

Humanitarian Cutter 98 Meter

Preliminary Specification with Water Jet Propulsion

1 June 2016



This Fast Response Cutter will be a next-generation ship that will complement the current and future fleet to extend the service's operational capabilities. The Cutter provides emergency assistance and disaster relief from earthquakes, floods, typhoons, epidemics, nuclear accidents, solar storms, tsunamis, volcanic eruptions and wildlife events. It will feature increased speed and endurance, a well deck for rigid hull inflatable boats (RHIBs), a helicopter pad, and improved command, control, communications, computer systems, intelligence, surveillance and reconnaissance equipment. The Cutter will accommodate helicopters, drones and small boat operations in all weather conditions.

The Puma Aero Marine mono hull Humanitarian Class Cutter would be designed to provide a unique combination of speed and endurance. This is not a new mono hull design, but a well proven hull used for over a decade as a high speed passenger vehicle ferry. These 90 plus meter ferries have been operating at 40 knots in open seas.

Puma Aero Marine's next-generation Cutter takes advantage of the latest improvements representing the next evolution in waterjet propulsion technology. Developed from the highly successful Thrustmaster DOEN waterjet incorporating improved efficiency and cavitation performance to enhance the existing benefits of Thrustmaster DOEN's propulsion systems.

Puma Aero Marine's mono hull Humanitarian Class Cutter is designed to provide a unique combination of speed and endurance. A stabilized, sea motion system for a comfortable ride in all sea states, will enable her to provide all weather helicopter operations.

She'll be fast, with excellent maneuverability, high reliability and economical operation.

Diesel electrical propulsion is very convenient for the users, because of the following:

1. Excellent dynamic response from zero to maximum speed
2. Short reversing time
3. Quiet operation
4. Minimum mechanical vibrations
5. Shallow draft

Puma Aero Marine specifications are very flexible, with varied optional deck plans and crew accommodations to meet the client's exact requirements.

MAJOR ASSETS:

- Intimidating and daunting vessel for your adversary to deal with
- Well deck with one wet slip for launching and recovery of 11 meter NSW rigid hull inflatable boats (RHIBs) each with a capability of handling up to 24 passengers & crew
- Mid-size helicopter pad, 14 meters (46') by 18.7 meters (61.5') for either an AUW 10 ton helicopter and/or large "Boss" surveillance helicopter drones (VTOL-UAV).
- A larger telescoping type helicopter hanger 12.5 meters (41') by 14.6 meters (48') can be quickly converted to provide shelter and humanitarian aid to victims of major disasters, such as earthquakes, floods, typhoons, epidemics, nuclear accidents, solar storms, tornados, tsunamis, volcanic eruptions and wildlife events. The hanger will have a Para-Port hanger door 4.57 meters (15') high by 11.3 meters (37') wide.
- The ship could serve as an emergency cell phone site, re-establishing communications between the people and essential government centers and to outside of the disaster area.
- Ships water treatment and desalination systems could provide fresh drinking water for over 5,000 disaster victims per day.
- Provide services such as a radio station to provide vital information to the disaster victims.
- Ships medical wards and surgical suite could provide disaster victims medical aid. And in the case of an outbreak of disease, could also provide a ward to isolate victims.
- Ships galley has the capability of providing over 5,000 warm meals a day to disaster victims.
- Overall the vessel is designed to be easily maintained.
- Three MTU 20V 1163-M94 Diesels, directly driving three Thrustmaster DOEN water jet propulsion systems, permitting high speeds and shallow draft operations.

PRINCIPAL DIMENSIONS:

- Length: 98 meters (321')
- Maximum Draft: 2.4 meters (8')
- Length Water Line: 88.1 meters (289')
- Gross Displacement: 2,100 M tons
- Air Draft: 17.0 meters (56')
- Helicopter pad: 14 meters (46') by 18.7 meters (61.5') 10 ton capacity.
- Hanger deck: 12.5 meters (41') by 14.6 meters (48') Para-Port hanger door 4.57 meters (15') high by 11.3 meters (37') wide.
- Water Jet Propulsion: Two Thrustmaster DJ-550 waterjets
- Main Propulsion Engines: 3 x MTU 20V 1163 M94 Marine Diesels 9,925 bHP each
- Electrical Ships Service: 4 x Caterpillar® C-18 Acert 50 hertz 400kVa each
- Beam: 14.2 meters (46'7")
- Dead rise at Transom: 14 degrees
- Jet pumps centers: 7.3 meters (24')
- Fuel Capacity: 306 tons

DESIGN PERFORMANCE SPECIFICATIONS:

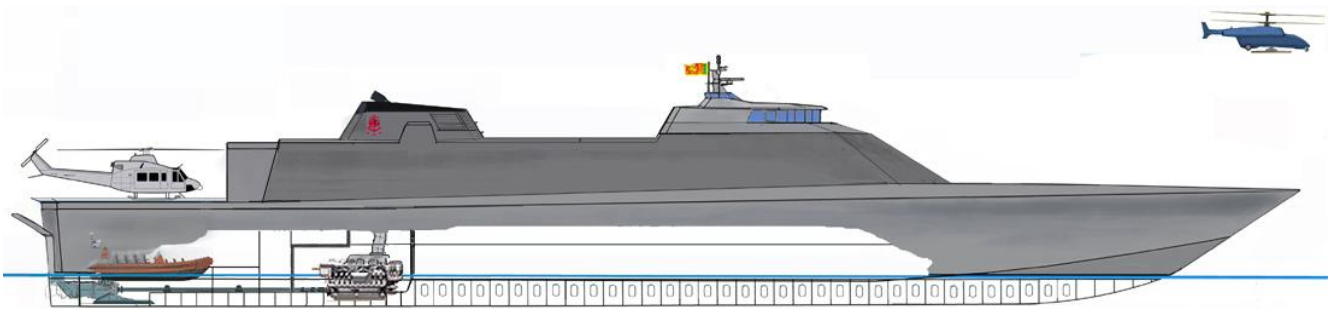
- Fuel Endurance on two engines: 25 days, 6,600 nautical miles, cruising at 11 knots at 400 RPM and 168 US Gallons an hour
- Fast Cruise on two engines: 10.7 days 5,136 nautical miles cruising at 20 knots at 750 RPM 390 US Gallons an hour
- Maximum obtainable speed for two engines: +28 knots.
- Three engine maximum obtainable speed: 37.5 knots

CONSTRUCTION:

- Steel Hull; Stepped Vee Mono hull design. Watertight bulkheads and engine mounts are of welded ASTM A-36 carbon structural steel construction and high-tensile steel (HTS) construction as required.
- Superstructure and decks are welded structural Marine Grade Aluminum EN-AW 5086/5083 Standards QQ-A250/6 / ASTM-B928.
- Upper forward Superstructure (the bridge) of Kevlar/Reinforced Fiberglass with Core-Cell. Hand lay-up vacuum infused.
- Hand rails and railings of anodized aluminum
- Overall engineering and Design by Puma Aero Marine using Computer-Aided Design (CAD) and Computer-Aided Engineer (CAE) software, in accordance with in accordance with the American Bureau of Shipping (ABS) Rules for High Speed Naval Craft Code (HSNC), All Oceans, Maltese Cross, AMS & Full SOLAS.
- Hull was designed by: Industri Navali Meccaniche SA of Affini, Italy. She is a well proven hull design, with superior deadweight and axle loading capacities, superior seakeeping and vessel maneuverability.
- Builder: Puma Aero Marine of Florida.

ACCOMMODATIONS:

- Ship's crew quarters accommodates: 15 Officers and 85 enlisted crew.
- Overnight accommodations for 30 passengers
- Bridge/wheelhouse deck air conditioned space: 84 square meters (911 square feet)
 - ✓ Command/control emergency center and emergency generator
- Deck Four available air conditioned space: 424 square meters (4,560 square feet)
 - ✓ Captains' stateroom, wardroom, office quarters, guest quarters & flight ops offices.
- Deck Three available air conditioned space: 464 square meters (4,994 square feet)
 - ✓ Enlisted mess-deck/lounge, galley, ship hospital, medical ward, ship stores office, quarter deck and access to the hanger deck.
- Deck Two available air conditioned space: 536 square meters (5,772 square feet)
 - ✓ Enlisted deck crew quarters and storage.
- Deck One available air conditioned space: 455 square meters (4,897 square feet)
 - ✓ Enlisted engineering department crews' quarters, machinery control room, tools, spare parts and laundry.
- Air conditioning provided by 10 units of Technicold Chilled Water Air Conditioning Systems.
- Officers' wardroom seats 20. Enlisted mess-deck/lounge seats 100.
- Ship hospital, medical ward, surgical suite and lavatory.
- Intensive care unit (ICU) 5 beds plus Medical ward 20 beds
Note: Beds in the medical ward area can be converted to an isolation ward
- Galley arranged to prepare over 5,000 personnel with warm meals per day.
- Communication Center: provides emergency cell phone services, Radio broadcasting services, video satellite links and high speed satellite Internet links.
- Helicopter pad with telescoping hanger 12.2 meters (40') wide and length up to 24 meters (78' 7"). Hanger deck in an emergency converts to accommodate 300 persons.
- Three 11 meter small craft (RHIBs) on the well deck with the launch bay/slip
- Storage for a minimum of 25 days of operations.
- Engine Rooms two (2) isolated port and starboard, each engine room contains two primary power propulsion diesel generators and one auxiliary diesel generator.





PRIMARY POWER:

Three MTU® 20V 1163-M94 Marine Diesels V20 cylinder Turbocharged Intercooled Diesel providing 9,925 bHP (7.400 kW) each Electronic Control System.

The units are keel cooled, mounted in one of three isolation center, port and starboard engine rooms, with the engineer control center below decks aft of the engine rooms.



WATERJET PROPULSION:

Two controllable Thrustmaster DOEN DJ550 Water Jets and one booster Thrustmaster DOEN DJ550 Water Jets.

Thrustmaster DOEN is a leading designer and manufacturer of waterjet propulsion systems focused on offering high-quality waterjet products that excel in the harsh operating conditions of the commercial and military marine market.

With over 40 years of experience, DOEN's expertise in waterjet propulsion mixed with Thrustmeters' engineering and manufacturing capabilities ensures outstanding levels of performance and reliability with all models designed and built to exceed the most stringent classification society standards.

Thrustmaster DOEN Waterjets are specified by the most demanding operators throughout the world and we are dedicated to providing you with the best possible waterjet solutions for your vessel.



Waterjet Propulsion Permits Shallow Draft Operations:

- Absence of underwater appendages
- Shallow draft – the waterjet intake is flush with hull bottom to allow access to shallow water areas and beach landings with no risk of damage to the drive

Impeller:

- Diameter: 55 inch (1,397 mm)
- No of Stages/Configuration: Single Stage – Axial flow pump
- Standard Rotation: Anti-clockwise (Looking forward from stern)
- Impeller Material: Cast ASTM A296 Stainless Steel

Pump Assembly:

- Impeller Casing Material: AISI 316 Stainless Steel
- Discharge Nozzle Material Cast ASTM A296 & AISI 316L Stainless Steel

Steering System:

- Description Balanced nozzle
- Operation Hydraulic with Dual Inboard cylinder actuation
- Steering Bowl/Nozzle Material: Cast ASTM A356 Aluminum Alloy

Reverse System:

- Description Compact Split Duct Type – “High Thrust”
- Operation Hydraulic with Dual Inboard cylinder actuation
- Reverse duct material Cast ASTM A356 & 5083 grade plate aluminum

Shaft Assembly:

- Main Shaft Material: Stainless Steel Grade SAF 2205
- Rear Bearing: Water Lubricated Cutlass Bearing
- Main Bearing: Spherical roller Thrust Bearing
- Spherical roller Bearing - Radial
- Lubrication Oil lubrication with circulating pump
- Shaft Seal: Face type Mechanical Seal
- Coupling Flange: GWB Series to suit application
- Shaft Angle 0 degrees standard

Intake Body:

- Material: welded ASTM A-36 carbon structural steel construction
- Inspection Opening: Inboard



AUXILIARY ELECTRICAL SHIPS SERVICE/POWER:

Ship's power provide by either one of the four Caterpillar® C-18 Acert turbo charged, in line six cycled Diesel Generators, 3 phase 50 hertz 400kVa each. One of the four C-18 generator set is as the emergency mount aft of the wheel house and is radiator cooled



PROPULSION CONTROLS AND STEERING:

Kobelc propulsion and steering system controlled form either the bridge or engine control room. A Telegraph panel allows for communication between the bridge/wheelhouse and the engine room.

- Engine power directly electronically controlled
- Water jet reverse and steering control by electronically imputed to hydraulic actuators, supplemented with power from a main and standby 3 phase AC driven hydraulic pumps.

Two combinations of control inputs are used:

- Combined electronic propulsion & steering control head for multi-function use. These units are provided on the bridge wings.



- The classic propulsion control using a standard steering wheel for directional control at the bridge helm stations.



AUTOPILOT:

Raytheon Autopilot NautoPilot 5000. Ease of use – NP 5000 features a large graphical display which offers different day and night modes. Clearly arranged functions are operated via hard keys and touch screens. You will feel familiar with the autopilot after a few minutes due to its intuitive operation philosophy.

- Precise steering
- Ease of use and intuitive handling: graphical display, touch screen
- Simple adjustment of autopilot parameters by use of Integrated Heading and Rudder Plotter Weather Adaptivity
- New mode Course Control compensates for wind and drift automatically
- Cross Acceleration Monitor
- Approved for High Speed Craft
- Approved as part of a Track Control System in combination with ECDIS

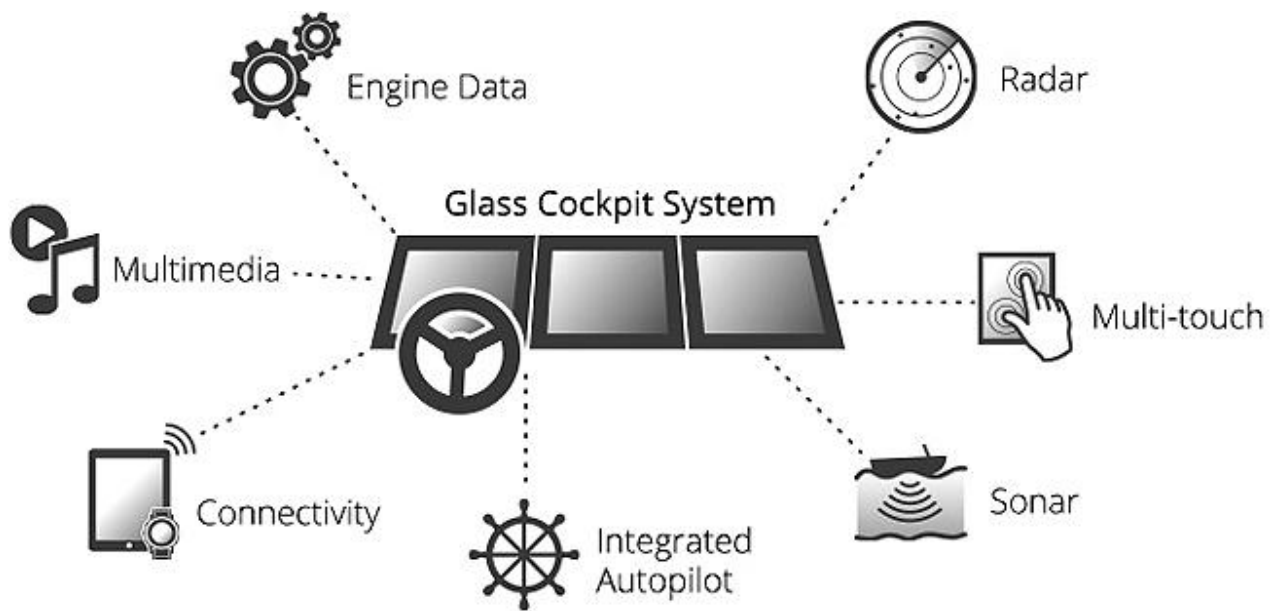
INTEGRATED INFORMATION, NAVIGATION DISPLAY SYSTEM:

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
- Create a single display installation or expand 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, Galileo¹ and QZSS¹. 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

Raymarine CP570 Professional CHIRP™ Sonar Module. A Serious Offshore Sonar Superior target definition and enhanced sensitivity using Raymarine's exclusive wide spectrum CHIRP sonar technology.

- Target and track the sea floor down to 10,000ft. (3,000m) with two adjustable CHIRP sonar channels.
- Hunt in different parts of the water column with the CP570's two fully independent 2kW sonar channels.

Weather Instruments: HF Weatherfax, Sea, Air and dew point temperature sensors, wind speed and direction.

Surface Radar: Two Sea-Hawk SHN X12 Radar:

The Sea-Hawk radar SHN X12 is one of the most advanced radars in Sea-Hawk's product line with extreme detection performance characteristics, and in particular in rough weather conditions. This radar is designed for users with very high demands for surface detection as small and low reflecting objects travelling at high speeds (e.g. RIB's, Zodiacs, jet skies etc.), ships/vessels travelling at high speed, oil spill detection capabilities etc.

Typical users for Sea-Hawk radar SHN X12, on large High Speed Craft, special task vessels and vessels operating in congested areas, such as Straights and approach areas with special requirements.



Important features:

- Extreme detection performance, also in rough weather conditions such as white breaking seas and heavy precipitation
- High Performance Dynamics (i.e. its ability to detect and follow the smallest object/movement at the same time as detecting large objects)
- Detection of small high speed objects (which often is "lost" in standard navigation radar systems, if detected at all)

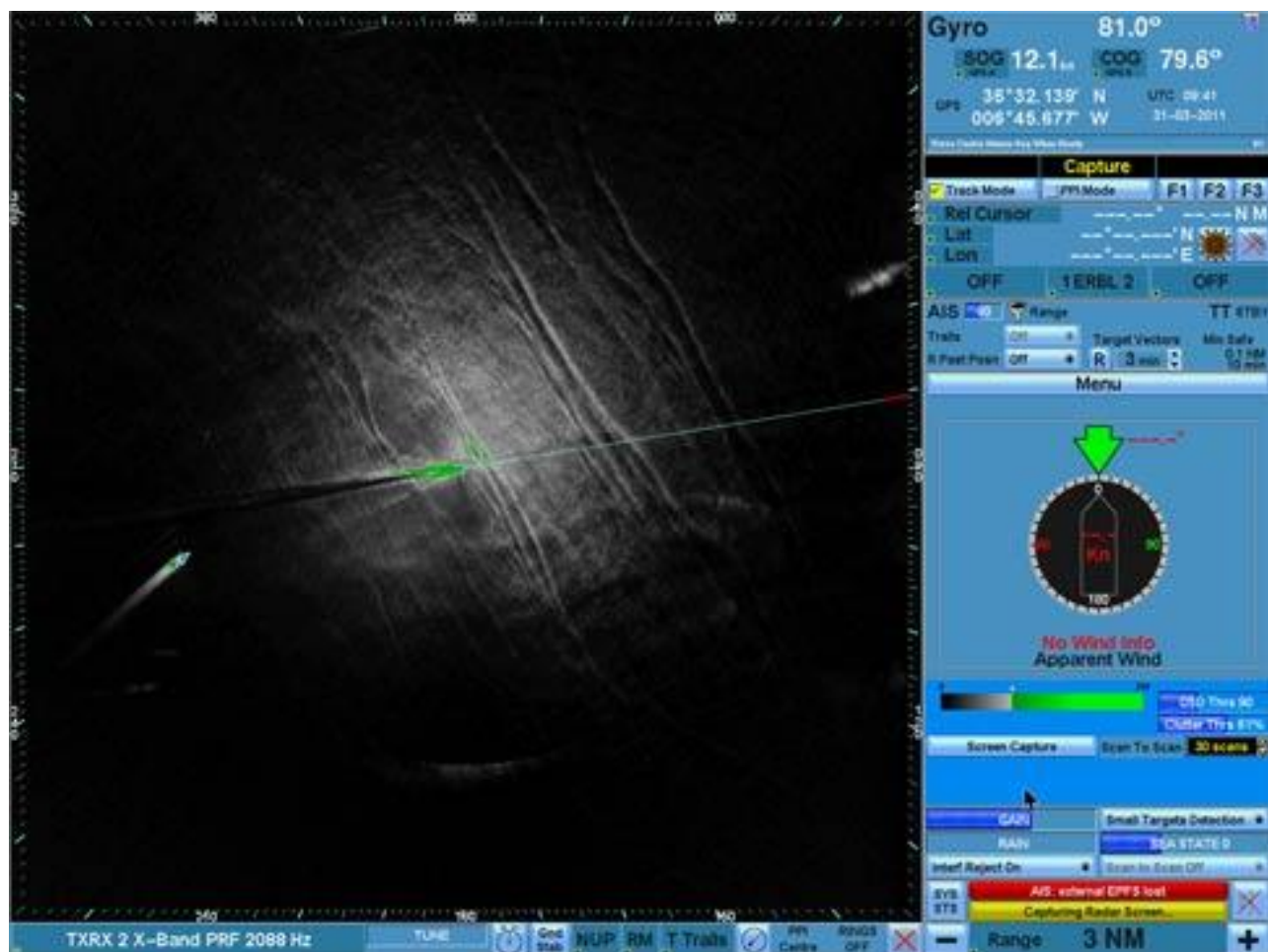
- Detection of small and/or low reflection objects on the surface
- Weather protection / reliable operation / long service intervals / life cycle costs
- Also designed for operation in Ex-zones (areas exposed to inflammable gases etc.)
- Easy access to Radom for sheltered service/maintenance (bottom)

Anti-piracy detection is important also in windy conditions. In sea-state 4 or higher, small targets become even more difficult to detect for a standard marine radar. Unlike normal X-band radars, Sea-Hawk still provides detailed and reliable data during wind, storm and rain.

Superior surface detection:

If you are looking for superior surface detection for your vessel, a polarimetric radar antenna should be your best choice. The Sea-Hawk radar is your future anti-piracy radar system.

Sea-Hawk polarimetric radars are multi polarized, resulting in far more detailed detection ability than traditional radar systems. Sea-Hawk can detect very small, fast moving objects and would therefore increase your anti-piracy capabilities to a level you could only dream about until recently.



Different Targets

These small and fast targets are obviously very different. It could be a skiff with a powerful outboard motor or perhaps a rapid RIB. In what shape the pirates materialize doesn't matter. They appear on the screen.

Polarization is the key. The size, shape and distance of the moving targets of course reflect the radar signals differently. However, they all generate a wake, which you will easily detect with a Sea Hawk radar, before the target is detected itself.

Superior small target detection:

If you are looking for superior small target detection for your vessel or for your offshore

location, a polarimetric radar antenna should be your best choice. The Sea-Hawk radar is your future small target detection system.

Sea-Hawk polarimetric radars are multi polarized, resulting in far more detailed detection ability than traditional radar systems. Sea-Hawk can detect very small, and even fast moving, objects and would therefore raise your small target detection capabilities to a level you could only dream about until recently.

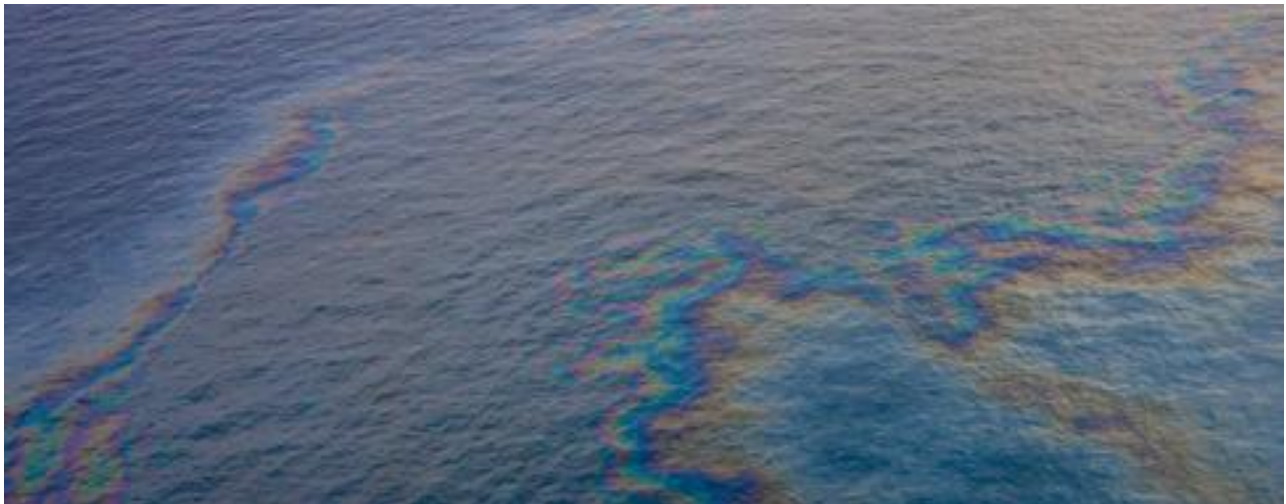
All kinds of small targets:

Small targets are obviously very different. It can be a person in the water, a life raft, a little fishing boat, a sailing boat, small fishing markers, driftwood or flotsam/ jetsam (like drifting containers with only one corner visible above the surface).

Polarization is the key. The size, shape and distance of the moving targets of course reflect the radar signals differently. The targets generate fluctuations in the surface. They also generate significant background clutter, in addition to the echo from the target itself.

Oil spill detection:

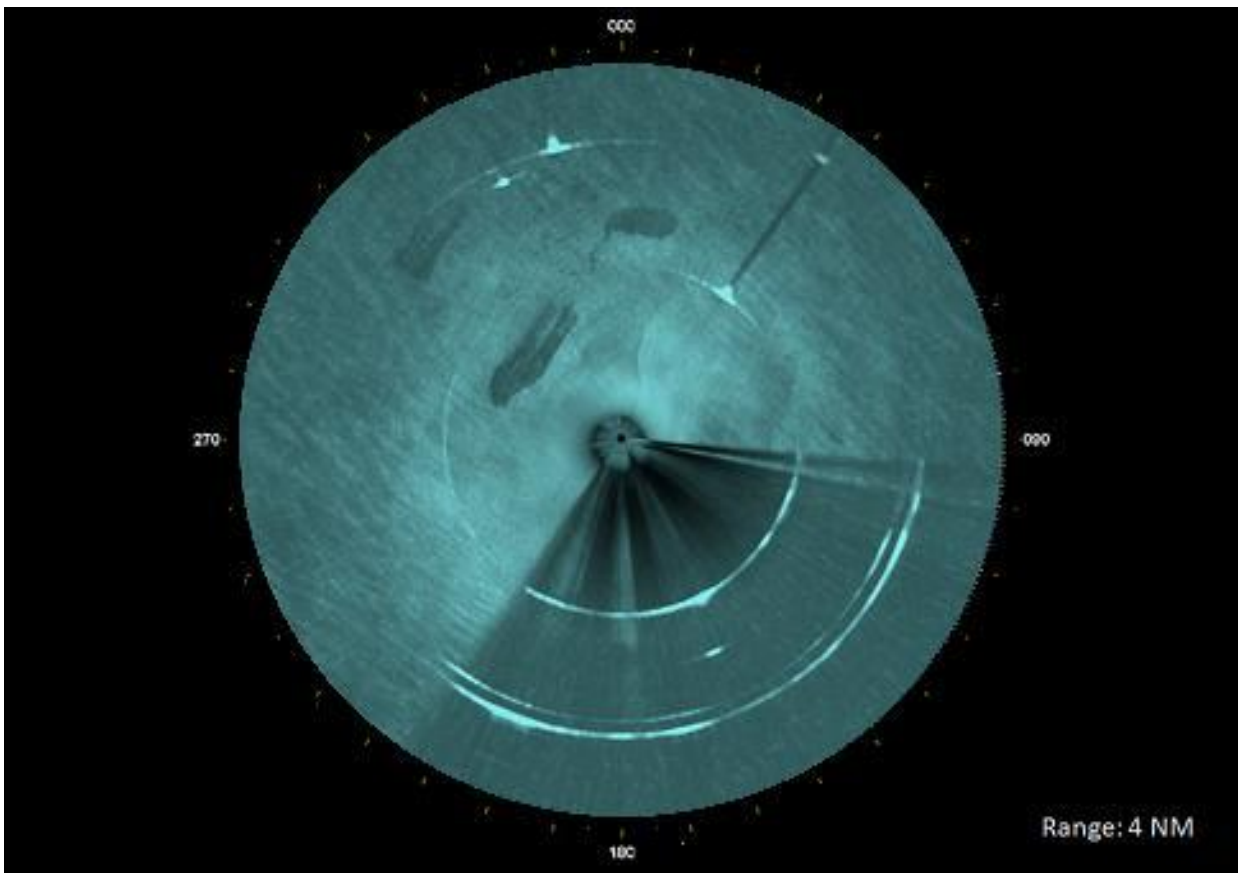
Sea-Hawk Radar can detect Oil slicks on the surface, in addition to debris from shipping in harbours and refineries. A valuable essential for SARs missions to help locate downed aircraft and ships which have sunk by their oil slick left behind



Time spilled = oil spilled

Night view – of course

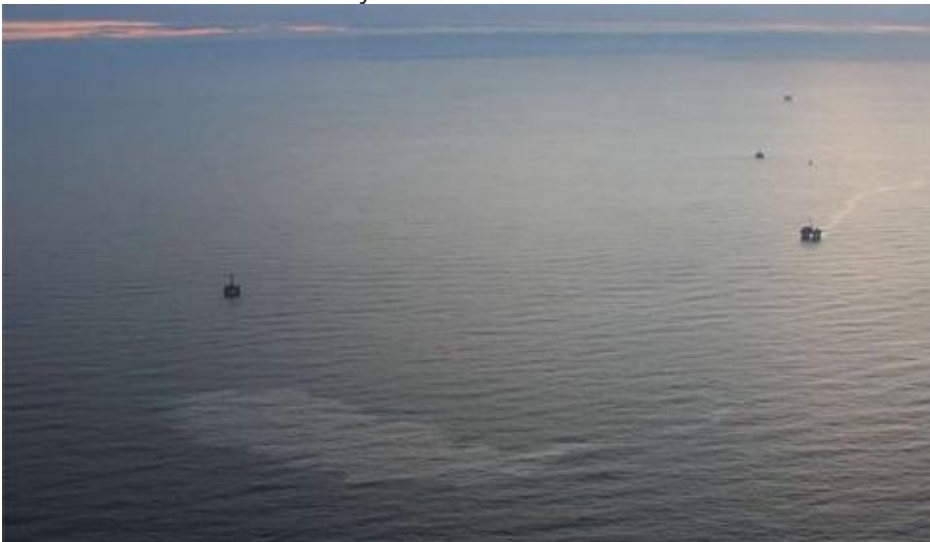
The image shows three oil slicks in the water. This was part of an exercise in the North Sea, where oil was deliberately poured to the sea in order to detect the spill, follow the spreading oil, and finally collect the oil.



Behind the scene

If you are looking for very detailed surface detection for your vessel, a polarimetric radar antenna should be the solution for you. That is what Sea-Hawk radars are exclusively equipped with.

Sea-Hawk can detect the surface within the radar horizon, displaying it similarly to an unusually detailed aerial photo. We bring radar detection to a new level, which was unobtainable until recently.



The surface is constantly changing. The Sea-Hawk radar displays oil and dispersants, lenses and small work boats simultaneously, thanks to the multi polarized radar and advanced display system. Polarization is the key. The varying distribution of oil on the surface and the different kinds of small targets will produce different radar reflections and hence, different presentations on the radar screen.

If we add windy weather to the scenario described above, with sea-state 4 or higher, surface detection becomes more important. An oil spill quickly becomes more hazardous as the oil spreads faster.

It has been verified that a polarimetric Sea-Hawk radar is able to detect anything on the surface at a much longer distance than a standard navigational radar. The reason for the polarimetric radar's superior detection ability is the combined utilization of different polarizations (horizontal, vertical and circular), while standard navigation radars only utilize horizontal polarization. Furthermore, we are able to process the background clutter from the antenna, and the turbulence and fluctuations naturally produced by the sea.

In calm weather a vertical polarized antenna is superior for surface detection. The surface echoes are significantly stronger in the vertical plane than in the horizontal plane utilized in ordinary X-band radars.

We have verified that Sea-Hawk will detect an extremely thin skim of oil or chemicals, also in calm weather. Again it is the capability to use the sea clutter information that comes into play here.

Thermal Night Vision Technology FLIR: FLIR MV-604CLW system is equipped with a cooled Vanadium Oxide (VOx) detector that produces remarkable thermal images of 640 x 480 pixels, with a field of view between 25.3° and 4.1°. Plus a visible light color camera and additional black & white visible low-light camera as a third camera payload. Having the ability to detect a man @ 4.26 kilometers (2.3 miles) with a target size of 1.8m x 0.5m and a small vessel @ 16.09 kilometers (10 miles) with a target size of 4.0m x 1.5m



- Pan/Tilt enables you to continuously pan 360° and tilt +/- 90°, enhancing situational awareness
- Active gyro-stabilization provides steady, long-range imaging — even in rough air
- Radar tracking identifies and tracks specified radar returns, enhancing safety when visibility is low
- Video tracking locks on and follows objects as long as they're in view of camera
- Picture-in-Picture mode (PIP) displays images from two sensors at once, one full screen and the other as a smaller inset
- Digital Detail Enhancement (DDE) assures a crisp thermal image, even in scenes with extreme temperature dynamics.

Communication

- Satellite Communication Iridium Secure Voice, Data and Broadband Terminal with link to vessel's Wi-Fi.
- VHF Communication Radio combines radio communication and 1 or 25 watts of transmitting power with multi-station support to give you the flexibility and convenience you need to safely navigate and communicate on the open water. In addition, the VHF AIS has a voicemail feature that lets you pre-record a 15 second message and deliver the message to any Digital Selective Calling radio. The ability to replay the last 90 seconds of any incoming voice transmission at the touch of a button.

- VHF Automatic Identification System (AIS) system provides detailed data of your vessels surroundings, regardless of visibility. Crew has ship identification information, position, course and speed for vessels equipped with AIS within range. The VHF AIS also receives both Class A and Class B signals at the same time to ensure no critical information is lost.
- Marine HF/SSB transceiver
- Microwave data link: Secure line of sight down link of data from the drone and for line of sight secure communication between RIBs, shore and other vessels.
- Ships intercom system and hailer.
- Signal Flags and signal light.

WATER MAKERS:

Three: US Water 4000-SD makes 15,140 liters per day (4,000 GPD) Commercial Marine Reverse Osmosis water maker system super duty. Powder-coated aluminum frame with S150 LCD Computer Controller and AXEON Extra low Energy membranes. Up to 75% recovery rate.

- LCD Controller Display in engine control room.
- S150 Permeate And Feed TDS Monitoring – *allows for greatest amount of economy*
- Goulds Multi-Stage Stainless Steel Pump

FRESH WATER PUMPS:

Two: HeadHunter HydropaQ HP-16/50 water pressure systems pumps

MARINE SANITATION SYSTEM USCG TYPE II:

Two: HeadHunter TWH-MX 4000 Marine Sewage Treatment Systems, 500 men PH.

Heads/Toilets: HeadHunter Royal Flush Commercial Bravo Heads/Toilets

- Utilizing pressurized water
- Jet maceration with small diameter discharge piper.
- Non-electric HydroVac system.
- Low volume flush reduces MSD size

SAFTY EQUIPMENT:

- Six: Ocean Master Canisters, automatically inflated canopy, 25 Man Life rafts
- 150: Life Jackets U.S.C.G. Type III
- Portable 1A10BC Rated Fire Extinguishers
- Each engine and equipment compartment is equipped with a Automatic Kiddle Fire System Marine ECS™ using Clean Agent Fire Suppression System.
- CET 20 HP Honda High Volume Portable Fire Pumps 48,000 liters per hour (18,400 GPH) with Scotty Form System
 - Flows: 550 GPM @ 10 PSI
 - 490 GPM @ 25 PSI
 - 390 GPM @ 50 PSI
 - 295 GPM @ 75 PSI
 - 170 GPM @ 100 PSI
- Two Fire and de-watering pumps 220 Volt 3 phase electric driven Peerless Pump PVF Series 3000 system, up to 2,839 liters per minute (750 GPM)
- Fire Fighting sprinklers system

- Two remote controlled fire monitors and fire hydrants throughout the vessel. Designed for water, foam and CAF applications
 - Fire Fighting Foam
 - HazClean-ER 75 for emergency spill response agent for incidental hydrocarbon spills.
- Emergence Vessel Electric Service provide by one of the four Caterpillar® C-18 Acert generators mounted on the upper deck just aft of the bridge. The bridge system are backed up with battery power via a 50 hertz AC converter.
- Smoke and Fire detectors and bilge alarm monitor at the bridge and engine control room.
- 18,168 liters per minute (4,800 GPH) 220 Volt 3 phase electric driven bilge pumps, one in each watertight compartment
- CCTV camera in key areas of the vessel, monitor placed at the bridge.
- To include all required safety equipment for this size and class of vessel
- Seven: Satellite 406MHz EPIRB Category II, one for each life raft and one for the ship

FINISH:

- Exterior primed, with an anti-rust coating on all steel surfaces and then painted in accordance to specifications with Perfection Topside Paint, a 2-part polyurethane.
- Below waterline primed, anti-rust coating and painted according to specifications for Epoxycop hard modified-epoxy antifouling paint.
- Exterior aluminum surfaces are primed with Awlgrip 545 Epoxy Primer, a two component epoxy primer. Then finished off with Awlgrip Polyester Urethane Topcoat Paint. Awlgrip finishes are renowned for their superior resistance to sun, saltwater, chemicals, and abrasion. Vessel exterior primed and painted in accordance with Awlgrip instructions. (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.)

Most popular colors



- Decks covered with grey Decko Dot Marine Flooring
- **CUSTOM DECORATION:** Interior decoration will be designed and provided by the Buyer.

OTHER EQUIPMENT:

- Nautical Structures Jack Knife Telescopic gangway at the Quarter Deck
- One anchor with windlass/capstan.
- Two capstans mounted aft on port and starboard sides
- Fuel polishing centrifuge for Diesel Fuel
- Deck hydraulic crane located starboard side aft, model Toimil SL-4000MT
- Providing all required galley equipment dish washer, range, ovens, etc.
- Three: heavy duty commercial type cloth washers and dryers.
- Dock Lines / Tow Bridle

Two: “Boss” HEAVY LIFT SURVEILLANCE DRONE CO-AXIAL HELICOPTER: (VTOL-UAV)

PROVIDING:

- Surveillance: Operating up to 100 miles from the Cutter
- Night Lighting Tactical Operations
- Sea Hawk SHN-X9 Airborne Radar for detecting oil spills & small targets.
- FLIR
- Weather Surveillance



“Boss” SPECIFICATION

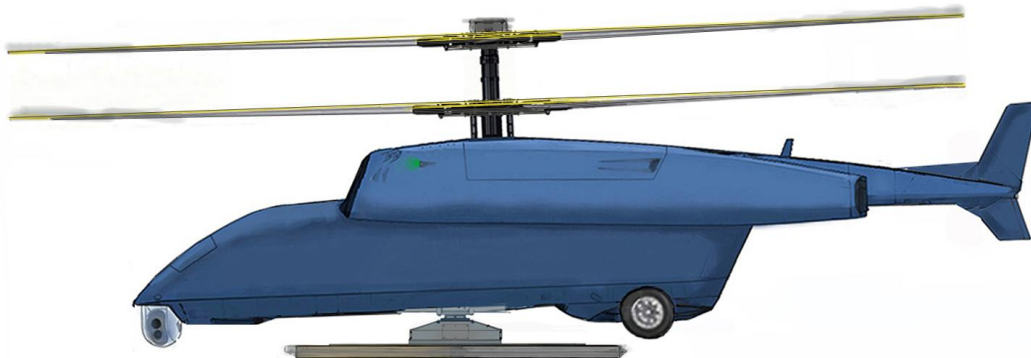
- * Simple to Operate: Heavy Lift Drone Co-axial Helicopter at “Very Low Cost”
- * Rotor: 2 X 4 bladed co-axial rotor system with 204cm by 3.65 meter blades
- * Operating speed zero to 75 knots
- * Power – “Ford” 5.0L RSC engine, Supercharged with 600 HP 546 FT/LB of torque.
- * Normal operating RPMs 5,200 providing 489 hp/lb ft of torque.
- * Very Quiet rotor system and engine
- * Augmenter exhaust system helps cool exhaust and engine compartment, reducing engine noise and lowering the total heat signature.
- * Auto Pilot – Micro Pilot Heli Provides:
 - Fly-by-wire
 - GPS sensing
 - Terrain Awareness & Warning System (CAS)
 - Collision Avoidance System (TAWS)
 - PID feedback loops for camera stabilization

Dimension:

- Length overall: 8.38 meters (27' 6")
- Body Length: 7.77 meters (25' 6")
- Height overall: 2.89 meters (9' 6")
- Rotor Diameter: 7.77 meters (25' 6")
- Current estimated empty wt: 605.7 kg. (1,335 lbs.)
- Gross takeoff wt: 2,137.9 kg. (4,712 lbs.) @ sea level /ISA +20°
- Hovering Performance in-ground effect 14,800 ft
- Fuel: 262 US gallons 990.9 liters (262 US gallons)
- 20 hour surveillance missions.

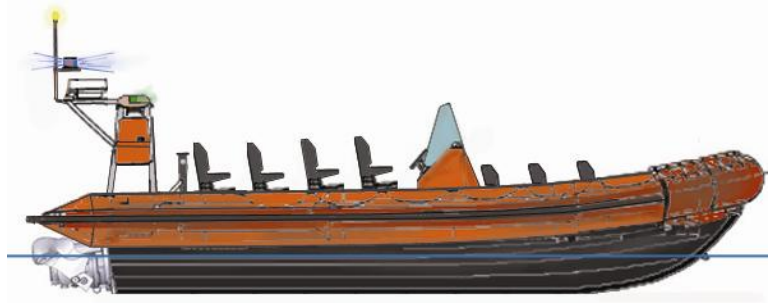
Boss Equipped as follows with:

- Surveillance Sea-Hawk SHN X9 Radar
- Thermal Night Vision Technology FLIR MV-604CLW system
- High intensity LED flood lights produce 1,720 lumens



Three: PAMs SAR 11 Meter RIB

- Length Overall: 11 meters (36')
- Beam: 3.4 meters (11'2")
- Draft: 0.91 meter (3')
- Personal capacity: Up to 24 men
- Fuel Capacity: 645 liters (170 US Gallons)
- Aluminum hull and deck with air-filled sponson
- Displacement: Unladen 5.1 tons ~ Gross tonnage 8.9 tons
- Two: Volvo Penta D6-435 Marine Diesel 435 bHp (320kW) each
- Two: Thrustmaster DJ-110 Jet water jets
- Top Speed: 40+ Knots ~ Normal Cruise 28 knots 1800 RPM ~ 52.9 liters @ hour. (14 GPH)
- Range: 300+ NM
- Seaworthiness: Sea State 5



DELIVERY: Delivery is possible within 17 months from a signed purchase agreement.

TRAINING:

Training will be provided for client's key personnel for operating all equipment installed and vessel maintenance.

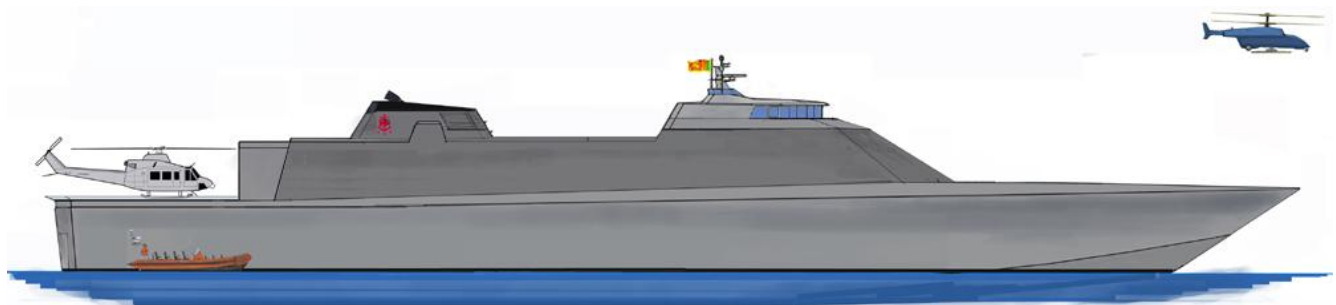
SPARES: Recommended spare parts required for equipment installed on the vessel.

WARRANTY:

- All the hull fabrication work unconditionally guaranteed for 60 months.
- Deck and Interior fabrication work and finish guaranteed for 24 months.
- Installed machinery equipment covered by Manufacture's Standard Warranty for 12 months.
- MTU Warranty: Extended Service Coverage (ESC) is available for up to 60 months and up to 6,000 hours.

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 MTU Marine Power Systems.



SUMMARY:

A high payload capacity and a high level of comfort, at high speeds, even in rough seas, are just some of the reasons why this mono hull is a superior hull form to use over any other type. The hull form is optimized for speed, economy and comfort. It has superior deadweight and axle loading capacities, superior sea-keeping and vessel maneuverability.