

# 16.5 Meter – RÁPIDO Patrol Interdiction Vessel

## Preliminary Specification

April 2017



### TWIN DIESEL SEA FURY SURFACE DRIVE ~ 16.5 METER RÁPIDO INTERDICTION PATROL BOAT

This 16.5 meter vessel is designed and built as a fast open ocean heavy duty reinforced fiberglass/"Kevlar" multipurpose vessel - patrol vessel providing interdiction, security and escort for law enforcement.. To operate at high-speed in shallow coastal waters and/or blue water up to approximately 200 miles from shore. The vessel has the ability to conduct her missions safely in open Oceans up to Sea State 5.

- Note: the specifications are very flexible with multiple interior and equipment options.

### MAJOR ASSETS:

- The vessel is provided with a very efficient and proven surface drive propulsion system manufactured by Sea Fury.
- Twin in-line 6 cylinder turbocharged Heavy Duty Diesels, Caterpillar C-18 Acert Marine Diesel Rating E with 847 bkW (1136 bHP) at 2,300 RPM each.
- Very Fast acceleration, idle to 39 knots within 32 seconds.
- Operates in shallow waters at speeds approaching +50 knots.
- Virtually Silent Running
- ZF Marine Electronic Engine Controls provide in open ocean operations fingertip control of engine rpm, letting the operator optimize fuel economy. Easy and precise, even in rough seas.
- Minimum of four (4) watertight compartments with watertight doors and/or hatches
- Two helm stations: one in the climate controlled wheel house and one on a flybridge
- A multipurpose vessel – Patrol, Escort, Port Security, SAR, Fire Service or Utility Vessel
- Has a very rugged design, Ability to sustain water tight integrity with very minimal damage in accidental groundings.
- Integrated with the EVC (Electronic Vessel Control) system, the Glass Cockpit provides an enhanced overview and control of both engine and all navigation systems
- At higher speeds, there is immediate response to the helms commands with safe and predictable handling. Operating the vessel is both safe and economical.
- Designed to be easily maintained and provides for reduced operating costs and reliably

## PRINCIPAL DIMENSIONS:

Length: 16.5 meters (54'1')

Beam: 4.8 meters (15'10')

Length Water Line: 13.6 meters (44'9") Dead rise at Transom: 21 degrees

Normal Draft: 1.4 meters (3'10")

Air Draft top of mast: 5.05 meters (16'7")

Displacement: Unladen: 12.4 tons

Gross tonnage: 18.15 tons

Fuel: Approximately 700 US gallons / 2.15 tons 15:30 hours of operation at cruising power

Maximum Speed: +50 Knots

Normal/Operational cruise speed: 39 knots @ 1,800 RPM / 45.2 GPH

## CONSTRUCTION:

Hull; Stepped deep "V"

- Hull constructed of reinforced Fiberglass/Kevlar with Core-Cell. Hand lay-up vacuum infused.
- The four watertight bulkheads and engine mounts are of welded 5083 aluminum alloy reinforced with welded structural aluminum 5086-H116 alloy angles.
- Minimum of four (4) watertight compartments with watertight doors and/or hatches
- Superstructure and deck; Kevlar/Reinforced Fiberglass with Core-Cell. Hand lay-up vacuum infused.
- Aluminum and/or stainless steel mounting, backing plate embedded in the core for cleats, handrails, doors, hatches, etc.
- Tempered glass safety glass - installed in all wheel house windows
- Railing 42" high completely around the perimeter of the whole vessel are welded anodized aluminum.
- Designed with the use of Computer-Aided Design (CAD) and Computer-Aided Engineer (CAE) software, in accordance with American Bureau of Shipping
- Eight (8) aluminum welded 18" deck cleats.
- Bollard welded aluminum aft for towing with 500' of 1 inch line held on a reel ahead and below deck from the bollard.
- Tempered/safety glass – ½" heated/frosted for the forward pilothouse windows, with 3/8" tempered/safety glass in the sling port, starboard and rear pilothouse windows
- Fuel and water tank aluminum EN-AW 5086/5083 thickness 0.250" minimum with inspection full size inspection covers.
- All electrical and wiring to ABYC standards
- Hinged cast aluminum watertight engine compartment deck hatch with ladder.



## PRIMARY POWER:

The twin heavy duty Caterpillar C18Acert Marine Engine are In-line 6 cylinder four-stroke cycle diesels, turbocharged after cooled charge air with heat exchanger cooling providing head and block cooling. The Rating 1 Rating E with 847 bkW (1136 bHP) to each propeller shaft at 2,300 rpm.)

Major advantage of In-line 6 cylinder type of engines is their simplicity compared to horizontally opposed or even V designs. Their crankshaft and cylinder banks can be milled from the same metal casting. This configuration requires fewer camshafts and cylinder heads. Straight engines are usually small and can therefore be mounted in any direction. The engine is much easier to maintain because most of its components and accessories are reachable from the sides rather than from the top or bottom of the cylinder banks.

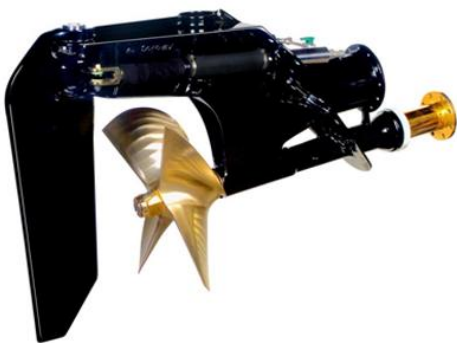


The straight-six or I-6 layout is the simplest engine configuration that has both primary and secondary mechanical engine balance; and it does so without a balance shaft. It is characterized by much less vibration compared to engines with fewer cylinders.

- Reverse gear ZF Marine ZF 550 Marine Gear Ratio 1.485:1
- ZF Marine Electronic Engine Controls MC2000-4 (ZFME)
- Power plants are mounted side by side within an isolated fireproof and watertight compartment.
- Engine compartments are equipped with a two Fire Extinguishing Systems.
- The batteries are located in a watertight compartment just ahead of the engine compartments.

## PROPULSION DRIVES:

Twin Sea Fury Surface Drives: Model SF36 Surface Drive Marine Propulsion System



- Propeller Diameter: 800 mm (32") to 910 mm (36") dependant on application.
  - Drive Body: Cast Silicon Bronze (C 87500)
  - Steering: Twin single-acting hydraulic cylinders per drive
  - Rudder: Single spade on each drive
  - Engine Exhaust: Engine discharge through the drive just ahead of the propeller
  - Shaft: Fully enclosed 2205 CG S/S inline conventional driveline
- Bearings: Front and rear water lubricated cutlass bearings

### Higher Speeds / with Less Horsepower

Seafury installations achieve significantly higher speeds with the same engine horse power compared to Conventional Propellers & Water Jets in the higher speed ranges.

### Low Maintenance

Simple design and high quality marine manufacture, ensures extremely low maintenance and high performance.

### Fuel Savings

With Seafury's design efficiencies, harnessing maximum torque and using carefully designed and developed variable pitched blades, Seafury equipped vessels travel further with the same fuel burn.

### Advanced Highly Efficient Design

Seafury Surface Drives operate at water surface level, thereby eliminating the drag co-efficient of conventional systems.

This alone makes them 10 - 20% more efficient in the higher speed ranges of 25 knots plus.

### Better Reverse Performance

Seafury's unique 45° transom and specially designed propeller has the benefit of deflecting thrust water under the hull when reversing.

This significantly improves vessel handling and safety.

### Less Propeller Damage

As the propeller is positioned aft of the transom, forward of the rudder and being only partially submerged when in operation, there is minimal chance of propeller damage.

### Quieter and Smoother

Advanced propeller design ensures Seafury Surface Drives produce a smooth and efficient propeller performance.

### Sooner to Plane

Seafury's unique propeller design means craft are quicker to the plane with minimal lazy speed range, e.g. approximately 10 seconds from idle to 35 knots for the vessel if loaded at 16 tons.

### Protected From The Marine Environment

No hydraulic steering or articulated drive system is exposed to the harsh marine environment, both reducing and making maintenance easier.

- New Inboard Hydraulic Steering System
- No Exposed External Hydraulic Piping

### Advanced Propeller Design

Seafury Propellers are designed to suit fixed shaft surface drive systems, the graduating pitch zones ensure that the propeller is appropriately loaded throughout the speed range, negating the need for a trimable drive.

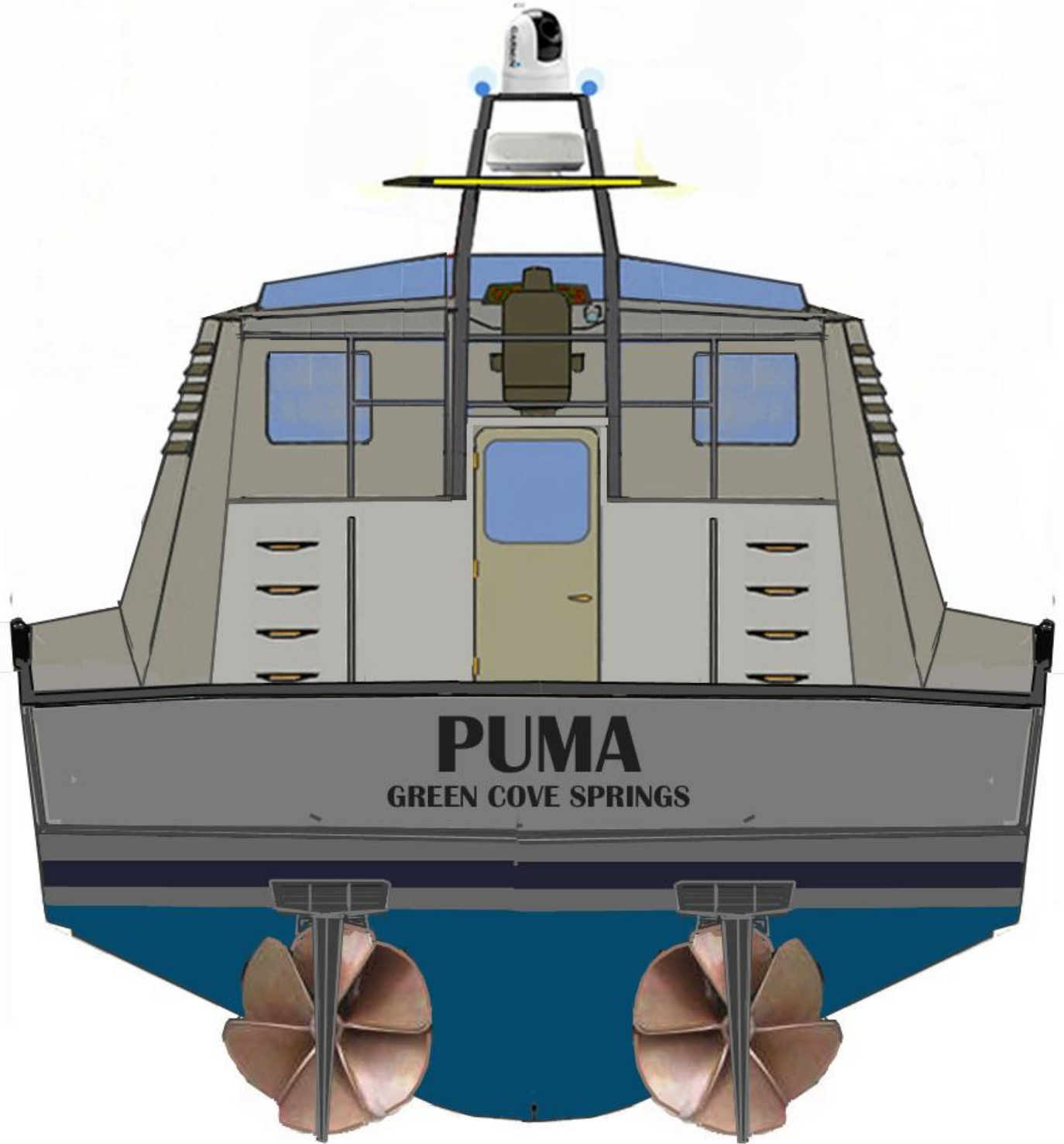
### Safer for Passengers and Crew

The design of the Seafury system protects the propeller from damage and protects people from the propellers.

- Low Maintenance
- Minimal spares required
- Spares readily available
- Faster speeds achievable
- Reduced fuel consumption
- Reliable
- At higher speeds, there is immediate response to driver commands with safe and predictable handling.
- Driving the boat is both safe and economical.





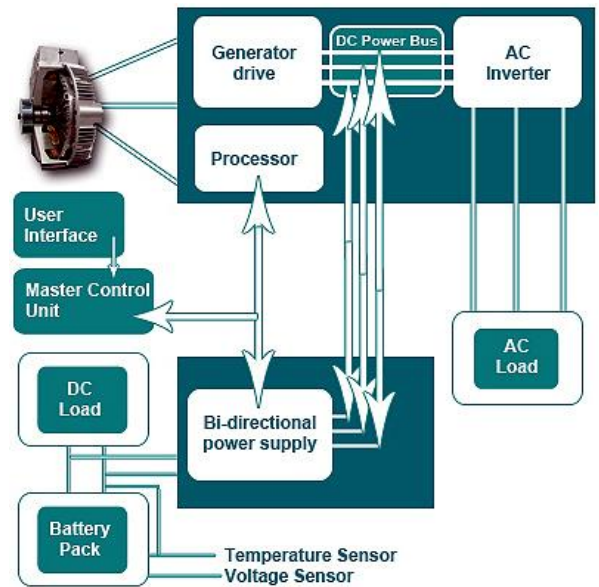


## ELECTRICAL SERVICE:

### Main System: 24-28 Volt DC System:

28 volt DC power provided by two engine driven alternators 65 amps each.

- Main engines starter motors 24 VDC
- Four pairs of 12 VDC Marine Gel-Cell Batteries, 225 amp hour, 1,470 cranking amps each.
- Powers Vessel Electronics
- Four (1 in each watertight compartment) automatic submersible bilge pumps, 2,000 GPH
- Windshield and side pilot house widows are equipped with (DC) electric heating element strips.
- LED Deck Lights (DC)
- Two LED Searchlight Golight Stryker Remote Control Searchlight mount on top of the spreader one port and one starboard.
- LED blue 360 degree signal light(s) steady and/or flashing (DC)
- LED Navigation lights and masthead recognition light red and white (DC).
- LED cabin lighting all (DC)
- Powerwinch Capstan 300 Anchor Windlass (DC)
- Three LED 50 inch light bars spot/flood combo by Rigid Industries, marine units mounted in the Spreader in a equilateral triangle, one facing aft illuminating the aft deck and beyond. The other two lightbars facing forward at a 45 degree angles port and starboard providing 360 degree, high intensity illumination around the vessel. (DC)
- Outlets providing 12/24 volt DC, available in the pilot house and flybridge



### AC sub-systems 110/220 Volt / 60 Hz.

Xantrex Technology twin FREEDOM SW Inverter/Chargers: power provide by two engine driven alternators 180 amps each. (Two: P-Type Alternator, 24 Volt, J-180 #4110)

- ✓ Total of 6,800 watts (20.9 amps) of continuous 110/220 Volt / 60 Hz power / with a total of 13,600 watts of peak power.
- ✓ 24 volts 90 Amp of charge is available from each FREEDOM SW from Shore Power
- ✓ Pure AC sine wave will not interfere with any electronics, computers or sensitive digital electronics.
- ✓ Equipped with heat sensor and re-settable circuit breaker.
- ✓ Maintenance free, no parts to replace.
- ✓ Safe and reliable, no spark or hot components
- ✓ Operating range: from engine speed, from idle to red line.
- ✓ Shore Power 50 Amp Heavy Duty 220 VAC Cord set, 15.2 meters (50') long
- One wheelhouse unit and one forward crew area unit; Heat & Air conditioning Webasto FCF with reverse cycle (heat pump) cool or heat unit with Reverse Cycle is 12,000 BTU 220 VAC 8.6 amps.
- Outlets AC 110 volt located throughout the interior and engine compartment
- USB power outlets available throughout the interior of the vessel.

## ELECTRONIC

### INTEGRATED INFORMATION, NAVIGATION DISPLAY

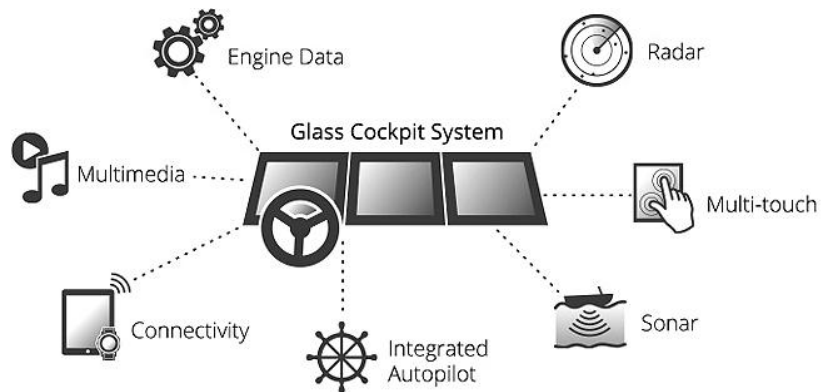
Raymarine Electronic Helm and information System, a unique Electronic information system, means a clean and easy-to-use dashboard. More importantly – an enhanced overview and control of all the engines and navigation in one place.

Raymarine GS195 (0.482m) Premium Glass Bridge Multifunction Navigation/Information Displays. Elegant, flexible and simple to use, GS multifunction displays will transform your helm station into a powerful glass bridge navigation system. A step above black-box systems, each GS Series display is a smart, self-contained multifunction navigation display equipped with Raymarine's fastest dual core processor plus a third dedicated graphics processor, delivering super fast and responsive performance.



#### Key Features:

- Integrated with the EVC system (Electronic Vessel Control), the Glass Cockpit gathers all driver information and displays this in one spot. The easy-to-handle, pinch-to-zoom displays provides instant control. Displays in the wheelhouse and CNC are the largest digital monitors currently available. The anti-glare touchscreen Monitor 1080p 48.2 cm is easy to read by the vessels captain/helmsman/deck and engineering crew.
- One look. One touch. One system. When the vessel is powered up, all screens light up simultaneously. All settings that you control, including instrument dimming, are carried out concurrently at the helm and CNC. The Glass Cockpit system is a common, ergonomic design – and interface – for the whole dashboard, with push-buttons on the controls and touch-buttons on the screens. Smart displays - a step beyond black box systems, each GS Series is a smart touch screen MFD
- Smooth and responsive multi-touch control with pinch to zoom
- Creates a single display installation or expanded GS Series into a multi-station system, the choice is the crews.
- For added flexibility, GS Series systems network seamlessly with any LightHouse II powered Raymarine MFD, allowing you to customize a navigation network that's just right for the mission.
- Auto guidance This unique feature searches through all relevant charts to create a route to follow – and avoid shallow water, buoys and other obstacles.



## NAVIGATION AND SYSTEMS:

### GPS Receivers: WAAS-capable

- The highly accurate GPS position receiver/antenna provides 10 Hz update rates for position, velocity and time data. It offers high-sensitivity reception and enhanced position acquisition to the multifunctional displays (MFD), instrument display and autopilots.
- Delivers Reliable Location Data: The 32-channel receiver is capable of tracking multiple global navigation satellite systems, including GPS, GLONASS, Galileo<sup>1</sup> and QZSS<sup>1</sup>. Since more satellites are visible, it can provide more accurate fixes in challenging conditions. With its enhanced position, heading and speed accuracy delivered 10 times more often than other receivers/antennas, it provides smoother drawing of your position on the chart/plotter/MFD at higher speeds. It can determine ship's precise location to within 3 meters (9.84 ft).
- Heading Providers: Magnetic Compass, GPS and Gyro Compass

### FLIR M400: Premium Multi-Sensor Maritime Thermal Night Vision System

The M400's advanced 640 x 480 sensor delivers crisp thermal video images in total darkness and lowlight conditions. An integrated HD Color visible camera and tight-beam LED spotlight augment target identification for added safety. M400 has a continuous optical thermal zoom lens (up to 4x) that allows operators to see other vessels and targets at longer ranges. Active gyro-stabilization ensures a steady image, plus radar tracking keeps potentially dangerous targets in view at all times. Capable of detecting a man at up to 1.3 n miles and vehicles as far away 3.2 n miles.



### Raymarine RD424HD 4KW HD Radome

Raymarine's RD 424HD Radar is a 48 nautical mile HD radar providing the user with an adaptive digital receiver that adjusts to different environmental and sea conditions for a much clearer picture. It also offers "Bird Mode" which automatically optimizes the receiver for detecting sea birds feeding.

- Max. Range Scale: 48nm
- Peak Power Output: 4 kw
- Horizontal Beam Width: 3.9 Degrees
- Vertical Beam Width: 25 Degrees
- Rotation Rate: 24 rpm

### Sonar

CP200 CHIRP SideVision® sonar up to 180 meters

The CP200 CHIRP SideVision® Sonar expands your underwater horizon with crystal-clear, bank-to-bank displays of underwater structure.

Engineered with the same CHIRP sonar technology as Raymarine's award winning DownVision™ the CP200 uses advanced CHIRP signal processing technology to let you see further, see more clearly, and detect more targets than traditional side scanning sonars.



### Weather Instruments:

Water, Air and dew point temperature sensors, wind speed and direction.



## VHS Communication

Dual Raymarine Ray260AIS Modular VHF Radio with Hailer, Intercom and Integrated AIS Receiver and Features:

- Includes full-featured VHF radio with Class D DSC, loudhailer / foghorn, internal multi-station intercom and dual-channel AIS receiver
- Built-in 30 Watt loudhailer, 2-way talkback and automatic fog horn with signals for both power and sailing vessels
- Slimline handset with extra-large LCD display and dedicated soft keys for easy control of features and functions
- Powerful, remote-mounted speaker
- Capable of supporting (2) additional onboard locations
- Handset and speaker perfectly matched to Raymarine's latest generation multifunction displays and instrument systems
- Digital Voicemail and message recording – allows you to pre-record a voice message up to 15-seconds and automatically send it to another DSC-equipped vessel
  - Can also be used to record incoming voice messages or alerts up to 90-seconds long
- Commercial-grade Class D DSC transceiver with dual-channel AIS receiver, built-in NOAA weather channels and weather alert, dual / tri-watch and channel scanning functions
- Position tracking feature allows you to simultaneously receive position reports from up to (5) nearby DSC equipped vessels
- When connected to a compatible multifunction display, radar, chart plotter or instruments – AIS system allows you to see names and positions of other AIS users within radio-range of your vessel on your chart, radar or instrument display
- Easily integrates with other NMEA2000 (via Raymarine ST<sup>ng</sup> cabling system) or NMEA0183® onboard electronic systems

## Intercom System

- Bluetooth wireless combined wired submersible Intercom system 8 with stations.

## HF Communication

Furuno FS2575 250 Watt MF/HF GMDSS Compliant Radiotelephone with DSC

- 250 Watt MF/HF Radiotelephone with DSC facility
- Fully meets GMDSS carriage requirements for SOLAS ships operating in A3 and A4 sea areas
- Meets the new ITU recommendation on digital selective calling system for use in the Maritime Mobile Service, ITU-R M.493-13
- High-contrast 4.3" bright color LCD (480x272 pixels)
- Capable of distress, safety and routine communication
- Instant selection of 256 user-specified channels with a rotary knob or direct keypad input
- Quick access to DSC message composition by dedicated keys on the control unit
- Quick access to dedicated functions in the menu operation using numeric keypad

## Satellite Communications:

KVH TracPhone FB150 for voice, SMS & broadband data

- Broadband data rates as fast as 150 Kbps
- Simultaneous voice, data and SMS text messaging

## **CREW:**

A three (3) man crew is recommended for normal operations. This vessel may be controlled either from a helm station on the flying bridge or in the enclosed wheelhouse. The enclosed wheelhouse area has an arrangement to seat six (6) on bolster seats. Air conditioning can be powered either by the main engine alternators via the inverter or from shore power.



The Webasto FCF 230 VAC air conditioning with reverse cycle cool or heat.

- Wheelhouse: Air conditioning unit with Reverse Cycle is 14,000 BTU
- Galley and Head area (below deck): Air conditioning unit with Reverse Cycle is 5,000 BTU

Below and forward of the wheelhouse enters into a small galley and head, equipped as follows:

- Refrigerator / Freezer: Gross capacity: 79.1 liters (2.8 cu ft), dual power 24 VDC and 230 VAC
- One Burner Cook Top Stove Combo Alcohol and/or 230 VAC
- A Stainless Steel Microwave Oven 230 VAC
- Galley Sink
- Dinette nook seating for four
- Toilet Manual Jabsco
- Fresh Water System Pumps (24 VDC) with heated 40 gallon tank
- Four Solar powered fresh air cabin vent circulation, Volume: 15 CFM

## **SAFETY EQUIPMENT:**

- Complete First Aid Kit
- One Ten Person Canister Coastal life raft, automatically inflated canopy with survival kit.
- Twenty-five (25) Life Jackets U.S.C.G. Type III
- Five Portable 1A10BC Rated Fire Extinguishers
- Each engine equipped with Fire boy Automatic FE-241 Fire Extinguishing System
- Four Manual Bilge Pumps, MK3 19 GPM self-priming pump for each watertight compartment
- Ships Bell
- Fiamm Fultone Pneumatic Dual Marine Horn
- Four Sensor Fail-Safe BilgAlarm™ System
- To include all required safety equipment for the size and class of vessel
- Satellite 406MHz EPIRB Category II

## **FINISH:**

- Exterior is primarily a Gel coat finish. Balance of exterior primed and painted according with INTERLUX specifications for their Perfection Topside Paint a, 2-part polyurethane.
- (Colors to be specified by the clients.)
- Below water line primed and painted according with INTERLUX specifications for Interlux Nautical Epoxycop hard modified-epoxy antifouling paint. (Colors to be specified by the clients.)
- Decks bare Aluminum 5-bar Tread Plate.
- Interior walls/ceilings; Thermax non-combustible laminated with HPL's FILPRO Certificates for SOLAS, IMO, EU, and USCG are issued by Bureau Veritas. (Colors to be specified by the clients.)

## OUR FIVE MOST POPULAR LAMINATE COLORS:



**CUSTOM DECORATION:** Interior decoration will be designed and provided by the Buyer.

### OTHER EQUIPMENT:

- Two Compass Ritchie Globemaster SP-5C (Magnetic)
- Anchor with 150 meters of line and 3 meter of chain
- Lifting points (eyelets)
- Vessels Shipping Cradle
- Two 28 VDC engine compartment blowers
- Dock Lines / Tow Bridle / Larger Towing Bollard
- Sacrificial zinc anodes; five each.

**DOCUMENTS:** Wire diagrams, digital as build drawing, Operation Manuals and maintenance manual with required maintenance schedule.

**TRAINING:** Intense Training will be provided for client's key personnel for operating all equipment installed and vessel maintenance in Florida. Plus, onsite training for other personnel provided in a maritime system simulator and on-the-vessel training.

**DELIVERY:** Delivery is possible within 8 months after a receipt of a signed Purchase Agreement, from the Port of Jacksonville, Florida

**SEA TRAIL:** Initial vessel's sea trials and commissioning to be conducted from the Port of Jacksonville, Florida at the cost of Puma Aero Marine and Cummins Marine Diesels.

**SPARES:** Provide recommended spare parts required for equipment installed on the vessel.

**WARRANTY:** All fabrication work unconditionally guaranteed for 12 months. Installed equipment by Manufacture's Standard Warranty based of the following utilization.

- Excess of 50 knots 100 hours annually or a 10% annual utilization
- Excess of 19 knots to 39 knots 500 hours annually or a 70% annual utilization
- Excess of 5 knots to 18 knots 300 hours annually or a 20% annual utilization
- Total annual utilization 900 hours

**Design & Built by:** Puma Aero Marine of Florida

**Link:** <http://PumaMarine.com/> ~ **Email:** [Sales@PumaMarine.com](mailto:Sales@PumaMarine.com)

*Leaves Other Vessels in her wake (Rooster Tail)*



**Hangar Nine**  
**1005 Bunker Avenue**  
**Green Cove Springs, FL 34043**  
**Tel: 1 904 638-5888**  
**Email: Sales@PumaMarine.com**  
***www.PumaMarine.com***

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*Puma Aero Marine*