul, reach "high speeds with little fuel consumption" and "answer the needs of elderly and disabled passengers, passengers with bicycles and families with baby carriages", Şehir Hatları announced.

Each boat in the series was built in approximately one month, ensuring a fairly fast roll-out. All 50 of the water taxis have been built at Haliç Shipyard, one of the oldest shipbuilding facilities in the world. The modular nature of the water taxis played a part in enabling these swift newbuild turnaround times. Şehir Hatları currently oversees 600 trips daily, accounting for around 40 million passengers a year, and also has access to 50 ship terminals.

The 50 water taxis have been designed in-house, relying on the experience of Mrs Sinem Dedetas, a naval architect/marine engineer and general manager of Şehir Hatları and Haliç Shipyard. The water taxis are available for hire around the clock, and can be booked via the İBB Deniz Taksi app developed by Şehir Hatlari.

All of the boats are WiFi-enabled. Access for wheelchair users was also a key consideration for the new water taxis. "Starting from 2019, we converted our entire fleet to be suitable for disabled passengers, and the water taxis were designed and built-in accordance with this perspective," Şehir Hatlari says. The Sea Taxis' hulls have been produced in GRP, using vacuum infusion techniques.

Each of the diesel-fuelled boats in the series will run on a pair of 162kW Volvo D3 220 engines, for a service speed of 23knots. The diesel taxis will also have a range of up to 200nm. The five hybrid-electric boats, meanwhile, will be equipped with LiFePO4 batteries for a combined power output of 240kWh, and will have a service speed of 15knots.

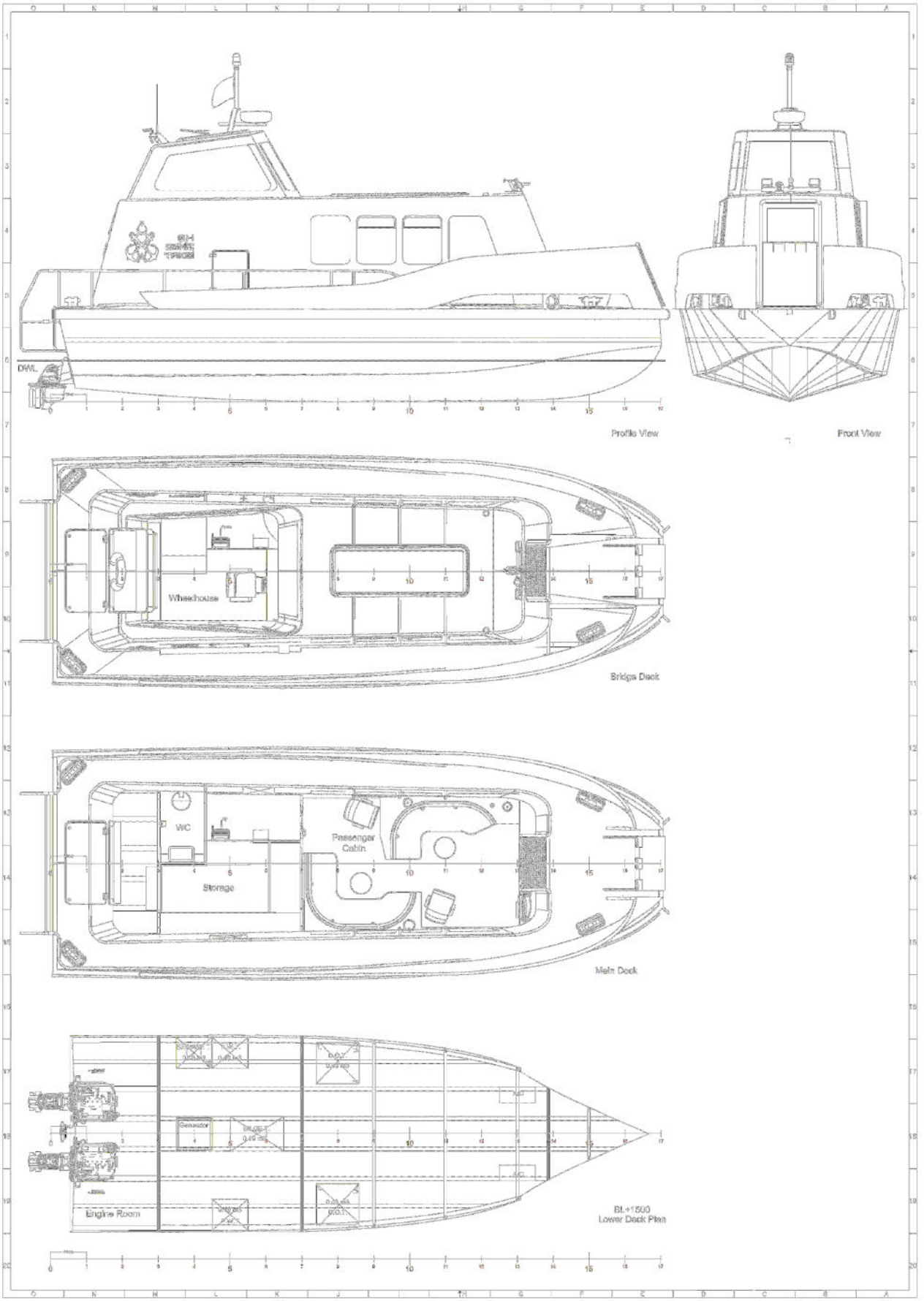
Şehir Hatları also expects the new water taxis to provide optimal fuel efficiency, reducing opex considerably. "As a result of engineering calculations, we achieved a new hullform for the taxis that allowed us to use smaller onboard machinery," the operator says. "The fuel consumption for an equivalent boat is 9.5litres per mile, but it is 6litres for the diesel water taxis and 2litres for the hybrid-electric models."

The diesel Sea Taxis could save up to 210litres per day, equating to a saving of 76,650litres a year, while their hybrid-electric counterparts could save 450litres daily and 164,250litres annually.

"In other words, the entire 50-boat fleet will save a total of 4.27 million litres of fuel, and reduce the carbon footprint by 11.5 million kg, annually," Şehir Hatlari explains.

TECHNICAL PARTICULARS

Length, oa	11.7m
Length, bp	11.7m
Breadth, moulded	4.3m
Depth, moulded	1.8m
Gross tonnage	35.65tonnes
Displacement	13.2tonnes
Design, draught	0.8m
Design, deadweight	19tonnes
Lightweight	7,143tonnes
Deck space (total)	45m²
Service speed	23knots (diesel)/ 15knots (electric)
Propulsion	
Main engine(s):	
Number of engines	2
Make	Volvo Penta (I/O Stern Drive)
Model	D3 220
Output of each engine	162 kW
Radar(s)	Furuno DRS4D NXT
GPS	Furuno SCX20
Chart plotter	Furuno TZTOUCH 3 12"
Engine monitoring system	Volvo Penta EVC Control Panel (Digital)
Fire detection system	Maxlogic ML – 22102/M Conventional Fire Detection System
Onboard capacities:	
Fuel oil	860litres
Fresh water	384litres
Sullage	192litres
Complement:	
Number of crew	2
Number of passengers	10
Number of cabins	2


DWL
Profile View
Front View
Wheelhouse
Bridge Deck
WC
Passenger Cabin
Storage
Main Deck
Generator
Engine Room
BL+1500
Lower Deck Plan

SEACAT COLUMBIA – Wind support ship offering 30% lower emissions than traditional CTVs

Image: BAR Technologies

Builder:	**Diverse Marine**
Designer:	**BAR Technologies**
Vessel's name:	***Seacat Columbia***
Owner/operator:	**Chartwell / Equinor**
Country:	**UK**
Flag:	**UK**
Total number of sister ships already completed:	**0**
Total number of sister ships still on order:	**1**
Contract date:	**2021**
Delivery date:	**August 2022**

The offshore wind farm vessel *Seacat Columbia* may not look that novel from the quayside – until you get a proper look at the far side of the boat, where the asymmetrical design becomes apparent. Looked at front on, there's the narrow bow and, to the left, a slender strut supporting the torpedo shape of the swath-style outrigger: the effect is to reduce the total wetted area substantially, resulting in far lower resistance.

BAR Technologies developed the vessel's foil optimised stability system (FOSS), which consists of one transom-mounted hydrofoil to control pitch, plus one stabiliser fin to control roll. These dynamic hydrofoils work collectively to control the roll and pitch of the boat, reducing vertical acceleration by up to 70%. The foils also further reduce drag and increase fuel efficiency: by levelling out the pitching motion, they ensure the boat is presented to the upcoming seas and waves in the most effective manner. This allows the twin MTU engines and Kongsberg waterjets to power the boat to speeds in excess of 30knots.

BAR Technologies has also concentrated on slow-speed manoeuvring. The outrigger thruster, which is normally set perpendicular to the water flow, is positioned in-line, fore and aft, yielding a sturdy turning response. Furthermore, *Seacat Columbia* can handle far higher seas – up to 2.5m Hs – both in transit and at the tower, rather than the more typical 1.5-1.75m Hs limit.

This new design also sets the stage for green innovation. "We now have an efficient hullform...it opens up the potential for replacing the diesel engines with electric propulsion," says Cooper. "To get the same power output on a more traditional cat, you'd think you'd need 30% more weight in batteries...but that increases displacement, so in fact you need nearer 47% more installed battery power." He adds: "This hullform features the opposite phenomenon. With a hull 30% more efficient, you naturally need 30% less fuel regardless of whether that is diesel, batteries, hydrogen or whatever.

"In fact, we already have the 30e on the drawing board, with 3MWh of installed battery power. This would come with a diesel range extender to satisfy class as a separate form of propulsion. The resulting boat is estimated at around 85% emissions reduction."

The future of this hullform is not just limited to wind farm maintenance: a 40m version could be used as a ferry, for example. However, given the pace of innovation, "it could even find a place as an unmanned geosurvey vessel for deeper waters", Cooper says.

TECHNICAL PARTICULARS

Length, oa	30m
Length, bp	29.95m
Breadth, moulded	10.09m
Depth, moulded	3.5m
Displacement	100tonnes (approx.)
Design, draught	1.49m
Design, deadweight	20tonnes
Lightweight	78tonnes
Deck space (total)	108m^2
Deck capacity	1.5tonnes/m^2
Service speed	22knots
Max speed	30knots (higher speeds can be achieved with different drivetrain)
Bollard pull	12tonnes
Range	1,216nm

Propulsion
Main engine(s):

Number of engines	2
Make	MTU
Model	12v2000 M72
Output of each engine	1,080kW

Gearbox(es):

Number of gearboxes	2
Make	ZF
Model	ZF 3050
Output speed	2.037:1

Waterjet(s):

Number of waterjets	2
Make	Kongsberg
Model	RR Kamewa S56-3/CA

Deck machinery
Crane(s):

Number of cranes	1
Make	TMP Hydraulik
Model	TMP900XL
Capacities/SWL	2,990kg@3m 865kg@10.4m

Winch(es):

Number of winches	1 (anchor)
Make	Hercules
Model	AA150
Capacities	40rpm-25lpm@190bar

Bridge electronics:

Radar(s)	Furuno 2218 12kW 4ft Open Array.
Autopilot	Navitron 888G Auto Pilot System
GMDSS	Tron TR30 GMDSS HH Radio
GPS	Furuno GP170 GPS
Chart plotter	Furuno FCR3210BB chart radar
Engine monitoring system	MTU
Fire detection system	Stat-X

Onboard capacities:

Fuel oil	16m^3
Fresh water	1m^3
Sullage	1m^3

Complement:

Number of crew	3-6
Number of passengers	24
Number of cabins	2

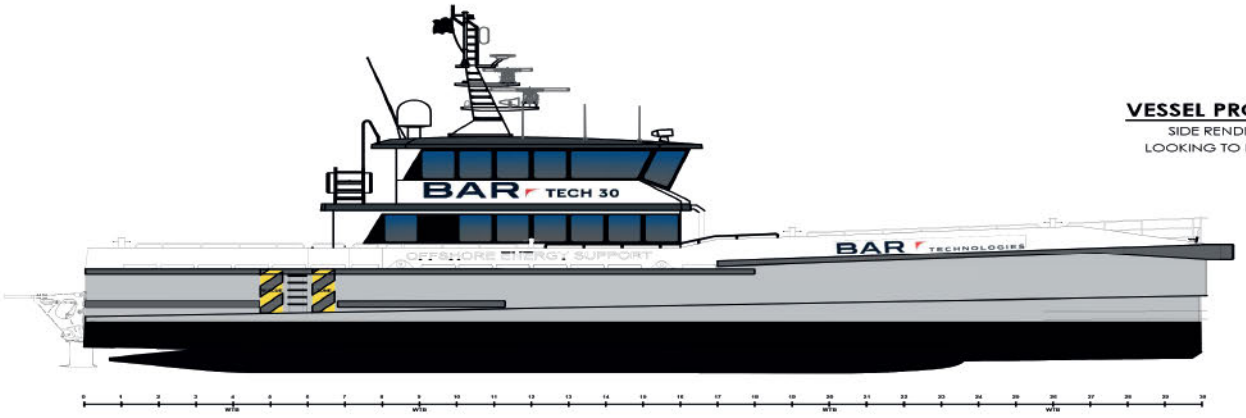
Other significant or special items of equipment:
- Foil optimised stability system (FOSS)

Classification

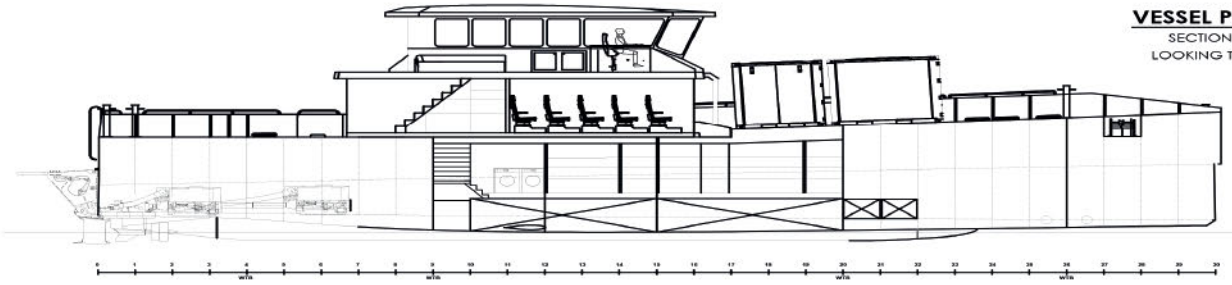
Classification society	Bureau Veritas
Notations	BV Hull • Mach Wind Farm Service Ship MO

Other important international regulations complied with:
- IMO HSC 2000
- ABS AIP

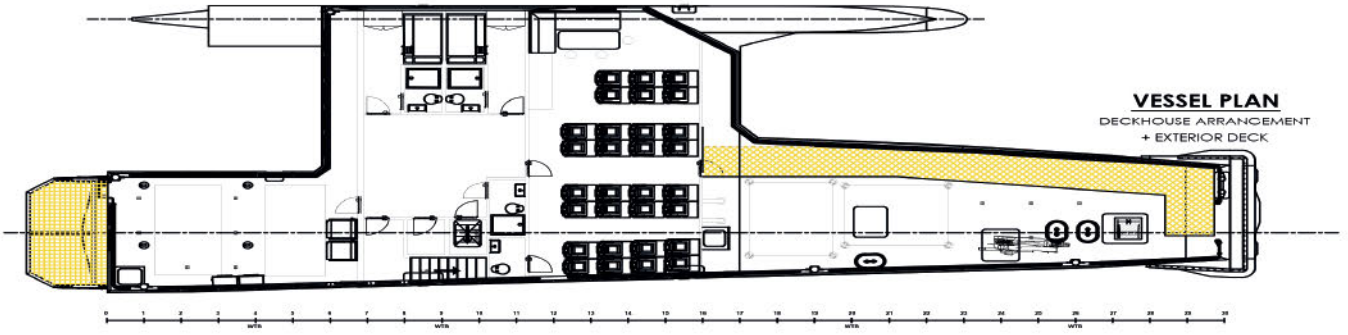
SEACAT COLUMBIA



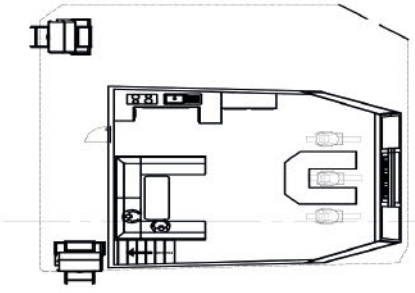
VESSEL PROFILE
SIDE RENDER
LOOKING TO PORT



VESSEL PROFILE
SECTION VIEW
LOOKING TO PORT



VESSEL PLAN
DECKHOUSE ARRANGEMENT
+ EXTERIOR DECK



VESSEL PLAN
WHEELHOUSE ARRANGEMENT

SL MACALOE – Powerful tug/standby vessel supporting FLNG terminal operations

Builder:	**Uzmar Shipyard**
Designer:	**Robert Allan Ltd.**
Vessel's name:	***SL Macaloe***
Owner/operator:	**Smit Lamnalco Singapore**
Country:	**Mozambique (Maputo)**
Flag:	**Marshall Islands**
Total number of sister ships already completed:	**2**
Total number of sister ships still on order:	**0**
Contract date:	**October 2019**
Delivery date:	**April 2022**

SL Macaloe is one of a trio of tugs – the others including *SL Ibo* and *SL Matemo* – which were designed by Canada's Robert Allan Ltd and delivered to owner Smit Lamnalco by Turkish shipbuilder Uzmar. All three vessels have entered service as scheduled at Coral Sul FLNG terminal in Mozambique - heralded as the first FLNG terminal operating in ultra-deep waters.

These tugs are the first RAstar 4200 design vessels to be used for terminal support, and have consequently been outfitted specially for these operations. These new tugs are specifically designed to be operated in the offshore area off the northeast coast of Pemba, Mozambique. The three tugboats are adding a supporting hand to FLNG operations, including the provision of berthing and unberthing service to LNG carriers and condensate tankers, as well as serving as holdback tugs during cargo transfer operations.

Like her sisters, *SL Macaloe* has been designed to exhibit good seakeeping characteristics, and is capable of performing both berthing and unberthing services in open water. The tug has considerable power, featuring a bollard pull of up to 93tonnes ahead, and is also designed to the requirements of a standby vessel. As such, *SL Macaloe* carries the Bureau Veritas notation of Standby Rescue of 20 Survivors.

The RAstar 4200 trio is designed to have a full height forecastle deck with one tier of deckhouse above the forecastle deck and below the wheelhouse. Each tug has been outfitted for an operating crew of up to 12 persons. The crew cabins, galley and mess are spaciously arranged in the deckhouse and forecastle deck. The cabins are isolated from the machinery space, in order to guarantee quiet and comfortable living spaces for all crew members. A gym has been installed on the lower deck, as well as accommodation for rescued survivors.

The tugs have been outfitted for safe and efficient ship-handling operations. Deck machinery comprises a Brattvaag escort winch and two hydraulic vertical anchor windlasses at the bow. The escort winch is spooled with a high-performance synthetic towline on each drum. On the aft deck, a towing hook, a tow pin, an aft towing winch and two tugger winches are provided. In addition, a deck crane enables deck cargo handling. "The aft deck is designed to load 100tonnes of deck cargo," Robert Allan Ltd says.

A U-tube anti-roll tank is incorporated and arranged to significantly reduce roll motions and improve the seakeeping performance in offshore operations.

TECHNICAL PARTICULARS

Length, oa	42m
Breadth, moulded	16m
Depth, moulded	6.62m
Gross tonnage	1,227tonnes
Displacement	1,888tonnes
Design, draught	6.6m
Design, deadweight	567.8tonnes
Lightweight	1,245tonnes
Deck space (total)	90m²
Deck capacity	100tonnes
Max speed	14knots
Bollard pull	93tonnes

Propulsion
Main engine(s):

Number of engines	2
Make	Anglo Belgian Corporation (ABC)
Model	12V DZC-166-1000
Output of each engine	2,900kW

Propeller(s):

Number of propellers	2
Make	Kongsberg
Model	US 35
Diameter	3,000mm
Fixed/controllable pitch	Controllable
Open/nozzled	Nozzled

Deck machinery:
Crane(s):

Number of cranes	1
Make	Heila
Model	HLRM35-5S

Winch(es):

Number of winches	2
Make	Brattvaag (escort winch and towing winch)
Model	SL150T-2T/SL120T-2T

Roller(s):

Number of rollers	1 (stern roller)
Make	Data Hidrolik Makina Sanayi
Model	DSR 1000x3000
Capacities	100tonnes

Other deck machinery/equipment:
- Tugger winches
- Tow hook & tow pins

Onboard capacities:

Fuel oil	360m³
Fresh water	117m³
Ballast water	55m³

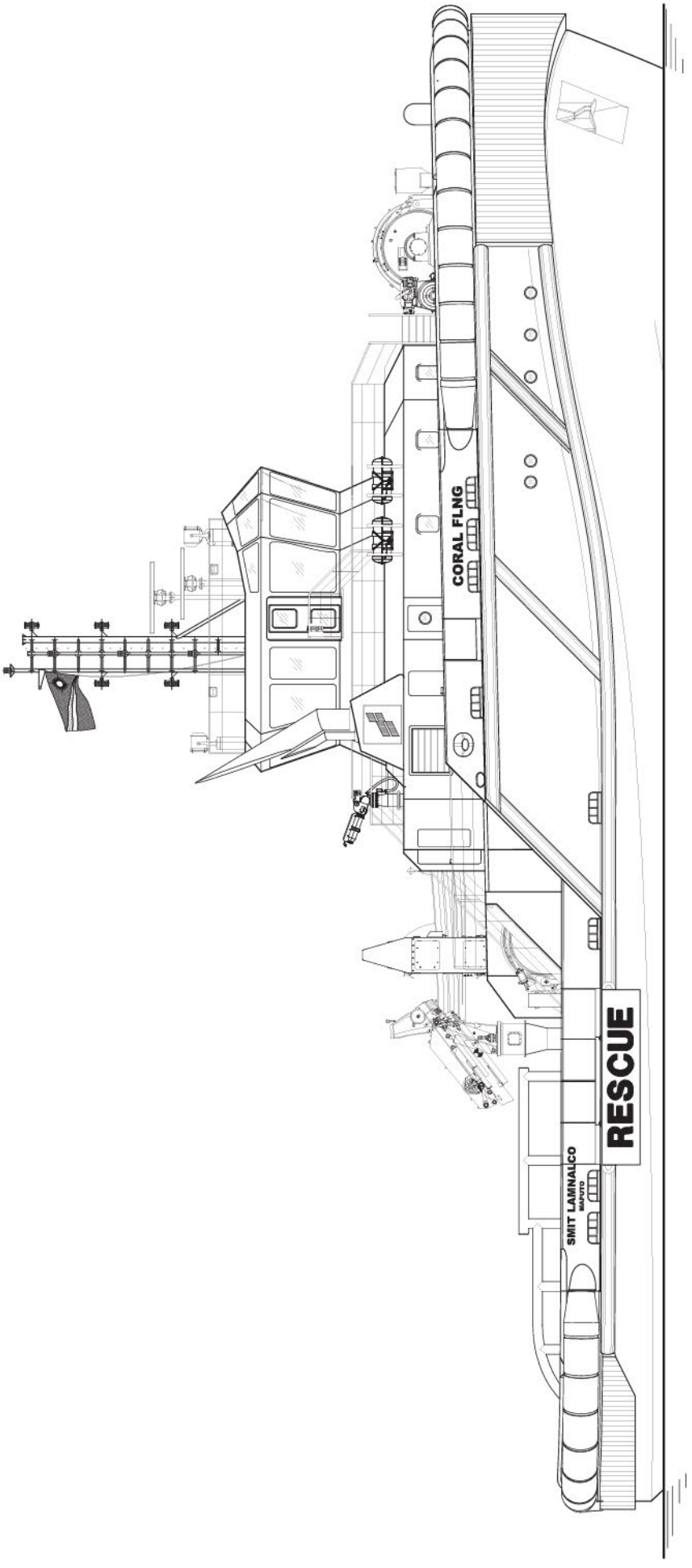
Complement:

Number of crew	12
Number of passengers	20 (survivors)
Number of cabins	0

Classification

Classification society	Bureau Veritas
Notations	I ✠Hull, ✠Mach, Tug, FI-FI 1 With Water Spray, Oil Recovery Second Line, Standby Rescue (20 Survivors), ✠ AUT-UMS, Unrestricted Navigation, Cleanship, IWS, Green Passport EU

SL MACALOE



SPARKY – Battery-powered harbour tug with notable pulling power

Builder:	**Damen Shipyards Group**
Designer:	**Damen Shipyards Group**
Vessel's name:	***Sparky***
Owner/operator:	**Ports of Auckland**
Country:	**New Zealand**
Flag:	**New Zealand**
Total number of sister ships already completed:	**0**
Total number of sister ships still on order:	**0**
Contract date:	**August 2019**
Delivery date:	**July 2022**

Sparky is Damen's first 70tonne bp fully electric tug, based on the RSD Tug 2513 design but offering zero-emission propulsion. The electric propulsion system has an energy storage of 2,800kWh and a charging time of approximately two hours, meaning the vessel can cover most of the operational profile of ports of Auckland.

The lifetime of the battery in this application is expected to be approximately 30,000 cycles, which is equal to the 30-year lifetime of the vessel. For maximum redundancy, four identical and independent battery packs are situated in each insulated, temperature-controlled battery room. The propulsion system can be sized up and down in power, and will, in the future, be used in several bigger and smaller Damen tug types, the builder says.

Sparky has a bow on both fore and aft sides of the hull. As a result, the tug can operate 'bow first' at the front side and at the aft side of a vessel requiring assistance. Twin fin skegs give the tug optimal manoeuvrability and course stability, despite its small length/beam ratio. Compact outer dimensions were also factored into the design, to help the tug to manoeuvre in confined harbours and locks. Damen says: "The combination of high freeboard, large bow height fore and aft, wide beam, low VCG and big down flooding angles make this vessel an extremely safe harbour/terminal tug."

The tug's MLC-compliant crew accommodation is situated in the deckhouse above the main deck. The complete superstructure is resiliently mounted on the hull, for low noise and vibration levels in the accommodation and the wheelhouse, and the large wheelhouse windows, featuring safety glass, provide unobstructed 360° views for the crew.

Sparky can operate with a crew of just two, thanks to a high degree of automation in the engine room, switchboard room and battery rooms. Damen's Human Machine Interface (HMI), plus the Praxis centralised alarm, monitoring and control system connected to Damen Triton, makes it possible to monitor and manage the vessel from shore.

For the captain, the RSD-E Tug 2513's controls are almost identical to those of the diesel RSD Tug 2513 version. "With the Kongsberg control levers, the captain controls propeller RPM and steering angle of each rudder propeller, and the control of the winch and all auxiliary systems are also identical to the diesel tug," Damen says.

TECHNICAL PARTICULARS

Length, oa	24.73m
Breadth, oa	13.13m
Depth at sides	4.95m
Gross tonnage	320tonnes
Displacement	540tonnes
Draught aft	6.4m
Design, deadweight	63.8tonnes
Max speed	12.3knots
Bollard pull	70.9tonnes (ahead) 70.5tonnes (astern)

Propulsion

Main engine(s):

Number of engines	2
Make	Ramme
Model	TW 1400r_L
Output of each engine	3,700kW@500rpm
Battery capacity	2,782kWh (max)

Propeller(s):

Number of propellers	2
Make	Kongsberg Maritime
Model	US 255 L-Drive
Diameter	3,000mm
Material	NiAlBr
Number of blades	3
Fixed/controllable pitch	Fixed
Open/nozzled	Nozzled

Winch(es):

Number of winches	1
Make	Damen Marine Components

Capacities:
- 1 x hydraulically driven split drum
- pull 31tonnes up to 11m/min
- reduced pull up to 50m/min
- brake holding force 175tonnes (all specified on 2nd layer)

Other deck machinery/equipment:

Firefighting set	1,200-1,400m³/hr

Bridge electronics:

Radar	Furuno FAR-1518-BB
Autopilot	Simrad AP70
GMDSS	A1
Satellite compass/GPS	Simrad GN70/ HS80A
Engine monitoring system	Praxis Automation

Other communication systems:
- Navi-Sailor 4000 ECS
- Furuno FCV-628 echosounder
- 2x Cobham Sailor 6222 VHF (one with DSC)
- 2x Jotron TR-30 hand-held VHF
- Sailor 3965 UHF radio-telephone

AIS	Furuno FA-170
EPIRB	Jotron Tron60S
Sart	Jotron Tron SART 20

Other capacities:

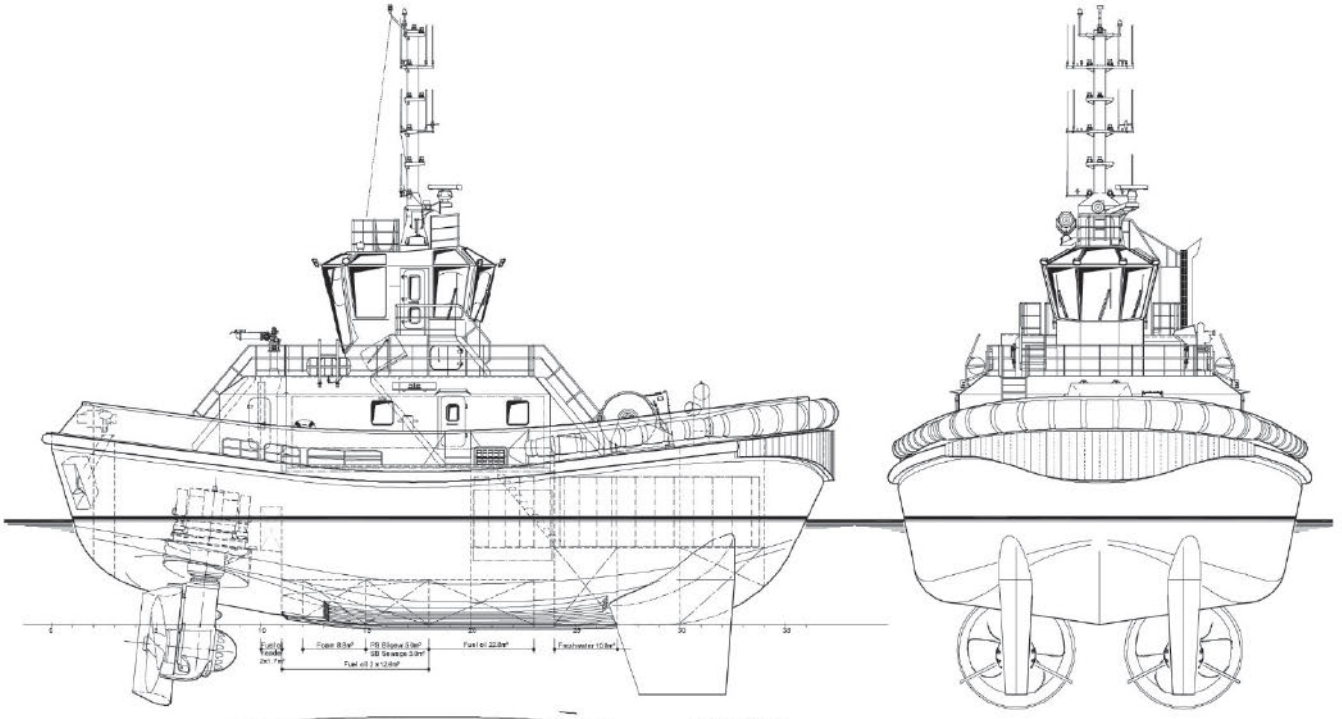
Fuel oil	50m³
Fresh water	8.7m³
Bilge water	5m³
Sewage	5m³
Clean lubrication oil	1.6m³
Dirty lubrication oil	1.6m³
Foam	8.8m³
Urea	1.5m³

Complement:

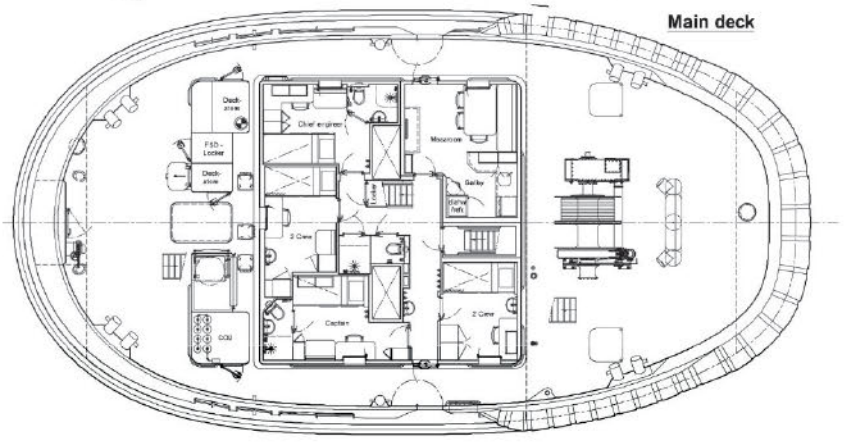
Number of crew	4 persons (MLC compliant)
Number of passengers	N/A
Number of cabins	1 x captain's cabin 1 x chief engineer's cabin 1 x double crew cabin

Classification

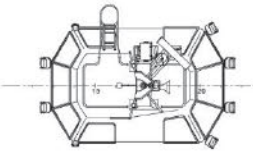
Classification society	Lloyd's Register
Notations	100 A1 Tug, Specified Coastal Service, [ ] LMC UMS IWS CAC 3 Electric Hybrid DC



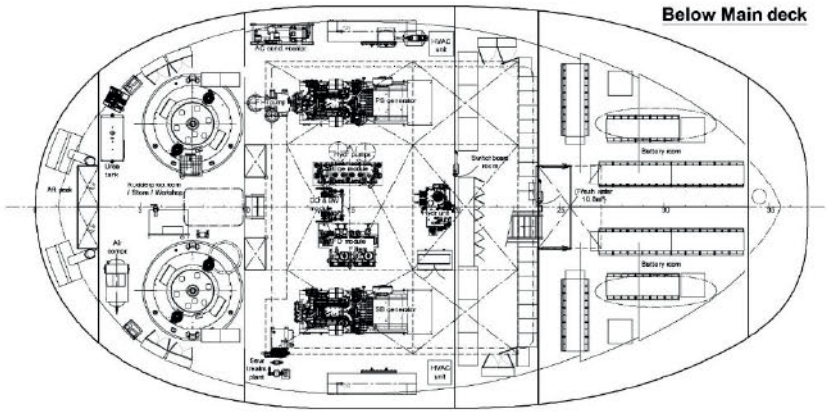
Main deck



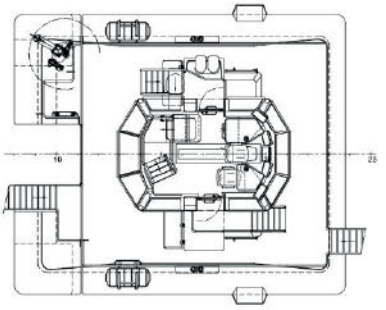
Top deck



Below Main deck



Bridge deck



TANNER & ERRINGTON – Higher-speed response boats for the London Fire Brigade

Builder:	**Holyhead Marine**
Designer:	**Camarc Design**
Vessel's name:	***Tanner/Errington***
Owner/operator:	**London Fire Brigade**
Country:	**UK**
Flag:	**UK**
Total number of sister ships already completed:	**2**
Total number of sister ships still on order:	**0**
Contract date:	**Not specified**
Delivery date:	**September 2022**

As part of City Hall's £40 million commitment to increasing the London Fire Brigade's fleet of tools and vehicles, two new aluminium fireboats were introduced to the River Thames in September 2022. The 16.2m-long boats, christened *Tanner* and *Errington*, were designed and built domestically, by naval architect Camarc and Welsh boatbuilder Holyhead Marine respectively. Both newbuilds have taken the place of the London Fire Brigade's older fireboats, which were originally built in 1999, and which are named in honour of two London Fire Brigade officers who were awarded medals for gallantry during the Blitzkrieg in World War II.

Tanner and *Errington* now provide the London Fire Brigade with enhanced capabilities, most notably in helping the brigade's crews to reach speeds in excess of 40knots, thereby enabling a rapid response to fire and/or rescue operations. "The shallow-draught hull and waterjet propulsion allow for fire and rescue operations in shallow waters, along with a bow ramp to be able to complete rescues on the river bank and mud flats," says Camarc.

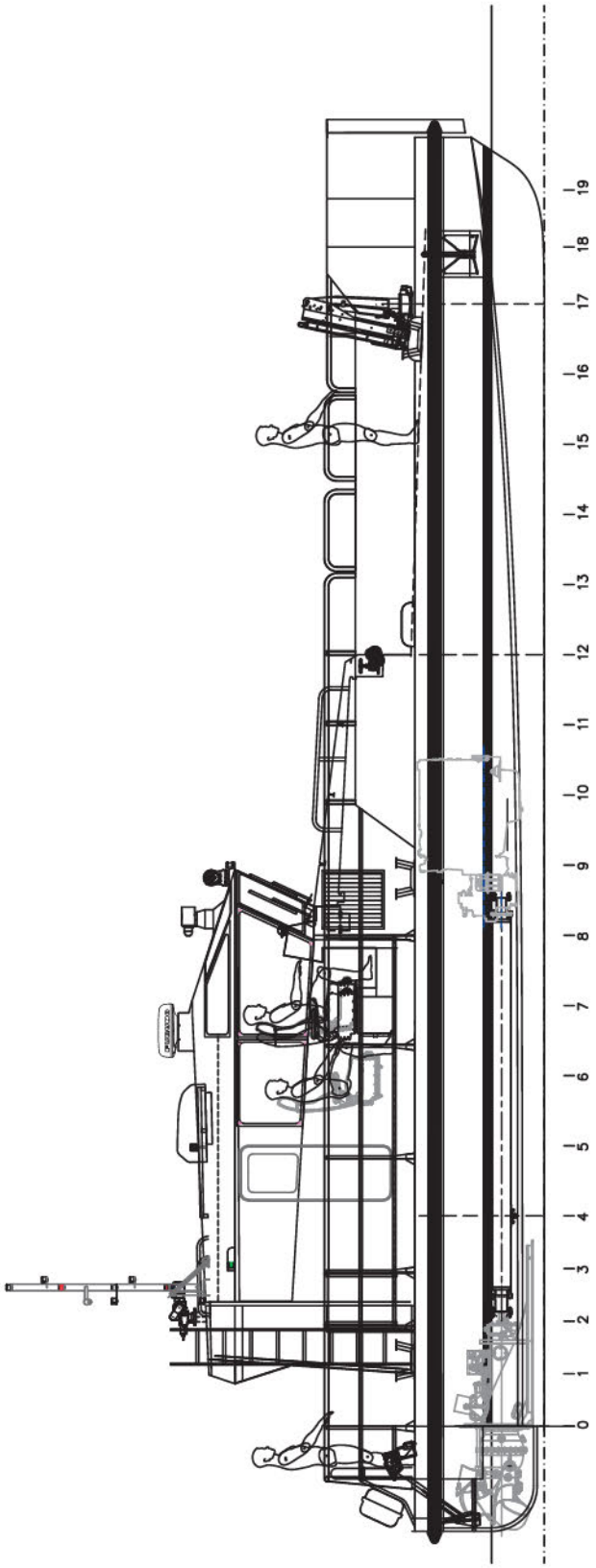
The combination of shallow draught, enhanced speed and fuel efficiency also reduce the total volume of power required, and the wake created by each boat.

The new fireboats also accommodate additional life-saving equipment. Each vessel has been fitted with two water monitors that can be controlled remotely, and which can pump 2,500litres of water per minute. The boats are also equipped with hydraulic cranes for undertaking casualty rescues from the water, as well as high-definition thermal imaging cameras, to assist with firefighting and rescue operations when visibility is restricted by thick clouds of smoke. Camarc adds: "Deck hydrants and hoses allow teams to attack fires or support land units from the river, and towing facilities allow for assisting other vessels that are in difficulty."

In combination with the enhanced hull efficiencies to reduce emissions, an IMO Tier III-rated selective catalytic reduction (SCR) system was installed to reduce emissions and meet the latest standards. For crew and passenger comfort, each boat features a resiliently mounted wheelhouse, installed to reduce noise and vibrations, and an adjustable interceptor trim control system, to optimise trim through the speed range for efficiency.

TECHNICAL PARTICULARS

Length, oa	16.2m
Length, bp	14.5m
Breadth, moulded	5m
Displacement	27tonnes
Design, draught	0.6m
Max speed	40knots+
Propulsion	
Main engine(s):	
Number of engines	2
Make	Scania
Model	DI16 076M
Output of each engine	661kw
Gearbox(es):	
Number of gearboxes	2
Make	ZF
Model	ZF 500
Waterjet(s):	
Number of waterjets	2
Make	Kongsberg
Model	S36 – 3/CA
Deck machinery:	
Crane(s):	
Number of cranes	1
Make	Hiab
Model	T-CLX 009-2
Bridge electronics:	
Radar(s)	Furuno DRS4d-NXT
Autopilot	Furuno FA170 AIS
GPS	Furuno RD33
Onboard capacities:	
Fuel oil	1,600litres
Fresh water	100litres
Sullage	175litres
Other capacities:	
- AdBlue	200litres
Complement:	
Number of crew	6
Number of passengers	12 (standing passengers) 50 (casualties)
Number of cabins	0
Classification	
Classification society	MCA
Notations	MCA Workboat Code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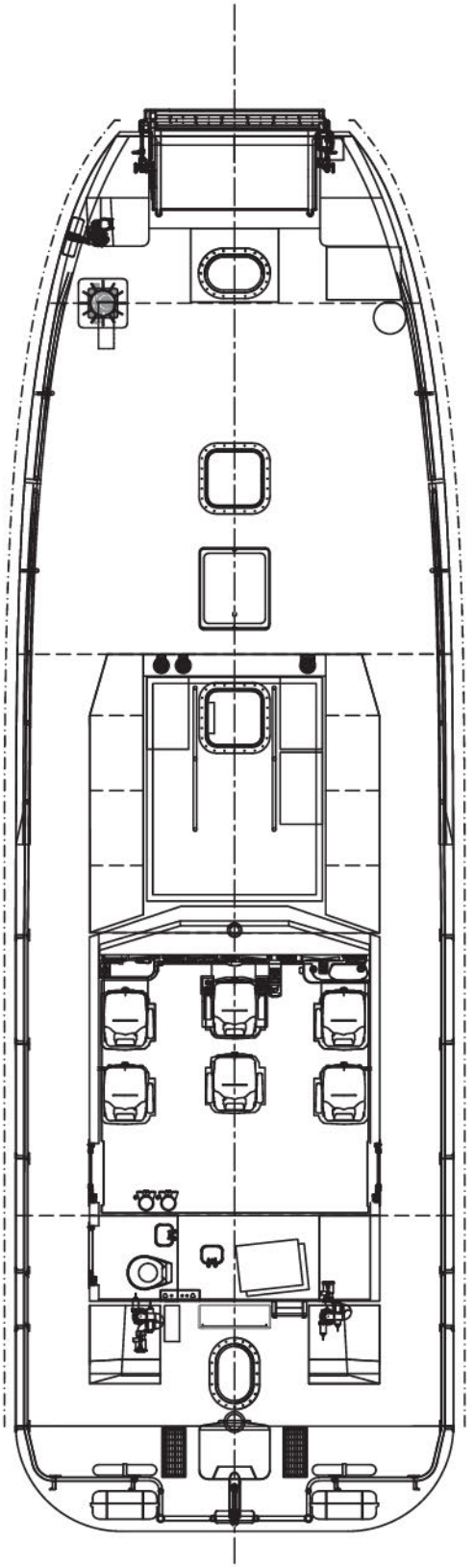

ULSAN TAEHWA – Korean eco-ferry offering 40% reduction in CO^2 emissions

Builder: ..... **Hyundai Mipo Dockyard**
Designer: ..... **Hyundai Mipo Dockyard**
Vessel's name: ..... ***Ulsan Taehwa***
Owner/operator: ..... **Ulsan ICT Promotion Agency**
Country: ..... **Korea**
Flag: ..... **Korea**
Total number of sister ships already completed: **0**
Total number of sister ships still on order: **0**
Contract date: ..... **June 2020**
Delivery date: ..... **November 2022**

Ulsan Taehwa is a dual-fuel, smart electric passenger ship, built by Hyundai Mipo Dockyard (HMD) and delivered to Ulsan ICT Promotion Agency (UIPA) in November 2022. The 89.1m ship has incorporated a DC Grid-based electric propulsion system to maximise fuel efficiency, plus a dual-fuel LNG engine, the latter capable of powering the vessel to a speed of 16knots.

HMD built *Ulsan Taehwa* in cooperation with both UIPA and the city government of Ulsan. The contract stemmed from the 'ICT Convergence Electric Propulsion Smart Ship' project. The ship essentially has three operational modes: 'zero emission', powered solely by battery; 'normal seagoing', powered by the engine' and 'boosting', which combines both engine and battery.

According to HMD, sea trials demonstrated that *Ulsan Taehwa*'s electric system was found to reduce CO_2 emissions during operation by 40% compared to conventional marine diesel engines, and to improve fuel efficiency by 6% "through optimal engine control". The LNG DF engine also enhanced performance to the extent that power generation output can be adjusted in 1/1000 second units: approximately 100 times faster than most conventional engines, HMD says.

Other onboard tech includes the Hyundai Integrated Smart Ship Solution (Hyundai ISS), which includes ship monitoring system, navigation assistance system and an operating system linked to a shore-based control centre. *Ulsan Taehwa* also protected by a smart IoT and cloud security system, developed by Hyundai Global Service, and intelligent management applications for the generator engine, cylinders and pressure/vibrations. It also carries the HiNAS anti-collision assistant system and the HiBAS intelligent berthing assistant system, to provide robotic assistance to the crew.

TECHNICAL PARTICULARS

Length, oa 89.1m
Length, bp 78.5m
Breadth, moulded 12.8m
Depth, moulded 5.4m
Gross tonnage 2,696tonnes
Design, draught 3.3m
Design, deadweight 350tonnes
Service speed 14knots
Max speed 16knots

Propulsion
Main Propulsion Engines
Number of motors 2
Make ..... Hyundai Electric & Energy Systems
Model HIN1 459-68E
Output of each motor 1,300kW

Gearbox(es):
Number of gearboxes 2
Make ..... Renk
Model RSV-500
Output speed 226rpm

Propeller(s):
Number of propellers 2
Make ..... HMD/Haeyang Metal
Material ..... Ni-Al-Br
Number of blades 4

Deck machinery
Winch(es):
Number of winches 3
Make ..... Yoowon Industries
Model YH-4MW-D2-2V
Capacities ..... 3.9tonnes@15m/min

Bridge electronics:
Radar(s) ..... Furuno FAR-2338S/FAR-2328
Autopilot ..... Tokoy Keiki PR-9320A-E1-ST2
VHF ..... Furuno FM-8900S
GPS ..... Furuno GP-170
Gyro ..... Tokoy Keiki TG-8000
Chart plotter (ECDIS) ..... Marine Works HTB30
Engine monitoring system ..... Hyundai Global Service HiCONiS
Fire detection system ..... B-I Industrial Co. BDS-4000

Onboard capacities:
Fuel oil (MGO) ..... $50m^3$
LNG ..... $60m^3$
Fresh water ..... $30m^3$
Sullage ..... $50m^3$
Ballast water ..... $180m^3$

Complement:
Number of crew 12
Number of passengers 288
Number of cabins 0

Classification
Classification society ..... Korean Register

Notations ..... KRS OC – Passenger Ship, Leisure, LFFS(DF-LNG), HMS +KRM OC – UMA, CMA, Battery-A, LI

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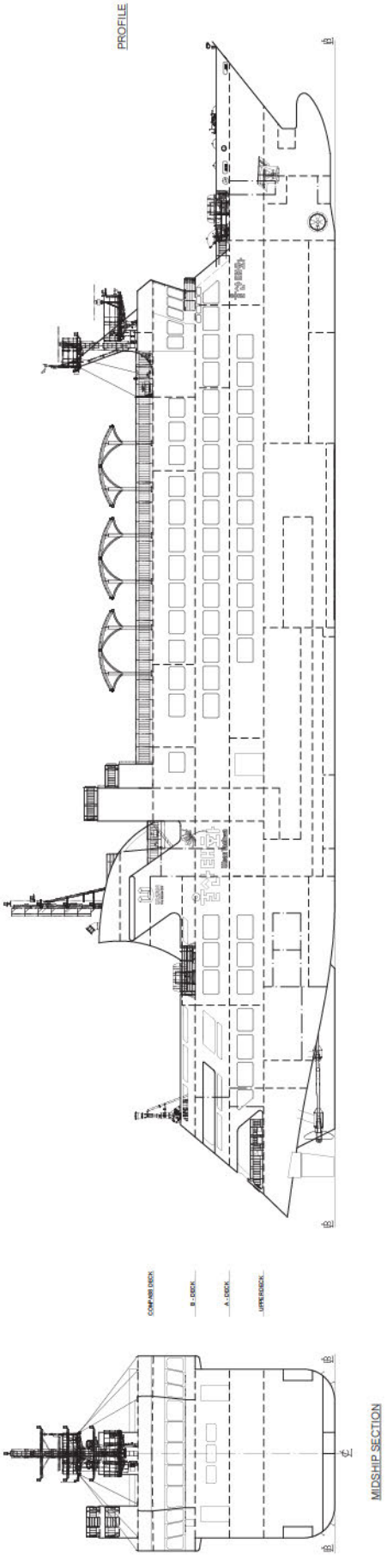

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E: putri.wulandari@informa.com

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VENTURE IV – Trawler with a specially developed, uncommon hull

Builder:	**Macduff Shipyards Limited (outfitting) / Finomar (hull)**
Designer:	**Macduff Shipyards Limited & Macduff Ship Design**
Vessel's name:	***Venture IV***
Owner/operator:	**Mark Lovie**
Country:	**UK**
Flag:	**UK**
Total number of sister ships already completed:	**1**
Total number of sister ships still on order:	**0**
Contract date:	**Unspecified**
Delivery date:	**November 2022**

Designed and built for trawling in the North East Atlantic, *Venture IV* features a bow design that is "often overlooked as suitable for small fishing vessels", Macduff Ship Design explains. The project began when the owner requested a new fishing vessel with improved fuel efficiency, service speed and seakeeping compared to their existing vessel. An early study between Macduff Ship Design and Macduff Shipyards Limited concluded that, to achieve this, a longer ship, free from the constraints of registered length, would likely be required.

At this point, the yard reached out to the Wolfson Unit in Southampton and an initial trial was carried out using CFD technology to assess the differences in calm water hull resistance between an existing hull form and a new concept model. "The new concept hull form was an evolution of the *Endeavor V* hull, which was delivered in February 2021," says Macuduff. As well as having a ship free from registered length restrictions, it was decided that, to fully hone in on the desire for efficiency and seakeeping, it would be beneficial to have a bow design with much more volume than a traditional bulbous bow shape.

Macduff recalls: "The new fuller bow design was assessed against the previous hullform, and the data showed that a reduction in hull resistance could be achieved with the fuller bow hull form. However, the computational-based analysis could not assess the differences in seakeeping qualities, so a further trial was conducted at the Wolfson Unit, towing representative scale models in the Solent University Towing Tank facility.

Both hullforms were assessed at various speeds in both calm water and head seas with wave properties reflecting those found in the North Atlantic. "As well as confirming the reduction in hull resistance between the two models, the tank testing also enabled seakeeping to be measured and it was concluded that a fuller bow hull experienced considerably less pitching motions along with lower bow impact from wave force," says Macduff.

TECHNICAL PARTICULARS

Length, oa	34.5m
Length, bp	31.56m
Breadth, moulded	10.5m
Depth, moulded	4.9m
Gross tonnage	642tonnes
Displacement	960tonnes (depart port)
Design, draught	6.1 - 6.3m
Design, deadweight	220tonnes
Lightweight	760tonnes
Deck space	200m² (at trawl deck)
Deck capacity	1tonne/m²
Service speed	11knots
Max speed	13knots
Bollard pull	30tonnes (estimated)

Propulsion
Main engine(s):

Number of engines	1
Make	Yanmar
Model	6EY26W
Output of each engine	1,110kW@750rpm

Gearbox(es):

Number of gearboxes	1
Make	MEProduction (Mekanord)
Model	650HS
Output speed	5.44:1

Propeller(s):

Number of propellers	1
Make	Helseth
Model	4TX750/260-3300
Diameter	3.3m
Material	AB2 (aluminium bronze)
Number of blades	2
Speed	13knots
Fixed/controllable pitch	Controllable
Open/nozzled	Nozzled

Deck machinery:
Crane(s):

Number of cranes	1
Make	Toimil Garcia S.L.
Model	T-35000MT/4
Capacities/SWL	2.315tonnes@12.2m

Other deck machinery/equipment:
MacGregor supply:
- 3 x trawl winches (30tonnes core pull each)
- 3 x split sweep net winches (19tonnes core pull each)
- 3 x bagging drum winches (12.5tonnes core pull each)
- 2 x cod end lifting winches (10.3tonnes core pull each)
- 2 x net Gilson winches (13tonnes core pull each)
- 2 x gantry winches (5.9tonnes core pull each)
- 3 x gear handling winches (2.9tonnes core pull each)
- 1 x fish landing winch (2.9tonnes core pull)
- 1 x triple barrel anchor/mooring winch (5.5 tonnes core pull)
- MacGregor Pentagon autotrawl system

Bridge electronics:

Radar(s)	2 x Furuno
Autopilot	Simrad
GMDSS	Sailor
GPS	Furuno
Gyro	Furuno
Chart plotter	Furuno
Engine monitoring system	Noris Automation
Fire detection System	Electronic Device 16 Zone
Other communication systems	Noris Automation Alarm & Monitoring Panel

Onboard capacities:

Fuel oil	95,278litres
Fresh water	14,775litres (domestic) / 35,794litres (ice)
Ballest water	18,204litres

Complement:

Number of crew	12 certified
Number of passengers	0
Number of cabins	8

Classification

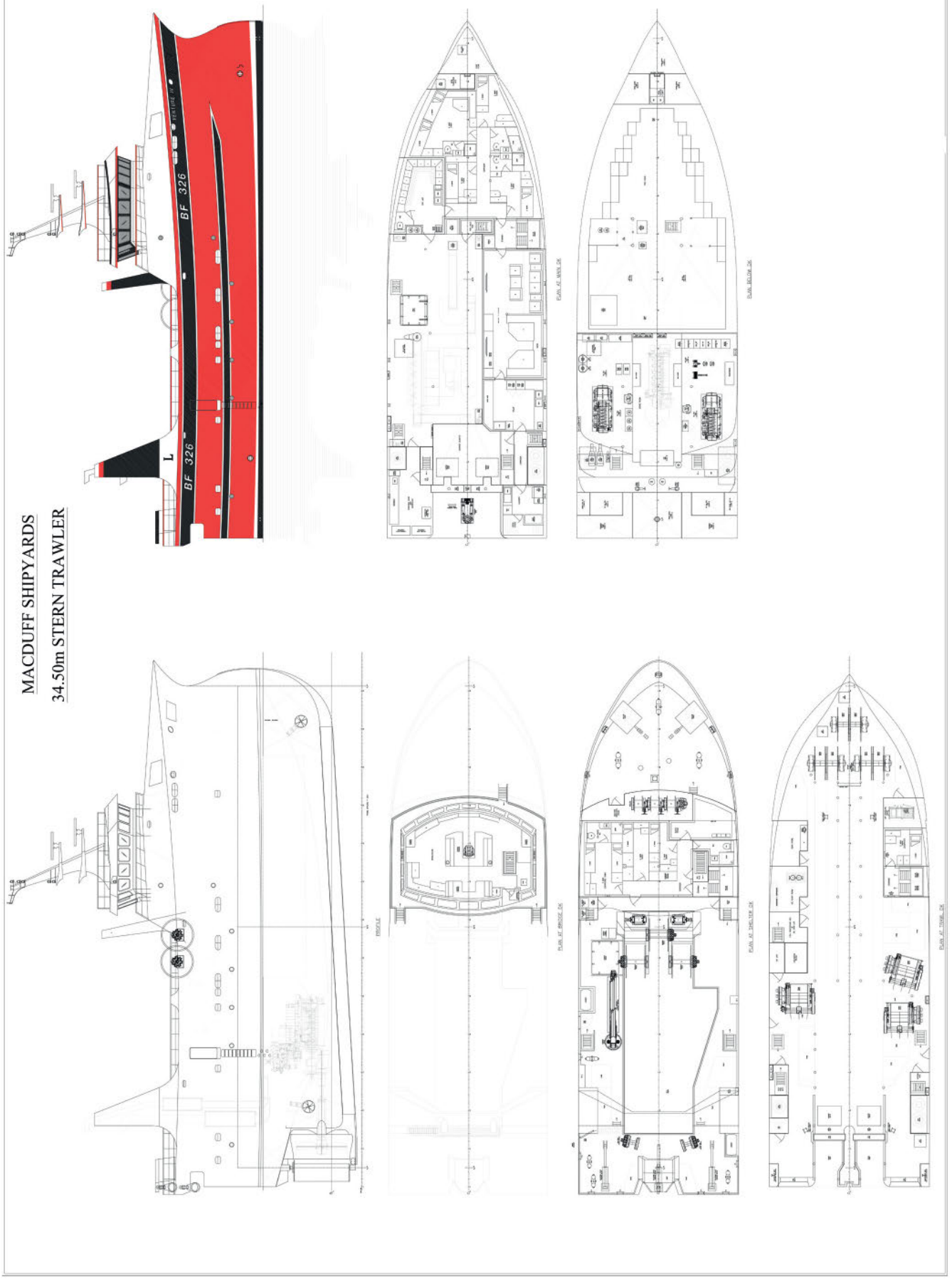
Classification society	Bureau Veritas
Notations	BV I + HULL • MACH, Fishing Vessel, Unrestricted Navigation

Other important international regulations complied with
- MCA IFVC >24m Fishing Vessel
- International Sewage Pollution Prevention Certificate
- International Oil Pollution Prevention Certificate
- International Anti-Fouling System Certificate
- International Air Pollution Prevention Certificate

VENTURE IV

MACDUFF SHIPYARDS

34.50m STERN TRAWLER



XIN SHENG TAI – Commuter ferry fuelled by a high-power supercapacitor system

Builder: ..... **Yaguang Technology Group Co, Ltd**
Designer: ..... **Shanghai Merchant Ship Design & Research Institute, CSSC (SDARI)**
Vessel's name: ..... ***Xin Sheng Tai***
Owner/operator: ..... **Shanghai Passenger Ship Co, Ltd**
Country: ..... **China**
Flag: ..... **China**
Total number of sister ships already completed: **0**
Total number of sister ships still on order: **0**
Contract date: ..... **December 2019**
Delivery date: ..... **November 2022**

Late 2022 saw the delivery of *Xin Sheng Tai*, an electric ferry designed by the Shanghai Merchant Ship Design & Research Institute (SDARI) and built by Yaguang Technology Group. The ferry will provide public transport to commuters between Changxing Island and Hengsha Island, on the Yangtze River estuary, with a remit for 24 round trips daily.

Xin Sheng Tai can carry up to 165 passengers and 30 cars (or 14 trucks). "The 2km crossing takes about six minutes," SDARI told *Ship & Boat International* in November last year. Key to the ferry's power is a 625kWh supercapacitor system, which will be the main source for both onboard and propulsive electric power. Typically, batteries provide more energy over a longer period of time: sometimes, up to 10x as much as a supercapacitor. However, supercapacitors deliver their energy around 10x quicker than batteries do – and, given *Xin Sheng Tai*'s relatively short crossings, SDARI decided that this energy source would be the better option.

Supercapacitors also tend to have low internal resistance and do not generate as much as heat as batteries do following a short circuit – a beneficial safety feature. SDARI says: "With the rapid charge-discharge rate, high power density and virtually unlimited lifecycles, no replacement of the supercapacitor is required. Accurate monitoring and control of the energy can be achieved as the supercapacitors have performance of linear charge and discharge voltage."

Xue Bing, the ferry's chief engineer, has added: "The supercapacitor has four groups of batteries, and comprises 60 capacitor modules combined. Each module has 360 single capacitor cells, and there are 21,600 single cells in total. If a fault occurs, the service provider can obtain data remotely, communicate with us in time and guide us to correct the fault."

The ferry will recharge via a quayside DC fast-charging system at Changxing Island. "This system offers continuous charging power up to 2.5MW during the boarding and loading period," says SDARI. In an additional move to reduce energy consumption, SDARI ran CFD calculations and model testing at the Shanghai Ship and Shipping Research Institute (SSSRI), to optimise the ferry's hull lines. As a result, *Xin Sheng Tai* could cut 1,000tonnes of CO_2 yearly compared to an equivalent-sized diesel-powered vessel, SDARI estimates. The vessel also carries twin diesel gensets for emergency use, should the crew need to quickly return to port or access a typhoon shelter.

The hope is that the ferry will spearhead a wider transition to green propulsion for inland vessels transiting Shanghai and its surrounding areas.

TECHNICAL PARTICULARS

Length, oa 65m
Length, bp 62.5m
Breadth, moulded 14.5m
Depth, moulded 4.3m
Displacement 1,040m³
Design, draught 2.5m
Design, deadweight 250tonnes
Deck space (total) 513m²
Deck capacity 2tonnes/m²
Service speed ..... 10knots (60% of the max. output of the rudder propeller, with 10% SM)
Max speed 11.8knots

Propulsion
Main engine(s):
- Number of engines 2
- Make ..... Chongqing Cummins Engine Co, Ltd
- Model K19-DM
- Output of each engine ..... 507kW@ 1,800rpm

Propeller(s):
- Number of propellers 2
- Make ..... Sjmatek (Suzhou) Marine Machine Co.
- Model SZP35A-FP
- Diameter 1,385mm
- Material ..... Ni-Al-Br
- Number of blades 4
- Fixed/controllable pitch ..... Fixed
- Open/nozzled ..... Nozzled
- Special adaptations ..... Rudder propeller

Winch(es):
- Number of winches 4
- Make ..... Hangzhou Botu Marine Mechanical & Electrical Equipment Co.
- Models 225HBTYMA32-00WX 227HBTYB-50-00WX
- Capacities ..... 50kN, ≥15m/min (rope winding)

Bridge electronics:
- Radar(s) ..... JRC JMR-5410-6X
- GMDSS ..... Furuno FM8900S
- GPS ..... Furuno GP-170
- Chart plotter ..... Shanghai Aiwei AWENA-1
- Fire detection system ..... Kexun K1302
- Other communication systems ..... Kexun KG-4

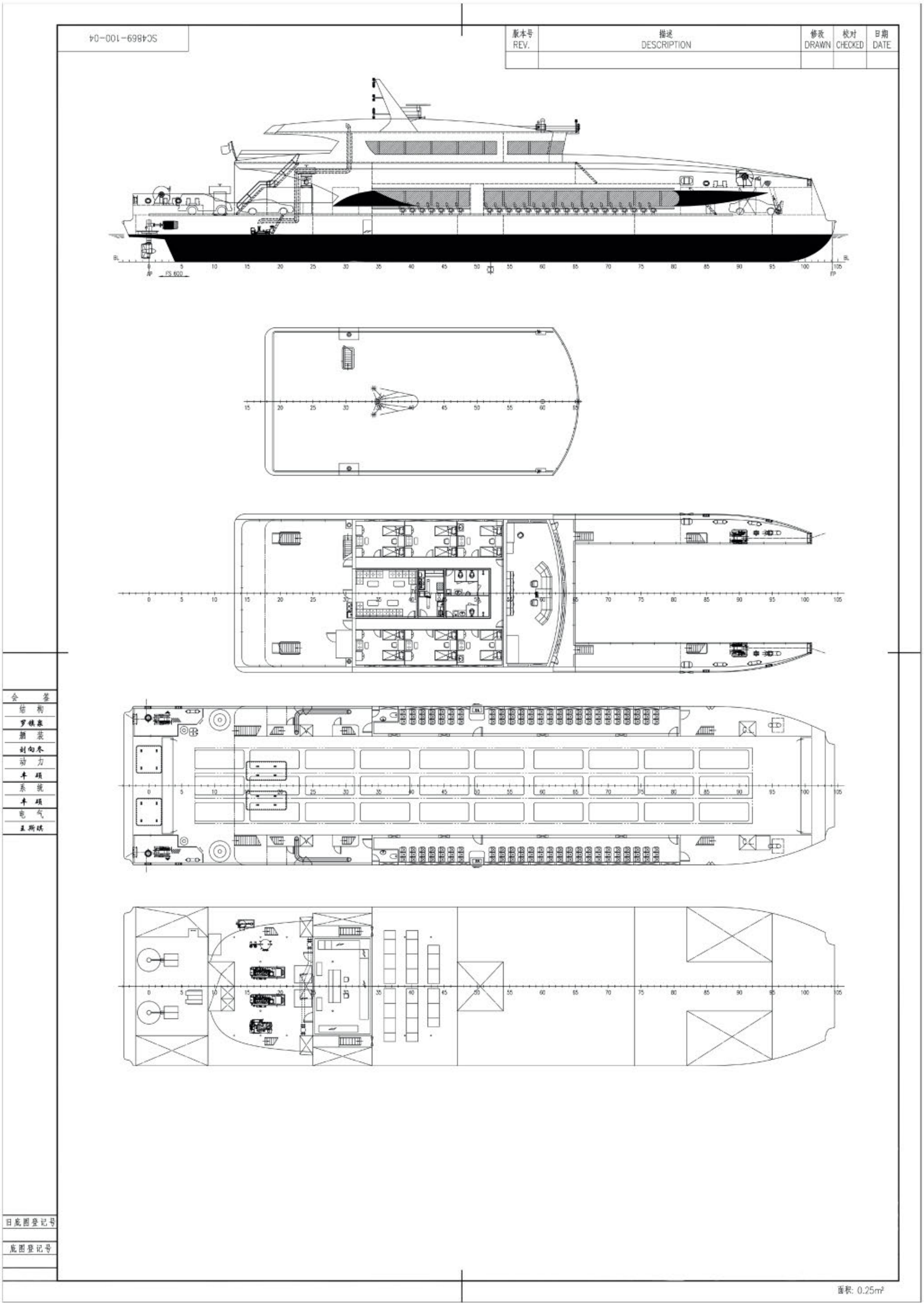
Onboard capacities:
- Fuel oil 17,000litres
- Fresh water 36,000litres
- Sullage 15,000litres
- Ballast water 118,000litres

Complement:
- Number of crew 10
- Number of passengers 165
- Number of cabins 0

Vehicles:
- Number of vehicle decks 1
- Total lane length 51m
- Number of cars 30
- Number of trucks/trailers ..... 14 trucks (instead of cars)

Other significant or special items of equipment:
- 625kWh supercapacitor

Classification
- Classification society ..... China Classification Society
- Notations ..... ★ CSAD Ferry, Inland river navigation area A Class ★ CSMD AUT-1, Electrical Propulsion system, Green Ship-2



版本号
REV.
描述
DESCRIPTION
修改
DRAWN
校对
CHECKED
日期
DATE
会签
结构
舾装
动力
系统
电气
旧底图登记号
底图登记号
面积: 0.25m²

YU FENG ZHE 001 – Catamaran CTV developed for Chinese offshore wind farms

Builder:	**Afai Southern Shipyard (Panyu Guangzhou) Ltd.**
Designer:	**Incat Crowther**
Vessel's name:	***Yu Feng Zhe 001***
Owner/operator:	**Shanghai Goldsea Marine and Offshore Engineering Co, Ltd.**
Country:	**China**
Flag:	**China**
Total number of sister ships already completed:	**0**
Total number of sister ships still on order:	**0**
Contract date:	**September 2021**
Delivery date:	**November 2022**

Yu Feng Zhe 001 is a high-speed catamaran wind farm support vessel built by Afai Southern Shipyard for Shanghai Goldsea Marine. This vessel's design has been based on the characteristic of wind farms in China, and the requirements of wind farm operation and maintenance within this region.

The CTV's powertrain was selected to provide sufficient thrust and manoeuvrability for vessels sailing at low speed, for added efficiency and safety when pushing on and embarking. Furthermore, an integrated multi-function hydraulic system is installed with various equipment such as a hydraulic bow thruster and deck crane. The vessel is equipped with a new type of buffer and professional rubber fender, loading a maximum deadweight of 60tonnes.

Yu Feng Zhe 001 offers its captain multiple operation modes to suit different working conditions, and for condition-specific efficiency. These include: servo mode; pushing mode; berthing mode (translational motion); and single joystick control mode.

The fore part of the boat's main deck is fitted with multi-section damping rubber fender, to mitigate the impact of the wind turbine on the bow, as well as the fender itself, in heavy sea states. The vessel has also adopted a multi-section rubber fender, which can be replaced separately depending on the abrasion of the rubber fender in different areas, in a bid to improve the economy of the vessel.

The elastic mounting of superstructure is intended to improve the comfort of the technician passengers, and the superstructure and main hull have been isolated, to reduce the vibration and noise in the cabin. The builder says that this layout has restricted noise levels to: 63-70dB in the first floor cabin; 57-66dB in the second floor cabin; and 57db or lower in the bridge.

Afai Southern Shipyard adds: "Multiple systems have improved the economy and safety of the vessel, achieving energy efficiency, emission reduction and consumption reduction. The integrated hydraulic power system could make full use of the spare power of the main engine to drive the hydraulic equipment when the main engine is idling, and in other different working conditions, so as to achieve energy efficiency and emission reduction. This system, unlike traditional electric systems, has reduced generator power and distribution capacity, improving the space use rate and maximising the economy." The CTV has been equipped with an adjustable interceptor system, to achieve best ship attitude and speed, and to reduce fuel consumption caused by excessive trim.

TECHNICAL PARTICULARS

Length, oa	30.94m
Length, bp	28.7m
Breadth, moulded	10m
Depth, moulded	4.15m
Gross tonnage	339tonnes
Displacement	195.8tonnes
Design, draught	1.82m
Design, deadweight	84tonnes
Lightweight	111.79tonnes
Deck space (total)	90m^2
Deck capacity	2tonnes/m^2
Service speed	20.13knots
Max speed	24.78knots
Bollard pull	~20tonnes
Range	1,000nm

Propulsion

Main engine(s):

Number of engines	2
Make	MAN
Model	D2862 LE466
Output of each engine	1,029kW

Gearbox(es):

Number of gearboxes	2
Make	Kumera Helseth
Model	KMG-350VUR&UL-PTO
Output speed	656rpm

Propeller(s):

Number of propellers	2
Make	Kumera Helseth
Diameter	1,250mm
Material	CuNiAl
Number of blades	4
Fixed/controllable pitch	Controllable

Deck machinery

Winch(es):

Number of winches	1
Model	YB15.3-9

Bridge electronics

Radar(s)	Furuno FAR-2218
GPS	BDS / GN150-12
Gyro	Harbin Hatran Navigation Technology Co. / SINS-FOG-C001
Chart plotter	XINUO/ HM-5817
Fire detection system	Kexun Electron

Onboard capacities:

Fuel oil	2 x 17,000litres
Fresh water	2 x 12,500litres
Sullage	2,000litres

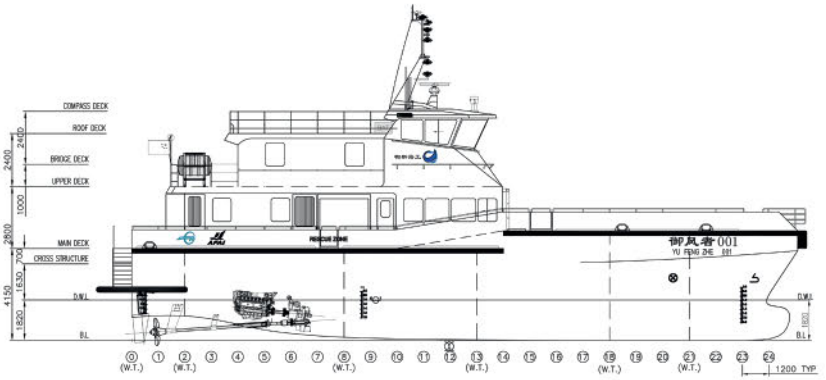
Complement:

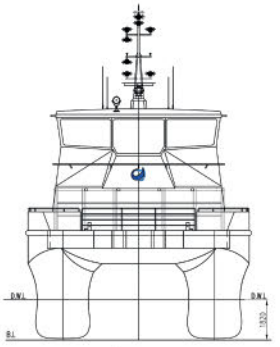
Number of crew	6
Number of passengers	12
Number of cabins	6

Classification

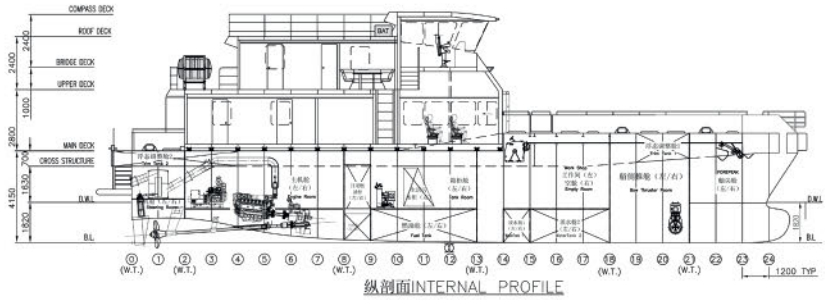
Classification society	CCS
Notations	★ CSA Catamaran HSC, Cargo, Greater Coastal Service Restriction ★ CSM

YU FENG ZHE 001

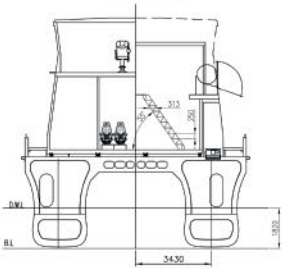




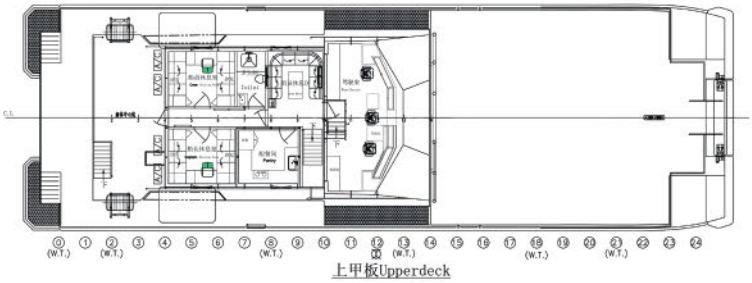
艏视图
BOW VIEW



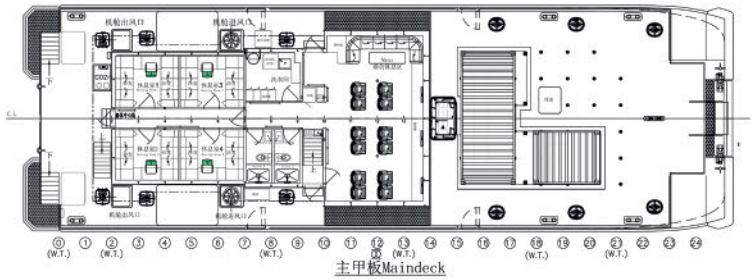
纵剖面INTERNAL PROFILE



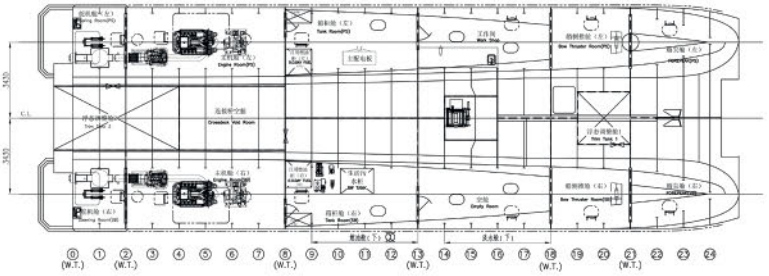
典型横剖面图
TYPICAL SECTION



上甲板Upperdeck



主甲板Maindeck



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❑ SS & SSS as a set	Members £15	Non-members £30	❑ PDF	❑ Printed
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❑ SS & SSS 1990-2020 as a set	Members £750	Non-members £850	❑ PDF	❑ Printed
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❑ SS 2000-2020 set	Members £300	Non-members £350	❑ PDF	❑ Printed
❑ SSS 2000-2020 set	Members £300	Non-members £350	❑ PDF	❑ Printed
❑ SS & SSS 2000-2020 as a set	Members £500	Non-members £600	❑ PDF	❑ Printed
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