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SIGNIFICANT SMALL SHIPS OF 2020

Welcome to *Significant Small Ships of 2020*, the Royal Institution of Naval Architects' annual round-up of first-in-class and/or unique vessel and boat designs in the 5-100m loa class.

There's no escaping the fact that 2020 was overshadowed by the COVID-19 pandemic, which disrupted ship delivery schedules, created logistical headaches for crews, drove the cruise sector to despair and forced the cancellation of virtually every international marine trade show.

It was a year in which our sector swapped conference badges for Zoom links, and drone technology came to the fore as a valuable inspection tool; a time when ferry safety seminars had a brand new risk to assess. However, let's not forget the thousands of fishermen, workboat crew, coast guard operatives and wind turbine technicians who held the line during 2020, working 'as usual' throughout each lockdown.

Unsurprisingly, the majority of vessel handover ceremonies in 2020 were rather muted, at least in comparison to previous years. However, as this edition of *Significant Small Ships* attests, the drive for design innovation and quality vessel construction remains as strong and focused as ever.

For instance, we were pleased to welcome a few prototypes to our roster this year. The VICTA diver deployment unit (page 68) is a fascinating and versatile concept, capable of operations both on and below the surface. While it can be deployed as a reconnaissance tool for military end users, VICTA could also assist offshore platform inspections, or even serve as a high-end recreational toy for yacht owners and hotel tour operators.

Another interesting vessel with regards to military/police operations is CP329 (page 14), which has met the requirements for class society RINA's 'self-righting' and 'unsinkable' notations. Meanwhile, Marell Boats' new M15 Quad Outboard High-Speed Interceptor (page 36) harnesses more than 1,300kW of power to achieve an eye-watering top lightspeed of 67knots.

When it comes to self-isolation, we can think of worse places to hole up than aboard the solar-powered houseboat *Noé* (page 40). This vessel has been approved for sailing categories B and C, as well as

enabling owners to moor up wherever they choose, and even boasts its own option for a greenhouse and a garage area – making the boat, in its developer's words, "a tool for semi-autonomous living". In a similar vein, the all-electric catamaran *Solar Eclipse* (page 60) spreads an array of solar panels across its 55m² roof, permitting the boat to cruise continuously at an average speed of 4knots+.

The autonomous research vessel *Mayflower 400* (page 38) was another notable launch of 2020, and will soon embark on its transatlantic research trip, collating oceanic data while piloted by an 'AI captain'. This robotic boat was named to commemorate the ship that transported the English Pilgrims to the 'New World' of America in 1620: we can only guess what they would have made of its 21st century namesake.

The US, of course, has ambitions to boost its network of offshore wind farms, and we can surely look forward to a series of domestically built crew transfer vessels (CTVs) and service operation vessels (SOVs) in future editions. For now, we chose to profile UK operator Seacat Services' new 24m CTV *Seacat Weatherly* (page 54), which features one of the largest foredecks on the market, and which was designed for enhanced personnel safety, plus high bollard push and frictional holding force when pushing on to the wind turbines.

As always, we would like to thank all of the naval architects, builders, operators and equipment suppliers who contributed the necessary information, pictures and general arrangements. At the time of writing, Q1 2021 appears to be offering 'more of the same' with regards to lockdowns and restrictions, and it would be rash therefore to make any predictions regarding the coming year. We have little doubt, though, that both designers and boatyards will continue to innovate, and produce memorable, efficient and cutting-edge vessels for next year's edition. If you're part of that process, we would be delighted to hear from you.

Martin Conway,
Editor

Despite
the pandemic,
the drive for design
innovation remains as
strong and focused
as ever



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A.P.T. JAMES: First in Austal's Auto Express 94 high-speed catamaran ferry class

Builder **Austal Vietnam**
 Designer **Austal Ships**
 Vessel's name **A.P.T. James**
 Owner/operator **National Infrastructure Development Company**
 Country **Trinidad and Tobago**
 Flag **Trinidad and Tobago**
 Total number of sister ships already completed **0**
 Total number of sister ships still on order **0**
 Contract date **November 2018**
 Delivery date **November 2020**

November 2020 saw Australian shipbuilder Austal deliver the first commercial vessel constructed entirely at its 9,820m² Vung Tau facility in Vietnam since that site commenced operations in March 2018.

A.P.T. James was handed over to the National Infrastructure Development Company (NIDCO) of Trinidad and Tobago, which will use it to shuttle passengers and their vehicles across the 'sea bridge' linking the two Caribbean islands. The ferry was named after Alphonso James, a Tobago-born politician and businessman who was mainly politically active between the 1940s-1960s. The vessel is the first in Austal's Auto Express 94 class, designed by Austal's Australian division.

The all-aluminium ferry features a raked-bow design and has been equipped with four MAN 16V 28/33D diesel main engines: a brand more commonly associated with naval and patrol applications, albeit one that has found its way onto superyachts (and which Austal previously installed aboard its 112.6m catamaran *Leonora Christina*, delivered to Nordic Ferry Services in 2011).

The engines drive four Kamewa S3-112 waterjets through Reintjes VLJ 7531 gearboxes, granting *A.P.T. James* a cruising speed of 37.5knots at 90% MCR.

To balance high speed with crew and passenger comfort, Austal has also fitted the ship with an advanced motion control system. For fuel storage, the vessel relies on a pair of 80,000litre-capacity

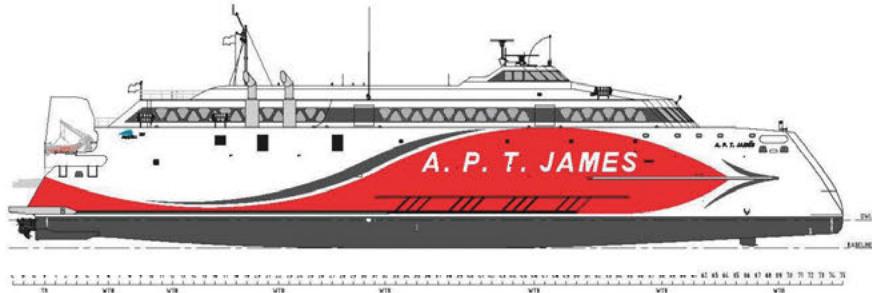
tanks, while onboard passenger facilities include a large kiosk and two bar areas. Class society DNV GL has granted *A.P.T. James* the notation ✱1A HSLC R1 Ferry B E0.

Austal's Vung Tau yard currently employs around 450 personnel. Speaking around the time of the ferry's handover in November 2020, David Singleton, Austal CEO, commented: "Austal Vietnam is now clearly a valuable asset in our commercial vessel shipbuilding network, building upon and complementing the growing capability in the Philippines, while also freeing up capacity in our Australian shipyard for additional defence contracts for the Royal Australian Navy and export markets."

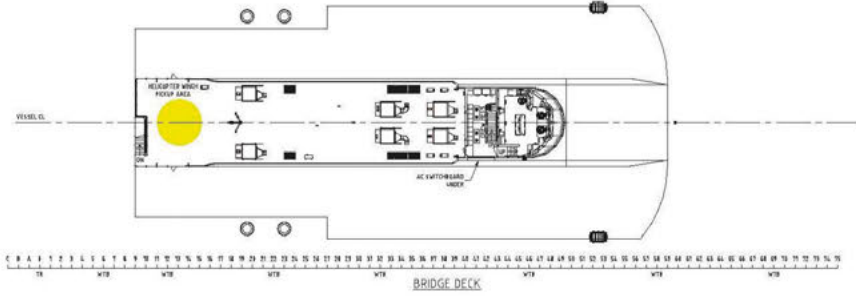
TECHNICAL PARTICULARS

Length, oa 94m
 Length, bp 90m
 Breadth, moulded 26.2m
 Depth, moulded 7.8m
 Gross tonnage 6,542tonnes
 Design, draught 3m
 Design, deadweight 595tonnes
 Lightweight 1,000tonnes
 Deck space (total) 250 cars / 222 cars + 90m of truck lanes, 10 motorbikes
 Deck capacity Variable (up to 12tonne axle loads for trucks)
 Service speed 37.5knots@90%MCR
 Max speed 44knots
 Range 1900nm@38knots
 Main engines
 Number of engines 4
 Make MAN
 Model 16V 28/33D
 Output of each engine 7,280kW
 Gearboxes
 Number of gearboxes 4
 Make Reintjes
 Model VLJ 7531
 Waterjets
 Number of waterjets 4
 Make Kamewa
 Model S3-112

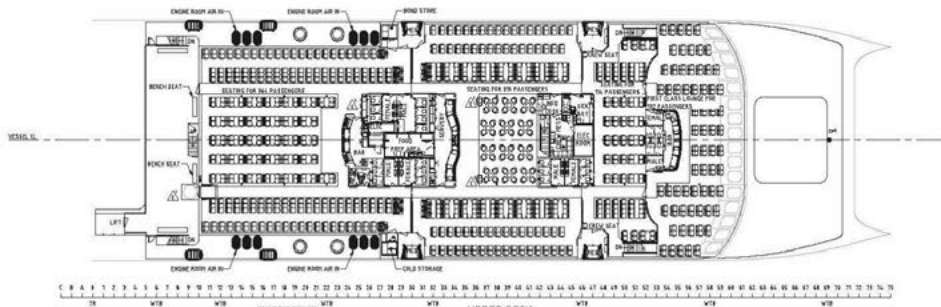
Bridge electronics
 Radar(s) X-Band, Furuno FAR3210BB; S-Band, Furuno FAR3230SSSD-BB
 Autopilot Navitron NT888G;
 GMDSS Furuno FM-8900S Furuno FS-2575C
 GPS Furuno GP-170
 Gyro Raytheon Standard 22
 Chart plotter Furuno FMD-3200-BB
 Engine monitoring system MarineLink
 Fire detection system Consilium
 Onboard capacities
 Fuel oil 180,000litres
 Fresh water 7,000litres
 Sullage 5,000litres
 Ballast water 500litres
 Complement
 Number of crew 20
 Number of passengers 926
 Number of cabins 10
 Vehicles
 Number of vehicle decks 2
 Total lane length 90 lane metres (trucks)
 Number of cars 250/222 with trucks@90 lane metres
 Number of trucks/trailers 6
 Other significant or special items of equipment
 Austal Motion Control System – trim tabs and T-foils; Jail cell (port); Passenger lift from main deck to pax deck; Four main passenger zones, including VIP area – two main bars plus central servery; Dedicated crew zones
 Classification society DNV GL
 Notations ✱1A HSLC R1 Ferry B E0
 Other important international regulations complied with International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009; International Energy Efficiency (IEE) Certificate; International Air Pollution Prevention Certificate; International Sewage Pollution Prevention Certificate; International Oil Pollution Prevention Certificate



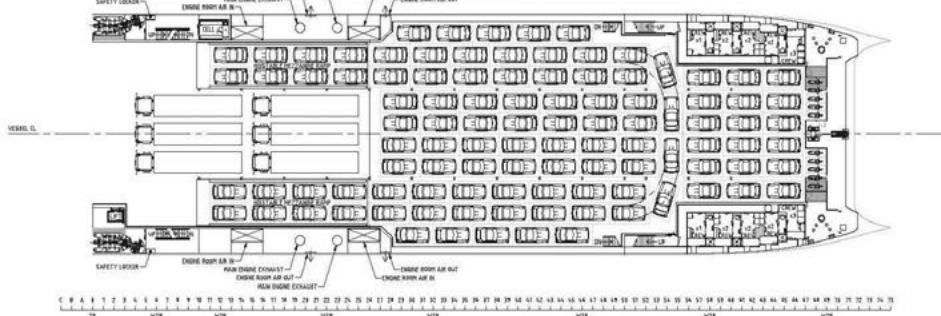
PROFILE



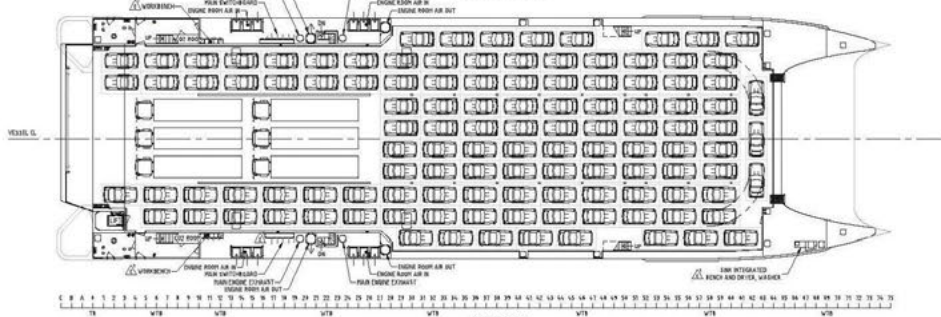
BRIDGE DECK



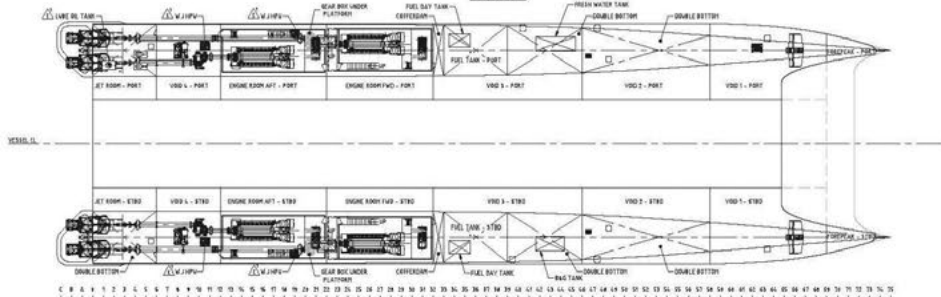
UPPER DECK



MEZZANINE DECK



MAIN DECK





BELOV HUMAITÁ: Waterjet-powered dive support boat for Brazil's offshore sector

Builder **Belov Engenharia Ltda.**
 Designer **Robert Allan Ltd.**
 Vessel's name **Belov Humaitá**
 Owner/operator **Belov**
 Country **Brazil**
 Flag **Brazil**
 Total number of sister ships
 already completed **1**
 Total number of sister ships still on order **0**
 Contract date **November 2018**
 Delivery date **March 2020**

There's been a renewed wave of investments in the Brazilian offshore sector, spurring demand for highly specialised support vessels. There's especially been demand for vessels that can serve as platforms for diving operations and ROV surveys, to safeguard assets located in deep waters.

As a result, offshore operator Belov Engenharia took the decision to build and operate two new dive support vessels at its new fabrication facility in the port city of Salvador. Robert Allan Ltd (RAL) was commissioned to provide the support vessel's design, which is an example of the naval architect's RALLY 4000 class.

The 40.5m *Belov Humaitá* and her sister, *Belov Amaralina*, have each been fitted with a DP2 dynamic positioning system, four diesel generators, three waterjets and triple bow thrusters for redundancy. RAL explains: "The propulsion system is diesel-electric to improve efficiency when operating in lower-power DP modes." Waterjets were selected instead of propellers so as to ensure diver safety. "Because waterjets are typically used on higher-speed vessels, extensive self-propelled CFD analysis,

including waterjet tunnel flow, was performed in-house by RAL to verify resistance and thrust at the slower speeds that this design will operate at when on station," the designer adds.

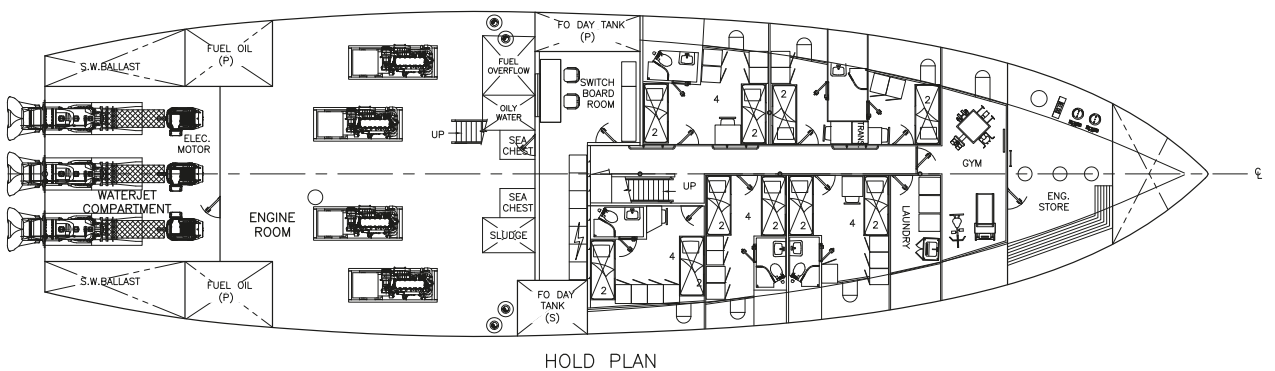
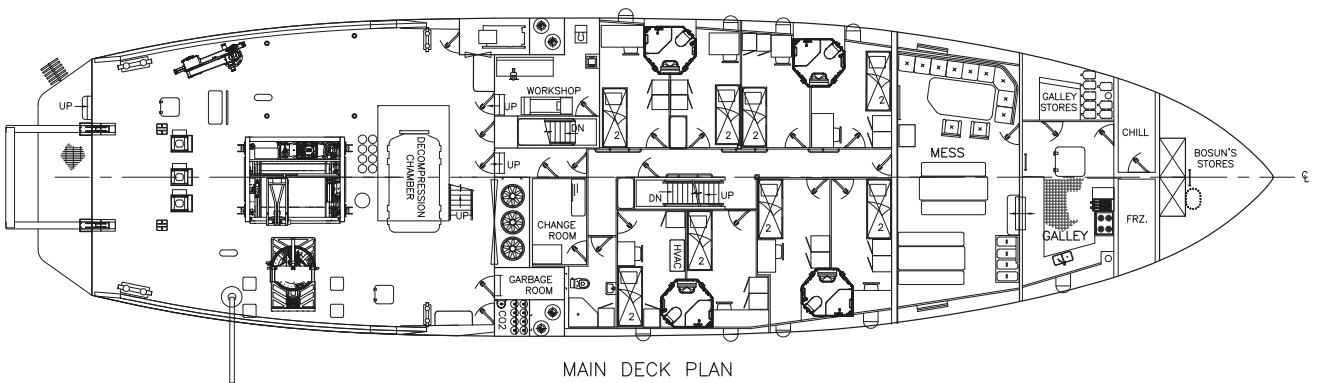
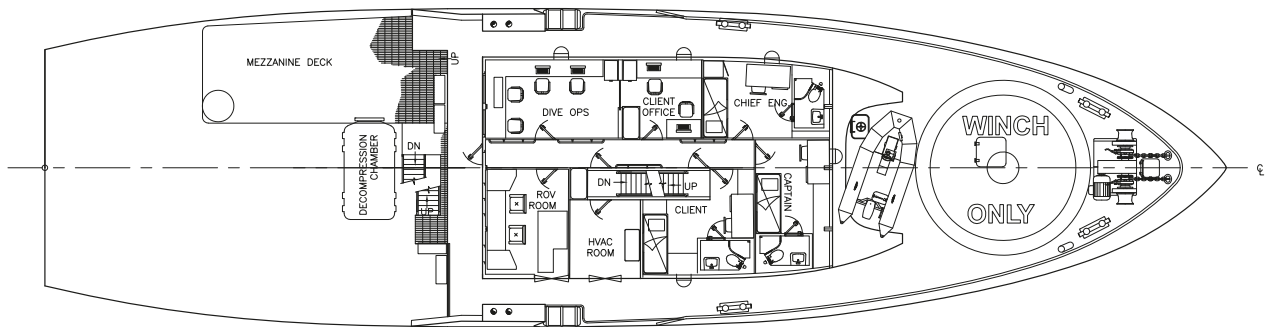
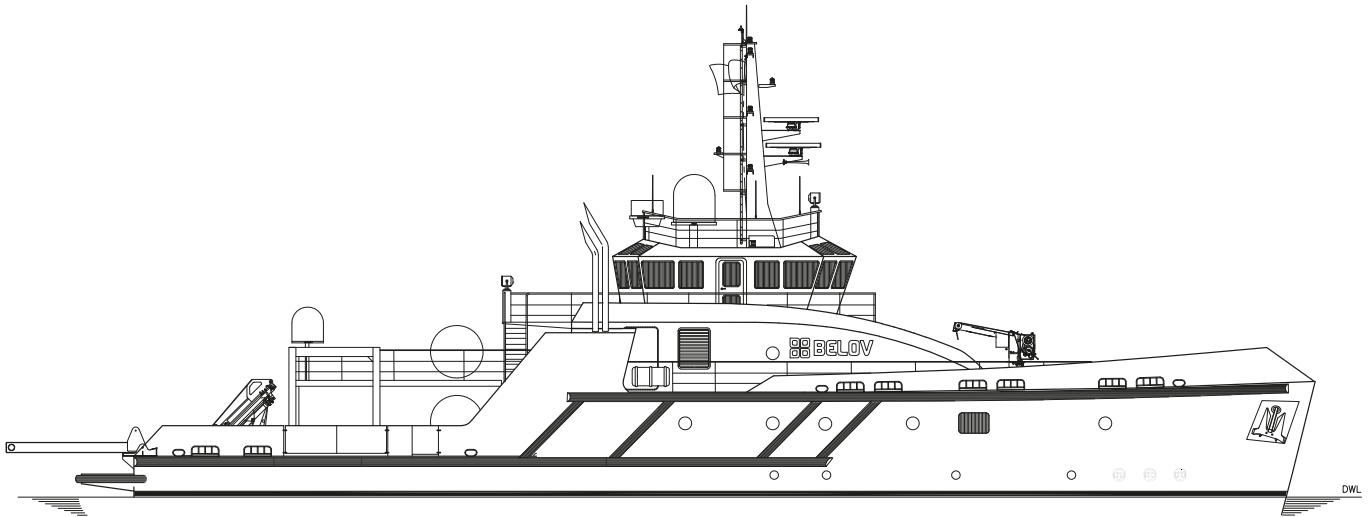
The RALLY 4000 was also designed to be fitted with an ROV launch and recovery system (LARS), plus an aft-mounted A-frame to operate the diving bell. Other features include a decompression chamber and spacious crew quarters, with RAL and Belov managing to keep the gross tonnage under 500tonnes.

Class society RINA has certified *Belov Humaitá* and her sister as Special Diving Support vessels, suitable for Unrestricted Navigation.

TECHNICAL PARTICULARS

Length, oa 40.5m
 Length, bp 38.4m (rule length)
 Breadth, moulded 10.75m
 Depth, moulded 3.8m
 Gross tonnage 499tonnes
 Displacement 583.8tonnes
 Design, draught 2.7m
 Design, deadweight 89.6tonnes
 Lightweight 494.2tonnes
 Deck space 110m²
 Max speed 12knots
 Endurance 14 days
 Main gensets
 Number of engines 4
 Make CAT
 Model C18
 Output of each engine 565kW
 Propulsion motors
 Number of motors 3
 Make WEG
 Output 500kW

Waterjets
 Number of waterjets 3
 Make Hamilton
 Model HM651
 Output 500kW
 Deck machinery
 Cranes
 Number of cranes 1
 Make Palfinger Systems
 Model PK 23500 M
 Capacities/SWL 98kN (maximum vertical load)
 Other deck machinery/equipment
 Stern A-frame
 Onboard capacities
 Fuel oil 97,100litres
 Fresh water 23,200litres
 Sullage 12,500litres
 Ballast water 36,800litres
 Black water 11,400litres
 Oily water 2,200litres
 Fuel oil overflow 2,800litres
 Sludge 2,200litres
 Complement
 Number of crew 38
 Number of passengers 0
 Number of cabins 17
 Other significant or special items of equipment
 A-frame diving bell support;
 ROV launch and recovery system;
 Decompression chamber
 Classification society RINA
 Notations RINA C Special Service-
 Dynapos-AM/AT-R, Diving Support,
 Unrestricted Navigation, AUT-UMS
 Other important international regulations
 complied with International Loadline,
 MARPOL





BOĞAÇAY XXXVIII: First tug to use Caterpillar's AVD hydro-mechanical hybrid propulsion system

Builder **Sanmar Shipyards**
 Designer **Robert Allan Ltd.**
 Vessel's name **Boğaçay XXXVIII**
 Owner/operator **Sanmar**
 Country **Turkey**
 Flag **Turkey**
 Total number of sister ships
 already completed **0**
 Total number of sister ships still on order **0**
 Contract date **Undisclosed**
 Delivery date **January 2020**

Delivered by Sanmar Shipyards to Sanmar's towage arm in January 2020, *Boğaçay XXXVIII* is the first tug to be powered by Caterpillar's Advanced Variable Drive (AVD) hydro-mechanical hybrid propulsion system, and has been described as an evolution of Robert Allan Limited's (RALs) RAmports 2400-SX design.

The hydro-mechanical hybrid propulsion system consists of two dual-input, continuously variable transmissions located in the shaftlines between the main engines and the Z-drives. The AVDs are fed solely by the auxiliary engine in transit mode, from the CAT 3512 main engines in work mode, and from both the main engines and the auxiliary engine in boost mode.

Power is delivered to two fixed-pitch Z-drives via the continuously variable transmissions. RAL says: "It is noteworthy that with this system, the engines are smaller than would normally be the case in a tug of this power – CAT 3512 instead of 3516 engines." The auxiliary engine also drives the tug's firefighting pump.

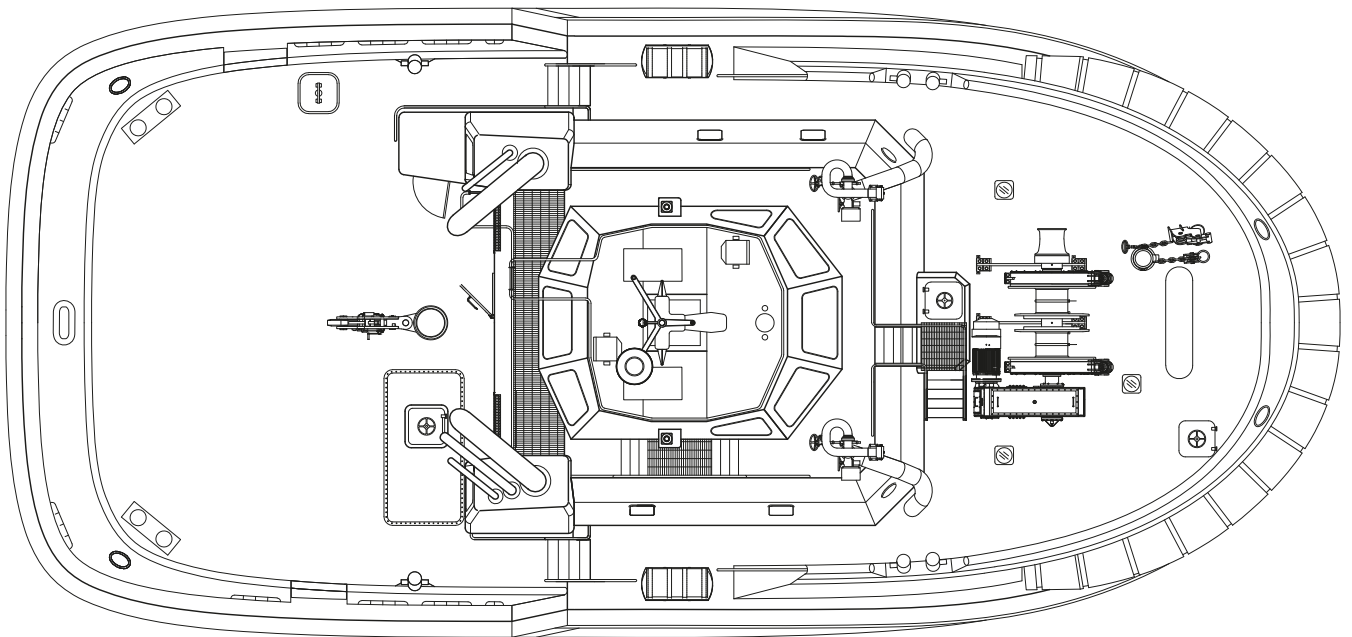
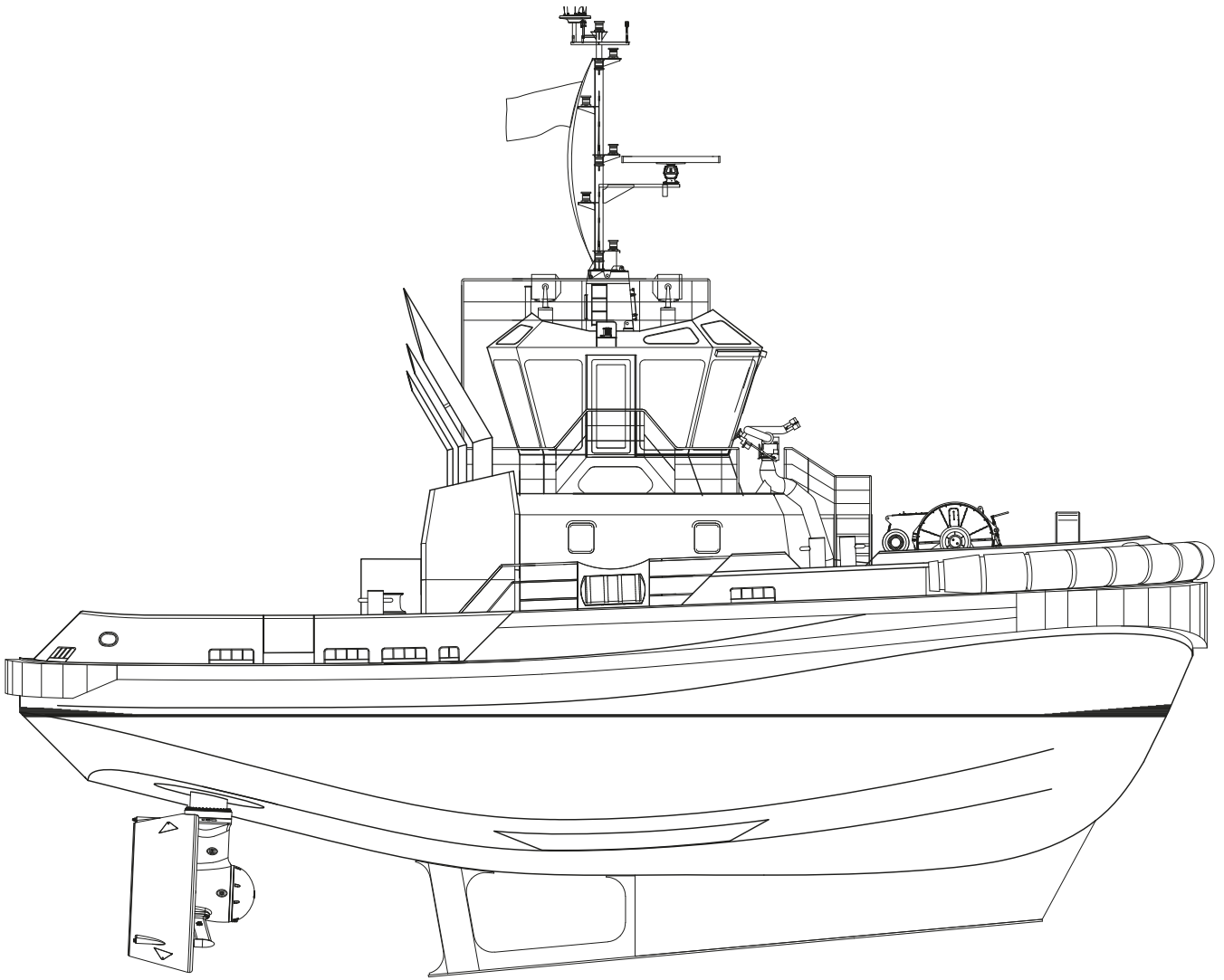
RAL continues: "In addition to the fuel-saving modes of operation, another significant advantage of the system is that the continuously variable transmission can modulate propeller speed down to 0rpm like a slipping clutch. It can also spin the propeller up faster than would be possible if the engine was directly coupled to the drive, allowing the engines to operate in their peak-efficiency zone instead of along the propeller demand curve at higher specific fuel oil consumption, resulting in significant fuel savings."

Other claimed benefits of the AVD arrangement include improved response and acceleration, plus lower lifetime maintenance costs as a result of the reduced hours on the main engines.

TECHNICAL PARTICULARS

Length, oa 24.4m
 Length, bp 23.74m
 Breadth, moulded 11.25m
 Depth, moulded 4.38m
 Gross tonnage 315tonnes
 Displacement 545tonnes
 Design, draught 3.29m (operational design waterline)
 Design, deadweight 97tonnes
 Lightweight 448tonnes (inclined lightweight)
 Max speed 13.42knots
 Bollard pull 70tonnes
Main engines
 Number of engines 2 + 1
 Make CAT
 Model 2 × 3512C / 1 × C32
 Output of each engine 2 × 1765kW @ 1,800rpm / 1 × 1,081kW @ 2,000rpm
Gearboxes
 Number of gearboxes 2 × AVD (main) / 1 × AVD (auxiliary)
 Make CAT
 Model Advanced Variable Drive (AVD) hybrid
 Output speed Continuously variable
Propellers
 Number of propellers 2
 Make Caterpillar
 Model MTA 627 FP
 Diameter 2,700mm
 Material ABS-Type 4 NiAlBr
 Number of blades 4
 Fixed/controllable pitch Fixed
 Open/nozzled Nozzled

Winches
 Number of winches 1
 Make DMT
 Model TW-E 250kN electric double drum hawser winch
 Capacities Pull of 250kN at 0-9m/min on low speed; Pull of 80kN at 0-28m/min on high speed
Tow hook
 Make Data Hidrolik
Capstan (aft)
 Make Data Hidrolik
 Capacities 5tonnes
Bridge electronics
 Radar(s) Furuno X-Band
 Autopilot Raytheon Anschutz NP60
 GMDSS A1 + A2
 GPS Furuno 6P-170
 Gyro Furuno Satellite Compass SC-70
 Engine monitoring system Wärtsilä Nacos Platinum (Lyngsø Marine)
 Fire detection system Consilium
Onboard capacities
 Fuel oil 72,400litres
 Fresh water 10,800litres
 Sullage 3,800litres
 Ballast water 32,100litres
 Foam 6,600litres
 Lube oil 1,900litres
 Used oil 2,200litres
 Grey water 3,800litres
 Fuel oil overflow 1,600litres
 Oily water 4,500litres
Complement
 Number of crew 6
 Number of passengers 0
 Number of cabins 4
 Classification society ABS
 Notations * A1, Towing Vessel, FFV 1, * AMS, * ABCU, UWILD, QR, Unrestricted Service, BP (70 tonnes)
 Other important international regulations complied with ILO MLC 2006





BRYGGEN: Zero-emissions ferry, optimised for cost efficiency throughout its lifespan

Builder **Damen Shipyards Group**
 Designer **Damen Shipyards Group**
 Vessel's name **Bryggen**
 Owner/operator **Arriva Denmark A/S**
 Country **Denmark**
 Flag **Danish Maritime Authority**
 Total number of sister ships
 already completed **7**
 Total number of sister ships still on order **0**
 Contract date **June 2018**
 Delivery date **July 2020**

The Damen Ferry (DFe) 2306 E3 vessel type, of which *Bryggen* was the first in class, features an all-electric, completely emission-free propulsion system. Seven of the vessels are now operating in Copenhagen, operating from three charging points. The vessels feature Damen's E3 notation, which stands for 'environmentally friendly', 'efficient in operation' and 'economically viable'.

The electric propulsion system of this class has been redesigned to allow for fully electric operation. For optimal efficiency, the amount of electrical converters was minimised and highly efficient electric motors were used. Lithium-titanate oxide (LTO)- type batteries were used for energy storage, these ships being the first with a DNV GL classification for this system.

These batteries make it possible to charge with high capacities (>3C) in a short timeframe, and ensure that the existing timetable of the ships can be maintained. Additionally, the batteries have a lifespan of 12 years, which means that they have to be changed only once over the expected lifespan of the vessel.

To enable charging with high power, components from the automotive bus industry were used to optimise the ratio of reliability and costs. To make these components applicable, an automatic mooring system was developed, which ensures that the ships are coupled to the jetties with minimal vessel movements. As a result, the electrical

connection has been simplified and as much space as possible saved on the jetties and the ship. The automatic mooring system also improves safety for passengers while boarding and disembarking, and ensures that the charger cannot disconnect due to sudden movements. Finally, energy consumption during mooring is significantly reduced because the electric motors can be stopped.

To ensure that the entire electrical system (hardware and software) functions optimally, Damen made a full-scale test set-up, in which the entire electrical installation was built and the operational route simulated over a long period. As a result, the future crew was able to become acquainted with the new bridge and the control of the electric powertrain. "Ultimately, the test set-up ensured that a lot of time was saved during the tests," Damen says.

Also of significance, because the ships have a 100% zero-emission propulsion system, the reduction in total emissions from public transport in Copenhagen will contribute to the city's emission targets.

Economic benefits were also achieved with the construction of these vessels. As the City of Copenhagen has launched the tender for a 12-year operation, the provider has the opportunity to reduce its operational costs. Damen adds: "It is even expected that these will be reduced to such an extent that the total costs over the 12 years, including the initial investment for both the ships and the loading installations, will be lower than those for operating a conventionally powered variant of the ship."

TECHNICAL PARTICULARS

Length, oa 23.3m
 Length, bp 22.8m
 Breadth, moulded 5.6m
 Depth, moulded 2.3m
 Gross tonnage 101.29tonnes
 Displacement 70tonnes (max)
 Design, draught 0.9m

Design, deadweight 10tonnes
 Lightweight 55tonnes
 Service speed 8knots@35% MCR
 Max speed 9.5knots
 Range 17.5m
 Propulsion motors
 Number of engines 2
 Make Baumüller
 Model Electric propulsion motor
 Output of each engine 2 x 100kW
 @ 1,000rpm

Propellers
 Number of propellers 2
 Make MarineWorks
 Diameter 700mm
 Material NiAlBr
 Number of blades 4
 Fixed/controllable pitch Fixed
 Open/nozzled Open
 Special adaptations Anti-singing edge

Bridge electronics
 Radar(s) Raymarine
 GPS Furuno GP-150
 Engine monitoring system MarPower
 integrated automation system;
 Damen Triton

Depth sounder Airmar P79
 VHF Simrad RS12

Onboard capacities
 Fuel oil 200litres
 Fresh water 150litres
 Sewage 300litres
 Batteries 183kWh

Complement
 Number of crew 2
 Number of passengers 80
 Other significant or special items of equipment

Automated mooring system;
 Fully automatic 600kW shore
 charging installation

Classification society N/A
 Notations N/A
 Other important international regulations
 complied with Danish Maritime Authority

DMT
MARINE EQUIPMENT



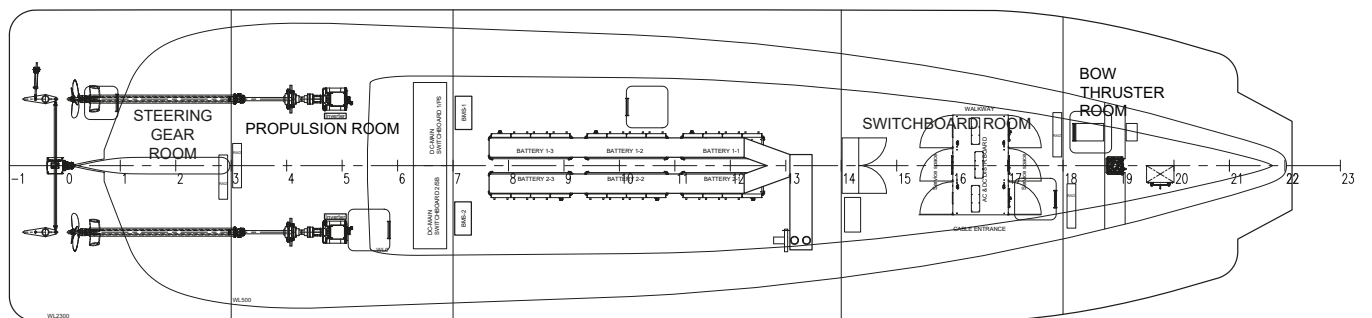
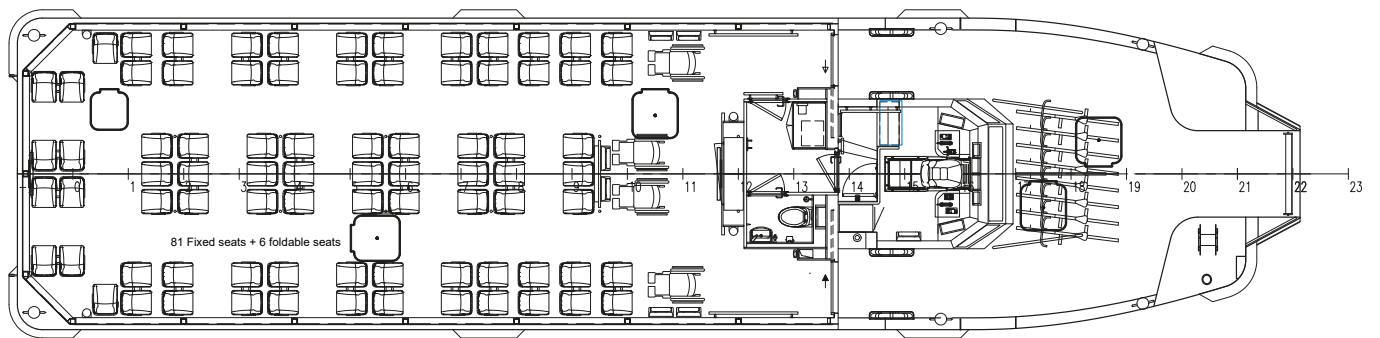
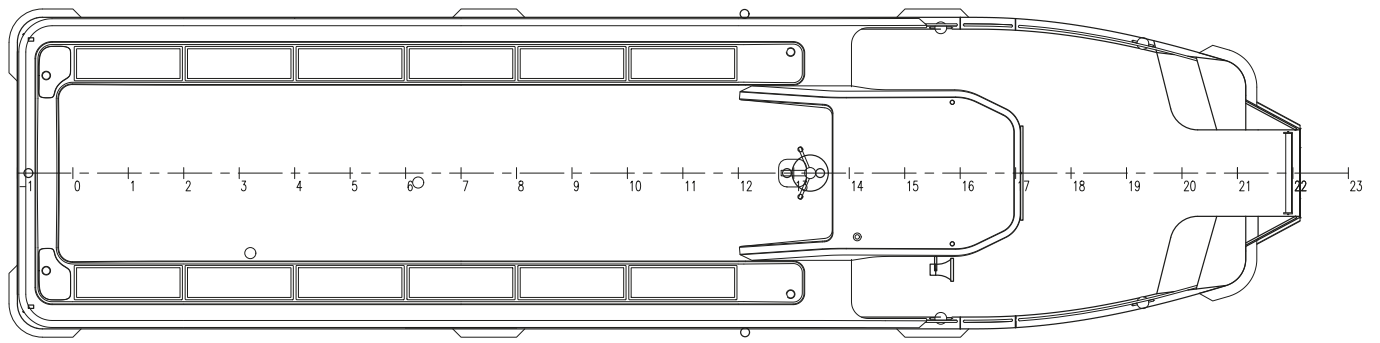
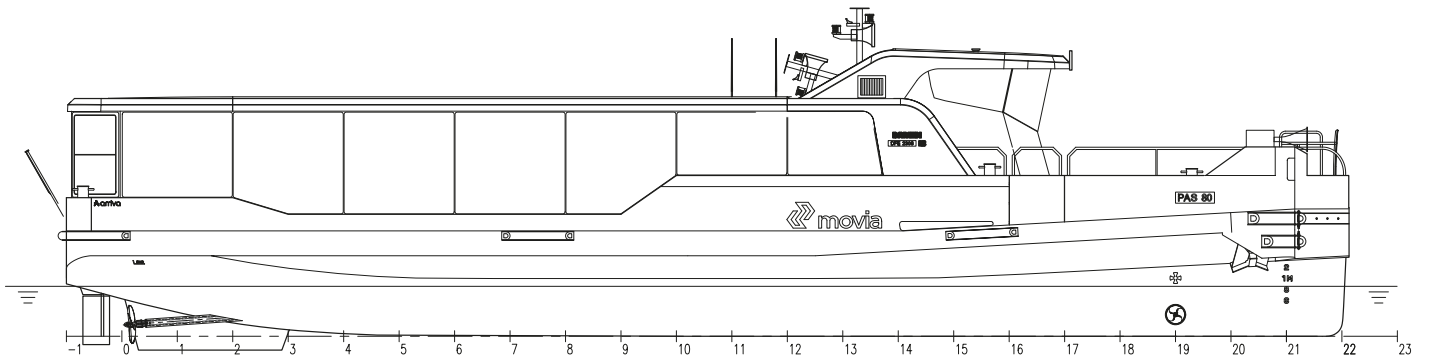
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CP329: ‘Unsinkable’ SAR craft for Mediterranean rescues

Builder **Cantiere Navale Vittoria**
 Designer **Camarc Design**
 Vessel's name **CP329**
 Owner/operator **Italian Coast Guard**
 Country **Italy**
 Flag **Italy**
 Total number of sister ships
 already completed **2**
 Total number of sister ships still on order **3**
 Contract date **January 2019**
 Delivery date **September 2020**

CP329 is one of the first two vessels in a five-boat order for the Italian Coast Guard (Guardia Costiera), a series of search and rescue (SAR) vessels completed through 2020. These boats represent the latest models and additions to the Coast Guard's Class 300 fleet, built by Italian yard Cantiere Navale Vittoria.

With their 20m lengths, self-righting capabilities and potential speeds of 35knots, along with significant rescued survivor capacities, the Class 300 boats are well-equipped for their SAR missions in the Mediterranean. The design is the latest SAR craft from Camarc Design of the UK, and all five boats share the Camarc double chine hull, a proven form for enhanced seakeeping in challenging conditions and heavy weather operations.

The all-aluminium vessels were built to RINA requirements, along with a dedicated class notation and RINA rule set for both 'self-righting' and 'unsinkable' capabilities. As is typical with Camarc designs, self-righting is inherent to the design, and this capability does not rely on closing devices nor vent closures. Additionally, these particular craft are also subdivided and fitted with internal foam, to maintain positive buoyancy in a worst-case

scenario of damage affecting all watertight compartments - hence RINA awarding the series the 'Unsinkable' notation.

The vessel arrangement features a centrally positioned wheelhouse to provide command and control stations for the five-man crew, with all-round visibility. A raised outside flybridge with helm conning position is provided to facilitate rescue operations. Rescue stations for recovery of persons are placed port and starboard with deck wells and davits, along with one at the transom with a full-width deployable rescue platform.

The forward survivor cabins beneath the raised foredeck are simply arranged with bench seating for maximum capacity, and the internal and external decks can accommodate up to 200 survivors. The craft are equipped with two high-capacity liferafts aft, for rescued persons, and a smaller crew liferaft.

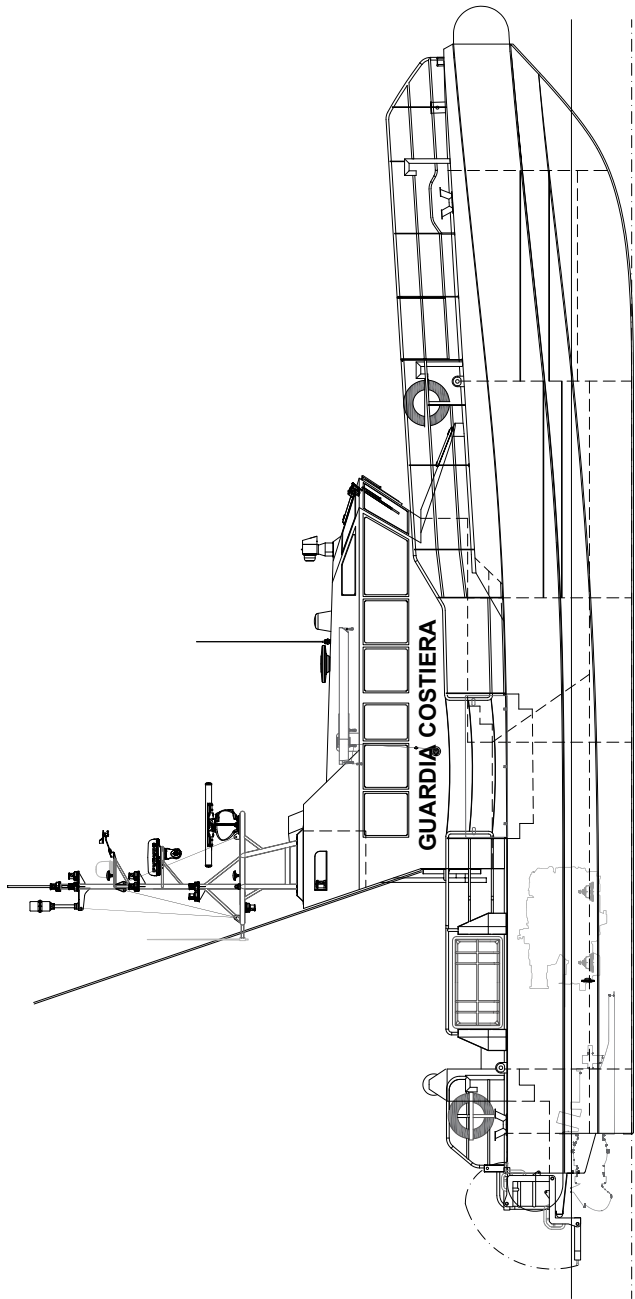
A large section fender has been fitted around the hulls to protect CP329 and her sisters during routine operations and when coming alongside other vessels during rescues. Towing arrangements are also provided aft for use in rescue operations.

Twin MTU engines with ZF 665 gearboxes drive Kamewa waterjets, giving the craft a top speed in excess of 35knots. A significant fuel capacity of just over 7,000litres also provides for a range in excess of 565nm.

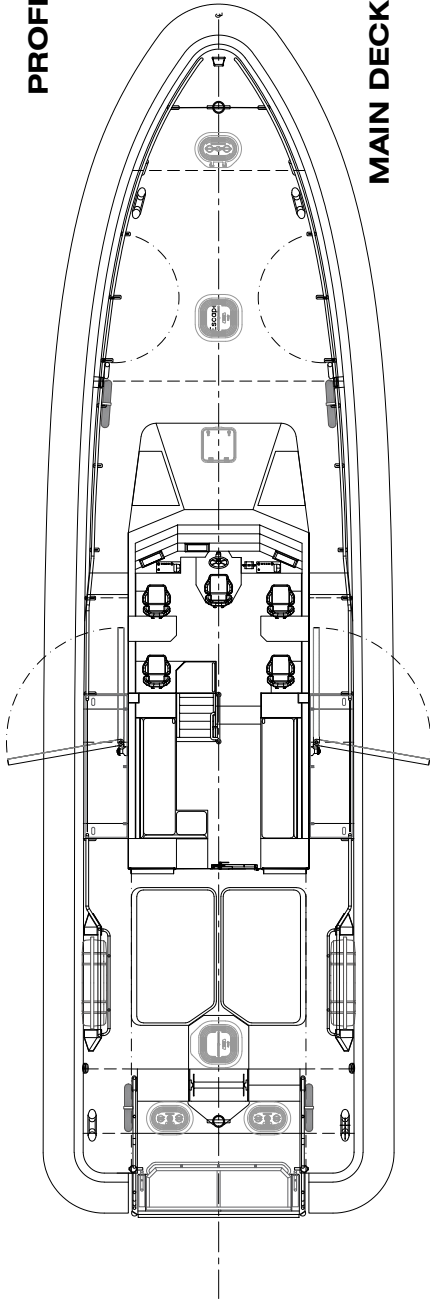
TECHNICAL PARTICULARS

Length, oa 20.1m
 Length, wl 17m
 Breadth, moulded 4.5m
 Depth, moulded 2.11m
 Displacement 33.3tonnes
 Design, draught 1m

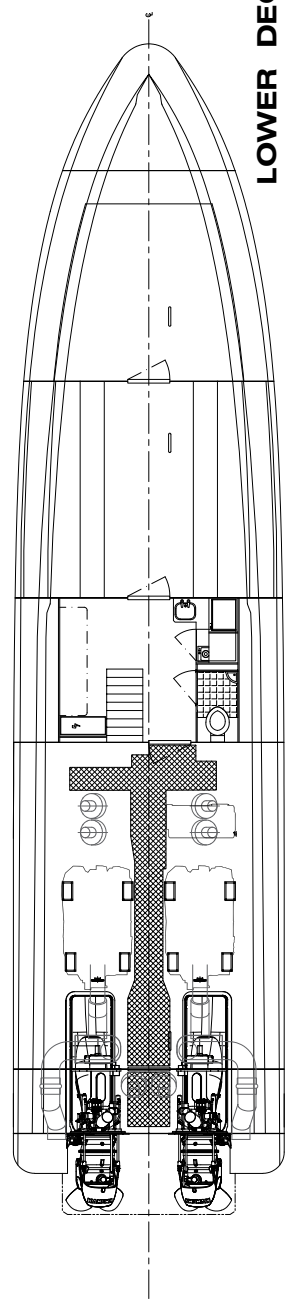
Design, deadweight 7tonnes without rescued persons; 22tonnes with rescued persons
 Lightweight 27tonnes
 Max speed 35+knots
 Range >565nm
 Main engines
 Number of engines 2
 Make MTU
 Model 8V 2000 M84L
 Output of each engine 895kW @ 2,450rpm
 Gearboxes
 Number of gearboxes 2
 Make ZF
 Model 665
 Waterjets
 Number of waterjets 2
 Make Kamewa
 Model S40-3/CA
 Onboard capacities
 Fuel oil 7,500litres
 Fresh water 150litres
 Ballast water 150litres
 Complement
 Number of crew 5
 Number of passengers 200 rescued persons (inside & outside)
 Number of cabins 0
 Other significant or special features/items of equipment Self-righting; Rescue stations aft, port & starboard; High rescued persons capacity
 Classification society RINA
 Notations C(*)HULL- Rescue & Maritime Police - Special Navigation - SELFRIGHT0 - UNSINK
 Other important international regulations complied with RINA Self-righting & Unsinkable rules



PROFILE



MAIN DECK PLAN



LOWER DECK PLAN



FSD N800: Composite-hulled patrol boat with hybrid-propulsive option

Builder **Ferretti Security Division / Ferretti S.p.A.**
 Designer **Ferretti Security Division**
 Vessel's name **FSD N800**
 Owner/operator **Arma dei Carabinieri – Servizio Aeronavale**
 Country **Italy**
 Flag **Italy**
 Total number of sister ships already completed **1**
 Total number of sister ships still on order **15**
 Contract date **August 2019**
 Delivery date **October 2020**

The Ferretti Security Division (FSD) branch of Italian yacht specialist Ferretti Group has launched the FSD N800 as the first of sixteen patrol boats to join the fleet of the Carabinieri, Italy's national police force, which is putting the boat to use in coastal and territorial waters.

The FSD N800 features a composite hull, fashioned from carbon fibre and glass fibre. Although this first model runs on MAN diesels, the core unit is flexible, enabling the use of an environmentally conscious, new-generation hybrid propulsion system (such as those produced by Transfluid, selected for the forthcoming second-in-class vessel), depending on the Carabinieri's request. These hybrid versions (which will be referred to as FSD N800 HY units) will enable the boats to patrol eco-sensitive areas in zero-

emissions mode. The Carabinieri's requirement for this electric propulsion mode was for an endurance of one hour when operating at 7knots.

FSD explains: "The vessel can be fitted with an additional electric propulsion system coupled with the standard thermal propulsion engines [TPEs], to operate in zero-emission mode. The system consists of two three-phase electric motors with permanent magnets, each delivering 75kw, mounted between the TPEs and the shaft lines; and two latest-generation battery packs with lithium-iron phosphate cells, each one 288V - 100Ah, all managed by an integrated monitoring system."

As with a previous FSD model, the FSD 195, the FSD N800's hull has been based on that of the Pershing 64 motor yacht. However, the FSD N800 has tweaked this a little to reduce its weight and boost its rigidity. The vessel can operate safely in conditions up to sea state 4 and achieve speeds of more than 30knots at full load, and crew protection is enabled by shock-absorbing seats supplied by Canada's Shoxs.

TECHNICAL PARTICULARS

Length, oa 16.75m
 Breadth, moulded 4.65m
 Depth, moulded 1.57m
 Displacement 25.5tonnes (laden)
 21.7tonnes (unladen)
 Max speed 34knots
 Bollard pull 25tonnes
 Range >300nm

Main engines
 Number of engines 2
 Make MAN
 Model i6-800
 Output of each engine 588kW
 Gearboxes
 Number of gearboxes 2
 Make ZF
 Model 325 IV
 Propellers
 Number of propellers 2
 Make Eliche Radice
 Diameter 800mm
 Number of blades 5
 Fixed/controllable pitch Fixed
 Bridge electronics
 Radar(s) Furuno
 GMDSS Furuno
 GPS Furuno
 Chart plotter Furuno
 Engine monitoring system Boeing
 Fire detection system Marine Fire
 Onboard capacities
 Fuel oil 2,600litres
 Fresh water 550litres
 Complement
 Number of crew 3 + 3
 Number of passengers 12
 Number of cabins 2
 Classification society RINA
 Other important international regulations complied with Fast Patrol Vessel - Offshore

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to completion**



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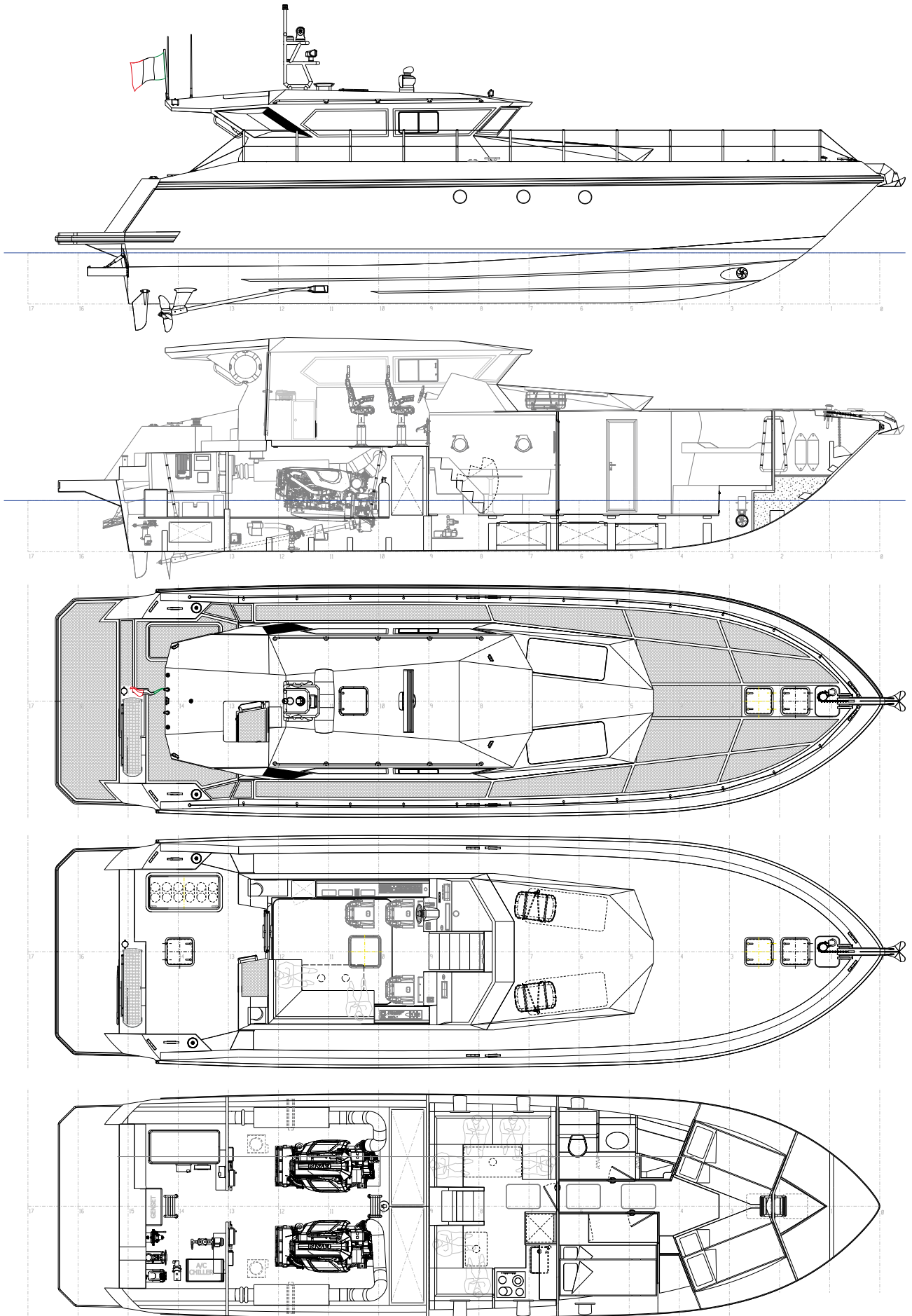
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OPUS 50 Design, Royal Institute of Naval Architect's
Significant Small Ship of 2020 Award recipient



FSD N800



THE POWER OF
EXPERIENCE
THE COURAGE OF
INNOVATION



CANTIERE NAVALE
VITTORIA



SAR CP329

Length OA 20 m, **Breadth (Overall)** 6,1 m, **Full load Displacement** 31,5 t,
Draft 1,0 m, **Fuel Oil** 7500 lt, **Max People on Board** 200.
Performance: Max speed at full load 35,2 kn, *Range* ab 600 nm.
Propulsion: Power MTU 8V M84L 2 x 895 kW @ 24500 rpm,
Propulsion 2 x Rolls Royce Kamewa S40/3.

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H401 / CURIOSITY / CITY FISH: New York ferries with EPA Tier 4-compliant engines

Builder **Halimar, Breaux Brothers, St Johns**
 Designer **Incat Crowther**
 Vessel's name **H401 / Curiosity / City Fish**
 Owner/operator **NYC Ferry**
 Country **US**
 Flag **US**
 Total number of sister ships already completed **3**
 Total number of sister ships still on order **3**
 Contract date **Undisclosed**
 Delivery date **April 2020**

H401 is the first in a new class of environmentally friendly 29m passenger ferries, designed by Incat Crowther for Hornblower's continually expanding NYC Ferry fleet. The Incat Crowther Digital Ship design package allowed H401 and her identical sisters, *Curiosity* and *City Fish*, to be constructed at independent shipyards: namely, Halimar Shipyard of Morgan City, Louisiana and Breaux Brothers Enterprises of Loreauville, Louisiana.

Although the vessels were commissioned prior to the current pandemic, Incat Crowther said that it is expected that the high passenger demand NYC Ferry has experienced since commencing operations in 2017 will return. The new vessels complement the 17 Incat Crowther-designed 26m vessels and

14 x 29m vessels that have already been delivered to NYC Ferry.

Four additional 26m vessels are currently under construction at Gulf Craft and Metal Shark (both of Franklin, Louisiana) along with an additional 29m vessel under construction at St John's Shipbuilding in Palatka, Florida. Upon completion of these additional vessels, the NYC Ferry fleet will have grown to a total of 38 vessels in just over three years.

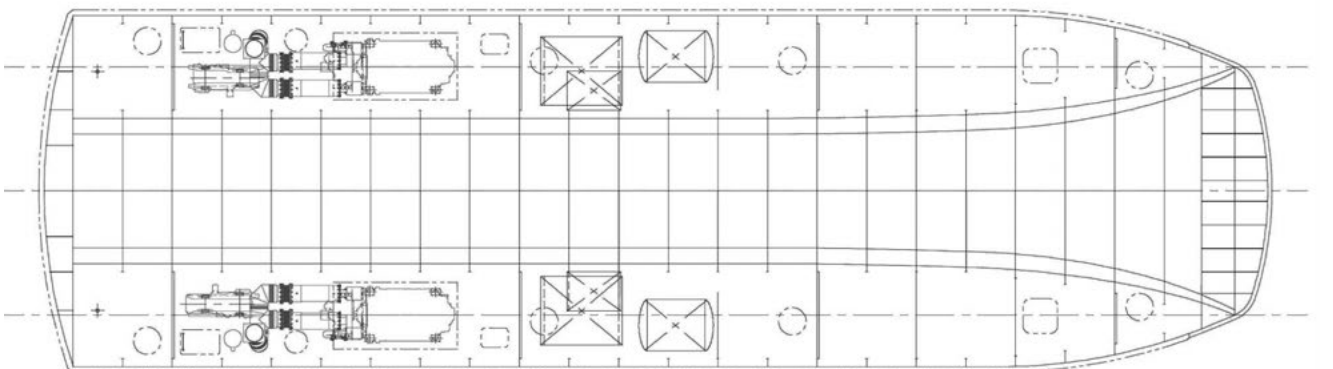
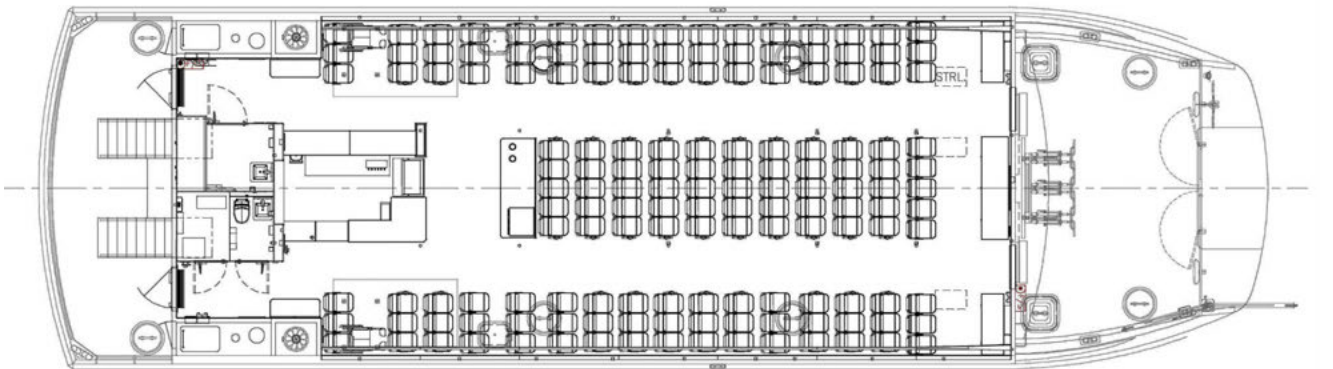
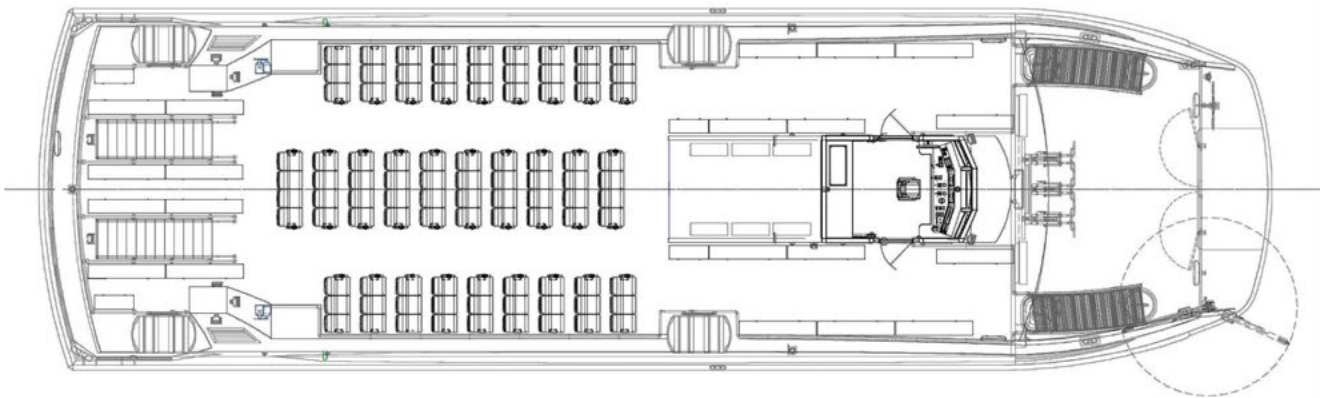
The new vessels include seats for 354 passengers, dedicated bicycle storage, disability access, mobile device charging stations, WiFi connectivity and a well-equipped onboard convenience store. All of the trio are equipped with main engines from Baudouin; however, unlike any of the previous NYC Ferry vessels in operation, these newcomers utilise US Environmental Protection Agency (EPA) Tier 4-compliant engines, to curb emissions. In order to bring the engines into compliance with Tier 4, Incat Crowther integrated a Baudouin-supplied selective catalytic reduction (SCR) system into the vessel design, along with the necessary urea tanks and dosing system components.

Incat adds: "The innovative NYC Ferry fleet has been developed in close co-operation with Hornblower, leveraging Incat Crowther's comprehensive digital design package and expertise in the US ferry industry to satisfy challenging operational and regulatory requirements."

TECHNICAL PARTICULARS

Length, oa 29.6m
 Breadth, moulded 8.5m
 Depth, moulded 3.5m
 Design, draught 1.3m
 Service speed 25knots
 Max speed 26.5knots
 Main engines
 Number of engines 2
 Make Baudouin
 Model 12 M26.3
 Output of each engine 1,029kW
 Gearboxes
 Number of gearboxes 2
 Make ZF
 Model 3050
 Output 2.609:1
 Propellers
 Number of propellers 2
 Diameter 1,067mm
 Material NiAlBr
 Number of blades 5
 Fixed/controllable pitch Fixed
 Onboard capacities
 Fuel oil 7,750litres
 Fresh water 1,987litres
 Sullage 1,987litres
 Complement
 Number of crew 8
 Number of passengers 354
 Notations USCG
 Subchapter K

H401 / CURIOSITY / CITY FISH





HELEN RICE: Multipurpose workboat with significant deck cargo capacity

Builder **Ferguson Marine**
 Designer **Macduff Ship Design**
 Vessel's name **Helen Rice**
 Owner/operator **Inverlussa Marine Services**
 Country **UK**
 Flag **UK**
 Total number of sister ships
 already completed **0**
 Total number of sister ships still on order **1**
 Contract date **September 2018**
 Delivery date **March 2020**

Launched in March, *Helen Rice* was designed by Macduff Ship Design and completed by Ferguson Marine Engineering at its yard on the River Clyde. The vessel, described by Macduff as a “multirole workboat”, features a large, open working deck with offset port casing, for improved starboard side access, in addition to a sizeable forward ramp. This layout is intended to help her complement achieve a wide range of tasks, ranging from general cargo transportation to niche aquaculture-related duties.

Macduff Ship Design originally commenced the detailed design process in September 2018, with Ferguson Marine Engineering cutting the first steel in early 2019. *Helen Rice* is constructed entirely in steel and features a hard-chine, landing craft-style hullform. According to Macduff, the design was inspired “by combining the operational requirements for a landing craft bow with the successful clean open deck of the Macduff multirole vessel *Suffolk Spirit*” – a 26m loa vessel launched in 2012. Macduff adds: “The vessel with its new layout complements Inverlussa Marine’s existing fleet, and will join four existing

Macduff-designed vessels.” Another vessel was delivered at the end of 2020.

The workboat is equipped with an array of equipment permitting her to operate in various roles. Main propulsion is provided by twin Doosan 4L126TIH engines delivering 316kW@2,000rpm. These engines drive through Dongi gearboxes connected to open propellers supplied by Teignbridge Propulsion.

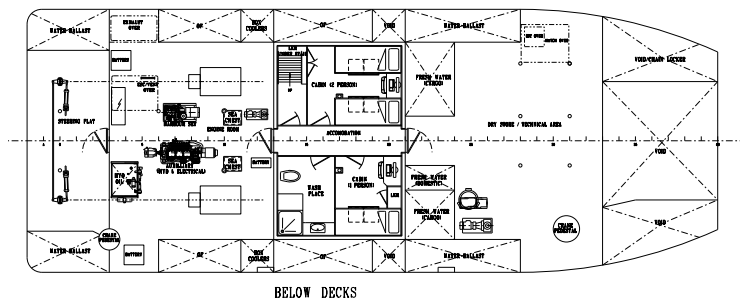
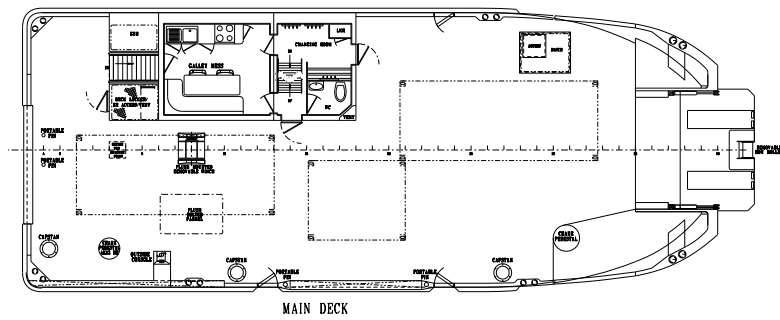
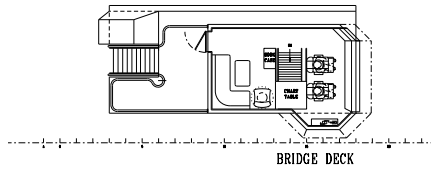
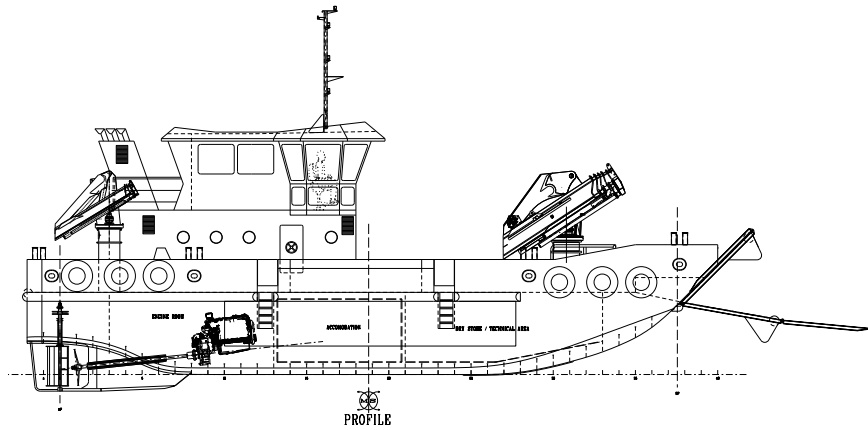
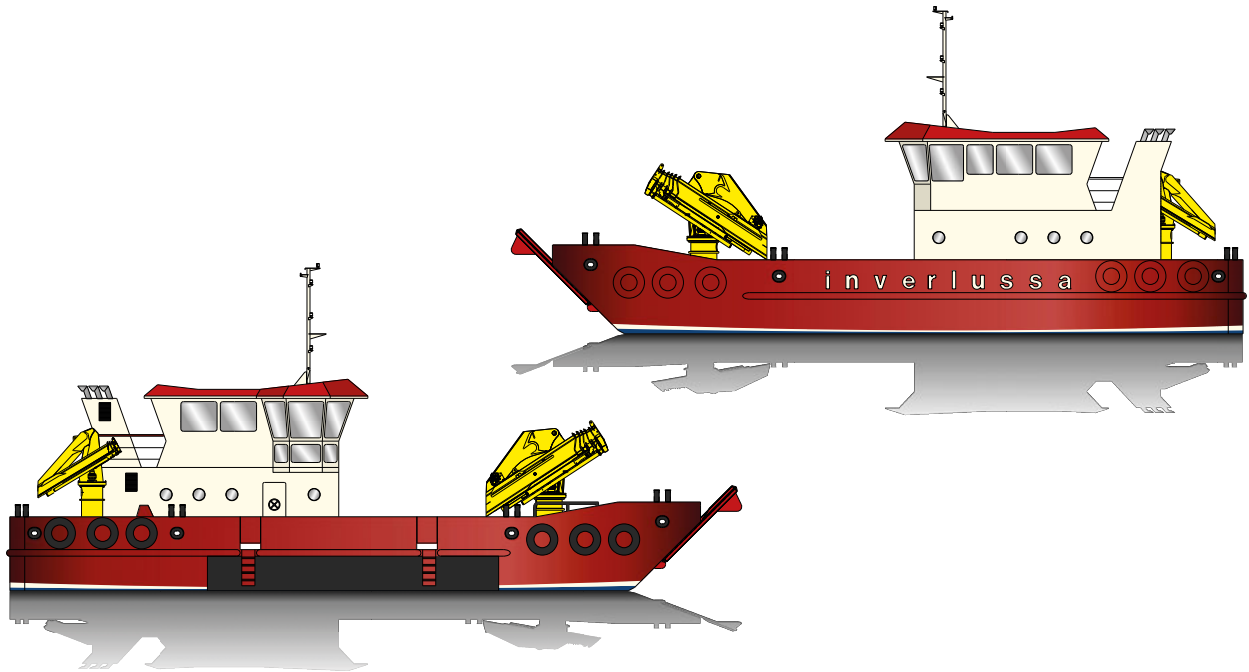
On deck, there are two marine cranes to starboard, both of which were supplied by HS Marine: these comprise an AK61/19.5E5 and an AK13 HE3. The hydraulic package also comprises: three 5tonne capstans, all arranged to starboard; an anchor windlass; hydraulic rams, for operation of the bow ramp; and a tow winch situated on the centre line. Due to the offset position of the casing, the winch can work both aft, over a stern roller with portable pins and a gog eye to control the wire, or forward, over a narrow roller built into the bow ramp.

Helen Rice also has a notable cargo-carrying capability for her size; she boasts a maximum capacity of 90tonnes of deck cargo or, alternatively, the ability to carry two full ISO tanks.

TECHNICAL PARTICULARS

Length, oa 21m
 Length, bp 18.77m
 Breadth, moulded 8.35m
 Depth, moulded 2.5m
 Displacement 240tonnes
 Design, draught 1.9m
 Design, deadweight 100tonnes
 Lightweight 140tonnes
 Deck space (total) 136m²
 Deck capacity 2.5tonnes/m²
 Service speed 9knots

Max speed 10.5knots
 Bollard pull 7tonnes
 Main engines
 Number of engines 2
 Make Doosan
 Model 4L126TIH
 Output of each engine 665kW
 Gearboxes
 Number of gearboxes 2
 Make Dongi
 Propellers
 Number of propellers 2
 Make Teignbridge
 Diameter 1,100mm
 Number of blades 4
 Fixed/controllable pitch Fixed
 Open/nozzled Open
 Deck machinery
 Cranes
 Number of cranes 2
 Make HS
 Model AK13 HE3;
 AK61/19.5E5
 Capacities/SWL 645kg@ 11.15m;
 1,180kg@ 19m
 Winches
 Number of winches 1
 Other deck machinery/equipment
 Hydraulic bow ramp
 Onboard capacities
 Fuel oil 14,000litres
 Fresh water 12,000litres
 Ballast water 40,000litres
 Complement
 Number of crew 4
 Number of passengers 2
 Number of cabins 2
 Classification society UK Workboat Code





I SEE ONE: First of four lightweight ferries for Maltese hop-on/hop-off services

Builder **Wight Shipyard Co.**
 Designer **One2Three Naval Architects**
 Vessel's name **I See One**
 Owner/operator..... **Captain Morgan Holdings Ltd**
 Country **Malta**
 Flag..... **Malta**
 Total number of sister ships
 already completed **4**
 Total number of sister ships still on order..... **0**
 Contract date..... **Autumn 2019**
 Delivery date..... **March-April 2020**

The 33m ferry *I See One* was designed by One2Three Naval Architects of Australia and built by Wight Shipyard Co. (WSC), UK as a bespoke, passenger-only vessel for Captain Morgan Holdings Ltd, a subsidiary of Fortina Investments.

Designed to be lighter and more fuel-efficient than anything the yard has built previously, the vessel is the first of a four-ferry order comprising two 33m and two 20m ferries.

The two 33m medium-speed ferries have been tasked with servicing a new commuter/tourist hop-on/hop-off service along the east coast of Malta, as far as the island of Gozo, and will speedily carry commuters and tourists between different locations around the coast.

While the ferries are intended to operate below 20knots they are capable, under the IMO

High-Speed Craft (HSC) Code, of achieving a top speed in excess of 30knots.

The main deck features an enclosed, air-conditioned cabin with seating and a kiosk/bar located at the aft end, while the open upper deck offers a panoramic view of the local Maltese scenery, and has a large overhanging roof to shield passengers from rain. WSC says: "The passenger loading was challenging in that the vessels have to service an assortment of Malta's historic stone wharfs, and are fitted with multiple side and aft gangways in order to provide significant variability in both the location and boarding heights."

The vessel has been wrapped in an eye-catching vinyl design to match the rest of the hop on/hop off fleet of buses that operate across the island.

Fitted with four toilets and six disabled spaces, the vessel can carry 298 passengers and four crew. *I See One* is powered by twin MAN D2862 LE422 marine diesel engines, rated a combined 1,498kW@2,100rpm, and these are coupled with a pair of ZF3000 marine transmissions and two Veem five-bladed, fixed propellers.

TECHNICAL PARTICULARS

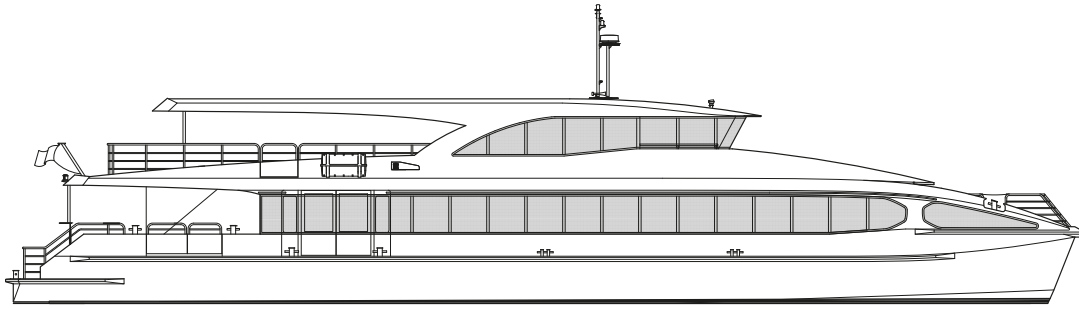
Length, oa..... 34.04m
 Length, waterline 32.78m
 Breadth, moulded 8.5m

Depth, moulded 2.7m
 Gross tonnage.....211tonnes
 Design, draught 1.3m
 Design, deadweight.....30tonnes
 Max speed30knots
 Main engines
 Number of engines..... 2
 Make MAN
 Model D2862 LE422
 Output of each engine..... 749kW@2,100rpm
 Gearboxes
 Number of gearboxes..... 2
 Make ZF
 Model ZF3000
 Propellers
 Number of propellers..... 2
 Make Veem
 Number of blades 5
 Fixed/controllable pitch Fixed
 Onboard capacities
 Fuel oil..... 2 x 2,500litres
 Fresh water 1,500litres
 Sullage 1,500litres
 Complement
 Number of crew 4
 Number of passengers 298
 Number of cabins 0
 Classification society Malta NCV Code;
 Lloyd's Register for machinery;
 DNV GL for structure
 Notations R5, 50nm summer/
 20nm winter

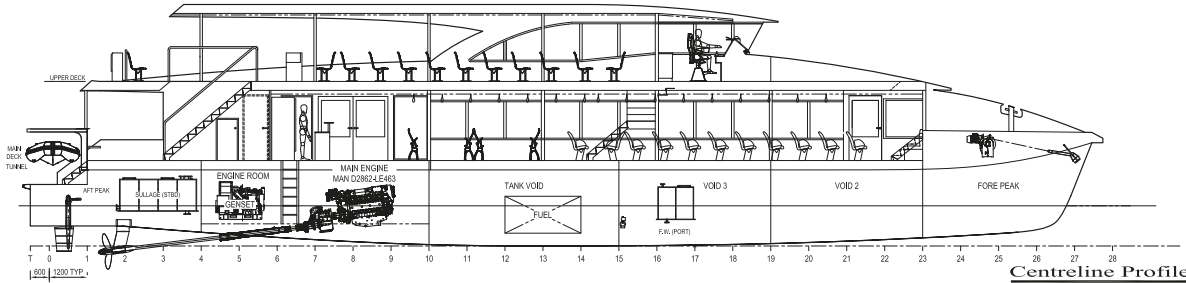


ROBERT ALLAN

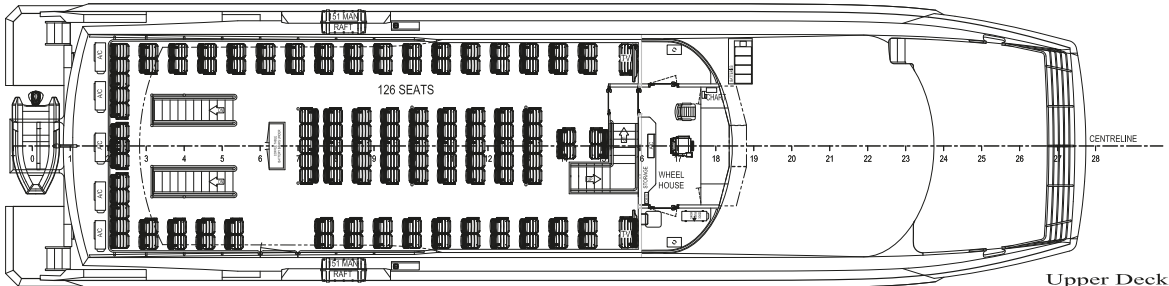
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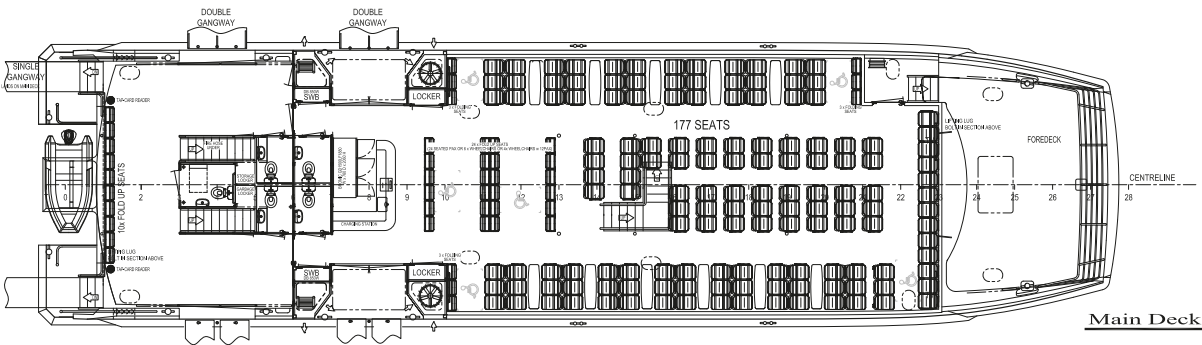
Profile View



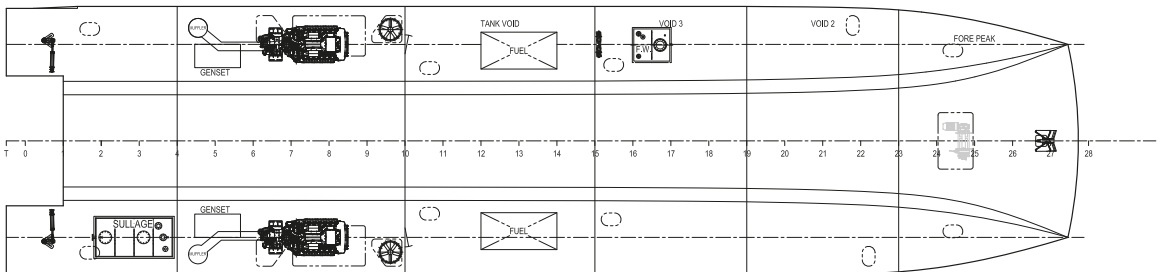
Centreline Profile



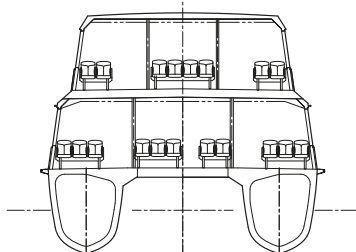
Upper Deck



Main Deck

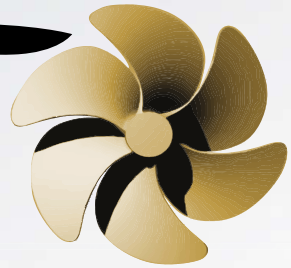


Below Decks



Typical Section

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Maximum diameters:

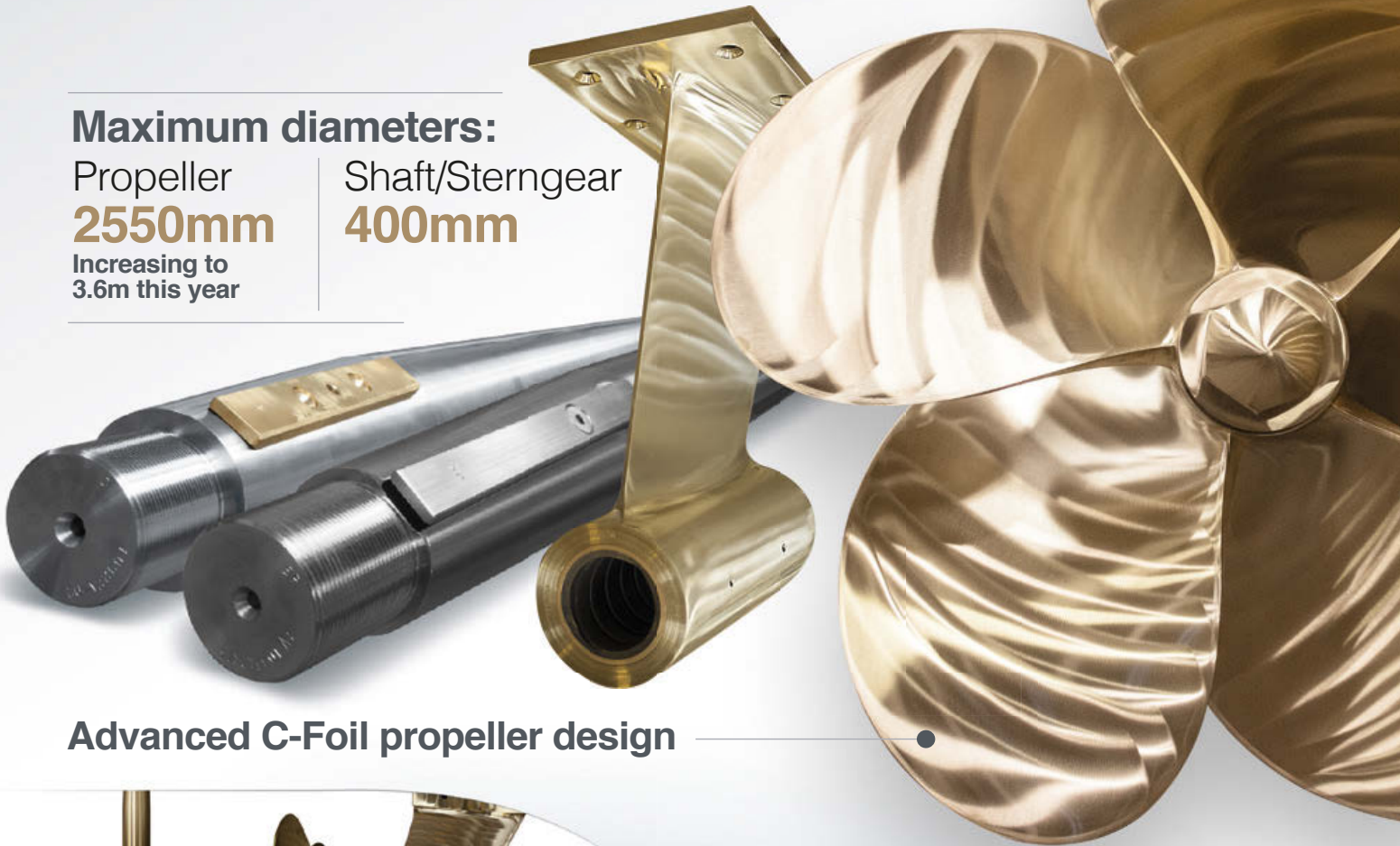
Propeller

2550mm

Increasing to
3.6m this year

Shaft/Stern gear

400mm



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KAGUYA: Japan's first LNG bunkering vessel

Builder **Kawasaki Heavy Industries**
 Designer **Kawasaki Heavy Industries**
 Vessel's name **Kaguya**
 Owner/operator **Central LNG Shipping Japan Corporation**
 Country **Japan**
 Flag **Japan**
 Total number of sister ships
 already completed **0**
 Total number of sister ships still on order **0**
 Contract date **July 2018**
 Delivery date **September 2020**

Kaguya has been hailed as Japan's first LNG bunkering vessel, delivered by Kawasaki Heavy Industries (KHI) to Central LNG Shipping Japan Corporation (CLS), a joint venture owned by Nippon Yusen Kaisha, Kawasaki Kisen Kaisha, JERA Co. and Toyota Tsusho Corporation. The vessel will conduct its bunkering activities at JERA Kawagoe Thermal Power Station, in Japan's Chubu region.

Its main feature is a 3,500m³ IMO Type-C cargo tank, made of robust aluminium alloy. A dual-fuel auxiliary boiler, capable of burning boil-off gas (BOG), was installed to ensure operational flexibility. By adopting a single-tank concept, the total weight of the vessel has been reduced; meanwhile, operational redundancy was optimised through installing multiple pumps inside the cargo tank.

For thermal insulation, the cargo tank has adopted the Kawasaki Panel System, which incorporates KHI's patented technology – a blend of phenolic resin foam (PRF) and polyurethane foam (PUF). KHI says that this technology has been applied to various LNG carriers, ranging from small-scale vessels to Moss-type vessels with capacities up to 182,000m³.

Kaguya has been fitted with foam-type fenders, fender davits and ship-to-ship transfer equipment – the latter including LNG transfer hoses, emergency release couplings and emergency shutdown systems. Four bunkering manifolds were installed: two on both sides, midships, and two on both sides, bow. Additionally, hose-handling cranes were installed on the starboard and port sides.

Kaguya also incorporates a 'ballast-free' concept, for reduced maintenance. The propulsive

arrangement includes a controllable-pitch propeller, a Schilling rudder, a stern thruster and a bow thruster, for precise thrust control and high manoeuvrability during in-port navigation and bunkering operations.

TECHNICAL PARTICULARS

Length, oa 81.7m
 Length, bp 76.2m
 Breadth, moulded 18.0m
 Depth, moulded 7.8m
 Gross tonnage 4,044tonnes
 Design, draught 4.8m
 Design, deadweight 2,431tonnes
 Deck space (total) 198.4m²
 Deck capacity 750.96m³
 Service speed about 10knots
 Range about 4,100nm
Main engines
 Number of engines 2
 Make Taiyo Electric Co.
 Model IW 400L
 Output of each engine 440kW@900rpm
Gearboxes
 Number of gearboxes 1
 Make Hitachi Nico
 Transmission Co.
 Model MMGR1243-67
 Output speed 298.4rpm
Propellers
 Number of propellers 1
 Make KHI
 Model 590CB / 180RU
 Diameter 2,200mm
 Material NiAlBr
 Number of blades 4
 Speed 298.4rpm
 Fixed/controllable pitch Controllable
 Open/nozzled Open
Deck machinery
Cranes
 Number of cranes 1 × tender boat /
 miscellaneous crane;
 3 × hose-handling cranes
 Make Okada Nansei
 Model PC-504XG-D50;
 PC-35HG-F07
 Capacities/SWL 0.95tonnes@8m;
 0.95tonnes@5.8m

Winches
 Number of winches 2 × windlass/
 mooring winch;
 2 × mooring winch
 Make KHI
 Capacities 90/58.9kN@12/15m/min;
 58.9kN@15m/min
Rollers
 Number of rollers 4
 Make Trelleborg
 Model SeaGuard foam fender
 Capacities 2,000mm dia. ×
 3,000mm length
Other deck machinery/equipment
Side thruster (bow and stern)
 Make KHI
Steering gear
 Make Japan Hamworthy & Co.
Fender davit
 Make Mansei Inc.
Bridge electronics
 Radars JRC, JMR-7225-6X &
 JMR7230-S
 Autopilot Tokyo Keiki Inc.,
 PR-919C-E1-HS2
 GPS JRC, JLR-7800
 Engine monitoring system JRCS Co.,
 SMS-55
 Fire detection system Nippon Hakuyo
 Electronics, FF-3063
 Auto telephone Nippon Hakuyo
 Electronics, OAE-7224
Onboard capacities
 Fresh water 122,800litres
 Sullage 6,700litres
 Ballast water 720,600litres
 Clean drain 15,400litres
 CPP oil 2,600litres
 Bilge 9,700litres
Complement
 Number of crew 9
 Number of passengers 0
 Number of cabins 9
 Classification society ClassNK
 Notations NK, NS* (SWS)(HP-HDS,
 LGC 2G)(IWS)/MNS*
 (Descriptive note – design maximum pressure:
 0.31mpa / minimum temperature: -163°C
 KA32-HD20 applied to side shell
 plate within fr.32-83)



KOC AL ZOUR: Multipurpose oil spill recovery vessel for Kuwait

Builder **Uzmar Gemi Insa Sanayi ve Ticaret A.S.**
 Designer **Robert Allan Ltd**
 Vessel's name **Koc Al Zour**
 Owner/operator **Kuwait Oil Company**
 Country **Kuwait**
 Flag **Kuwait**
 Total number of sister ships
 already completed **0**
 Total number of sister ships still on order **0**
 Contract date **March 2019**
 Delivery date **February 2021**

Launched in August 2020, and with delivery imminent at time of writing, *Koc Al Zour* comprises a multipurpose oil spill recovery vessel and the first RAmpage 6000 class vessel to be constructed. At 60m loa, this also happens to be the largest vessel in naval architect RAL's RAmpage series.

The ASD vessel has been outfitted to undertake operations such as oil spill response duties, oil spill containment and recovery, area surveillance, offshore firefighting, back flush capabilities, logistics supply duties, towing services and rescue operations in the area around the state of Kuwait, and in international waters.

Koc Al Zour also features dynamic positioning (DP) capability and is suitable for a variety of duties; for instance, when not undertaking tasks related to oil recovery, she can be put to work as an offshore support ship.

The vessel is also designed to be on stand-by at sea for long periods. Both her hull shape and the optimised location of the anti-roll tanks are intended to ensure that the best possible seakeeping behaviour is achieved at all times.

TECHNICAL PARTICULARS

Length, oa 60m
 Length, bp 56.869m
 Breadth, moulded 14m
 Depth, moulded 7.3m
 Gross tonnage 1,855tonnes
 Displacement 3,162tonnes

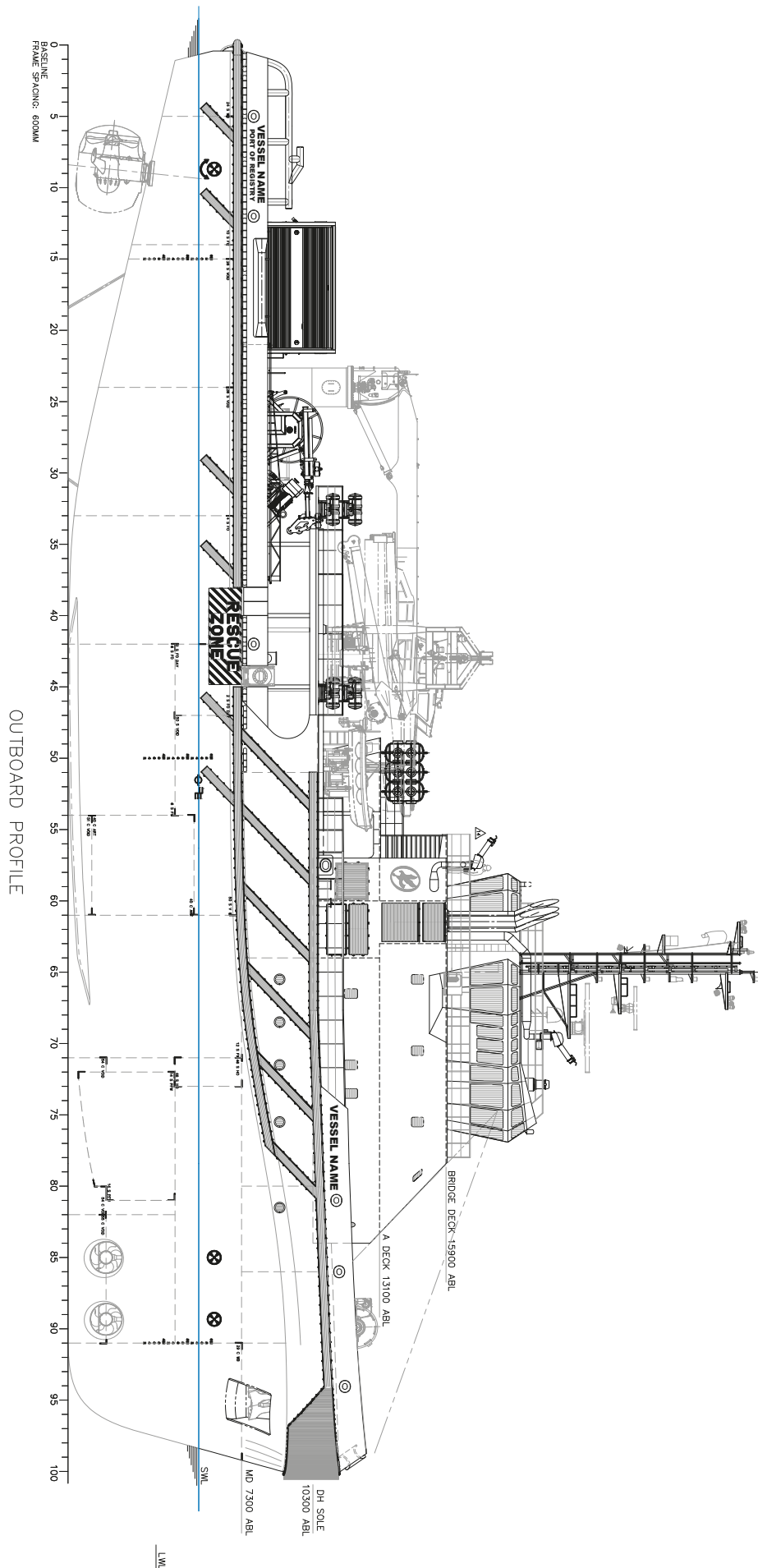
Design, draught 4.7m
 Design, deadweight 1,367tonnes
 Lightweight 1,795tonnes
 Deck space (total) 442m²
 Deck capacity 5tonnes/m²
 Service speed 13knots@90% MCR
 Max speed 13.8knots@100% MCR
 Bollard pull 48tonnes
 Range 4,000nm
 Main engines
 Number of engines 2
 Make Yanmar
 Model 6EY26
 Output of each engine 1,620kW
 Propellers
 Number of propellers 2
 Make Kongsberg
 Model US 205-SP20 CP Azimuth
 Diameter 2,200mm
 Material NiAlBr
 Number of blades 4
 Speed 271rpm
 Fixed/controllable pitch Controllable
 Open/nozzled Nozzled
 Bow thrusters
 Number of thrusters 2
 Make Kongsberg
 Model TT 1300 DPN FP Tunnel Thruster
 Diameter 1,300mm
 Material NiAlBr
 Number of blades 4
 Speed 271rpm
 Deck machinery
 Deck cranes
 Number of cranes 1
 Make Heila
 Model HR 200/20-2BJ
 Capacities/SWL 3tonnes@20m
 Rescue boat cranes
 Number of cranes 1
 Make Palfinger
 Model PFHS 15
 Capacities/SWL 15tonnes
 Hydraulic Pivoting Davit
 Number 1
 Make Palfinger
 Model PRH 100 H

Tugger winches
 Number of winches 2
 Make Kraaijeveld B.V
 Model SA-10-H-TR
 Capacities 10tonnes
 Stern rollers
 Number of rollers 1
 Make Data Hidrolik
 Model DSR 1000X3000
 Capacities 100tonnes
 Anchor windlass
 Make Kraaijeveld B.V
 Bridge electronics
 Radar(s) JRC X-band radar
 JMR-7225-6XN;
 JRC S-band radar
 JMR-7230-SN
 Autopilot Navitron NT888G
 GMDSS JRC VHF JHS-800S;
 JRC MF/HF JSS-2150;
 JRC JUE-87 Inmarsat C;
 Jotron Tron TR30
 GPS JRC JLR-21;
 JRC JLR-7900
 Gyro Yokogawa CMZ 900D
 Chart plotter 2 x JRC Ecdis JAN-7201-N
 Engine monitoring system Praxis
 Fire detection system Praxis
 Onboard capacities
 Fuel oil 325,000litres
 Fresh water 225,000litres
 Sullage 8,800litres
 Ballast water 194,300litres
 Recovered oil tanks 757,900litres
 Complement
 Number of crew 20
 Number of cabins 12
 Other significant or special items of equipment:
 400m + 300m of single point inflatable oil containment booms;
 250m³/h skimmer system with 80m umbilical hose and telescopic crane, EX ZONE II;
 Dispersant system with 10m spray arm, neat & dilute spray;
 Workboat - aluminium, 12m, 35knots
 Classification society Lloyd's Register
 Notations LR 100 A1 Oil Recovery, Offshore Supply Ship, Fire-fighting 1 (2400m³/h) with water spray, DP (AM), LMC, UMS, National Maritime Regulations of Kuwait SOLAS 2003, Marpol 1973/78, Loadline Convention 1966 AS Amended by IMO, NOx Code, Colregs, GMDSS Area A1+A2+A3, ISO 6954 – 2000 Vibration, IMO, FSS



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LADY COMEAU III: Scallop-fishing vessel with extended range

Builder **Astilleros Armon Vigo**
 Designer **Allswater**
 Vessel's name **Lady Comeau III**
 Owner/operator **Comeau Sea Foods**
 Country **Canada**
 Flag **Canada**
 Total number of sister ships
 already completed **0**
 Total number of sister ships still on order **0**
 Contract date **September 2018**
 Delivery date **August 2020**

Lady Comeau III, which was built for Comeau Sea Foods of Nova Scotia, has an impressive range in excess of 5,500nm, enabling her to operate on 14- to 21-day voyages with a crew of up to 31 persons.

The vessel is being used to harvest scallops, and has the ability to freeze the catch immediately after arriving on deck, at -30°C. The vessel's onboard processing factory uses cleaning, sorting and automated shucking technologies, and the end product is then sorted and stored in the refrigerated hold. *Lady Comeau III* also utilises a pair of side-towed scallop rakes, with an optional third rake operated from the stern.

The refrigeration machinery recirculates the environmentally neutral refrigerant ammonia R717 by pump, and is designed for semi-automatic operation. The refrigeration plant comprises two Sabroe and SAB 120 E screw compressor units, both equipped with frequency drives with manual and automatic VSD stepless capacity control from 100% to 10%, governed by a UniSAB III computer mounted on each of the compressors. Builder Astilleros Armon says: "The computers interconnect to each other for optimal utilisation of the compressor capacity, and to optimise best possible performance and lowest possible power consumption."

The main MaK engine has been fitted with an SCR system to meet IMO Tier III emissions requirements. The propeller was optimised for the vessel's specific requirements when fishing, granting the boat "a tow force of three rakes, estimated to be approximately 3,500kg line pull per rake," the builder adds. Another notable feature is the ship's WASSP multibeam sonar, which can be used to assess the composition of the seafloor when detecting areas rich in scallops.

TECHNICAL PARTICULARS

Length, oa 49.7m
 Length, bp 47.06m

Breadth, moulded 12m
 Depth, moulded 5.36m
 Gross tonnage 1,476tonnes
 Displacement 1,530.14tonnes
 Design, draught 4.3m
 Design, deadweight 1,530.15m
 Lightweight 1,226.94m
 Deck space 302m² (working deck)
 Deck capacity 2tonnes/m²
 Service speed 11knots
 Max speed 13.2knots
 Bollard pull 4.5tonnes
 Range 5,544nm
Main engines
 Number of engines 1
 Make MaK
 Model 6M25E
 Output of each engine 2,100kW
Gearbox
 Number of gearboxes 1
 Make Reintjes
 Model LAF 2355
 Output speed 147rpm
Propellers
 Number of propellers 1
 Make CAT Propulsion
 Model MPP 690
 Diameter 3,200mm
 Material Bronze
 Number of blades 4
 Speed 147rpm
 Fixed/controllable pitch Controllable
 Open/nozzled Nozzled
Deck machinery
Crane
 Number of cranes 1
 Make Toimil
 Model T 20500/2
 Capacities/SWL 2.3tonnes @ 8.1m
Winches
 Number of winches 2
 Make Ibercisa
 Model MAI-E/260/800-28
 Capacities 13.2tonnes pull
 108m/min at first layer;
 9.8tonnes pull 146m/min at half layer.
Tow Arms
 Number of tow arms 2
 Make Hawboldt
 Capacity/SWL 9tonnes
Bridge electronics
 Radars... X-band radar, Furuno FAR-2827-BB
 S-band radar, Furuno FAR-2137-BB

Autopilot Simrad AP70 Mk2
 GMDSS Sailor 6333D console
 for GMDSS A3
 GPS Furuno GP-170.
 Gyro Simrad GC-80
 Compact
 Chart plotter MaxSea TZ Professional v4
 Engine monitoring system CAT Propulsion
 Fire detection system Marinelec
 Phoenix V2
 Satellite phones Globalstar GSP-2900
 with RAUs
 VSAT system KVH TracPhone V3-IP
 mini-VSAT

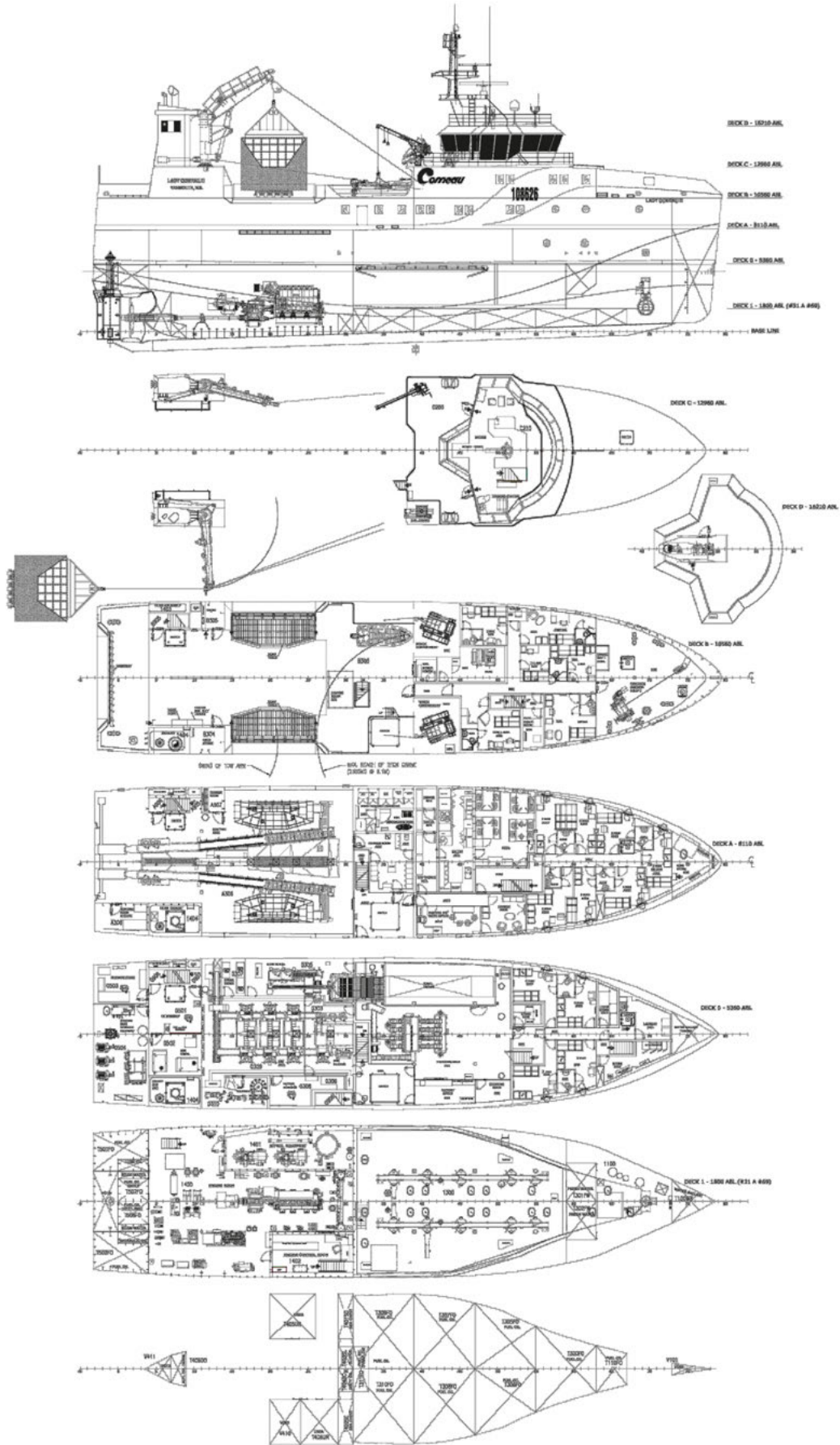
Onboard capacities
 Fuel oil 238,250litres
 Fresh water 33,320litres
 Sullage 6,680litres
 Ballast water 36,510litres
 Urea 26,590litres
 Lube oil 4,410litres
 Hydraulic oil 4,410litres

Complement
 Number of crew 31
 Number of passengers 0
 Number of cabins 17
 Other significant or special items of equipment

Refrigerating system for cargo:
 IQF tunnel freezer
 Number 1
 Make Johnson Controls
 and Carsoe AS
 Capacity 9tonnes product over
 22hours of operation
 Inlet temperature 12°C
 Outlet temperature -24°C
 Freezer capacity 504m³ @ -30°C
 Ammonia refrigeration system;
 Galvanized evaporator coils with
 individual expansion/isolation valves;

Factory processing plant with different areas:
 Sorting and picking room;
 ASM room and freezer space
Equipment (supplied by Optimar and Darose):
 Receiving hoppers;
 Product hopper;
 Shellstock picking and cleaning stations;
 Shellstock size sorting drum;
 ASM factory equipment;
 Scallop QA station;
 IQF hopper and IQF tunnel feed;
 Hand shucking station and hopper
 cargo hold hopper system;
 By-catch gutting station

Classification society DNV GL
 Notations *1A1, Fishing Vessel, EO, TMON
 (Open Loop Water)
Other important international regulations
 complied with Ship built complying with
 BIS and Clean class notations





M15Q: High-speed interceptor craft compliant with LR's Grey Boat Code

Builder	Marell Boats Sweden AB
Designer	Marell Boats
Vessel's name	M15Q
Owner/operator	TBA
Country	Sweden
Flag.....	Sweden
Total number of sister ships already completed	1
Total number of sister ships still on order.....	1
Contract date	December 2019
Delivery date.....	June 2020

2020 saw the launch of Marell Boats' M15 Quad Outboard High-Speed Interceptor (M15Q), designed for high-speed interception missions and capable of cutting through the waves at speeds in excess of 60knots.

The M15Q incorporates a "fine-tuned" version of Marell Boats' M15 hull, adding four Mercury 450hp (336kW) outboards to the arrangement. Designed for operations in conditions up to sea state 6, the vessel's 8mm hull plate and longitudinal/transversal framing were incorporated to prevent damage or buckling when the boat is subject to impacts in high seas.

The four engines grant the boat a top speed of 64knots when fully laden, and 67knots in lightship mode. Should five of these Mercury models be deployed, that lightship speed would increase to 70knots. Twin 900litre-capacity fuel tanks permit a range of 200nm, though this will depend on duty cycle.

The hull has a V-shaped bottom with hard chines. A canopy, fashioned in lightweight vacuum-moulded GRP, shields the crew area from the excesses of winter and summer weather, making the M15Q "suitable for both arctic and tropical conditions", the company comments.

The M15Q also meets the requirements of Lloyd's Register's (LR's) Grey Boat Code, which was introduced in 2019 for naval and government-managed craft under 24m in length.

The boat's raised foredeck acts as a buffer against splashing and creates a stable platform for

personnel when approaching and preparing to board other vessels. The lower aft deck serves as a multi-purpose platform that can be used to launch smaller craft (including rescue runners) for SAR tasks and/or provide a helicopter pick-up point for personnel. A centre-steering position was adopted to grant the helmsman maximum visibility when undertaking high-speed turns and intricate manoeuvres.

Marell Boats' construction methodology includes fabricating the vessels in jigs to ensure straightness. The builder elaborates: "The jig frames forming the hull shape are precision-cut with the same waterjet cutting method as for the hull material. Also, cut-outs for the lifting strakes are made in the jig frames with the precision cutting machine, making the jig a base for a very accurate hull production of the bottom and sides of the craft, with possibility to build a number of hulls in the same jig to identical dimensions, and kept within very small tolerances"

Once the deck girder structure has been created, sandwich composite deck panels are glued into place on the girder structure, to form a watertight bond. The deck panels also act as insulation against excessive solar radiation, thereby safeguarding hull integrity, especially in tropical and hot climates: the panels absorb any elongation of the aluminium plating, safeguarding the hull from deformation.

Sea trials were conducted in the Stockholm archipelago, including avoidance, U-turn and straight-line tests. Marell Boats comments: "As one example, the vessel [accelerated] from 0-50knots in less than 12 seconds. All parties [were] very satisfied with the safe and stable platform and the performance results achieved with the strong moderate V-shaped bottom with hard chines and longitudinal strakes, which shows no tendencies of chine-tripping at full high-speed turns over 50knots."

TECHNICAL PARTICULARS

Length, oa.....	14.475m
Length, bp.....	12.875m

Breadth, moulded	4.184m
Depth, moulded	2.43m
Displacement.....	9.3tonnes
Design, draught	1m
Design, deadweight.....	2.8tonnes
Deck space (total).....	15m ²
Service speed.....	45knots
Max speed.....	67knots
Range	200nm
Main engines	
Number of engines.....	4
Make	Mercury
Model	450R
Output of each engine.....	4 x 331kW
Propellers	
Number of propellers.....	4
Make	Mercury
Model	Revolution 4
Material	Stainless steel
Bridge electronics	
Radar(s)	Simrad Halo
Autopilot	Simrad
GMDSS	Furuno SCX-20
GPS	Furuno GP-33
Gyro	Thrane LT-500 AHRS
Chart plotter	SeaCross
Engine monitoring system	Mercury
Other communication systems.....	FLIR M400 Nightvision
Onboard capacities	
Fuel oil.....	1,800litres
Complement	
Number of crew	4
Number of passengers	5
Other significant or special items of equipment	
Strong lightweight aluminium hull with composite deck panel, design speed 70knots	
Classification society	Lloyd's Register
Notations	Lloyd's Register ("LR")
*100A1 SSC	
PATROL HSC G2;	
Other important international regulations complied with.....Lloyd's Register Grey Boat Code	





MAYFLOWER 400: Autonomous research vessel on a transatlantic mission

Builder	Aluship / M Subs Ltd
Designer	M Subs Ltd & Whiskerstay Ltd
Vessel's name	Mayflower 400
Owner/operator	ProMare
Country	US
Flag	UK
Total number of sister ships already completed	0
Total number of sister ships still on order	0
Contract date	N/A
Delivery date	N/A (launched September 2020)

The Mayflower Autonomous Ship (MAS), or *Mayflower 400*, is an autonomous research trimaran whose genesis dates back to 2016, when ProMare founder Brett Phaneuf, a submarine builder and expert in underwater robotics, attended a meeting to discuss how to celebrate the 400th anniversary of the 1620 voyage of *Mayflower* from Plymouth, UK to the US.

Running on a combination of AI (which will effectively function as the vessel's 'captain') and a mix of diesel and (predominantly) solar power, the MAS was launched in September 2020 (the pandemic sadly muting some of the fanfare it deserved), representing not only an eye-catching example of innovative UK boatbuilding, but also a capable tool for collecting oceanic data, with the technology and build to undertake an Atlantic crossing.

Featuring a long, slender hullform (to reduce the wet area), the vessel will be utilised by

scientists and will work with other autonomous craft to analyse microplastic pollution, the effects of global warming and the impact on sea mammals – all with unlimited range.

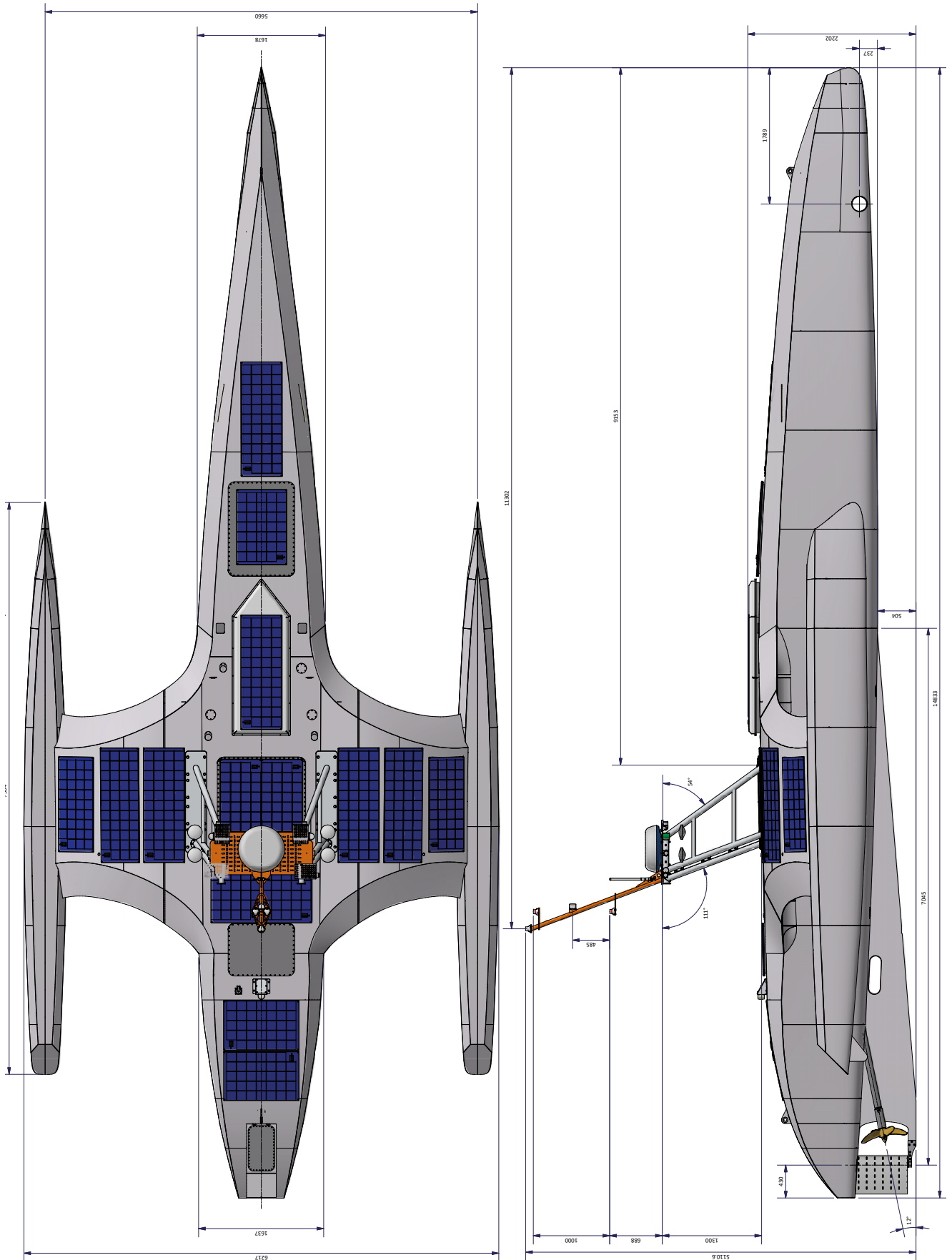
The AI 'captain' will assimilate data from various sources and constantly assess its route, status and mission. Onboard cameras and computer vision systems, meanwhile, will scan the horizon for potential hazards, while meteorological applications will check for dangerous storms, for instance. ProMare adds: "Machine learning and automation software ensure that decisions are safe and in-line with collision regulations."

The vessel's voyage, which will commence in April 2021, will be enhanced by an interactive web portal, allowing people to track its progress, including real-time updates on its current position and research data. The portal also features an octopus chatbot to provide this info in a lively format for browsers of all ages.

TECHNICAL PARTICULARS

Length, oa	14.833m
Length, bp	14.833m
Breadth, moulded	6.217m
Depth, moulded	2.202m
Displacement	9.1m ³
Design, draught	1.005m
Design, deadweight	9,100kg
Lightweight	6,100kg
Service speed	7knots
Max speed	10knots
Range	>10,000nm

Main engines	
Number of engines	2 × electric 1 × diesel generator
Make	Fischer Panda
Output of each engine	20kW (electric)/ 22kW (diesel generator)
Propellers	
Number of propellers	1
Make	Teignbridge
Model	R24 Hi Skew
Diameter	609mm
Material	Aluminium bronze
Number of blades	4
Speed	600rpm
Fixed/controllable pitch	Fixed
Open/nozzled	Open
Bridge electronics	
Radar(s)	Furuno
Autopilot	Guardian AI
GPS	Veripos LD8
Gyro	iXSea Octans
Engine monitoring system	Custom
Fire detection system	Custom
Other communication systems	Thales VesseLINK
Onboard capacities	
Fuel oil	2.5tonnes
Complement	
Number of crew	0
Number of passengers	0
Other significant or special items of equipment:	
'Guardian AI' artificial intelligence system, created by Marine AI Ltd (UK) and IBM	
Classification society	N/A
Notations	Autonomous





NOÉ: Eco-friendly houseboat for “semi-autonomous living”

Builder **META Shipyard**
 Designer **CBA Architects**
 Vessel's name **Noé**
 Owner/operator **SAS Noé**
 Country **France**
 Flag **According to the potential client's wishes**

Total number of sister ships already completed **0 (1 hull in construction)**
 Total number of sister ships still on order **0**
 Contract date **N/A**
 Delivery date **N/A**

One notable concept launched in 2020 was the Noé solar-paneled houseboat, a canal and maritime boat which could, in principle, be approved in sailing categories B and/or C. Adapted both to quayside living in a big city and to travel on canals and European rivers, Noé is intended to permit its owner to 'lay anchor' wherever he or she chooses.

The 24m boat has been customised into seven sections - the wheelhouse, rear hold, living area, terraces, greenhouse, engine, and under-deck storage area. Noé is built in natural materials and enables owners to produce their own energy, eliminating utility bills and reliance on water or electricity networks, while ensuring onboard heating, lighting, cooking and refrigeration facilities. An onboard greenhouse, designed by a permaculture specialist, will also allow owners to grow their own fresh produce.

The hull has been constructed in Strongall, a zinc-galvanised thick aluminium which was selected for its sturdiness, to safeguard the boat in the event of an impact. SAS Noé adds: "Once covered with zinc, there is no further electrolysis in the water and no further chemical surface treatment on the inside or the outside of the hull. This avoids using polluting paint which gradually dissolves in the water. Recyclable, it also reduces the environmental footprint compared with steel or composite materials." The material should also reduce the amount of time and cost required for maintenance.

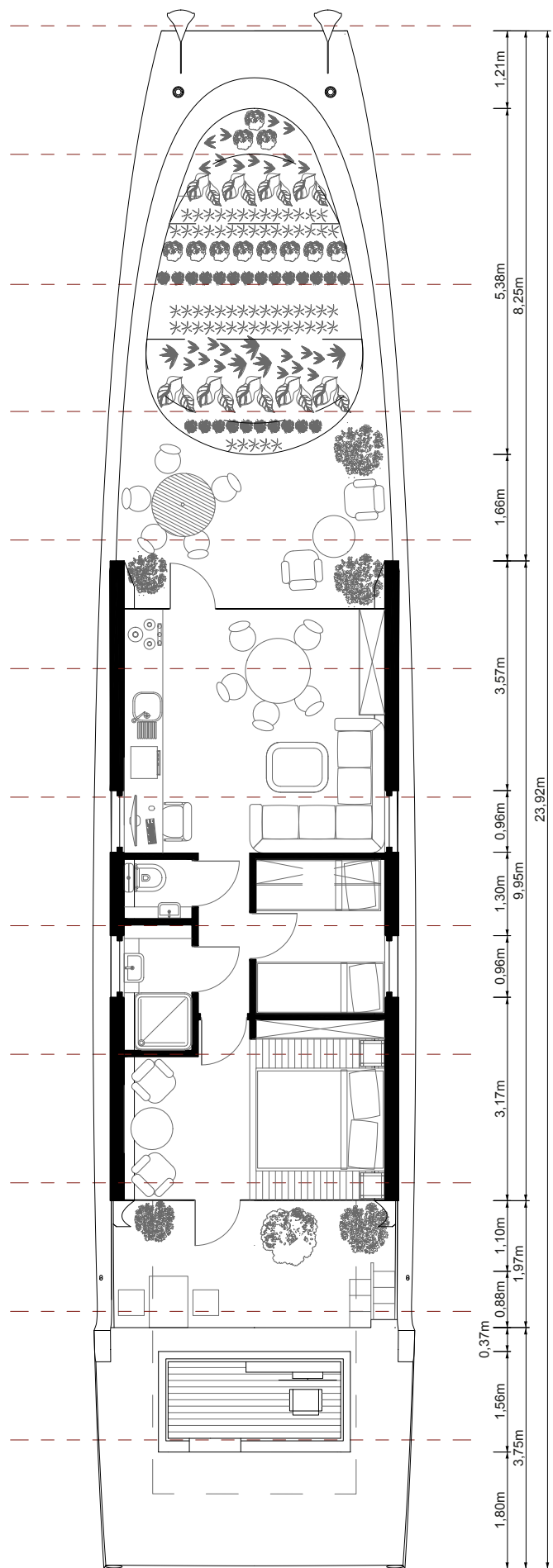
The 'overhanging' deck (the base for the separate wooden living area) conceals the technical part of the boat; its dimensions can be modified. The rear of the deck bears the wheelhouse and covers a garage area for a small city car, permitting the owner to hit the road when required.

The rear panel (with a fold-down option) can serve as a car turning area when loading or unloading it on the quayside by ramp or crane. The hull is fitted as standard with a single central rudder to limit vibration and, although there are no bow thrusters, this option exists. Noé SAS adds: "The hull and deck assembly is the base for customisable configuration, making Noé adaptable as a boat, a living space, or a tool for semi-autonomous living."

TECHNICAL PARTICULARS

Length, oa 23.92m
 Length, bp 21.25m
 Breadth, moulded 5.02m
 Depth, moulded 1.30m at 48tonnes
 Displacement 48tonnes (without ballasts, approx. 60tonnes with ballasts)
 Design, draught 1.30m at 48 tonnes
 Design, deadweight 48tonnes
 Lightweight 25tonnes (with housing, without ballasts)
 Deck space (total) 118m²
 Service speed 8knots while charged at 50tonnes
 Max speed 11knots while charged at 50tonnes
 Range 500-5,000nm, depending on options chosen
 Main engines
 Number of engines 2 × electric engines or 2 × combustion engines, depending on option chosen
 Electric option
 Make Transfluid
 Model Custom-made
 Output of each engine 55kW
 Combustion option
 Make Nanni

Model N440 135 HP
 Output of each engine 100kW
 Propellers
 Number of propellers 2
 Diameter 609.6mm
 Material Aluminium
 Number of blades 3-4
 Speed 1,200rpm
 Fixed/controllable pitch Either can be chosen as an option
 Onboard capacities
 Fuel oil 600-5,000litres (depending on option chosen)
 Fresh water 600-2,000litres (depending on option chosen)
 Sullage 300-600litres (depending on option chosen)
 Ballast water 20,000litres
 Batteries
 Electric system
 Engine 30.8kW * 2 and 2*200A*144V for the starting of the engine
 Service From 600A*12V to 1200A*24V (option)
 Combustion system
 Engine 2*200A*12V for the starting of the engine
 Service From 600A*12V to 1200A*24V (option)
 Complement
 Number of passengers 12 max.
 Number of cabins 2 (1 × master cabin, 1 × cabin with two small beds - floor plan can be adjusted accordingly)
 Vehicles
 Number of vehicle decks 0
 Number of cars 1 × small car if the option of the garage is chosen
 Other significant or special items of equipment
 Option of a garden under a glasshouse towards the bow
 Classification society N/A
 Notations European conformity class C, or B (depending on the options chosen)
 Other important international regulations complied with European conformity (CE)





OLYMPIC PRAWN: Arctic trawler with high standard of onboard comfort

Builder **Cemre Shipyard**
 Designer **Kongsberg**
 Vessel's name **Olympic Prawn**
 Owner/operator **Olympic Seafood AS**
 Country **Norway**
 Flag **Norway**
 Total number of sister ships
 already completed **0**
 Total number of sister ships still on order **0**
 Contract date **April 2018**
 Delivery date **December 2020**

In builder Cemre's own words, the combined fish factory and triple trawler *Olympic Prawn* was "designed to be safer for the crew, smarter for the operations, and greener for the environment" in an effort to get away from more traditional but 'basic' fishing vessels.

Designed by Kongsberg to operate in harsh weather conditions, the ship will catch and process prawns and white fish in the Arctic, storing them within its 1,400m³ freezing hold.

An installed hybrid shaft generator enables operation at various rpms, and reduces fuel consumption. The IMO Tier III-compliant main engine and auxiliaries were supplied by Kongsberg. *Olympic Prawn's* accommodation area was designed in accordance with the hotel standards, for the welfare of the crew; for instance, the crew can access a comfortable day room and a galley with a well-decorated mess room, serving 29 persons.

Olympic Prawn features two wet areas. At the end of the day's work, crew access these wet areas and leave their wet clothes for the dryers, which have the capacity to dry clothing in less than an hour. And, in case of accidents, the vessel also features an onboard hospital, fully equipped according to regulatory requirements, to look after injured fishermen until they reach a shore-based medical facility.

TECHNICAL PARTICULARS

Length, oa 69.91m
 Length, bp 62.2m
 Breadth, moulded 16m
 Depth, main deck 6.15m
 Gross tonnage 3,318tonnes
 Displacement 4,540tonnes
 Design, draught 6.7m
 Design, deadweight 1,709tonnes
 Lightweight 2826.5tonnes
 Service speed 17knots
 Max speed 18knots
 Main engines
 Number of engines 1
 Make Bergen

Model B33:45 L9
 Output of each engine 5,400kW@
 750rpm IMO TIER III with SCR
 Auxiliary engines
 Number of engines 2
 Make Cummins;
 Scania
 Output of each engine 1,900kWm@
 1,800rpm (Cummins);
 596kWm@1,800rpm (Scania)
 Hybrid shaft generator
 Make Kongsberg
 Output 2,910kW (PTO);
 1,500kW@700rpm (PTI)
 Propellers
 Number of propellers 1
 Make Kongsberg
 Model 111A1/4E - B/P/N
 Diameter 3,900mm
 Material NiAlBr
 Number of blades 4
 Speed 17knots
 Fixed/controllable pitch Controllable
 Open/nozzled Nozzled
 Thrusters
 Number of thrusters 1
 Make Kongsberg
 Output 590kW@466rpm
 Deck machinery
 Deck cranes
 Number 1
 Make Motus
 Model MMC40-E
 Capacities/SWL 3tonnes@16m
 Loading/unloading cranes
 Number 2
 Make Motus
 Model MMC80-E;
 MMC20-F
 Capacities/SWL 10tonnes@7.5m/
 5tonnes@15m (MMC80-E);
 3tonnes@8m (MMC20-F)
 Ice trawl davit
 Number 2
 Make Motus
 Capacities/SWL 60tonnes
 Wing trawl winches
 Number 2
 Make Kongsberg
 Capacities/SWL 52tonnes
 Mid trawl winches
 Number 2
 Make Kongsberg
 Capacities/SWL 52tonnes
 Net drums
 Number 1
 Make Kongsberg
 Capacities/SWL 40tonnes

Sounding cable/net sounder winch
 Number 1
 Make Kongsberg
 Capacities/SWL 4tonnes
 Sweep line winches
 Number 8
 Make Kongsberg
 Capacities/SWL 20tonnes
 Gilson winches
 Number 3
 Make Kongsberg
 Capacities/SWL 20tonnes
 Cod end winches
 Number 2
 Make Kongsberg
 Capacities/SWL 11tonnes
 Out-haul winches
 Number 2
 Make Kongsberg
 Capacities/SWL 11tonnes
 In-haul winches
 Number 2
 Make Kongsberg
 Capacities/SWL 16tonnes
 Retriever winches
 Number 3
 Make Kongsberg
 Capacities/SWL 0.6tonnes
 HP auxiliary winches
 Number 4
 Make DIMO
 Capacities/SWL 10tonnes
 PAL winches
 Number 2
 Make DIMO
 Capacities/SWL 16-60tonnes
 Onboard capacities
 Fuel oil 589,600litres
 Fresh water 124,500litres
 Sullage 34,400litres
 Ballast water 224,800litres
 Freezing hold 1,400,000litres
 Receiving bins 2 x 32,500litres
 Complement
 Number of crew 29
 Other significant or special items of equipment
 Freezing System for Cargo:
 Øyangen compressed ammonia/pump
 circulated (-) 30° 100tonnes/24 hours;
 4 x chutes;
 26 x conveyors;
 Rotating bin;
 17 x buffer bins;
 Vacuum system;
 16 x adjustable platforms;
 4 x bleeding bins;
 Fish catcher;
 Electronic grader;
 Antioxidant bin;
 Packing machine;
 Label applicator;
 Automatic palletiser unit;
 Pallet magazine;
 Block turner for frozen blocks;
 Plastic wrapper;
 2 x Marel grader air cabinets;
 Pneumatic valve cabinets;
 Baader knife sharpening machine;
 3 x Baader 444 de-heading machines;
 2 x Breivik 00755 de-heading machines;
 Breivik 415 de-heading machine;
 8 x V16 vertical plate freezers;
 Fish Factory/Line:
 5 x chutes;
 3 x buffer bins;
 Catch separator;
 23 x conveyors;
 2 x grading machine for shrimp;
 3 x feeding chutes;
 2 x suction pipes;
 Connie 800 cooker;
 Connie 500 cooker;
 Blast freezer;
 2 x pre-cooling bin;
 Packing table;
 Scale and label printer strapping machine
 Lifesaving equipment:
 Norsafe Merlin-615 MKI 140 HP waterjet
 Classification system DNV GL
 Notations *IA, Stern Trawler, ICE IB (HULL:
 ICEIA*), E0, TMON, BIS

THIS IS WHY.

SUSTAINABILITY
OF THE SEA.

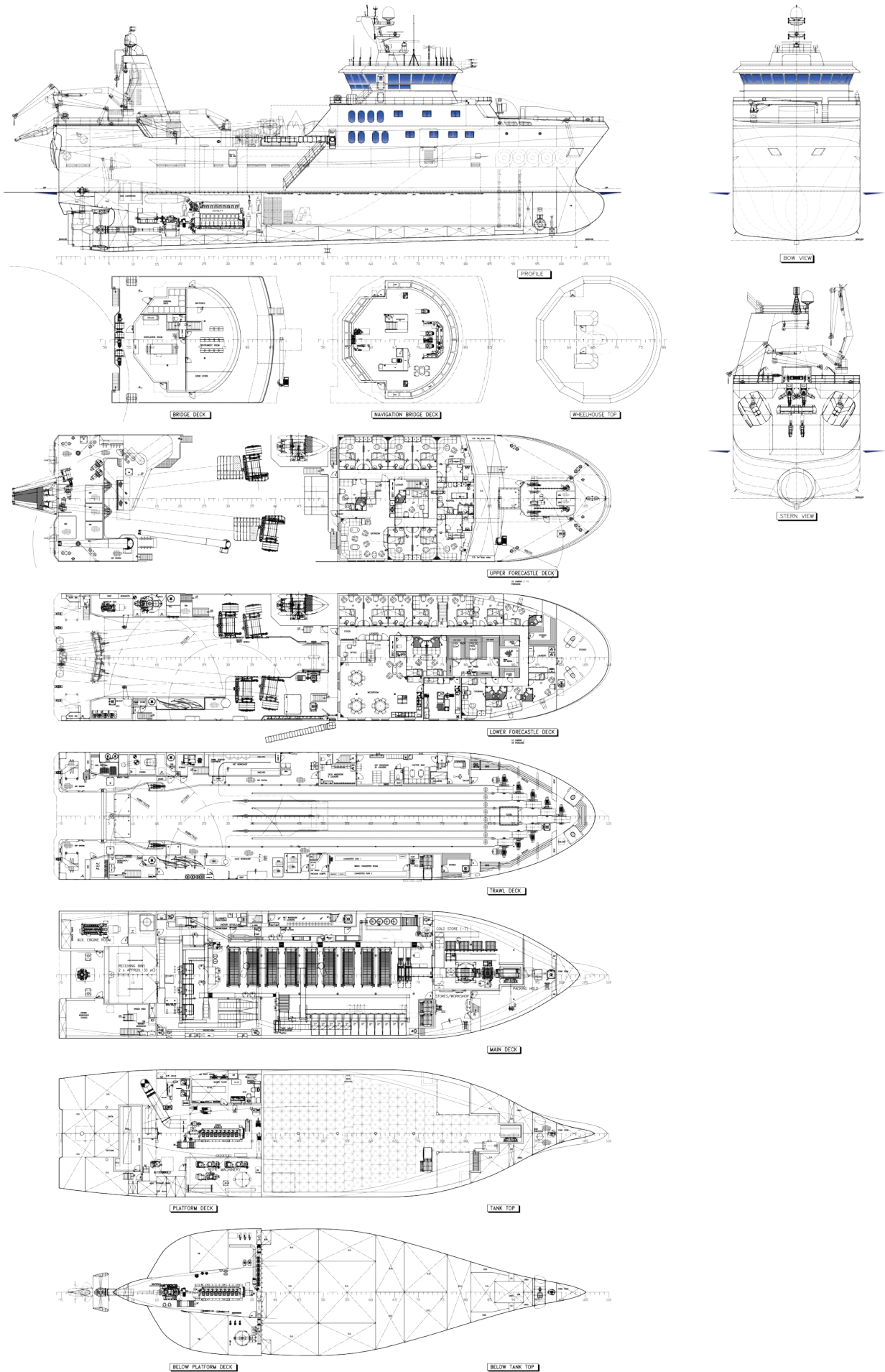


JOHN DEERE

***Sea Explorer* plays a fundamental role contributing to sustainability in the Mediterranean.** Aboard *Sea Explorer*, Michel Franck's team shares messages of discovery, education, preservation, and respect for the marine environment. As a floating classroom, this catamaran not only facilitates the teaching of environmental sustainability — it is built from recycled aluminum and an energy-efficient power solution that includes **John Deere marine engines**. Franck says, "We were looking for fuel-efficient engines that would help minimize our impact on marine life."

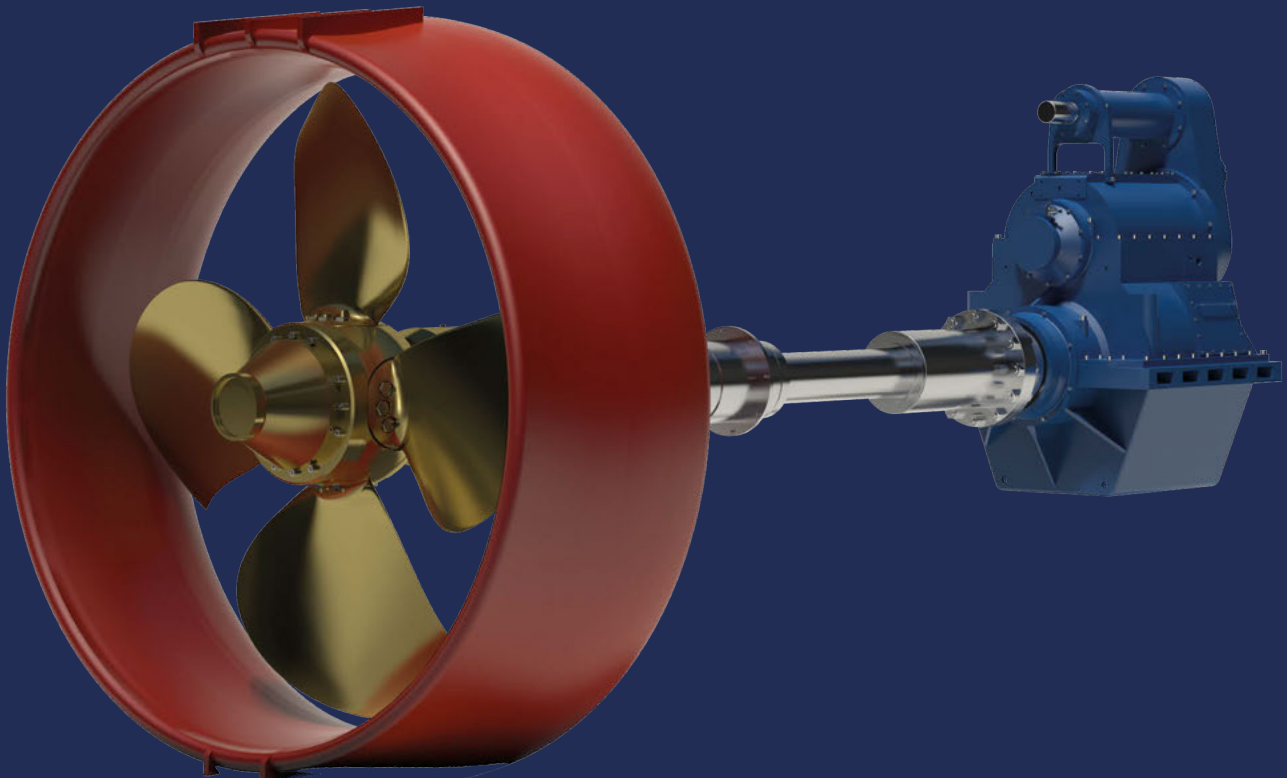
Read more about why *Sea Explorer* runs with **John Deere power** and find your why at [JohnDeere.com/Explorer](https://www.johndeere.com/explorer).

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PATRIA 22: Tug designed for operations in shallow waters

Builder **PT Patria Maritim Perkasa**
 Designer **OSD-IMT**
 Vessel's name **Patria 22**
 Owner/operator..... **PT Patria Maritim Lines**
 Country **Indonesia**
 Flag..... **Indonesia**
 Total number of sister ships
 already completed **0**
 Total number of sister ships still on order..... **2**
 Contract date **September 2019**
 Delivery date..... **August 2020**

The first in a series of at least three OSD-IMT 7402 shallow-draught tugs, *Patria 22* was delivered to PT Patria Maritim Lines, an operator based in Cikarang, Indonesia, in August 2020. The vessel was built at the Batam shipyard of PT Patria Maritim Perkasa, a subsidiary of PT United Tractors Pandu Engineering.

The tug is equipped to assist 300' (91.4m) barges when berthing and unberthing, and to tow these barges along the 890km Barito River in the South Kalimantan area of Indonesia. During the dry season, the upstream part of the river has a water depth of only 2.5-3m, effectively restricting *Patria 22*'s design draught to 2m.

The 23m tug is fitted with a 25tonne SWL towing hook, aft, alongside a 1tonne double gypsy anchor winch and a push bow triple

vertical D-fender. This arrangement will also be applied to the vessel's sisters. The design offers accommodation for 10 persons, arranged in two quadruple and two single cabins.

The tug is equipped with a pair of 610kW main diesel engines connected to drive shafts, and conventional fixed propellers with high-efficiency nozzles. This configuration allows for an ahead bollard pull of 20tonnes and a free running speed of around 12knots. The boat is Indonesian-flagged and classed by Bureau Veritas. PT Patria Maritim Perkasa intends to build more OSD-IMT7402 tugs at a later date.

TECHNICAL PARTICULARS

Length, oa..... 23.6m
 Breadth, moulded 9.2m
 Depth, moulded 3m
 Gross tonnage 203tonnes
 Design, draught 2m
 Max speed 10-12knots
 Bollard pull 20tonnes
 Main engines
 Number of engines 2
 Make Yanmar
 Model 6AYM-WET
 Output of each engine 610kW @ 1,900rpm
 Gearboxes
 Number of gearboxes 2
 Make Kanzaki

Propellers
 Number of propellers 2
 Make BT Marine
 Model Fixed-pitch Kaplan nozzle propeller
 Diameter 1,400mm
 Material Manganese Bronze (British Standard 1400 HTB1)
 Number of blades 4
 Fixed/controllable pitch Fixed
 Open/nozzled Thrust nozzle
 Deck machinery/equipment
 Towing hook installed aft
 Bridge electronics
 GMDSS Area A1
 Onboard capacities
 Fuel oil 50,000litres
 Fresh water 28,000litres
 Sullage 6,900litres
 Ballast water 17,000litres
 Bilge 2,100litres
 Complement
 Number of crew 10
 Number of passengers 0
 Number of cabins 2 x single
 2 x quadruple
 Classification society Bureau Veritas
 Notations I * HULL, • MACH,
 TUG (Bollard Pull 18tonnes),
 Coastal Area

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QUEEN BEETLE: Japan's first high-speed trimaran ferry, operating between Fukuoka and Busan

Builder	Austal
Designer	Austal
Vessel's name	Queen Beetle
Owner/operator	JR Kyushu Jet Ferry Inc
Country	Japan
Flag	Panama
Total number of sister ships already completed	0
Total number of sister ships still on order	0
Contract date	February 2018
Delivery date	September 2020

Ordered to complement Japanese operator JR Kyushu Jet Ferry's 'Beetle' ferry service, connecting Japan to South Korea, the new two-deck, high-speed, all-aluminium *Queen Beetle* is tasked with shuttling up to 502 passengers per trip across the Tsushima Strait, linking Fukuoka, on the Japanese island of Kyushu, to Busan, in south-eastern Korea – a route spanning 115nm.

The vessel was constructed by Australian boatbuilder Austal at its Henderson South facility and constitutes Austal's first newbuild for the Japanese transport company, which is a subsidiary of railway operator JR Kyushu. *Queen Beetle* is an all-new design, described as the Passenger Express 83, and Austal's first passenger-only high-speed trimaran ferry, as well as Japan's first high-speed trimaran ferry.

Queen Beetle is fuelled by four MTU engines of the 16V 1163 M74 type. These drive a quartet of waterjets through ZF gearboxes, resulting in a speed of approximately 37knots at 85% MCR – though Austal says that the trimaran has achieved speeds of 40knots+ in sea trials. The trimaran can carry up to 62,500litres of fuel. *Queen Beetle* also features: Austal's proprietary MARINELINK monitoring and control system, providing real-time onboard and remote analysis of key vessel operating systems; and Austal's MOTION CONTROL SYSTEM, comprising one active T-foil forward with two roll control foils aft, plus interceptors on the transom aft, for a ride

with less motion and greater passenger and crew comfort in various sea states.

The ferry's layout includes: two classes of seating, including compartments for groups and family; a children's play area; a duty-free shop; and café and bar facilities. Austal says: "Seating includes luxuriously appointed reclining seats with footrests, personal reading lights, coat hooks and individual USB ports that allow mobile device charging. There are also group seating configurations available, with folding tables for families, plus unallocated lounge seating available for all guests to utilise during their journey." Unlike previous newcomers to the fleet, *Queen Beetle* will not feature seatbelts, so as not to hamper passenger movement.

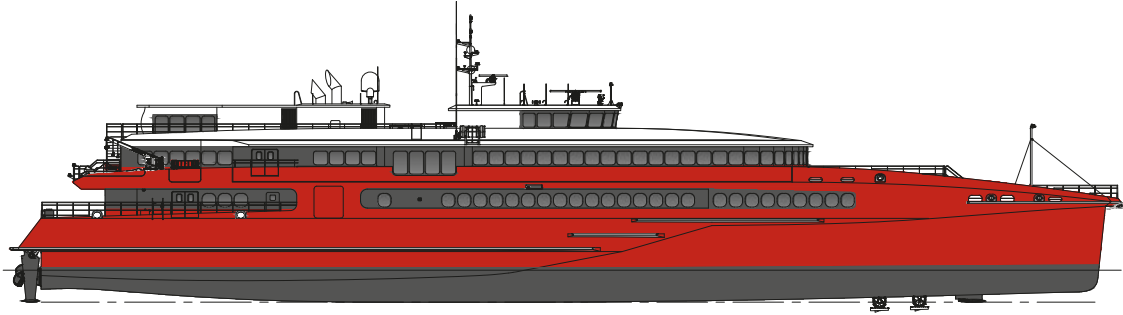
The vessel also provides lockers for luggage storage and all-access spaces for wheelchairs and prams. An outdoor viewing deck, meanwhile, will provide some variety during the crossing, and large panoramic windows are intended to grant passengers unobstructed views.

As well as potentially boosting the operator's business, the *Queen Beetle* construction project was praised by Western Australia (WA) premier Mark McGowan as a significant achievement for the state's maritime businesses. Austal estimates that getting the ferry off the blocks generated work for more than 200 people in WA. "The extent of the local content in this vessel is proof of both a vibrant shipbuilding industry in WA, as well as a testament to the quality of work and products that WA companies can contribute to the maritime sector, whether in civil or defence areas," McGowan said.

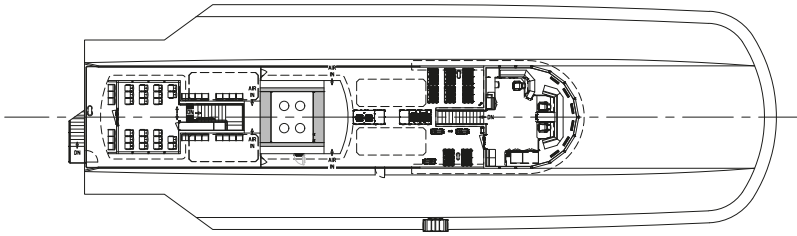
TECHNICAL PARTICULARS

Length, oa	83.5m
Length, bp	79.6m
Breadth, moulded	20.2m
Depth, moulded	6.3m
Gross tonnage	2,600tonnes
Displacement	750tonnes
Design, draught	2.4m
Service speed	37knots

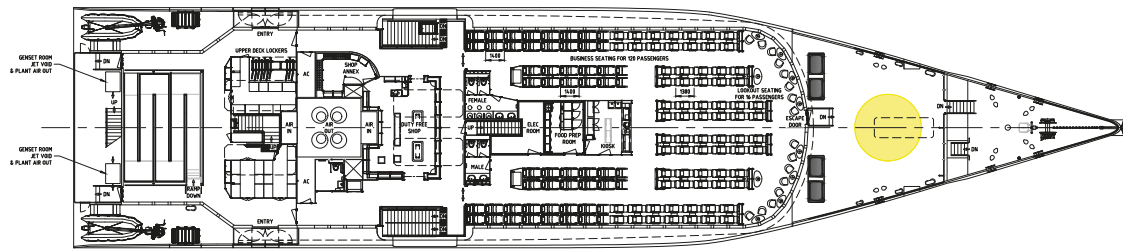
Max speed	>40knots
Range	550nm
Main engines	
Number of engines	4
Make	MTU
Model	16V 1163 M74
Output of each engine	4,800kW
Gearboxes	
Number of gearboxes	4
Make	ZF
Model	40060 NR2H
Waterjets	
Number of waterjets	4
Make	Kongsberg
Model	S90-4
Deck machinery	
Cranes	
Number of cranes	2
Make	Palfinger
Model	SCH 12-3.5
Winches	
Number of winches	1
Make	Hypac
Model	HHAW6040
Bridge electronics	
Radar(s)	Furuno S-Band and X-Band
Autopilot	Navitron NT888G
GMDSS	Furuno FELCOM18
GPS	Furuno GP-170
Gyro	Alphatron
Chart plotter	Furuno FMD-3200 ECDIS
Engine monitoring system	Austal MARINELINK
Fire detection system	Consilium
Onboard capacities	
Fuel oil	62,500litres
Fresh water	2,000litres
Sullage	1,500litres
Complement	
Number of crew	17
Number of passengers	502
Classification society	DNV GL
Notations	*1A HSLC R2 Passenger E0
Other important international regulations complied with	HSC Category B



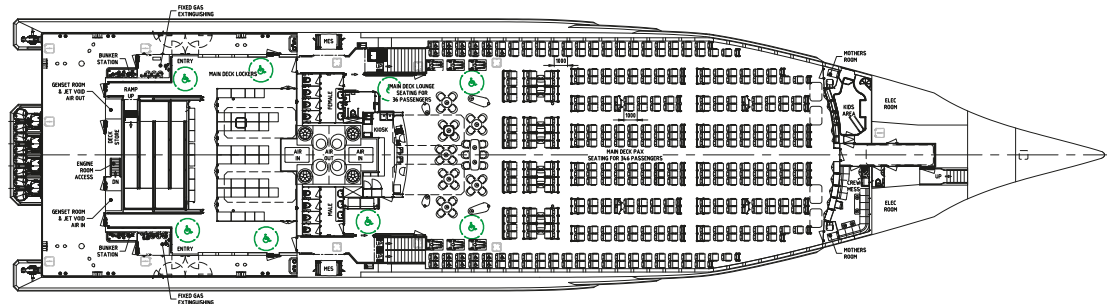
PROFILE



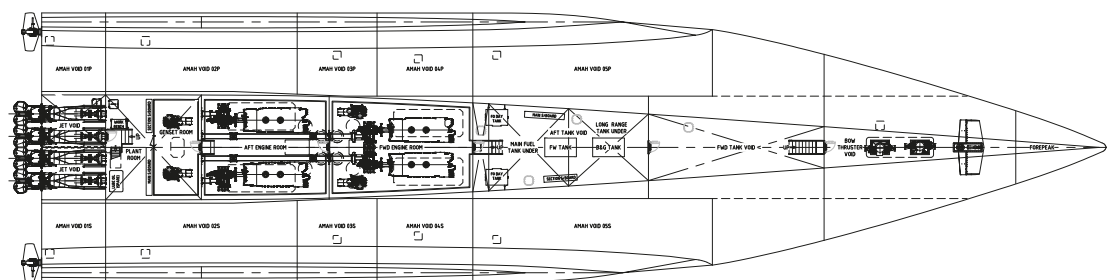
BRIDGE DECK



UPPER DECK



MAIN DECK



HULL



SAOIRSE NA FARRAIGE: Boosted capacity and lower fuel drain for Irish monohull ferry

Builder **Cheoy Lee Shipyards Ltd**
 Designer **BMT UK Ltd**
 Vessel's name **Saoirse na Farraille**
 Owner/operator **Island Ferries Teoranta**
 Country **Ireland**
 Flag **Ireland**
 Total number of sister ships
 already completed **0**
 Total number of sister ships still on order **0**
 Contract date **January 2019**
 Delivery date **August 2020**

The medium-speed monohull ferry *Saoirse na Farraille* ('Freedom of the Sea' in Gaelic) has the claimed honour of being the largest domestic passenger ferry in Ireland, featuring the capacity for up to 394 passengers. The vessel was built by Cheoy Lee Shipyards in China to a design supplied by BMT, and is tasked with carrying passengers to the Aran Islands, off the coast of Galway, Ireland.

The vessel features a spacious main deck for 306 passengers, divided into two seating areas; meanwhile, a semi-covered area on the top deck can accommodate 88 passengers. All-round crew visibility was a key consideration in the design of the wheelhouse.

In addition to her capacity, *Saoirse na Farraille* has captured attention for her environmentally friendly assets. Sylvain Julien, BMT director of naval architecture, recalls: "This design is based on high-speed craft design paradigms with the aim of significantly reducing fuel consumption and, more generally, operating cost."

As such, the vessel was built out of lightweight aluminium, and attention was paid to realising a low displacement – deemed as key to achieving minimum installed power. Julien adds: "Despite

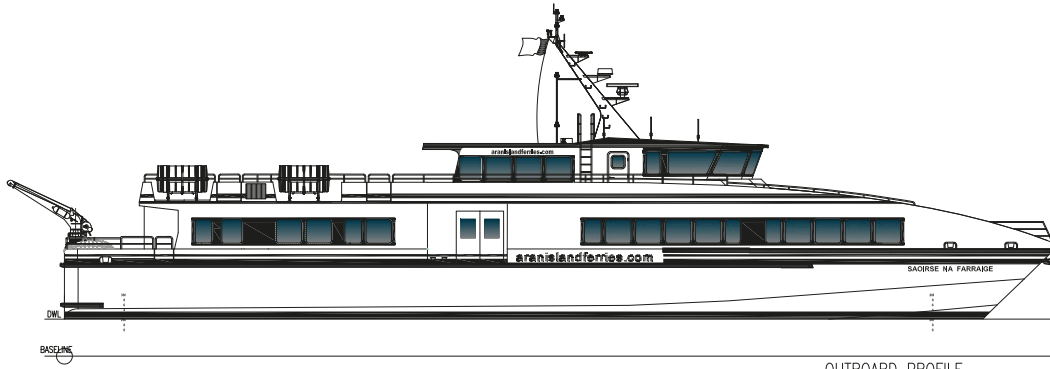
the constraints associated with the use of aluminium for vessels that do not fall under IMO High Speed Craft [Code requirements], this construction material significantly improves the through-life cost of the vessel while reducing the day-to-day exhaust emissions thanks to [the] reduced power requirements."

BMT developed a new double hard chine, semi-displacement hullform for this particular project, taking into account the specific conditions that the ferry can expect to encounter on its route. This hullform was optimised for hydrodynamic efficiency and a high level of comfort. The ferry's propulsion system comprises two Caterpillar C32 diesel engines driving fixed-pitch propellers which, together with the newly developed BMT hullform, enable *Saoirse na Farraille* to hit speeds in excess of 20knots.

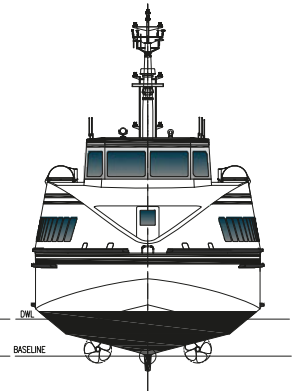
TECHNICAL PARTICULARS

Length, oa 39.8m
 Length, wl 33.23m
 Breadth, moulded 9m
 Depth, moulded 3.7m
 Gross tonnage 424tonnes
 Displacement 157tonnes
 Design, draught 1.52m
 Design, deadweight 79.5tonnes
 Lightweight 120.5tonnes
 Service speed 19.9knots@85% MCR
 Range 360nm
 Main engines
 Number of engines 2
 Make Caterpillar
 Model C32
 Output of each engine 1,081kW
 Gearboxes
 Number of gearboxes 2

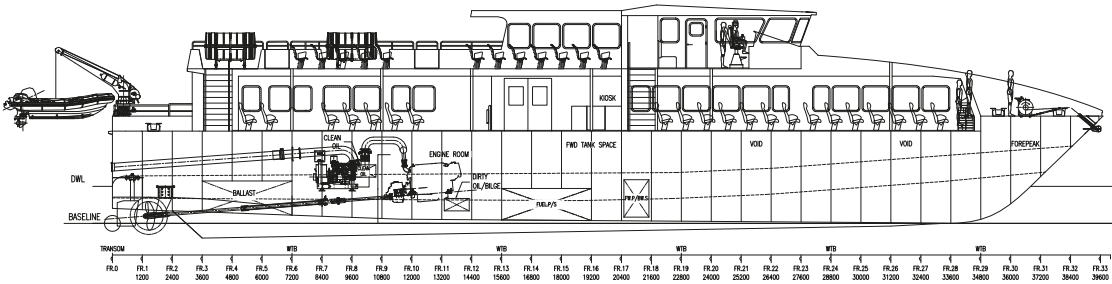
Make ZF
 Model 3055
 Output speed 3:1
 Propellers
 Number of propellers 2
 Make Teignbridge
 Diameter 1,150mm
 Material Aluminium bronze
 Number of blades 5
 Fixed/controllable pitch Fixed
 Open/nozzled Open
 Deck machinery
 Cranes
 Number of cranes 1
 Make Navigations
 Model 1.2LL-M
 Capacities/SWL 1.9tonnes
 Bridge electronics
 Radars Furuno FAR-1518-BB;
 Furuno 1835
 AIS Furuno FA-170
 Echo Sounder Furuno FE-800
 GPS Furuno GP-170
 Satellite Compass Furuno SC-70
 Log Furuno DS-80
 Engine monitoring system Caterpillar
 Fire detection system FireTech
 Radiotelephone Furuno FM-8900S VHF
 Onboard capacities
 Fuel oil 10,000litres
 Fresh water 1,500litres
 Sullage 1,500litres
 Complement
 Number of crew 6
 Number of passengers 394
 Number of cabins 3
 Classification society Lloyd's Register
 Notations ✕100A1, SSC, Passenger Mono,
 HSC, G3, ✕LMC, UM



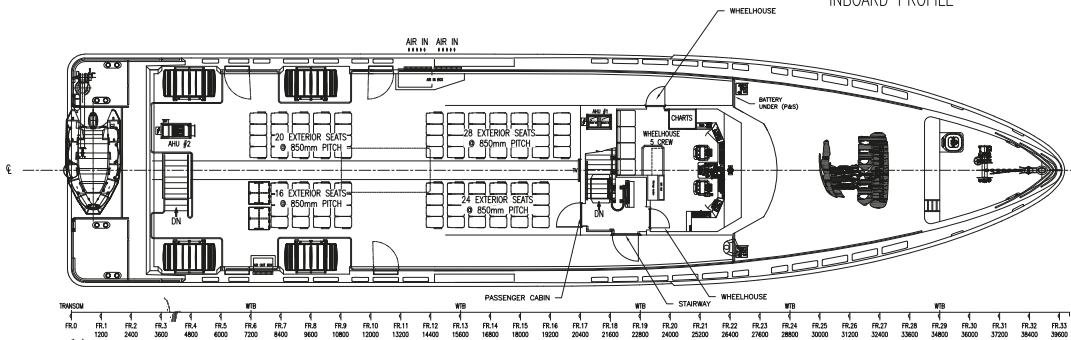
OUTBOARD PROFILE



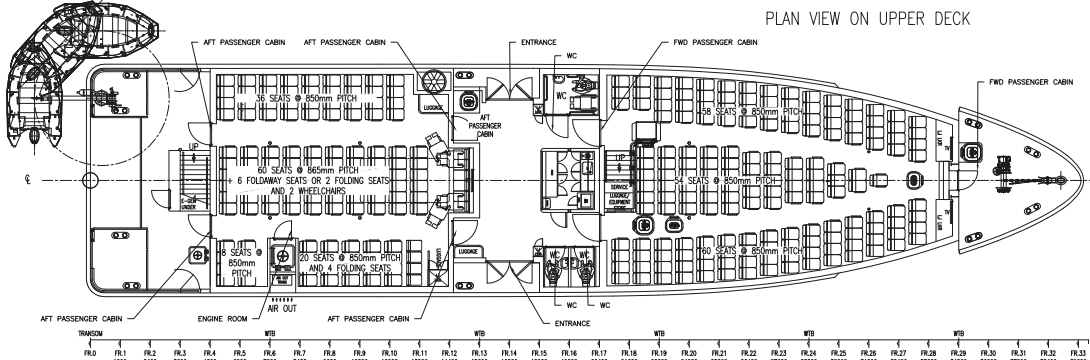
VIEW ON BOW



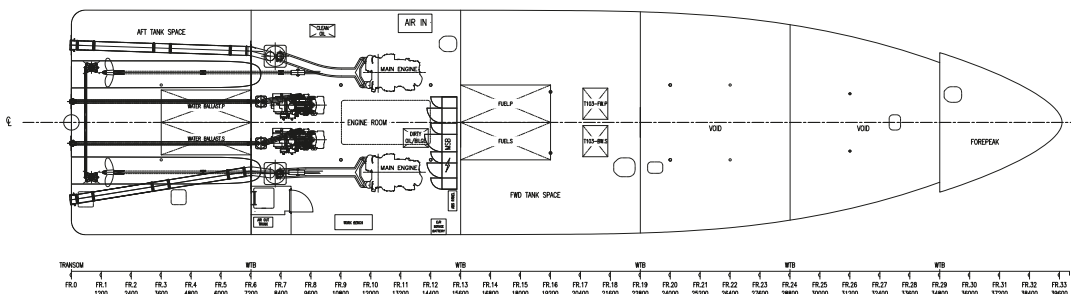
INBOARD PROFILE



PLAN VIEW ON UPPER DECK



PLAN VIEW ON MAIN DECK



PLAN VIEW ON HULL



SEACAT WEATHERLY: Offshore support vessel developed for optimal performance

Builder	Diverse Marine
Designer	Chartwell Marine
Vessel's name	Seacat Weatherly
Owner/operator.....	Seacat Services
Country	UK
Flag.....	UK
Total number of sister ships already completed.....	1
Total number of sister ships still on order.....	2
Contract date.....	June 2019
Delivery date.....	June 2020

S *Seacat Weatherly* is the first next-generation Chartwell 24 catamaran designed by UK naval architect Chartwell Marine. The 24m catamaran was built at the Diverse Marine shipyard in Cowes, on the Isle of Wight, and has taken up its first charter contract at a major UK offshore wind project.

The vessel was developed by Chartwell Marine off the back of 10 years of offshore wind vessel design and experience, alongside extensive dialogue with high-profile stakeholders, including Seacat Services and various wind farm owners and turbine manufacturers. Consequently, the design was optimised for safety and passenger welfare, as well as technical availability – key metrics for offshore energy support vessel (OESV) performance.

To boost the vessel's performance, the hull was constructed in aluminium, reducing weight and increasing load-bearing capabilities and performance. The vessel has an operational draught of 1.2m, delivering high levels of operational versatility.

Seacat Weatherly has been outfitted with two powerful MTU engines, enabling the vessel to reach speeds of up to 29knots. Combined with the optimised hullform, this is achieved while offering increased fuel economy.

In its capacity as an OESV, *Seacat Weatherly* can carry 24 industrial personnel, plus 3-6 crew

members, out to offshore wind farms. Crucially, the vessel is outfitted to ensure maximum comfort for non-seafaring passengers, increasing levels of availability for turbine technicians. The vessel also has one of the largest foredecks on the market, increasing cargo-carrying capacity, and has been optimised for safety, with designated walkways, handrails and safety sliding rails positioned for safe, repeatable crew transfer. Safety is further enhanced by the catamaran's 'step-free' design, minimising trip hazards. Skippers benefit from a unique wheelhouse configuration that provides total control and complete visibility during complex logistical and crew transfer operations.

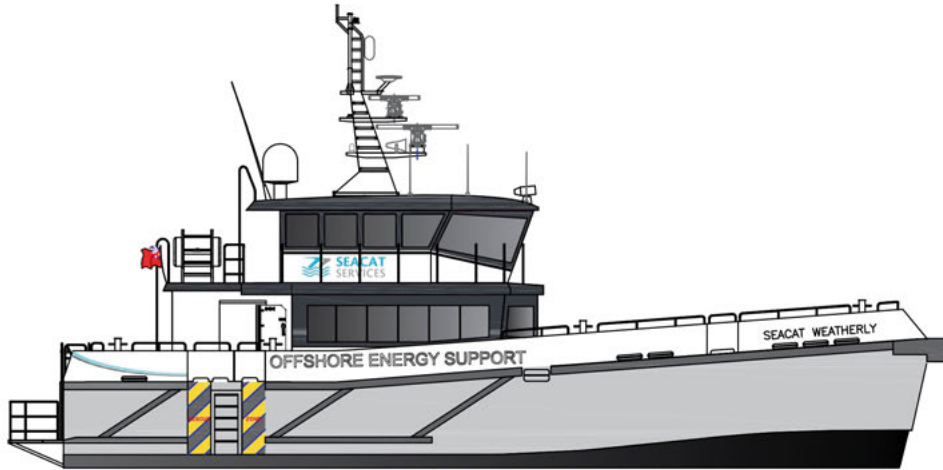
The vessel's hull and engine configuration was designed to provide superior transit speed and manoeuvrability, alongside high bollard push and frictional holding force – both critical attributes for vessels 'pushing on' to offshore wind turbines and other infrastructure. Chartwell Marine adds: "This has all been achieved while making use of many of the same components and equipment as its sister vessels in the 14-strong Seacat Services fleet, in order to maintain operational familiarity and ensure effective management of spares and inventory."

TECHNICAL PARTICULARS

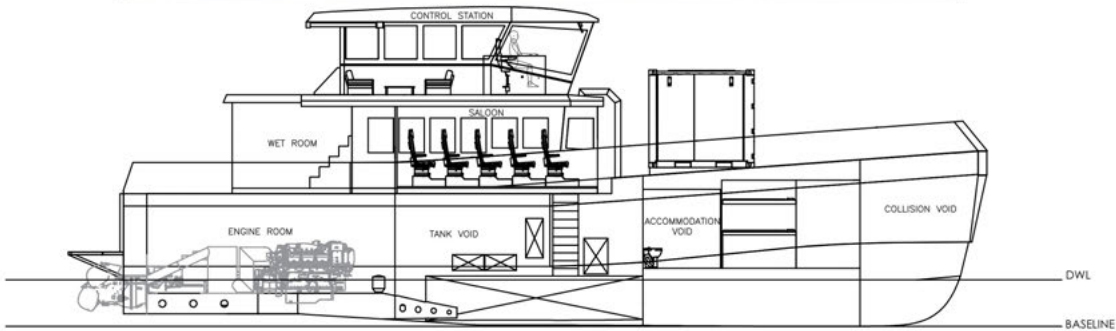
Length, oa.....	23.8m
Length, bp.....	21.6m
Breadth, moulded.....	8.87m
Depth, moulded.....	1.2m
Gross tonnage.....	111tonnes
Displacement.....	78tonnes
Design, draught.....	1.25m
Design, deadweight.....	27tonnes
Deck space.....	85m ²
Deck capacity.....	1.5tonnes/m ²
Service speed.....	27knots
Max speed.....	29knots
Bollard pull.....	11tonnes

Range.....	1,600nm
Main engines	
Number of engines.....	2
Make.....	MTU
Model.....	2000 M72
Output of each engine.....	1,080kW
Gearboxes	
Number of gearboxes.....	2
Make.....	ZF
Model.....	3050
Waterjets	
Number of waterjets.....	2
Make.....	Kongsberg
Model.....	S56-3
Deck machinery	
Cranes	
Number of cranes.....	1
Make.....	TMP
Model.....	900XL
Capacities/SWL.....	1.14tonnes@7.9m
Bridge electronics	
Radar(s).....	Furuno
Autopilot.....	Navitron
GMDSS.....	Tron TR30
GPS.....	Furuno
Chart plotter.....	Furuno
Engine monitoring system.....	Blue Wave
Fire detection system.....	Consilium
Onboard capacities	
Fuel oil.....	16,000litres
Fresh water.....	1,000litres
Sullage.....	1,000litres
Complement	
Number of crew.....	3-6
Number of passengers.....	24
Number of cabins.....	2
Classification society.....	Bureau Veritas
Notations.....	BV IX Hull • Mach Lightship / Fast Utility Vessel Sea Area 2 & 3
Other important international regulations complied with.....	UK HS-OSC; Workboat Code

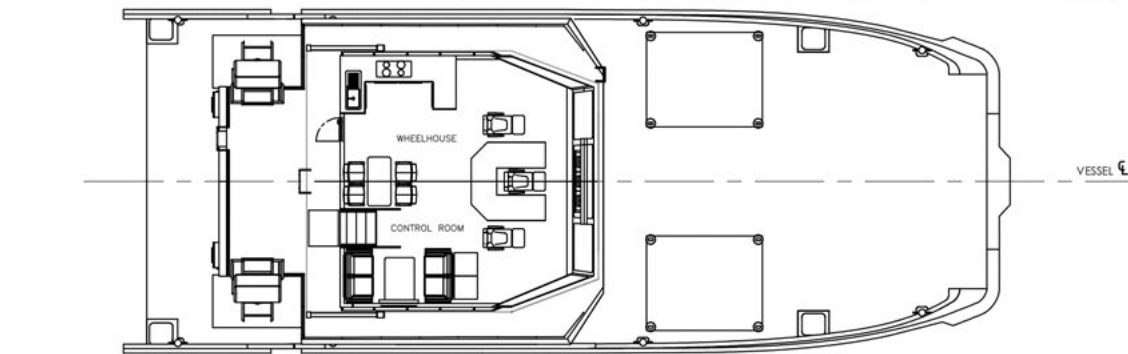
SEACAT WEATHERLY



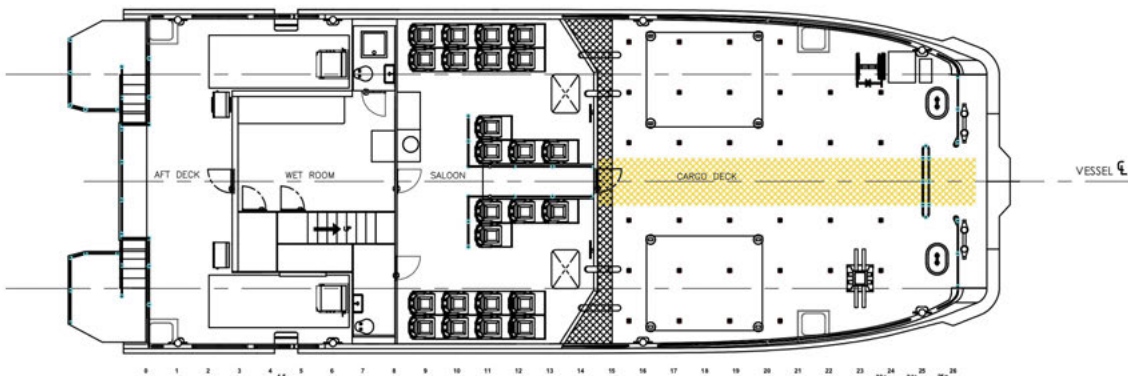
VESSEL PROFILE
SIDE RENDER
LOOKING TO PORT



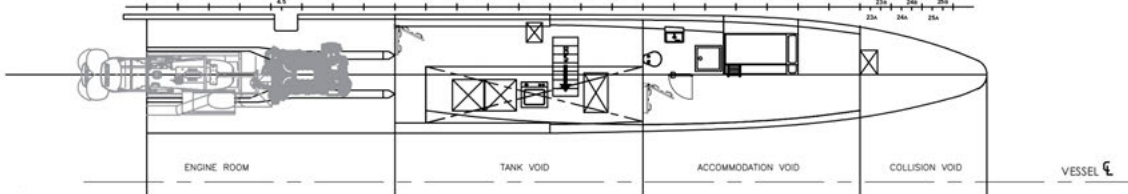
VESSEL PROFILE
PRINCIPLE INTERIOR
ARRANGEMENT
LOOKING TO PORT



VESSEL PLAN
WHEELHOUSE ARRANGEMENT
+ SKIPPER FIELD OF VIEW



VESSEL PLAN
DECKHOUSE ARRANGEMENT
+ EXTERIOR DECK



VESSEL PLAN
BELOW MAIN DECK PORT ONLY



Credit: Nathan Jarvis, SLSDC

SEAWAY GUARDIAN: Ice-class tug for the St. Lawrence Seaway

Builder **Gulf Island Shipyard**
 Designer **Robert Allan Ltd.**
 Vessel's name **Seaway Guardian**
 Owner/operator **Saint Lawrence Seaway Development Corporation**
 Country **US**
 Flag **US**
 Total number of sister ships already completed **0**
 Total number of sister ships still on order **0**
 Contract date **December 2017**
 Delivery date **August 2020**

view from the control position of the bow while pushing a barge ahead, and also the stern when handling aids to navigation.

The large aft deck, with wood sheathing and heavy-duty cargo rails provides space for the SLSDC to handle and secure multiple navigational buoys, using its suite of buoy-handling equipment. A workboat stored on a cradle above the aft winch room can also be deployed by the crane as required.

Typical complement will be four to six crew; however, comfortable accommodations are provided for up to 14 persons for extended buoy run missions.

TECHNICAL PARTICULARS

Length, oa 36m
 Length, bp 34m
 Breadth, moulded 13.7m
 Depth, moulded 6m
 Gross tonnage 729tonnes
 Displacement 1,077tonnes
 Deck space 78m²
 Design, draught 4.9m
 Design, deadweight 237tonnes
 Lightweight 840tonnes
 Deck capacity 2.6tonnes/m²
 Max speed 14.5knots@100% MCR
 Bollard pull 62tonnes
 Main engines
 Number of engines 2
 Make Caterpillar
 Model 3516E
 Output of each engine 2,000kW
 Propellers
 Number of propellers 2
 Make Kongsberg
 Model US 35 CP
 Diameter 2,600mm
 Material NiAlBr
 Number of blades 4
 Speed 1,600rpm
 Fixed/controllable pitch Controllable
 Open/nozzled Nozzled
 Deck machinery
 Cranes
 Number of cranes 1
 Make Rapp Marine
 Model HP40-40KE
 Capacities/SWL 9tonnes@12m (maximum reach)

Towing winches
 Number of towing winches 1
 Make Markey
 Model TES-34UL
 Capacities 50tonnes@7.75m/min, 25 tonnes@15.5m/min
 Tugger winches
 Number of tugger winches 1
 Make Markey
 Model DEP-12
 Capacities 5tonnes@15m/min
 Barge winches
 Number of barge winches 2
 Make Patterson
 Model WWP 75E-12.5
 Capacities 68tonnes dog holding capacity
 Rollers
 Number of rollers 1
 Make Smith Berger Marine
 Other deck machinery/equipment
 Gob eye Custom-fabricated
 Shark jaws Smith Berger Marine
 Capstan
 Make Schoellhorn-Albrecht
 Model SA1817-65-20E
 Capacities 4.7tonnes@20m/min
 Anchor Windlass
 Make Schoellhorn-Albrecht
 Model VAW1.12-15E
 Capacities 3.5 tonnes@9m/min
 Onboard capacities
 Fuel oil 131,500litres
 Fresh water 28,800litres
 Sullage 5,600litres
 Fuel oil overflow 12,800litres
 Foam 17,000litres
 Grey water 31,000litres
 Used oil 3,700litres
 Sludge 3,400litres
 Oily water 3,300litres
 Lube oil 1,700litres
 Diesel exhaust fluid 2,700litres
 Z-drive lube oil 700litres
 Z-drive hydraulic oil 300litres
 Complement
 Number of crew 14
 Number of passengers 0
 Number of cabins 6
 Other significant or special items of equipment
 Off-ship firefighting system, 2 x 1,200m²/hr monitors plus water spray (FFS supply)
 Classification society ABS
 Notations ✱A1, Towing Vessel, FF Capable, ✱AMS, ✱ABCU, Ice Class 1A, BP (61), IHM, Domestic Service

The TundRA 3600 ice-class tug *Seaway Guardian* has entered service with the Saint Lawrence Seaway Development Corporation (SLSDC). The SLSDC is a wholly owned US government corporation tasked with operating and maintaining the St. Lawrence Seaway between Massena, NY and Lake Ontario, within the territorial limits of the US.

The tug, which will be based in Massena, NY, will primarily operate between the Snell and Eisenhower locks with typical duties including icebreaking/ice-management services, handling navigation aid buoys and pushing the SLSDC's buoy and gate lifter barges. The tug is also capable of secondary roles in fire-fighting and pollution response. Built by Gulf Island Shipyards, LLC (GIS), the vessel was phased in to replace *Robinson Bay*, a 62-year old tug.

The tug design is of relatively shallow draught, classed by ABS as an Ice Class 1A tug, and incorporates an ice-breaking bow form. It is powered by a pair of EPA Tier 4-compliant engines with after-treatment, delivering a bollard pull of 61t (long tonnes) and a top speed exceeding 14knots via controllable-pitch Z-drive propulsion units.

Seaway Guardian is equipped with a heavy-duty deck crane, a stern roller, shark jaws, and a tugger winch for ease of handling aids to navigation on the aft working deck. All equipment is rated for operating in the notoriously cold local winter conditions, and the decks feature a heat tracing system to reduce the accumulation of ice and improve the safety of crew operations on deck.

Barge winches and push knees on the forward deck, plus a towing winch within an enclosed house aft, allow the tug to handle barges off the bow or the stern. The elevated wheelhouse provides an enhanced

INDEPENDENT INNOVATIVE SOLUTIONS



OSD-IMT7402

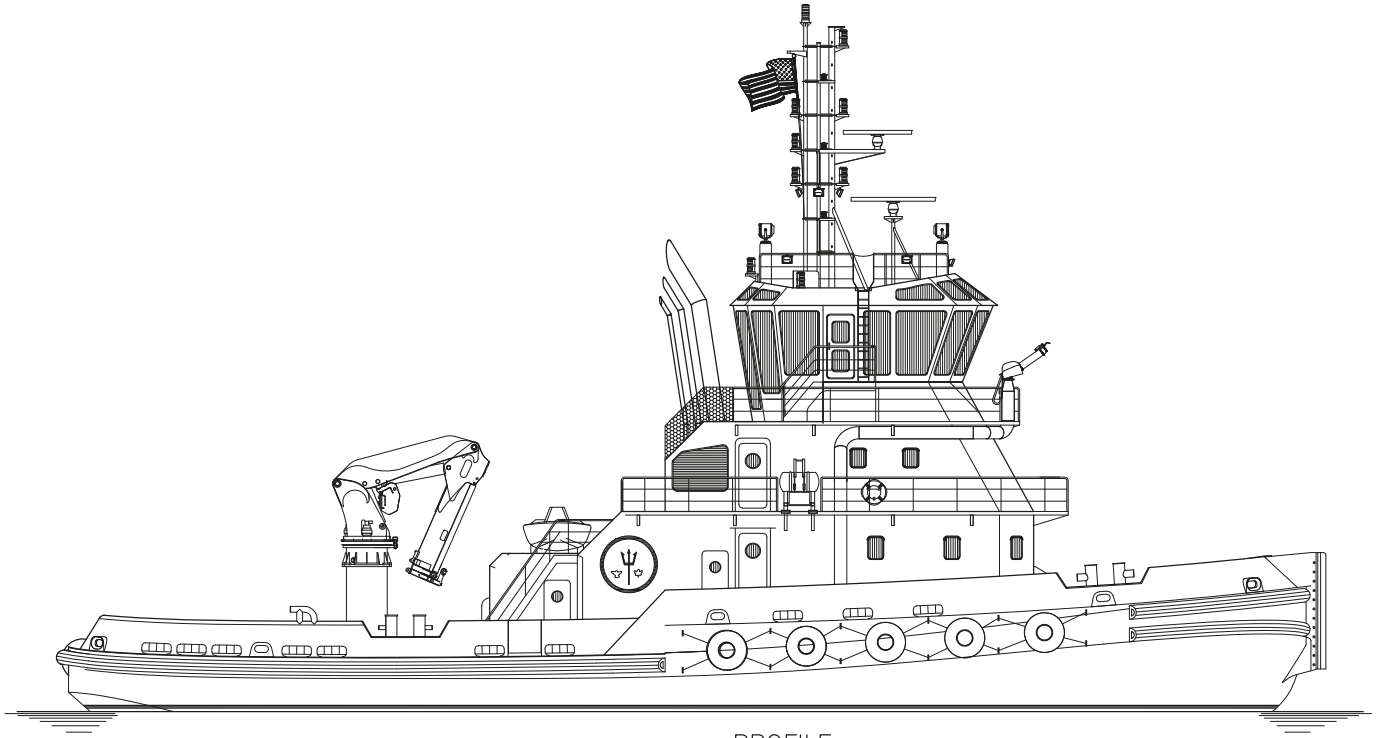
Shallow draft tug
LOA 23.60 m
Beam 9.20 m
Design Draft 2.00 m
Bollard Pull 20 tonnes
Accommodation for 10

The 23 metre OSD-IMT7402 tug is fitted with a towing hook aft. A push bow with a triple vertical D-fender is integrated in the ships' structures. The tug is equipped with two 829BHP main diesel engines connected to conventional fixed pitch propellers in high efficiency nozzels. This configuration allows for a bollard pull ahead of 20 tonnes and a free running speed of 12 knots.

The OSD-IMT7402 can operate in extremely shallow waters. The design can be adapted to your requirements. OSD-IMT provides fit-for-purpose vessel designs based on proven solutions.

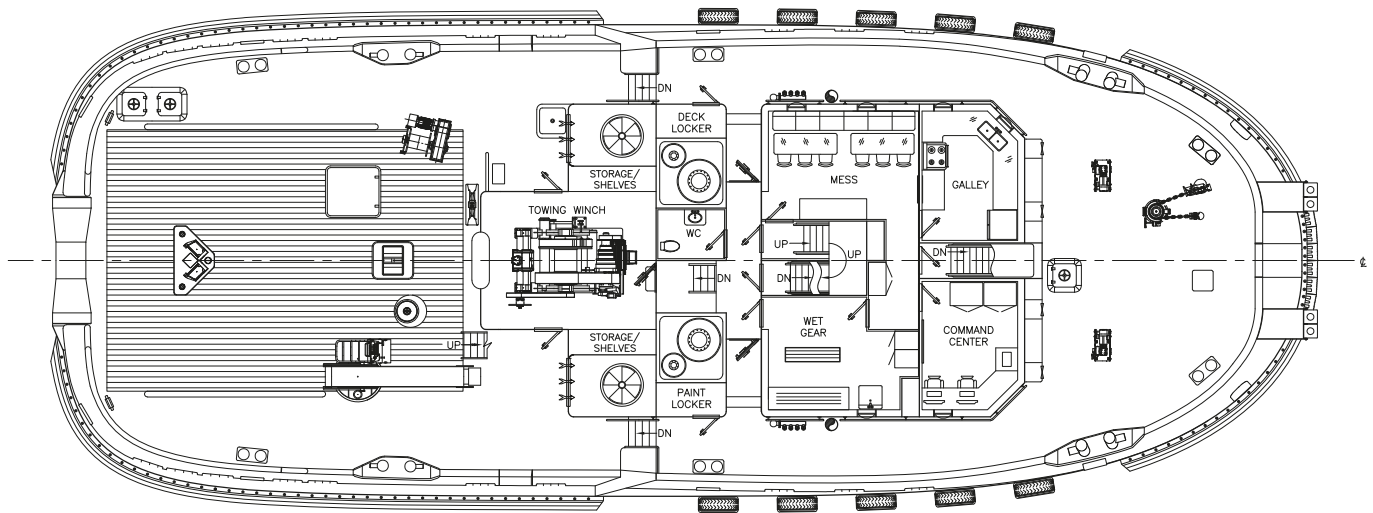
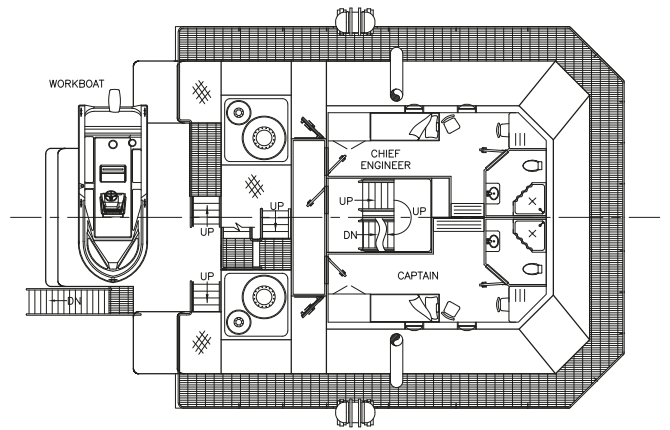
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MAIN DECK PLAN



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SOLAR ECLIPSE: All-electric catamaran designed to offer unlimited range

Builder **Azura Marine**
 Designer **Azura Marine**
 Vessel's name **Solar Eclipse**
 Owner/operator **Azura Marine Indonesia**
 Country **Indonesia**
 Flag **Singapore**
 Total number of sister ships
 already completed **0**
 Total number of sister ships still on order **0**
 Contract date **May 2018**
 Delivery date **May 2020**

Over the past few years in *Significant Small Ships*, it's been interesting to note those vessel entries that record 'N/A' for diesel fuel capacity; all-electric vessels, considered by many as something of a pipe dream a decade ago, have certainly demonstrated their capabilities when the technology is applied correctly.

Solar Eclipse is the first unit in builder Azura Marine's Aquanima range of solar-powered catamarans, and a vessel completely self-sustained, as she harvests 100% of all energy used on board from the sun. Solar energy is captured by high-efficiency solar panels covering most of the vessel's 55m² roof, and is then distributed through the main voltage panels and stored in two large battery banks. The panels are "coupled with the best solar charging computers available, maximising the solar output at a rate of hundreds of calculations per second", explains Azura Marine.

Powered by twin brushless DC motors, this vessel can cruise continuously, day and night, at an average speed of 4knots+. Azura Marine adds: "Daily energy harvests in excess of 55kWh have been recorded multiple times onboard *Solar Eclipse*, a remarkable figure for a 10kW peak roof around the equator. During summer, in higher/lower latitudes, the yield would be even greater."

The vessel's full displacement hull shape was designed from scratch for solar energy and electric propulsion using CFD software run on supercomputers, enabling next-level design iteration and achieving ultra-low drag. The

propellers were designed and manufactured specifically for high-torque, low-RPM and ultra-low losses. Maintenance-free electric motors were selected with an efficiency point as high as 98%, compared to a typical 35-40% for diesel engines, the builder states.

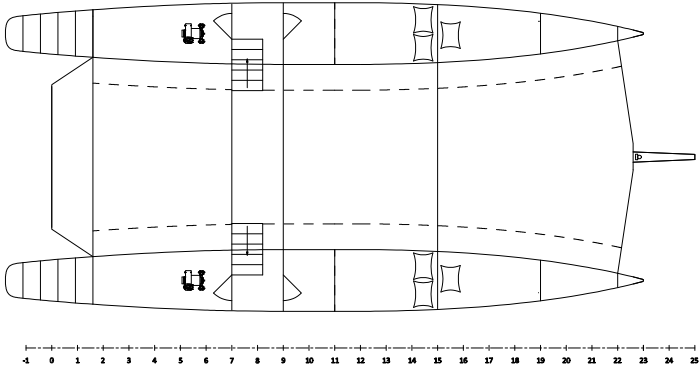
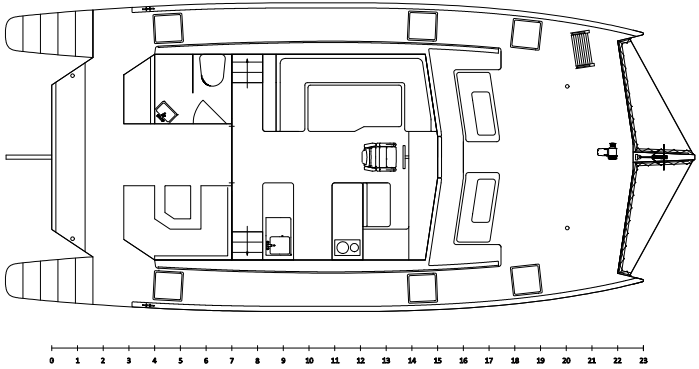
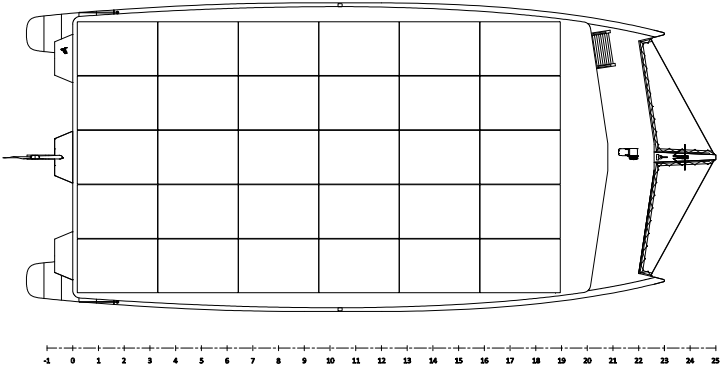
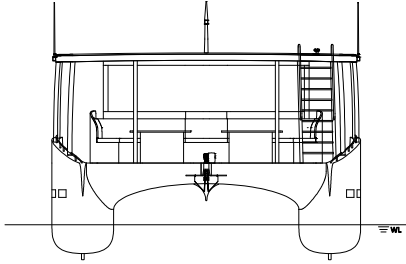
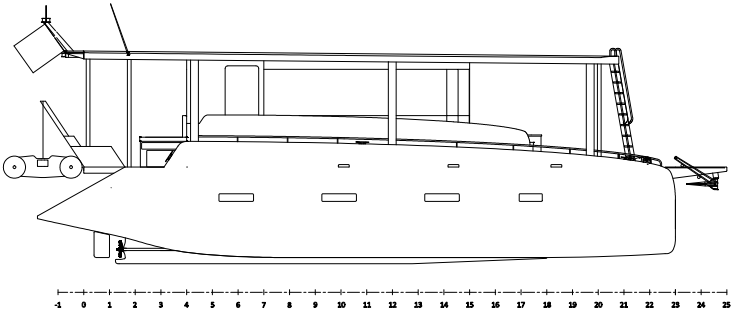
The electrical architecture of *Solar Eclipse* and subsequent cats in the Aquanima range has marine and offshore DNA, thanks to her designer's background: Julien Mélot was previously project manager at ASL Shipyard and responsible for the Swire ASD and Svitzer hybrid tugs, among other vessels. Z-Power Automation of Singapore manufactured and integrated the electric panels. As a result, the vessel has achieved full redundancy for the propulsion, plus 5 × redundancy for the batteries and 10 × redundancy for the solar-panelled roof. "*Solar Eclipse* could lose entirely one of her two battery banks and still operate as normal," Azura Marine adds.

Without any range limits nor pollution restrictions, the cat is able to explore remote areas without running out of power. *Solar Eclipse* has also been equipped with a dive compressor, a watermaker, air conditioning, a fridge, an ice maker, an induction stove and underwater lights. An electric tender, recharged from the mother vessel, can accommodate up to eight people for extending cruising in comfort and complete silence. Another big advantage is that there are no costs related to fuel, lube oil or propulsion-related maintenance.

TECHNICAL PARTICULARS

Length, oa 13.25m
 Length, bp 12.5m
 Breadth, moulded 6m
 Depth, moulded 1.7m
 Gross tonnage 16.5tonnes
 Displacement 10tonnes
 Design, draught 0.75m
 Design, deadweight 2tonnes
 Lightweight 10tonnes
 Deck space (total) 58m²

Service speed 5knots
 Max speed 8knots
 Range Infinite
 Main engines
 Number of engines 2
 Make Fischer Panda
 Model 10kW BLDC
 Output of each engine 10kW
 Propellers
 Number of propellers 2
 Make Confidential
 Model Custom
 Diameter 37cm
 Material Bronze alloy
 Number of blades 5
 Speed 1,200rpm
 Fixed/controllable pitch Fixed
 Open/nozzled Open
 Special adaptations Confidential
 Deck machinery
 Dive compressor;
 Racks for 10 scuba diving tanks
 Bridge electronics
 Radar(s) Raymarine Quantum 2
 Autopilot Raymarine Evolution ACU-150
 GMDSS Raymarine Ray63
 GPS Raymarine Raystar 150
 Gyro Raymarine p70RS
 Chart plotter Raymarine Axiom 12
 Engine monitoring system Fischer Panda
 Other communication systems
 Proprietary remote data acquisition
 and boat monitoring system
 Onboard capacities
 Fuel oil N/A
 Fresh water 550litres
 Sullage 215litres
 Battery capacity 60kWh (main bank)
 2kWh (back-up for navigation/
 communications)
 Complement
 Number of crew 2
 Number of passengers 10
 Number of cabins 4
 Classification society Bureau Veritas





SUNDERØY: Hybrid-powered factory freezer stern trawler

Builder **Astilleros Gondan**
 Designer **Rolls-Royce Marine AS – Ship Design & Systems (now Kongsberg Gruppen ASA)**
 Vessel's name **Sunderøy**
 Owner/operator **Prestfjord Seafood**
 Country **Norway**
 Flag **Norway**
 Total number of sister ships already completed **1**
 Total number of sister ships still on order **0**
 Contract date **May 2018**
 Delivery date **October 2020**

Described as one of the world's most advanced fishing vessels, the factory freezer stern trawler *Sunderøy* has been designed for triple trawl and pelagic trawl capabilities. The vessel's speciality is catching white fish and shrimp within Arctic waters, particularly in the Barents Sea and the waters of Svalbard, and she has been optimised for bottom and mid-water trawling.

The 77.3m, ice-class *Sunderøy* was built in steel, with an aluminium superstructure, and incorporates modern and automated fish-processing equipment, including a meal plant. The vessel has a total hold capacity of 2,250m³.

Sunderøy is intended to minimise her environmental footprint through selection of a wave-piercing hull design and a hybrid propulsion system, enabling the trawler to operate in diesel-electric or diesel-mechanical modes – or utilising both in combination.

TECHNICAL PARTICULARS

Length, oa 77.2m
 Length, bp 69.6m
 Breadth, moulded 17m
 Depth, moulded 6.5m
 Gross tonnage 4,226tonnes
 Displacement 5,573tonnes
 Design, draught 6.9m
 Design, deadweight 1,837tonnes
 Service speed 16knots
 Main engines
 Number of engines 1
 Make **Bergen**
 Model **B33:45V12**
 Output of each engine 7,200kW
 Auxiliary engines
 Number of engines 1

Make **Bergen**
 Model **C25:33L6A**
 Output of each engine 1,920kW
 Gearboxes
 Number of gearboxes 1
 Make **Kongsberg**
 Model **950 GHC-S600**
 Output speed 142rpm for propeller;
 1,200rpm for PTO;
 900-1,000rpm for PTI

Propellers
 Number of propellers 1
 Make **Kongsberg**
 Model **121A1**
 Diameter 4,200mm
 Material **NiAlBr**
 Number of blades 4
 Speed 142rpm
 Fixed/controllable pitch **Controllable**
 Open/nozzled **Nozzled**

Bow thruster
 Number of bow thrusters 1
 Make **Rolls Royce**
 Model **TT1650**
 Output 640kW

Auxiliary generator
 Number of auxiliary generators 1
 Make **Marelli**
 Model **MJBM355MB4**
 Output 550kW

Hybrid shaft generator
 Number of hybrid shaft generators 1
 Make **Kongsberg**
 Model **B5V560LC6**
 Output 2,950kW (PTO);
 2,000kW (PTI)

Deck machinery
 Service/unloading knuckle boom crane
 Number of cranes 1
 Make **MacGregor/Triplex**
 Model **KN-30**
 Capacities/SWL 2tonnes @ 12m

Knuckle boom deck crane
 Number of cranes 1
 Make **MacGregor/Triplex**
 Model **KN-50**
 Capacities/SWL 3tonnes @ 16m
 Loading/unloading crane
 Number of cranes 1
 Make **MacGregor/Triplex**
 Model **KN-75**
 Capacities/SWL 4tonnes @ 14.3m
 Service/unloading boom crane
 Number of cranes 1

Make **MacGregor/Triplex**
 Model **KN-30**
 Capacities 4tonnes @ 8m

Other deck machinery/equipment
 1 x white fish heading and gutting factory system;
 1 x shrimp factory/line;
 1 x meal and oil factory

Mid-trawl winches
 Number of winches 2
 Make **Kongsberg**
 Capacities 52tonnes at first layer;
 26tonnes at mid layer;
 17tonnes at top layer

Wing trawl winches
 Number of winches 2
 Make **Kongsberg**
 Capacities 52tonnes at first layer;
 26tonnes at mid layer;
 17tonnes at top layer

Net drum
 Number of winches 1
 Make **Kongsberg**
 Model **EDE400M.040**
 Capacities 40tonnes at first layer;
 14tonnes at mid layer;
 8tonnes at top layer

Net sounder winch
 Number of winches 1
 Make **Kongsberg**
 Model **EU228.003**
 Capacities 3tonnes at first layer;
 2tonnes at mid layer;
 1.6tonnes at top layer

Sweep-line winches
 Number of winches 8
 Make **Kongsberg**
 Model **EDS288.020**
 Capacities 20tonnes at first layer

Gilson winches
 Number of winches 3
 Make **Kongsberg**
 Model **EDM288.019**
 Capacities 19tonnes at first layer

Emptying (cod end) winches
 Number of winches 2
 Make **Kongsberg**
 Model **EDS280.011**
 Capacities 11tonnes at first layer

Out-haul winches
 Number of winches 2
 Make **Kongsberg**
 Model **EDS280.011**
 Capacities 11tonnes at first layer

In-haul winches
 Number of winches 2
 Make **Kongsberg**
 Model **EDS280.016**
 Capacities 16tonnes at first layer

Bridge electronics
 Radar(s) **Furuno FAR-2218 BB;**
FAR-2238S NXTBB/PM
 Autopilot **Simrad AP70**
 GMDSS **Sailor;**
Jotron

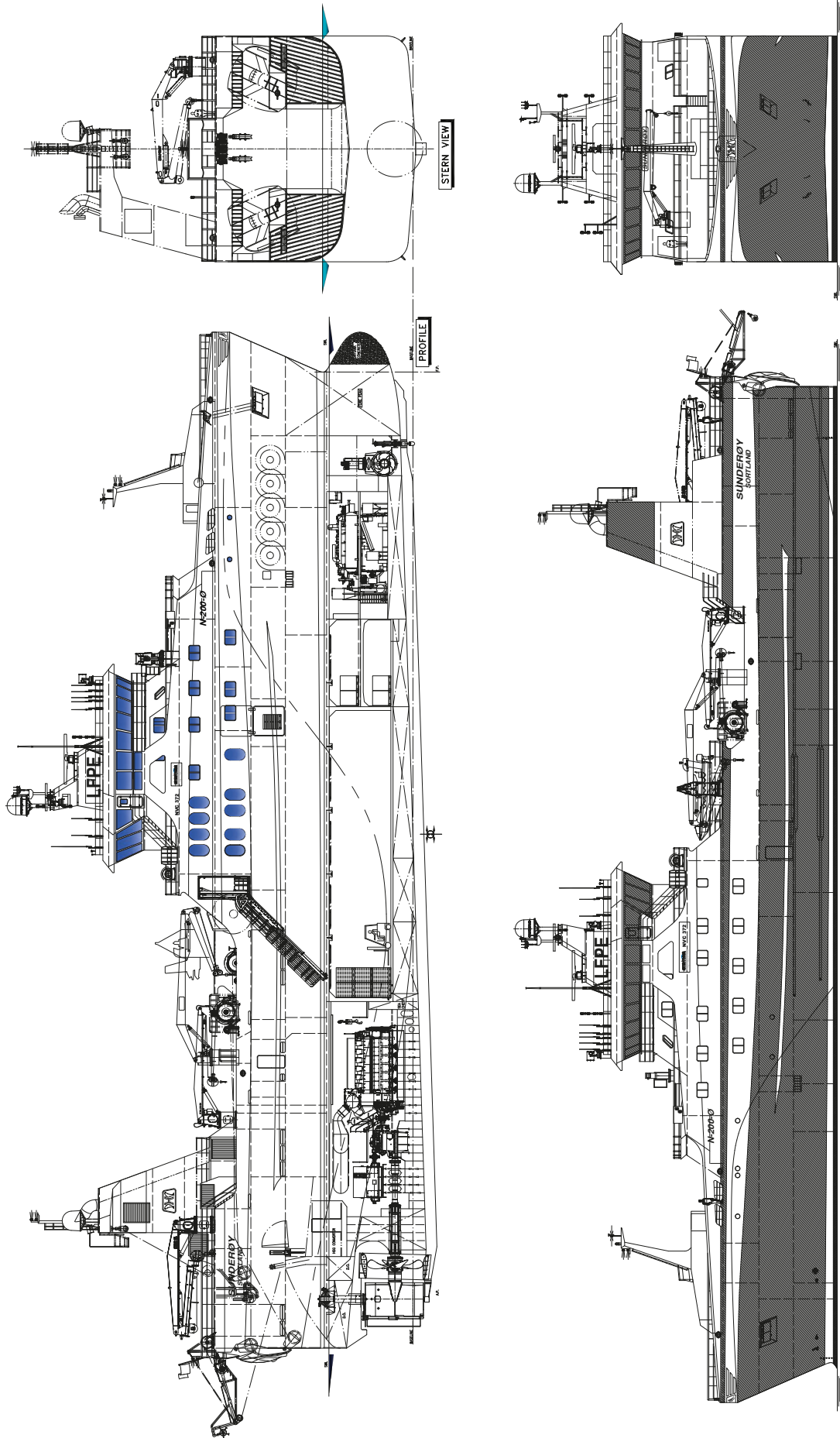
GPS **Furuno GP-170/**
GPA-017S;
 Satellite compass **SC-70**
 Gyro **Simrad GC80 Expanded**
 Chart plotter **Time Zero;**
Olex

Engine monitoring system **Kongsberg**
 Fire detection system **Autronica;**
Consilium

Onboard capacities
 Fuel oil 670,000litres
 Fresh water 50,000litres
 Sullage 200litres
 Fish hold 1,500litres
 Meal hold 300,000litres
 Battery energy storage 350kWh

Complement
 Number of crew 29
 Number of passengers 0
 Number of cabins 26
 Classification society **DNV GL**
 Notations ***1A, Stern Trawler, ICE 1B (HULL: ICE1A*), E0, TMON, BIS**

Other important international regulations complied with **Norwegian Food Safety Authority**





TERROR: Compact support craft aboard RRS *Sir David Attenborough*

Builder **Coastal Workboats Ltd**
 Designer **Incat Crowther**
 Vessel's name **Terror**
 Owner/operator **British Antarctic Survey**
 Country **UK**
 Flag **Port Stanley, Falkland Islands**
 Total number of sister ships
 already completed **0**
 Total number of sister ships still on order **0**
 Contract date **October 2016**
 Delivery date **June 2020**

The monohull landing craft *Terror* is one of two support craft carried aboard the UK-built, 129m polar research ship RRS *Sir David Attenborough*, which commenced technical trials in November 2020 and which will conduct a range of scientific tasks, as well as supporting the resupply of the five Antarctic research stations operated by British Antarctic Survey.

Terror, which was built by UK-based Coastal Workboats (formerly Exeter Fabrication), was designed for the transfer of food, vehicles, fuel and scientific equipment "to any location where the water is too shallow for the new polar ship to approach", her designer, Incat Crowther, explains. The working deck can accommodate one 20' container or a pair of 10' containers, care of twist-lock fittings and additional lashing points.

The craft also features a folding bow ramp and removable vehicle ramps, as well as a shallow forefoot for bow loading, with the vessel having been designed to load and accommodate a telehandler. A Heila HLM 10-2S deck crane can lift 2tonne loads to the cargo deck, while a kedje anchor and deck winch were selected to further enhance *Terror's* overall functionality.

An elevated wheelhouse affords excellent visibility and accommodates three crew, in addition to the captain. She can accommodate an additional 12 personnel. *Terror* is powered by twin Doosan L086TIH main engines driving

fixed-pitch propellers, and features robust skegs for protection, and this arrangement grants her a service speed of 9knots.

TECHNICAL PARTICULARS

Length, oa 14.3m
 Length, bp 12.44m
 Breadth, moulded 5m
 Depth, moulded 2m
 Displacement 25.397tonnes
 Design, draught 1.4m
 Design, deadweight 45tonnes
 Lightweight 22tonnes
 Deck space (total) 40m²
 Deck capacity 16tonnes
 Service speed 9knots
 Max speed 12.1knots
 Range 200nm

Main engines
 Number of engines 2
 Make Doosan
 Model L086TIH
 Output of each engine 210kW

Gearboxes
 Number of gearboxes 2
 Make ZF
 Model 325 IV
 Output speed 1.793:1

Propellers
 Number of propellers 2
 Make Clements Engineering
 Diameter 600mm
 Material NiAlBr
 Number of blades 5
 Fixed/controllable pitch Fixed
 Open/nozzled Open
 Special adaptations H4 Marine rope cutters

Deck machinery
 Cranes
 Number of cranes 1
 Make Heila

Model HLM 10-2S with 1tonne cable winch
 Capacities/SWL 2tonnes
 Winches
 Number of winches 1
 Make Hercules Hydraulics
 Type Deck winch
 Capacities 2tonnes

Other deck machinery/equipment
 Secondary helm position;
 Hydraulic bi-folding bow ramp;
 Fuel bund for 10tonne flubber fuel tank;
 Main anchor stowed in transom;

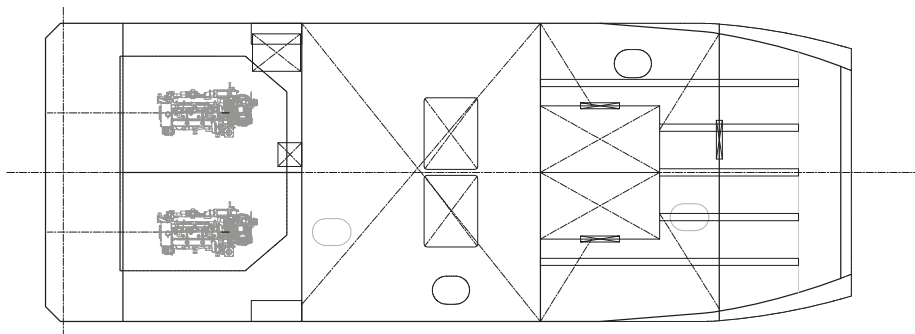
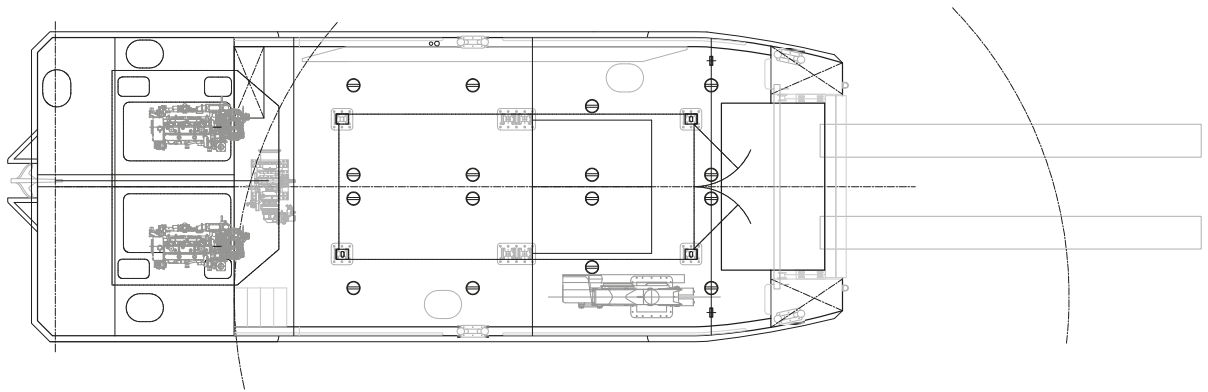
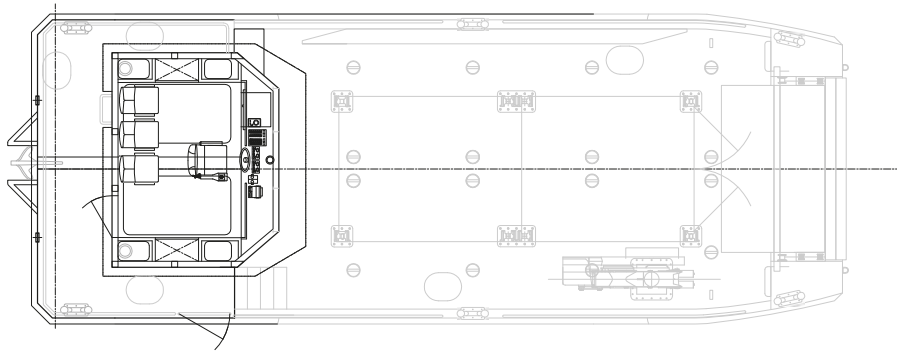
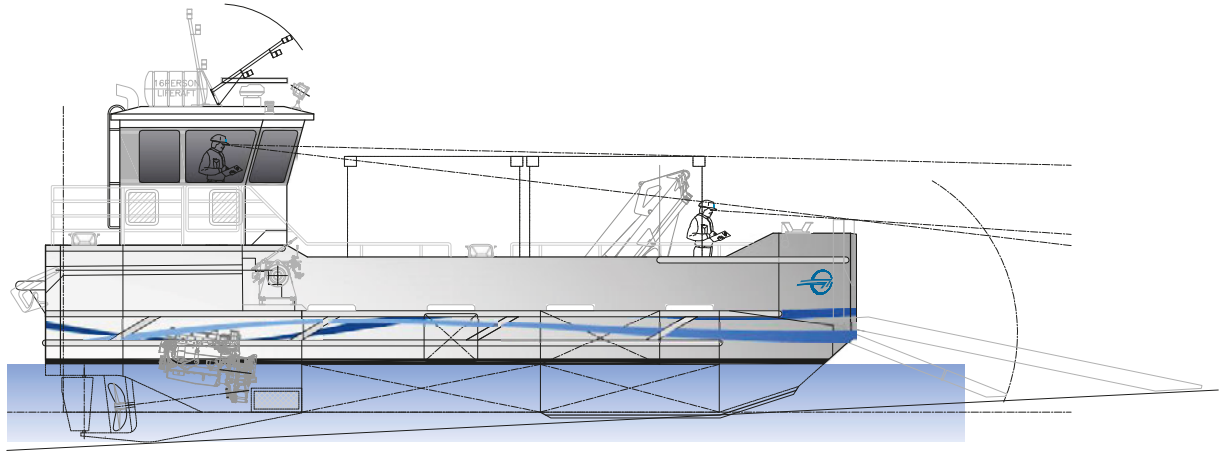
Bridge electronics
 Radar(s) Raymarine Multifunction
 GMDSS 1com
 GPS Raymarine Multifunction
 Gyro Navionics
 Chart plotter Raymarine Multifunction
 Engine monitoring system Doosan
 Fire detection system Stat-X
 Other communication systems 1com

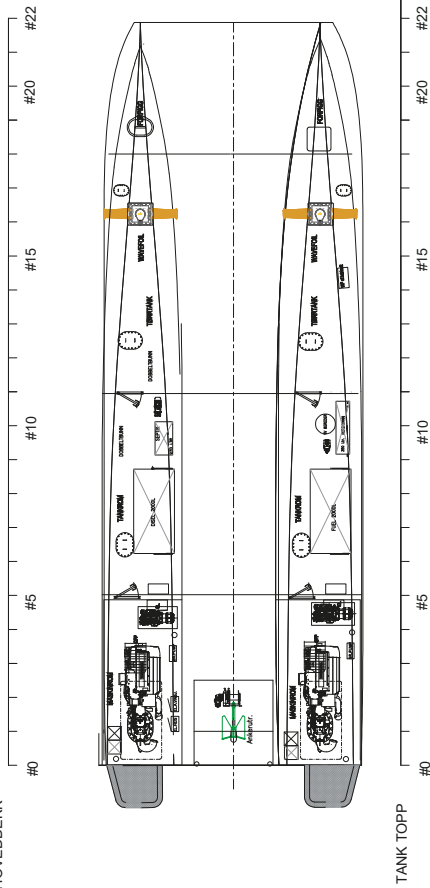
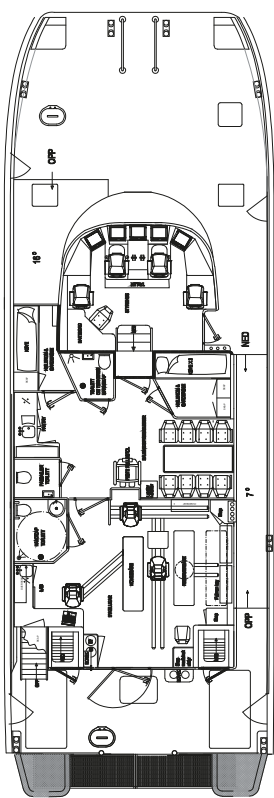
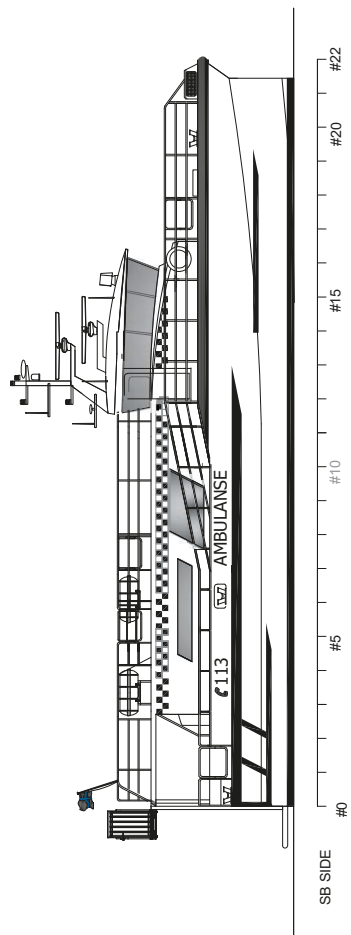
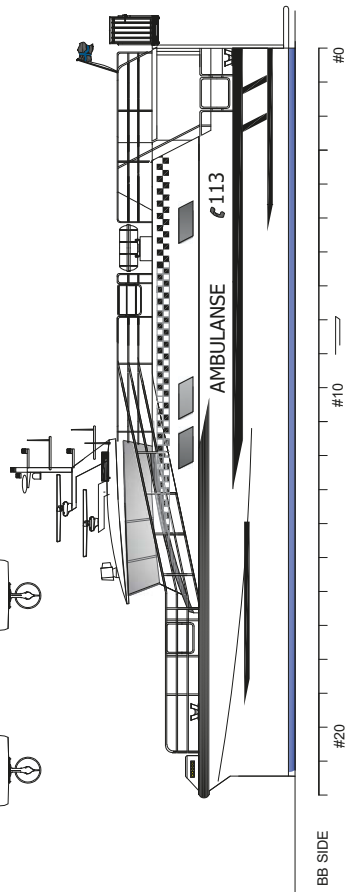
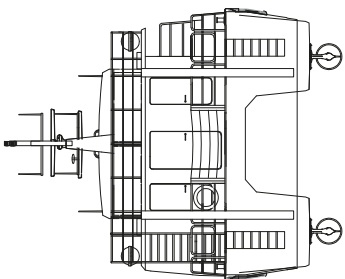
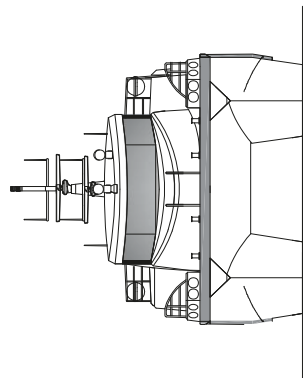
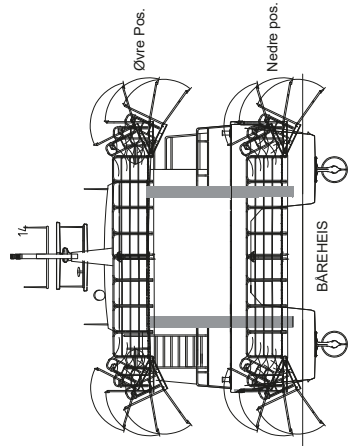
Onboard capacities
 Fuel oil 2 x 850litres
 Ballast water 2 x 2,000litres
 Hydraulic fluid 300litres

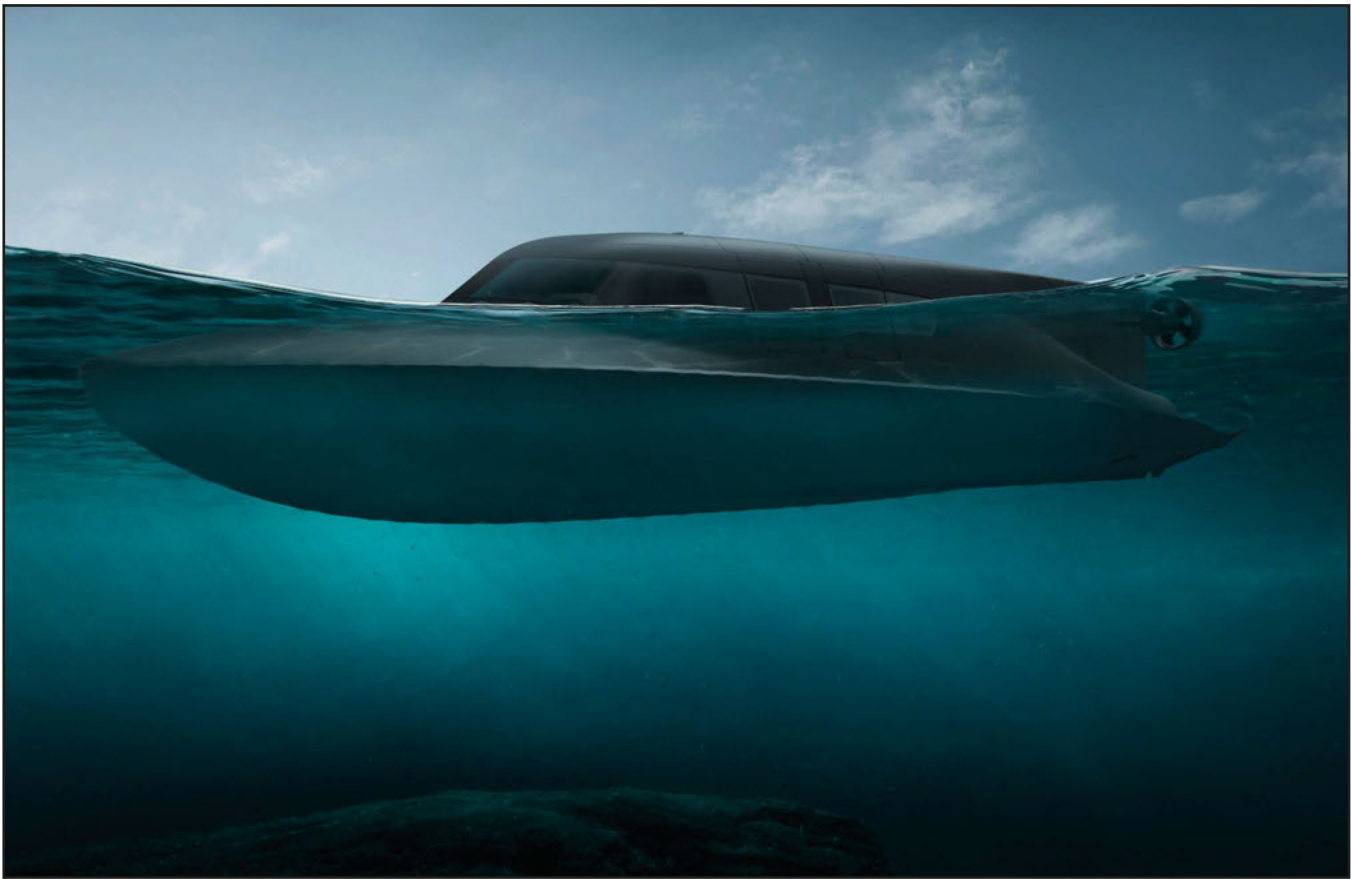
Complement
 Number of crew 12
 Number of passengers 4
 Number of cabins 0

Vehicles
 Number of vehicle decks 1
 Number of trucks/trailers 1 x vehicle

Other significant or special items of equipment
 Lifting lugs;
 Double bottom hull;
 HDPE hull bottom skids;
 Nyalic coating in engine room;
 A60 fireproof insulation in engine room;
 Shore power heating system for when stowed on board mothership
 Classification society UK MCA
 Notations UK MCA Workboat Area Cat 3 / Daughter Craft Type 1







VICTA: Diver delivery unit capable of surface and submerged operations

Builder **SubSea Craft Ltd**
 Designer **SubSea Craft Ltd in partnership with BAR Technologies**
 Vessel's name **VICTA**
 Owner/operator **SubSea Craft Ltd**
 Country **UK**
 Flag **N/A**
 Total number of sister ships
 already completed **0**
 Total number of sister ships still on order **0**
 Contract date **Undisclosed**
 Delivery date (scheduled) **Autumn 2021**

Launched in 2020 as a concept vessel, VICTA is a revolutionary diver delivery unit (DDU), a surface/submersible craft designed to operate at speed over range and capable of transition beneath the surface to operate submerged, enabling the discreet delivery and recovery of divers.

An innovative British product, VICTA is focused primarily on the defence market but with utility beyond that in the research and leisure sectors. The vessel is unique as it combines the characteristics of a long-range insertion craft with those of a swimmer delivery vehicle. It transitions rapidly from surface to subsurface, limiting exposure and reducing risk. The craft's performance in both domains, and the transition between the two, is enabled by a fly-by-wire control system.

A surface speed of 40knots and a range of 250nm gives VICTA long and fast legs. Its subsurface performance is equally impressive with four hours endurance, sufficient to navigate fully submerged with two crew and six operators for 25nm. It should take approximately two minutes for VICTA to transition from surface to submersible operations, SubSea Craft estimates.

The close involvement of experienced operators in the design and ergonomic layout of the craft has resulted in a user-oriented solution that enables the delivery of mission-ready capability over range. Also of note is an obstacle avoidance sonar, described as VICTA's "eyes underwater". The sonar builds a 3D impression of the seafloor out to 600m and down to 100m, to alert crew to any possible objects or traps.

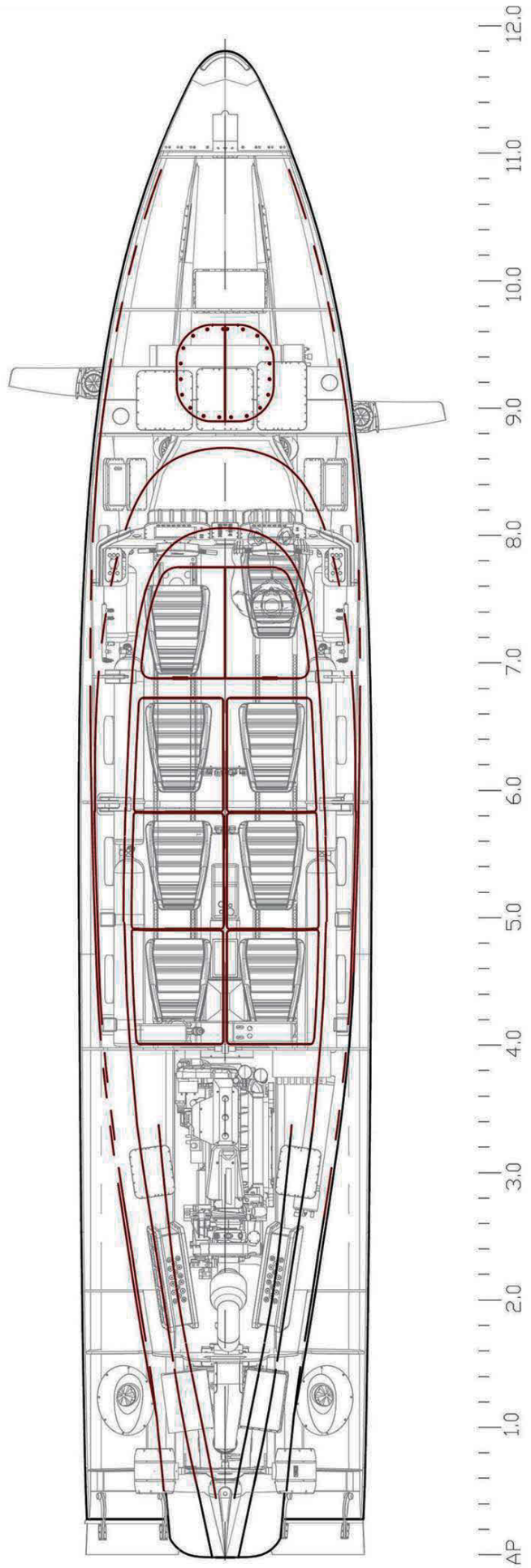
Compatibility with a standard ISO shipping container offers a range of deployment options: from a port of opportunity, through any surface vessel with appropriate crane capacity, through to movement within the cargo bay of a standard air-transport aircraft of carriage underslung from a standard heavy-lift helicopter. On arrival, the operators can simply rope or winch down to the craft. Alternatively, the craft can be embarked on the upper deck of a ship with the appropriate craning or davits, allowing it to be introduced into the operating area directly from the deck.

Finally, with 250nm endurance, VICTA is capable of independent transit into and from an area of operations – with additional fuel or a way-point re-fuelling option, this range can be extended significantly. Advanced materials, combined with minimal mechanical linkages and a digital thread – the bank of data – enables predictive and preventive maintenance to become part of routine equipment support. Maintenance, overhaul and repair are optimised by this digital diagnosis and, in turn, this increases availability and reduces cost.

TECHNICAL PARTICULARS

Length, oa 11.95m
 Breadth, moulded 2.3m
 Depth, moulded 2m

Displacement 6,919kg (dry)
 9,315kg (full load)
 Design, draught 0.64m
 Service speed 30-40knots
 Cruise speed (sub-surface) 6knots
 Max speed 40knots
 Sprint speed (sub-surface) 8knots
 Dive depth 30m
 Range (surface) 250nm
 Range (submerged) 25nm
 Main engines
 Number of engines 1
 Make SeaTek
 Model 725 Plus sub-marined diesel
 Output of each engine 533kW
 Gearboxes
 Number of gearboxes 1
 Make TwinDisc
 Model MG-5082
 Waterjets
 Number of waterjets 1
 Make Rolls-Royce
 Model Kamewa FF37
 Other deck machinery/equipment:
 Fly-by-wire advanced control system
 Onboard capacities
 Fuel oil 900litres
 Complement
 Number of crew 2
 Number of passengers 6
 Number of cabins 0
 Other significant or special items of equipment
 120 seconds transition from fully surfaced under diesel engine power to fully submerged under electric power;
 4 mins to maximum dive depth (30m);
 Sub-surface operation;
 Dynamically-stabilised;
 Fully-electric drive
 Classification society N/A



SIGNIFICANT SMALL SHIPS OF 2021

The twenty fourth edition of our annual *Significant Small Ships* series, *Significant Small Ships of 2021*, will be published in February 2022. As in previous editions we shall be including up to 30 of the most innovative and interesting commercial ship designs (up to 100m in length) delivered in 2021.

The Editor invites shipbuilders, designers and owners to submit details of vessels for possible inclusion in *Significant Small Ships of 2021*. Presentation will follow on the established two-page format, with a colour photograph, descriptive text and tabular details (including major equipment suppliers) on the first page, followed by a full page general arrangement. Potential entries should include a short technical description (500 words) of the proposed vessel, highlighting its special features and delivery date.

All entries should be addressed to:

Martin Conway, Editor, Significant Small Ships of 2021,
8-9 Northumberland Street, London WC2N 5DA, UK.
e-mail: mconway@rina.org.uk

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SIGNIFICANT SMALL SHIPS OF 2020

The annual volume of the most innovative commercial craft (vessels under 100m in length)

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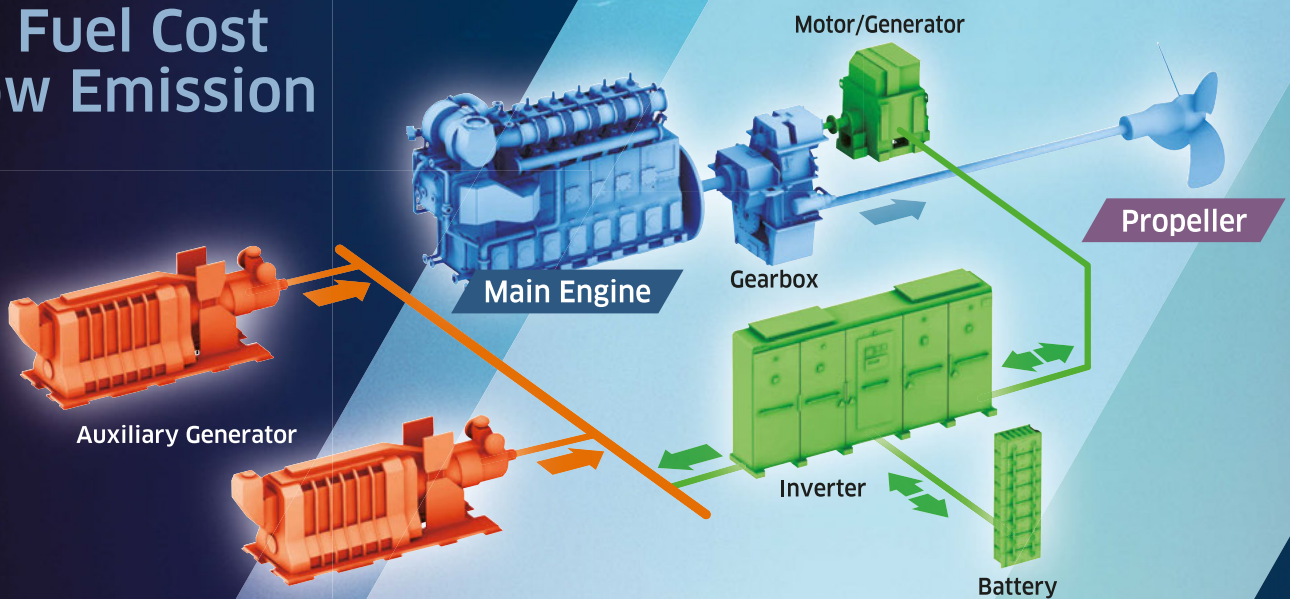
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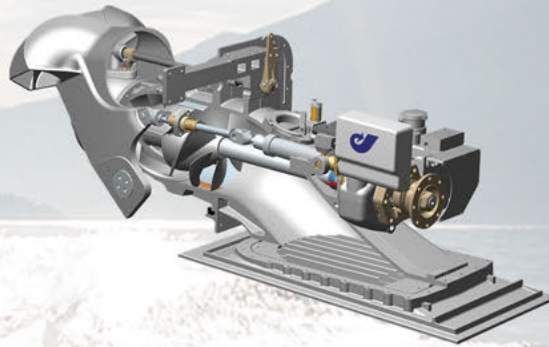
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