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## SIGNIFICANT SMALL SHIPS OF 2020

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*H401* | Tier 4 Compliant 29m Catamaran Passenger Ferry

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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

# 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..... 110m$^2$
Max speed.....12knots
Endurance .....14 days
Main gensets
Number of engines..... 4
Make ..... CAT
Model .....C18
Output of each engine..... 565kWe
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 XXXIII* 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 (RAL's) RAmparts 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 lightship weight)
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 Anschütz 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 × 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

# 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 sub-divided 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

# 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..... Boening
- 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

# 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 × 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

# 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)..... 136m$^2$
Deck capacity ..... 2.5tonnes/m$^2$
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..... 0
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 speed .....30knots
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 × 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

# 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)..... 442m$^2$
Deck capacity ..... 5tonnes/m$^2$
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 × 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; 250m$^3$/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 (2400m$^3$/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

# 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.....302m$^2$ (working deck)
Deck capacity ..... 2tonnes/m$^2$
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..... 504m$^3$@-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, E0, 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 × 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-panelled 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)..... 118m$^2$
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 × 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 × chutes;
26 × conveyors;
Rotating bin;
17 × buffer bins;
Vacuum system;
16 × adjustable platforms;
4 × 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 × Marel grader air cabinets;
Pneumatic valve cabinets;
Baader knife sharpening machine;
3 × Baader 444 de-heading machines;
2 × Breivik 00755 de-heading machines;
Breivik 415 de-heading machine;
8 × V16 vertical plate freezers;
Fish Factory/Line:
5 × chutes;
3 × buffer bins;
Catch separator;
23 × conveyors;
2 × grading machine for shrimp;
3 × feeding chutes;
2 × suction pipes;
Connie 800 cooker;
Connie 500 cooker;
Blast freezer;
2 × pre-cooling bin;
Packing table;
Scale and label printer strapping machine
Lifesaving equipment:
Norsafe Merlin-615 MKI 140 HP waterjet
Classification society .....DNV GL
Notations .....✠IA, Stern Trawler, ICE IB (HULL: ICEIA*), E0, TMON, BIS

# 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 Maritime 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 Maritime 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 × single 2 × quadruple

Classification society .....Bureau Veritas
Notations .....I ✠ HULL, • MACH, TUG (Bollard Pull 18tonnes), Coastal Area

# 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 |

# 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 Farraige***
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 Farraige* ('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 Farraige* 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 Farraige* 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

Credit: Diverse Marine

# 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** |

*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 |

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**

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 61lt (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 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
Design, draught ..... 4.9m
Design, deadweight.....237tonnes
Lightweight .....840tonnes
Deck space..... 78m$^2$
Deck capacity ..... 2.6tonnes/m$^2$
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 × 1,200m$^3$/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

# 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 55m$^2$ 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) | 58m$^2$ |
| 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 × white fish heading and gutting factory system; 1 × shrimp factory/line; 1 × 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, 26tones 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 kedge 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)..... 40m$^2$
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 .....Icom
GPS.....Raymarine Multifunction
Gyro .....Navionics
Chart plotter .....Raymarine Multifunction
Engine monitoring system.....Doosan
Fire detection system ..... Stat-X
Other communication systems.....Icom
Onboard capacities
Fuel oil.....2 × 850litres
Ballast water.....2 × 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 × 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

# THEA JENSEN: Ambulance boat designed for safe patient transfers in remote regions of Norway

Builder ..... **Maritime Partner**
Designer ..... **Lindstøl Ship**
Vessel's name ..... ***Thea Jensen***
Owner/operator..... **Loppa Legeskyssbåter**
Country ..... **Norway**
Flag..... **Norway**
Total number of sister ships already completed ..... **0**
Total number of sister ships still on order..... **0**
Contract date ..... **August 2019**
Delivery date..... **September 2020**

Designed to operate in one of the harshest environments in the far north of Norway, encountering 24 hours of darkness in winter, and snow, ice and storms from the North Atlantic, *Thea Jensen* has been described by builder Maritime Partner as the biggest ambulance boat operating in Norway.

The boat is providing safe and reliable ambulance duties to a vast area in the Loppa, Hasfjord and outer Altafjord areas. As residents are spread out in these remote locations, cut off by fjords and mountains as well as weather restrictions, transport by road ambulances is not an option as it takes a much longer time to navigate the roads around the fjord, partly because the roads are impassable in winter. "Patients require the ambulance service to be stable, and here lies the design challenge that is solved with this boat," Maritime Partner says.

The vessel has a unique hullform for operation in rough seas; its shape was designed for efficient movement through the water, to reduce fuel consumption. It is also fitted with foils supplied by Wavefoil, for a smooth ride and to contribute to fuel efficiency. The Wavefoils reduce the vertical accelerations by up to 25% on an already capable hull shape. The hull is also strengthened for ice and heating cables in large parts of the deck.

Other features include a functional platform, to pick up and treat patients in all kinds of weather, enabling the boat to make a safe passage to the hospital in Hammerfest all year round. Patients can board the boat at multiple levels, supported by an advanced lift arrangement, and the vessel can also support safe helicopter transfers. *Thea Jensen* hosts a spacious emergency room, with all the latest equipment for medical personnel, and a doctor's office.

Maritime Partner adds: "The big challenge was to achieve a successful boat that can operate year-round way north of the polar circle. The seas in the area are very rough, with storms and polar nights a large part of the year. Hull shape and freeboard had to be optimal to ride out the storms, and the result is a very 'dry' boat which will help avoid spray and resulting icing in winter."

### TECHNICAL PARTICULARS

Length, oa..... 23.1m
Length, bp..... 21.6m
Depth, moulded ..... 1m
Gross tonnage .....115tonnes
Service speed.....26knots
Max speed .....30.5knots
Range ..... 500nm

Main engines
- Number of engines..... 2
- Make ..... Volvo Penta
- Model ..... D13-IPS1050 C4
- Output of each engine..... 588kW

Gearboxes
- Number of gearboxes..... 2
- Make ..... Volvo Penta
- Model .....IPS3-C

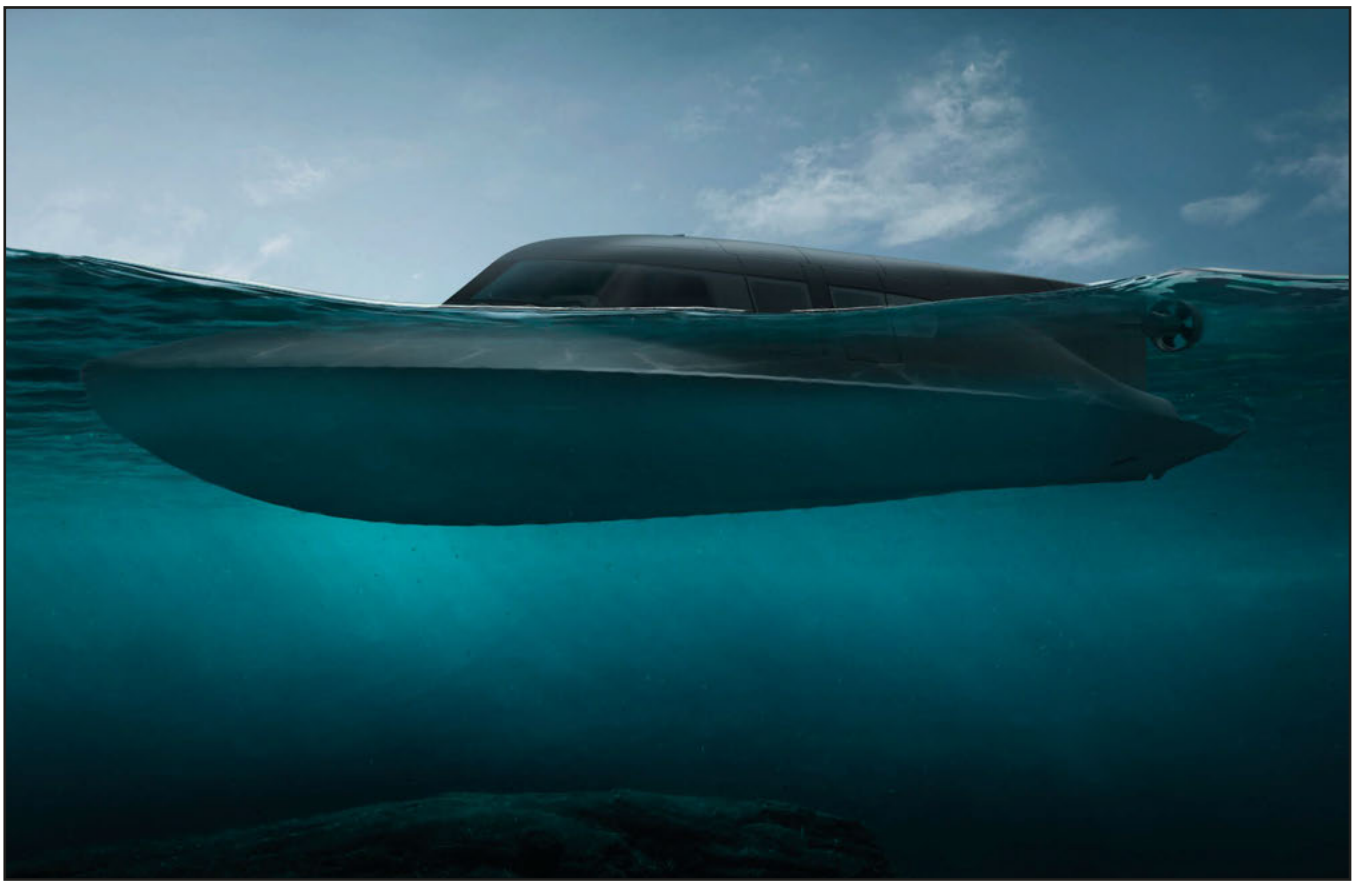
Propellers
- Number of propellers..... 2
- Make ..... Volvo Penta
- Model ..... IPS 3 / IPS 30 Q series
- Special adaptations.....Twin counter-rotating

Bridge electronics
- Radars.....Furuno FAR-2318; Furuno DRS6A-NXT
- Autopilot ..... Simrad AP70
- GMDSS ..... Furuno VHF FM-8900S; Furuno MF/HF FS-1575
- GPS..... JRC GPS Navigator; Furuno SC-70
- Chart plotter .....Furuno TimeZero Professional
- Engine monitoring system..... Volvo

Onboard capacities
- Fuel oil.....4,000litres
- Fresh water .....300litres
- Sullage .....200litres

Complement
- Number of crew..... 2
- Number of passengers..... 12
- Number of cabins .....0 (2 rest areas)

Classification society .....Norwegian Maritime Authority
Notations .....NMA Sailing Area 4



# 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 cranage 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-marinised 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