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1.0 Background

The Canada Border Services Agency (CBSA), Vancouver Island Operations, has a requirement for a year-round capable vessel that allows officers to meet commercial and recreational vessels that are high risk or unknown for contraband and illegal migrants on their arrival, in all weather and water conditions, at all times of the day, at remote and distant marine Ports of Entry (POE) and Commercial Reporting Sites. It will provide officers with the ability to board vessels to complete risk assessments of the vessels, conduct rummages, complete examinations at anchorages and at remote locations without extensive delays or reliance on other government department assets or private service providers. Many of the remote and distant marine POE's are not otherwise accessible by land. It also provides the ability to deploy a submersible Remote Operating Vehicle (ROV) and complete an underwater examination in order to detect parasitic attachments on vessels at anchor.

2.0 Requirement

2.1 The requirement is for an all welded aluminum Rigid Hull Inflatable vessel with an extended and enclosed cabin in the 10.0 to 11.0 meter range. The vessel will be used in open water conditions on the West Coast of Vancouver Island, and will be travelling for extended periods of time. The vessel will have combined usage as a Mobile Office, ROV deployment platform and to transport Officers and equipment to and from remote marine POE's which are only accessible by water.

2.2 Information Required for Tendering

The Bidder must submit a proposal that clearly demonstrates the vessel and equipment offered meets or exceeds the mandatory requirements specified herein.

1. The Bidder must submit the following drawings showing all vessel dimensions and clearly labelled to identify the type of drawing being offered. Maximum details must be provided to effectively demonstrate the bidder has met the requirements herein:

- a. General Arrangement
- b. Side Profile
- c. Cabin Interior
- d. Fuel Tank location, including filling and venting arrangements
- e. Bilge pump arrangement
- f. Lines plan

3.0 General Information



- 3.1 The vessel must be of a commercial design and build capable of withstanding the year round rigors of a severe marine environment. Areas of operations may include, but are not limited to, the coastal waters of British Columbia, with a range of twelve nautical miles offshore and 350 nautical miles shoreline travel without refueling.
- 3.2 Vessel must be designed and constructed for ease of maintenance, repair and must be readily supportable and serviceable by local commercial facilities and suppliers.
- 3.3 All components, equipment and material must be Contractor furnished material (CFM) unless stated as being otherwise.
- 3.4 Bidder must provide supporting documentation to validate choice of brand name and or model of equipment , which will require approval prior to purchase.
- 3.5 Given the high-risk nature of our work, and our operations in role in Canada's security, the vessels time out of operation due to service or maintenance must be limited. As such, all components, all mechanical, auxiliary, electronic and electrical equipment installed on the boat, must be supportable by parts and service (excluding outboards) within a maximum of five (5) days.
- 3.6 Contractor must standardize on selection of equipment, fittings and fabrication methods to facilitate replacement, inter-changeability of parts, maintenance procedures and operator training. All components and equipment must be current production models.
- 3.7 Contractor must provide a letter to confirm vessel has been constructed and outfitted to the standards addressed herein. Letter must be on company letterhead.
- 3.8 This vessel is intended to be built based on small working or commercial vessel hull forms with a minimum of customization as indicated herein. A number of proven hulls must be shown to have been produced and be in service for the Contractor to indicate suitability of the hull for this procurement. Bidders must submit brochures, photographs, references, builder's plates, hull identification numbers confirming multiple builds, etc. as applicable. Previous extensive experience building completely outfitted new build vessels to Law Enforcement departments is required.
- 3.9 Public Services and Procurement Canada is the "Contracting Authority" (CA), and the CBSA is the Technical Authority (TA) / Inspection Authority (IA).

4.0 VESSEL PARTICULARS

- 4.1 **Physical Characteristics:**
 - A) Length of Hull - bow to transom (excluding collar) – 10.0 metres (minimum) to 11.0 metres (maximum)
 - B) Breadth Overall – (collar deflated) – 3.3 metres (minimum) – 3.8 meters (maximum)
 - C) Draft (outboard motor lowered) between 0.90 and 1.1 meters



D) Draft (outboard motor raised) maximum 0.6 meters

4.2 Normal Load Condition:

Crew – four (4) persons – 120 kg/person

A) 2x Fuel tanks full – 1650 liters capacity

B) Equipment and supplies – 250 kg

C) Detection Equipment – ROV – 150 kg

Heavy Load Conditions: Vessel will be occasionally required to carry up to 8 additional persons for short duration(s) - personal / gear – 960kg

4.3 Vessel Tonnage Measurement

It is a MANDATORY REQUIREMENT that the registered tonnage of the vessel must not be greater than five (5) tons - the Contractor must complete and provide the “Simplified Tonnage Measurement” form demonstrating that this requirement has been met.

5.0 OPERATIONAL PERFORMANCE

- 5.1 The completed vessel must be of sufficient strength to withstand the lateral, vertical impact- loading that equates to the conditions of the Operational Profile when in Normal or Maximum Load Conditions.
- 5.2 Maximum speed required (Normal Load Condition) – 40 knots
- 5.3 Cruising speed (Normal Load Condition) - 30 knots (approximate)
- 5.4 Range (Normal Load Condition): approximately 350 nautical miles at cruising speed with 10% fuel reserve
- 5.5 Full power (Normal Load Condition) – three (3) hours
- 5.6 Cruising power (Normal Load Condition) – ten (10) hours (recommended RPM by engine manufacturer)
- 5.7 Slow speed operation (Normal Load Condition) – ten (10) hours (approx. 1500 RPM)
- 5.8 The Maximum Load Condition(s) must be calculated to determine the maximum number of persons and weight allowable for each of the design categories identified in the Transport Canada “Small Craft Stability Standard ISO12217-1. Maximum Load Condition(s) must be clearly identified on capacity plate as 12x persons.
- 5.9 Normal load conditions include full fuel (gas/diesel) and water tanks.

6.0 ENVIRONMENTAL CONDITIONS



- 6.1 Vessel must be capable of operating both day, and night, and must maintain a stable platform when operated at varying speeds during any of the following conditions:
- A) Average ambient air temperature: -10 degrees C to +35 degrees C
 - B) Average water temperature: 0 degrees C to 20 degrees C
 - C) Wave heights: 0 - 4.0 meters
 - D) Wind speed: 0 - 35 knots
 - E) Operate in freezing spray or freezing rain with accumulations of up to 6.0 mm.
 - F) Operate fully in depths of 1 metre with outboard motor(s) lowered.
 - G) Basic maneuvering in depths of 0.80 metre with outboard motor(s) in partially raised position.

7.0 CONSTRUCTION STANDARDS

- 7.1 The vessel must be constructed and comply at a minimum with the current issue of Transport Canada TP 1332 "Construction Standards for Small Vessels" and American Bureau Yacht Council (ABYC) where applicable to ISO Design Category "B", ISO standard- 6185-2014 "Offshore Inflatable Boat"- Type VIII. Full structural and stability testing must be carried out as addressed in ISO standard.
- 7.2 Canadian Standards Association (CSA) C22.2 NO.183.2-M1983 (R1999) "Standards for D.C. Electrical Installations" and American Bureau Yacht Council (ABYC) where applicable.
- 7.3 All aluminum welding must be performed by a company that is certified in accordance with CSA Standard W47.2M 1987, Certification for Companies for Fusion Welding of Aluminum, Division 1 or 2.1. The minimum weld design must be in accordance with ABS Rules for Building and Classing Aluminum Vessels and CSA W59.2- M1992 "Welded Aluminum Construction"
- 7.4 Transport Canada Marine Safety Regulation TP 1324 – Coated Fabrics
- 7.5 Canada Shipping Act, Collision Regulation (COLREGS).

8.0 CONSTRUCTION PRACTICES

- 8.1 All materials and equipment must be stored, installed and tested in accordance with the manufacturers' guidelines, recommendations and requirements.
- 8.2 Vessel and all components must be free of local vibration that could endanger crew, damage boat structure or interfere with the operation or maintenance of machinery & systems.
- 8.3 All equipment must be accessible for use, inspection, cleaning and maintenance. Measures must be taken to avoid wear and damage incident to construction, and to prevent corrosion and deterioration. Equipment subject to freezing must be kept drained, except during sea trials. Equipment must be kept clean and protected from the environment.



- 8.4 Prior to painting, vessel must be free of construction marks such as gouges, magic marker, pencil, scratches, stains and welding smoke. All exposed metal surfaces (excluding deck) must be prepared and painted in such a way to insure long lasting adhesion with no paint blisters. Marine quality paint or coating for commercial use must be used. A minimum of two top coats must be applied.

9.0 ERGONOMIC DESIGN

- 9.1 The design of the vessel must incorporate accessibility, visibility, readability, crew (both male and female), efficiency and comfort for a range of physiques from approx. 5' to 6'4" in height, wearing cold weather clothing and equipment. All rough edges and sharp angled corners must be rounded and ergonomically adapted.
- 9.2 Weather tight stowage for small items of equipment must be provided in void spaces, and where practical, inside console(s). All stowage compartments must be self-locking, secured by positive means and operable by gloved or insensitive hands. One Master key, and two spares must be provided. Where possible a universal locking system should be used to limit the number of keys required. Alternatively a "lockable key box" will need to be constructed and installed on interior cabin wall in an easily accessible space.
- 9.3 **Vibration**
- A) The boat and all components must be free of local vibration that could endanger boat personnel, damage boat structure, machinery or systems, or interfere with the operation or maintenance of boat machinery or systems.
- B) Mounts for movable components, including items moved for stowage, towing or transport must be provided with resilient material as necessary to prevent rattling.
- C) Loosening of fasteners under vibration must be prevented by the use of self-locking fasteners, as applicable.

10.0 MATERIALS - GENERAL

- 10.1 All materials must be corrosion resistant and suitable for use as detailed in the Environmental Conditions. All materials normally subjected to sunlight must resist degradation caused by ultraviolet radiation.
- 10.2 Any dissimilar metals must be insulated from each other.
- 10.3 Aluminum alloy types 5086, H116 must be used for plate; aluminum alloy 6061-T6 (anodized grade), suitable for type 5356 filler alloy, must be used for extruded shapes and welded tubing and pipe. Non-structural items of trim and outfit such as hatch frames, castings, consoles and hardware items must be of other aluminum alloys best suited for commercial marine salt water use such as dual rated 5083/86 or 5052.



- 10.4 Stainless steel type 316L or 316 must be used for all stainless steel applications.
- 10.5 Any fasteners directly threaded into aluminum alloys must be coated and threaded into the appropriate thickness of aluminum.
- 10.6 Where nuts can become inaccessible after assembly of the vessel, nuts must be captured to allow reassembly and prevent backing off. Unless otherwise specified, self-locking nut must be installed to prevent loosening of fasteners due to shock and vibration.

11.0 HULL DESIGN AND CONSTRUCTION

- 11.1 Hull design must be a “V” style mono hull with a reverse chine flat that extends from transom to bow area. Lifting strakes must be fitted to allow for shallow water accessibility. To re-direct waves and spray away from vessel spray strakes must be fitted. Hull shape must not impede water flow to the propulsion unit.
- 11.2 Hull design must have a sufficient number of watertight compartments and/or flotation foam to allow for adequate stability and positive buoyancy in a flooded condition. Low smoke and flame spread or fire retardant flotation foam must be used.
- 11.3 Hull must be constructed of 1/4” plate for bottom and chine. Hull sides and decking must be a minimum 3/16” plate.
- 11.4 Hull must be transversely framed from keel to deck with reinforced longitudinal girders running from transom to as far forward as practical. Hull construction shall have channel stiffeners running from transom as far forward as possible, there shall be minimum of three (3) stiffeners a side. Transom must be reinforced to support weight of engines and the accompanying thrust.
- 11.5 Welding must be continuous in the hull, deck, bow and transom and other areas subject to corrosion, vibration and impact.
- 11.6 Hull bottom on center line must be reinforced with a minimum 1 /4” thick welded aluminum “beaching shoe” to allow for emergency beaching/grounding. Vertical stiffener must be fitted inside on centerline. Sea keeping capabilities and performance must not be affected.
- 11.7 The bow stem must be equipped with two eyes for securely attaching the bow line, trailer hook, safety line, etc.
- 11.8 Two water proof LED lights that are a spot/flood combination must be recessed into bow area below collar, one each side. They must be angled for slower speed travel 20-24 knots. Must be marine grade and highest intensity allowable for the space provided. Must be completely sealed to prevent water intrusion and resistant towards water impact during rough water operation.



- 11.9 The hull above the water line must be prepped and painted. Color must be a semi-gloss black. Below the water line a suitable anti-fouling coating must be applied. Color must be flat black.

12.0 BEACHING

- 12.1 Capable of beaching on soft (sand, earth or clay) surfaces at a speed of up to five (5) knots without damage to the hull.
- 12.2 Capable of beaching on hard (stone or concrete) surfaces at speeds of up to three (3) knots without damage to the hull.

13.0 DECK CONSTRUCTION AND OUTFITTING

- 13.1 Deck and the hull must be constructed of similar materials.
- 13.2 Deck must be self-draining by use of scuppers installed at transom. They must be designed for quick and effective drainage of deck area when vessel is at slow speed or stationary. Bow deck must have separate self-drainage.
- 13.3 Deck above the water tight compartments must have bolted hatches to allow easy access for repair of buoyancy compartments below. Hatches must be fitted to eliminate a tripping hazard. Material must be aluminum.
- 13.4 Deck area in companionway must have removable panel where practical, to allow for the inspection, maintenance, repair of hull and equipment below.
- 13.5 All walking decks must have a commercial grade, marine suitable non-skid coating applied. Color must be matte black. Non-skid tape is not acceptable.
- 13.6 Cadmium plated parts and fasteners, including washers, **must not be used.**
- 13.7 All fasteners must be of corrosion resistant materials. All fasteners must be flush mounted to eliminate tripping and snagging hazards.
- 13.8 No fasteners must be directly threaded into aluminium alloys, except with adequate bolt or insert sizes, minimum 1/4" diameter, tapped into a suitable alloy type, and thickness, such as 1/4" 6061, with the use of thread adhesive type material. Aluminium or Stainless steel washers or backing plates must be used as appropriate.
- 13.9 A minimum of four (4) lift up type tie downs must be fitted to secure equipment along inside of aft deck. They must be of a suitable size and quality to withstand severe strain when in use. Material must be stainless steel.



- 13.10 Four (4) pop-up type cleats for mooring, anchoring and towing must be securely mounted flush to deck. Location must be one cleat each side of sliding door and one each side at cabin edge aft. Size must be a minimum of eight inches. Material must stainless steel.
- 13.11 Four (4) cleats must be securely mounted. One on each side of bow, one on each side of transom. Cleat size must allow for one full turn and three figure eights when securing lines. Material must be welded aluminum.
- 13.12 Cruciform tow post used for EMERGENCY towing rated for 3000 lbs. (1360 kg.) must be permanently mounted to aft deck ahead of vessel thrust point. This requirement must be tested and confirmed prior to Acceptance. A hand cranked tow reel must be fitted at transom with 100 metres of buoyant 3/4 inch towline with eye/chaffing gear fitted at the tow end line. Tow reel must be equipped with a cover that can be quickly removed. An aluminum screen protection barrier must be installed to prevent aft egress and recoil of towing line. Hand rails of a suitable height must be installed on each side of screen barrier. Material must be welded aluminum pipe. Color must be semi-gloss black for all items.
- 13.13 A welded aluminum stowage box for anchor/ lines must be installed at bow. Locker must be self-draining, ventilated, fitted with suitable gasket, properly hinged and lockable. Color must be semi-gloss black. Top of locker must have a commercial grade, marine suited non-skid applied. Color must be black. Aluminum boarding rails of a proper height must be installed. Rails should be removable and color must be semi-gloss black.
- 13.14 To prevent glare, all surfaces forward of cabin must be painted. Color must be semi-gloss black.

14.0 CABIN - GENERAL

- 14.0.1 Cabin must be fully enclosed, forward leaning windshield and roofline with a forward cuddy. Adequate working deck space must be arranged at both bow and on aft deck (see section 24 – Aft Deck Requirements). Cabin exterior color is tbd. Interior color should be semi-gloss dark grey.
- 14.0.2 The cabin must be designed in such a way as to allow access between the navigator and helms stations to the bow's cuddy area.
- 14.0.3 Cabin's interior dimensions should be a minimum of seven (7) square metres. Cabin width must extend to tube cradles with a minimum length of 2.75 meters and a minimum width of 2.43 meters. Base of cabin side(s) must be designed as walking deck(s) for the safe passage of crew members to bow and transom areas. Cabin roof aft must extend beyond cabin door to provide shelter for aft helm operator (see 20.3.7).
- 14.0.4 All interior including cuddy must be properly insulated with thermal insulation. It must be neatly installed and firmly secured. Insulation coverage to include window frames. A wall cladding material must be securely fitted over the insulation. It must be fire retardant, low



maintenance and able to withstand low temperatures without cracking or breakage. Color must be dark grey.

- 14.0.5 A preferred configuration is to have a complete vacu-flush Head system installed in the forward cuddy. The toilet should be located in a location/manner which does not interfere with daily operations and is concealed when not in use. A means to provide privacy to the forward cuddy or toilet use only is required. Holding tanks, piping and overboard discharge systems must be installed to must meet both Federal and Provincial Regulations.
- 14.0.6 Floor covering in cabin, including cuddy, must be anti-fatigue, shock and sound absorbing rubber with embossed tread. Covering must not absorb water. Color must be black.
- 14.0.7 A total of sixteen welded aluminum grab rails must be fitted, securely attached and located for quick access. They must be painted the color in contrast to grab rail location. Color must be grey or semi-gloss black. Please see below the following locations:
- (2) - bench seating - as appropriate
 - (1) - helm station- one on side of console going into forward cuddy
 - (2) - co-pilot station- one on console, one on side of console going into forward cuddy
 - (2) - side sliding door (interior) - one just forward of each
 - (2) - cabin ceiling full length offset from passage way (one port, one starboard)
 - (1) - aft sliding door (interior) starboard side
 - (1) - aft sliding door (exterior) starboard side
 - (1) - cuddy hatch (interior) starboard side
 - (1) - cuddy hatch (exterior) above
 - (1) - roof perimeter (exterior)
 - (2) - cabin aft (outer exterior) vertical port and starboard
- 14.0.8 A 1000W microwave must be supplied and mounted in a practical area that accounts for accessibility and maximizes usage of space. The type, location and mounting must consider impact from the vessel maneuvering. When in use power to all other operating systems must not be affected. Prior to installation TA to approve location. This may be located in cuddy if this increases vessel stowage and capacity.
- 14.0.9 A “mini-fridge” style refrigerator (minimum 2.3 cubic feet) must be supplied and mounted in a practical area that accounts for accessibility and maximizes usage of space. The type, location and mounting must consider impact from the vessel maneuvering. When in use power to all other operating systems must not be affected. Prior to installation TA to approve location. This may be located in cuddy if this increases vessel stowage and capacity.
- 14.0.10 Every effort must be made to minimize sound inside cabin from ambient noise including sound from hull moving through water and waves. Noise level inside cabin, with doors open, must not exceed 80 decibels when operating at full speed in one meter waves. Any sound dampening material must not hinder inspection of the interior hull and cabin.



Material must be non-combustible /flammable and resistant to absorbing any type of liquid or vapor.

- 14.0.11 Port-side aft in the cabin, where traditionally the head would be located, will be an evidence handling polished aluminum or stainless steel countertop. Below this countertop will be multi-drawer cabinetry for contraband detection equipment, supplies and seizure documentation. Heavy duty, commercial grade, lockable, painted and matching the vessel interior. 110/12V and USB Power outlets at this location will be supplied through a high capacity inverter as well as the generator. Evidence handling countertop and cabinetry design is TBD and discussed with vendor.
- 14.0.11 A small, deep sink is to be installed at the fridge/microwave counter. A cover for the sink is required when not in use. Faucet is to be pressure water, cold only.

14.1 CABIN - Detailed

14.1.1 Windows

- 14.1.1 Window design must allow for maximum lines of sight when coming alongside larger vessels/structures and when turning whether in a seated or standing position. Where practical all windows must be configured to reduce “blind spots”.
- 14.1.2 Windows must be ¼ inch thick laminated glass fitted into anodized aluminum frames. They must be Category “B” certified ICO6185 standards as per Transport Canada.
- 14.1.3 Hardware for windows must be of a commercial grade able to withstand frequent use without damage. Material must be stainless steel. Sliding windows must have removable screens and must slide open to maximum capacity.
- 14.1.4 Windshield must be a forward rake design with a minimum of two windows. Design of windshield must eliminate “blind spots” where practical.
- 14.1.5 Each windshield must be equipped with a heavy-duty commercial grade wiper system installed above windshield. Wiper system must be externally mounted and provide maximum wipe coverage in a linear straight line manner from port to starboard and return. This system is not to interfere with viewing when underway. Washer system must have a fluid reservoir of ten liters minimum. The helm and co-pilot stations each must have a control to operate all wipers. Wiper speed must be variable. Hardware is not to interfere with normal vessel operation. External hardware is to be painted and color matched to vessel.
- 14.1.6 A minimum of sixteen windows must be located as follows:
- Two – portside aft – as appropriate
 - One – helm station – one on side of console going into forward cuddy



- Two – co-pilot station – one on console, one on side of console going into forward cuddy
- Two – side sliding door (interior) - one just forward of each
- Two – cabin ceiling full length offset from passage way w/retractable sunscreen (one port/starboard)
- Two – cabin ceiling full length offset above/forward of helm/co-pilot to provide visibility to gangways when embarking/disembarking officers w/retractable sunscreen
- One – aft sliding door (interior) starboard side
- One – aft sliding door (exterior) starboard side
- One – cuddy hatch (interior) starboard side
- One – cuddy hatch (exterior) above

14.1.7 All windows are to be tinted with the shade.

14.2 Doors

14.2.1 All doors must be designed to remain in an open position and close with ease. They must be weather tight, lockable and fitted with a suitable size sill to offset water from deck and overhead. Doors must allow exit/entry of person in full gear with ease. Material must be metal. Exterior color must be same as cabin exterior, interior color must be same as interior.

14.2.2 Doors must be located as follows:

- Two (2) (slide aft) - one at helm and one at co-pilot station to access side decks.
- One (1) (slide port) - cabin aft to access aft deck.

14.3 Consoles – General

14.3.1 Two (2) separate welded aluminum consoles with walk thru access must be provided. Helm must be located on starboard side and co-pilot station on port side. Consoles must be painted with a textured, marine grade coating resistant to wear from abrasion, scratching and chipping. Color must be dark grey. Additional Aft Helm Console is to be produced in the cockpit on the starboard side and painted with same coating.

14.3.2 Console face must be at an angle that maximizes a comfortable operating position with good visibility of all console equipment in a standing or seated position. Layout must be arranged in an ergonomic manner, with consideration given to the forward leaning windshield/roofline to provide easy access to all light switches, controls, electrical panels



and easy viewing of navigation, communication and propulsion instruments. Prior to installation Contractor must provide a drawing of proposed lay-out for review and approval by TA.

- 14.3.3 All electrical equipment and hardware must be installed in accordance with the manufacturer specifications and must be capable of operating simultaneously with any electronic equipment without causing interference to it or to the magnetic compass.
- 14.3.4 Displays for the electronic equipment must be mounted on forward dash. A suitable size opening to access the equipment above for repair or replacement must be provided.
- 14.3.5 Console tops should be covered in a non-slip heavy durability rubberized matting to protect consoles and reduce glare. Color must be black.
- 14.3.6 Console box must be created and securely mounted on ceiling, centered and forward of consoles behind windshield. The CBSA radio must be located in the center with a VHF radio on each side. Radios are to be flush face mounted into the console box with no wiring visible. Location must allow for easy access. CBSA Radio and antenna will be supplied as Government Furnished Material (GFM). Care should be taken to ensure installation location will not affect head room access to cuddy.

14.4 Console - Helm Station

- 14.4.1 The Contractor must supply and install the following items:
 - A) High Definition 12" screen size (or 16" screen size preferred if space permits) multifunction touch screen display interfaced with 4G Broadband radar open array radar and sounder. Navionics navigation software required for West Coast use to be included. Positioned and flush mounted appropriately for operators ease of use.
 - B) Plotter must be split screen capable for simultaneous radar/plotter/sounder use, including an 'overlay' function.
 - C) Compatible Network Switch, with associated cabling and adaptors.
 - D) Plotter should include an internal solid state quad core processor. Screen brightness minimum 1200 nits and resolution minimum 800x1280. Direct sunlight viewable screen. Minimum 16MB internal storage and supports all common and local marine charts. Waterproof rated to IPX6 standard minimum. AIS read only capable. Power consumption of 30w), with a voltage supply of 10-31.2v DC. Must be a modular multifunction display system.
 - E) Stainless steel through hull transducer which best provides depth display while underway. Must incorporate a med/high Chirp capability. 3D imaging capability



required. 300M depth readable, with 180M sides can sonar readable. 500W power output with 83kHz on Med and 200kHz on high.

- F) AIS Automatic Identifier (receive only).
- G) Another independent and isolated depth sounder display (only) with its own independent hull transducer (see Sec. E above) providing maximum performance while at speed. Display to be mounted in a location clearly visible to most crew above centered and forward. For use as redundancy safety feature. Digital display is to be 4.1" color screen which primarily displays Depth and Vessel Speed in knots. Screen is to be optically bonded to the glass covering and is direct sunlight viewable and waterproof. Both Depth and Speed must be displayed during vessel operation on this screen. Must be 12v DC supply voltage, flush mountable, IPx7 waterproof rating, and max power consumption of 1.8w.
- H) Two Class D DSC marine VHF radios with antennas (minimum 6DB) flush mounted in an overhead compartment for navigator and helm usage. Radio's are to incorporate dual-channel AIS receivers with an integrated GPS receiver. The fist microphone is to be removable and permanently located to a suitable location close to both the helm and navigator consoles (removed from the VHF Radio's.)
- I) Radar is to include a 4 foot open array system providing a minimum 64nm range. This radar must include a Dual Range mode to monitor 2x distances simultaneously and capable of tracking high speed watercraft at close range. Radar is to be operational from 16-25 seconds from cold start up. Marine grade 12v system with 180W peak power consumption. 40W average power consumption. Head/North Up capable with a 75M minimum range scale. IPX6 waterproof rating minimum. Radar viewing is to be made available in both the Helm and Navigator plotter screens.
- J) GPS Antenna is to be matching hardware/software to plotter, appropriately mounted on the roof and suitably provide an accurate and rapid vessel position. Must provide a magnetic heading for boat direction and is fully waterproof.
- K) All displays are to be flush mount.
- L) Manufacturer original (OEM) multi-function touchscreen display instrumentation package for each engine, gauges must be digital and include as a minimum, a tachometer, hour meter, trim gauge, fuel gauges, battery indicator meter, water pressure gauge for each engine (see section 15.3). To incorporate fuel management system analysis.
- M) A marine grade, high quality cellular signal booster for 4G LTE and 3G.
- N) Type of outboard propulsion engine brand to be provided to TA at the bid stage.



- O) All navigation instrumentation, GPS, Radar, VHF, Sounders and related hardware and software are to be of the same make and compatibility. All external hardware is to be painted a marine grade semi gloss black.

14.5 Console - Co-Pilot Station

14.5.1 The Contractor must supply and install the following items:

- A) High Definition 16" (screen size) multifunction touchscreen display plotter interfaced with 4G Broadband open array radar and sounder. Software required for West Coast use to be included. Positioned and flush mounted appropriately for navigators ease of use.
- B) Plotter must be split screen capable for simultaneous radar/plotter/sounder use, including an 'overlay' function.
- C) Plotter should include an internal solid state quad core processor. Screen brightness minimum 1200 nits and resolution capable to 1920x1080. Direct sunlight viewable screen. Minimum 90MB internal storage and supports all common and local marine charts. Waterproof rated to IPX6 standard minimum. AIS read only capable. Power consumption of 40w (+/- 4w), with a voltage supply of 10-32v DC. Must be a modular multifunction display system.
- D) Radar is to include a 4 foot open array system providing a minimum 64nm range. This radar must include a Dual Range mode to monitor 2x distances simultaneously and capable of tracking high speed watercraft at close range. Radar is to be operational from 16-25 seconds from cold start up. Marine grade 12v system with 180W peak power consumption. 40W average power consumption. Head/North Up capable with a 75M minimum range scale. IPX6 waterproof rating minimum. Radar viewing is to be made available in both the Helm and Navigator plotter screens.
- E) All navigation instrumentation, GPS, Radar, VHF, Sounders and related hardware and software are to be of the same make and compatibility. All external hardware is to be painted a marine grade semi gloss black.
- F) All displays are to be flush mounted.

14.5.5 Console - Aft Helm Station (outside)

14.5.5.1 The Contractor must supply and install the following items:



- A) High Definition 9" (screen size) multifunction touchscreen display plotter and depth sounder with navigation software required for West Coast use to be included. Positioned and flush mounted appropriately for aft helm operators ease of use.
- B) Plotter is to include 16GB of internal storage, 23W max power consumption, include a 720x1280 display resolution and IPX7 waterproof rating.
- C) Steering station with stainless steering wheel. Tilt function. Integrated into power hydraulic steering system.
- D) Engine(s) control must be enhanced dual binnacle type incorporating trim and tilt. Digital electronic controls required. Engine controls must conform for commercial use. Any control cables must be encased in protective hose. Ignition switch(s) must be keyed and positioned not to collect water. Master Kill switch with lanyard must be included along with a spare. The mechanical power hydraulic engine raising/lowering system controller to be situated at a suitable location at the aft helm.
- E) Fuel gauges
- F) An industrial, removable, fit cover to protect the Aft Helm components from exposure to the environment when not in use.
- G) All navigation instrumentation, GPS, Radar, VHF, Sounders and related hardware and software are to be of the same make and compatibility.
- H) Aft helm station is to be located on Starboard side outside against the cabin exterior wall. Console is to be painted and color matched to the vessel. Controls are to be ergonomically situated for operation from a standing position.

14.6 Seating

- 14.6.1 All seats upholstery must be of superior marine grade materials, extremely resistant to tears, punctures and the deterioration due to environmental exposure, and the operators gear. They must be able to support a weight of 130 kg safely. Color must be black. Seats provided must be serviceable by the original manufacturer locally and with a limited time delay. The quality and grade of product must be compatible with other law enforcement marine vessels built for similar water conditions.
- 14.6.2 The helm and co-pilot seats must be shock mitigating, and are designed to allow a standing or sitting position while providing full comfort and lateral support. Seats must have a high back adjustable fore, aft, and height. They must be equipped with folding arm rests and seat belts. Pistol grip style hand grips must be provided on co-pilot seat only. A suitable size foot rest must be provided at each console designed to not interfere when in a standing



- position. The helm and co-pilot seats must have a section of forward seat base which can flip up to allow more standing room.
- 14.6.3 Behind the helm and co pilot seating there must be 2x additional matching shock mitigating seats. Seats must have a high back adjustable fore, aft, and height. They must be equipped with folding arm rests and seat belts. Pistol grip style hand grips must be provided on these seats as well. A suitable size foot rest must be provided. All seats must be from the same manufacture.
- 14.6.4 Each seat must be securely mounted on a welded aluminum stowage box. An opening with a hinged door on the front face must be arranged with a suitable mechanism to hold in an open position. Size of the opening must be maximized for quick and easy access. Boxes must be designed to best utilize interior space and maximize stowage capacity. Color must be consistent with interior color.
- 14.6.5 A small work table must be mounted on side, or back, of co-pilot seat, to be used by co-pilot or crew seated in rear seats. It must, at minimum, provide a work area for a robust impact resistant laptop. It must be fold down with a minimum size of 14 inches wide and 12 inches deep. A robust locking mechanism with quick release must be fitted to keep table stable. It must be at proper height for quick access and comfort when in use. It must not impede access to electronics, or companion way, when folded away and not in use. Color should be black.
- 14.6.6 A larger work table must be mounted behind helm seating for the purpose of a mobile work station. Table must be fold down and hinged to cabin wall. Size must allow for use of ROV equipment with table dimensions of 30 inches wide and 20 inches deep minimum. This table must be able to support 100 lbs. A robust locking mechanism with quick release must be fitted to keep table stable. It must be at proper height for quick access and comfort when in use. It must be accessible to the rear seating configuration. Color should be black.
- 14.6.7 All seat locations must have a cup/water bottle holder designed to fold close against cabin wall(s), minimum of six (6) provided. Both helm station and co-pilot station must have minimum of one (1). Material must be metal, and color should be black.
- 14.6.8 To allow for the safe stowage of small items such as binoculars, gloves, etc. an open-topped metal bin must be mounted on cabin wall at co-pilot seat, as well as two more located at usable distance from rear seating. Location must be low to deck with quick access. Pinch points caused from shifting of seats must be considered in location of bins. Height of bin must be a minimum of five inches. Color should be black.

14.7 Interior Lighting



- 14.7.1 To facilitate night time operations progressive dimmers for all equipment where practical, must be installed.
- 14.7.2 The cabin must be equipped with at least two rows of overhead white lights.
- 14.7.3 The vessel must also be equipped with two rows of dimmer controlled RED night-lights in the cabin.
- 14.7.4 There must be a red chart lamp on each side of the dash, one for the operator and one for the navigator and one over the evidence handling countertop, each with switch controls, and dimmer.
- 14.7.5 Cuddy must be fitted with an overhead 12 volt red/white light.
- 14.7.6 All cabin lightning must be LED

14.8 Heating and Cooling

- 14.8.1 One complete marine grade diesel heating system to defrost windshield, side windows and heat cabin interior must be installed. Defroster must have a three speed fan blowing either warm or cold air, capable of clearing entire windshield. Heat ducts must be located at all seat positions close to deck. Heat duct material must be heavy duty. System must be controlled by a dash mounted thermostat. Heat output should be 17,000+ BTU on high and 8,000+ BTU on low. Unit must be marine grade and have low fuel and power consumption. The heater unit must fit in a space which allows access for service, and the heat output is suited for the size of vessel.
- 14.8.2 Four commercial grade fans must be installed to provide effective cooling inside cabin and cuddy. Fan must be multi directional providing a high level of air flow with no noise. It must have quick connect / disconnect type fittings for easy change-out. Each fan must be located in cabin corner securely mounted to prevent shifting when in rough weather or when being trailered. Material must be metal.
- 14.8.3 4x Hatches must be securely fitted on cabin roof to provide additional interior ventilation. Size must be a minimum of eighteen inches fitted with removable screens and tinted. Hatch cover must be weather tight, lockable and equipped with a suitable and robust mechanism to allow door to remain in an open position and close with ease. Locations must be strategically placed to allow the helm/co-pilot a view up gangways when embarking disembarking crew, and over the rear seating positions.
- 14.8.4 A minimum of two vents, one in the cuddy and one in the cabin must be installed to provide natural air flow from outside. Vents must be weather tight, adjustable and the proper size to provide effective air flow thru out. Vents must be controlled from inside. Material must be heavy duty.



14.9 Cuddy

- 14.9.1 Cuddy's interior dimensions should be a minimum of three and one half (3.5) square metres. Cuddy must be designed to provide maximum stowage with the starboard side designated with hanging wet lockers / pistol lockers / evidence locker or safe / gear storage. Shelving must be supplied and installed from ceiling to deck best suited for a marine environment. Shelving must be adjustable, and easily removed without the use of hand tools. Shelving must be able to support a weight of 100 kg safely.
- 14.9.2 Bench seating should be installed opposite side of storage shelving. Use maximum allowable foam / padding to increase passenger comfort and security when underway.
- 14.9.2 Any electric or electronic components inside cuddy must be protected from damage from shifting of stowage items.
- 14.9.3 A hatch above to access bow deck must be provided. Hatch frame must be fitted with suitable material to minimize injury when exiting/entering in full gear. Hatch cover must be hinged on the port side, weather tight, lockable and securely dogged to stay in an open position and close with ease. Cover must be easy to open from both inside & out. Material must be welded aluminium. Color must be same as cabin.
- 14.9.4 Toilet to be located in a suitable location forward, with a removable aluminum painted to stand on or stow gear around. A means of privacy is to be integrated into the cuddy from the cabin, or around the toilet itself. Location of the toilet cannot interfere with regular operations, or become a hazard to step around. The toilet located in the cuddy is a preferred configuration. Toilet is to be a vacuum flush system.

15.0 COLLAR - INFLATABLE

- 15.1 Collar must be constructed of current and proven material that meets or exceeds the criteria for strength, elasticity, resistance to wear and longevity. Any minor damage must be repairable without complete removal of collar. Collar must be securely attached to hull using mechanical fasteners. The material must be a common, similar product used currently on law enforcement vessels which are built for operation in similar environmental conditions. Color must be black.
- 15.2 Collar must have a minimum of five separate chambers of approximately equal volume. Each chamber must be fitted with a suitable inflation system and over-pressure relief valves calibrated to 3 psi. The inflation valve and over pressure relief valve must be suitable and matching to the collar and specifications required to suit the design.



- 15.3 A semi-auto inflation and monitoring system must be supplied and installed. The system must allow for ease of deflation/re-inflation for all chambers with a minimum pumping ability of 550 liters' per minute able to exceed the maximum psi in each chamber.
- 15.4 Rub strakes must be securely attached to collar to protect against abrasion and puncture. Area must cover entire length of top, sides and underneath of collar. Extruded neoprene rubber material. Color must be black.
- 15.5 Grab lines must be fitted along the centerline on both port and starboard sides attached by removable D-Rings. Grommets must be the proper size and securely attached to allow frequent use without becoming detached. Both the grab lines and D-rings must be easily removed as a single unit. Material must be nylon braided rope construction ½" diameter. Color must be black.
- 15.6 For additional protection a skirt from bow area to mid ship must be bolted to the flange at bottom of collar. Material must be heavy-duty and puncture resistant. Color must be black.
- 15.7 A complete collar repair kit including a manual air pump must be provided.
- 15.8 The collar must be supported by parts and service in Canada within 48 hours of receiving the service call.
- 15.9 A "D shaped" style collar configuration is preferred to maximize the available deck space for ROV operations, and boarding a team at anchor.

16.0 PROPULSION SYSTEM

- 16.1 The Contractor must supply and install an outboard engine system with a combined power that meets standards set out in section - 5.0 Operational Performance. Fuel must be regular unleaded fuel (no high-octane). Outboard Engine system must be of a commercial grade capable of meeting or exceeding the Operational Requirements addressed herein. Engines selected should be of the latest generation high (fuel) efficiency design. Bidder must provide supporting documentation to clearly demonstrate choice of Outboard Engine system, which will require approval of TA. Contractor recommended engine system must be provided at the bid stage.
- 16.2 As a minimum the following criteria must be considered in choice of engine:
 - Minimum noise level,
 - Minimum weight
 - High alternator output
 - Fuel efficient
 - Low maintenance
 - Proven reliability for service and support
 - 40 knot speed under Normal Load conditions (see 5.0 - Operational Load Conditions)



- 16.3 The instrumentation package for each engine must be the engine manufacturers integrated touch screen multifunction display and include as a minimum, a tachometer, hour meter, trim gauge, fuel gauges, battery indicator meter, water pressure gauge, fuel management systems. Size must allow for easy visibility. To facilitate night operations progressive dimmers must be installed where applicable. Audible alarms and warning indicator lights must be installed where applicable.
- 16.4 Engine(s) control must be enhanced dual binnacle type incorporating trim and tilt. Digital electronic controls required. Engine controls must conform for commercial use. Any control cables must be encased in protective hose. Ignition switch must be keyed and positioned not to collect water. Master Kill switch with lanyard must be included along with a spare.
- 16.5 The engines must be mounted on an outboard engine bracket/hull extension that must support the motors and accompanying thrust. Drain plug must be installed in the lowest part at the aft end. A zinc anode mount and zinc anode must be mounted on the aft plate. Material must be welded aluminum and of suitable durability to match the engine horsepower output. A power hydraulic mechanical system is to be mounted between the motors and engine bracket/hull extension to allow the raising/lowering of the motors without changing the direction of propulsion. The mechanical engine raising/lowering system controller to be situated at a suitable location at the helm.
- 16.6 Heavy Duty tie bar must be supplied and installed with the proper length to allow engines full movement in either direction. Material must be stainless steel.
- 16.7 A switch to operate the power hydraulic engine raising/lowering mechanism is to be installed at the helm at a suitable location in proximity to the throttles. This should be incorporated into the existing throttle trim controls if possible.
- 16.8 Propellers must be stainless steel. Contractor must inform the TA prior to sea trials of appropriate pitch and diameter to meet the Operational and Performance requirements.
- 16.9 An engine guard must be designed to protect the motors from impact. It must be heavy duty constructed of welded aluminum pipe suitable for salt water use. Guard must not interfere when engines are tilted or in any steering configuration. Non-skid coating must be applied to top of engine guard. Color of engine guard must be semi-gloss black.
- 16.10 Trim tabs must be installed on transom. The digital electronic indicator control must be installed at helm. An auto trim system should be installed.
- 16.11 The complete outboard engine system must be approved and installed in accordance with the engine manufacturer's recommendations.
- 16.12 As a minimum the installation of the controls, lubrication, fuel systems, battery connections must be verified by the outboard engine authorized representative.



- 16.13 All components of the propulsion system must be warranted by the original equipment manufacturer for the standard term. Engines and components must not be used, nor trials performed on the engines that would in any way void the manufacturer's warranty.
- 16.14 Outboard engines must be supportable by parts and service in Canada within 30 days.
- 16.15 Choice of engines must not exceed maximum outboard rating allowed for proposed hull design as per Transport Canada.

17.0 FUEL SYSTEM

- 17.1 Fuel system must meet with all requirements of TP 1332 "Construction Standards for Small Vessels" and the most current American Boat and Yacht Council Standards (ABYC).
- 17.2 Twin fuel tanks must be fitted with baffles and located below deck. They must be hydrostatically tested, approved and bear manufacturers' name, capacity and testing data.
- 17.3 Fuel system must be arranged to allow for maintenance and repair. Fuel lines must be protected from chafe and wear and arranged such that each engine may be supplied from either tank. The fuel shut-off valves must be located to prevent accidental shut-off. They must be readily visible, accessible and clearly labelled in English and French.
- 17.4 A fuel/water separator filter is to be mounted "in-line" to each engine with easy access to drain the sediment bowl. The filter system must be a marine grade and commonly used product where replacement filters are locally available for servicing.
- 17.5 Fuel fills must be the type which will allow for a high flow nozzle. They must be surface flush mounted on the side decks located to prevent any over fill draining onto deck. Each must be clearly labelled for fuel type and lockable.
- 17.6 Fuel system area must be equipped with a proper bilge blower system with both passive and powered ventilation. A gas/fume detector must be installed.
- 17.7 Twin fuel tanks must be of the highest capacity possible to allow for long range transits to remote areas around Vancouver Island with limited access to fueling stations. A reserve fuel tank can additionally be considered.

18.0 STEERING / PIPING SYSTEMS

- 18.1 A power hydraulic steering system must be supplied and installed based on engine manufacturers' recommendations.
- 18.2 Where flexible connections are required for steering and fuel systems, suitable hose of a sufficient size, strength and length must be installed to prevent pulsing. The steering hoses must be routed below deck fitted with no pinch or chafing points. Ends must be either



permanently crimped or reusable hose ends used. Fittings and clamps must be stainless steel. Exposed hoses must be suited for marine application.

- 18.3 The wheel/console location must be of robust construction, to eliminate fore and aft or lateral movement of wheel/steering shaft fixture. The steering wheel must be stainless steel and properly padded to provide a grip surface.

19.0 ELECTRICAL SYSTEM

- 19.1 Electrical system must meet the Canadian Standards Association C22.2 NO.183.2-M1983 (R1999) "Standards for D.C. Electrical Installations" and American Bureau Yacht Council (ABYC) where applicable.
- 19.1.1 All electrical equipment and hardware must be installed in accordance with the manufacturer specifications and must be capable of operating simultaneously with any electronic equipment without causing interference to it or to the magnetic compass.
- 19.1.2 Electrical system must be designed, installed, and protected for marine application. All wires must be tinned copper strands (CSI type) UL 1426. All wiring must be properly secured and fastened to protect from chafing. Wiring in or behind consoles must be grouped separate and color coded for each system. Each group must be clearly labeled in English.
- 19.1.3 A 12 volt circuit breaker panel with a breaker for each accessory plus six spare for additional equipment must be installed. The panel must have a digital ammeter to indicate voltage, draw, and charge remaining. Each breaker must be clearly labeled in English. Panel must be equipped with a cover.
- 19.1.4 Minimum of seven (7) GFCI protected 110 VAC power receptacles must be installed. One at each seat (excluding helm), one near microwave / mini-fridge counter, evidence handling counter and one inside cuddy. An exterior 110vac receptacle is also to be installed in the cockpit in a suitable location with an appropriate waterproof cover. Prior to installation the TA to approve locations.
- 19.1.5 Minimum of four (4) 12 volt splash proof auxiliary receptacles must be installed on cabin exterior. One each side of transom, one each side of opening into cuddy. Prior to installation the TA to approve locations.
- 19.1.6 Minimum of four (4) USB style charge ports must be installed, one by helm, co-pilot, evidence counter and rear seating areas. Prior to installation the TA to approve locations.
- 19.1.7 A shore power system with minimum 75 foot extension cord must be installed. Receptacle must be installed on aft wall starboard side. Quick connect, push/pull style is required.



19.1.8 At the evidence handling counter, an additional 110vac power outlet at this location will be supplied through an inverter capable of providing power for laptops, printers and an Ion Scanner.

19.2 Battery

19.2.1 Twelve volt DC distribution system must be provided to power the engine starting and boat service loads including all navigation, instrumentation, interior/exterior lighting, electrical equipment, appliance (mini-fridge), and bilge pumps. Starting battery must be used for engine service loads only.

19.2.2 Batteries must be of marine quality 12 volt Deep-Cycle maintenance free equipped with rollover caps with the capacity to service engines and ancillary vessel loads. High quality marine grade Group 8D Deep Cycle, house service battery with an auto charging relay must be provided. Gel or glass matt batteries preferred if suitable to the electrical system build.

19.2.3 Batteries must be connected in accordance with the motor manufacturer's technical specifications. They must be wired to cross connect for twin engine start-up of either engine from either battery. A three kilowatt inverter must be installed.

19.2.4 Selector switch for batteries must be certified and mounted in a safe location to prevent snagging or accidental switching.

19.2.5 Batteries must be contained in a suitable size compartment. Size and location must allow for easy access and removal of batteries. The area must weather tight and fitted with a suitable means of gas venting.

19.2.6 A system which allows for charging of batteries when built-in generator is operating is to be included.

20.0 RADAR ARCH / CABIN ROOF

20.1 A low profile arch must be constructed of welded aluminum pipe and securely mounted to cabin roof. Position of arch must be located forward where practical, to allow all lights mounted be fully visible to oncoming traffic. Suitable size and type of conduit must be installed inside stanchions to accommodate wiring. Waterproof connectors must be fitted and labeled. Arch and all electronic navigation hardware should be painted semi-gloss black.

20.2 Arch must be equipped with following:

20.2.1 4G Broadband open array radar (4ft.).



- 20.2.2 POLICE siren with PA (Public Address) system including external marine grade speaker/hailer and multifunction controller.
- 20.2.3 A trumpet style horn operated by a spring loaded switch located at helm.
- 20.2.4 Six (6) high grade/high output commercial dimmable LED flood lights – two port, two starboard, two aft. Switch must be installed at helm.
- 20.2.5 Two (2) high intensity light bars (blue LED). Switch must be installed at helm, and if possible integrated into siren control head multifunction display.
- 20.2.6 Loud Hailer/Fog Horn suitable for vessel size.
- 20.2.7 Two (2) VHF antennas compatible with requested radios. Antennas should be low profile, or flexible, to reduce risk of damage by commercial vessel gangways.

- 20.3 **Cabin roof must be equipped with the following:**
 - 20.3.1 Cabin roof must be coated with a durable commercial grade non-skid coating. Color must be flat black.
 - 20.3.2 Loud Hailer/Fog Horn.
 - 20.3.3 To gain access to the roof a step up arrangement with a minimum of two individual steps must be provided on the cabin exterior both port and starboard. Steps must be folding with a weight capacity of a minimum of 130 kg. Location of steps must allow for quick access. Material must be stainless steel. Steps are to be spring loaded foldable and will not rattle when stowed.
 - 20.3.4 Two (2) high grade commercial LED dimmable flood lights located forward at roof line. Flood lights must provide a minimum of 1000 lumens. Switch must be installed at helm.
 - 20.3.5 Two (2) remote controlled search lights one on port side and one on starboard side positioned to provide maximum visibility. Search light must be capable of 360 degree rotation and 140 degree motorized tilt with a brightest light available. Controls for starboard light must be at helm station. Port light controls must at co-pilot station.
 - 20.3.6 With the radar arch forward, the aft section of roof may be used for stowage. Eight (8) strategically located spring loaded fold down D rings are to be mounted in four (4) rows along the aft section of roof line to allow for the strapping of gear.
 - 20.3.7 The aft section of roofline is to extend further over the cockpit and slightly higher to provide more covered space and wind deflection for aft helm operator and additional crew. Dimensions are TBD and for design discussion with vendor.



21.0 NAVIGATION

- 21.1 Navigation lighting fixtures must be of such a design as to resist the effects of vibration and moisture and must be provided with adequate protection from damage which may occur when rafting alongside a vessel or a pier. Must meet the Canadian Shipping Act, Collision Regulation (COLREGS).
- 21.2 Navigation lights must be permanently fitted to cabin located to not interfere with vision from helm or co-pilot station.
- 21.3 Non-white (red or green) lighting must be wired together on a separate breaker of the 12 volt DC electrical system.
- 21.4 An all-round mast light must be mounted on arch. It must be a fold down type that can be easily removed without tools. Wiring must be reinforced to allow for frequent removal. Switch must be installed at helm.
- 21.5 A direct read compass with led light must be mounted on dash center of steering wheel. The compass must be equipped with its own waterproof marine-grade dimmer switch and must be adjustable for deviation. Compass must be of marine grade quality which meets or exceeds quality requirements for a vessel of this size. Color black.

22.0 PUMPING AND DRAINAGE

- 22.1 A 12 V electric bilge pump with a minimum 2000 gal/h capacity must be fitted in each hull compartment. Each pump must be equipped with an automatic float switch. To prevent debris from entering a suitable metal cage must be provided.
- 22.2 At each pump location must have a float switch with audible alarm to indicate high water as well as a manual flapper switch. Location and installation of switches must allow for inspection, maintenance and repair.
- 22.3 Bilge pump control system as a minimum must include a panel with three way on-off-auto switches, with indicator lights for the operation, monitoring of pumps and the audible visual alarm to indicate high water level. The indicator light for pump(s) operation must be installed at helm. Switches must be installed on breaker panel located inside cuddy.
- 22.4 All pump overboard outlets must be located midship. Check valves and handles must be stainless and fitted close to discharge outlets and located for easy access.
- 22.5 A fixed manual pump, diaphragm type must be installed aft to remove any water in the compartments and arranged to discharge directly overboard aft.
- 22.6 Hull drainage - a non-corrosive threaded plug must be provided in the lowest point to drain the hull aft compartment when out of the water.



23.0 LIFESAVING & EMERGENCY EQUIPMENT

- 23.1 The following items must be supplied and installed with proper stowage /securing arrangements. All fittings must be heavy duty stainless steel. All items must be readily accessible.
- A) Three (3) Fire extinguishers (Class 1 BC, marine type) – 2 x cabin, 1 x aft deck area
 - B) Two (2) Boat hooks (8 ft. long retractable) – 1 x aft deck door, 1 forward deck door.
 - C) Two (2) Paddles – inside cuddy on wall.
 - D) One (1) Anchor suitable for multi surface setting and appropriate for the weight class of the vessel with 100 feet nylon rode and appropriate chain. Must be storable in a designated compartment aboard.
 - E) One (1) Drogue sea anchor with 100 feet 1/2” braided nylon line
 - F) Six (6) Mooring lines 20 feet X 1/2” braided nylon line with eye spliced on one end
 - G) One (1) Lifebuoy with buoyant heaving line of a minimum of 15 metres – mounted in transom area
 - H) Twelve (12) Pyrotechnical distress signals – 3 x Type A, 6 x Type B, 3 x Type C
 - I) One (1) Watertight flashlight
 - J) One (1) Re-boarding device
 - K) One (1) Marine first aid kit – Transport Canada regulations for vessel length
 - L) One (1) externally mounted EPIRB. Suitable for the class of vessel.

24.0 Generator

- 24.1 A built-in diesel generator, with a built-in fuel tank, supplied by Contractor, must be installed. Location must be near aft, below deck. Stowage area must be sound insulated and properly vented. The fuel tank must be hydrostatically or air tested approved. Tank must bear manufacturers' name, capacity and testing data.
- 24.2 Generator exhaust must be vented in a way as to not adversely interfere with crew member conducting ROV tether operation or prolonged station keeping while standing on aft deck while generator is in operation.
- 24.3 Generator decibel rating and vibration must be suitable and not interfere with standard conversing on outer decks.
- 24.4 Generator must produce a minimum of 5kw, with 60hz at 2900 rpm. Generator must be both 120 and 240 voltage capable. The generator must weigh less than 170 lbs, be marine



grade quality and have suitable dimensions to fit below decks with enough room for appropriate maintenance and servicing.

25.0 Aft Deck Requirements

- 25.1 Enough deck space should be available to allow for the safe launch and retrieval of the ROV, this should be outlined in the tendering drawings as per section 2.2.1.
Minimum interior usable space required (not including collar): Length – 2.3 metres, Breadth – 2.5 metres
- 25.2 A removable davit / lift (powered) should be provided to support the launch and retrieval of the ROV, as well as, the easy management of the ROV tether for both safety and visibility. This should be located on port side of vessel.
- 25.3 Tie Downs: a minimum of 4 flush mounted deck ties downs will be fitted on the aft deck to allow for the securing of cargo.
- 25.4 Space allowed for future installation of a built-in ROV Tether spool similar to the tow rope installation.

26.0 Launching, Recovery and Transport

- 26.1 The vessel must be readily road transportable on a trailer (not provided), and must be able to be launched and recovered using a trailer at existing launch ramps.

27.0 SEA TRIALS - CONTRACTOR

- 27.1 Contractor must inspect construction quality, test all on board equipment, systems and hull performance to ensure all are fully functional.
- 27.2 The propulsion system must be operated as per the engine manufacture recommendations to accumulate the hours sufficient for the initial engine service check. An authorized engine manufacturer representative must carry out the service check. Service report must be provided to both the TA and the CA.
- 27.3 Contractor must submit a Test and Trials Plan a minimum of fourteen days prior to CBSA sea trials. Plan will include a description of all the acceptance trials to be performed.
- 27.4 Prior to sea trials the complete vessel must be weighed and the weight recorded on the Test and Trials form.
- 27.5 Stability examination as per TP 1332 requires the Contractor to record all stability and structural calculations. Copy must be provided in Operator Technical Manual.

28.0 SEA TRIALS - CBSA



- 28.1 Contractor must notify the CA and IA no less than 14 days prior to sea trials. CBSA reserves the right to witness or decline attendance of sea trials. Absence does not relieve the Contractor of its responsibility to conduct and record sea trials. Upon completion the sea trial report must be forwarded to CBSA for review prior to delivery of vessel.
- 28.2 Contractor must be responsible for supply of fuel, crew, instrumentation and equipment required to conduct sea trials.
- 27.3 During the trials the vessel must overall demonstrate excellent handling characteristics such as, but not limited to, no slide out in hard turns, maintaining course with no deviation. There must be no constant pounding nor excessive bow immersion.
- 28.4 As a minimum, the following trials must be conducted in the Normal Load Condition specified at:
- A) Speed Trials - The Contractor must demonstrate that the vessel meets or exceeds the mandatory speed requirement. The speed trials must be done over a course at least one nautical mile in length. Two runs must be made over the course, one in each direction, with the speeds for the two runs averaged. The use of GPS data (averaged) is acceptable.
 - B) Endurance Trials:
 - Maximum speed: The vessel is to be operated at maximum engine speed for not less than 1 hour, however, on agreement with the IA, a lesser time may be accepted.
 - Maximum continuous speed: The vessel must be operated for not less than 2 hours at the maximum engine speed recommended for continuous operation by the engine manufacturer, which must achieve not less than the cruising speed. This trial may be incorporated with the maximum speed trial, on agreement with the IA, if the continuous speed is not less than the maximum speed.
- During the endurance and other trials it must be demonstrated that all parts of the propulsion system are in full operation. Characteristics such as engine rpm and vessel speed, oil pressure, and temperatures must be recorded. All systems must be operated to check for proper installation.
- C) Astern Propulsion - The vessels must be operated and manoeuvred using astern propulsion to establish the astern performance. During the backing performance tests the throttles must be set to provide 1/3 of the rated engine RPM.
 - D) Steering Gear - The complete steering system must be operated at increasing boat speeds with the vessel being maneuvered through a series of turns port and



starboard. Maneuvering trials must be conducted in the manner recommended by manufacturer.

- 28.5 At the conclusion of sea trials the boat must be thoroughly cleaned and inspected for damage. Contractor must repair any damage to the satisfaction of CBSA. Outboard engine cooling systems must be flushed through with fresh water.
- 28.6 The Contractor must maintain records of testing for each boat for a minimum of two years. A copy of the completed Tests and Trials sheets must be included in the Operator Technical Manual for each vessel.

29.0 FINAL INSPECTION

- 29.1 Final Inspection must not be performed until all tests have been satisfactorily completed with data available for review. The boat must be ready for delivery in all respects, except for final preparation for shipment. The Contractor must provide personnel, as required, to resolve questions and to demonstrate equipment operation maintenance accessibility, removal and Installation. The Contractor must document the results of the final inspection and submit these results to CBSA. Serial numbers and other identifying information must be recorded for each boat and engine.

30.0 PACKAGING AND SHIPPING

- 30.1 Prior to shipping, the boat must be cleaned throughout, preserved and covered as follows:
- A) Vessel interior must be cleaned thoroughly including inside all hatches, all stowage boxes, consoles, cuddy.
 - B) Bilges must be dry and free of oil and debris, and the fuel tanks must be drained if required.
 - C) The propulsion system must be preserved in accordance with manufacturer recommendations for storage in an environment that will be subjected to freezing temperatures for up to one year.
 - D) The batteries must be disconnected for shipping or storage.
 - E) A durable warning tag must be wire tied to the steering wheel indicating vessel has been reserved for shipping and storage and must not be started until the propulsion machinery has been reactivated.



- F) During shipping and storage the vessel must be secured to prevent movement or damage.
- G) The vessel must be properly covered with shrink wrap to minimize damage during transit.
- H) Every effort must be made to ensure all contact points between vessel and trailer are properly padded to prevent any damage during transit.
- I) Vessel must be transported by commercial carrier.

31.0 ACCEPTANCE

- 31.1 Upon delivery, CBSA will inspect vessel to confirm there has been no damage resulting from shipping. Contractor must repair the damage to the satisfaction of the CBSA.

32.0 OPERATOR TECHNICAL MANUAL

- 32.1 The Contractor upon delivery of vessel must provide one hard copy and one CD/USB of a manual that provides a physical and functional description of the craft, its machinery and equipment. Each manual must have the sections and subsections clearly identified in the same sequence as addressed below. Manual must include, but not be limited to, sections such as the following:
 - A) General Information
 - B) Technical Information
 - C) Initial Spare Parts List
 - D) Preventive Maintenance List

32.2 Technical Manual - Requirements

A) General Information Section

This section must include a description of the arrangement and function of all structures, systems, fittings and accessories, with subsections and illustrations as appropriate, for example:

- 1) Operating procedures
- 2) Basic operating characteristics, including as a minimum, temperatures, pressures, flow rates, etc.
- 3) Installation criteria and drawings, assembly and disassembly instructions with comprehensive illustrations showing each step.
- 4) Recommended planned maintenance which clearly illustrates the maintenance required, hourly, daily, monthly and annually for all components including the



engine, drive train and hull. Complete troubleshooting procedures must be included.

B) Technical Information Section

This must include a complete set of detailed owner/operator instructions, drawings, parts lists and supplemental data for all components of the boat (whether acquired from external sources or custom-manufactured), including:

- 1) Hull, Collar
- 2) Outboard Engine(s)
- 3) Systems, with schematics or one-line diagrams, (steering, fuel, electrical, etc.)
- 4) Electronics
- 5) Fittings, accessories and ancillary equipment.

C) Initial Spare Parts List

This must include a list of recommended initial on board spare parts to be stocked for the craft. As a minimum, this list must include the following items:

- 1) Propulsion: Propeller, filters, starting battery, throttle/ shift cables, any special engine tools
- 2) Electrical: fuses, light bulbs
- 3) Boat Structures and Fittings: Miscellaneous commonly used fasteners.

32.3 Technical Information Section-Additional (Deliverable)

A) The Technical Information Section a complete set of detailed owner / operator instructions, drawings, parts lists and supplemental data for all components of the boat (whether acquired from external sources or custom-manufactured). The itemized list below represent most of the documents required to meet the registration to the Small Vessel Compliance Program.

1. "As Fitted", dimensioned drawings must be produced for manuals to record the vessel particulars;
2. Calculated lightship weight;
3. General arrangement, Plan Profile section views;
4. Structural drawings showing deck plan, a centerline profile and frame station construction details;
5. Detailed lines plan;
6. Drawing of the fuel and propulsion supply arrangement; and,
7. Drawing of the electrical supply and functions of the vessel.



8. Hull Serial Number (HIN), copy of builders' plate, TEST and TRIAL results, serial or manufacturer's numbers, and equipment warranty cards.
9. Engine(s) and equipment: including engine and propulsion serial numbers.
10. If applicable, collars; including collar material and glue materials and procedures necessary for onboard repair of the collar.
11. Acceptance Certificates, and compliance sheets or certificates distributed with equipment i.e. life-saving appliances, lifting appliances, engine test reports, calibration certificates, Nav light certificates, Fire suppression material certificates, flotation foam rating sheets
12. Pre-trial shop Testing Check Sheet.
13. Electronics, (if applicable): including model and serial numbers.
14. Regulatory and Stability documentation: as required per TP 1332, which, references ISO12217 or ISO 6185 for RIBs (if applicable).
15. Tonnage Registration Certificate in accordance with TP 13430 - <http://www.tc.gc.ca/eng/marinesafety/svcp-gt-3948.htm> ;
16. Two (2) Bill of Sales, one (1) for the vessel ;
17. Test & Trial results as required by Appendix A;
18. Acceptance Certificates, i.e. life-saving appliances, lifting appliances, engine test reports, calibration certificates, extinguishers, etc;
19. All testing check sheets created and completed by the builder.