TENDER SPECIFICATION MARINE BRIDGE SIMULATOR (QUANTITY - 01 SET)

SECTION-A: GENERAL INFORMATION

1. **Name of the Equipment**. Marine Bridge Simulator.

2. **Quantity**. 01 (One) Complete Set.

3. **Installation Site**. The Marine Bridge Simulator with required features, configuration, software application and associated accessories shall be installed in a Naval Base (SMWT, Chattogram) of Bangladesh Navy (BN) as Turn-Key basis. The term 'Turn-Key' basis means the Bidder/ Supplier shall be responsible for system design, manufacture, supply of equipment and software, installation at designated site of BN, commissioning of overall system, tests & trials, training and handing over to the Purchaser for immediate operation.

4. **Purpose**.

   a. The purpose of Marine Bridge Simulator is to impart training on navigation and ship handling to BN personnel. The simulator shall be used for basic, medium and advanced crew training on navigation, ship handling, blind pilotage, passage planning (coastal/ off-shore and ocean navigation), rules of the road (ROR), navigation during rough sea, navigation in hazardous situation/ restricted visibility (i.e. fog, heavy rain, heavy wind, sand storm, cyclone, etc.), tugging simulation, man overboard drill, search and rescue (SAR) operations, ship's system failure/ breakdown drills, fire/ damage incident, emergency procedures, replenishment at sea (RAS), Towing, etc.

   b. The simulator shall look similar to the bridge of modern warship, so that trainees can feel realism in simulator. It shall simulate interactive functionalities of modern warship bridge to generate a feeling to the trainees as if they are handling a warship in a realistic way in maritime environment.

5. **Brand**. To be mentioned.

6. **Model**. To be mentioned.

7. **Year of Manufacture**. 2024 or later (To be mentioned).

8. **Country of Origin**. Australia, Canada, Denmark, France, Finland, Germany, Italy, Japan, Netherlands, Norway, Spain, Switzerland, Sweden, Turkey, UK and USA.

9. **Country of Manufacture**. Australia, Canada, Denmark, France, Finland, Germany, Italy, Japan, Netherlands, Norway, Spain, Switzerland, Sweden, Turkey, UK and USA.

10. **Manufacturer**. Name & Full Address with telephone number and e-mail of Manufacturer are to be mentioned.

11. **Bidder/ Supplier**. Name & Full Address with telephone number and e-mail of bidder/ supplier and local agent are to be mentioned.

12. **Local Agent**. Name & Full Address with telephone number and e-mail of supplier and local agent are to be mentioned.

13. **Simulation Standard.** The Marine Bridge Simulator software shall comply with HLA/ DIS standard. The design, development, operation and functional configuration of the simulator and its sub-system shall conform to the standard of the relevant aspect of IMO, SOLAS Convention, STCW-2010, IALA, IEEE, IEC, DNV, etc. as applicable. The applicable standard(s) of the simulator and each offered item are to be mentioned and supported by the Original Equipment Manufacturer (OEM) brochures/ certificates.

14. **Qualification of Bidder/ Supplier**.

a. Manufacturers of Marine Bridge Simulator/ Naval Simulator or their authorized distributor/ agent can submit offer as Bidder/ Supplier through their authorized local agent enlisted at DGDP, Bangladesh. In case of offer from distributor/ agent, relevant certificate of dealership/ agency ship from OEM is to be submitted with the offer.

b. The Manufacturer shall have at least 10 (ten) years working experience on developing, manufacturing and supplying Marine Bridge simulator and supplied, installed, commissioned, and maintained such simulators in at least 10 (ten) maritime forces around the world.

c. Bidder/ Supplier's qualification shall necessarily be satisfied by relevant documentation such as client list, ISO 9001 certification/ CMMI Level 3 certificate, compliance statement and at least 10 (ten) client's list with name, postal address, email address and telephone number.

d. Bidder shall have the capability to provide local presence and service support team for maintenance and operational support as and when required by BN during warranty period. Bidder shall provide certificate in this regard mentioning the response time and procedure for such support.

15. **Bidder's Responsibility**.

a. The Bidder is to submit their offer in the double envelops system as per the DGDP's rule namely Technical Offer and Financial Offer.

b. It is the responsibility of bidder to have a valid Government Assurance Certificate that there is no restriction from the respective Government to export the offered system and its ancillary equipment to Bangladesh and export permit shall be issued to the bidder if the contract is awarded (if applicable).

c. Bidder shall quote all main equipment and optional equipment as mentioned in section-B in foreign currency (USD/Euro/GBP) on Free on Board (FOB) basis. However, equipment, hardware, furniture, accessories supplied from local market are to be quoted in local currency. If any other item to be imported from foreign market, their price also needs to be quoted in foreign currency. However, price of optional items shall not be considered as criteria for selecting the lowest bidder. BN reserves the rights to select all/partial /none of the optional items.

d. Bidder is to comply with all clauses of this tender specification. The bidder is to submit full specification and relevant documents, latest brochures of the items and system along with the offer. The information in brochures needs to be self-explanatory and must support and validate the information mentioned in the tender specification.

Deviation or variation of information between the brochure and formally offered documents would be treated as non- compliance.

e. Bidder is to provide the detailed explanation of the technical and cross reference to relevant pages of their offer/ original supporting documents. The bidder is to provide performance /technical data, specific figures and information as asked against each condition of tender specification.

f. The bidder may request for clarifications on any issue relating to the information contained in the tender specification from NHQ (Directorate of Naval Training) in writing with an information copy to DGDP.

g. All items proposed/supplied under this tender specification are to be brand new with original packing. Necessary certificates in this regard are to be provided at the time of delivery. Newly developed product under trial will not be accepted. The strict compliance of this article is to be ensured by the Bidder.

16. **Pre-Bid Meeting**. The Bidder shall attend a pre-bid meeting at NHQ within 03 weeks from the day of floating the tender by DGDP. In that case, Bidder is to submit necessary information and bio-data including photography and passport information of the team to NHQ (Directorate of Naval Training) at list two weeks before the meeting for arranging necessary security clearance. The date and time of the Pre-Bid meeting shall be informed to all concerned.

17. **Pre-Bid Site Survey**.

a. The Bidder or their local representative shall conduct a pre-bid site survey with prior permission and on pre-agreed schedule from NHQ to assess/ determine precisely the action required for the installation of the offered Simulator and its ancillary equipment at the designated site. The Bidder shall assess all the installation requirements for the Simulator which may include the site preparation works such as earthling, laying of Inter-facility link (IFL) cables in conduit metal pipes, necessary foundation, civil engineering, electrical, lightning protection and other works.

b. The Bidder may submit a site survey report with the offer (optional). If submitted, Site survey report shall contain detail information including layout plan for Simulator, Indoor equipment, power arrangement, Network management, Briefing Room, Instructor Room, Server Station, etc. The Bidder shall submit necessary information and bio-data including photography and passport information of the site survey team to NHQ at list two weeks before the date of site survey for arranging necessary security clearance.

18. **Presentation By Bidder**. The Bidder may be required to give a presentation at NHQ on their tender offer as desired by BN any time after submitting the offer at Bidder's expense. The presentation shall cover detail aspects, which have been covered in the Bidder's proposal for clarity.

19. **Additional Feature offered by Bidder**. The Bidder may offer additional features which are not asked in the tender specification. In this case, Bidder shall explain the detailed advantage of that/ those features.

20. **Project Schedule**. Project schedule including timeline for manufacture, assembly, development, site preparation, installation of hardware, integration, configuration, testing and commissioning is to be submitted with the offer.

21. **Evaluation Procedure**. The offer submitted by the Bidder(s) shall be evaluated based on following elements:

a. Compliance to eligibility criteria for bidding.
b. Compliance to the Tender Specification.
c. Financial Competitiveness of the Offer.

22. **Compliance Statement**. Bidder shall mention compliance/ non-compliance against each condition/ article. A compliance statement fulfilling all the requirement of the tender specification is to be submitted with the tender offer for evaluation. BN preserves the right to reject those offers which merely mention 'Complied/ Agreed' without highlighting required information/ data/ figures/ graphs as asked against each condition. Stating mere 'Yes or No' will not suffice and detailed evidences with description/ information, brochures/ booklet, drawing and diagram as required is to be given. An incomplete compliance statement may attribute to cancellation of the offer. If any clause of this specification does not commensurate with the offered Simulator, the deviation has to be spelt out clearly. Bidder shall comply all the terms and conditions of the tender specification as per below compliance statement tabular format:

Tender Article No	Description of Tender Terms and Condition	Compliance/Remarks by Bidder

SECTION-B: TECHNICAL SPECIFICATION

23. **Name of the Equipment**. Marine Bridge Simulator.

24. **Quantity**. 01 (One) Complete Set.

25. **Scope of Supply**. The offered Marine Bridge Simulator shall be scalable system, which is to be offered as "Turn-Key" basis. The scope of supply is as follows, but not limited to:

a. 01 (one) x Complete set of Marine Bridge Simulator with Server, Software and associated accessories consisting of followings:

(1) 01 (one) x OLED Screen-based Full Mission Bridge Simulator and necessary equipment.

(2) 02 (two) x OLED Screen-based Mini Bridge Simulator and necessary equipment.

(3) 01 (one) x Blind Pilotage Station and necessary equipment.

(4) 01 (one) x Instructor Control Station and necessary equipment.

(5) 01 (one) x Briefing/ De-briefing Station with necessary equipment.

(6) 01 (one) x System Server with RAID system and necessary equipment.

(7) 01 (one) x Database Management Station and necessary equipment.

(8) 01 (one) x Game Testing Station with necessary equipment.

(9) 01 (one) x Set of Communication System (GMDSS as part of the Full Mission Bridge) with necessary equipment.

b. Installation, Supervision, STW and Commissioning (as per paragraph 80).

c. Test, Trail and Final Acceptance (as per paragraph 81).

d. Training (as per paragraphs 71-74).

e. Spares and Tools (as per paragraphs 60 and 61).

f. Backup Software, Electronic Charts and Manuals (as per paragraphs 59 and 76).

g. Auxiliary/ Ancillary Equipment (as per paragraph 62).

System Specification of Marine Bridge Simulator

26. **General Features**. The simulator software, equipment, servers, hardware and other accessories shall be user-friendly to facilitate trouble-free operations with minimum intervention of the operators/ maintainers. The simulator shall provide following facilities, but not limited to (details to be mentioned in the tender offer):

a. Requisite features to create real time training scenario in developing skills and proficiency of officers and sailors by building confidence on navigation in different scenario.

b. Able to conduct basic navigation and ship handling as well as advanced level navigation, maneuvering and complete team training in the bridge.

c. Able to provide training on different navigational situations/ hazards, tug handling, machinery breakdown and damage control situation.

d. Instructor control station shall control and manage the simulation parameters, as well as role-play the other entity in the scenario.

e. The main and mini bridges (total three) are to be operated both simultaneously and/or independently.

f. The system shall allow to incorporate new harbor/ platform/ navigational hazards/ navigational aids, etc. in the game scenario.

g. The system shall be able to provide recording and playback function to easily evaluate and assess trainee's performance during scenario executions.

h. The system shall incorporate 12 own ship, 50 different target ships, gaming areas with specified ports, harbor and navigation area of coverage (as mentioned).

27. **Simulation Features**. The simulation features shall include followings, but not limited to:

a. Navigation & ship handling, training & practices in different navigational scenario including passage planning, coming alongside, casting off, anchoring/ weigh anchoring, leaving/ entering harbor, navigation in restricted water, coastal/ offshore/ ocean navigation, navigation in heavy seas, handling of tug and other instructor designed navigational hazards.

b. Individual training on navigation, wheeling, engine control procedure, bridge communication procedure and orientation with standard bridge console including navigational equipment training on Radar/ ARPA, Blind Pilotage, ECDIS, GMDSS, AIS, GPS, Echo sounder, Look-out duties, anchoring/ mooring, chart work, and autopilot etc.

c. Multi-unit training on ship handling in-company, multi-unit RAS procedure, towing procedure, naval formation station keeping, etc.

d. Navigation and maneuvering training in different weather and environmental conditions (offshore/ onshore wind and currents, calm sea to very rough sea, day to night time, clear visibility to thick fog and precipitation as well as navigation in coral region).

e. Navigation and maneuvering training in different traffic conditions in the area of specified channel and straits including application of ROR (International Regulations for Preventing Collisions at Sea 1972) and COLREG (Collision Regulations).

f. Emergency breakdown drills/ procedures (man overboard, collision & grounding, power failure, steering gear failure, gyro failure, engine failure, fire onboard, etc.).

g. Command Team Training on bridge watch-keeping procedure, blind pilotage etc.

28. **Simulation 3D Database**. The simulation database shall include following features, but not limited to:

a. **Area Database**. Bidders shall provide a detailed list of available ports and navigation areas, with indication of the area coverage. The system shall provide database of geographic areas (inconspicuous objects, transits, navigational marks, buoys & beacons) and ships model in 3D, which shall be suitable for inland, coastal, offshore and ocean navigation. The database shall include gaming areas as required. The system shall have the option to update/ edit the area database and other database. The database shall have minimum total 35 items including following preferred items:

(1) **Ocean and Seas**.

(a) Bay of Bengal.
(b) Arabian Sea.
(c) Andaman Sea.
(d) Persian Gulf.
(e) Red Sea.
(f) Mediterranean Sea.
(g) South China Sea.

(2) **Important Straits including Traffic Separation Schemes (TSS)**.

(a) Malacca.
(b) Singapore.
(c) Dover.
(d) Hormuz.
(e) Gibraltar.
(f) Dondra Head.
(g) Bab al-Mandeb.

(3) **Important Canals**. Suez.

(4) **Important Ports**.

(a) Al-Salalah (Oman).
(b) Jeddah (KSA).
(c) Vizag (India).
(d) Karachi (Pakistan).
(e) Langkawi (Malaysia).
(f) Yangon (Myanmar).
(g) Beirut (Lebanon).
(h) Colombo (Sri Lanka).
(i) Port Blair (India).
(j) Changi (Singapore).
(k) Mumbai (India).
(l) Halda (India).
(m) Sittwe (Myanmar).

(5) **Local Ports and Harbours**.

(a) Approaches to Karnaphuli Channel including Chattogram Port.
(b) Approaches to Zulfiquar Channel including Pussur River and Mongla Port.
(c) Approaches to Rabnabad Channel including Payra Port.
(d) Approaches to Pekua Channel.
(e) Approaches to St Martin's Anchorage.
(f) Chattogram Port Outer limits and adjacent areas.
(g) Matarbari Deep Sea Port and adjacent areas.

b. **Own Ship Models**.

(1) Bidders shall provide own ship model depicting BN Frigates and other suitable ships of following 12 (Twelve) categories:

(a) Modified ULSAN Class FFGH (BNS BANGABANDHU).
(b) Type 053 H3 JIANGWEI II Class FFG (BNS UMAR FAROOQ).
(c) HAMILTON Class FF (BNS SAMUDRA JOY).
(d) Type C13B SHADHINOTA Class FSGHM (BNS SANGRAM).
(e) CASTLE Class FSGH (BNS DHALESHWARI).
(f) ISLAND Class OPV (BNS GOMATI).
(g) DURJOY Class PGG (BNS NIRMUL).
(h) MADHUMATI Class PSO (BNS MADHUMATI).
(j) MEGHNA Class Fishery Protection Vessel (BNS MEGHNA).
(k) PADMA Class PBO (BNS SURMA).

(l) RIVER Class Mine Sweeper (BNS SHAPLA).
(m) Coastal Tug (BNT HALDA) (with full mission bridge only).

(2) The models shall include hydrodynamic features and 3D view of the unit having the same behaviors of real ships. The models shall have 6 Degree of Freedom (DOF) characteristics.

(3) The following general data shall be modeled, but not limited to:

(a) Type.
(b) Call sign.
(c) Length and Breadth.
(d) Draught (forward and aft).
(e) Displacement and Deadweight.
(f) Speed data (full ahead, astern, telegraph table and crash stop distance).
(g) Engine data (number of engines, power, revolution table for both ahead and astern, bow thruster, etc.).
(h) Propulsion data (number of propellers, CPP, propeller blade area ratio, number of blades etc.).
(j) Rudder and Steering data.
(k) Anchor data and other accessories related to anchor.
(l) Squat, shallow water effects, canal effect, bank effect, interaction forces, etc.
(m) Grounding and collision effect.
(n) Autopilot data.
(p) AIS data.
(q) Winch data.
(r) Ship's boat data including boat operations.
(s) RAS and towing operations data.

(4) **Own Ship Hydrodynamic Features**.

(a) Own ship model shall include sailing and maneuvering using ship's controls at all speeds, in all water depths, in channels and banks, in wind and current.

(b) The momentary environmental condition (ship to ship interaction, water depth, bank effect, current velocity, high and low water, wind direction and force) shall be considered from the ship's current position and they will provide input to the hydrodynamic model along with command input from the bridge equipment in order to generate the realistic impact.

(c) The hydrodynamic model shall include ship's equipment such as main engines, auxiliary devices (different pumps, motor, azipod, thrusters, etc.), steering gear, rudder, propeller, etc. and other items for external forces like mooring lines, tugs, anchors, etc.

c. **Target Ship Models and Objects**.

(1) The library shall include minimum 50 different target ship models generally common at sea. The model or objects in the library shall at least include the following, but not limited to:

(a) Aircraft Carrier.
(b) Destroyer.
(c) Frigate.
(d) Submarines.
(e) Corvettes.
(f) LPD.
(g) OPV.
(h) Oil Tankers.
(j) Hovercrafts.
(k) Sea Plane.
(l) Merchant Ships.
(m) Harbor/ Ocean Tugs.
(n) Barge.
(p) Container Vessel.
(q) Cargo Vessel.
(s) Feeder vessel.
(t) LPG/ LNG Carrier.
(u) Mother Tanker.
(v) Bulk Carrier.
(w) Car Carrier (Roll on/ Roll off) Ferries.
(x) Coastal Cargo Vessel.
(y) Oil Rig/ Platform.
(z) Fishing Boats.
(aa) Artisanal Fishing Boats.
(ab) Industrial Fishing Trawlers.
(ac) RHIB.
ad) Pilot Boats/ Vessels.
(ae) Sailing Boats.
(af) Yacht.
(ag) A wide range of floating nets/ objects, etc.

(2) The hydrodynamic model of target ship and objects shall be designed such a way that they will behave and interact realistically during simulation applying integrated advanced physics engine. The models shall have 3 Degree of Freedom (DOF) characteristics.

d. **Mathematical Modeling and Tools**. The simulator shall be able to work on principles of mathematical vessel models to calculate motion of the ship and dynamics of other physical phenomena. It shall be able to calculate the impact on hydrodynamics and hydrostatics due to buoyancy force, vessel drag, added mass, influence of propulsion/ thruster's units, weather & environmental force, etc. In addition, the system shall provide the features and facilities for editing and modification of existing models, and creation of new models of ships, ports, harbour, etc.

e. **Entity Collision with Land**. Entities which hit land, get aground or collide with other vessels shall be frozen in their position and the controller shall be notified that the entity has collided or is aground. The entity shall remain frozen in position until the controller changes their position or changes their heading to a new course which would have avoided the collision or grounding.

f. **Simulation Environment**. The databases shall contain one triangular mesh for the sea bed and another for the terrain. The triangular mesh shall be both visual and mechanical, which means that a ship shall ground when sailing into the sea bed triangular mesh. The transition between areas (databases) shall be seamless. It shall be possible to specify time-zone, temperature in air and sea, sun's position, either automatically or manually based on the time of the year/month/day. The weather shall have options to be specified i.e. fog, snow, rain, hail, storm, etc.

g. **Ocean State**. It shall be possible to vary waves, swell, wind, current, tide, etc. from their default values as per instructor's choice.

h. **Sea Bed**. It shall be possible to vary sea depth, type of sea bed, etc. from their default values as per instructor's choice.

j. **Support for 3D Modeling of Local Area**. BN shall provide necessary support to the Bidder/OEM for photo shoot, video graphy and site visit at designated local area/ ports/ harbours to create 3D model for the simulator. However, the prepared 3D model of local area/ ports/ harbours will be confidential and BN property, which will not be deliverable to any third party. In this respect, a non disclosure agreement (NDA) shall be signed by the Bidder/OEM and BN to maintain the confidentiality of the information and database. Moreover, Bidder is to submit necessary information and bio-data including photography and passport information of the team to NHQ (Directorate of Naval Training) at list eight weeks before the schedule visit for arranging necessary security clearance.

29. **Record and Replay Facility**. The simulator shall have the facilities for playing, replaying, recording and evaluating the exercises. The system shall have adequate storage device to store all recorded files for covering minimum 30 days exercise activities. It shall have following facilities, but not limited to (details to be mentioned in the tender offer):

a. Recording and monitoring of any Bridge station in real-time to replay it directly for effective debriefing.

b. Recording of all voice communications with an option to replay in sync with exercise time.

c. Record and replay option of exercise data and scenarios.

d. Accelerate/de-accelerate option to play/ replay speed, jump to a specific marker in the timeline, and other tools.

30. **General Arrangement/ System Composition**. The Marine Bridge simulator shall have the following system composition, but not limited to (details to be mentioned in the tender offer):

a. Instructor Control Station.

b. OLED Screen-based Full Mission Bridge Simulator.

c. OLED Screen-based Mini Bridge Simulator.

d. Blind Pilotage Station.

e. Briefing/ De-briefing Station.

f. System Server with RAID system

g. Database Management System

h. Game Testing Station.

j. Communication System.

k. Back-up Power System.

31. **Instructor Control Station**. The instructor control station shall have the capabilities and facilities to accommodate at least 08 (eight) bridges. It shall have the following features, but not to be limited to (Details are to be mentioned in the offer):

a. It shall have the full control of the tactical scenario which shall have the provision to modify the exercise conditions. Moreover, instructor shall be able to role-play different functions in different scenarios.

b. It shall include recording and playback with assessment system on trainees' performance for de-briefing.

c. The simulator shall have the facilities to run single or multiple exercises in the bridges simultaneously.

d. It shall have user-friendly tools which shall cover:

(1) Exercise scenario based on official nautical charts with an option to incorporate ENC for the exercise areas.

(2) Injection of on-board emergency situations.

(3) New exercises creation, management of existing exercises, Start/ Freeze/ Stop/ Rewind, Record/ Replay, Zoom In/ Out, etc.

(4) Display of exercise parameters and bridge operation (window for monitoring the cubicles operations and the status of each navigational aid, and management of waypoints, target ships, shore/ land based fixed targets, etc).

(5) Management of scenario's environmental conditions, date and time (affected by Lat/ Long data), lighting status (Sun, Moon, Generic Stars), sea state (9 levels, Douglas scale with wave period and height set up), wind (in knots and degrees with the option to set gusts), currents and tidal streams, showers, visibility state (smooth transition from dawn to dusk to night and from clear visibility to haze to fog to rain and in combination), etc.

(6) Anchor management (up to 2), mooring lines management (up to 8).

(7) Failure and alarm management.

(8) Event scheduling (alarms, visibility, environmental conditions, etc.).

(9) Management of buoys and traffic lights (standard IALA A and B).

(10) Management and generation of distress signal as an input for GMDSS.

(11) Creation, editing of scenarios and configuration of bridges.

(12) All other tools to manage the functionalities of individual bridges.

e. **Overhead Instrument Panel**. The instructor control station shall have a separate overhead instrument panel consisting of different monitors (as applicable) to display the status of propulsion, machineries, navigation, exercise session, internal and external situation, navigation & meteorological aid display, etc. The details are to be mentioned in the offer.

f. **Computer Control Facilities**. The instructor shall have the facilities to monitor, control, restart or reboot any system computer. On selecting a system PC, the application shall give details about the running application and the machine configuration. The interface shall be intuitive and easy to manage, and it shall acts as a diagnostic tool.

g. **Trainee Assessment System**. The assessment system shall provide an objective assessment of the exercises performed by the students based on pre-set criteria. Details are to be mentioned in the offer. The simulator supplier should include training on assessment system as part of the training package.

32. **Full Mission Bridge Simulator**. The Full Mission Bridge Simulator shall have the following features (but not limited to) with the flexibility of variation in composition and layout (detail features are to be mentioned in the tender offer):

a. **Helmsman Display and Control**. Helmsman visualization shall depend on the selected ship model in use, its navigational lighting arrangement, propulsion characteristics and relevant gauges/indicators (single/ dual rudder, fixed or variable pitch, azimuthal, etc.). The controls will be in the form of wheel, joystick, push buttons/ switches, etc. as applicable.

b. **Conning Monitor**. Conning monitor shall be able to display all relevant data according the own ship model loaded. The conning monitor shall display the related information but not limited to: position Lat Long, gyro and magnetic compass graphic, heading indicator, calculated speed (Knots), speed over ground and course over ground, speed log information, rate of turn, wind speed and direction, rudder angle indicator (numerical and graphic), propulsion data, compressed air availability (for direct shaft propulsion), thruster indicator, etc.

c. **Auxiliary Monitor**. One or more auxiliary monitor shall be used for other functions according to own ship specifications and its operations. The functional display shall include shipboard operations like, RAS, Towing, Man overboard, SAR, winch operations, ship's boat operations etc. The interactive panels shall allow controlling the vessel equipment according to own ship specification.

d. **Chart Table**. The frame of the chart table may be metal frame complete with touch monitors for displaying as follows but not limited to: Echo Sounder, Anemometer, Meteorological Instrument (barometer, barograph, hygrometer) Display, Cartographic GPS, AIS Bridge Panel, EPIRB, Alarm (fire and generator) Control Panel. The simulator manufacturer should also include the option of digital chart and its integration with Simulator

e. **Radar/ ARPA**. The system shall be equipped with the Radar/ ARPA simulation having related operator display and radar control features. It shall simulate all options of a modern navigation radar.

f. **ECDIS**. The system shall have a modern ECDIS with all kind of related features.

g. **GMDSS**. The system shall have a GMDSS station with generic interface and features.

h. **GPS**. The system shall have the facilities to simulate GPS with generic interface and features. The device status shall influence all other GPS based device, if the GPS receiver is OFF therefore the position data is not communicated to the other devices (ECDIS, Radar, etc) that rely on GPS data. Errors can be injected and precision can be diluted from the instructor that can insert the requested error.

j. **AIS System**. The simulator shall have AIS device with generic interface and features. It shall visualize such device in the chart table. The device status shall influence the other entire device that retrieved AIS data, in particular if the AIS transponder is OFF therefore the AIS target data, for instance, shall not be available for ECDIS and Radar/ ARPA.

k. **Echo Sounder**. The simulator shall include a graphic echo sounder plotter with generic interface and features. It shall have the facilities to adjust scale, clutter, change unit, colors, and set up alarms.

l. **Multifunction Clock**. A multifunction digital clock shall be displayed on the upper screen portion of chart table to show game time and actual time.

m. **Sound Generation**. The system shall include the sound generation module with all the hardware and software needed to have a high-end sound and vibration system. It shall be able to generate coherent sounds for own ships, target ships, scenario objects (bells, sirens, etc.) and environmental objects. Own ships and target objects shall have different sound according object definition in the database system. Being a stereo quadraphonic system, it shall create the effects of left-right and front-back sound. The doppler effect shall also be presented.

n. **Fire Safety Alarm Panel**. The fire alarm panel shall allow simulating the procedures to be performed in the event of a fire (under the control of the instructor).

p. **Machinery Failure Situation**. The system shall provide the facilities to simulate all kind of machinery failure situation under the control of instructor.

q. **EPIRB Transponder**. The system shall be equipped with software based EPIRB Direction Finder system with generic interface.

r. **Visual Generation System**.

(1) The full mission bridge simulator shall use the latest release of rendering software engine. The visual engine shall be developed to have a high resolution realistic virtual scenario, in all the conditions, at a high frame rate.

(2) The visual system composed of a large screen with a horizontal field of view of minimum 270^0 and vertical field of view of minimum 35^0. A set of 85" or more screen shall be vertically placed in this regard to enhance the smart viewing angle.

(3) Bridge shall have 02 (two) VR headsets which will be used for RAS, towing, anchoring and weigh anchoring, lookout functions, close-view of own ship, etc.

(4) The system shall generate a multi-texture sea with variable color and simulation of the transparency effect of the water. The sea state shall be variable both in wave height, direction and period within the Beaufort scale (1-9 levels). It shall affect own ship and target ship movement according to the dynamic environmental conditions with visual impact.

(5) The range of visual conditions shall be programmable from day to sunset to night with smooth transitions from one to the other with neither interruption of the simulation nor interruption of the visual image, including variation from clear visibility through haze, fog, poor visibility to dense fog. The conditions of reduced visibility shall be simulated with a gradual transition between the different states in real time.

(6) The system shall able to automatically generate navigation lights, navigation marks as well as environmental lights. The lights shall be capable of showing any combination of colors, sectors, rhythms, intensities and other characteristics appropriate to the maritime environment in conformity with IALA "A" and "B" Buoyage System.

(7) The system shall correspond with daylight images of navigation marks as described before. The visual system shall display the navigation and other lights and shapes of traffic ships as appropriate to their aspect and position relative to the own shipping in compliance with the International Regulations for Preventing Collisions at Sea.

(8) The system shall generate bow and stern waves related to the target speed, combustion fumes, other elements (e.g. radar antenna rotation animation), etc. Wind dependent sea state (force and direction) texturing and swell shall be provided to simulate conditions up to Beaufort Wind Scale force 1-9.

(9) The system shall be capable of displaying minimum 50 (fifty) target ships together with the coastal characteristics and elements related to navigation. Each target ship can be replicated as per the requirement of the exercise.

(10) The 3D visual scenes shall show enough detail of close maneuvering and interaction of own ship with other objects in a realistic way.

s. **SAR Module**. The simulator shall have SAR module to realistically simulate search and rescue operations, man-over-board operations, night search and navigation with searchlight, etc. This module shall include:

(1) A set of target objects like life raft, lifebuoy, man at sea, rescue boat, helicopter, dismasted sailing boat, capsized ship, etc.

(2) A set of visual effect/objects like rockets, dye marker, smoke signal, etc.

(3) EPIRB/ RDF panel for individual bearing of active emergency beacons.

t. **Crisis Module**. Crisis module may allow simulation of emergency situations like fire, smoke, machinery failure, sinking, etc.

33. **Mini Bridge Simulator**. There will be 02 (two) in number Mini Bridge Simulators installed in separate cubicles. Each simulator shall have all the functions and features of full mission bridge simulator with few exceptions (the composition is given at paragraph 46). Unlike the full mission bridge simulator, the visual system shall be composed of a large screen with a horizontal field of view of minimum 120^0. In this respect, required number of OLED screens of 65" or more (as applicable) shall be placed vertically for visual generation. The detail features of the mini bridge simulator are to be mentioned in the tender offer.

34. **Blind Pilotage Station**. The Blind Pilotage Station shall have the following features, but not limited to:

a. It shall be integrated with the all bridge simulators for the training of blind pilotage activities in coastal, off-shore, ocean navigation with relevant gadgets and sensors. The detail facilities of the blind pilotage station are to be mentioned in the tender offer.

b. It shall have the facility to conduct Command team training in planning and execution of a passage.

35. **Briefing/ De-briefing Station**. The briefing/ de-briefing station of the simulator shall be fitted with all-in-one smart board system to display the ongoing/ recorded simulation of the system for audio/ visual briefing. A Public Address system shall be available for briefing. The detail facilities of the station are to be mentioned in the tender offer.

36. **System Server**. The system server shall host all the simulation system applications and database system. The detail facilities of the system server are to be mentioned in the tender offer.

37. **Database Management Station**. The database management station shall be used for creating and modifying the system database including all types of data (platform, environment, target, game area, sea state, etc.) as well as to modify and create new gaming areas in case the instructor console is involved in running simulations. The detail facilities of database management system/ console are to be mentioned in the tender offer.

38. **Game Testing Station**. The system shall act as a standalone system which shall have the provision for development, creation, editing, adjustment of any selected/ new types of game, training environment, targets, sea area, and scenario for simulation using game testing station in-addition to main simulator. The detail facilities of the game testing station are to be mentioned in the tender offer.

39. **Communication System**. The instructor control station, full mission bridge, mini bridges and blind pilotage station shall be equipped with intercom facilities for various modes: intercom and simulation of radio communication of ship of ship, ship to shore, ship to air, etc. The intercom communication shall have the standard features of one-one, multicast and broadcast. The detail facilities of the communication system are to be mentioned in the tender offer.

40. **CCTV Monitoring**. The full mission bridge simulator, mini bridge simulators and blind pilotage station shall have CCTV monitoring system consisting of appropriate number of cameras and NVR system. The CCTV system shall be integrated with the system server for controlling and monitoring facilities from instructor control station having other standard features including record and replay facilities. The detail facilities of the communication system are to be mentioned in the tender offer.

Equipment Specification of Marine Bridge Simulator

41. **System Architecture and Network Diagram**. A diagram of complete system with configuration/ system architecture showing network connectivity is to be provided with the tender offer for assessment. The system shall be accommodated within the specified floor area of SMWT.

42. **Floor Plan**. The floor area available for tentative installation are as follows:

a. **Bridge Simulators, Blind Pilotage Station and Store Room**. 17.67m x 11.99m x 7.16m (L x W x H).

b. **Instructor Control Station and Server Room**. 4.95m x 3.15m x 3.45m (L x W x H).

c. **Briefing/ Debriefing Room**. 15.49m x 13.53m x 3.45m (L x W x H).

43. **Environmental Condition**.

a. All equipment of the simulator is intended to be installed inside the building, which shall meet following environmental conditions:

(1)	Temperature	:-5°C to 45°C.
(2)	Relative Humidity (RH)	: Up to 95% (non-condensing).

b. However, the recommended temperature and humidity for safe operation and storage of the system are to be mentioned, and the same are to be maintained with the supplied air-conditioning and dehumidification unit as required.

44. **Instructor Control Station**. The instructor control station beings the master control station of the Marine Bridge Simulator shall have required workstation facilities with following hardware, but not limited to (details is to be mentioned in the tender offer):

Ser	Item	Specification
1.	Function	a. The Instructor Control Station shall control the training sessions of full mission bridge simulator and mini bridge simulator independently (using separate computers) or simultaneously (using single computer). b. It shall have required display system for viewing exercise session, trainees/student's activity, etc. c. Other functions as per paragraph 31.
2.	Quantity	01 (one) complete set.
3.	Computer	a. **Quantity**. (1) Minimum 02 x PC for Instructor Console. (2) Minimum 01 x PC for Repeater with multiple monitors. b. **Specification**. As per paragraph 56a.
4.	Monitor/ Display	a. Minimum 2 x 27 inch or higher LED Monitor for Main Instructor Console. b. Minimum 3 x 24 inch or higher LED Monitor for Repeater Display System.
5.	Software	a. **Operating System (OS)**. Latest version operating system (Windows) with original license shall be used. (Details are to be mentioned). b. **Bridge Simulator Software**. Latest version Bridge simulator software with original license shall be used. (Details are to be mentioned). c. **Other Software**. Latest version other software with original license shall be used. (Details are to be mentioned). d. **Scalability**. System shall have option for future expansion to accommodate more bridge simulator or additional simulation features are to be incorporated in the software. (Details are to be mentioned).
6.	Communication System	To be incorporated as per paragraph 52
7.	Handset and Headset with Microphone (PTT incorporated)	To be incorporated as per paragraph 52
8.	Dimension of Instructor Console	To be mentioned

Ser	Item	Specification
9.	Weight of Instructor Console	To be mentioned
10.	Material Composition of Instructor Console	To be mentioned
11.	Power Consumption	To be mentioned
12.	Power Supply	220V, 50 Hz, 1 Ph.
13.	CCTV System	To be incorporated as per paragraph 53
14.	Multifunction Clock	To be incorporated

45. **Full Mission Bridge Simulator**. The full mission bridge simulator shall have the following facilities, but not limited to (details are to be mentioned in the tender offer):

Ser	Item	Specification
1.	Quantity	01 (one) complete set.
2.	Function	Act as main mockup bridge. Other functions as per paragraph 32. The facilities are as follows.
3.	Computer	a. **Quantity**. As required. (Details to be mentioned) b. **Specification**. As per paragraph 56a.
4.	Software	a. **Operating System (OS).** Latest version operating system (Windows) with original license shall be used. (Details are to be mentioned). b. **Bridge Simulator Software**. Latest version Bridge simulator software with original license shall be used. (Details are to be mentioned). c. **Other Software**. Latest version other software with original license shall be used. (Details are to be mentioned). d. **Scalability**. System shall have option for future expansion to accommodate more bridge simulator or additional simulation features to be incorporated in the software. (Details are to be mentioned).

Ser	Item	Specification
5.	Helmsman Console	a. Simulate conning of own ship. b. The console should include the following: (1) 1 x azimuth (2) 1 x rudder (3) 1 x steering wheel (attached with this console). (4) Display of steering motors, pump or any other equipment associated with the steering arrangement. (5) Lighting control panel having appropriate lighting arrangement as per ROR. (6) Arrangement for anchoring and weigh anchoring with the display for cable to be veered/ heaved. (7) Follow-up and non-follow-up steering. (8) Auto-pilot function (9) Other facilities as required.
6.	Bridge Wing	Port and Stbd for navigation with digital/ electronic Binocular lookout system and gyro repeaters.
7.	Horizontal Sea View	Minimum 270°.
8.	Vertical Sea View	Minimum 35°.
9.	OLED Screen	a. Item: OLED Screen. b. Quantity: As required for the system. (To be mentioned) c. Brand: To be mentioned. d. Model: To be mentioned. e. Size: 85 inch or more. To be mentioned. f. Resolution: 4K or more. To be mentioned g. Dimension: To be mentioned. h. Weight: To be mentioned. j. Country of Origin: Norway/ Canada/ USA/ UK/ Japan/ EU Countries/ Japan/ South Korea. k. Country of Manufacture: To be mentioned. l. Network connectivity: To be mentioned. m. Power Supply: 220V, 50 Hz, 1 Ph
10.	ECDIS Console	To be incorporated
11.	RADAR/ ARPA Console	To be incorporated
12.	Gyro Compass	a. 1 x Pelorus with azimuth circle (at the center of the bridge). b. 2 x Gyro Repeaters with azimuth circle (To be integrated with port and starboard lookouts).
13.	Magnetic Compass	To be incorporated
14.	Chart Table	To be incorporated
15.	Propulsion Console	a. Propulsion throttle control shall be as per own ship specification. b. Simulate ship's engines' different parameters including

Ser	Item	Specification
		the Start and Stop options of the engine and the use of a bow thruster as applicable. c. Various parameters of the propulsion system shall be displayed in the conning monitor. d. Simulate the dual generator panel, auxiliary panel, fire alarm panel, etc. e. Other standard features.
16.	Binocular Console	To be incorporated
17.	VR Headset	2 x VR Headset to be incorporated. (Details to be mentioned)
18.	NAVTEX Receiver	To be incorporated
19.	EPIRB Transponder	To be incorporated
20.	AIS	To be incorporated
21.	Overhead Console	To display ship's data, virtual CCTV display as per standard own ship requirement
22.	Conning Monitor	To be incorporated
23.	Auxiliary Monitor	To be incorporated for displaying of other functions.
24.	Anemometer	To be incorporated
25.	Hygrometer	
26.	Barometer	
27.	Barograph	
28.	GMDSS	To be incorporated
29.	Captain's Chair with lumber spine support	For the use of Captain
30.	Sound System	To be incorporated as per paragraph 54
29.	Communication System	To be incorporated as per paragraph 52
30.	Handset and Headset with Microphone (PTT incorporated)	To be incorporated
31.	CCTV System	To be incorporated as per paragraph 53
32.	Multifunction Clock	To be incorporated

46. **Mini Bridge Simulator**. Each Mini Bridge Simulator shall have the following facilities, but not limited to (details are to be mentioned in the tender offer):

Ser	Item	Specification
1.	Quantity	02 (two) complete set
2.	Function	Act as mini mockup bridge. Other functions as per paragraph 33. The facilities are as follows.
3.	Computer	a. **Quantity**. As required. (Details to be mentioned) b. **Specification**. As per paragraph 56a.
4.	Software	a. **Operating System (OS)**. Latest version operating system (Windows) with original license shall be used. (Details are to be mentioned). b. **Bridge Simulator Software**. Latest version Bridge simulator software with original license shall be used. (Details are to be mentioned). c. **Other Software**. Latest version other software with original license shall be used. (Details are to be mentioned). d. **Scalability**. System shall have option for future expansion to accommodate more bridge simulator or additional simulation features to be incorporated in the software. (Details are to be mentioned).
5.	Helmsman Console	a. Simulate conning of own ship. b. The console should include the following: (1) 1 x azimuth (2) 1 x rudder (3) 1 x steering wheel (attached with this console). (4) Display of steering motors, pump or any other equipment associated with the steering arrangement. (5) Lighting control panel having appropriate lighting arrangement as per ROR. (6) Arrangement for anchoring and weigh anchoring with the display for cable to be veered/ heaved. (7) Follow-up and non-follow-up steering. (8) Auto-pilot function (9) Other facilities as required.
6.	Horizontal Sea View	Minimum 120°.
7.	Vertical Sea View	To be mentioned as per 65" large screen display vertically placed
8.	OLED Screen	a. Item: OLED Screen.

Ser	Item	Specification
		b. Quantity: As required for the system. To be mentioned. c. Brand: To be mentioned. d. Model: To be mentioned. e. Size: 65 inch or more. To be mentioned. f. Resolution: 4K or more. To be mentioned g. Dimension: To be mentioned. h. Weight: To be mentioned. j. Country of Origin: Norway/ Canada/ USA/ UK/ Japan/ EU Countries/ Japan/ South Korea. k. Country of Manufacture: To be mentioned. l. Network connectivity: To be mentioned. m. Power Supply: 220V, 50 Hz, 1 Ph
9.	ECDIS Console	To be incorporated
10.	RADAR/ ARPA Console	To be incorporated
11.	Gyro Compass	1 x Pelorus with azimuth circle
12.	Magnetic Compass	To be incorporated
13.	Chart Table	To be incorporated
14.	Propulsion Console	a. Propulsion throttle control shall be as per own ship specification. b. Simulate ship's engines' different parameters including the Start and Stop options of the engine and the use of a bow thruster as applicable. c. Various parameters of the propulsion system shall be displayed in the conning monitor. d. Simulate the dual generator panel, auxiliary panel, fire alarm panel, etc. e. Other standard features.
15.	VR Headset	To be incorporated
16.	NAVTEX Receiver	To be incorporated
17.	EPIRB Transponder	To be incorporated
18.	AIS	To be incorporated
19.	Overhead Console	To display ship's data, virtual CCTV display as per standard own ship requirement
20.	Conning Monitor	To be incorporated
21.	Auxiliary Monitor	To be incorporated for displaying of other functions.
22.	Anemometer	To be incorporated

Ser	Item	Specification
23.	Hygrometer	
24.	Barometer	
25.	Barograph	
26.	Captain's Chair with lumber spine support	For the use of Captain
27.	Sound System	To be incorporated as per paragraph 54
28.	Communication System	To be incorporated as per paragraph 52
29.	Handset and Headset with Microphone (PTT incorporated)	To be incorporated as per paragraph 52
30.	CCTV System	To be incorporated as per paragraph 53
29.	Multifunction Clock	To be incorporated

47. **Blind Pilotage Station**. The Blind Pilotage Station shall have required features with following hardware, but not limited to (details are to be mentioned in the tender offer):

Ser	Item	Specification
1.	Quantity	01 (one) complete set
2.	Function	To act as a part of a command team.
3.	Computer	a. **Quantity**. As required. (Details to be mentioned) b. **Specification**. As per paragraph 56a.
4.	Software	a. **Operating System (OS).** Latest version operating system (Windows) with original license shall be used. (Details are to be mentioned). b. **Bridge Simulator Software**. Latest version Bridge simulator software with original license shall be used. (Details are to be mentioned). c. **Other Software**. Latest version other software with original license shall be used. (Details are to be mentioned).
5.	RADAR/ ARPA Console	To be incorporated
6.	ECDIS Console	To be incorporated
7.	Gyro Repeater	To be incorporated
8.	Chart Table	To be incorporated
9.	Communication System	To be incorporated as per paragraph 52
10.	Handset and Headset with Microphone (PTT incorporated)	To be incorporated as per paragraph 52
11.	CCTV System	To be incorporated as per paragraph 53

48. **Briefing/ De-briefing Station**. The requirement of the Briefing/ De-briefing Station are as follows, but not limited to (details are to be mentioned):

Ser	Item	Specification
1.	Quantity	01 (one) complete set
2.	Function	As per paragraph 35
3.	Compositions	a. 01 x All-in-One Touch Smart Board. b. 30 x Classroom chairs with lumber spine support along with a foldable table for the students (Local/ Foreign Supply). c. 02 x HP Laser Printer (Capacity: 30 PPM or more) (Local/ Foreign supply). d. 01 x Sharp/ Toshiba/ Samsung Digital Photocopy Machine (Capacity: 40 CPM or more, Resolution: 800x800 dpi, Page: A3 and A4) (Local/ Foreign Supply).
4.	All-in-One Touch Smart Board	a. **Quantity**. 1 x All-in-One Touch Smart Board. b. **Specifications**. (1) **Brand and Model**. To be mentioned (2) **Resolution**. 4K. (3) **Size**. 120 inch. (4) **Country of Origin and Manufacture**. USA, EU, Japan, Korea, Malaysia (5) **Power Supply**. 220V, 50 Hz, 1 Ph.
5.	Communication System	To be incorporated as per paragraph 52.
6.	Handset and Headset with Microphone (PTT incorporated)	To be incorporated as per paragraph 52

49. **System Server**. The system server shall be equipped with the necessary hardware and software, including but not limited to the following hardware components (detailed specifications to be provided with the offer):

Ser	Name of Item	Description
1.	Quantity	01 (one) complete set
2.	General Feature	a. The server should host all the simulation system applications and database system and the simulator architecture should be based on a centralized storage architecture. b. Failure of a computer in the system will not affect the

Ser	Name of Item	Description
		running exercise, simply the functionality of such a non-operative computer will be not available, but exercise should continue without any problem. c. There should be a redundant server to ensure the system's reliability. d. The server should be a RAID system to minimize the possibility of data losses and all server components should have redundant. e. Standard configuration should be typically dual disk mirroring, therefore data should be saved contemporary on 2 separate arrays, improving the system reliability.
3.	Brand	Dell/HP/ Cisco
4.	Model No	To be mentioned.
5.	Country of Origin	Canada/ USA/ UK/ EU/ Japan.
6.	Country of Manufacture	Canada/ USA/ UK/ EU/ Japan/ China.
7.	Processor	2 x Intel Xeon 6th Generation GPU Server or latest Processor, Base Clock speed 2.20 GHz or higher
8.	Cache	96 MB or Higher
9.	Motherboard	Intel Motherboard compatible with the processor
10.	RAM	2 x 128 GB DDR5 ECC RDIMM or more
11.	Hard Drive (SSD)	2 x 1 TB SSD for running the server operating system
12.	RAID Controller	Compatible Hardware and Software are to be incorporated. Details to be mentioned
13.	NAS Storage	Brand – Seagate or Equivalent, Model - To be mentioned, Capacity- Minimum 4 x 10 TB HDD or higher (will be configured as per RAID system).
14.	Graphics	2 x NVIDIA A16 GPU, 64GB (4x 16GB) GDDR6 or higher
15.	Monitor	1 x 27" LED Monitor or Higher
16.	Keyboard	Standard Keyboard
17.	Mouse	Standard Mouse
18.	Sound Card	Standard
19.	Network Card	Dual 10G Base –T Ethernet or higher
20.	I/O Expansions	As required. To be mentioned
21.	Ports and Interface	Standard ports and interfaces bundle with the package
22.	Server Operating System	Microsoft Windows Server latest version with a perpetual license. (To be mentioned)

Ser	Name of Item	Description
23.	Database Software	Perpetual Licensed Software (To be mentioned)
24.	Power Supply	Dual Power Supply System. (220V, 50 Hz, 1 Ph.)
25.	Server Rack	High Quality Standard Rack (1U/2U) is to be provided.

50. **Database Management System**. The Database Management Station shall be equipped with the necessary workstation, including but not limited to the following hardware components (detailed specifications to be provided with the tender offer):

Ser	Item	Description
1.	Quantity	01 (one) complete set
2.	General Feature	To be supplied in standard panel and with mounting. The system shall be able to edit and change the simulation parameters as well as can be used as an additional instructor control station. (as per paragraph 37)
3.	DBMS Software	Modern and higher configuration database system software (Windows-based DMS is preferable). Details to be mentioned.
4.	Computer	a. **Quantity**. As required. (Details to be mentioned) b. **Specification**. As per paragraph 56a.
5.	Software	a. **Operating System (OS)**. Latest version operating system (Windows) with original license shall be used. (Details are to be mentioned). b. **Bridge Simulator Software**. Latest version Bridge simulator software with original license shall be used. (Details are to be mentioned). c. **Other Software**. Latest version other software with original license shall be used. (Details are to be mentioned). d. **Scalability**. System shall have option for future expansion to accommodate more bridge simulator or additional simulation features to be incorporated in the software. (Details are to be mentioned).
6.	Monitor	2 x 27" LED Monitor or Higher
7.	Communication System	To be incorporated as per paragraph 52.
8.	Handset and Headset with Microphone (PTT incorporated)	To be incorporated as per paragraph 52
9.	Dimension of	To be mentioned

	Console	
10.	Weight of Console	To be mentioned
11.	Material Composition of Console/ Work Station	To be mentioned
12	Power Supply	220V, 50 Hz, 1 Ph.

51. **Game Testing Station**. The Game Testing Station shall be outfitted with the required workstation, incorporating but not limited to the following hardware components (specific details to be provided with the offer):

Ser	Item	Description
1.	Quantity	01 (one) complete set.
2.	General Feature	The system shall act as a standalone mini simulator which shall have the provision for development, creation, editing, adjustment of any selected/ new types of game, training environment, targets, sea area, and scenario for simulation using game testing station in-addition to main simulator. (As per paragraph 38)
3.	Computer	a. **Quantity**. 03 (three). One shall be used for Instructor plus server, one for Database Management Station and the other with multiple monitors for bridge functions b. **Specification**. As per paragraph 56a. c. **Operating System/ Software**. Microsoft Windows latest version OS with a perpetual license and other relevant licensed version software (Details to be mentioned).
4.	Monitor	At least 5 x 24" or higher LED Monitor.
5.	Table-top Propulsion and Helmsman Console	To be incorporated as per requirement. (Details to be mentioned)
6.	Power Supply	220V, 50 Hz, 1 Ph

52. **Communication System**. Communication System shall be outfitted with the required hardware and software, incorporating but not limited to the following components (specific details to be provided with the tender offer):

Ser	Item	Description
1.	Quantity	01 (one) complete Set.
2.	Function	a. The instructor control station, full mission bridge, mini bridge and blind pilotage station shall be equipped with intercom facilities for various modes: intercom and radio communication simulation. The communication shall have the standard features of one-one, multicast and broadcast communication features. b. Communication system shall be software based system and it shall be able to simulate communication between ship to ship, ship to shore and ship to air by simulating radio communication i.e VHF, UHF, HF.
3.	Technical Specification	a. **Type**. All components including panel and handsets shall be of robust and Industrial Grade. (To be mentioned) b. **Quantity**. As required for all stations. (To be mentioned) c. **Brand**. To be mentioned. d. **Model**. To be mentioned. e. **Year of Manufacture**. 2024 or later. To be mentioned f. **Country of Origin**. USA/ UK/ EU/ Japan. g. **Country of Manufacture**. USA/ UK / EU / Japan/ China. h. **Redundant Option**. To be incorporated. j. **Headsets and Handsets**. As required for all stations. (To be mentioned). k. **Other Technical Features**. To be mentioned. l. **Dimension**. To be mentioned. m. **Power Supply**. 220V, 50 Hz, 1 Ph/ as per system requirement (To be mentioned).

53. **CCTV System**. CCTV monitoring system shall be outfitted with the required hardware and software, incorporating but not limited to the following components (specific details to be provided with the tender offer):

Ser	Item	Description
1.	Quantity	01 (one) complete Set.
2.	Function	The instructor control station, full mission bridge, mini bridge and blind pilotage station shall be equipped with CCTV monitoring facilities for recording, re-playing and monitoring purposes.
3.	Technical Specification	a. **Type**. Industrial Grade. (To be mentioned) b. **Quantity**. As required for all stations. (To be mentioned) (1) Camera: To be mentioned. (2) NVR: To be mentioned. c. **Brand**. To be mentioned for Camera, NVR, Network Switch, etc. d. **Model**. To be mentioned for Camera, NVR, Network Switch, etc. e. **Year of Manufacture**. 2024 or later. To be mentioned f. **Country of Origin**. USA/ UK/ EU/ Japan. g. **Country of Manufacture**. USA/ UK/ EU/ Japan/ China. h. **Redundant Option**. To be incorporated. j. **Storage Capacity**. To be mentioned. k. **Technical Features**. Details to be mentioned for Camera, NVR, Network Switch, etc. l. **Cable and Accessories**. As required. m. **Power Supply**. 220V, 50 Hz, 1 Ph.

54. **Surround Sound System**. Surround Sound System shall be outfitted with the required hardware and software, incorporating but not limited to the following components (specific details to be provided with the tender offer):

Ser	Item	Description
1.	Quantity	01 (one) complete set.
2.	Function	The system shall provide required surround sound in full mission bridge simulator, mini bridge simulator and blind pilotage station to simulate realism to the trainees.
3.	Technical Specification	a. **Type**. Dolby digital/ AC3/ THX 5:2 channel or more 3D surround sound system (To be mentioned). b. **Brand**. Bose/ JBL/ Sony (To be mentioned). c. **Model**. To be mentioned. d. **Year of Manufacture**. 2024 or later. To be mentioned e. **Country of Origin**. USA/ UK/ EU/ Canada/ Japan. f. **Country of Manufacture**. USA/ UK/ EU/ Canada/ Japan/ China. g. **Configuration and Other Technical Features**. To be mentioned h. **Dimension and Weight**. To be mentioned. j. **Power Supply**. 220V, 50 Hz, 1 Ph.

55. **Software Feature**. The system shall have following software features, but not limited to:

a. **Operating System (OS)**. Latest version operating system (Windows) with original license shall be used. (Details are to be mentioned).

b. **Simulator Software**. Latest version simulator software with original license shall be used. (Details are to be mentioned).

c. **Other Software**. Latest version other software with original license shall be used. (Details are to be mentioned).

d. **Scalability**. System shall have option for future expansion to accommodate more additional simulation features/ control station to be incorporated in the software. (Details are to be mentioned).

56. **Computer and Other Accessories**. The following necessary hardware are to be provided to facilitate the networking of the simulation system, but not limited to (if additional items are required, those are to be offered. Detailed specifications are to be provided):

a. **Computer/ PC**.

(1) All PC shall have similar specification except the high definition graphic processor card which shall be used for visual generation. The PCs are to be interchangeable so that it can be changed as and when required.

(2) The license shall be of perpetual with or without dongle binding. The license with MAC binding shall not be accepted

(3) **Specification of PC**.

Ser	Description	Specification
1.	Type	Industrial Grade/ Heavy Duty
2.	Brand	HP/DELL
3.	Model	Latest Model. (To be mentioned)
4.	Country of Origin	USA/UK/ Japan
5.	Country of Manufacture	USA/ UK/ EU/ Japan/ China
6.	Year of Manufacture	2024 or later. (To be mentioned)
7.	Processor	Intel Core i9 with 14th generation or latest. (To be mentioned).
8.	Motherboard	Intel Chipset Motherboard compatible with the processor. (To be mentioned).
9.	RAM	64 GB or Higher. (To be mentioned).
10.	Hard Disk	1TB SDD or Higher.
11.	Graphics	Latest version of NVIDIA®GeForce. (To be mentioned).
12.	Keyboard and Trackball	Industrial quality
13.	Sound Card	Standard
14.	Network Card	High-Speed Network Card/ 10G Network Card (To be mentioned).
15.	I/O Expansions & Ports	Includes all standard ports and slots to support the complete system.
16.	Cooling	Advanced cooling system.
17.	Cables and Accessories	All standard cables and accessories are to be supplied for immediate use and smooth functioning (as required).

b. **Network Switch (Manageable).**

Ser	Name of Item	Description
1.	Type	Rack Mounted
2.	Quantity	As required
3.	Brand	CISCO.
4.	Model	To be mentioned
5.	Country of Origin	Canada/ USA/ UK/ EU/ Japan
6.	Country of Manufacture	To be mentioned
7.	Product Features	To be mentioned
8.	Network Ports	24 GE or Higher, Compatible with Server and other Consoles.
9.	Memory/Flash	Min 32 MB or Higher

c. **Router.**

Ser	Name of Item	Description
1.	Type	To be mentioned
2.	Purpose	For remote login.
3.	Quantity	As required. To be mentioned
4.	Brand	CISCO
5.	Model	To be mentioned
6.	Country of Origin	Canada/ USA/ UK/ EU/ Japan
7.	Country of Manufacture	To be mentioned
8.	Product Features	To be mentioned
9.	WiFi Network Standards	IEEE 802.11b/g/n 2.4GHz, IEEE 802.11a/n/ac 5GHz. To be mentioned
10.	Number of Concurrent User	Up to 30 User or more

d. **KVM Switch.**

Ser	Name of Item	Description
1.	Type	Rack Mounted
2.	Quantity	As required
3.	Brand & Model	To be mentioned
4.	Country of Origin	Canada/ USA/ UK/ EU/ Japan
5.	Country of	To be mentioned

Ser	Name of Item	Description
	Manufacture	
6.	Brand & Product Model	To be mentioned
7.	Ports	To be mentioned, Compatible with Server and other Consoles.

57. **Backup Power Supply**. The power supply at site is 400V ± 10%, 50 Hz, 3 Ph and 220V ± 10%, 50 Hz, 1 Ph. All equipment is to be suitable to run at above mentioned power supply. The following necessary equipment is to be provided to provide the backup power of the simulator system (if additional items are required those are to be supplied and detailed specifications are to be provided):

Ser	Item	Description		
1.	Name of Item	Online UPS		
2.	General Feature	The Simulator should have a minimum 30 minutes backup power supply		
3.	Quantity	03 (Three), Each shall be 30 KVA or more as per 30 minutes backup requirement. Maximum two will be used at a time and other will remain standby.		
4.	Technical Parameters	a.	Input Voltage	220V ± 5%, 50 Hz, 1 Ph
		b.	Output Voltage	220V ± 1%, 50 Hz, 1 Ph and as per system requirement
		c.	Brand and Model	To be mentioned
		d.	Capacity (KVA)	To be mentioned
		e.	Battery Type	Li-ion (Maintenance Free)
		f.	Dimension	To be mentioned
		g.	Weight	To be mentioned
5.	Country of Origin	Details to be mentioned		
6.	Country of Manufacturer			

58. **Standard Accessories**. The following accessories are to be provided with the simulator, but not limited to:

Item	Qty	Country of Origin and Manufacture	Description	Remarks
Laptop	01	Country of Origin: USA/UK/Japan. Country of Manufacture: To be mentioned	Brand: Dell/ HP. Model: Latest Model. To be mentioned. Processor: Intel Core i9 with 14th generation or latest. RAM: 64 GB or more. Graphics: NVIDIA® GeForce. HDD (SSD): 512 GB SSD or Higher.	To facilitate software installation and debriefing
Portable SSD Hard Disk	02	Country of Origin: USA/UK/Japan/ South Korea. Country of Manufacture: To be mentioned	a. Capacity: 2TB b. Interface: USB 3.1 Gen 2 (USB 10Gbps)	
Other Accessories	Other accessories shall include cable, connectors, rack and other items to operate the simulator, whether those are mentioned in the specification or not.			

Other Specification

59. **Software and Backup Software**.

a. **List and Particulars of Software**. The system shall be provided with all the necessary software. Software shall be of modern and best configuration quality to be ensured with options for future up-gradation/modification. A list of all necessary software is to be submitted with the offer. The following information about all software and its functionality are to be mentioned for tender evaluation and assessment:

Ser	Name of Item	Description
1.	Name of Software(s)	To be mentioned
2.	Purpose/ Function	To be mentioned
3.	Version	To be mentioned
4.	Country of Origin/Developer	To be mentioned
5.	Software Developer Company	To be mentioned
6.	Year of Release	2024 or later
7.	Software update option	To be mentioned

Ser	Name of Item	Description
8.	Requires Operating System (OS)	To be mentioned
9.	Quality Assurance Certificate	To be mentioned
10.	Security Features	To be mentioned

b. **Software Backup and System Restoration**. Necessary software and backup software with licensed copies of all related software for the simulator are to be provided in portable SSD and portable memory devices. Method of loading and recovery of software is to be provided through training. Moreover, the step-by-step procedures for installing any software are also to be provided. In case of any software crash, BN personnel should be able to install the backup software using those step-by-step instructions to restore the whole system. Details is to be mentioned.

c. **Intellectual Property (IP)**. Manufacturer is to grant a royalty-free, non-exclusive license to enable the end-user to use such IP only as it required in order to use the delivered equipment in accordance with its intended use.

d. **Providing Software Compatibility Support for 10 Years**. The supplier will provide 10-year software compatibility support to BN simulator. This support entails that the supplier will ensure that the software remains compatible with future computer and operating systems for 10 years after the system is accepted. For instance, if BN needs to replace defective PCs with the available upgraded PCs at the time of need and if the upgraded PCs including OS is not compatible with the marine bridge simulator, the supplier shall take the necessary arrangements to ensure compatibility at no additional cost. The supplier shall provide updates, patches, and modifications required to maintain software compatibility within the 10-year support period for up-gradation.

60. **Tools**. 01 (one) set of following tools, but not limited to is to be provided along with the equipment that may be required for the installation, replacement of unit or any other maintenance purpose:

a. 1 x Ethernet Cable Crimping Tool.
b. 1 x Ethernet Cable Tester.
c. 1 x Wire Strippers.
d. 2 x Screwdriver Set.
e. 2 x Cable Management Tool Kit.
f. 2 x Flashlight or Headlamp.
g. 2 x Fluke Multimeter.
h. 1 x Fiber Optic Cable Cutter.
j. 1x Fiber Optic Cable Splicer.

61. **Spares**. The following spars should be supplied with the system, but not limited to (if additional spares are required, those are to be offered. Detailed are to be provided):

a. 12 x Trackball.
b. 12 x Keyboard (6 x Industrial Grade Keyboard, 6 x Standard Keyboard).
c. 2 x GPU Card.
d. 12 x Handset.
e. 5 x Headset.
f. 3 x Communication System PCB.
g. 12 x Power Supply Unit for PC.
h. 5 x OLED Screen (as per the specification required for main and mini bridge).
j. 1 x Throttle Complete.
k. 1 x Steering Wheel.
l. 4 x Computer with monitor (As per system configure).
m. 2 x Joystick.
n. 5 x HDD/ SSD as per System Configuration.

62. **Ancillary/Auxiliary Items**. Various ancillary and auxiliary items like Air Conditioning Unit(locally available good quality standard) and required furniture (rostrum, chairs, tables, bookshelf, etc- Bangladesh HATIL Standard) shall be supplied by the bidder from the local market as per the overall requirements and floor space. These items may be supplied from foreign source as per bidder's choice. The details of required ancillary items and furniture which shall be provided are to be quoted with item wise price.

63. **Site Preparation and Installation Works**. The Bidder shall be solely responsible for all the site preparation work such as minor civil works, earthing, laying of IFL cables in conduit metal pipes, foundation, etc. for the installation of Bridge Simulator equipment at the designated site, including electrical and other works. The Bidder shall prepare the work plan which shall contain detailed information of preparation activities which need to be accomplished prior to system installation.

64. **Sound Proofing**. The Bridge Simulator rooms are to be made soundproof by using appropriate acoustic panels and soundproof materials. The details are to be mentioned in the tender offer.

SECTION-C: OTHER TERMS & CONDITION

65. **Detail Project Plan**. The Bidder shall conduct an assessment study at SMWT after signing the contract. The bidder shall work and coordinate with BN to determine any site restrictions and constraints and identify the best solution for the installation of the complete system. The Bidder shall provide detail project plan. The project plan shall contain detail information of all site preparation activities to be accomplished by the bidder prior to installation including main power, backup power, communication, cable layouts, painting, interference mitigation (if any), lightening arrester, support structure, air-conditioning, de-humidification, etc. The assessment study report shall be delivered to BN within 60 days of contract award, which must be vetted by NHQ.

66. **Software Requirement Specification (SRS)**. Software Requirement Study (SRS) report details including simulator layout plan and architecture details; critical design work of software functionality; Simulator-wise equipment, hardware and software functionality composition plan; procurement plan of equipment, hardware, construction material, furniture items; etc are to be prepared before stage inspection as referred to para 75.

67. **Installation Materials**. All installation materials, cable, cabinet, steel accessories, mountings, etc are to be provided by the Bidder. All types of power, control and communication cable should be fire redundant and wire shielded (rat protected) to ensure uninterrupted service.

68. **Standard Accessories**. All standard accessories shall be provided by the Bidder. The standard accessories must include every item and accessories, which are essential to make the system operational, whether those are mentioned in the tender specification or not. A list of such items/ accessories is to be submitted with the tender offer.

69. **Optional Accessories/ Items**. Optional accessories/ items (if any) are to be quoted separately mentioning their usages. BN will have the right to select or reject optional accessories/ items.

70. **Factory Acceptance Test (FAT)**.

a. Factory Acceptance Test of Marine Bridge Simulator will be carried out at OEM premises by a team of 04 (four) members for duration of 07 (Seven) working days, at the Buyer's expense.

b. Both way airfare, accommodation and food will be borne by BN for FAT team. All internal transportation of the team within the manufacturer/ Bidder's country, reception and arrangement for entry into country/ concerned area will be arranged by the Bidder.

c. On return from the country of supplier, the FAT team will submit the report to concerned Directorate at Naval Headquarters. Naval Headquarters will, in turn, forward final decision along with FAT report, basing on which DGDP will render clearance for shipment of stores to the supplier concerned. The supplier will not make shipment of any item of the contract without clearance from DGDP.

d. Supplier will provide all necessary documents including certificates of country of origin, certificate of manufacture of Marine Bridge Simulator and its system equipment to FAT team.

e. FAT will be carried out at manufacture's factory premises following FAT protocols. The bidder is to send the proposed FAT protocol for approval of BN at least 08 weeks prior to the conduct of FAT. During FAT, required tests will be carried out to fulfill the necessary condition mentioned in technical specification and FAT protocol. Various test results with their performance are to be recorded and signed by both parties.

71. **Training**.

a. **Training Objective**. The training should be combination of both theoretical training and practical training. The objectives of training are as follows:

(1) On completion of operator training, BN personnel shall have basic knowledge on system overview and simulator operation. Based on basic knowledge and subsequent system-based training, BN personnel shall be able to design, create, edit, and configure all kinds of database in order to run and analyze simulation environment, scenario and exercises through the operation of instructor control station, full mission bridge and mini bridge.

(2) On completion of maintenance training, BN maintainers will be able to operate the simulator, install and re-install relevant software, configure, replace the Line Replaceable Unit (LRU), set to work the system and carryout periodic and preventive maintenance. They should also be able to restore the system using step-by-step procedures and backup software.

(3) The trainees shall be able to maintain the simulator at least 10 years after the expiry of warranty period. They shall also be able to replace the defective hardware with COTS compatible hardware available in the market during that period.

b. **Training Plan and Curriculum**.

(1) The bidder is to mention detailed breakdown of the training schedule, plan and syllabus. The training will be conducted both in OEM premises and in Bangladesh. All training related to simulator operation and maintenance shall be held in line of operation and maintenance manuals of OEM. Following documents/ manuals are to be provided to BN trainees during training:

(a) Operation Manual.

(b) Maintenance Manual.

(c) Installation Manual.

(2) The bidder is to provide a detailed training plan of conducting training highlighting the subject wise (based on simulator) period requirement, no of hours including theoretical and practical training as per the group.

72. **Foreign Training**. A comprehensive theoretical and practical training shall be conducted at OEM's premises. Accommodation, food, international air fare and internal transportation will be borne by the supplier. The theoretical and practical training will be as follows:

a. **Simulator Operator Training**. Detail theoretical and practical training for 07 (seven) BN personnel is to be provided on simulator operation, game planning, conducting evaluation examination, ship handling, full mission bridge operation, mini bridge operation, conducting of briefing/ debriefing, designing of new exercise, etc. The duration of the training will be 03 (three) weeks. Training will be conducted in English and 8 (eight) hour/ day and 5 (five) days/ week and operation training shall be provided by actual expert. The details of training syllabus is to be provided with the tender offer. The composition of the trainees will be as follows:

(1) 1 x Cdr (X) – Team Leader.
(2) 2 x Lt Cdr (X).
(3) 4 x QRP Ratings.

b. **Simulator Maintainer Training.** Detail theoretical and practical training for 07 (seven) BN personnel is to be provided on simulator operation, game planning, conducting evaluation examination, maintenance of full mission bridge, maintenance of mini bridge, other maintenance, server management, database management, etc. The duration of the training will be 06 (six) weeks (03 weeks operation and 03 weeks practical maintenance training). Training will be conducted in English and 8 (eight) hour/ day and 5 (five) days/ week and operation training shall be provided by actual expert. The training should include maintenance in details. The details of training syllabus is to be provided with the tender offer. The composition of the trainees will be as follows:

(1) 1 x Cdr (L) – Team Leader.
(2) 1 x Lt Cdr (L).
(3) 1 x Lt Cdr (L/ Edu).
(4) 3 x REA.
(5) 1 x EA.

73. **Local Training.** A group of operators and technicians about 20 (twenty) personnel has to be trained locally in Bangladesh for 03 (three) weeks by OEM expert on completion of installation and Test/Trial of Simulator. The training shall be conducted on simulator operation, game development, maintenance, software installation, system setup etc. All costs related to transportation, food, accommodation, etc of OEM expert are to be borne by the bidder.

74. **Certificate of Authorization and Qualification of Trainees.** On completion of each session of training, BN trainees shall be assessed by OEM experts to ascertain their level of understanding of the Simulator operation and technical competence. The OEM shall provide the trainees with the **Certificate of Training and Authorization** mentioning individual trainee's ability to conduct operation and maintenance of Marine Bridge Simulator on successful completion of their training.

75. **Stage Inspection.**

a. One BN expert team consisting of 04 (four) members shall visit the OEM premises during the development process of the system for a total duration of 05 (five) working days. The stage inspection shall be conducted after 06 months of simulator development work or before from the contract effective date. The stage inspection shall have specific milestones including Simulator layout plan and architecture details; Software Requirement Study (SRS) report details; critical design work of software functionality; completion of at least 25% of Area and Own ship model database; Simulator-wise equipment, hardware and software functionality composition plan; procurement plan of equipment, hardware, construction material, furniture items; etc. The supplier should inform the buyer about the schedule of Stage Inspection, milestones, and inspection criteria at least 12 (twelve) weeks prior to the date of inspection. The milestones and the inspection criteria shall be approved by BN. On successful completion of stage inspection, the stage inspection certificate shall be signed by both parties. Basing on the report of successful stage inspection, FAT and Training schedule shall be confirmed by BN. In case, stage inspection is not successful, re-inspection shall be conducted by BN team at the supplier's cost including international airfare, accommodation, food and internal transportation.

b. Both-way airfare, accommodation and food cost shall be borne by BN. Internal transportation of BN team within the manufacturer/ supplier's country, reception and arrangement for entry into country/ concerned area shall be arranged by the supplier without any extra cost.

76. **Manuals**. The following documents (03 sets each) is to be provided in English including all text in illustrations, drawings and circuit diagrams at free of cost during delivery for the Simulator:

a. **Operator Manual**. The operator manual shall cover but not limited to:

(1) Basic information of Simulator with block and necessary diagrams.
(2) Simulator operating procedures.
(3) System setup and operation.
(4) Description of all operational mode and menu with explanations.
(5) Game design, environment, target, own platform simulation details.
(6) Conduct of exercise.
(7) Management of Instructor console, game testing station, full mission bridge, mini bridge, database management and system server.
(8) Detailed software function.
(9) Record and replay process including database management.
(10) System check.

b. **Technical and Maintenance Manual**. The technical and maintenance manual shall contain descriptions based on figures, diagrams and tables. The system description should cover the following information but not limited to:

(1) System functionality with detail description.
(2) Functional build-up of the system and its sub units (hardware and software).
(3) Necessary block diagrams and circuit details for the system and its sub-system
(4) Software installation, system setup, restore and reconfiguration procedures.
(5) Fault finding and remedial actions.
(6) Logical and physical networking description.
(7) Database management.
(8) Assembly and de-assembly procedure of computer components for maintenance work.

77. **Shipment & Delivery**.

a. The supplier will deliver the complete system within **09 (nine) months** (without import duties) after signing the contract to the following consignee:

The Commanding Officer Naval Stores Depot New Mooring, Chattogram, Bangladesh	Or	Officer In Charge Naval Stores Sub Depot Dhaka Naval Unit Khilkhet Namapara, Dhaka-1229, Bangladesh

b. The complete system shall be transported by ship/air from the assemble place/ factory. In case of FOB, the supplier will carry the items from Chattogram Sea Port/ Airport (as applicable) to NSD Chattogram at the cost and risk of supplier. Before shipment, the supplier is to get a written clearance from DGDP for shipment of the system.

c. All items are to be delivered in seaworthy packing to ensure safe transit by sea.

d. All packages are to have packing notes showing their contents in detail and all packages shall be marked with the name and address of the consignee and gross weight. Package is to provide protection from the external mechanical and environmental factors exposure during its transportation and storage.

78. **Port of Shipment**. Any port of the country of origin/ manufacture of the whole system.

79. **Lead Time**. The installation works including commissions and test/ trial is to be completed within **03 (three) months** of delivery of the items.

80. **Installation, Supervision, STW and Commissioning**.

a. The bidder shall send an installation team to Bangladesh for the assembly and installation of whole system. Necessary items for installation and commissioning shall be provided by the supplier. After the successful completion of site preparation, removal of various items of existing bridge simulator and minor civil works, the supplier shall install all supplied equipment and system at the site. During installation, any damage, burnt-out or de-shaped part, equipment or spare should be replaced with the new one, no repaired or modified item will be accepted.

b. Qualified manufacture's/supplier's engineers are to be employed for the installation and setting to work (STW) of offered marine bridge simulator.

c. After completion of installation of the system, the supplier shall carry out a detail test of all the equipment and Simulator operation in presence of BN experts/ technicians.

d. After completion of installation and detail test of all the equipment and system, the supplier will confirm the readiness of the Simulator for final acceptance test. The bidder shall provide technical assistance as required to support initial commissioning and test/ trail of the system.

e. All expenses for OEM installation team including accommodation, food, air fare, etc are to be borne by the bidder.

81. **Test, Trial and Final Acceptance**.

a. **Test/ Trail**. The supplier will ensure satisfactory tests, trial and functioning/ commissioning of the Simulator at purchaser's premises.

b. **SAT**. System Acceptance Test (SAT) will be carried out on completion of setting to work (STW).

c. **SAT Protocol**. The SAT protocol/ procedures are to be submitted by the bidder and to be approved by BN well in advance. Supplier shall submit two copies of SAT Protocol to the purchaser not less than eight weeks prior to the commencement of SAT.

d. **Final Acceptance**. The supplier shall carry out SAT of the Simulator in the presence of the BN team. On completion of satisfactory SAT, the final acceptance certificate will be jointly signed by the purchaser and supplier.

82. **Certificates**. Following certificates are to be provided in English for the Simulator and all associated equipment during delivery/ with tender offer (as applicable):

a. Certificates of Standard.

b. Quality Assurance Certificates.

c. Factory Acceptance Test (FAT) Certificate.

d. Stage Inspection Certificates.

e. Guarantee and Warranty Certificates.

f. Country of Origin and Country of Manufacture Certificates.

g. Year of Production Certificate.

h. OEM Authorization Certificate.

83. **Brochures/ Booklet**. One set of original brochures / booklets in English having detail technical information about the offered Simulator including software features are to be provided along with the tender quotation for evaluation/ assessment.

84. **User List/ Client List**. List of users of offered Simulator is to be mentioned with full address. The list shall provide the name of various Navies/ Coastguard/ Maritime Agencies with respective model and brand of Simulator and year of delivery. The user list/ client list will be used for the assessment of the tender offer.

85. **Maintenance Support**.

a. **Reliability & Maintainability**. The simulator shall be highly reliable and easy to maintain with low maintenance cost. Modular design of site replaceable units would be highly preferable. The built in self-test facility for the simulator and all section and sub-section are to be incorporated.

b. **Special Tools**. Special tools and special test equipment (network related tools, test equipment and other tools) shall be provided by the bidder that may be required for the installation, assembling, replacement of unit or any other maintenance purpose.

c. **Preventive Maintenance**. The bidder is to highlight the schedule of required maintenance for the offered system.

d. **Expected Life**. The bidder is to mention the expected life of the offered system, which shall not be less than 15 years.

e. **After-Sale Service**. The technical service through online support or physical support of OEM expert is to be provided as and when required during warranty period. Moreover, at the end of warranty period BN may go for maintenance contract with OEM based on mutual consent of both the parties.

86. **Warranty**.

a. Minimum 24 (twenty-four) months warranty is to be provided from the date of acceptance by the buyer. If any component of the supplied items becomes defective during the warranty period, the warranty shall be extended automatically (for relevant component) for the period of the subject component remains defective.

b. For warranty repair/ replacement, the supplier will collect the defective item from NSD, Chittagong/ NSSD, Dhaka (as applicable) and re-supply the same to collecting place after warranty repair or for replacement within 60 (sixty) days from the date of defect at no cost to the purchaser. Freight and insurance charges for both the ways for the item and cost of site visit by OEM engineer (if needed) are to be borne by the supplier.

c. PG to be released on submission of 5% of TCP (Total Cost Price) as warranty from the date of acceptance.

d. The supplied items/ equipment on warranty shall be identified by attaching a warranty label/ disc or stenciling as shown below:

Contract No and Date	
Warranty Begins on	
Warranty Expires on	

87. **Performance Guarantee (PG) and Bank Guarantee (BG)**. The terms and conditions related to PG and BG are as under:

a. **Performance Guarantee (PG)**. The BIDDER shall furnish a Performance Guarantee (PG) with validity from the date of expiry of the delivery schedule (as per DGDP format in foreign currency) in the form of Bank Guarantee as security. The PG is of **@ 10% on the LC value** in favour of The Senior Finance Controller (Navy), Sailors Colony, Lalasarai, Mirpur-14, Dhaka-1206 as security money through any scheduled bank located in Bangladesh. In all the cases PG should be submitted before signing the contract. The **PG shall be released by the SFC(Navy) on receipt of Final Acceptance Certificate from DGDP**. If the contractual obligation warrants the extension of validity of PG, the BIDDER shall remain liable to do so at his own cost. If, however, the BIDDER despite being requested by DGDP, decides not to extend PG; DGDP shall reserve the right to encash the PG, which shall later on completion of contractual obligations be handed over to the BIDDER. In this connection, the LC open by DGDP shall remain in-operative till receipt of PG from the Principal. On getting the valid PG, the LC shall be made OPERATIVE. All expenditures involved in making the LC operative shall be borne by the PURCHASER. In case of failure of the BIDDER to fulfill the contractual obligations as per terms and condition of the contract, PG in full or part thereof may be forfeited at the discretion of the PURCHASER and necessary punitive action shall be taken against Bidder/Manufacturer/Principal and Local Agent as per DGDP rules. In any case either PG validity expires, or contractual obligations is not completed, Local Agent of Bidder/Foreign Manufacturer/Principal must ensure that the PG issuing bank takes written clearance from DGDP before releasing PG to the principal.

b. **Bank Guarantee (BG).** The BIDDER shall issue a Bank Guarantee (BG) for a value of **@ 20% (twenty percent) of the total LC value** from any scheduled bank in Bangladesh in favour of The Senior Finance Controller (Navy), Sailors Colony, Lalasarai, Mirpur–14, Dhaka-1206, representing Bangladesh Navy, Peoples Republic of Bangladesh, information to The Directorate General Defence Purchase, Ministry of Defence, Peoples Republic of Bangladesh. **This BG shall remain valid until the delivery (Final Acceptance) of the Marine Bridge Simulator System** (notwithstanding minor deficiencies which would be mutually settled and agreed between PURCHASER and BIDDER) in Bangladesh, and it **shall expire on the signature by the parties of the "Final Acceptance Certificate"**. If the contractual obligation warrants the extension of the validity of the BG, the BIDDER shall remain liable to do so at its own cost. In case of material failure of the BIDDER to fulfill its contractual obligation as per the terms and conditions of the contract, the BG in full or part thereof may be forfeited at the discretion of the PURCHASER.

88. **Supply Assurance Certificate**.

a. The BIDDER/SUPPLIER will provide a "Supply Assurance Certificate" before releasing the first Milestone of the payment, stating that:

(1) The SUPPLIER will apply for all necessary export licenses. The SUPPLIER will continue to provide the PURCHASER with the necessary support for any further export license applications beyond the term of this contract. This is particularly relevant for the procurement of spare parts and other equipment in the future.

(2) The concerned Manufacturer will remain obliged to supply of spare parts and provision of technical advice with respect to the Hardware and Software to the PURCHASER for a period of fifteen (15) years from the date of Final Acceptance.

b. SUPPLIER will provide all the authorizations/ export licenses/ export permits/ equivalent documents from the concerned government agency of respective manufacturer's country for hardware and software, eight (08) weeks prior to the commencement of Factory Acceptance Test (FAT).

c. If an export license from the relevant government agency of the manufacturer's country for hardware and software, is in a language other than English, the SUPPLIER will provide a notarized English translation along with it.

89. **Guarantee for Spares Support**. The supplier is to give guarantee of continued supply of spares for at least 10 years at a reasonable price. The price of the required spare parts are to be quoted separately. Yearly increase of price of spares should not be more than 3% of the price list that is to be submitted with the tender offer.

90. **Liquidated Damage (LD).** As per DGDP terms and conditions.

91. **Grace Period**. As per DGDP terms and conditions.

92. **End User Certificate (EUC).** As per DGDP terms and conditions.

93. **Offer Validity**: The offer will remain valid up to 30 June 2025.

94. **Price**.

a. Price of each element of the total offer is to be shown separately (e.g. price of the main items, additional and optional items, Installation and STW, Training, Warranty/ Guarantee, etc) and the grand total of the foreign currency to be shown on the original offer submitted by the supplier. The price to be quoted for each of the following but not limited to:

(1) Main Equipment and Facilities including hardware and software as multiple list of items.

(2) Optional Equipment/ Item (if any).

(3) Foreign Training.

(4) Local Training.

(5) Installation, STW and Commissioning.

(6) Spares.

b. Price/ cost of locally supplied items is to be quoted separately in local currency.

95. **Terms of Payment**. 100% Payment shall be made through an irrevocable Letter of Credit (LC) opened with scheduled bank in Bangladesh for foreign currency except locally supplied items and services and local currency payment shall be made through SFC(N) under the following terms and conditions:

a. **Payment for System Hardware and Software**.

(1) **Installment-1 (Survey for Designing Marine Bridge Simulator System)**. 20% (twenty percent) of the total CFR price shall be released after signing the contract, opening the LC and upon completion of following works and presentation of the following document to the bank:

(a) A certificate by the PURCHASER that the "Survey report with design and Installation layout of Marine Bridge Simulator System" submitted by the BIDDER/SUPPLIER and accepted by Purchaser.

(b) "Supply Assurance Certificate" by BIDDER/SUPPLIER and Acceptance on "Supply Assurance Certificate" by PURCHASER.

(c) Performance Guarantee (PG) in the form of Bank Guarantee (BG) for 10% of the total of the LC value in accordance with Article 12 (PG and BG).

(d) Bank Guarantee (BG) for the total amount (20% of the total LC value) in accordance with Article 12 (PG and BG).

(e) BIDDER's signed Commercial Invoice, in duplicate for the value of 1st installment.

(2) **Installment-2 (Requirement Study for customization of Marine Bridge Simulator Software)**. 20% (twenty percent) of the total software (Marine Bridge Simulator Software) price shall be released upon presentation of the following document to the bank:

(a) A certificate by the PURCHASER that the "Software Requirement Specification of Marine Bridge Simulator System" submitted by the BIDDER/SUPPLIER and accepted by Purchaser.

(b) A certificate by the PURCHASER that the "Software Architecture Layout for Marine Bridge Simulator system" submitted by the BIDDER/SUPPLIER and accepted by Purchaser.

(3) **Installment-3 (Delivery of Bridge Simulator System Hardware)**. 60% of CFR value shall be paid on shipment of all relevant items and submission of following documents to the Bank:

(a) Original Bill of Lading (BL)/ Airway Bill (AWB) of 06 sets (01 x Original and 05 x Copies) must be issued by shipping lines or authorized agent of shipping/ airlines. The DGDP Contract number, LC number and Bangladesh Bank registration number are to be mentioned in the BL/ AWB. Freight amount must be shown otherwise only FOB value shall be paid. In addition to this, following shall also be considered:

(1) Name of carrier must be indicated in BL/ AWB.

(2) Must be signed by carrier or a named agent for on behalf of the carrier

(b) Packing List.

(c) Certificate of Origin and Assemble from concerned Agency/org by Supplier.

(d) Export License/ Export Permits from concerned Govt Agency/org by Supplier.

(e) Warranty/ Guarantee Certificate by Manufacturer's/ Supplier's.

(f) Certificate of Satisfactory Completion of Joint Factory Acceptance (FAT) by purchaser.

(g) Certificate of Satisfactory Completion of Pre-shipment Inspection (if held) by Purchaser.

(h) Quality Assurance Certificate (QAC) by Supplier.

(j) Final shipment clearance letter of DGDP.

(k) Commercial Invoice signed by Supplier.

(4) **Installment-4 (Development and Deployment of Marine Bridge Simulator Software).** 60% (sixty percent) of the total software (Marine Bridge Simulator software) value shall be released upon presentation of the following document to the bank:

(a) Certificate of satisfactory completion of FAT by PURCHASER.

(b) "Setting-to-Work Acceptance Certificate in PURCHASER Location" by PURCHASER.

(5) **Installment-5 (Final Acceptance of Marine Bridge Simulator Hardware and Marine Bridge Simulator Software).** Remaining 20% of total CFR value and 20% of total software (Marine Bridge Simulator software) value shall be released upon submission of following documents to the Bank:

(a) "Final Acceptance Certificate" of the Marine Bridge Simulator System (as per scope of supply), issued by the PURCHASER.

(b) Submission of Warranty for Guarantee in the form of Bank Guarantee (BG) for an amount equivalent to 5% (five percent) of LC value. This BG shall remain in vogue, which shall be released **on receipt of 'No Objection Certificate' from the PURCHASER** after the warranty period.

(c) Commercial Invoice signed by supplier.

b. **Payment for Training and Technical Services**.

(1) 100% cost of Installation and Setting-to-Work (STW) shall be paid on successful completion of commissioning of Marine Bridge Simulator System and on production of "Job Completion Certificate" issued by the PURCHASER and clearance letter from PURCHASER (DGDP) to the Bank.

(2) 100% cost of foreign training shall be paid on submission of "Foreign Training Completion Certificate" issued by the PURCHASER (DGDP) and clearance letter from DGDP to the Bank.

(3) 100% cost of local training shall be paid on submission of "Local Training Completion Certificate" issued by the PURCHASER and clearance letter from PURCHASER (DGDP) to the Bank.

c. **Payment for Locally Supplied Item and Services**. 100% cost of locally supplied items (if any) and local services (if any) shall be released on production of "Supply Completion Certificate of Locally Supplied Item" and/or "Delivery Completion Certificate of Locally Hired Services", issued by the PURCHASER (DGDP) in local currency by SFC (N).

96. **Financial Offer**. The Bidder shall comply with the price/quotation as asked in the tender specification. The Bidder may mention the price of additional items (if required) and services in the financial offer. Item-wise price is to be mentioned for each item and services. The Bidder has to submit the summary of financial offer as per following format:

Ser	Description of Item	Qty	Unit Price	Total Price
1.	**Main equipment, facilities including hardware and software as multiple list of items**	1 set	To be mentioned	To be mentioned
2.	**Spares**	As reqr	To be mentioned	To be mentioned
3.	**Optional Items (If any)**	As reqr	To be mentioned	To be mentioned
4.	**FOB Value**		To be mentioned	
5.	**Freight**		To be mentioned	
6.	**CFR Value** (FOB + Freight and other price)		To be mentioned	
7.	**Cost of Training**			
	a. Foreign Training Package		To be mentioned	
	b. Local Training Package		To be mentioned	
8.	Cost of Installation, Supervision, STW and Commissioning	-	To be mentioned	
9.	**Total Cost** (in foreign currency) as **LC Value**	-	To be mentioned	
10.	**Locally Supplied Items** (quoted separately in local currency)	-	To be mentioned	
11.	**Total Cost** (in local currency)		To be mentioned	
12.	**Total Offered Price** (Ser 9 + Ser 11)	-	Total Cost (Foreign Currency) + Total Cost (Local Currency)	

97. **Special Condition**. The offered simulator will be considered as defense stores and shall be used by the Bangladesh Navy only. Hence, the simulator along with associated accessories shall be exempted from payment of custom duties and sale tax as per Ministry of Finance Memo Number 9(41)/NBR/CUS-IV/72/246 dated 10 April 1981 as per DGDP terms and conditions.