

TENDER SPECIFICATIONS OF JARIP BOAT

SECTION 1: INTRODUCTION

1. **Introduction.** Two (02) aluminium Jarip boats (hereinafter called '**the Boat**') are to be procured for Bangladesh Navy (BN). The boat should be designed for conducting hydrographic survey operations in coastal waters up to 50m. The boat should be highly stable of sufficient capacity to keep the boat afloat even when flooded or capsized in extreme bad weather. The boat should be fully automated.
2. **Standard.** The Boats are to be designed and constructed as per the specifications set forth herewith and as per the highest ship building standard and should be able conduct hydrographic survey operations upto sea state 2 and withstand adverse weather conditions at least upto sea state 3.
3. **Country of Manufacture of the Boat.** The boat is to be constructed in any local shipyard of Bangladesh having experience of building similar type boat. The shipyard is to be ISO or equivalent certified. The certificate has to be attached with the offer. Name and address of the shipyard has to be mentioned in the offer.
4. **Material and Workmanship.** The hull and structure must be made of high quality Aluminum with necessary reinforcement as per standard set forth by the classification society involved in the design and construction of the boat. The material must be new and of marine quality and built in accordance with the class requirements of a reputed international classification society which should be a member of International Association for Classification Society (IACS). Workmanship throughout the boat will be of the highest marine standard and shall be according to specified class requirements.
5. **Design.**
 - a. The boat is to be constructed as per proven design. The designer of the boat should have the experience of designing hydrographic boat under the classification society. The list of hydrographic boats designed by the offered designer and approved by the classification society are to be submitted with the offer.
 - b. The aluminium boat shall be with a modern highly manoeuvrable twin shaft for coastal waters with capacity to undertake hydrographic survey works in shallow water. As such the hull should be designed in such a way so that the propeller will not be damaged if the boat touches the ground/seabed.
 - c. The boat should be fully automated. All control and monitoring of the boats should be from bridge with good lookout facilities for the helmsman.
 - d. The boat would be used in muddy and fuzzy waters of coastal belt of Bangladesh. Therefore, special attention is to be given for designing main engine, genset and other machineries and equipment.

6. **Classification.**

- a. The Boat's hull and structure shall be designed, manufactured and built in accordance with the class requirements of a classification society which should be a member of IACS. Specific name of the classification society and the appropriate class notations are to be indicated in the offer.
- b. Relevant classification society certificates for design of the hull & structure, power and propulsion system are to be provided.

7. **Performance Curve and Calculation.** Following performance curves and calculations both for reference boat and proposed boat are to be provided with the offer:

- a. Speed vs combined power curve.
- b. Speed vs shaft RPM.
- c. Fuel consumption vs power (RPM of main engine).
- d. Fuel consumption vs Speed.

8. **Scope of Supply.** The scope of supply of the Boat:

- a. Complete design, drawing, and material package from a foreign reputed design firm/ shipbuilder either directly or through their authorized agent in Bangladesh.
- b. Supervision during construction and installation of major machinery, equipment, and systems.
- c. All machineries, equipment, and systems must come along with 01 (one) year warranty (effective from the final acceptance).
- d. Installation Drawings, User's/Owner's Manuals, Maintenance/Repair Manuals, Capacity Plans, Technical Bulletins/Updates, etc as applicable during the time of handover of each individual item of machinery, equipment, and system.

9. **Qualification / Eligibility of Bidder.** The bidder must be a well reputed and established local shipbuilder having experience of building boat for Bangladesh armed forces in last 20 years.

10.a. **Submission of Quotation.** The quotation must include the following:

- (1) Complete technical specification of the Boat.
- (2) A Preliminary General Arrangement (GA) Drawing of the boat shall have to be provided with the offer.
- (3) Following Drawings of the Reference Boat are to be committed to provide after notification of award for final approval of the buyer:
 - (a) Preliminary General Arrangement (GA) drawing with principal particulars.

RESTRICTED

- (b) Preliminary Lines plan.
- (c) Preliminary Machinery and Equipment Layout.
- (d) Preliminary Propulsion and Steering Gear arrangement.
- (e) Preliminary Midship Section Plan.
- (f) Arrangement of POL and Fresh Water Tank.
- (g) Preliminary power calculation.

(4) Following drawings of the offered Boat are to be committed to provide (based upon which the offered Boat will be constructed) after correction of the preliminary drawings mentioned at sub paragraph (3) of this paragraph and before signing of the contract for final approval of the buyer:

- (a) General arrangement drawing with principal particulars.
- (b) Lines plan.
- (c) Machinery and Equipment Layout.
- (d) Propulsion and Steering Gear arrangement.
- (e) Midship Section Plan.
- (f) Scantling of Hull and Superstructure.
- (g) Stability Booklet Including Hydrostatics Curve at Different Loading Conditions.
- (h) Trim calculation at different loads.
- (j) Final Power calculation.

(5) Following drawing and other document two copies (if applicable) shall be provided in sequence with class approval process and during construction:

- (a) Mid ship section.
- (b) Shell expansion drawing.
- (c) Aft structure and Fore structure.
- (d) Rudder and rudderstock.
- (e) Stern tube- and propeller.
- (f) Engine room arrangements.
- (g) Piping arrangements.
- (h) Electrical diagrams.
- (i) Firefighting and lifesaving appliances plan.
- (j) Details of machinery and equipment.
- (k) HAT and SAT procedure.
- (l) Further mill/test certificates/type approved of Aluminium, Main engine, Gear box, Genset, and other machinery equipment etc if applicable.
- (m) Docking plan and alternative docking plan.
- (n) Any other drawings as deemed necessary.

(6) Full set of final drawings are to be provided at the time of delivery of the offered Boat.

(7) Complete list of machinery and equipment of the offered Hydrographic Boat mentioning the make, model, type, and principal technical particulars.

RESTRICTED

(8) Delivery schedule (with reference to the date of signing the contract) of the constructional drawings and materials, machinery, equipments and other items for construction including supervision.

(9) Proposed schedule for construction.

(10) The Bidder must submit the GA Drawing (min in A3 sized prints, colour prints preferred) of the reference boat for comparison.

(11). Two (02) complete copies of the offer will have to be submitted by any Bidder; each must contain sufficient information on the offer along with that on the Bidder, and must include brochures of all material, machinery, equipment, system, etc. All documents to be submitted for this bid must be in English language.

(12) All documents must also be submitted in soft copies (Microsoft Office and Acrobat Reader compatible) in a conveniently retrievable media (CD/DVD preferred).

10.b. **BN Project Implementation Team at Construction Site.** A Project Implementation Team consisting of at least one BN officer will remain at the construction site throughout the period of the construction. The bidder will arrange the following:

(1) Internal transportation.

(2) Accommodation.

(3) A separate office room at or near the shipyard with necessary office equipment including computers/ laptops, laser printer, photocopiers, internet and telephone access facilities, etc.

10.c. **Bid Price and Terms of Payment.** Bid price and terms of payment will be as per section 9.

10.d. **Duration of Project and Delivery.** The duration of the project is intended to be not more than 12 months from the signing of the contract. Test and trial are also to be completed within this time and the results of these tests should be brought to satisfactory level. Thereafter, delivery of two boats are to be arranged in Builder's Jetty.

10.e. **Bank Guarantees.**

(1) **Performance Guarantee (PG) Bond.** Performance Guarantee (PG) in the form of Bank Guarantee for 10% of the TCP is to be submitted by the Shipbuilder valid till satisfactory test, trial and acceptance of each delivery of the boat to the Purchaser. **The PG shall be released after successful acceptance of the boats** and on submission of 5% guarantee for warranty of the total contract price.

(2) **Guarantee for Warranty.** The Bidder shall furnish to DGDP a bank guarantee for warranty after satisfactory handing over of each boat for an amount equivalent to 5% (Five percent) of the contract price of each boat (2.5% of the total contract price) which shall remain valid until expiry date of the warranty period.

10.f. **Legal and Financial Issues.** All legal and financial issues mentioned in this specification are to be fully complied/ agreed upon by the Bidder. BN will have option to cancel the bid in case such compliance is not agreed upon by the Bidder during the process of evaluation and negotiation to finalize the contract specification. Besides, all legal issues will be governed by DGDP form DP-35.

10.g. **Special Conditions.** This is to be noted for compliance that the Project is a procurement for deliverables which shall in general be considered 'Defense Stores' in Bangladesh. These defense stores shall be used only by the Defense Forces of Bangladesh and hence are exempted from payment of custom duties and sales taxes in Bangladesh as per the Government of the People's Republic of Bangladesh, Ministry of Commerce, National Bureau of Revenue (NBR) Memo No 9 (41) NBR/Cus-IV/72/246 dated 10 Apr 1981.

11. **Article-wise Compliance Sheet.** Article-wise compliance on the Purchaser's Technical Specification of boat is to be provided. The Bidders should clearly mention whether they comply with the requirements/ offers of the Purchaser mentioned in the various articles of the tender specification or not. For any deviation from that, it is to be clearly mentioned in the offer.

SECTION – 2**GENERAL CHARACTERISTICS**

12. **Ambient Conditions.** The Boat is to be designed to operate in the moist and humid tropical environment of Bangladesh. The conditions to be expected in service will be as follows:

- a. Air (ambient) temperature : +5°C to +45°C.
- b. Seawater (SW) temperature : +5°C to +32°C.
- c. Relative humidity : Up to 98% (non-condensing).
- d. Salinity : Up to 34gm/litre.
- e. Suspended solids in SW : Up to 20,000 ppm in SW in coastal areas.

13. **General**

a. **Principal Particulars.** The principal particulars of the intended Boat are to be:

1.	Principal Dimensions (Dimensions are approximate, may vary for optimization of better characteristic)	
2.	Length OA	13-15m
3.	Length WL (approx)	To be mentioned
4.	Breadth MLD (approx)	To be mentioned
5.	Depth MLD (approx)	To be mentioned
6.	Draught Loaded (maximum)	Not more than 1 m
7.	Displacement a. Net wt b. Gross wt	To be mentioned
8.	Thickness of following plates: a. Keel plate b. Bottom Plate c. Side Plate	To be mentioned
9.	No of Engine	Two
10.	Max Speed	14 -16 knots (to be mentioned).
11.	Cruising speed	10 - 12 knots (to be mentioned).
12.	Survey speed	4- 6 knots (to be mentioned).
13.	Endurance at economic speed	Not less than 200 nautical miles.
14.	Engine Power	Sufficient to achieve the required speed

RESTRICTED

15.	Complement	8 (Cox'n-01, Bowman-01, Boat ME-01, Survey Supervisor-01, Survey Recoder-03 & Radio Elect Staff-01).
16.	Designed life	At least 20 Years.
17.	Normal interval for refit	At least 3 Years.
18.	Annual usage	About 1,000 hrs per year.
19.	Stability	Intact stability for light ship condition and different loading conditions should be checked in compliance with IMO Resolution A 749 (18)

b. **Tank Capacities.**

1.	Fuel Oil Capacity (Service)	As required for endurance (to be mentioned)
2.	Fresh Water (Service)	As required for endurance of the crews (to be mentioned)

14. **Sea Keeping Ability.** The Boat should be able to operate at Sea State 2 and sustain up to Sea State 3.

15. **Complement.** 8 (Cox'n-01, Bowman-01, Boat ME-01, Survey Supervisor-01, Survey Recoder-03 & Radio Elect Staff-01).

16. **Construction.** The Boat is to be constructed of internationally recognized shipbuilding quality aluminium (Marine Grade 5083 or better).

17. **Ship's Main Power System.** The main power supply system will be designed and developed as a complete solution for the Boat to run at full efficiency both at sea on own power 415V, 50Hz, 3 Phase (without conversion) and at harbour on national power supply system 400V, 50Hz, 3 Phase. All electrical machineries for use at harbour should be designed accordingly. Necessary load calculation and load management information for sea going, survey and harbour are to be submitted with the quotation.

18. **NBCD Marking.** NBCD markings (those for Location along with Risk, Control, and Gastight) to be used throughout the Boat shall be as per UK Royal Navy (RN) BR 2170 as practised in BN.

RESTRICTED

SECTION – 3

ENGINEERING AND ELECTRICAL

19. **Propulsion Plant.** The propulsion plant for the Boat should consist of the following:

a. **Main Engine.** Two (02) four stroke marine diesel engines capable of operating at rated load and rated speed and typical operating range up to 1,000 hours per year. The Boat should be able to run using single engine/shaft, if needed.

1.	Model/Type of engine	To be mentioned.
2.	Maker	To be mentioned.
3.	Country of Origin	USA, Canada, Australia, Japan and EU countries (name of the country to be mentioned).
4.	Country of Manufacture	USA, Canada, Australia, Japan and EU countries (name of the country to be mentioned).
5.	Cycle	4 stroke.
6.	Aspiration	Turbo charged and after cooled.
7.	Fuel Injection	To be mentioned.
8.	Cooling	To be mentioned.
9.	No of Cylinder	To be mentioned.
10.	Bore x Stroke	To be mentioned.
11.	Max Continuous Power	To be mentioned.
12.	Max power output	To be mentioned..
13.	Idling rpm	To be mentioned.
14.	Maintenance/ Overhauling period	To be mentioned.
15.	Dimension	To be mentioned.
16.	Fuel used	Dieso F-76 or equivalent/LSHSDO
17.	Specific fuel consumption (sfc)	To be mentioned.

b. **Gearbox.** Two (02) marine gearboxes, one connected to each propulsion diesel engine.

1.	Model/Type of Gearbox	To be mentioned.
2.	Maker	To be mentioned.
3.	Country of Origin	USA, Canada, Australia, Japan and EU countries (name of the country to be mentioned).
4.	Country of Manufacture	USA, Canada, Australia, Japan and EU countries (name of the country to be mentioned).

c. **Propeller Shafts and Propeller.** Shaft and water lubricated stern tube with necessary seal and fixed pitch propeller to be provided. The propeller should have propeller guard and necessary protection from fishing net and underwater floating objects.

d. **Factory Acceptance Test (FAT) and Pre-Shipment Inspection (PSI):** Factory Acceptance Test (FAT) and Pre-Shipment Inspection (PSI) for the main engines will have to be conducted in the manufacturer's factory premises in presence of the Customer's and the Buyer's representatives. The duration of the FAT and PSI shall be not less than 05 (five) calendar days (excluding travel time). The Customer and the Buyer will bear all expenses related with international air travel, food, and accommodation of their representatives.

20. **Manning of the Machinery Rooms.** The machinery/engine room onboard the Boat is to be manned by minimum amount of personnel during operation.

21. **Electrical Power Generation.**

a. **Electrical Power Rating and Standard.** The main electrical power supply on-board the Boat will be of 3 wire 415V, 50Hz, 3 Phase. Moreover, all electrical systems, equipment, machinery, fittings, fixtures, items, cables, wiring etc shall comply with recognized marine/ military standard. Red, Yellow and Blue colours are to be used in power distribution system to identify 3 phases of cables, busbars, terminals etc.

b. **Main Generator Set (Genset).**

(1) An electrical power generation system consisting of at least two (02) identical marine type (with four stroke diesel engine prime mover) three-phase generators are to be installed. Each set should be capable of taking normal cruising and survey load of the Boat. The generator sets are to be fitted with instrument panels and all standard safety devices including emergency shutdown devices. The major requirement of the Genset is outlined below:

(1)	Type/ Brand	To be mentioned
(2)	Model	To be mentioned
(3)	Country of Origin	a. For Prime Mover : USA, France, Finland, Germany and UK. b. For Alternator : USA, France and UK. c. Control/Monitoring :To be mentioned. d. Other parts/ accessories: To be mentioned.
(4)	Manufacturer	a. For Prime Mover: (1) Cummins Engine Company Inc, USA. (2) Wartsila, France/ Finland. (3) Deutz AG, Germany. (4) MAN B &W, GmbH, Germany. (5) Moteurs Baudouin, France.

RESTRICTED

		(6) Sisu Diesel Inc, Finland (7) MTU, Germany. (8) Caterpillar Tractor Co, Ltd, USA. (9) Dorman Diesel Ltd, UK. b. For Alternator: (1) Leroy Somer, France. (2) Newage International Ltd, Stamford, England. (3) Delco Products General Motors Corporation Ltd, USA. (4) Brush Electric Machine Ltd, England. c. Control/ Monitoring: To be mentioned. d. Other parts/ accessories: To be mentioned.
(5)	Year of Manufacture	2017 or later.
(11)	Voltage Regulation	Within $\pm 1\%$.
(13)	Overall weight and dimension	To be mentioned

(2) **Auto Voltage Regulators (AVR).** Each alternator will be incorporated with an AVR. The AVR is to be of electronic type with three phase sensing devices. The Name and address of Maker and Model are to be mentioned.

(3) The Genset should be of sufficient capacity to independently cater for full (100%) electrical load plus 15% reserve for future installation of machineries / equipment.

(4) **Generator Control Panel.** All necessary gauges/ meters (Digital/ analogue readout display) including kilowatt meters are to be fitted in the control panel.

(5) **Loading Condition.** The generators and AVR system must be highly responsive and should meet the following condition:

(a) **Voltage.**

- i. Voltage transient tolerance: + 16%.
- ii. Voltage transient recovery time: 02 sec (for the voltage level to recover to within +3% of the original value).

(b) **Frequency.**

- i. Frequency transient tolerance: +04%.
- ii. Frequency transient recovery time: 02 sec (for the frequency level to recover to within +3% of the original value).

RESTRICTED

(c) The above transient Conditions must be maintained under following load change:

- i. Load Changes from 0 to 50%.
- ii. Load Changes from 50% to 100%.
- iii. Load Changes from 100 to 0%.

Note: Graphs showing various characteristics and response of transient voltage and frequency variation are to be submitted with the FAT report.

(6) **Factory Acceptance Test (FAT) and Pre-Shipment Inspection (PSI)**: Factory Acceptance Test (FAT) and Pre-Shipment Inspection (PSI) for the main generator sets will have to be conducted in the manufacturer's factory premises in presence of the Buyer's representatives (02 personnel). The duration of the FAT and PSI shall be not less than 05 (five) working days (excluding travel time). The Buyer will bear all expenses related with international air travel, food and accommodation of their representatives.

c. **Emergency Power Supply System.** The Boats are intended to be powered by an emergency genset of suitable rating. The generating power will be used for communication and ship's navigation purposes during emergency period. The offer must mention what type of arrangement will be available along with the equipment and services to be fed by such arrangement.

22. **Switchboards.**

a. **Main Switchboard.** One Main Switchboard is to be supplied and installed. The switchboard is to be of marine type, floor mounted and shall be capable of withstanding shipboard vibration without damage or faulty operation.

b. **Synchronizing Panel.** One synchronizing panel is to be provided with each switchboard. The synchronizing panel should have auto synchronization synchroscope with load sharing and any other appropriate arrangement for paralleling the Gensets. Panel shall consist of the following:

1. Synchroscope.
2. Dual frequency meter.
3. Dual voltage meter.
4. Frequency Regulator/ Adjust knob.
5. Voltage Regulator/ Adjust knob.
6. Generator circuit breaker ON/OFF push Button.

c. **DC switchboard.** 01x DC switchboard is to be supplied and installed including DC feeder panel.

23. **Ship's Main Battery and Charging System.** Required number of Batteries of appropriate capacity including one rack along with one suitable battery charger are to be provided for charging and distributing DC power sources to navigation lights, general alarm system, fire monitoring system, propulsion control circuits, gyro compass, internal communication, radio equipment, survey equipment, engine and generator control system etc as emergency supply and control supply.

24. **Conversion Machinery.** Conversion machinery for the Boat will be as under:
- a. **Transformers.** Required number of transformers of appropriate capacity are to be provided and installed.
 - b. **Rectifiers.** Required number of appropriate capacity rectifiers are to be provided and installed.
 - c. **Converter.** Required numbers of static converter of appropriate capacity are to be provided for Survey Equipment, Armaments and Sensors etc.
25. **Shore Supply Arrangement.** The Boat should be equipped to take on electrical power from shore connection through the following arrangement:
- a. **Shore Supply Cable.** Three core one flexible shore supply cable (rubber insulated) of 100m length of appropriate capacity wound on a roller is to be provided.
 - b. **Shore Supply Box.** One Shore Supply Connection Box of 415V, 50 Hz, 3 phase with an appropriate Breaker, Phase Sequence Indicator, Power Meter, and other necessary safety and indication equipment is to be provided.
 - c. **Ship's Along Side Feeder Breaker.** A feeder breaker of appropriate capacity of generator voltage rating is to be provided in the shore connection box to supply power to other ship alongside.
26. **Cables and Plugs.**
- a. Cables installed throughout the Boat are to be marine type approved by classification society. It is to be of appropriate grade insulation to meet the voltage to which they are subjected.
 - b. Cabling is to cater for required level of redundancy in every case or as appropriate.
 - c. All cables are to be shielded armoured cable duly type approved for marine use.
 - d. All plugs and wall receptacles/sockets used in the Boat must be of appropriate International Electrotechnical Commission (IEC) standard.
27. **Batteries.**
- a. All batteries to be of lead acid type and placed in acid proof boxes made of GRP/aluminium.
 - b. **Main Engine and Generator Starting Batteries.** Adequate number of heavy-duty 12V/24 V batteries suitable for starting the main engines and generators should be installed in the engine room. The battery should be secured in GRP/aluminium box.

RESTRICTED

- c. **Communication Batteries.** Adequate number of 12V/ 24V DC for navigation lights, VHF and other safety equipment to be located on suitable place for emergency supply.
- d. **General Service Batteries.** One set of general service battery bank to be supplied to provide power for 12V/24V consumers described under 24V DC circuit.
- e. **Battery Charging System.** Boat's battery charging system should be available on board.

28. **Motors, Starters and Lightings.**

- a. **Motors.** Motors are to be of squirrel cage induction type of International Electro-technical Commission (IEC) standard. Motors should be rated for continuous full load duty except motors for steering gear, deck machinery, etc.
- b. **Starters.** Starter of appropriate rating for respective equipment/ machinery are to be separate and no group starter shall be acceptable.
- c. **General Lighting.** Light fittings to be fluorescent type suitable for marine environment. Light should be of Battery operated and LED type.
- d. **Emergency Lighting.** Emergency lighting to be provided for accommodation areas, Engine Room, Wheel house and Steering compt. etc.
- e. **Deck Lighting.** 02 (two) deck lights should be installed to light the forward and aft deck of the boat.

29. **General Broadcast and Ship's Alarm System.**

- a. **General Broadcast.** The General Broadcast system will be used in the ships to provide zone wise voice announcement
- b. **General Alarm.** General alarm is to be audible in all spaces except tanks. Alarm is to be operated on 24V DC.
- c. **Fire Detection Alarm.** Self-address type audible and visual alarm system should be installed.
- d. **Man Overboard Alarm.** At Forecastle and After deck area.
- e. **Internal Communication.**
 - (1) Internal telephone system covering all machinery control, navigational purpose and sensors control are to be provided.

RESTRICTED

(2) Internet/LAN facilities covering office spaces, mess deck, accommodations space etc.

(3) Central TV receiving system covering office spaces, mess deck, accommodations space etc.

30. **Steering Gear.**

a. One electro hydraulic/ hydraulic steering gear to be fitted on board. Brand, model and country of origin of the steering gear system to be mentioned. Catalogue / Brochures to be submitted with offer.

b. **Emergency Steering.** Necessary arrangements are to be fitted onboard the Boat for emergency steering in case of system failure.

31. **Ventilation.**

a. **Air Conditioning Unit.** Marine type air conditioning system to be installed on board with air handling unit and ducting to provide conditioned air for accommodation spaces and closed bridge. The country of origin and manufacture of the system to be USA/Japan/Australia/EU. The plant should be able to maintain Dry bulb temperature of 20⁰ C with a relative humidity of 55%. Capacity of the AC unit is to be mentioned.

b. **Ventilation in Engine Room.** Engine room should be ventilated applying positive pressure.

c. All cabins, mess room, saloons and the wheel house to be fitted out with necessary small oscillatory fans of standard boatbuilding practice.

32. **Pumps** Pump suitable for boat is to be offered as per requirement mentioned below. Pump should be operated by boat's power as per design. All Pumps must be marine type and new. Brand and model of various pumps to be mentioned and catalogue/brochures to be submitted with offer.

SECTION 4**HYDROGRAPHIC RESEARCH AND SURVEY EQUIPMENT AND FITTINGS**

33. **Survey Equipment.** The hydrographic research and survey equipment (type approved by IHO in every case, and be of EU/USA/Japan origin) described in the following Articles of this document are to be supplied complete with associated accessories, attachments, software along with associated licence and key, and all types of consumables to run for at least one (01) year for installation and use onboard the Boat.

34. **Hull Mounted Multi-Beam Echo Sounder.** One hull mounted Multi-Beam Echo Sounder (MBES) has to be provided. The offered MBES should fulfill following characteristics:

- a. **Brand/Model.** To be mentioned.
- b. **Country of Origin.** USA and European Countries.
- c. **Country of Manufacturer.** USA or European Countries (Manufacturer should be ISO or equivalent certified).
- d. **Date of Introduction in the Market.** To be mentioned.
- e. **Year of Manufacture.** 2017 or later.
- f. **Basic Composition.** The MBES should be comprised of the following main units:
 - (1) Operator's station with real time data display window.
 - (2) Helmsman display.
 - (3) Transceiver Unit.
 - (4) Transducer.
 - (5) Positioning System.
 - (6) Motion Sensor for position, attitude (roll, pitch and heading) and heave measurement.
 - (7) Sound Velocity Profiler.
 - (8) Data acquisition and processing software
 - (9) Data processing work station
 - (10) All accessories for installation.
- g. **Technical Specifications.**
 - (1) **Performance Requirements.**

Ser	Description	Requirement
1	Transducer Dimension and Weight	Light weight and small dimension is preferred. Detail dimension to be mentioned.
2	Depth Range	1 - 50m or more.
3	Swath coverage in Degree	140° or more.
4	Transducer Frequency	To be mentioned.

RESTRICTED

5	Number of ping per sec	To be mentioned.
6	Maximum sounding per ping	To be mentioned.
7	Depth Accuracy	Should be capable of complying special order survey as mentioned in SP-44 (latest edition) of IHO. Detail to be mentioned.
8	Minimum Beam Width	a. Along track: 1.5° b. Across track: 1.5°
9	Beam pattern (Equiangular/Equidistant.)	To be mentioned. Both equiangular and equidistant option preferable.
10	Beam Stabilization	Beam to be stabilized. Detail to be mentioned.
11	Motion Sensor	
	a. Motion Compensation	Motion compensation should be done in real time. Brand, model and different components of the offered Motion Sensor is to be mentioned.
	b. Different component of the Motion Sensor should have following accuracy:	
	(i) Position	To be mentioned both for differential and normal mode.
	(ii) Roll and Pitch	At least 0.02°.
	(iii) Heading	At least 0.05°.
	(iv) Heave Accuracy	At least 5 cm.
12	Sound Velocity Profiler	To be offered along with all required accessories. Detail specification is to be mentioned in the offer.
13	Interfaces	Should be capable of interfacing standard DGPS Receivers (i.e. Hemisphere, Trimble brand, etc). Standard data acquisition and processing software like HYPACK, HYSWEEP, CARIS HIPS & SIPS should be compatible with the system. Detail to be mentioned in the offer.
14	Maximum sea state condition for operation	Should be at least 3 or more.

(2) **Positioning System.** The offered system should be compatible with shore based MF Reference Stations, SBAS, DGNSS etc.

(3) **Operational Requirements.**

i. The system performance will not be affected by deltaic condition of Bangladesh coast which is heavily laden with sediment. The performance should not also be affected by the turbulence of coastal water where there are melange of sea and fresh water.

ii. The MBES transducers shall be well protected against damage by floating/submerge fishing nets/sticks or drowned objects at sea.

iii. The system shall be insensitive to electromagnetic and electrostatic disturbances. If there is any disturbances then that should be reduced by appropriate method.

(4) **Environmental Conditions.** The system should be robust enough to sustain rough sea condition and operate without any performance degradation under the following environmental conditions:

i. Freshwater, muddy sea water and water-oil-emulsions.

ii. Water temperatures: Between 10°C and +55°C.

iii. Sound velocity between 1480 m/sec to 1600 m/sec.

iv. Higher humid condition.

h. **Software Packages.**

(1) **Data Acquisition Software.** Latest version of HYPACK and HYSWEEP data acquisition software is to be provided.

(2) **Multibeam Data Processing Software.** Latest Version of CARIS HIPS and SIPS software is to be provided for Multibeam data processing.

(3) **Seabed Classification Software.** Necessary software for seabed classification is to be provided with the offer. Name and specification of the software is to be submitted.

j. **Data Backup Facilities.** Two portable hard drives with a capacity of minimum 5 Tera Bite (TB) each are to be provided. Brand and model is to be mentioned in the offer.

k. **Hardware.** All necessary hardware for satisfactory installation and performance of the MBES system are to be provided. Details description of the hardware such as computers, SV profiler, Motion Sensors, Positioning System etc are to be mentioned in the offer.

I. **Installation and Setting-to-Work.**

(1) **Installation Materials.** The installation material should be non-corrosive. All installation materials (underwater and above water) including special underwater paint, silicone gel, cable, socket, plugs etc should be provided by the supplier. Adequate length of the cable is to be supplied with the equipment so that the acquisition console can be fitted at ship's bridge. Detail is to be mentioned in the offer.

(2) **System Installation.** The transducer has to be installed in such a way that it is well protected against impact from fishing nets, floating objects, submerged obstacles, trawling gears etc. Therefore, suitable proven design of the arrangement is to be provided with the offer.

(3) **Other Requirements.**

i. Sensor alignment will be carried out by manufacturer's technical expert with their appropriate tools and appropriate method.

ii. After installation, the MBES system should be calibrated for roll, pitch, latency and heading offsets by the manufacturer's technical expert using proven method.

iii. All other installation including electronic components and system hardware should be protected against shocks and vibrations.

m. **Power Supply.** Necessary power supply should be arranged from the boat. Continuous supply should be made through UPS. The detail description of continuous power supply solution is to be provided with the offer.

n. **Optional Items.** List of optional items which are nice to have is to be provided with the offer. However, the 100% performance of MBES should be achieved without those optional items. Prices of optional items which are nice to have are to be quoted separately.

p. **Tools.** Tools required for servicing and maintenance are to be supplied with the MBES. List of such tools to be mentioned in the offer.

q. **Standard Accessories.** Standard accessories must include every item and accessories, which are essential to install and operate the MBES with it's full capacity, whether those are mentioned in this specification or not.

r. **Documents.** The documents to be submitted with the offer shall include:

- (1) Two sets of original Catalogue/Brochure in English.
- (2) List of Standard Accessories.
- (3) List of Optional Accessories.
- (4) List of Installation Materials.
- (5) List of spares parts for 5 years.
- (6) Manufacturer's authenticity certificate
- (7) Certificate of assurance for minimum 10 years supply of spares.
- (8) List of tools required for servicing and maintenance.

RESTRICTED

s. **Manuals/Drawings.** Following manuals are to be supplied with each of the equipment:

- (1) Two sets operating and technical manual in English.
- (2) Parts Catalogue.
- (3) Detailed installation Diagrams.

t. **Condition of MBES while Supplying.** The offered MBES must be brand new and in operational condition.

u. **Training.** Six BN personnel for 05 working days would be trained by the manufacturer engineer or by a person certified by the manufacturer to be adequately qualified and experienced on the system for troubleshooting and maintenance in Bangladesh. The training should cover the following:

- (1) Rigging techniques and function of all individual components.
- (2) Periodical maintenance, fault findings and its rectification.
- (3) Theoretical and practical training on calibration and data acquisition.
- (4) In-depth training on data processing, transferring and archiving.
- (5) Any other topics as deemed necessary.

Note: The supplier should provide two copies of supporting manuals for the above mentioned topics in English. Training should be conducted by experienced trainer(s) having in-depth knowledge on data acquisition, processing and maintenance. The name and detail profile of the trainer is to be submitted with the offer.

35. **Hull Mounted Single Beam Echo Sounder.** One hull mounted precision Single Beam Echo Sounder (SBES) has to be offered for each of the boat. The offered SBES should fulfill following characteristics:

a. **Brand/Model:** To be mentioned.

b. **Name and address of the Manufacturer:** To be mentioned (address, telephone, facsimile number, email addresses are to be mentioned).

c. **Country of Origin:** USA/Canada/European Countries.

d. **Date of Introduction in the Market:** To be mentioned.

e. **Year of manufacturing:** 2017 or later.

f. **Basic Composition:** The Echo sounder should be comprised of the following main units:

- (1) Hull mounted transducer assembly.
- (2) Digital display unit, recording unit and other accessories.

RESTRICTED

g. **General Features:** The Echo Sounder will contain the following features:

- (1) Robust in design and construction.
- (2) Provision for interfacing with GPS & DGPS.
- (3) Provision for interfacing with heave compensator unit.
- (4) Recording of digital data.
- (5) Event mark with position, date, time, & depth.
- (6) Self check functions.
- (7) Automatic Gain Control.
- (8) Both Auto and Manual phasing.
- (9) Annotation functions with built-in Clock and Calendar.
- (10) Digital Display.
- (11) Audio alarm when exceeding/falling short of pre-set depth.
- (12) Provision for sea bottom layer classification.

h. **Hull mounted Transducers:** Hull mounted transducer assembly to be provided:

- (1) **Size** : Height, Width & Depth to be mentioned.
- (2) **Weight** : To be mentioned.
- (3) **Associated Fittings:** Associated fittings for hull mounted installation of transducer to be provided along with detail list.
- (4) **Transducer Cable** : As required from survey operation room to transducer.

j. **Technical Parameter**

- (1) **Frequency.** Dual channel, high and low frequency, which can be used simultaneously and capable of sea bottom layer classification.
- (2) **Measuring range:** 0.5-100m or more in Northern Bay of Bengal area.
- (3) **Measuring Accuracy:** At least $0.01\text{m} \pm 0.1\%$ of the depth. IHO Specification (S-44, 5th Edition) to be complied.
- (4) **Recording.** Digital data recording system.
- (5) **Minimum Detection Range** : At least 0.5 meter (To be mentioned).
- (6) **Bottom tracking algorithms:** To be mentioned.
- (7) **Interfacing:** Echo Sounder will be interfaced with Hydrographic data acquisition systems HYPACK. Necessary accessories & driver/software for interface to be provided. Such accessories with Name, Model number, Pattern number, Manufacturer address etc. to be listed.

RESTRICTED

(8) **Beam Angle:** The echo sounder must have a variable beam angle options both in high and low frequencies.

(9) **Output Power.** Minimum 350 watt.

(10) **Data Input:** The echo sounder must have heave, pitch, roll and position data input capacity.

(11) **Real Time Data Display:** Colour display, enable to show depth, along the track, slope and layer detection in both high and low frequencies with in built data logger preferably a laptop with IP 56. Brand and model of the laptop has to be mentioned.

(12) **Data Output Option:** Raw data and heave, pitch and roll corrected data.

(13) **Data Input/ Output Format:** NMEA.

(14) **Data Storage:** All necessary devices like Hard disk, DVD or other accessories to be provided for data backup.

(15) **Multiple Functions:** Provisions of supporting “*multi pulse function*” for better accuracy.

(16) **Correction Capability:** The echo sounder must have the capacity to correct heave, pitch and roll corrections.

k. **Power Requirement.**

(1) **Supply voltage:** Provision for 220 V AC, 50- 60 Hz, Single Phase & 24 V DC power supply.

(2) **Average Power Consumption:** To be mentioned.

l. **Environmental Conditions:** The echo sounder will be used in and around Bangladesh coastal area where sea water is muddy and tropical environment persists.

(1) **Operating Temperature** : To be mentioned (suitable for sub-tropical region).

(2) **Operating Humidity** : To be mentioned (suitable for sub-tropical region).

m. **Operating Condition of Echo Sounder while Supplying:** The offered set must be brand new and in operational condition.

n. **Tools:** Tools required for servicing and maintenance are to be supplied with each Echo Sounder. List to be provided.

p. **Catalogue/Brochure:** Two sets of original Catalogue/Brochure in English to be supplied with the offer.

RESTRICTED

q. **Standard Accessories:** Standard accessories must include every item and accessories, which are essential to install and operate the Echo Sounder, whether those are mentioned in the specification or not.

r. **Manuals/drawings:** Following manuals are to be supplied with each of the equipment:

- (1) Two sets operating and technical manual in English.
- (2) Parts Catalogue.
- (3) Installation Diagrams.

s. **Installation Materials:** All installation materials like cables, Junction box, Transducer plug kit, Transducer cable, Power cable, socket & all related items are to be provided.

t. **Documents.** Following documents are to be submitted with the offer:

- (1) Original Catalogue.
- (2) List of Standard Accessories.
- (3) List of Optional Accessories.
- (4) User list.
- (5) Manufacturer's authenticity certificate.

36. **DGPS Receiver.** One DGPS Receiver is to be provided for each of the boats. The offered DGPS should fulfill following characteristics

a. **Model/Brand.** To be mentioned. The offered brand/model should be used by various national hydrographic offices around the world. List of such national hydrographic offices and other user's is to be provided with the offer.

b. **Country of Origin.** USA/Japan/Canada / European Countries (name of the country to be mentioned).

c. **Country of Manufacture.** To be mentioned.

d. **Name of the Manufacturer.** The manufacturer is to be ISO or equivalent certified. Name and full address of the manufacturer is to be mentioned.

e. **Year of Manufacturing.** 2017 or later.

f. **Scope of Supply.** The DGPS Receiver will be supplied along with all accessories as per the specification mentioned in this document.

g. **Basic Composition.** The DGPS Receiver should comprise following main units:

- (1) Receiver unit / data display unit.
- (2) Antenna and antenna cable.
- (3) Data communication cable.

h. **Technical Specification.** The equipment should have following specification:

(1) **General Specification.**

Ser	Description	Requirement
(1)	Name	DGPS Receiver.
(2)	Size and weight	To be mentioned.
(3)	Display type and size	Should have built in display and keyboard. Display type and size to be mentioned.
(4)	Number of channel	12 or more channels. Higher channel is preferable.
(5)	Receiver Type	a. GNSS Multi frequency Receiver. b. GLONASS and Galileo signal reception capability (optional).
(6)	Differential correction	a. <u>Differential Correction.</u> Should be capable of receiving DGPS correction message from the following sources: (i) IALA Beacon Station (283.5 kHz to 325 kHz). (ii) SBAS (WAAS, EGNOS etc). b. <u>RTK Signal Reception.</u> BN is using Trimble SPS 855 and Leica Viva 10 RTK sets. The offered receiver should be capable of receiving RTK signals of those equipment.
(7)	Accuracy	<u>DGPS Positioning</u> a. At least sub-meter differential accuracy. <u>RTK Positioning</u> a. Horizontal: at least 10cm. b. Vertical: at least 15 cm vertical.
(8)	Time to first fix	To be mentioned.
(9)	Position update	To be mentioned.
(10)	Casing of the DGPS	Should be robust, dust proof, waterproof and shock resistant.
(11)	Datum	WGS-84. It should have the option of selecting other different datum's manually.
(12)	Length of the antenna	At least 25 meter.

RESTRICTED

Ser	Description	Requirement
	cable	
(13)	Antenna type and dimension	Antenna type, quantity, dimension etc. to be mentioned clearly in the offer.
(14)	Operating temperature	-10°C to +50°C.
(15)	Humidity tolerance	At least 95%.
(16)	Ingress Protection	IP66 or more.

(2) **Communication Specification.** Following communication criteria should be available:

Ser	Description	Requirement
(1)	Antenna connector	Both GPS and DGPS antenna connectors.
(2)	Serial Ports	At least two RS-232/RS-422 serial ports.
(3)	Baud Rates	To be mentioned.
(4)	Correction input/output protocol	RTCM SC-104.
(5)	Data input/output protocol	NMEA 0183 (Latest version).
(6)	Raw data	RINEX format availability in addition to proprietary format preferred.
(7)	Data Cable	Standard length of cable to be provided. The offered length to be mentioned.
(8)	Auxiliary port	To be mentioned.

j. **Power supply.** To be powered by 8 to 36 V DC. If AC power supply option is available then that is to be mentioned and one converter (AC to DC) should be included in the offer.

k. **Interfaces.** The offered DGPS Receiver should be capable of interfacing with HYPACK hydrographic data acquisition software used by BN.

l. **Manuals/Drawing.** Following manuals are to be supplied with the equipment:

- (1) Operating manual in English.
- (2) Technical manual in English (If any).
- (3) Parts catalogue.
- (4) Installation diagram.

m. **Catalogue/Brochure.** Original catalogue/brochure in English is to be supplied with the offer.

RESTRICTED

n. **Tools.** Tools required for servicing and maintenance are to be supplied for each DGPS Receiver. List of such tools to be provided in the offer. Price of tools to be quoted separately.

p. **Standard Accessories/Essential Items.** Standard accessories must include every item and accessories which are essential to install and operate the DGPS Receiver, whether those are mentioned in the specification or not. A list of such essential items with item wise price must be included in the quotation.

q. **Installation Materials.** Installation is to be done by the supplier. All installation materials like cables, junction box, power cable, socket etc are to be included in the offer.

r. **Optional Item.** Optional items (if any) are to be quoted separately, indicating item wise price.

s. **Operational condition of set while Supplying.** The offered set must be brand new and in operational condition.

37. **Sound Velocity Profiler.** One Sound Velocity Profiler of the following description is to be provided for each of the Boat:

a. **Brand/Model.** To be mentioned.

b. **Country of Origin.** USA/European countries (Name of the country to be mentioned).

c. **Year of Manufacturing.** 2017 or later.

d. **Measuring Sensors.** The equipment should have at least sound velocity, temperature, salinity and pressure measurement sensors with following specifications:

(1) **Sound Velocity.**

Ser	Description	Requirement
1.	Range	1450-1600 m/sec
2.	Accuracy	± 0.05 m/sec or better.
3.	Resolution	To be mentioned.
4.	Type of Sensor	To be mentioned.

(2) **Temperature.**

Ser	Description	Requirement
1.	Range	-2°C to + 32°C.
2.	Accuracy	± 0.05 °C or better.
3.	Resolution	To be mentioned.
4.	Sampling Rate	To be mentioned.
5.	Type of Sensor	To be mentioned.

(3) **Pressure.**

1.	Range	0-100m.
2.	Accuracy	$\pm 0.1\%$ of full scale or better.
3.	Resolution	To be mentioned.
4.	Sampling Rate	To be mentioned.
5.	Type of Sensor	To be mentioned.

(4) **Conductivity.**

Ser	Description	Requirement
1.	Range	0-70mS/cm.
2.	Accuracy	$\pm 0.02\text{mS/cm}$ or better
3.	Resolution	To be mentioned.
4.	Sampling Rate	To be mentioned.
5.	Type of Sensor	To be mentioned.

e. **Data Recording.**

(1) **Memory.** Total number of data points that can be stored in the memory is to be mentioned in the offer. More memory capacity will be preferred.

(2) **Sampling Mode.** The equipment should have following sampling mode of operation:

- (a) Continuous.
- (b) Profile (with change of pressure/depth).
- (c) Conditional.

If other sampling modes available apart from those stated above then those are to be mentioned in the offer.

(3) **Synchronization** : Should have the true synchronous sampling for all three sensors.

f. **Communication.** The equipment should have user configurable communication setting option. Sufficient length of data cable is to be offered with the equipment. Length and specification of the data cable is to be mentioned in the offer.

g. **Interfaces.** The recorded data of the Sound Velocity Profiler should be compatible with "Hydrographic Data Acquisition System" like HYPACK etc. Necessary interfacing facilities to be provided. The output data would be used for the MBES of the boat. As such the sound velocity profiler data should be compatible and effectively able to be fed into the offered MBES system.

RESTRICTED

- h. **Software.** Software for data acquisition and processing is to be included with the offer. The software should be Window based and should allow configuration for data sampling. It should also allow visualization of extracted data in graphical and tabular form. The detail description of the software is to be provided with the offer.
- j. **Power supply.** The equipment should have integrated power supply option. The battery should be replaceable. It should be common in nature and readily available in Bangladesh local market.
- k. **Mechanical Details.** To be mentioned. The physical specifications like size, dimension, weight, construction material etc. of the equipment is to be provided in details in the offer.
- l. **Tools.** Tools required for servicing and maintenance are to be supplied with the equipment at the time of delivery.
- m. **Catalogue/Brochure.** Two sets original Catalogue/Brochure in English to be supplied with the offer.
- n. **Manuals.** Following Manuals in English are to be supplied with the equipment at the time of delivery:
- a. Two sets Operating Manual.
 - b. Two sets Technical Manual.
 - c. Parts Catalogue.
- p. **Rigging Materials.** All rigging materials such as instrument suspension bar/weight, lowering flexible rope etc are to be included in the offer.
- q. **Operational Condition of set while Supplying.** The offered set must be brand new and in operational condition.
- r. **Standard Accessories.** Standard Accessories must include every item and accessories, which are essential to install and operate the Sound Velocity Profiler, whether those are mentioned in the specification or not. A list of such essential accessories must be included in the quotation.

SECTION 5

NAVIGATION AND COMMUNICATION

38. **Equipment** The following navigation and communication items to be provided. The country of origin of the items would be of USA / EU Countries / Japan. The brand and model with catalogue / brochures are to be mentioned with the offer.

- (1) 01xNavigation Radar with multi role display (16-inch approx), dome type.
- (2) 01xMagnetic Compass suitable for boat.
- (3) 01xGPS receiver and display output to multi display.
- (4) 01x Echo sounder for boat display on multi display.
- (5) 01xRudder angle indicator.
- (6) 01x Search Light with cabin control.
- (7) 01 x Complete Marine VHF Transceiver (Commercial).
- (8) 01xLoud Hailer.
- (9) 02xEmergency Lamp.
- (10) 02xClocks.
- (11) 02xBinoculars (Marine Type).
- (12) 01xInclinometer.
- (13) 01x Air Horn/whistle.
- (14) 01xGA plan (fitted in a frame board).
- (15) 02 x VHF Walkie Talkie Set with Spare Battery

39. **Arrangement of the Wheel House and Work Station.** The wheel house to be arranged in such a way that the helmsman has all the navigation and communication displays required for navigation are readily available in front of him. In addition to that he should have survey helmsman display for steering the boat. All the survey equipment like MBES, SBES, DGPS etc should be arranged in a befitting manner preferably rack mounted for the equipment and separate display console for the survey supervisor.

SECTION 6
ACCOMMODATION

40. **Accommodation.** The Boat should have Standard furnished accommodation with required facilities for the complement as follows:

- a. Seating arrangement for 8 people.
- b. 01 x Mess with 2x 2 -tier Bunks for 4 Sailors
- c. Common Toilets and Baths for 08 x Sailors.
- d. 01x Dining and recreational space for 08 x Sailors.

RESTRICTED

SECTION 7

MISCELLANEOUS

41. **Ship's Outfit:**

- a. **Weather/ Watertight Doors.** All watertight/weather tight doors in the hull and superstructure are to be of aluminium construction. The bridge door on stern side should have window for back view.
- b. **Windows, Scuttles and Porthole.** The window on wheel /bridge should be wide for clear visibility. The wheel house and working spaces should have enough windows which is easily operable for natural ventilation and lighting while air-conditioning is not operating.
- c. **Hatches and Manhole.** All watertight hatches are to be of aluminium construction and to be capable of being operated from both sides of the hatch as per class standard.
- d. **Ladder and Stair.** Aluminium vertical ladders and stair to be installed as required.
- e. **Bollards, Fairleads and other Mooring Fittings.** Aluminium Bollards, fairleads and other mooring fittings to be provided as required.
- f. **Railing and Bulwark.** Handrails and stanchions are to be made of aluminium pipe with standard dia.
- g. **Pneumatic Fender.** Six Pneumatic Fenders to be provided for each of the boats.
- h. **Bottom Plugs.** Bottom plugs with SS socket shall be fitted at bottom of water ballast and oil tanks excluding lubricating oil tanks if applicable.
- j. **Cathode Protection.** Sacrificial zinc anodes for 3 year life of adequate quantity shall be welded to the hull below the light water line on completion of painting. The anodes will be distributed around the ship's hull for efficient protection.
- k. **Painting.** Marine type, class approved, 3 years paint coating to be provided on hull and superstructure as per manufacture scheme.
- l. **Exterior Paint.** The boat exterior paint is to be as per approved paint scheme and presentable one. Paint sample must be approved by purchaser before application.

RESTRICTED

m. **Hull Markings and Name.** Draught marks should be welded and painted on each side, forward, amidships and aft of the hull. Boat's name should be marked with aluminium plate characters welded to the port and stbd of the boat.

n. **Fairlead and Bollards.** Adequate fairleads and bollards are to be fitted for securing/mooring the boat.

p. **Funnel/ Exhaust.** Funnel/exhaust to be planned as per class requirement and having special arrangement to reduce sound level and noise.

42. **Deck and Mooring Equipment:**

a. **Anchor and Chain.** One anchor for anchoring up to water depth of 7 m with a current speed of 3 kn to be provided with recommendation by the classification society. The anchor cable should be made of steel and to be stored on deck on fore part with anchor chain. There should be hatch to store anchor and chain in bow. One additional anchor is to be provided as spare. Brand, model and country of origin of the anchor and cables are to be mentioned.

b. **Anchor Winches.** Vertical Anchor Winch / Windlass with appropriate power supply from genset to be installed at forecastle including necessary reinforcement of the deck. Brand, Model and country of origin of the motor winches are to be mentioned.

c. **A-Frame.** A Marine A-Frame of 150 kg load bearing capacity with required pulleys for deploying/hoisting hydrographic survey equipment with an equipment towing winch is to be fitted at the quarter deck of each of the boats. The A-frame should be movable and the outreach from the boat has to be mentioned in the offer. The frame may be hydro-electrical or manually operated. Brand, model and Country of origin of the A-frame are to be mentioned.

d. **Boat Davit/ Derrick (optional).** One (1) davit with capacity of at least 80 kg (SWL) may be arranged at rear part of the boat for sideways lowering instrument. The outreach would be about 1.5 meter.

e. **Boat hook.** Two boat hooks are to be provided for each of the boats.

f. **Mooring Ropes.** Adequate dyneema/equivalent mooring ropes are to be provided.

43. **Furniture, Fittings, and Facilities.** Standard furniture, fittings, and facilities of accommodation, living spaces, and working areas are to be of good marine quality and must be adequate for the crew. All windows and wind shields must be of marine type tempered glass or appropriate glass of highest quality as per the standard of best marine practice and Classification Society. The wind shields will be fitted with heavy duty wipers and clear view screens. Detail of furniture, fittings and facilities are to be described.

44. **Galley Arrangement.** Mini galley facility to cook food for 08 persons. Adequate supply and exhaust blowers will be fitted to have good ventilation. Following equipment and furniture will be provided:

- a. 1 x Induction Cooker (Brand to be mentioned)
- b. 1 x Rice cooker (Capacity to be mentioned)
- c. 1 x Stainless steel sink with table.
- d. 1 x chopping board.
- e. 1 X Exhaust fan.
- f. 1 x Supply fan.
- g. Marine type fresh and seawater taps.
- h. 1 x Refrigerator.
- j. 1 x Microwave oven.
- k. 1 X Blender.
- l. 1 X Bread toaster.
- m. 1x Electric Kettle.

Mess Traps, Mess Utensils and Galley Implements: Mess Traps, mess utensils and galley implement will be supplied for officers and ship's galley as per ship's complements as ship's first outfit.

45. **Life Saving Equipment:**

- a. **Lifejackets.** 10X lifejackets (type1) has to be provided as per SOLAS standard and class requirement.
- b. **Lifebuoys.** Adequate lifebuoys has to be provided as per SOLAS standard and class requirement.
- c. **First Aid Kit.** 01 First Aid kit to be supplied.

46. **Fire Fighting Equipment/ System.** Firefighting equipment to be located in specified locations as per class and fire and safety plan.

47. **Emergency Medical Facilities.** The Boat should be equipped with at least 02 emergency first aid boxes at important spaces.

48. **Dressing Light/Illumination Circuit.** One set of dressing light/illumination circuit (LED lights) of Bangladesh Navy standard has to be fixed. In addition, darken ship illumination circuit arrangement has to be there.

RESTRICTED

49. **Ship's Colour.** The ship should be painted with standard BN colour.

50. **Spare Parts.** The following spare parts of each boat for main engine and genset are to be provided. Separate price quotation is to be submitted with the offer.

Ser	Description	Required Quantity	Unit Price
1	Piston	2 sets (1 set=1 No.x No. of Cylinder)	
2	Piston pin	20 nos.	
3	Piston rings	6 sets (1 set=1ring group x No. of Cylinder)	
4	Cylinder head gasket	6 sets (1 set=1 No.x No. of Cylinder)	
5	Exhaust valve	6 sets (1 set=2 Nos. x No. of Cylinder)	
6	Inlet valve	6 sets (1 set=2 Nos. x No. of Cylinder)	
7	Insert exhaust	6 sets (1 set=2 Nos. x No. of Cylinder)	
8	Insert inlet	6 sets (1 set=2 Nos. x No. of Cylinder)	
9	Valve spring	50 Nos	
10	Valve guide exhaust	6 sets (1 set=2 Nos. x No. of Cylinder)	
11	Valve guide inlet	6 sets (1 set=2 Nos. x No. of Cylinder)	
12	Injector complete (group)	6 sets (1 set=1 No.x No. of Cylinder)	
13	Cooling water pump rebuilt kit	6 sets (2 Nos. for each complete pump)	
14	Complete engine overhauling gasket Kit	6 sets (2 Nos. for complete engine)	
15	Lub. oil filter	40 Nos	
16	Fuel oil filter	40 Nos	
17	Bolt for connecting rod	150 Nos	

51. **Special Tools.** The following special tools are to be supplied with each boat:

- a. 1 x Propeller nut spanner.
- b. 1 Set of Propeller pulling device.
- c. 3 x Grease guns with nipple.

RESTRICTED

- d. 3 x Tool boxes (standard type).
- e. 2 sets of Socket spanners (Range to be mentioned).
- f. 2 sets of Ring spanners (Range to be mentioned).
- g. 2 sets of Open end spanners (Range to be mentioned).
- h. 2 sets of Allen key (Range to be mentioned).
- j. 3 sets of Files (Range to be mentioned).
- k. 2 x Vernier callipers (Range to be mentioned).
- l. 2 x Micrometres (Range to be mentioned).
- m. 3 sets of Adjustable spanners (Range to be mentioned).
- n. 2 x Carpentry tool boxes (Details of tools are to be mentioned).
- p. 2 x Bearing extractors (Standard size).
- q. 2 x Chain block (2 tons capacity).
- r. 2 x Chain block (3 tons capacity).
- s. 1 x Torque spanner (Range to be mentioned).
- t. 2 x Punch set (Range to be mentioned).
- u. 2 x Tool Kit Set (Brief Case of all necessary tools for electrical system).
- v. 2xSafety Harness for working in radio-electrical system fitted in the mast.
- w. 1X Portable Hot Blower.
- x. 1X Portable Hand Blower
- y. 1X Lub oil and cooling water test kit.

52. **Test Equipment.** The following test equipment are to be supplied for each boat:

- a. 1 X Digital Multimeter.
- b. 1 X Weber Tester.
- c. 1 X Clamp Tester.
- d. 1 X Megger.
- e. 1 X Digital Tachometer.

53. **Accessories.** Standard accessories for all machinery and equipment in addition to those mentioned herein are to be supplied.

54. **Manual and Booklet.** Two copy complete sets of workshop manuals, Instruction manual and Spare parts Catalogue each to be supplied by the builder/supplier for main engines, Gear box, Genset and other machineries equipment during handing over of the boats.

55. **Test and Trial/ , Inclining Experiment and Training.** Prior to keel laying, basic design and production drawing of hull and super structure is to be finalized by the approval of the Classification Society and BN's representative (Project Implementation Team). During construction, all production drawing and installation diagrams are to be approved by the BN's representative (Project Implementation Team) and on completion of each work, inspection is to be done jointly by BN's representative, Bidder/ builder and class (as applicable). Test and trials of individual equipment and machinery at various level ie FAT, STW (Setting to Work/Installation), HAT, SAT etc. as applicable are to be done jointly by the BN's representative and the Bidder. Test/ trial procedure of each stage are to be submitted to the BN's representative well in advance duly concurred by the class (as applicable) for necessary approval. Tests and trials to be conducted during HAT and SAT and their criteria/ acceptable limits are to be mentioned in the offer and approved by the BN. However, the test and trials are to include the following:

- a. **Inclining Experiment.** The inclining experiment is to be carried out upon the substantial completion of boats but before the sea trial and results are to be recorded for the calculation of the boats trim, stability, light weight and dead weight.
- b. **Factory Acceptance Test (FAT).** All machinery, equipment and items are to be factory tested. To this effect, copies of FAT certificates are to be provided.
- c. **Harbour Acceptance Trial (HAT) and Sea Acceptance Trial (SAT).** HAT to be carried out by a group of BN officers in the shipyard premises. SAT will be carried out before taking over. The test and trial of MBES by the manufacturer's engineer to be carried out during HAT followed by SAT. The test and trial for SBES, DGPS and sound velocity profiler to be carried out at the same time.

56. **Personnel Training.** Two separate trainings on operation and maintenance to be offered for five working days in Bangladesh besides the training mentioned for MBES.

57. **Validity of Offer:** The offer should remain valid for one year from the date of opening of the tender.

SECTION 8

SERVICES

58. **General.** The following types of services will be required for the construction, test/trial, and handover of the Boat:

a. **Supervision of Construction.** The construction supervision will be carried out by a classification society.

b. **Services by OEM Personnel.** The Bidder will have quote for the following services to be rendered by OEM personnel adequately qualified and well practised in relevant procedure for:

(1) Supervision of works (ie, that of installation, commissioning, tests/trials, and handover) by OEM for the main engines and the propulsion package.

(2) Supervision of works (ie, that of installation, commissioning, tests/trials, and handover) by OEM for all hydrographic equipment.

(3) Supervision of works (ie, that of installation, commissioning, tests/trials, and handover) by OEM for all navigation and communication equipment.

(4) Supervision of works (ie, that of installation, commissioning, tests/trials, and handover) by OEM for the gensets and all electrical equipment.

(5) At least a week long (ie, min 05 working days) User Training to be rendered to the Ships' Crew at builder's premises. The training will have to be separate and independent from time spent in installation.

SECTION 9

PRICE AND PAYMENT SCHEDULE

59. **Bid Price.** The quoted price is to be broken down into the following components where the Buyer will have the option to choose the whole or part of any component if so needed and/or desired:

- a. Price of design and constructional drawings.
- b. List and price of hull, material and manhour.
- c. List and Price of main machinery, auxiliary machinery, Hydrographic, Navigation, and Communication equipment will have to be quoted separately showing item wise price for each.
- d. List of OEM recommended spare parts required for 03 (three) years running (with item wise prices).
- e. Other costs like VAT, TT, commission of the local agent and any other costs not mentioned in the offer are to be quoted.
- f. In local Currency price is to be quoted with VAT and Tax.

60. **Terms of Payment.** Mode of payment shall be through bills / documents submitted by the supplier to BN. All payment shall be made in local currency (Bangladeshi Taka). Payment schedule will be under following terms and conditions:

- a. 20% of the contract price will be released after signing of the contract subject to submission of the followings:
 - (1) Performance Guarantee (PG) in the form of Bank Guarantee for 10% of the TCP is to be submitted by the Shipbuilder valid till satisfactory test, trial and acceptance of each delivery of the boat to the Purchaser. **The PG shall be released after successful acceptance of the boats** and on submission of 5% guarantee for warranty of the total contract price.
 - (2) Bank Guarantee (BG) for the amount of 10% of the Total Contract Price (TCP) is to be submitted by the Shipbuilder from a Scheduled Bank in Bangladesh to Purchaser and valid till keel laying of the boat duly certified by the classification society.
- b. 10% of the TCP is to be paid after keel laying of each of the boat duly certified by the classification society.
- c. 40% of the TCP is to be paid after arrival of Main engine, Generator and MBES for 02 Boats (20% for each boat) **duly certified by the classification society.**
- d. 10% of the TCP is to be paid after launching of 02 Boat as applicable **duly certified by the classification society.**
- e. 20% of the TCP is to be paid after test/ trial, acceptance and delivery of 02 in no Boat (10% for each boat).

61. **Special Condition.** This is to be noted for compliance that the Project is a procurement for deliverables which shall in general be considered 'Defence Stores' in Bangladesh. These defence stores shall be used only by the Defence Forces of

RESTRICTED

Bangladesh and hence are exempted from payment of custom duties and sales taxes in Bangladesh as per the Government of the People's Republic of Bangladesh, Ministry of Commerce, National Bureau of Revenue (NBR) Memo No 9 (41) NBR/Cus-IV/72/246 dated 10 Apr 1981.

62. **Mandatory Provisions to be Incorporated in the Contract.** The following are intended to be entered as an integral and mandatory part of the Contract to be signed following a successful Bid:

"Penalty".

- a. Delay in delivery will be dealt with existing DGDP rules.
- b. In case the Boat(s) fail to achieve the maximum speed as stated in the contract specification, then penalties shall be imposed on the Seller for non-compliance of the contract as per following table:

Ser	Speed Deficiency from that of Mentioned in the Contract Specification	Penalty Counted in % of Total Contract Value of Two Boat for Speed Deficiency in case of One Boat	Penalty Counted in % of Total Contract Value of Two Boat for Speed Deficiency in case of Two Boat
1.	0.10 to 0.49 knots	2%	4%
2.	0.50 to 0.99 knots	3%	6%
3.	1.00 to 1.49 knots	4%	8%
4.	1.50 to 1.99 knots	5%	10%

- c. If the deficiency in actual speed of the Boat(s) is more than 2.0 (two) full knots below the speed guaranteed in the Contract (to be signed), then the Buyer at their option may, subject to the Seller's right to effect alternations or corrections within a reasonable time after detection of such shortcoming, cancel the Contract."

and

"Warranty Period/Services.

- a. The Seller shall undertake the full responsibility to rectify, any defect in any of the Boat which is due to defective material, construction, miscalculation and/ or improper workmanship on part of the Seller and/ or its subcontractors, or to replace any such defective item, equipment and machinery, provided that the defects are revealed/ discovered during the period of 12 (twelve) months after delivery of the Boat at Seller's expense.

- c. Warranty repair/ replacement shall be accomplished in Bangladesh and within 01 (one) month of notification of the relevant defect. Otherwise warranty shall be extended by non-operational period of the equipment."

63. **Guarantee for Warranty.** The supplier shall furnish to DGDP a bank guarantee for warranty in any schedule bank in Bangladesh after satisfactory handing over of the boat an amount equivalent to 5% (five percent) of the Total Contract Price for two boats or 2.5% (two and half percent) of the Total Contract Price for each boat which shall remain valid until expiry of the Warranty period.

64. **Delayed Delivery.**

a. Delay in delivery of any of the boat shall mean partial delay in delivery and shall be dealt individually. The Buyer is satisfied that the failure to deliver boat within the scheduled delivery period has been for reasons within the control of the bidder, and/or if the Government has suffered loss for reasons of belated delivery, liquidated damages, shall be recovered at the rate of 2% but not less than 1% of the value of each boat per month or fraction thereof of the period exceeding the original delivery period, subject to the provision that the total liquidated damages thus leviable will not exceed 10% of the contract value of each boat.

b. Delay in the delivery of each boat up to 21 days shall be regarded as 'Grace Period' available to the supplier and the delivery date (ending as of 12 O'clock midnight of Bangladesh Time on delivery date) will be considered to have been automatically extended up to that limit without issuance of any liquidated damages. For delays beyond 21 days, formal amendment to delivery period shall be calculated from the original delivery date given in the contract.

c. As soon as it is apparent that, the dates of delivery cannot be adhered to, the Supplier shall send an application for extension of delivery period to the Purchaser. If failure to deliver within scheduled time as aforesaid shall have arisen from any cause which purchaser may admit as a reasonable ground for the extension of delivery period, the Purchaser may allow such additional time as he considers to be justified without imposing liquidated damages. If the delay is considered by the purchaser due to reasons within the Supplier's control, the liquidated damages will be applied on delayed delivery. The Decision of the Purchaser on the issue shall be considered as final.

d. But if the Delay in Delivery of each boat continues for a period of more than 210 (two hundred and ten) days beyond the date upon which the delivery is due under the terms of this CONTRACT, then, in such event and after such period has expired, the Purchaser may, at its opinion, cancel this contract by serving upon the Supplier a notice of cancellation directed to the Suppliers addresses given in this contract.

e. For the purpose of this article the delivery of boat shall be deemed to be delayed when and if boat after taking into account extension of the delivery date or permissible delays as provided in the contract, is delivered beyond the date upon which delivery would then be due under the terms of the contract.

f. During delivery if number of item. Items remains short supplied which shall not affect/hamper operational capability of boat, delivery of boat may be accepted by the Purchaser, under mutual agreement between the Purchaser and Supplier as specified in Art No 44.

g. If delivery of the boats are delayed due to any dispute or delay in test and trial, the Supplier shall borne all the relevant expenditure in regard to the port, utility, consumables and other charges beyond the scheduled delivery date.

65. **Force Majeure.**

a. Notwithstanding the provision of the previous clauses, the Supplier shall not be liable for forfeiture of its performance security, liquidated damages or

RESTRICTED

termination for default if and to the extent that its delay in performance or other failure to perform its obligations under the contract is the result of an event of force majeure.

b. For purposes of this clause, force majeure means any event, act or other circumstances, beyond control of the Supplier and not involving the Supplier's fault in or negligence and not foreseeable. Such events may include, but are not restricted to acts of the Purchaser either in its sovereign or contractual capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions and freight and embargoes.

c. If a force majeure situation arises, Supplier shall promptly notify the Purchaser in Writing of such condition and the cause thereof. Unless otherwise directed by the Purchaser in writing the Supplier shall continue to perform its obligations under the contract as far as is reasonably practical, shall seek all reasonable alternative means for performance not prevented by the force majeure event.

66. **War Risk.** In this clause, 'War Risks' means any blockade or any other actions which are announced as a blockade by any government or by any belligerent or by any organizations, sabotage, piracy or any actual or threatened war, hostilities, warlike operations, civil war, civil commotion or revelation. If at any time before the boat commence voyage or during the voyage it appears that performance of the contract will subject the 2Xboat or their crew to war risk at any stage of the voyage, the supplier has the right to stop the voyage. In all the rest not stipulated in this clause is related to 'War Risks' the parties shall be guided by the clause 'War Risks' of "Uniform General" (as revised 1922, 1976 and 1994). Code name "GENCON" recommended by "The Baltic and international Maritime Conference".

67. **Omission.** In case the Supplier fails to supply/provide any of the items (i.e. machinery, equipment, sensors, missile system and armaments etc) within the scope of supply of the contract for construction of boat, the contract price shall be adjusted by deducting the quoted price of the item along with 25% penalty based on the contract price of the item. If the price of the item is not quoted in the original offer, the purchaser shall have the right to determine the price of the item based on procurement price of similar item by the Purchaser through DGDP/ NSSD, Dhaka or any other means. However, any omission/ correction may be made under mutual agreement between the Purchaser and Supplier.

68. **Arbitration.** All legal dispute of whatever kind arising out of the contract concluded between the parties including disputes regarding validity of contract shall be settled wherever possible amicably with the exclusion of ordinary Court of Law. Will this not be possible the dispute can/ shall be settled with the strict application of the law of the land under the rules of arbitration of the Bangladesh Chamber of Commerce/ International Chamber of Commerce by Arbitration appointed in accordance with the rules. The said court of arbitration having jurisdiction is explicitly competent to decide overall legal dispute arising from or concerning the Contract. The Court of Arbitration shall have the right to determine its own rules of the procedure in its absolute discretion. It shall, however, grant both the parties opportunity to present their case and their proofs in writing and by words of mouth in the course of the proceedings. Place of Arbitration will be at Dhaka, Bangladesh.

RESTRICTED

69. **Legal and Financial Issues.** All legal and financial issues mentioned in this specification are to be fully complied/ agreed by the Supplier. Beside, all legal issues will be governed by Bangladesh Defence Purchase Regulations, DP-35, AFD policy for Procurement, other procurement related rules and regulations in practice for Bangladesh Defence Forces.

70. **Condition of acceptance of quotation.** Quotation will not be accepted if detailed information/specification, original catalogues etc. as mentioned above are not provided.

71. **Compliance statement.** All equipment and spares to be provided must be of brand new condition. Following points should be followed:

a. Article wise reply against BN requirements is to be given clearly. A compliance statement fulfilling all the requirement of this technical specification along with original OEM certificates/authorized certificates from OEM is to be submitted for evaluation of the quotation. An incomplete compliance statement may attribute to cancellation of the offer.

b. If any clause of this specification does not commensurate with offered item, the deviation has to be spelt out clearly.

(Member Secy)

DNW&EE (Rep)
(Member)

DNE (Rep)
(Member)

DSig (Rep)
(Member)

DNP
(Member)

DNO
(Member)

(President)

policy for Procurement, other procurement related rules and regulations in practice for Bangladesh Defence Forces.

71. **Condition of acceptance of quotation.** Quotation will not be accepted if detailed information/specification, original catalogues etc. as mentioned above are not provided.

72. **Compliance statement.** All equipment and spares to be provided must be of brand new condition. Following points should be followed:

a. Article wise reply against BN requirements is to be given clearly. A compliance statement fulfilling all the requirement of this technical specification along with original OEM certificates/authorized certificates from OEM is to be submitted for evaluation of the quotation. An incomplete compliance statement may attribute to cancellation of the offer.

b. If any clause of this specification does not commensurate with offered item, the deviation has to be spelt out clearly.

(Member Secy)

DNS (Rep)
(Member)

DNP (Rep)
(Member)

DNIT
(Member)

DNAI&S
(Member)

DNE
(Member)

(President)

RESTRICTED