

ANNEX NO 8: TECHNICAL SPECIFICATION

DRAFT_TECHNICAL SPECIFICATION_11 07 2023

FOR THE PROCUREMENT

“PURCHASE OF A MULTI-PURPOSE ICE-CLASS SERVICE VESSEL”

(ID NO _____)

1.	General
1.1.	This technical specification (hereinafter – TS) describes minimum requirements and completeness set for the Multi-purpose ice-class service vessel (hereinafter – the Vessel). TS provides basic information, standards and technical requirements to enable the Supplier to carry out detailed design, engineering and production work in accordance with the requirements of the applicable rules and regulations.
1.1.1.	No goods, services and/or involved persons that are subject to and/or subject to Sanctions (prescribed international, European Union or national sanctions or sanctions affecting significant financial and capital market interests of the European Union or member states of the North Atlantic Treaty Organization) directly or indirectly are used in the construction of the ship. The Supplier does not take any actions aimed at circumventing the sanctions.
1.2.	The types of equipment mentioned in TS are only to explain the functionality of the required equipment.
1.3.	<p>The Vessel must be designed and produced in accordance with good shipbuilding practice and must comply with rules and standards IMO Conventions and IACS to this kind of craft.</p> <p>The Supplier must follow design, engineering and production requirements laid down in this TS.</p> <p>If not clearly defined, the Supplier must follow the good shipbuilding practice.</p> <p>Requirements in TS marked as “desirable” are not compulsory, and alternative solutions from the Seller are welcome.</p>
1.4.	LVR Flote aims to minimise its impact on the environment and adheres to the policy of fuel saving and reducing emissions.
1.5.	<p>The Vessel will operate in the Daugava River, the Gulf of Riga and the Baltic Sea (navigation area A2). Operation is planned all year round, including operation in ice conditions.</p> <p>The Vessel’s main tasks:</p> <p>I - Ice breaking in the port and Gulf of Riga during ice navigation period;</p> <p>II - Out of the ice navigation period, the Vessel will perform following operations (approx. share of total annual workload outside of ice breaking, %):</p> <ul style="list-style-type: none"> • Boarding operations - 8% • Depth measurements -10%

	<ul style="list-style-type: none"> • Buoy handling and anchors lifting and installation - 35% • Buoy service - 35% • Technical emergency assistance - 1% • Transportation of personnel and equipment - 5% • Elimination of consequences of accidents - 5% • Ploughing operations - 1%
1.6.	All materials, equipment and mechanisms used for the building Vessel must be new.
1.7.	The Supplier must install all equipment in accordance with equipment manufacturers' requirements.
1.8.	All of the installed equipment must be modern and may not be out of production.
1.9.	All of the installed equipment must have responsible maintenance representatives in European Union. Representative should be no further than 2000 km (straight-line distance) from Riga, or Supplier must provide maintenance service in the Republic of Latvia by other means.
1.9.1.	Deck machinery must be able to operate on bio-soluble oil.
1.10.	Estimated usage of Vessel
1.10.1	A minimum life-span of the 20 years must be considered when building the Vessel (at least 3,000 engine hours per year).
1.11.	Delivery of the Vessel
1.11.1.	When delivering the Vessel to the Purchaser after completion of all works, the Vessel must be completely ready for immediate use. The Vessel hand over to the Purchaser takes place in the port of Riga, Republic of Latvia as specified by the Purchaser.
1.11.2.	All the Vessel's equipment must be located in its foreseen locations according to project approved by Class (IACS member).
1.11.3.	The Vessel, its mechanisms and equipment must be tested, fully cleaned and painted.
1.11.4.	<p>Together with the Vessel, the Supplier shall handover to the Purchaser three sets of the documents (in digital format on memory stick) that include at least the following:</p> <ol style="list-style-type: none"> 1) Technical drawing of the Vessel, her systems and equipment; 2) Installed equipment and spare parts list (including, makers list); 3) Operation and service manuals of the Vessel, her systems and installed equipment in English; 4) Certificates (Class, Flag, CE, declaration of conformity, other if available). <p>Other documentation required for registration of the Vessel.</p>
1.12.	Rules and regulations
1.12.1.	The Vessel shall be designed, built and equipped according to Lloyd's Register (LR) or Bureau Veritas (BV) or DNV Special Service Craft Ruled requirements and rules.

	Upon delivery the Vessel must have a class certificate and other class documents from one of the classification societies.
1.12.2.	The Supplier must ensure that the Vessel is provided with an IMO number.
1.12.3.	The Vessel must comply with ice class at least LR 1c (Finnish-Swedish class).
1.12.4.	The Supplier must involve Classification Society: Lloyd's Register (LR) or Bureau Veritas (BV) or DNV for supervision of the Vessel construction.
1.12.5.	The Supplier shall carry all costs concerning the supervision by Classification society.
2.	Dimensions and performance
2.1.	Dimensions of the Vessel
2.1.1.	Length overall: from 27 m till 34 m
2.1.2.	Breadth moulded: min 10 m
2.1.3.	Draught: max 3,5 m
2.1.4.	GT: not more than 480
2.2.	Performance
2.2.1.	<p>The top speed of the Vessel: at least 10 knots.</p> <p>The Vessel shall be designed and constructed to achieve a test speed of not less than 10 knots at maximum draught with the propulsion engines operating at 100 % of the maximum continuous rating (MCR).</p> <p>Test conditions:</p> <ul style="list-style-type: none"> • Clean hull • Calm sea • Max wind strength: 2 points on the Beaufort scale.
2.2.2.	Number of members of the Vessel's crew: must comply with the requirements of the Classification society.
2.2.3.	Passenger capacity: at least 6 persons excluding the Vessel crew. Primally, passengers are technicians, personnel of the hydrographic service and other.
2.2.4.	<p>The Vessel must be operational in the following temperatures:</p> <ul style="list-style-type: none"> • Air: at least -25 °C to +35 °C • Water: at least 0 °C to +25 °C
3.	General arrangement and design
3.1.	<p>The Vessel should have at least the following areas:</p> <ul style="list-style-type: none"> • Wheelhouse • Main deck • Forepeak • Tank section • Engine room

	<ul style="list-style-type: none"> • After peak • Accommodations: minimum 10 persons (incl. crew): <ul style="list-style-type: none"> ✓ 2 single cabins for crew members with additional foldable bunks ✓ Other cabins for passengers • Galley and mess room • Toilets: at least 2 pcs • Shower rooms: at least 2 pcs • Storage room (for auxiliary equipment)
3.2.	The main deck and other walking lines must be covered by an anti-slipping paint.
3.3.	The Vessel must be equipped by fenders and 1 Push bow.
3.4.	The Supplier must present to the Purchaser for confirmation and approval detailed full-size wheelhouse model (drawing or digital 3D model).
3.5.	<p>Wheelhouse workstation must allow control of at least the following devices and functions:</p> <ul style="list-style-type: none"> • Main engine control • Indicators and alarms of main Vessel systems • Chart plotter • Radar • Communication equipment, VHF, intercom • Navigation and work lights control • Window washing and wipers control • Thermal image camera • Searchlight • Fog horn • Winch remote control
4.	Premises
4.1.	Dryer system: for drying at least 2 work suit sets simultaneously.
4.2.	<ul style="list-style-type: none"> • Wardroom and cabins must be furnished • The wardroom should have a rest area and a dining area • 2 crew cabins, single occupancy with additional foldable bunk • Passenger cabins must have at least 2 bunks • Wheelhouse, cabins and wardroom shall be adequately ventilated and heated through an appropriate heating, ventilation and air conditioning system (HVAC)
4.3.	Placement area: must be provided with a ceiling height at least 2 m in the passage areas.
4.4.	<p>The vessel should have a galley, which must be equipped at least with the following:</p> <ul style="list-style-type: none"> • Kitchen working surface • Kitchen sink • A locker and a drying cabinet above the sink

	<ul style="list-style-type: none"> • A freshwater faucet, hot and cool water • Microwave oven at least 1,000 W • Refrigerator with internal volume of at least 40 litres • Automatic coffeemaker • Water kettle • Cooking dishes, dishes and cutlery (taking into accounts at least 6 persons) • Paper towel rack
4.5.	<p>The Vessel should have at least 2 lavatories, which are to be equipped with at least the following:</p> <ul style="list-style-type: none"> • Water toilet bowl, electrical • A sink • A freshwater faucet, hot and cold water • Water drainage to suitable tank • A lavatory paper rack
4.6.	<p>The Vessel should have at least 2 shower rooms, which are to be equipped with at least the following:</p> <ul style="list-style-type: none"> • Shower with freshwater faucet, hot and cold water • Towel rack • Water drainage to suitable tank
4.7.	The door of the lavatory should be lockable from both sides to ensure privacy.
4.8.	Cabins should be equipped with as many storage spaces as possible for storing equipment.
5.	Other spaces
5.1.	The forepeak must function as a section for storing the anchor chain, line and other equipment.
5.2.	A high water alarm sensor must be installed and the compartment be able to drain.
5.3.	Entrance to forepeak must be through watertight manhole on the main deck.
5.4.	The pathways in the engine room should have a metal floor sheeting.
5.5.	The engine room must be equipped, with railings and gripping tubes for safe accessibility and moving around in engine room.
5.6.	<p>It must be possible to place a TEU container at the stern of the Vessel. Container mounts must be installed on the deck.</p> <p>The container will be used to keep equipment and tools for special operations, for example, to eliminate the consequences of accidents.</p>
5.7.	<p>From the deck there must be an external connection for:</p> <ol style="list-style-type: none"> 1. Electricity 2. Water 3. Air system

	4. Hydraulic system
5.7.1.	Desirable: Connections are located nearby, at the aft deck shipboard.
5.8.	At the Vessel stern at least 1 winch with towing power of at least 30 tonnes Bollard Pull (BP) must be installed. The winch will be used for emergency technical assistance: pulling, pushing and for rescue and salvage operations of ships in distress.
5.9.	At the stern of the Vessel a non-hydraulic removable A-Frame (SWL 25-30t) for ploughing operations must be installed. The foundation of the A-Frame must be integrated in the hull / deck.
5.10.	The Vessel must be equipped with a hydraulic deck crane, with lifting capacity of at least 10 tons at declared aft deck length). The crane must include at least the following: <ul style="list-style-type: none"> • Operator seat • Remote control • Winch kit of 5 tons A hydraulic deck crane will be used for buoy handling operations - lifting/setting and anchoring them.
5.11.	At the stern of the Vessel there should be a stern roller (minimal width of 4 m) and towing pins with sufficient working load.
5.12.	Universal transducer (e.g. multibeam sonar) mounting/deployment system (e.g. pole) with cabling (power, ethernet) from the installation area to wheelhouse must be installed. Mount type - over the side. Tilt (swing), hinge and gear option for recovery and deployment, preferably hydraulics powered. Minimum transducer draft in line with vessel keel. Materials used for pole (steel, aluminum) must be chosen to support transducer weight in water of around 50 kg. Minimum pole transverse diameter is 150 mm. Default transducer width is 500mm, distance from hull at least 300mm.
5.13.	Towing pins must have option to be lowered to deck level and raised for operation.
5.14.	At the stern of the Vessel, 1 tugger winch (12-15 t at 1st layer) must be installed.
6.	Hull and deck structures
6.1.	Hull
6.1.1.	The hull must be strong enough to be able to navigate in ice conditions. Breaking the ice with the Vessel's hull.
6.1.2.	All materials used on the Vessel's shall plating must have a washer or other solution at the joints to avoid electrochemical corrosion.
6.1.3.	The paint renewal interval: min 3 years. Antifouling paint renewal interval: min 3 years.

6.1.4.	Sufficient number of anodes must be installed to protect underwater part of the hull.
6.2.	The mast must have flag hoisting system (at least 1 flag).
6.3.	In all internal and external areas of the Vessel, a sufficient number of handrails and gripping pipes should be installed so that in rough conditions it is possible to safely move around the Vessel without releasing the grip.
6.4.	<p>Colour scheme and markings according to Purchaser's marking guide. Main colour tones:</p> <ul style="list-style-type: none"> • Blue • White • Green <p>Markings:</p> <ul style="list-style-type: none"> • Vessel name • IMO number • Logo
6.5.	Deck equipment
6.5.1.	The Vessel must be equipped with an electrical or hydraulic windlass.
6.5.2.	The Vessel must be equipped by two anchors and galvanized chain. Each anchor chain must be at least 30 m long.
6.5.3.	Vessel must be equipped with a sufficient number of mooring gear and ropes to ensure safe docking in port in various weather conditions.
6.5.4.	The mast for navigation lights and antenna must be mounted on the upper deck and the length of the mast shall be in accordance with the requirements of the classification society.
6.5.5.	Technical deck must be placed on the aft deck of the Vessel. The technical deck must be suitable for transporting objects (e.g. buoys) during navigation in ice conditions. The technical deck should have enough space to store 4 such objects at the same time (maximum size of the one object – length: 12 m, width: 7 m).
6.6.	Doors, hatches, windows
6.6.1.	All doors and hatches outside and between weathertight bulkheads shall be weathertight.
6.6.2.	Doors and hatches must be equipped with marine grade locking mechanisms, which can be opened and closed from both sides, and a position fixing device.
6.6.3.	All external doors and hatches must be lockable with the same single key (master key). The set must include at least 10 keys.
6.6.4.	The portholes with wipers should have heated wipers and must be able to spray freshwater or antifreeze.

6.6.5.	Wheelhouse portholes must be electrically heated. Heating elements of portholes must be of a type that does not cause optical distortions either regular view or use binoculars.
6.6.6.	All wheelhouse portholes must have hot air blowing defrost system.
6.6.7.	The wheelhouse portholes must have solar screens/blinds or equivalent solution.
7.	Power units
7.1.	Main engines
7.1.1.	Main engines: two variable speed and load, low fuel consumption marine diesel engines. ME total power at least 2600 kW. The operation of main engine set must support the hybrid operation with electric propulsion system.
7.1.2.	Engine's fuel consumption, emissions, environmental friendliness, and service life must be considered when selecting of main engines. The main engines propulsion system shall have EIAPP certificate (Engine International Air Pollution Prevention Certificate) stating compliance with Tier III.
7.1.3.	Running hours between overhaul (TBO) not less than 10,000 working hours.
7.1.4.	Main engines must be self-contained i.e. engines must have built-on pumps, heat exchangers, integrated lube oil and cooling systems, etc.
7.1.5.	Engines must be operable from captain's position.
7.1.6.	The engine control instrument readings must be in wheelhouse and must be visible to the captain.
7.1.7.	Both engines must be equipped with at least the following gauges and accessories: <ul style="list-style-type: none"> • Tachometer (rpm) • Hour meter (h) • Lubrication oil pressure gauge (bar or KPa) • Coolant thermometer (°C) • Boost gauge (bar) • Transmission oil pressure gauge (bar) • Transmission oil thermometer (°C) • Voltmeter • Amperemeter • Monitoring system
7.1.8.	Both engines must have an alarm system with visual and audio signals and connected to monitoring system.
7.1.9.	The fuel systems of each main engine must be independent from each other.
7.1.10.	UMS must be installed in Engine room.
7.2.	Electric propulsion system

7.2.1.	The Vessel must have an electric propulsion system to provide hybrid and /or electric-only operation of the Vessel.
7.2.2.	The Vessel should have option to select automatic / manual hybrid and / or electric-only propulsion via gearbox or other solution.
7.2.3.	Vessel must have a sufficient battery package with capacity to ensure the Vessel operation in electric-only mode at speed of at least 5 knots for 1 hour. Test conditions: <ul style="list-style-type: none"> • Clean hull • Calm sea • Max wind strength: 2 points on the Beaufort scale
7.2.4.	The battery package should have a service life of at least 10 years to be able reach the performance for the same period.
7.2.5.	The battery package should be able to be charged via the main engines on board.
7.2.6.	The battery package and Vessel auxiliary systems should be able to charge via shore power.
7.3.	Auxiliary systems
7.3.1.	The Vessel must have a separate power supply: at least two diesel generators/auxiliary engines (AE) located in engine room.
7.3.2.	AE must be operable from the captain's position.
7.3.3.	AE must provide power to all ship systems
7.3.4.	AE must be equipped with at least the following control devices: <ul style="list-style-type: none"> • Hour meter (h) • Lubrication oil pressure gauge (bar or KPa) • Coolant thermometer (°C) • Lubrication oil pressure too low • Coolant level too low • Coolant overheat
7.4.	Fuel tanks
7.4.1.	Fuel level sensors must be placed in all fuel tanks and the indicators must be placed as follows: <ul style="list-style-type: none"> • One at fuel tank • One in the bunker station • One at the control console
7.4.2.	Fuel tanks must be vented and filled through the separate pipe from the bunker station.
7.4.3.	It must be possible to use any of the fuel tanks.

7.4.4.	Each engine must have double water separator type filters with a changeover valve. Water separators must be equipped with "Water in fuel" sensor.
7.4.5.	The fuel tanks must be equipped with a low-level alarm, when the amount of fuel in either of the tanks is below 20% of the tank capacity.
7.4.6.	Each fuel tank and consumer must be equipped by quick release closing valve must be operable from deck.
7.4.7.	Engines and gear boxes must be equipped with the oil drainage system. The system must include an electric pump.
7.4.8.	Fuel tank capacity at least 75m ³ .
7.5.	Thrusters and propellers
7.5.1.	<p>The Vessel must be fitted with bow and stern thrusters operated from the wheelhouse. Removable grilles made of strips or bars shall be fitted to protect the drive unit.</p> <p>Power drive of bow and stern thrusters must be sufficient to support the Vessel's main tasks.</p> <p>Alternatively, if the Vessel is equipped with azimuth thrusters, the bow and stern thrusters are not needed.</p>
7.5.2.	The Vessel's propellers must be steel or CuNiAl.
8.	Drainage systems
8.1.	Each watertight compartment must have a bilge level sensor, which activates bilge alarm and in automatic mode activates the bilge pump.
8.2.	System must be equipped with electrical bilge pumps that must be able to pump bilge water depending on the need directly overboard or to the bilge tank.
8.3.	A manual draining pump with a separate pipeline must also be installed in the engine room.
9.	Heating and Ventilation system
9.1.	<p>Main source of heat is main engines through the heat exchangers to the central heating system.</p> <p>The fuel oil-burned boiler must be the secondary heat source.</p>
9.2.	In winter conditions, it is necessary to ensure the water temperature in the heating system is at least 65 °C.
9.3.	Central heating system productiveness/power must meet the submitted environmental conditions.
9.4.	All tanks must be equipped with natural ventilation.
9.5.	All ventilation pipes/openings are equipped with self-closing valve.

10.	Fresh water system
10.1.	Fresh water tank capacity at least 25m ³ . The metal inside the tank must have a hard coating.
10.2.	The freshwater tank must be equipped with a water level sensor, indication of which is led to instrument panel in the wheelhouse and that has a low-level alarm. Alarm must engage when the water level falls below 20%.
11.	Firefighting system
11.1.	The engine room must be protected by fire-smothering system CO ₂ or equivalent environmentally friendly fire extinguishing system that does not deplete oxygen.
11.2.	The fire extinguishing system must activate automatically and manually from the wheelhouse.
11.3.	The Vessel must be equipped with Marine External Fire Fighting FIFI System.
12.	Electrical system
12.1.	General
12.1.1.	Electrical network must be isolated from hull structure.
12.1.2.	Uninterrupted supply must be ensured in case of changeover from main power supply to auxiliary- or shore supply.
12.1.3.	Vessel must be equipped with heating and air-conditioning system (HVAC).
12.1.4.	The electrical system and power supply must be built with a reserve of future increase in power consumption and use of spare circuits with 10% spare capacity beyond those established during the construction of the vessel.
12.2.	Power management system
12.2.1.	A power management system must be installed on board and have the following supervisory functions: <ul style="list-style-type: none"> • Monitoring of system voltages, currents, and frequencies • Monitoring of ground-fault currents for the entire electrical system on board
12.2.2.	The system must have the following audible and visual alarm functions: <ul style="list-style-type: none"> • Low voltage for all system voltages • Ground-fault current • Low voltage for charging battery banks • Power failure alarm when the vessel is unmanned (with notification to the general alarm to guarding service or SMS message)
12.2.3.	Power management must have the following functions and controls (manual and automatic): <ul style="list-style-type: none"> • Switching to and from shore power • Switching to and from the main and emergency source of power • Operation of the generator

	<ul style="list-style-type: none"> • Operation of the main and emergency power
12.3.	Consumer and starter batteries in an emergency can be interchangeable.
12.4.	All cables are marked with a permanent marking system, type "Partex" or equivalent. External cables must be marked with stainless metal marking. Ship cables must be halogen-free and of marine approved type.
12.5.	The Interior of the Vessel must be equipped with a sufficient number of the electrical equipment, PCs, tools, charging of VHF handsets and mobile phones etc. The precise location of the outlets must be coordinated with the Purchaser during the vessel designing process.
12.6.	Wheelhouse workdesk must be equipped with following: <ul style="list-style-type: none"> • Internet connection • Sockets for connecting additional devices to 220 V power grid
12.7.	There must also be electrical outlets on the outside deck and in the engine compartment. Outlets on the outside of the vessel must be fitted with protection switch, UV and waterproof (IP67).
12.8.	Desirable: cable trays must be made of stainless steel.
12.9.	The connection to the shore power must be placed on the aft deck. The shore power plug has to have a safety switch, must be waterproof (IP 67), suitable to standard at least 32A socket.
12.10.	There must be electrical consumption meter installed to the shore power circuit.
12.11.	Electrical system must feature isolation and transformer with capacity to supply power for maintaining all systems work on board including heating, maintenance work and charging of batteries when docked.
12.12.	Vessel must be equipped with batteries that are powerful enough to allow engine start (at least 10 times) in winter conditions.
12.13.	The service and starting batteries on the vessel must be maintenance free and vibration resistant.
12.14.	The batteries must be safely fastened in ventilated battery box.
12.15.	All batteries on board are equipped with chargers to charge batteries while electrical system is fed by main engine, auxiliary engines or from shore supply.
12.16.	Bridge Navigation Watch Alarm System must be installed.
12.17.	Integrated automation, control and monitoring system must be installed.
13.	illumination
13.1.	Interior light intensity must comply with current working environment regulation of the Republic of Latvia.
13.2.	Following protection levels to be followed:

	<ul style="list-style-type: none"> • Inside technical spaces: at least IP44 • Lights on deck: at least IP67
13.3.	The Vessel must have lighting and emergency lighting.
13.4.	Wheelhouse must be equipped with low level lighting red LED lights for night navigation.
13.5.	All Vessel's premises and compartments must be lighted by means of LED daylight lights.
13.6.	In the salon as an addition to the regular ceiling lighting each seat must have a dimmable reading LED light.
13.7.	All light and instrumentation in wheelhouse and in control console must be dimmable down to total darkness.
13.8.	LED deck light (at least 45W each light) for lightening the Vessel and the area around it and low light LED deck lights for illuminating walking pathway around the wheelhouse and the forward deck must be installed. Lights must be placed so that they will not reflect to wheelhouse windows and control console.
13.9.	It must be possible to swich on deck lights on as separate direction groups (bow, aft, port- and starboard side).
13.10.	The Vessel shall be equipped with COLREG regulation requirements compliant navigation lights.
13.11.	The navigation and deck lights must be operated from control panel and be located near the navigator. Navigation lights control unit must be fitted with indicator signal lamps. If any of the navigation lights is not working, the control unit must give an alarm with the signal lamp and buzzer.
13.12.	Two powerful searchlights shall be installed on the wheelhouse roof.
13.13.	<p>Desirable: Searchlight technical requirements at least:</p> <ul style="list-style-type: none"> • Range: 1 lux at 2 000 meters • Adjustable focus of the beam: 2-7 degrees • Corrosion resistant • Protection class at least IP67 • Adjustable horizontal rotation at least 300, degrees and vertical movement at least 10 degrees
14.	Alarm system
14.1.	<p>The fire alarm system must consist of at least:</p> <ul style="list-style-type: none"> • Fire alarm control unit • At least 1 heat detectors in the engine room • At least 1 smoke detector in every compartment
14.2.	<p>The vessel bilge alarm system must consists of at least:</p> <ul style="list-style-type: none"> • Bilge system control- and alarm panel

	<ul style="list-style-type: none"> • Operating switches for every bilge pump (manual-0-auto)
14.3.	<p>The central alarm panel must contain at least following alarms:</p> <ul style="list-style-type: none"> • Hydraulic oil level • Accumulator undercharge/ overcharge alarm • Low fuel level alarm • Low freshwater level alarm • Shore power cut-off alarm
15.	Integrated navigational system
15.1.	<p>The Vessel must be equipped at least with following:</p> <ul style="list-style-type: none"> • Radar system • At least 2 multifunctional at least 19" monitors in total must be integrated into the fore console in the wheelhouse • Electronic chart system (ECS) with SAR functions if possible • Echo sounder with 3D function + an echo sounder sensor that provides correct water depth reading at all vessel speeds • Rudder angle indicator • Automatic Identification System (AIS class A) with transmitter switch off function • Autopilot with track control function, remote control and other necessary • Satellite compass • Magnetic compass • EPIRB • AIS-SART • Weather station • FLIR • Speed log
15.2.	Desirable: Integrated X-band+ broadband 4G (dome antenna) radar system that includes oil spill and small target detection capability.
15.3.	Touchscreen + keyboard.
15.4.	Resolution at least Full HD.
15.5.	HDMI, DVI inputs.
15.6.	<p>At least the following information must be displayed:</p> <ul style="list-style-type: none"> • Wind speed & direction • Barometric pressure • Relative humidity • Air temperature
16.	Communication system

16.1.	For marine communication GMDSS VHF DSC (A class) marine radio station and antenna must be installed. The installation location of the radio station must be coordinated with the Contracting Authority.
16.2.	At least 3 handheld VHF radio stations.
16.3.	External loudhailer.
16.4.	Internal communication between the wheelhouse, cabin, engine room and on deck.
16.5.	The captain position must be equipped with “hands free” system that allows to communicate through all Vessel’s communication devices.
17.	Equipment
17.1.	Safety equipment
17.1.1.	Install safety and rescue equipment in accordance with the requirements of classification society (LR or BV or DNV), for navigation area A2.
17.2.	Inventories
17.2.1.	The Vessel must be equipped with all special tools, that are needed for daily inspection and regular maintenance of the main and auxiliary engines, transmission, propulsion, hydraulic equipment, fire-extinguishing pump and other relevant equipment, as well as servicing the same for winter docking. Storage facilities must be provided for storing tools on board of the Vessel.