INDIAN MARITIME UNIVERSITY – Navi Mumbai Campus
(A Central University, Govt. of India)
TENDER

NOTICE INVITING TENDER(NIT)

Sealed tenders are invited for the following:

Product details	Qty	Location
Full Mission Ship Maneuvering Simulator (FMSMS)	02	IMU-Navi Mumbai Campus IMU- Chennai Campus

Bidders are advised to study the Tender Document (including all Sections, Schedules and Annexure etc.) carefully. On submission of Tender, it shall be deemed that a careful study and examination of the Tender Document with full understanding of its implications have been done.

The Tender Document can be downloaded free of cost from IMU website www.imu.edu.in from09.03.2024 onwards. The last date for receiving tender at IMU – Navi Mumbai Campus is 1300 hrs on01.04.2024.

DEPUTY REGISTRAR
IMU Navi Mumbai Campus

All bidders are requested to visit IMU Websites **https://www.imunavimumbai.ac.in & https://www.imu.edu.in** for regular updates.

Tender Abstract

1	**Title**	:	Supply of FMSMS Simulators - 02 Numbers
2	**Notice Inviting Tender No.**	:	IMU/NMC/PUR/2023-24/0041 dated 09.03.2024
3	**Pre bid meeting**	:	14:30 PM on 20**/03/2024** at Indian Maritime University, Navi Mumbai Campus (T S Chanakya), Karave, Nerul, Navi Mumbai-400076.
4	**Last date and time for receipt of bids**	:	13:00 Hrs on **01/04/2024**
5	**Date and time for opening of Technical bid**	:	14:30 Hrs on **01/04/2024**
6	**Date and time for opening of Financialbid (for technically qualified bidders)**	:	To be intimated later
7	**Proposal currency**	:	Prices shall be quoted in Indian Rupees (INR)
8	**Language of the proposal**	:	This proposal should be filled in English language only. If any supporting documents are to be submitted, in any other language other than English, then translation of the same in English language, attested by the bidder should be attached.
9	**Validity of tender offers**	:	180 days from date of opening of Technical bid
10	**EMD Amount**	:	Rs.9,00,000/-in the form of Demand Draft for 02 FMSM Simulators.
11	**Estimated Cost**	:	Rs. 4.5 Cr.
12	**Security Deposit (for finalized bidder only)**	:	5 % of the contract value in the form of Bank Guarantee/DD from any nationalized bank.
13	**Address for Submission of Tender**	:	Deputy Registrar (Admin), IMU, Navi Mumbai Campus, (T S Chanakya) Karave, Nerul, Navi Mumbai-400 706

INDIAN MARITIME UNIVERSITY – NAVI MUMBAI CAMPUS

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1. Invitation for Bids.

The Indian Maritime University – Navi Mumbai Campus (NMC) (hereinafter referred to as the Buyer or IMU- NMC invites sealed tenders for Supply of **Full Mission Ship Manoeuvre Simulator (FMSMS)** (hereinafter referred to as the Simulators) under Two bid system.

Overall Scope and objective of this Tender is to:

a) Select a successful bidder for supply, install the complete system with UPS, commissioning, training, subsequent Upgradation (including hardware & software). Technical Specification (Annexure I)
b) Comprehensive onsite warranty for a period of 05 years.
c) Comprehensive/non-comprehensive onsite maintenance for period of 5 years after expiry of 05 years' warranty.

1.1 EMD and Tender Fees:

Sl.No.	Particulars	Supporting document
1	Tender document can be downloaded free of cost from www.imu.edu.in under the section Tender or from www.imunavimumbai.ac.in under section tenders	Nil
2	Bidders must submit EMD of Rs.9,00,000/-in the form of Demand Draft for 02 FMSM Simulators.	Demand Draft from nationalized / scheduled commercial bank in the name of Indian Maritime University – Navi Mumbai Campus payable at Navi Mumbai.

1.2 Eligibility Criteria:

The bidder should have mandatory qualifications as per the following table. The proposal of the bidders who are fulfilling the mandatory qualification criteria shall only be considered for technical evaluation. The offer is liable to be rejected if non-compliance to mandatory qualification criteria is detected during the technical evaluation.

Sl.No.	Qualification Criteria	Supporting documents
1	The Bidder should be in the Business of Providing 'Similar Supply & Installation of Simulators for a period not less than 3 years i.e. since FY. 2020-21. 2021-22 and 2022-23	Copies of the Work order or Agreement or Work Completion certificate for the each Completed or ongoing Supply and Installation of Simulator– Proof for providing similar Supply and Installation not less than 3 years

2	The Bidder should have satisfactorily completed "Similar Supply and installation" with a minimum value specified in any one of the three set of values (a or b or c) carried out during the last any one of the five financial years (2018-2019 to2022-2023) a) At least 1 Similar Supply and Installation of FMSMS with a minimum value of i.e. Rs. 3.6 Cr (80% of Bid value) [OR] b) At least 2 Similar Supply and Installation of FMSMS with a minimum value of i.e. Rs. 2.25 Cr. (50 % of Bid value) each. [OR] c) At least 3 Similar Supply and Installation of FMSMS with a minimum value of i.e. Rs.1.8 Cr (40% of Bid value.) each.	Copies of the Work order or Agreement or Work Completion certificate
3	The Bidder should have an average annual turnover of at least Rs.10 Crores during the past 5 financial year's i.e.2018-19 to 2022-23.	Annual accounts duly certified by a Chartered Accountant.
4	The bidder should submit the copy of Income Tax return for last three financial years i.e. 2020-21, 2021-22& 2022-23 (Assessment year 2021-22, 2022-23&2023-24)	Copy Income tax Returns.
5	The Bidder should have a valid PAN and GST Registration Certificate.	Copy of the PAN Card and GST registration certificate.
6	The Bidder shall be the reputed Original Equipment Manufacturer (OEM) or their authorized/certified partner or authorized re-seller from India. He shall furnish necessary authorization from the OEM authorizing him to provide all goods and services support indicated in this tender and confirming that necessary assistance would be provided to the firm in providing required support during the Warranty Period.	OEM Authorization / Certification as per the Annexure III. In case of participation by OEM, self-declaration.
7	The Bidder should not have been blacklisted or debarred from bidding for any government or central government autonomous organisation.	Self-declaration to this effect.

1.2.1 'Similar Supply' means supply of Simulator Equipment of the similar type as per the tender with Government / Semi- Government/ Public Sector organizations/ National level educational institutes like IIT, IIM, NIT and Central Universities/ State Universities / Public Limited Companies. / Reputed UGC/ AICTE Recognized or private Sector Universities / Maritime training institutes/Reputed Private Companies and Port Organizations.

1.2.2 With regard to the various proof/supporting documents produced by the bidders for

establishing that they meet the various eligibility conditions, it shall be IMU's prerogative to decide whether the document produced is valid evidence or not and to call for additional proof, if required.

1.2.3 All the Mode of Proof Documents for meeting eligibility criteria enclosed with the tender are to be duly signed by the authorized signatory. If required, IMU-NMC may insist for notarized copy or ask to produce originals to ascertain the veracity of the documents. IMU-NMC also reserves the right to ask more proof to corroborate the eligibility declarations.

1.3 **Pre-bid Meetings Clarification.** IMU- NMC organizing a pre-bid meeting at **1430 hrs** on **20.03.2024**. All interested suppliers/vender's are requested to participate in the pre-bid meeting regardless of their eligibility/acceptance of tender conditions as per the present form of the tender. The prospective bidders shall submit their queries in writing in prescribed format below in writing to the address mentioned in the invitation of tenders or E-Mail to dradmin.navimumbai@imu.ac.in two days prior to the pre-bid meeting and the same shall be clarified during the pre-bid meeting.

Sl.No.	Clause No. & Page No.	Reference Clause Details	Clarification Sought

IMU-NMC may or may not incorporate any changes in the Tender document based on acceptable suggestions received during the Pre-Bid meeting. The decision of IMU-NMC regarding acceptability of any suggestion shall be final in this regard and shall not be called upon to question under any circumstances.

1.4 **Response to queries and issue of amendments.**

1.4.1 IMU-NMC will respond to any valid request for clarification, received one week prior to the last date for submission of tender. IMU-NMC's decision is final and binding with regard to interpretation of terms used or other tender contents.

1.4.2 IMU-NMC may, for any reason, suo-moto or in response to a clarification by a prospective bidder or bidder, modify the tender documents by amendments (through addenda/corrigenda etc.)

1.4.3 Any such amendments will be informed to all the participants in the pre-bid meeting besides hosting on IMU website and IMU-NMC website. All the bidders who had downloaded the Bid Document shall verify, whether any such amendments have been issued by IMU-NMC, before submitting their bid and shall take cognizance of and include such amendment(s) in their submission. In any case, the amendment(s), if any, shall be binding on the Bidder.

1.4.4 Any such corrigendum/addendum shall be deemed to be part or incorporated into this Notice Inviting Tender (NIT).

1.4.5 It is the responsibility of the bidder to check the website of IMU time to time for any updates.

1.5 **Language of Proposal & Correspondence.** The tender, and all correspondence and documents, related to the tender, exchanged between the bidder and IMU-NMC should be in the English language only. If the bidder along with their offer furnish any printed literature written in any other language, such documents should be supplemented with their English translation also. The contents in the English translated version alone shall be taken into consideration.

1.6. **Tender Validity.**

1.6.1 Tenders shall remain valid for 180 days from the last date for submission of tender. A proposal valid for a shorter period may be rejected by IMU-NMC as being non-responsive. During the period of validity of Proposals, the terms and condition mentioned shall not change and any such request may lead to denial of the award of work.

1.6.2. In exceptional circumstances, prior to the expiry of the original tender validity period, the IMU- NMC may request the bidder to extend the period of validity for a specified additional period. The request and the response thereof shall be made in writing through E-mail or Post or in person. A bidder agreeing to the request will not be required to nor permitted to modify his tender, but will be required to extend the validity of his tender for the period of extension. In case a bidder is not agreeing to the request of the IMU-NMC for extension of validity of the tender, then his tender will not be processed further and the portions of his tender which have not been opened will be returned to them unopened as the case may be. The EMD paid by them will also be refunded to them as in the case of other unsuccessful bidders.

1.7. **Proposal prices:** The prices indicated in the price schedule should be in INR only and shall be entered in the following manner.

1.7.1 The **price of the equipment** shall be inclusive of basic price, freight and insurance up

to **delivery at IMU Campuses as mentioned above**, Installation, Commissioning, training the trainers including incidental charges, and upgradation of software& hardware (after commissioning whenever required) excluding applicable GST. The bidder should clearly indicate cost break down for all the major hardware assemblies and software (excluding commercially licensed softwares such as Windows/Unix/Linux etc) separately along with the price bid.

1.7.2 Rate for both Comprehensive (hardware and software) and Non- comprehensive (hardware and Software) Onsite Annual Maintenance should be given for 5 years separately excluding GST immediately after expiry of 5 years warranty. GST of corresponding column should be entered in GST row in Price bid.

1.7.3 Prices quoted as above shall be valid for a minimum period of 180 days from last date for submission of the tender.

1.7.4 It must be clearly understood that the prices quoted in the tender are to include everything required to be done as per the specification and the conditions of tender and supply for the proper execution of supply/works although special mention thereof may have been omitted in the specification. The specifications indicated are for minimum and shall include accessories etc. to make the system fully operational. The bidders can inspect the site of installation to assess installation requirements.

1.7.5 IMU-NMC has the right to change /increase / withdraw the quantities of any items in the tender prior to acceptance by the supplier of the work order issued by IMU-NMC. IMU-NMC also has the right to increase the quantity of supply on pro-rata basis.

1.8 **Earnest Money Deposit (EMD):**

1.8.1 Tender should be accompanied by an Earnest Money Deposit (EMD) for an amount of Rs. 9,00,000/- for FMSMS Simulators in the form of Demand draft from any Nationalized Bank drawn in favour of "Indian Maritime University – Navi Mumbai Campus", Payable at Mumbai. No other form/ mode of deposit towards Earnest Money shall be accepted. Tenders not accompanied by the Earnest Money Deposit in the manner prescribed by the IMU will be summarily rejected.

1.8.2 The EMD of all unsuccessful bidders would be refunded by IMU-NMC within 15 days on selection of successful bidder. No interest will be allowed on the Earnest Money. The EMD of the successful bidder will be refunded only after the remittance of Security Deposit. Alternatively, the successful bidder shall when his tender is accepted, furnish Security Deposit as specified in the clause elsewhere after adjusting the amount deposited by him as earnest money. The earnest money shall retain its character as earnest money deposit, till the successful bidder furnishes the Security Deposit in full with or without adjustment of EMD.

1.8.3 Where a person whose tender has been received by IMU-NMC intimates that he is withdrawing their tender before the validity period or makes any modification in the terms and conditions of the tender which are not acceptable to the IMU-NMC (or) fails to furnish the Security Deposit within the prescribed time, the IMU-NMC shall without prejudice to IMU's any other right or remedy, be at liberty to forfeit the Earnest Money

deposited by such person absolutely.

1.9 **Submission of the Proposal:**

The tender submitted by the Bidder shall comprise the following and should be read in conjunction with any amendments issued at the time of submission of bid.

1.10 **Technical Bid (in Sealed cover-I). The Cover-I should comprise of following.**

1.10.1 - Earnest Money Deposit.

1.10.2 Tender Document downloaded from IMU Web site comprising Tender Notification, Abstract, General Rules and Directions for the Guidance of the bidder, General description of Supply and other terms and conditions, including the amendments, corrigendum /addenda issued by IMU-NMC which are duly signed by the authorized signatory of the bidder in each page with a stamp signifying the acceptance of all the tender conditions/terms/contents.

1.10.3 Duly filled Technical Bid format (Annexure II) and Supplier's OEM Authorization Form (Annexure III) with all the documents stated in the technical bids and other supporting documents in evidence of the data filled in technical bids and any other documents/enclosures/schedules/annexure etc. stated in the tender document.

1.10.4 Bidder Memorandum (Annexure IV) duly signed by the bidder.

1.10.5 The duly authorized signatory (ies) of the entity should sign and seal in all the pages of the tender document including the annexure/schedules signifying the acceptance of all the terms and conditions, stated in the various parts of the tender. The person(s) authorized to sign the tender shall also sign in all the pages of the supporting documents with office seal submitted as proof of their eligibility, proof of technical compliance etc. In other words, every page of the bid submitted should have the signature of the duly authorized signatory of the bidder with rubber stamp.

1.10.6 The Cover I shall be addressed to "T**he Deputy Registrar, Indian Maritime University – Navi Mumbai Campus**" and should be duly super scribed as "**TECHNICAL BID- SUPPLY OF FULL MISSION SHIP MANEUVERING SIMULATOR (FMSMS)** " and sealed properly. Name and Address of the bidder shall also be written/ printed on the cover.

1.11 **Price Bid (in sealed Cover-II).**

1.11.1 The Cover II shall only contain the Price Bid formats given in Annexure–V& Schedule 1. It has to be duly filled in, signed and sealed.

1.11.2 The Cover II shall be addressed to **"The Deputy Registrar, Indian Maritime University – Navi Mumbai Campus"** and should be duly super scribed as **"PRICE BID-SUPPLY OF FULL MISSION SHIP MANEUVERING SIMULATOR (FMSMS)"** and sealed properly. Name and Address of the bidder shall also be written/ printed on the cover.

1.11.3 The Rate shall be typed and signed by the person or persons duly authorized to sign on

behalf of the bidder. There should be no overwriting/scoring and rewriting. Any bid found to have overwriting or double entry or rewriting by scoring off one value shall be rejected during the price bid opening.

1.12 **Main Cover:**

Both the **"Cover I"** and **"Cover II"** shall be placed inside the main cover and sealed properly. The main cover should be duly super scribed as **"TENDER FOR SUPPLY OF FULL MISSION SHIP MANEUVERING SIMULATOR (FMSMS)"** and to be submitted in the following address which should reach on or before **13:00 p.m. on 01st April, 2024**.

Address:
The Deputy Registrar,
Indian Maritime University
Navi Mumbai Campus (TS Chankya),
Karave Village, Palm beach Road, Nerul,
Navi Mumbai -400706

1.12.1. The bidder shall note that no alternative or counter or qualifying tender conditions by the bidder will be acceptable to IMU-NMC. Tenders containing any qualifying conditions or even bidder's clarifications in any form may be treated as non-responsive and will run the risk of rejection. In general, printed terms & conditions shall not be accepted.

1.12.2. Bidder who submits more than one tender will be disqualified.

1.13 **Cost of Bidding:** The bidders shall bear all costs, efforts or their time associated with the preparation and submission of their bids and the IMU-NMC will in no case be responsible or liable for those costs / efforts / time, regardless of the conduct or outcome of the tendering process or the cancellation, if any, of tender by IMU-NMC, due to any reason whatsoever and at any stage of the tender (IMU-NMC is not responsible, if there is a cancellation even after price bid opening).

1.14 **Completeness of Tender:** The Bidder is expected to examine all instructions, forms, terms, conditions and deliverable in the tender document. Failure to furnish all information required by the tender documents or submission of a tender offer not substantially responsive in every respect to the tender documents will be at the bidder's risk and may result in rejection of its tender offer. The tender offer is liable to be rejected outright without any intimation to the bidder if complete Information as called for in the tender document is not given therein, or if particulars asked for in the forms / proforma in the tender are not fully furnished.

1.15 **Deadline for Submission of Proposals:** Tenders must reach the Deputy Registrar'soffice through speed post/ courier or to be dropped in to the box placed in the IMU – Navi Mumbai Campus prior to the last date & time for submission, specified in the abstract. IMU- NMC may, at its sole discretion extend the date and time for submission of tenders. Any updates with regard to such extension or any other communication intended for the bidders / prospective bidders will be made only through IMU's website stated above. Any tender received after the last date and time for submission of tenders prescribed will be rejected.

1.16 **Late Proposal:** Any proposal received by IMU-NMC after the deadline for submission will be rejected and kept as an unopened Tender.

1.17 **Modification and withdrawal of bids.**

1.17.1 The bidder may be allowed to modify or to submit revised bid due to corrigendum, addendum, etc., issued by IMU- NMC, any time prior to the last date prescribed for receipt of bids, by giving a written notice to the IMU-NMC.

1.17.2 The bidder's modification or withdrawal notice shall be prepared, sealed, marked and dispatched in a manner similar to the original Proposal.

1.17.3 Subsequent to the last date for receipt of bids, no modification of bids shall be allowed. No bid may be withdrawn in the intervening period between the deadline for submission of bids and expiration of the of bid validity period specified. Withdrawal of a bid during this period will result in forfeiture of EMD.

1.18 **IMU's Right to accept and to reject any or all proposals.**

Notwithstanding anything else contained to contrary in this Tender Document, IMU-NMC reserves the right to accept or reject any Bid or to annul the bidding process fully or partially or modifying the same and to reject all Proposals at any time prior to the award of work, without incurring any liabilities in this regard.

1.19 **Rejection of BidsThe bids will be rejected on following grounds:-**

1.19.1 If any of the eligibility criteria as per the qualification criteria is not met.

1.19.2 EMD not submitted.

1.19.3 If tender terms and conditions are not met.

1.19.4 If bidder gives wrong information in the bid.

1.19.5 Canvassing in any form in connection with the bids.

1.19.6 If the bid is incomplete /partial bid/ conditional/unclear in any form.

1.19.7 Bids submitted after due date and time.

1.19.8 Bids are submitted through Telex/Fax/ e-mail (i.e. modes other than by way of speed post/ courier/ dropping in the box in sealed covers as prescribed).

1.19.9 Erasure and/or overwriting (if not countersigned by authorized person).

1.19.10 Bids not signed by authorized signatory.

1.19.11 The Bid is found incomplete/ non-compliance to tender terms.

1.20 **Evaluation Process.**

1.20.1 IMU-NMC shall evaluate the responses to the NIT and all supporting documents / documentary evidence. Inability to submit requisite supporting documents / documentary evidence, may lead to rejection.

1.20.2 The interpretation of the bids and the decision made by the IMU in the evaluation of responses to the NIT shall be final. No correspondence will be entertained outside the process of evaluation with IMU-NMC.

1.20.3 IMU-NMC has the right to seek clarifications/documents from the bidders during the technical evaluation process. All such clarifications would be recorded and signed by the bidders authorized rep and authorized officer of IMU-NMC. Any verbal agreement arrived would not be entertained.

1.20.4 IMU-NMC reserves the right to reject any or all bids on the basis of any deviations.

1.20.5 Each of the responses shall be evaluated as per the criterions and requirements specified in this NIT.

1.20.6. IMU may request the vendor/bidder for arranging site visit for verifying the similar installation.

1.21 **Tender Evaluation.**

1.21.1 Technical bids will be opened at the IMU-Navi Mumbai Campus (TS Chanakya) located at the address stated in tender abstract. Any bidder who is willing to observe the tender opening, may, in person or through his authorized representative (Only one personnel on production of authorization letter), be present at the venue and witness the tender opening.

1.21.2 The bidder or his authorized representative who are present shall sign a register evidencing their attendance. IMU reserves the right to reschedule the tender opening date (technical / financial bid opening) if the scheduled tender opening day is declared as a holiday for the IMU or due to any other administrative reasons which would be published in IMU website and such rescheduling may not be communicated individually in any other modes.

1.21.3 Technical bid (Cover–I) of each bidder shall fulfil the minimum eligibility criteria prescribed in NIT.

1.21.4 The information furnished by the bidder in the Technical Bid in the format(s) prescribed as part of the tender document by IMU-NMC will form the basis for the technical evaluation. In exceptional cases, IMU-NMC reserves the right to obtain any clarifications from any of the bidder. If, in the opinion of the IMU-NMC, information and documents supplied in support of the tender do not meet the minimum eligibility criteria as per NIT and the any or some of the technical specifications as per NIT, as determined by IMU-NMC, the tender / product offering will be treated as non-responsive and rejected by the IMU-NMC and their Cover II – Price bid shall not be opened for evaluation. The IMU-NMC decision is final and binding, with regard to technical evaluation.

1.21.5 After satisfying that all / or some of the bidders have attained the minimum qualifying technical criteria as detailed above, bids of only such technically qualified bidders i.e. who fulfil all the qualification / eligibility criteria and also comply with the technical specifications, will be considered for further evaluation. A suitable date and time for opening of the **Price Bids** will be fixed and those bidder(s) who are technically qualified will be intimated through email about the opening of the Price Bids or alternatively, the date may be published in IMU website. Other procedures for opening the Price Bid including the witnessing (by only the technical qualified bidders) the tender opening event, no. of participants etc., will be similar as those for Technical Bid explained in the earlier para(s).

1.21.6 Price bid evaluation will be made based on price of the equipment, five year comprehensive warranty and 05 year comprehensive or non comprehensive onsite maintenance at IMU Campuses as the case may be i.e either by group A or B as mentioned in price bid.

1.21.7 After evaluating the price bids received under Cover II, the bidder who quoted the lowest will be awarded the work.

1.22 **Consignee Details.** The destination point for delivery of materials will be as follows:-

Srl No.	**Consignee**	**Items & Qty**
01	Director, Indian Maritime University, Navi Mumbai Campus (TS Chanakya) Krave Village, Palm Beach Road Nerul, Navi Mumbai - 400706	**FULL MISSION SHIP MANEUVERING SIMULATOR (FMSMS) - 01**
03	Director, Indian Maritime University, Chennai Campus Uthandi, East Coast Road (ECR) Chennai - 600119	**FULL MISSION SHIP MANEUVERING SIMULATOR (FMSMS)– 01**

2. General Conditions of Contract.

2.1 **Execution of Contract.** The successful bidder has to enter in to an agreement with IMU-NMC incorporating all clauses of the Tender document and any other as may be agreed to by both the parties on a Non-Judicial Stamp Paper of Rs.500/-.

2.1. Termination Clause:-

2.1.1. In the event of the breach of any of the provisions of contract by the supplier, IMU-NMC shall have the right to terminate the tender summarily, at any stage.

2.1.2. In the event of IMU-NMC terminating the contract for breach by the supplier of any of the provisions thereof, the supplier shall be liable for any loss suffered by IMU up to the time of the termination of the contract.

2.1.3. In the event of the death, insanity or insolvency of the supplier, IMU-NMC shall have the right to terminate the contract summarily and to purchase in the open market any Goods/ Services covered by the contract.

2.2. Security Deposit.

2.2.1. The supplier shall be required to submit the security deposit in the form of DD issued by any Indian Nationalized Bank for an amount of 5% of the Purchase Order value within 07 days from the date of receipt of the purchase order.

2.2.2. 50% of the Security Deposit will be refunded / returned without any interest after 15 days of successful installation. Remaining amount of SD will be refunded/returned after the maintenance period. The refund or return of Security Deposit is subject to the complete fulfillment of the contract obligation by the supplier to the satisfaction of IMU.

2.3. **Delivery Period:** The bidder is required to deliver, installation, testing, Commissioning and starting of operation of the Simulators in all aspects within **30 days** from the date of issue of work order by IMU – Navi Mumbai Campus. However, supply of all the equipment should be ensured within 45 days of the receipt of the Work Order failing on which shall attract provisions of para 3.6.

2.4. **Inspection & Rejection:** The supply may be subject to inspection by a reputed external organization or by internal Committee with external participation appointed/nominated by IMU and IMU's decision on their report as to the acceptance of any equipment or rejection of any equipment/goods as not conforming to specification shall be final and binding on the successful bidder. Such of the equipment / goods which are rejected shall be removed by the successful bidder at their own expense and replaced by fresh ones within a time, as determined by IMU.

2.5. **Liquidated Damages:** If the successful bidder fails to execute the Supply/Works in all respects within the period specified or within such extended period as may be allowed, the successful bidder shall pay a sum equivalent to 0.5% of the value of the total tender price per week (Seven days) or part thereof subject to a maximum limit of 10% of the value of the each

of the item tender as liquidated and ascertained damages. IMU shall have the right to determine what the "amount payable/corresponding payment" for any step/activity is, and while the Successful Bidder has a right to represent/clarify, IMU's determination of the same shall be final without prejudice to the Successful Bidder's rights to seek alternative remedy through arbitration/Courts.

2.6. Comprehensive Onsite warranty:

2.6.1 A comprehensive onsite warranty for the supplied equipment (Hardware & Software) shall be provided by the supplier for a minimum of five years from the date of final acceptance of the equipment by IMU. The supplier will be notified of any defect or claim arising under this warranty and the warranty support shall be provided at site at the respective IMU Campuses.

2.6.2 If the supplier having been notified fails to remedy the defect immediately IMU may proceed to take such remedial action as may be necessary at the supplier's expense. The period that the equipment is out of commission / operation as a result of supplier's failure to remedy the defects notified shall result in extension of the warranty period correspondingly and imposition of penalty Rs. 20,000/- (Rupees Twenty Thousand only) per instance.

2.7. Either Comprehensive or Non Comprehensive On-site AMC.

2.7.1. Either Comprehensive (hardware & software) or Non-Comprehensive maintenance (hardware & software) for 5 years is to commence immediately after the expiry of the comprehensive/non-comprehensive five years warranty period.

2.7.2. The supplier shall provide necessary comprehensive preventive and corrective maintenance on site i.e., by sending the engineer to the respective IMU campuses for attending the maintenance requirements of the supplied equipment. In case of intimation of break-down, the equipment should be attended immediately and restored to normal working condition within a maximum of 48 hours during the period of AMC. All spares which need replacement during the period of onsite maintenance are to be replaced without any additional cost. Any exception required with regard to the spares to be replaced to be intimated during the pre-bid meeting or by email within 15 days of notification of the tender to the above said email addresses. The conditions specified for warranty may also be applied by during AMC period and vice- versa.

2.7.3. In addition to above, support should also be available by phone, e-mail to solve the problem as soon as possible during the period of Warranty and Annual Maintenance Contract. He shall have facilities with sufficient service engineers trained to provide support services. The Bidder shall also have sufficient spares on hand for providing the uptime as indicated in this tender.

2.7.4. The AMC would include quarterly visit to clean the cabinets and devices internally to blow off any dust accumulated.

2.8. **Payment Terms.**

2.8.1. 50% of payment will be made after supply of simulators and balance payment will made after installation of simulators.

2.8.2. The Supplier shall be paid as per para 2.8.1 above of price of equipment with 5 year warranty against Supply, Installation, Commissioning, Acceptance Testing, Training and putting in to operation of Simulators at respective IMU Campuses against the invoice. IMU-NMC will, after verification of the claim for its correctness, make payment within **fifteen working days** after the date of receipt of the claim, complete and correct in all respects, from the supplier.

2.8.3 In respect of AMC, AMC charges will be paid at the end of each quarterly period.

2.8.4 The Tax Invoice raised by the supplier must be in compliance of relevant GST acts, rules & notifications made there under and should bear the IMU- NMCGST Registration no. 27AAAAI2610K1ZX. The rate and amount of CGST, SGST, IGST and GST (Compensation to state) cess, related to supply of goods, shall be shown separately in tax invoice for each item of supply.

2.8.5 **Statutory Variation.** If there is any statutory change in CGST & SGST or IGST within contractual delivery period, the same shall be admissible and will be paid at actual based on the documentary evidence. However, no upward revision in the same beyond original delivery period shall be admissible.

2.8.6 Any other statutory compliance will be adhered accordingly.

2.9 **Anti-Profiteering Rules of GST.** The bidder should strictly adhere to Anti-Profiteering Rules of GST.

2.10 **Ownership of License:** Licenses for all the software including Anti-Virus supplied along with the equipment under the scope of supply shall be in the name of Indian Maritime University. All documents and reports prepared or obtained in performing the Simulator shall become and remain the property of IMU.

2.11 **Secrecy.** The Supplier shall not transfer any part or share of his responsibilities directly or indirectly to any person whomsoever without the written consent of IMU.

2.12 **Force Majeure.**

2.12.1 The Supplier shall not be liable for forfeiture of its performance security, liquidated damages or termination for default, if and to the extent that, it's delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure.

2.12.2 For purposes of this Clause, "Force Majeure" means an event beyond the control of the Supplier and not involving the Supplier's fault or negligence and not foreseeable. Such events may include, but are not limited to, acts of the Purchaser either in its sovereign or contractual capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions and freight embargoes.

2.12.3 If a Force Majeure situation arises, the Supplier shall promptly notify the IMU in writing of such conditions and the cause thereof. Unless otherwise directed by the IMU in writing, the Supplier shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.

2.13 **Indemnity**: The selected bidder shall indemnify IMU from and against any costs, loss, damages, expense, claims including those from third parties or liabilities of any kind how-so-ever suffered including patent, copyright, trademark and trade secret, arising or incurred inter-alia during and after the Contract period out of:-

2.13.1 Negligence or wrongful act or omission by the Selected Bidder or its team or any Agency/ Third Party in connection with or incidental to this Contract;

2.13.2 Any breach of any of the terms the Selected Bidder's Proposal as agreed, the Tender and this contract by the Selected Bidder, its Team or any Agency/ Third Party.

2.13.3 The indemnity shall be to the extent of 100% of project cost in favour of the IMU.

2.14 **Arbitration & Jurisdiction.** In the event of disputes, differences, claims and questions arising between the parties hereto arising out of this Agreement or anyway relating hereto or any term, condition or provision herein mentioned or the construction or interpretation thereof or otherwise in relation hereto, the parties shall first endeavour to resolve such differences, disputes, claims or questions by mutual discussion and failing such settlement, the same shall be referred for arbitration by a sole Arbitrator appointed by IMU. Such arbitration shall be held in accordance with the provisions of the Arbitration and Conciliation Act 1996 or re-enactment thereof for the time being in force and shall be held in Navi Mumbai. In case the Arbitration award is not acceptable to either of the parties, they may approach courts having jurisdiction at Navi Mumbai only.

2.15 **Applicable Law.**The Contract shall be interpreted in accordance with the laws of the Union of India and all disputes shall be subject to place of jurisdiction of Mumbai courts only.

3. **Special Conditions of the Tender.**

3.1 Site Preparation. The supplier shall supply a layout plan in the Technical Bid taking all the requirements in to consideration for the performance as well as statutory (DG Shipping) requirements. The supplier must provide complete details regarding space and all the other infrastructural requirements needed for the equipment, which IMU should arrange before the arrival of the equipment to ensure its timely installation and smooth operation thereafter. The supplier shall visit IMU - Navi Mumbai Campus & IMU – Chennai Campus and see the site where the equipment is to be installed and may offer his advice and render assistance to the Institute in the preparation of the site and other pre-installation requirements. The operating environment is Tropical condition.

3.2 **Supply of Equipment.** The supply shall include complete set of equipment (including software, hardware and UPS) accessories and spares as described in the subsequent paragraphs of the "Technical Specification" (Annexure I)

3.3 **Installation, Demonstration and User Acceptance Testing:**

3.3.1 The supplier is required to supply the whole of equipment including installation and demonstration of the equipment **within 30 days** from the date of issue of work order.

3.3.2 The successful Bidder shall depute their Service Engineer for demonstration or calibration of the equipment. The Service Engineer shall demonstrate operation of equipment to the satisfaction of IMU Campuses. IMU Campuses may request to demonstrate the functioning of the equipment, after installation, by asking to perform a few experiments and verification of the results either by theoretical or other practical means.

3.3.3 In case of any mis-happening /damage to equipment and supplies during the carriage of supplies from the origin of equipment to the installation site, the supplier has to replace it with new equipment/supplies immediately at his own risk. Supplier will settle his claim with the insurance company as per his convenience. IMU will not be liable to any type of losses in any form.

3.3.4 The demonstration proposed to be done by the bidder in proof of correct working of the entire set up both individually and as an integrated system has to be specified in the technical bid format in Annexure II. Such demonstration should be acceptable to IMU. If the demonstration proposed by the bidder is not acceptable to IMU, at its discretion either reject the tender or alternatively ask the bidder to do some other demonstration which found by IMU, to be more appropriate.

3,4 **Inspection and Tests.** The supply may be subject to inspection by a reputed external organisation or by internal Committee with external participation appointed/nominated by IMU. This clause should be read in conjunction with clause 3.5. The compliance of the equipment with the requirements mentioned in Technical specifications and elsewhere in Tender document should be verifiable with supporting documents like OEM's manual, Certification from OEM etc. the certificate should be valid.

3.4.1 The above tests shall demonstrate the satisfactory operation of integrated system covering the full range of facilities of the equipment.

3.4.2 The acceptance tests for supplied goods shall be carried out at IMU by the supplier with the participation of concerned personnel from IMU.

3.4.3 In case of the acceptance tests are not concluded to the satisfaction of IMU the supplier shall repair or replace, at the supplier's cost, the whole or any part of the equipment as may be necessary for conclusion of the acceptance tests to the satisfaction of IMU within the reasonable period agreed by IMU. Demonstration of performance of the equipment should be done after such repair / replacement for acceptance of IMU.

3.4.4 IMU reserves the right to accept the delivered items with deviations, provided the supplier agrees to rectify the deviations within an acceptable time period. Regarding the acceptance date, decision of IMU would be final.

3.4.5 The supplier shall provide necessary consumables till the completion of acceptance testing, without any additional cost at the sites.

3.4.6 All the parts and equipment's supplied should be brand new and unused. Refurbished items will not be accepted.

3.4.7 The equipment shall be robust for academic use and shall have to produce results with accuracy, as determined reasonable by IMU.

3.5 **Availability of spare parts.** Supplier shall carry sufficient inventories to assure ex-stock supply of consumable spares for the goods. Other spare parts and components shall be supplied as promptly as possible but in any case within one month of placement of order.

3.6 **Replacement of Defective Equipment.** If any of the equipment supplied by the supplier is found to be substandard, refurbished, un-merchantable or not in accordance with the description/specification or otherwise faulty, the IMU will have the right to reject the equipment or its part. The prices of such equipment shall be refunded by the supplier with 18% interest per annum if such payments for such equipment have already been made. All damaged or unapproved goods shall be returned at suppliers cost and risk and the incidental expenses incurred thereon shall be recovered from the supplier. Defective part in equipment, if found before installation and/or during warranty period, shall be replaced within 30 days on receipt of the intimation from this office at the cost and risk of supplier including all other charges. In case supplier fails to replace above item as per above terms & conditions, IMU may consider 'Banning' the supplier and any other remedies, as deemed fit by IMU.

3.7 **Supply of Manuals & Drawings.**

3.7.1 Two Sets of operation and maintenance instruction manuals for the Simulator shall be supplied to IMU Campuses.

3.7.2 Complete technical and functional specifications, operation and maintenance manual for each hardware/cards on the equipment with part numbers and model de-codification documents, to be supplied in original, photocopy is not acceptable.

3.7.3 Complete engineering details of each system as required for the purpose (experiments and research) the equipment's are bought.

3.7.4 Complete system wiring details, input, output, wiring details as applicable to the scope of supply.

3.7.5 Operation and maintenance manuals for the scope of supply including computers, Data Acquisition Units, interface devices etc. (to be supplied in original, photocopy is not acceptable).

3.7.6 The party shall supply all the software with proper license (including Windows, PC- Motherboard drivers (as applicable to the supplied electronic data acquisition units), and any other software as required. The supplied software should comply appropriate software policy norms.

3.7.7 In addition to the Manuals given by the Manufacturers, the successful Bidder shall prepare full documentation.

3.7.8 The Supplier shall provide soft copy of all the manuals, and all the software on CD in two sets.

3.8 **Documentation.**

3.7.1 The successful bidder shall provide IMU Campuses with necessary documents including the following.

3.8.1.1 Operational and Maintenance Manuals of equipment.
3.8.1.2 Equipment serial numbers and models.
3.8.1.3 Test Certificates, Licenses if any.
3.8.1.4 Acceptance test results and acceptance status.
3.8.1.5 Training Material.
3.8.1.6 Full documentation with the software on CDs.
3.8.1.7 Two sets of hardcopy of the above shall be handed over to nominated personnel of IMU. Soft copy of the documents shall also be provided where applicable. Handing over of documents to IMU by supplier is a pre-requisite for Acceptance.
3.8.1.8 Manuals for the instruments are to be supplied with respect to operation, maintenance, ordering spares / technical services.

3.9 **Power Tolerance.** The Primary power supply for the system shall be 220 V Single Phaseor 440 Volts Three Phase, frequency 50 Hz. The input power supply tolerance should be +/- 15% for voltage variation and +/- 2 Hz. The Supply system for the simulator should have provision for online UPS to cater for full system load and should have surge protection plus EMI interference protection. It should be capable of withstanding permissible voltage and frequency variations without any damage to the equipment or loss of the information.

3.10 **Data Storage capability.** The equipment should be capable of storing sufficient measured data history in the equipment and should be able to transfer the data to stores devices. The scope of supply includes all means by way of drivers, software and interface cables and adapters to facilitate such transfer.

3.11 **Training and Support.**

3.11.1 The supplier shall impart training to four persons at each Campus on operation of the Simulators. The training will be conducted as and when software/hardware upgraded or any other parameters altered by the Manufacturer/Supplier. Periodical refresher training may need to be imparted.

3.11.2 The supplier shall make his own arrangements for supplying training material, equipment required for training etc. IMU Campuses will provide necessary space, infrastructure free of cost for conducting the training.

3.11.3 The training provided by the supplier shall cover operation of the equipment to exploit all the available features.

3.11.4 On completion of training, the supplier shall submit an evaluation report on the participants along with course details.

3.11.5 Completion of training is a pre-requisite for acceptance of the equipment.

3.11.6 All charges pertaining to the training shall be part of the price bid.

3.11.7 Support the operators through help desk (online plus telephonic support) and visits to the sites (at his own cost) as may be required. The number of visits may be specified in the pre-bid meeting if any questions are raised on this.

3.12 Acceptance of Equipment.

3.12.1 The activity shall deem to have been completed with the completion of Supply, Installation, Commissioning, Training and putting in to operation of said Simulators at IMU-Campuses. However, the supply shall be complete only upon certification to this effect issued by IMU's Consignee i.e. the Director of respective Campuses.

3.12.2 Upon completion of Supply / work and after successful completion of other prerequisites like acceptance testing, Training etc., as prescribed in this document, IMU shall receive a written undertaking from the supplier that the supply / works has been completed and accordingly a certificate of completion would be issued in respect of the supply/works. The warranty period for the supplied system would commence from the date of Acceptance by IMU Campuses.

3.13 Bidder's Representations and Warranties.

The selected bidder has to confirm to the IMU that:-

3.13.1 He has the capability to duly perform its obligations in accordance with the terms of the tender and to the satisfaction of the IMU.

3.13.2 The execution of the Supply, Installation, Commissioning, Training and putting in to operation of Simulator at IMU Campuses by the Bidder who does not and will not violate, breach any covenants, stipulations or conditions of any Agreement, Deed entered into by the Bidder with any third parties.

3.13.3 Bidder shall abide by all laws of the land including, Companies Act, Taxation laws,

and all other statutory and other obligations applicable to this contract for supply and IMU will not be responsible non-compliance, if any, by the supplier, in any way what-so-ever.

3.13.4 Provide the software updates free of charge during the period of Warranty and comprehensive and non-comprehensive AMC which is integral to this proposal.

3.14 **Bidder's Covenants.** The Goods/ Services to be supplied by the bidder shall be of the quality or sort specified and in every respect equal and answerable to the specifications sent with the tender and shall be subject to the approval of the IMU.

3.14.1 Supply, Installation, Commissioning, Training and putting in to operation of Simulators at IMU Campuses are to be completed, free of delivery charges as per specified time on Door delivery basis.

3.14.2 Rejected Goods shall be removed by and at the expenses of the bidder within seven days after notice. If not taken away so, the IMU may seize the goods or remove the materials on its own and charge the bidder with all expenses incurred on such removal.

3.14.3 Any notice to the successful bidder shall be deemed to be sufficiently served, if given or left in writing at his usual or latest known place of business or sent to the email address specified in the bid submitted.

3.14.4 In these conditions unless there is something in the subject or context is inconsistent there with words implying the singular shall include the plural and vice-versa words implying the masculine gender shall include the feminine and the words implying persons shall include bodies corporate/firms etc.

Sd/- Deputy Registrar
Indian Maritime University
Navi Mumbai Campus

ANNEXURE I

TECHNICAL SPESIFICATIONS OF FULL MISSION SHIP MANEUVERING SIMULATOR (FMSMS)

1. Objectives Of Full Mission Ship Maneuvering Simulator

"The objective of the Full Mission Ship Maneuvering Simulator at Indian Maritime University is to train Master, Pilots, Navigating Officers and other Navigational Watch-keepers in Ship-handling and conduct of navigational operations, including the handling of navigational emergencies. This may be achieved by controlled training in a simulated environment, leading to a better understanding of navigational operations and by developing the associated skills. A Full- mission Ship's Bridge simulator (Preferably capable of being interfaced with an Engine-Room Simulator) is a critical training aid to support this objective".

In order to fulfill these requirements the simulator shall be capable of the following:

i. The training recommended in latest **IMO Model Course 1.22 (2002)** as amended & the training requirements for navigating officers at management level by complying **with latest DG Shipping, Govt. of India circulars, rules and regulations (TEAP manuals), STCW 2010 code with latest amendments, SOLAS, MARPOL, Classification Society (IACS) members and any other such bodies / convention / rules as applicable** concerning to maneuvering and handling of a ship in various conditions and establishing effective team work during bridge watch keeping.

ii. Algorithms used to simulate various **processes, functions and** events should have the same effect/consequences as proper output, to converge towards real ship con**ditions and performance; under different operating conditions, such as varying weather, speed, load, normal and abnormal operations. This is paramount and any aberrations to these will not be accepted. Logic used should be consistent at all t**imes and in all scenarios. Even sporadic glitches or errors are not acceptable.

iii. Complying with all rules and regulations at the time of approval from regulatory authorities in India and IMO.

iv. In addition, the Full Mission Ship Maneuvering Simulator has to be certified by a member of IACS for compliance of Standards. For Certification of Maritime Simulator it is :

Class A (NAV) – standards for Full Mission Ship Maneuvering Simulator as per STCW Reference Table A-II/1.1, A-II/1.2, A-II/1.3, A-II/1.4, A-II/1.5. A-II/1.6, A-II/1.8, A-II/1.9, A-II/2.1, A-II/2.2, A-II/2.3, A-II/2.4, A-II/2.5, A-II/2.6, A-II/2.7, A-II/2.10, A-II/2.11, A-II/3.1, A-II/3.2, A-II/3.3, A-II/3.4, A-II/3.5, A-II/5.2 such as given in DNVGL or any other IACS member requirement (Example table A- II/1.1 stands for 1st item under column I , Competence table A- II/1.1 and so on). The Full Mission Ship Maneuvering Simulator has to be fully compliant with STCW's latest requirements.

v. Ship types as well as the equipments should be simulated as that of a real ship. The simulation models shall be based on real-time programming and thereby be able to replicate the operational behavior of

bridge installations as well as the interactions between the sub-systems for all ship types in all specified areas for chosen exercises.

vi. The Simulator hardware and software should be validated and certified to industry standards by an agency deputed to such works. Such agency includes Classification Society (IACS members only), ROs (approved by Indian Administration).

vii. Provisions for scalability for instructor stations and Student stations to be provided.

viii. In the event there is upgradation in software and/or hardware of the simulator within first two tts of commissioning, it should be supplied and incorporated free of cost for simulator to be functional. These upgradation and changes shall include IMO requirements, DGS requirements, or general changes in Officer of the Watch –Navigation Simulator Technology. Subsequently simulator should be upgraded as and when needed incorporating these changes. Wherever possible, the hardware and other items required for such simulator should be procured in India itself.

ix. Training for instructors after commissioning of the simulator and at each time after the up gradation of the simulator shall be provided to the satisfaction of IMU. Number of instructor for training as will be notified by IMU and the training schedule will be of 3 days or as appropriate, and certificates will be awarded to the instructors.

x. The comprehensive maintenance for the next ten years shall be provided after the successful commissioning and handing over of the fully operational simulator to IMU. During the warranty period of first fiveyears, the comprehensive maintenance of the simulator and up gradation shall be free of cost. This includes replacement / repair of parts. And for next five years the comprehensive annual maintenance contract shall be quoted at the time of bidding.

xi. All maintenance issues shall be attended within one working day at all centers of IMU. Working hours at IMU Campuses will be 0800 hrs to 2000 hrs. This includes online and in-person maintenance.

xii. Having 'add on' facility as an Assessment centre for full mission Ship Maneuvering Simulator leading to Certificate Of Competency Examination for navigating officers , as and when required by flag state's new requirements, such as Simulator based assessment.

xiii. Supporting students in doing research with subjects/matters related to nautical studies. The simulator should have interface capability with the ship/port models developed by research scholars/IMU.

xiv. Facilitating learners about all ship type maneuvering, transiting and navigating behaviors in strong wind /cyclones / snow/ice/restricted visibility and other adverse weather conditions including strong current/tide/tidal stream when maneuvering in shallow waters/deep sea /canals/ rivers/port/harbor situations, docking operations etc with/without tugs and pilots etc.

xv. Enabling detailed studies and training in the latest instruments related to navigation but not limited to SOLAS and other regulatory requirements like rudder angle indicator, ROTI, VDR, ARPA, ECDIS, BNWAS, Echo Sounder, Course Recorder, AIS, LRIT, Integrated Navigation System, Aldis Lamp, Search lights, Auto Pilot system with Gyro/Magnetic compass, navigational light and sound signals, various alarm systems found on navigational bridge, manned/ ums engine controls, bow thruster/stern thruster, conning and overhead instrumentation installations on a typical passenger / cargo ships of small / medium/large/very large sizes, GMDSS equipments, Speed log, Barometer.

xvi. Training navigators together with engineers by combining with engine room simulator to clearly demonstrate the impact of various types of faults, deterioration on the machineries and their total efficiency and lack of response on typical cargo/ passenger ships maneuvering and navigation. To also study overall fuel economy in close cooperation with engineers in the engine control room. This specification is optional.

xvii. Training in different emergency situations in different type of ships but not limited to piracy/ grounding / engine failure / collision / cargo shifting / fire / oil pollution / man overboard / power failure / towing / anchor dragging / steering failure / loss of stability, etc.

xviii. Real time experience (with downgraded feasible parameters) for simulation of parametric rolling experienced while sailing on container vessels.

xix. Add on facility which could also train pilots in Indian Ports.

xx. "The simulator needs to have the add on such as tug operation module to get experience on the tug operation during the pilotage and the software must include all the major ports of India for practicing berthing and unberthing operations."

xxi. Tug operations for pilotage training to be simulated for pseudo real type visualisation of tug operation.

xxii. Aid to navigation to be part of facilitation.

xxiii. DGS latest circular on even items like FMSMS - circular 21 of 2023 to be complied.

xxiv. As per make In India atleat 50% of the content should be local. Declaration in this regard may be enclosed.

xxv. "Only **'Class-I local supplier'** and **'Class-II local supplier'** shall be eligible to bid" as per the provisions of the Public Procurement (Preference to Make in India), Order 2017"

1.1. Specific objectives

As customized to the background knowledge and experience of the trainee, the simulator shall at least be capable of creating situations ensuring appropriate operational training:

- In simulating a realistic environment for all of the applicable STCW competence requirements, IACS members Standard for certification of Maritime simulator systems or the latest.
- In knowledge and use of "International Regulations for preventing collisions at sea."
- For preparing route planning of a voyage taking into consideration different weather conditions and maneuvering in risky and dense traffic areas with drifting ice and Iceberg, growler- prone areas.
- In use of anchors and the limitation in holding force for different sizes of ships and weather conditions.
- In use of Williamson- turn or other methods to find and bring back on board the rescued person(s) and training in use of various search patterns, as per IAMSAR Manual. Navigator's reaction or response when faced with serious problems but not limited to, like piracy / grounding/engine failure/collision/cargo shifting/fire/oil pollution/man overboard/power failure/towing/anchor dragging/ steering failure etc.
- Crew Operation/behavior when an abnormal situation develops.

As per the specifications detailed above, the simulator has the course objective which will be for certificate of competency and specialized Ship handling training/ assessment. It could be ship specific handling for ice navigation, polar navigation, STS operation as well as specific to port navigation for Pilots' training etc.

The Purpose of specification is to ensure that simulation provided by simulator conforms to appropriate level of physical & behavioral realism within the operating environment in accordance with recognized training and assessment objectives.

Therefore, the Full Mission SMS should adhere to specifics of real ship-like physical, behavioral and operational realism to realize wholesome training as integrated through various conventions and industry-based requirements.

1. **The technical specifications of Ship Maneuvering Simulator within the objectives laid above are as below:**

2.1

2.1) Specification by D.G. Shipping (Training circular No. 6 of 2005, letter No. 11-TR (49)/2004 and Training, Examination and Assessment Programme (TEAP) Part A

2.1.1) Training circular No. 6 of 2005, letter No. 11-TR (49)/2004:

The Simulator should conform to the requirements of STCW95 regulation I/12 (use of simulators), Section A-I/12 part 1 and 2 perform standards for the simulator and simulator training objectives' and section B-I/12, 37, 38, 39(guidance regarding the use of simulators) it should also be capable of being used for training and demonstrating competence for master and chief mates on ships of 500 GT or more as per STCW 95 A-II/2.

2.1.2) Training, Examination and Assessment Programme (TEAP) Part-A
Section I/12 Ref: M.S. (STCW) Rules 2014
Rule 15: Use of Simulators

Performance standards of the simulators and provisions regarding training and assessment shall be as per Section A-I/12 of the STCW Code as amended.

2.2

2.2) STCW 1978 as amended to STCW 2010 Convention
Regulation I/12
Use of simulators:

The performance standards and other provisions set forth in section A-I/12 and such other requirements as are prescribed in part A of the STCW code for any certificate concerned shall be complied with in respect of

a) All mandatory simulator based training
b) Any assessment of competency required by part A of the STCW Code which is carried out by means of a simulator, and
c) Any demonstration, by means of a simulator, of continued proficiency required by Part A of the STCW code.

2.3

2.3) STCW 2010 Code: Ship Maneuvering Simulatorshall be capable of simulating navigation functions integrated with various tasks related to maneuvering in various conditions with physical, operational, behavioral realism of real scenario of high seas , coastal navigation and shall incorporate specifications as per STCW code Section A-I/12 part1 &2 & B-I/12-37,68,69,70, A-II/2, B-V/g.

2.3.1) Section A-I/12Part I- Performance standards

The Simulator shall be designed to ensure that it shall:

a) Be suitable for the mentioned objectives and training tasks;
b) Be capable of simulating the operating capabilities of shipboard equipment concerned to a level of physical realism appropriate to training objectives, and include the capabilities limitations and possible errors of such equipment;
c) Have sufficient behavioral realism to allow a trainee to acquire the skill appropriate training objective;
d) Provide a controlled operating environment , capable of producing a variety of condition, which may include emergency, hazardous or unusual situation relevant to the training objectives;
e) Provide an interface through which a trainee can interact with the equipment, the simulated environment and, as appropriate , the instructor; and
f) Permit an instructor to control, monitor and record exercises for the effective debriefing of trainees.

Performance standards for Simulator used in Assessment of competence;

The simulator shall be designed to be capable of being used for assessment of competence required under convention for any demonstration of continued proficiency so required, shall:

a) Be capable of satisfying the specified assessment objectives.
b) Be capable of simulating the operating capabilities of shipboard equipment concerned, to a level of physical realism appropriate to assessment objectives, and include the capabilities, limitations and possible errors of such equipment;
c) Have sufficient behavioral realism to allow a candidate to exhibit the skill appropriate to the assessment objective.
d) Provide an interface through which a candidate can interact with the equipment and simulator environment.
e) Provide a controlled operating environment , capable of producing a variety of conditions, which may include emergency, hazardous or unusual situation relevant to the assessment objectives;
f) Permit an assessor to control, monitor and record exercises for the effective assessment of the performance of candidates.

- **Additional performance Standards**

In addition to meeting the basic requirements set out in above paragraphs, simulation equipment to which this section applies shall meet the performance standards given hereunder in accordance with their specific type.

Radar Simulation

Radar simulation equipment shall be capable of simulating the operational capabilities of navigational radar equipment which meets all applicable performance standards adopted by the Organization and incorporate facilities to:

a) Operate in the stabilized relative motion mode and sea and ground stabilized, true motion modes.
b) Model weather , tidal stream , current, shadow sector, spurious echoes and other propagation effects, and generate coastline , navigational buoys and search and rescue transponders ;and
c) Create a real time operating environment incorporating at least two own ship stations with ability to change own ship's course and speed , and include parameters for at least 20 target ship and appropriate communication facilities.

Automatic Radar Plotting Aid (ARPA) Simulation

ARPA simulation equipment shall be capable of simulating the operational capabilities of ARPA which meet all applicable performance standards adopted by the Organization, and shall incorporate the facilities for:

a) Manual and automatic target acquisition;
b) Past track information;
c) Use of exclusion areas;
d) Vector / graphic time scale and data display; and
e) Trial maneuvers.

2.3.2 The Manufacturer of the simulator should conform to basic requirements of STCW Code Section A-I/12 Part 2 for establishing Training Procedures and assessment procedures with simulator.

Section A-I/12Part 2 - Other provision

Simulator Training Objectives

Aims and Objective of simulator based training defined within an overall training programme and that specific training objective and task as selected so as to relate as closely as possible to shipboard tasks and practices.

Training procedures (Simulator design should be such as to be able to assist the instructor in conforming to following):

a) In conducting Mandatory simulator based training , instructor shall ensure that:
b) Trainees are adequately briefed beforehand on the exercise objective and tasks and are given sufficient planning time before the exercises commence;
c) Trainees have adequate familiarization time on the simulator and with its equipment before any training or assessment exercise commences;
d) Guidance given and exercise stimuli are appropriate to the selected exercise objective and task and to the level of trainee experience ;
e) Exercises are effectively monitored, supported as appropriated by audio and visual observation of trainee activity and pre and post exercise evaluation reports;
f) Trainees are effectively debriefed to ensure that training objective have been met and that operational skill demonstrated are of an acceptable standard;
g) The use of peer assessment during debriefing is encouraged ; and

h) Simulator exercises are designed and tested so as to ensure their suitability for the specified training objectives.

Assessment procedures-
Simulator design should be such as to be able to assist the assessor in conforming to following:

a) Performance criteria are identified clearly and explicitly and are valid and available to the candidates;
b) Assessment criteria are established clearly and are explicit to ensure reliability and uniformity of assessment and to optimize objective measurement and evaluation, so that subjective judgments are kept to the minimum;
c) Candidate are briefed clearly on the tasks and / or skills to be assessed and on the tasks and performance criteria by which their competency will be determined;
d) Assessment of performance takes into account normal operating procedures and any behavioral interaction with other candidate on the simulator or with simulator staff;
e) Scoring or grading methods to assess performance are used with caution until they have been validated ; and
f) The prime criterion is that a candidate demonstrates the ability to carry out a task safely and effectively to the satisfaction of the assessor.

STCW code Section B-I/12: Guidance- Regarding the use of Simulators,
Training and assessment in the operational use of ECDIS,
Navigation and Watch keeping simulation,
Ship handling and maneuvering simulation,
Section B-V/g

Guidance - Regarding training of masters and officers for ships operating in polar waters

2.4

2.4) I A C S requirements

The Simulator should have compliance certificate for Class A & Class S (NAV) from classification society.

Simulator class for the function area bridge operation is as follows:

Class A (NAV) – A full mission simulator capable of simulating a total shipboard bridge operation situation, including the capability for advanced maneuvering in restricted waterways as per Class A in Table 3-2.

Class B (NAV) – A multi task simulator capable of simulating a total shipboard bridge operation situation, but excluding the capability for advanced maneuvering in restricted waterways.

Class C (NAV) – A limited task simulator capable of simulating a shipboard bridge operation situation for limited (instrumentation or blind) navigation and collision avoidance.

Class S (NAV) – A special tasks simulator capable of simulating operation and/ or maintenance of

particular bridge instruments, and /or defined navigation / maneuvering scenarios as per Class S in Table 3-2.

Table 3-2 Competence addressed by bridge operation simulator Class A & Class S

STCW reference	*Competence*	*Class A (NAV)*	*Class S (NAV)*
Table A-II/1.1	Plan and conduct a passage and determine position	A	(S)
Table A-II/1.2	Maintain a safe navigational watch	A	(S)
Table A-II/1.3	Use of radar and ARPA to maintain safety of navigation	A	(S)
Table A-II/1.4	Use of ECDIS to maintain the safety of navigation	A	(S)
Table A-II/1.5	Respond to emergencies	A	(S)
Table A-II/1.6	Respond to a distress signal at sea	A	(S)
Table A-II/1.8	Transmit and receive information by visual signalling	A	(S)
Table A-II/1.9	Manoeuvre the ship	A	(S)
Table A-II/2.1	Plan a voyage and conduct navigation	A	(S)
Table A-II/2.2	Determine position and the accuracy of resultant position fix by any means	A	(S)
Table A-II/2.3	Determine and allow for compass errors	A	(S)
Table A-II/2.4	Co-ordinate search and rescue operations	A	(S)
Table A-II/2.5	Establish watchkeeping arrangements and procedures	A	(S)
Table A-II/2.6	Maintain safe navigation through the use of information from navigation equipment and systems to assist command decision-making	A	(S)
Table A-II/2.7	Maintain the safety of navigation through the use of ECDIS and associated navigation systems to assist command decision making	A	(S)

	Table A-II/2.10	Manoeuvre and handle a ship in all conditions	A	(S)
	Table A-II/2.11	Operate remote controls of propulsion plant and engineering systems and services	A	(S)
	Table A-II/3.1	Plan and conduct a coastal passage and determine position	A	(S)
	Table A-II/3.2	Maintain a safe navigational watch	A	(S)
IMU requirement		Navigation with reference to Polar Code as amended (Canadian and Northern Sea routes)		
IMU requirement		Parametric Rolling		
IMU requirement		STS/SPM Operation (VLCC and Tanker of 85,000 displacement)		
IMU requirement		Effect of Fin Stabilizer & Anti Roll Tanks		

- **Simulator requirements:**

The detailed requirements for bridge Operation Simulators shall, according to class, fulfill the requirements as per table 3-3 (Physical realism), table 3-4 (Behavioral realism), table 3-5 (Operating environment).

Simulator requirements (as per IACS).
The Full Mission SMS shall fulfill the following requirement for:

Physical realism

Item	Requirement	Class A (NAV)	Class S (NAV)
1.1.1	Equipment, consoles and workstations are to be installed, mounted, and arranged in a ship-like manner in accordance with design criteria described as in IACS Rules for Classification of Ships and / or IACS Rules for Classification of High Speed, Light Craft and Naval Surface Craft as appropriate to the ship types represented in the Simulator.	Yes	
The following equipment shall at least be included in the simulator:			
1.1.2	Controls of propulsion plant operations, including engine telegraph, pitch control and thrusters. There shall be indicators for shaft(s) revolutions and pitch of propeller(s). There shall be controls for at least one propeller and one bow thruster.	Yes	
1.1.3	Controls of propulsion plant operations.		
1.1.4	Controls of propulsion plant for mooring operations. By any method, it shall be possible to observe the ship's side and the dock during operation of such controls.	Yes	

1.1.5	Controls of auxiliary machinery. There shall be controls for at least two auxiliary engines, including electric power supply control.	Yes	
1.1.6	Steering console, including recognized facilities for hand steering and automatic steering with controls for switch over. There shall be indicators of rudder angle and rate of turn.	Yes	
1.1.7	Steering compass and bearing compass (or repeater) with an accuracy of at least 1 degree.	Yes	
1.1.8	Steering compass.	Yes	
1.1.9	At least one Radar/ARPA Display / unit (Automatic Radar plotting Aid). It shall be possible to simulate both a 10 cm and a 3 cm radar. The radar shall be capable to operate in the stabilized relative motion mode and sea and ground stabilized true motion modes (see STCW Section A-I/12.4. and 5 and paragraph 2 of section B-I/12).	Yes	
1.1.10	Communication equipment in accordance with GMDSS (Global Maritime Distress Safety System) frame-work, covering at least the requirements for relevant area (where simulated navigation is planned for). (See STCW paragraph 72 of section B-I/12 and section 5 of this standard)	Yes	
1.1.11	Communication equipment including at least one VHF (Very High Frequency) radio with DSC features.		
1.1.12	The simulator shall include a Communications system that will allow for internal ship communications to be conducted.	Yes	
1.1.13	ECDIS (electronic chart display and information system) displaying selected information from a system electronic navigational chart (SENC) with positional information from navigation sensors like AIS and Radar to assist the mariner in route planning and route monitoring, and by displaying additional navigation – related information. (See STCW paragraph 35 of section B-I/12)	Yes	
1.1.14	GPS (Global Positioning System), echo-sounder and speed log showing speed through the water (1axis) for ships below 50,000 GT and in addition speed and distance over ground in forward and athwart ship direction for ships above 50,000 GT.	Yes	
1.1.15	Instrument for indication of relative wind – direction and speed (anemometer).	Yes	
1.1.16	Sound panel according to the "International regulation for preventing collisions at sea".	Yes	
1.1.17	Instrument for indication of navigational lights.	Yes	
1.1.18	Function for transmitting visual signals (Morse lamp)	Yes	
1.1.19	Control system for fire detection, fire alarm and lifeboat alarm.	Yes	
1.1.20	AIS (Automatic Identification System)	Yes	
1.1.21	Ship borne meteorological instrument (aneroid barometer, hygrometer etc.)	Yes	
1.2 Additional requirements for simulators intended for training in ice navigation (Ref.			

Physical realism (Continued)

Item	Requirement	Class A (NAV)	Class S (NAV)
1.2.1	Two speed and distance measuring devices. Each device should operate on a different principle, and at least one device should be capable of being operated in both the sea and the ground stabilized mode.	Yes	
1.2.2	Searchlight controllable from conning positions.	Yes	
1.2.3	Manually operated flashing red light visible from astern to indicate when the ship is stopped.	Yes	
1.2.4	VDR (Voyage Data Recorder) or capability for vessel history track and learner actions log from the instructor and the assessor position.	Yes	
1.2.5	Equipment capable of receiving ice, icing warnings, and weather information charts.	Yes	
1.2.6	Anchoring and towing arrangements	Yes	
1.3 Additional requirements for simulators intended for training on Integrated Bridge Systems including Integrated Navigation			

Physical realism (Continued)

Item	Requirement	Class A (NAV)	Class S (NAV)
1.3.1	Workstation for navigating and maneuvering consisting of: - Radar / radar plotting - ECDIS - Automatic visual position indicator - Information of position fixing systems - Information of Automatic Ship Identification System (AIS) - Heading (adjustment) / track control system - Controls for main engine(s) incl. crash maneuvers, emergency stop - Controls for main rudder (incl. override facility) - Controls for thruster - Indications for: - For propeller revolutions (actual and desired) - Main engine revolution in the case of reduction geared engine - Propeller pitch in the case of controllable pitch propeller - Torque - Starting air - Lateral thrust - Speed (possibly longitudinal and lateral)	Yes	

	- Rudder angle - Rate - of - turn - Gyro compass heading - Magnetic compass heading - Heading reminder (pre-set heading) - Water depth incl. depth warning adjustment - Time - Wind direction and velocity - Air and water temperature* - Group alarms (with aids for decision – making). - Signal transmitter for: - Whistle - Automatic device for fog signals - General alarm - Morse signaling light. - Automatic device for emergency alarm - Controls for console lighting - Two-way VHF radiotelephone (walkie-talkie) with charging connection and / or paging system - Internal communication equipment - Public address system - VHF point with channel selector - Remote control for search light - Steering motor selector switch - Steering mode selector switch -Steering position selector switch - Controls for windscreen wiper, washer, heater - Night vision equipment - Sound reception system - Acknowledgement of watch alarm.		
* Located at the workstation for navigating and maneuvering or at the workstation for planning and documentation.			

Physical realism (Continued)

Item	Requirement	Class A (NAV)	Class S (NAV)
1.3.2	Workstation for monitoring consisting of: - Radar / radar plotting - Signal transmitter for whistle - Acknowledgement of watch alarm - Indications for: - Propeller revolutions - Pitch of controllable pitch propeller - Speed - Rudder angle - Gyro compass heading	Yes	

	- Time - Rate-of-turn - Water depth - Alarms. - Internal communication equipment - VHF point with channel selector.		
1.3.3	Workstation for manual steering (helmsman's) consisting of: - Steering wheel / steering lever - Steering motor selector switch - Indications for: - Gyro compass heading - Magnetic compass heading - Pre-set heading - Rudder angle - Rate of turn. - Helm order Indicator - Talkback to bridge wing workstation.	Yes	
1.3.4	Workstation for docking (bridge wing) consisting of: - Controls for main engine(s) - Controls for thruster - Controls for rudder - Controls for whistle - Steering position selector switch - Indications for: - Gyro compass heading - Propeller revolutions - Main engine revolution in the case of reduction geared engine - Propeller pitch in the case of controllable pitch propeller - Lateral thrust - Rate-of-turn - Rudder angle - Longitudinal and lateral movement of ship - Wind direction and velocity. - System for external communication with tugs, pilot boat (VHF point) - Controls for Morse lamp and searchlight - Acknowledgement of watch alarm.	Yes	

Physical realism (Continued)

Item	Requirement	Class A (NAV)	Class S (NAV)
1.3.5	Workstation for planning and documentation consisting of: - ECDIS including navigation planning station - Route planning devices - Chart table - Position fixing receiver - Retaining device for drawing triangles, dividers,	Yes	

	magnifying lens, pencils, etc. - Weather chart plotter (soft copy of weather fax) - Main clock - Log, including distance indicator, course plotter - Echo graph - Barograph - Indication for air and water temperatures - Command printer - VHF point.		
1.3.6	Workstation for safety consisting of: - Fire alarm for areas machinery, superstructure/ accommodations, cargo - Remote control and monitoring of fire-extinguishing system - Remote control and monitoring of watertight door/ fire doors (open / closed) - Emergency stop for air condition, ventilation and refrigerating installations - Controls for anti – rolling device - Indicator for bilge monitor - Indicator for strength load incl. alarm - Indicator for further safety systems (machinery failure alarms, SSAS) - Clinometers - Keys and control – elements for lights and signals (navigation lights, signal lamps, bridge lighting, deck lighting searchlights, as well as all fuses) - Internal communication system, in particular to muster stations - Adjustment of watch alarm system and acknowledgement button - Status indication for bow-, rear-flap - Controls/ indications for ballast water handling - Tools for documentation - Main station for two- way VHF radiotelephone (walkie – talkie).	Yes	
1.3.7	Workstation for communications consisting of: - GMDSS equipment as required for the applicable sea area: - VHF-DSC, radiotelephone - MF-DSC, radiotelephone -MF/HF-DSC, NBDP, radiotelephone - INMARSAT-SES -NAVTEX/ EGC/ HF direct printing telegraph - EPIRB trigger - Main station for two- way VHF radiotelephone (walkie – talkie)*.	Yes	
* Located at the safety or communication workstation.			

Physical realism (Continued)

Item	Requirement	Class A (NAV)	Class S (NAV)
1.3.8	All systems related to the integrated bridge system shall include failure control(s) and method(s) to train and assess the learner in the use of advanced equipment, technology and enable familiarization and training to understand the limitations of automatic systems.	Yes	

Behavioral realism

Item	Requirement	Class A (NAV)	Class S (NAV)
2.1.1	The simulation of own ship shall be based on a mathematical model with 6 degrees of freedom.	Yes	
2.1.2	The model shall realistically simulate own ship hydrodynamics in open water conditions, including the effects of wind forces, wave forces, tidal stream and currents.	Yes	
2.1.3	The model shall realistically simulate own ship hydrodynamics in restricted waterways, including shallow water and bank effects, interaction with other ships and direct, counter and sheer currents(cross currents).	Yes	
2.1.4	The simulator shall include mathematical models of at least the types of own ship relevant to the training objectives.	Yes	
2.1.5	The simulator shall include at least one tug model that can realistically simulate tug assistance during maneuvering and escort operations by any method. It must be possible to simulate pull, push, reposition towing and escorting.	Yes	

Behavioral realism (Continued)

Item	Requirement	Class A (NAV)	Class S (NAV)
2.1.6	The tug model shall be affected by own ship's speed and as such include degrading performance depending on the type of tug simulated. It should be possible to operate with both conventional and tractor tugs having different characteristics and response times.	Yes	
2.1.7	The simulator shall include exercise areas including correct data for landmass, depth, buoys tidal streams and visuals as appropriate to the nautical charts and publications used for the relevant training objectives.	Yes	
2.1.8	The simulator shall include exercise areas including correct data for landmass, depth, buoys and tidal streams as appropriate to the nautical charts and publications used for the relevant training objectives.	Yes	
2.1.9	The radar simulation equipment shall be capable of model	Yes	

	weather, tidal streams, current, shadow sectors, spurious and false echoes and other propagation effects, and generate coastlines, navigational buoys and search and rescue transponders (see STCW Section A-I/12.4.2).		
2.1.10	The ARPA simulation equipment shall incorporate the facilities for: - manual and automatic target acquisition - past track information - use of exclusion areas - vector / graphic time-scale and data display - trial maneuvers. (see STCW Section A-I /12.5)	Yes	
2.1.11	The ECDIS simulation equipment shall incorporate the facilities for: - integration with other navigation system - own position - sea area display - mode and orientation - chart data displayed - route monitoring - user-created information layers - contacts (when interfaced with AIS and /or radar tracking) - radar overlay functions (when interfaced).	Yes	
2.1.12	The simulator shall provide an own ship engine sound, reflecting the power output.	Yes	
2.1.13	The simulator shall provide capabilities for realistically conduct anchoring operations by any method. The model shall realistically simulate own ship hydrodynamics in interaction with applicable anchor and chain dimensions with different bottom holding grounds, including the effects of wind forces, wave forces, tidal stream and currents.	Yes	
2.1.14	The simulator shall provide capabilities for realistically simulate the function of mooring and tug lines and how each line functions as part of an overall system taking into account the capacities, safe working loads, and breaking strengths of mooring equipment including mooring wires, synthetic and fiber lines, winches, anchor windlasses, capstans, bitts, chocks and bollards.	Yes	
2.2 Additional requirements for simulators intended for training in ice navigation (Ref. STCW Section B-V/g Guidance regarding training of masters and officers for ships operating in polar waters)			
2.2.1	The own ship model shall realistically simulate hydrodynamics in interaction with solid ice edge.	Yes	
2.2.2	The own ship model shall realistically simulate hydrodynamics and ice pressure in interaction with solid ice.	Yes	
2.2.3	The own ship model shall realistically simulate the effects of reduced stability as a consequence of ice accretion.	Yes	

Behavioral realism (Continued)

Item	Requirement	Class A (NAV)	Class S (NAV)
2.2.4	It shall be possible to simulate the effect of the following ice conditions with variations: - Ice type - Ice concentration - Ice thickness.	Yes	
2.2.5	It shall be possible to realistically simulate the towing of own ship with target ship and target ship with own ship. It shall be possible to introduce different towing gear like rope or steel wire with different strength and elasticity, forward, stern and side towing.	Yes	

Operating environment

Item	Requirement	Class A (NAV)	Class S (NAV)
Targets			
3.1.1	The simulator shall be able to present different types of target ships, each equipped with a mathematical model, which accounts for motion, drift and steering angles according to forces induced by current, wind and wave.	Yes	
3.1.2	The targets shall be equipped with navigational and signal – lights, shapes and sound signals, according to "International regulations for preventing collision at sea". The signals shall be individually controlled by the instructor, and the sound signals shall be directional and fade with range. Each ship shall have an aspect recognizable at a distance of 6 nautical miles in clear weather. A ship under way shall provide relevant bow – and stern wave.	Yes	
3.1.3	The simulator shall be equipped with targets enabling search and rescuing persons from the sea, assisting a ship in distress and responding to emergencies which arise in port. Such targets shall at least be: - Rocket parachute flares - Hand flares - Buoyant smoke signals - SART (search and rescue transponder) - Satellite EPIRB (emergency position-indicating radio beacon) - Lifeboat - Life raft - Rescue helicopter - Rescue aircraft - People in water.	Yes	
3.1.4	The simulator shall be able to present at least 100 target ships at the same time, where the instructor shall be able to programme 20 voyage routes for each target ship individually. (see STCW Section A-I/12.4.3)	Yes	
Outside view			

3.1.5	The simulator shall provide a realistic visual scenario by day, dusk or by night, including variable meteorological visibility, changing in time. It shall be possible to create a range of visual conditions, from dense fog to clear conditions.	Yes	
3.1.6	The visual system and/or a motion platform shall replicate movements of own ship according to 6 degrees of freedom.	Yes	
3.1.7	The view shall be updated with a frequency of at least 30 Hz measured in a typical visual scene for the intended exercises and have an angular resolution of ≤ 2.5 arc minutes.	Yes	
3.1.8	The projection of the view shall be placed at such a distance and in such a manner from the bridge windows that accurate visual bearings may be taken to objects in the scene. It shall be possible to use binocular systems for observations.	Yes	
3.1.9	The visual system shall present the outside world by a view around the horizon (360 degrees). The horizontal field of view may be obtained by a view of 360 degrees	Yes	
3.1.10	The visual system shall present a vertical view from the workstations for navigation, traffic surveillance and maneuvering enabling the navigator to detect and monitor objects visually on the sea surface up to the horizon within the required horizontal field of view when the ship is pitching and rolling. In addition by any method, it shall be possible to observe the ship's side and the dock during mooring operations.	Yes	
3.1.11	The visual system shall present the outside world by a view of at least 120 degrees horizontal field of view. In addition, at least the horizon from 120 degrees port to 120 degrees starboard must be able to be visualized by any method.	--	

Operating environment (Continued)

Item	Requirement	Class A (NAV)	Class S (NAV)
3.1.12	The visual system shall present all navigational marks according to charts used.	Yes	
3.1.13	The visual system shall show objects with sufficient realism (detailed enough to be recognized as in real life).	Yes	
3.1.14	The visual system shall show mooring and towing lines with sufficient realism in accordance with the forces effecting the tension.	Yes	
3.1.15	The visual system shall provide a realistic set of bow wave, sea spray and wakes in accordance with ships power output, speed and weather conditions.	Yes	
3.1.16	The visual system shall provide a realistic set of flue gas emission and "Waving Flag Effect" in accordance with ships power output, speed and weather conditions.	Yes	

Outside sound			
3.1.17	The simulator shall be capable of providing environmental sound according to conditions simulated.	Yes	
Navigated waters			
3.1.18	The navigated waters shall include a current pattern, changeable in time, according to the charts used. Tidal waters shall be reflected.	Yes	
3.1.19	The simulation shall include the depth according to charts used, reflecting water level according to tidal water situation.	Yes	
3.1.20	The simulator shall provide at least two different wave spectra, variable in direction height and period.	Yes	
3.1.21	The visual system shall provide a realistic set of wind waves including white caps according to the Beaufort Wind Force Scale.	Yes	
3.2 Additional requirements for simulators intended for training in ice navigation (Ref. STCW Section B-V/g "Guidance regarding training of masters and officers for ships operating in polar waters")			
3.2.1	The visual system shall be capable of showing concentrations of solid and broken ice of different thickness.	Yes	
3.2.2	The visual system shall be capable of showing the result of icebreaking including opening, twin breaking and compacting channel.	Yes	
3.2.3	The visual system shall be capable of showing the effects of searchlight.	Yes	
3.2.4	The visual system shall be capable of showing the effects of the ice accretion to the own ship model.	Yes	

3. SIMULATOR SPECIFICATION

3.1 Simulator shall conform to the requirements of SOLAS, MARPOL, STCW 2010 Regulation I/12 (use of simulators), Section A — I/12 Part 1 and 2 "Performance Standards for the simulator and Simulator training Objectives" and Section B — I/12, 37, 38, 39, 68, 69, 70 (guidance regarding the use of simulators), B-V/g (guidance for polar water navigation). It shall also be capable of being used for training and demonstrating competence for Masters and Chief Mates on ship of 500 GT or more as per STCW 2010 A-II/2.

3.2 The Ship Maneuvering Simulator shall be similar to standards of Class A NAV and type approved by an IACS members complying STCW convention for Ship Maneuvering Simulator / IMO and also shall be approved by DG Shipping. Documentary evidence of such certificate to be submitted in the technical bid.

3.3 The SMS simulator shall be configured with one instructor station to design exercises, select geographic areas, own ships, targets and environmental conditions including heavy weather condition, control and monitor the exercises networked with a full scale mock up of a ship's bridge with instruments for navigation as listed, as well as full scale display of target ships and surrounding as seen from the portholes of a wheel house.

3.4 The simulator shall also be configured to facilitate instructor in designing exercises to

showhydrodynamic interactions with ships, with ground and from shore and also to have capabilities for exercises with reference to high latitude navigation (ice navigation), ships' routeing etc.

3.5 Instructor station shall be equipped with equipment necessary to monitor the activities of student stations and also the current exercise being played on the student stations.

3.6 Equipment and consoles to be installed, mounted and arranged in a ship like manner to conform to the most suitable ergonomics of wheel-house lay-out.

3.7 Each piece of simulated equipment installed in the simulator shall have a similar functionality to corresponding real equipment used on board.

3.8 Each piece of simulated equipment shall include the behavioral characteristics, e.g. accuracy, reaction time and other limitations, related to the corresponding equipment in use on board ships.

3.9 User manuals for the simulator equipment and operational controls shall be available to the learners for use during exercises.

4. SHIP TYPES AND AREAS

1) The simulator shall include mathematical models of 20 types of own ship. The models shall resemble accurately the behavioral characteristics of an actual ship of that size, power and type, and conditions of load/stability realistically behave as per the hydrodynamic effects of wind, current and swell.

4.2 Recommended Ship Types and Sizes (Own Ship Models)

Sr. No.	Type (loaded and ballast condition wherever applicable)	Displacement (tonnes)
1.	Bulk Carrier (Handy size) Loaded	About 30,000
2.	Bulk Carrier (Panamax size) Loaded Condition	About 60,000
3.	Bulk Carrier (Panamax size) Ballast Condition	
4.	Container Ship (feeder2000 TEU) Part Loaded Condition	About 30,000
5.	River Vessel	About 2000 DWT
6.	Container Ship (6500 teu) Loaded	About 70,000
7.	Container Ship (13000 to 18000 TEU) Part Loaded	About 1,20,000
8.	Coaster	Under 10,000
9.	Ro-Ro / Car Carrier	About 15,000
10.	Tanker Loaded	About 85,000
11.	VLCC Loaded Condition	Over 1,50,000
12.	VLCC Ballast Condition	
13.	ULCC Loaded	Over 2,50,000
14.	Seismic & Research Vessel	
15.	MPC (Gantry Crane)	DWT – upto 50K
16.	LNG Loaded	Approx 50k cbm
17.	LPG Loaded	Approx 75k cbm

18.	Product / Chemical tanker Loaded	LR 1 (DWT 50k)
19.	Ro Ro Ferry	Approx 150m LOA
20.	Cruise Vessel	Approx 1000 pax

Above vessels should be equipped with bow thrusters, Controllable Pitch Propeller, stern thrusters and different types of rudders as applicable. Each Own ship to be provided with Ship Particulars, maneouvring diagram, pilot card etc. relevant to safe navigation.

4.3 The simulator shall be able to present at least 20 different types of target ships, each equipped with a mathematical model, which accounts for motion, drift and steering angles according to the forces induced by current, wind and wave. Target vessels should be able to display light and sound signals as initiated by instructor.

Recommended Ship Types and Sizes (Target Ship Models)

Sr. No.	Type(loaded and ballast condition wherever applicable)	Displacement (tonnes)
1.	Bulk Carrier (Panamax size) Loaded	About 60,000
2.	Bulk Carrier (Panamax size) Ballast	
3.	Container Ship (feeder2000 TEU) Loaded Condition	About 30,000
4.	Oil Rig	
5.	Container Ship (ULCs / 18000 TEU)	About 1,20,000
6.	Coaster	Under 10,000
7.	Ro-Ro / Car Carrier	About 15,000
8.	Tanker	About 85,000
9.	VLCC Loaded Condition	Over 1,50,000
10.	LPG Vessel	
11.	ULCC	Over 2,50,000
12.	Ocean Going Tug	
13.	Ice breaker	
14	Fishing Vessels	
15.	Sailing Vessels	
16.	Virtual Buoys	
17.	Chemical Tanker	
18.	Barges	
19.	Wreck marking buoys	
20.	Pilot Vessel	
21.	Tug and Tow	
22.	Mooring Boats	
23.	Helicopter	
24.	Lifeboat	
25.	Rescue Boat	
26.	Inflatable Liferaft	
27.	Skiffs	
28.	Sea Plane	
29.	WIG craft	
30.	Submarine (Periscope visible)	

31.	Warship	
32.	High Speed Craft	

4 The simulator shall be able to provide 12 international geographical visual areas for exercises which include open sea and high density traffic areas out of following :

i. Dover Straits
ii. Singapore Straits
iii. Malacca Straits
iv. Gibraltar Straits
v. Approaches to New York
vi. Approaches to Rotterdam / Flushing
vii. Bisan Seto / Kanmon Kaikyo
vii. St. Lawrence River
ix. Entrance to Mississippi River / approaches to Houston
x. Open Sea
xi. Polar Region Chart such as North of Canada, NW Passage (Arctic), & North of Russia.
xii. Northern Sea Routes[arctic basin],
xiii. Adjoining open sea areas showing various stages of sea ice near LEADS and Open waters of arctic ocean.
xiv. Dardenelles & Bosphorous Straits area
xv. Entrance to Baltic Sea (Great Belt)

5. DETAILED SPECIFICATIONS

5.1 VISUALISATION

The simulator shall have 12 channels visualization of high-resolution graphics, with 360-degree horizontal field of view. (Subject to available area)

The visual screen size for each channel shall not be less than 6' x 4'. The visual system shall present all navigational marks as displayed on ECDIS and paper charts for that area.

a) The visual system shall show objects with sufficient realism. (Detailed enough to be recognized as in real life).
b) The visual shall replicate movements of all Own ships according to 6 degree of motion freedom (surge, sway, yaw, roll, pitch, heave).
c) It shall be possible to take accurate bearing of objects on the Screen.
d) It shall be possible to use magnified view for observations.
e) The visual system shall present at least 25 degree of vertical view. In addition, it shall have ability to observe the ship's side and the dock during mooring operations.
f) The simulator shall provide a realistic visual scenario by day, dusk or by night, including variable meteorological conditions, changing in time. It shall be possible to create a range of visual conditions such as rain, fog or clear visibility.
g) There shall be proper correspondence between the visual picture, Radar and ECDIS.
h) A ship-side view required for docking / undocking and STS operations.

6. SIMULATOR CAPABILITIES

a) The simulator shall realistically simulate the specified own ships' hydrodynamics in open water conditions, including the effects of wind forces, wave forces, tidal stream and currents.

b) The simulator shall realistically simulate Own ship hydrodynamics in restricted waterways, including shallow water & bank effect and interaction with objects.
c) The simulator shall provide an own ship engine sound reflecting the power output.
d) The target ships shall be equipped with navigational lights, shapes and sound signals, according to the International Convention for the prevention of collisions at sea, 1972. The signals shall be individually controlled by the instructor (not fixed by default) and the sound signal be directional and shall be able to fade with range.
e) The simulator shall be able to present at least 20 different target ships at the same time, where the instructor shall be able to program voyage routes for each target ships individually.
f) The simulator shall be capable of providing environmental light and sound (i.e. wind, thunder, rain), according to conditions simulated.
g) The simulation shall include the depth according to charts used, reflecting water level according to tidal water situation.
h) The simulator shall provide waves, variable in direction, length & height.
i) It shall be possible to simulate usage of at least 4 tugs (two high BHP tugs & two small BHP tugs) for the purpose of mooring the vessel with the capability to control the power and orientation of the tugs (push and pull). Own ship to have identified points such as 'T' or 'TUG' on ship-side for tug's push.
j) It shall be possible to berth and un-berth a vessel using mooring lines with the capability to control run out ,to heave slack, stop, let go the various mooring lines bearing in mind their breaking stress and subsequent whiplash effect to be simulated and markings on Forecastle & Poop Deck to be inserted.
k) It shall be possible for Own ship to let go the bower anchors and control its payout as per the strain on the cable. The simulator shall have the capability to read the numbers of shackles out and the strain at any times.
l) The simulator shall have simulation capabilities to create exercises for SAR operations (IAMSAR Manual), which shall depict with helicopter operation for rescue and evacuation purposes.
For Polar Navigation SAR with transfer of crew to the rescue vessel (which shall be the Ice Breaker, if the ship is 'beset').
If there is an alternate system in place for rescue, this ought to be simulated.
m) The simulator shall have the facility to integrate with other systems like Engine Room simulator and to be controlled by instructor's console.
n) The simulator shall be able to get upgraded with additional hardware.
o) The simulator shall have the facility to load the digitized picture of any minor or/and major ports of India to conduct the pilotage training on this simulator.
p) Create E-coach message for student guidelines.
q) Simulator shall have the facility to do the research & development works like:-
(1)Port development
(2)Accident Investigation
(3)Bridge Design
(4)Crew Fatigue research
(5) Pre - operations studies
r) Simulator shall be capable of generating extreme rolls caused by Parametric rolling [Vendor to have option to source the data from a competent location and if need be, add stability software to the following data provided, exclusively for ASSESSMENT CENTER]:

i) Must be initiated by a switch/click of mouse, by instructor when required:

- For container vessels :

ii] Depiction of visualization of container falling to sea for reasonably well-lashed containers on 6500 TEU Container vessel affected by parametric rolling.

Parameters (not limited to):

- Hs [significant wave height] of 4m and more
- GM = 1.2 m [after allowing effect of beam wind of 45m/s]
- Length of predominant wave: L= ship's LOA
- Realistic Cb = 0.5 to 0.6
- Period of encounter =1.8 times to 2.4 times the pitching value.
- Any other newer research on this aspect.

iii) Container vessels shall be fitted with 'Fin Stabilizers' and/or 'Anti-roll tanks' (as appropriate). Instructor to select same, from the menu, for purposes of realistically demonstrating the working, so that students can feel how these work.

iv] For high latitude areas (across Pacific, Atlantic or Arctic in winter season):
To realistically demonstrate setting in of ice accretion on the hull or deck cargo (containers) of a vessel. At the click of a mouse the menu shall simulated loss of GM for display, with its' consequent effect on the ship. And the resulting angle of heel caused by loss of stability.

s) The simulator may be capable of showing operations of Emergency Towing Arrangement, forward / aft of ship model.

7. OWN SHIP CONTROL STATION

The following shall be provided as HARDWARE PANELS and shall be installed, mounted and arranged in a manner that would physically resemble a ship's navigating bridge. These Hardware panels shall have operational resemblance to actual ship board equipments.

7.1 Radar set with Automatic Radar Plotting Aids (ARPA) – minimum 21'' inch colour screen

It shall be possible to simulate both 3 cms and 10 cms radars. The radars shall be capable of being operated in the relative motion Head up, North up and Course up mode facilities and sea/ground stabilized true motion modes. There should be options available to switch between three different radar makes.
The radar simulation equipment shall be capable of generation of interference, noise, Radar/ARPA failure, yawing, clutter, spurious and false echoes, blind sector, and parallel index lines for sea and for river navigation.
The ARPA simulation equipment shall incorporate the facilities for:-

a. Manual and automatic target acquisition.
b. Past track information
c. Use of exclusion areas
d. Vector/graphic time and data display
e. Trial maneuvers
f. if AIS is fitted on the Light houses, radar must display this.
g. Guard Zone
h. Ground Stablization with reference targets

7.2 Electronic Chart Display & Information Systems (ECDIS) – minimum 21'' colour screen

Vector charts shall be available for the exercise areas. It shall be possible to edit existing areas and be able to generate chart database of any area and scale, if desired at a later stage. Normal features for ECDIS system

shall be available including chart scaling and zooming, review, selectable layer, route planning and monitoring. AIO feature should be available.

Electronic Charts :

The Electronic Navigation Vector Charts for the following areas shall be installed in the ECDIS equipment:
i. Dover Straits
ii. Singapore Straits
iii. Malacca Straits
iv. Gibraltar Straits
v. Approaches to New York
vi. Approaches to Rotterdam / Flushing
vii. Bisan Seto / Kanmon Kaikyo
vii. St. Lawrence River
ix. Entrance to Mississippi River / approaches to Houston
x. Open Sea
xi. Polar Region Chart such as North of Canada, NW Passage (Arctic), & North of Russia.
xii. Northern Sea Routes[arctic basin],
xiii. Adjoining open sea areas showing various stages of sea ice near LEADS and Open waters of arctic ocean.
xiv. Dardenelles & Bosphorous Straits area
xv. Entrance to Baltic Sea (Great Belt)

Note:
For Polar charts, the normal conformal charts must be sourced.
Selection of chart or simulation effect, will conform to following for areas in 7.2 [xi] :
a]Shallow water patches to be available for exercise near navigable LEADS.
b]Realistic conditions of snow flurries with reduced visibility to be exercised.
c] Navigation aids malfunction due to ice accretion/snow pile-up to be calculated and displayed..
d] One sample of drifting, large iceberg, detached ice-floes with drift rate 0.7 knots to be available for exercise in these areas.
e]The navigation areas for vector charts shall be similar to navigational areas of simulators.

7.3 VHF Communication System

Communication between ships & port VTS shall be simulated on VHF sets, which will have at least the following channels – 6,8,9,10,12,13,14,16,67,69,75,77 by clicking an icon on the screen:

The following realism shall be depicted
i. Volume Control
ii. Squelch
iii. Dual watch
iv. Pressel switch when speaking
v. Simplex Communication System

7.4 Intercom / Telephone

There shall be a provision to communicate between bridge and other strategic locations like engine room,

steering flat, master, C/O, 2/O, 3/O, C/E, forward & aft stations etc.

7.5. Propulsion Controls for controlling own ship's engine ahead and astern

7.6. Bow-Thruster Control

- to be installed on own ship station, with overload alarm.
- alarm to show on instructor panel, with option to reset overload, start another generator, or activate total blackout.

7.7 Steering Console Stand

There shall be provision for the following at or near the console-

i. Steering Wheel
ii. Steering Motors (at least Two)
iii. Hand, Auto Pilot and Non follow up steering
iv. Compass Repeater, able to depict Gyro and / or Magnetic heading.
v. Gyro failure/non-functional alarm. For polar regions this will be applicable for both Gyro and Magnetic
vi. Helm Order Indicator
vii Auto- pilot
viii. Rate of Turn Indicator

7.7.The Auto-Pilot shall have the following capabilities

i. Weather adjustments (yawing and course control)
ii. Rudder limit setting
iii. Counter Rudder
iv. Off-course alarm
v. Setting of constant rate of turn

7.8. Engine Alarm Panel giving audible and visual alarm in case of –

i. Start Fail
ii. Shut Down
iii. Slow Down
iv. Over speed and
v. Over load
vi. Low Starting Air Pressure

7.9. General Emergency Alarm

There shall be a facility provided for activating the General Emergency Alarm from the wheelhouse. (Push Button Type).

7.10. Indicators

Each own ship station shall have at least the following indicators (Anemometer) Wind direction and speed indicator

i. Rudder Angle Indicator

ii. Rate of Turn Indicator
iii. RPM / Pitch Indicator
iv. Clock
v. Depth Indicator
vi. Doppler Speed Log shall be capable of indicating fore / aft and athwartship speed (speed made good). Depending upon the depth, speed shall be indicated on ground or water track.

7.11 Ships Horn (whistle)

To be provided on the wheelhouse console as a push button.

7.12 Chart Table with paper charts and publications

Chart Table will resemble a ship's Chart Table of minimum dimension 4' X 3'. Paper charts and publications provided shall be appropriate for the areas in use, in particular Charts of UTM & UPS projection for polar navigation.

7.13 The following equipment shall be simulated:-

If not using hardware panels, then, a colour monitor of not less than 17" size interfaced with the position and movement of own ship shall be used.

7.13.1. Echo Sounder

Simulation of complete echo sounder shall be provided. Facility to change gain adjustment, change over from depth below sea level and depth below keel, and vice versa etc, shall be provided. Alarm for shallow water depth shall be provided. Instructor should be able to introduce errors of varying magnitudes (not just failures).

7.13.2. Electronic Navigation Aids

a) Global Position System (GPS) - Simulation of all facilities of a standard GPS receiver shall be available. This shall include display of latitude, longitude, course and speed over ground by the own ship, UTC, RAIM (Receiver Autonomous Integrity Monitoring), normal navigational calculation functions such as Great Circle, Rhumb line sailing, 100 way points, Alarms for X-track error, anchor drag, approaching way point. Each own ship shall be equipped with two GPS receivers.

b) e-Loran configuration will be provided.

c) Instructor should be able to introduce errors of varying magnitudes for GPS display (not just failures).

7.13.3. Anchor Control

Capable of simulating anchoring with 2 anchors (port and stbd. –Bower anchors). This operations should be possible directly from the Bridge as well as from the instructor station.
This operation preferably to be visible from the bridge, and be realistic.
a) Means to let go and heave up own ship's anchor

b) Indicators for amount of cable paid out, direction of cable and strain on cable.

7.13.4. Sound Signal Generator

Ship's whistle and fog signal:- Facilities shall be available to generate fog signals manually or automatically operated by own ship (s) independently, as well as for each target separately by the Instructor console. The fog signals shall be interactive and the intensity and direction at own ship stations shall correspond to relative range and position of the station generating the sound signal. The fog signal generator shall be capable of generating the sound signals for the following:-

a) Vessel making way through water.
b) Vessel making no way through water.
c) Vessel restricted in her ability to maneuver
d) Vessel at anchor.
e) Vessel aground
f) Vessel not under command.

7.13.5. Navigation Lights and Shapes Display

Full set of Navigation, Christmas tree lights and shapes shall be available, which the own ship can select for display depending upon the prevailing circumstances.

7.13.6. Automatic Identification System (AIS)

A.I.S. to be interfaced with system to enable following objective

a) To receive and display data on other targets display using the A.I.S (static data, Dynamic Data, etc)
b) To receive and display data transmitted by ships and instructor A.I.S (Coastal A.I.S)
c) To transmit message with different status to other A.I.S objects.
d) To transmit own ships data (static and Dynamic data)

7.13.7 Voyage data recorder (VDR): With provisions for saving the exercise data.

7.13.8 Ship Security Alert System (SSAS)

7.13.9 Bridge Navigation Watch keeping Alarm System (BNWAS)

7.13.10 Search Light

7.13.11 NAVTEX (Ice Navigation reports)

7.13.12 Barometer

7.13.13 Long range identification &tracking [LRIT]

All above instruments shall conform to IMO Performance standards and /or other relevant guidelines as per industry standards; as applicable to.

8. INSTRUCTOR STATION

8.1 The instructor and assessor shall be able to

a) Start, Pause, Stop, Reset, in time and place, and restart an exercise;
b) Visually observe the trainees & their actions and follow the proceedings of an exercise by any method such as Digital Video Recording.
c) Change the operating environment during the running of an exercise, viz. shall be able to alter the wind (direction and force), swell (direction and height), current (direction and rate), cloud cover, state of visibility, etc.
d) A facility shall be provided to communicate between the Instructor and student stations (i.e. simulate outside world) by VHF on relevant communication channel and by intercom / telephone (for within the ship conversation).
e) A display of minimum 19" size of monitor shall be provided for a global view of the criteria simulation scenario. The display plots ships' tracks, target movements and also provides a tool for altering the parameters of the various target ships.
f) Instructor shall be able to view the Own ship radar as set and operated by the trainee.
g) Instructor shall be able to activate the simulation of failures in real time in the following equipment:

i. Navigation lights
ii. Gyro compass including insertion of error
iii. Doppler log failure or insertion of error
iv. Echo sounder
v. Radar
vi. ARPA
vii. AIS on ARPA
viii. GPS (including degrading of signal quality)
ix. Autopilot
x. Steering motor
xi. Bow thruster
xii. Engine

h) Instructor shall be able to create exercises where one or more own ship stations can be interactive within the exercise or to be able to run them independently and in different areas, if so required.
i) Instructor shall be able to create a channel by inputting depths and buoys.
j) Instructor on request from Own ship, can engage tugs and ship mooring lines during an exercise.
k) It shall be possible to replay a full exercise, showing the exercise performed by the trainees.

9. ASSESSMENT AND EVALUATION SYSTEM - System shall conform to following and requirements of STCW Code as referenced in objectives:

a. Assessment and Evaluation System shall be available.
b. The system shall include an integrated system in order to evaluate the education and training effort.
c. The system shall enable the instructor to make a structured and objective assessment of a student's performance during the exercise and produced a report of his performance upon completion of the exercise.
d. The results of the exercise assessment shall be presented in an easily understandable and clearly readable format, numerical as-well-as graphical. The outcome of the assessment must be presented on the screen and as a printout.

10. DE-BRIEFING SYSTEM

a. De-Briefing system shall be present at Instructor console.
b. It shall be possible to replay a full exercise showing the actions performed by the trainees.

c. Ability to store played exercise data on disk-system.

d. The simulator shall allow for replay of recorded exercise data in real time, fast/ slow motion and "Jump" forward/backward to any specified time. Ability to project recorded exercise for de-briefing purpose on 8' x 6' screen.

11. FACILITY OF AUDIO-VIDEO RECORDING OF ALL STUDENTS' STATIONS

Facility of audio-video recording of all students' stations shall be provided. The minimum required video cameras of HD resolution with recording capacity of each camera for eight hours i.e. at a stretch shall be provided. Provision shall be there to save/ transfer the recording to a portable storage facility.

Annexure II

(Technical Bid-Cover 1)

[On the Letter head of the Bidder and to be put in a separate sealed cover]

Tender for "Supply Full Mission Ship Maneuvering Simulator (FMSMS) – 02 Numbers Simulators at IMU"

Ref: IMU/NMC/PUR/2023-24/0041

Dated 09.03.2024

From
Name & Address of the Bidder

Ph:

Email:

To
Deputy Registrar (Admin),
IMU, Navi Mumbai Campus,
(T S Chanakya)
Karave, Nerul,
Navi Mumbai-400 706

Dear Sir,

We hereby submit our Technical Bid for **"Supply Full Mission Ship Maneuvering Simulator (FMSMS)**– 02 Numbers Simulators at IMU**"**.

1. Compliance Statement.

Sl. No	Item Description	Compliance to Specification Yes/No
1	Whether the bidder could supply the simulators as per the technical specification given in Annexure-I as per NIT	

2. Experience in the business of providing Similar Supply Since F.Y. 2020-21, 2021-22 and 2022-23 or earlier.

Sl No	Eligibility Criteria Details	Bidders Confirmation
1	Whether in the business of Providing Similar Supply Since F.Y. 2020-21, 2021-22 and 2022-23 or earlier & meet this eligibility criteria (Yes / No)	
a)	Since when	
b)	Mode of Proofs enclosed:	Page No.
(i)		
(ii)		
(iii)**		

** - May add more rows as required

3. A Similar Supply with minimum value specified in any one of the three set of values (a or b or c) carried out during the last five financial years (2018-19 to 2022-23):

(FMSM Simulators) :

Sl. No	Eligibility Criteria Details	Bidders Confirmation
A	The Bidder should have satisfactorily completed "Similar Supply and installation" with minimum value specified in any one of the three set of values (a or b or c) carried out during the last any one of the five financial years (2018-2019 to 2022-2023) (Yes / No)	
a)	At least one similar supply with a minimum value of Rs. 3.6 Cr (80% of Bid value) : (Yes / No)	
b)	At least two Similar Supply with a minimum value of Rs. 2.25 Cr (50 % of Bid value) (Yes / No)	
c)	At least three Similar Supply with a minimum value of Rs. 1.8 Cr (40% of Bid value.) (Yes / No)	

3. **B. Details of similar supply with minimum value specified in any one of the three set of values (a or b or c) carried out during the last five financial years (2018-2019 to2022-2023) [in proof of sl. No. 3-A above):**

Sl. No.	Client-Name Address	Equipment Supplied & Commissioned	Work order ref	Value of supply (Rs. in Cr)	Date of Commissioning by Bidder	Present Operational Status

** - May add more rows as required

4. Minimum Average Annual turnover.

Sl. No.	Eligibility Criteria Details	Bidders Confirmation	
(i)	The Bidder should have an average annual turnover of at least Rs. 10 Crores during past 5 financial year's i.e.2018-19 to 2022-23. (Yes / No)		
	Year / Proof enclosed	Turnover	Page No.
(ii)	2018-2019		
(iii)	2019-2020		
(iv)	2020-2021		
(v)	2021-2022		
(vi)	2022-2023		

Other Eligibility Criteria & Essential requirements and details.

Sl. No.	Particulars	Bidders Confirmation / Details	Details of Proof Enclosed	Page No.
5.	The bidder should submit the copy of Income Tax return for last three financial years i.e. 2020-21, 2021-22& 2022-23 (Assessment year 2021-22, 2022-23&2023-24) [YES / NO]		Copy Income tax Returns.	
6.	Whether the Bidder have a valid PAN and GST Registration [YES / NO]		Copy of PAN & GST Registration Certificate enclosed	
7.	The Bidder shall be the reputed Original Equipment Manufacturer (OEM) or their authorized/certified partner or authorized re-seller from India. He shall furnish necessary authorization from the OEM authorizing him to provide all goods and services support indicated in this tender and confirming that necessary assistance would be provided to the firm in providing required support during the Warranty Period. [YES/NO]		OEM Authorization / Certification as per the Annexure III. In case of participation by OEM, self-declaration.	

8.	The Bidder should not have been blacklisted or debarred from bidding for any government or central government autonomous organisation. [YES/NO]		Self-declaration to this effect.	
9.	Whether the Bidder has attached an EMD for Rs.9.00,000/-in the form of Demand Draft [YES/NO]		Original DD No. _____ enclosed with technical bid	
	Name, Designation, Address and Telephone Number of Authorized person(s) of Agency/ Firm			
	Type of the Organisation (Sole Proprietorship/Partnership/Pvt Ltd Co / Public Ltd Co. etc.			
	NameoftheAuthorised Signatory with Designation			
	Address of the Bidders			
	Email Address			
	Contract Numbers			
	Any other Remarks from Bidders:			
	Specific site preparation / site infrastructure required for effective functioning of equipment required (Yes/ No). If yet to be detailed in this column or to be enclosed.			

I am also enclosing bidder memorandum and undertaking duly signed by me /us.

Declaration

I / We certify that all the particulars furnished above are true and correct and based on documentary evidence, and that I /we understand that if any of the above particulars is found to be false or misleading, our bid is liable to be summarily rejected at any stage and my /our firm is liable to be debarred by IMU for at least 3 years, in addition to any other right or remedy available to IMU including forfeiture of EMD, Security Deposit etc.

Date:

Place:

Signature with Seal of Authorized Signatory

Annexure III

OEM'S AUTHORISATION CERTIFICATE TO THE BIDDER

To
Deputy Registrar (Admin),
IMU, Navi Mumbai Campus,
(T S Chanakya)
Karave, Nerul,
Navi Mumbai-400 706

Ref: IMU/NMC/PUR/2023-24/0041

Dated09.03.2024

Sir,

WHEREAS _____ who are official producers Authorized Sales and Service dealers of _____ do hereby authorised _____located at _____(to submit a bid and sign Tender with you for resale and support of the following Products supplied by us, for the quantities, specifications and delivery schedule called for by the technical specifications associated with the above Invitation for Bids:

Product Description	**Type**

We hereby extend to you a full guarantee and warranty and maintenance support, availability of spares for 10 years from the date of submission of the tender, in accordance with the Conditions of Tender along with the standard product warranty, and duly authorize the Bidder to act on our behalf in fulfilling all warranty and support obligations with respect to the above-listed products offered for resale by the Bidder in relation to this Invitation for Bids.

Name _____in the capacity of _____ Signed Duly authorized to sign the authorization for and on behalf of _____Dated on_____ day of _____

Note: This letter of authorization must be on the letterhead of the supplier, must be signed by a person competent and having the power of attorney to bind the supplier, and must be included by the Bidder in its bid.

Annexure IV

BIDDER MEMORANDUM & UNDERTAKING

[to be signed enclosed with technical bid by the bidder.]

1. General Description:

   Tender for " Supply of **02 Numbers of Full Mission Ship Maneuvering Simulator (FMSMS)**.

   Tender:- IMU/NMC/PUR/2023-24/0041 Dated 09.03.2024

2. Period of Contract. Outright supply with five-years warranty and Comprehensive/non-comprehensive Annual Maintenance Contract for subsequent 5 years.

3. Forfeiture of Earnest Money Deposit & Undertakings by the Bidder

   a) Should this tender be accepted in whole or in Part, I / we here agree to terms and abide and fulfil all conditions annexed hereto and all the terms and provisions contained in the all parts of the tender documents so far as applicable and/or in default thereof the EMD paid by me will be forfeited in favour of IMU – Navi Mumbai Campus.

   b) To execute all the supply and services referred to there in the tender documents upon the terms and conditions contained or referred to therein and carryout such deviations as may be ordered by IMU – Navi Mumbai Campus.

   c) This is to certify that I/We before signing this bid have read and fully understood all the terms and conditions and instructions contained therein and undertake to abide by the all the terms and conditions laid down in the tender/bid documents.

4. I/We abide by all the laws and statutory provisions applicable to the contract.

SIGNATURE.....
FOR AND ON BEHALF OF .....
DATE.....

Annexure V
PRICE BID (Cover II)
FORM OF TENDER

Note: This Memorandum forms part of the Tender must be on the letterhead of the bidder, duly filled in, signed & sealed and enclosed along with the Tender.

To
Deputy Registrar (Admin),
IMU, Navi Mumbai Campus,
(T S Chanakya)
Karave, Nerul,
Navi Mumbai-400 706

Ref: Tender IMU/NMC/PUR/2023-24/0041 dated:09.03.2024

Sir,

WHEREAS_____who are official producers / authorized Sales and Service dealers, of_____do hereby authorize _____ located at _____to submit a bid and sign Tender with you for sale and support of the following Products supplied by us, for the quantities, specifications and delivery schedule called for by the technical specifications associated with the above Invitation for Bids:

We hereby extend to you a full guarantee and warranty and annual maintenance support, availability of spares for the period covering warranty and comprehensive/non-comprehensive annual maintenance contract period from the date of submission of the tender.

SIGNATURE.....
FOR AND ON BEHALF OF .....
DATE .....

PRICE BID

"Supply of **02 Numbers of Full Mission Ship Maneuvering Simulator (FMSMS)**" at Indian Maritime University Campuses as per the tender document complying with all the conditions stipulated in various parts of the tender documents including its annexure and schedules.

Detailed Price Bid is enclosed as Schedule 1

Date:
Place:

Yours faithfully,

Signature with Seal of Authorized Signatory

PRICE BID

SCHEDULE 1

"Supply of 02 Numbers of –Full Mission Ship Maneuvering Simulator (FMSMS)" at Indian Maritime University –Campuses as per the tender document complying with all the conditions stipulated in various parts of the tender documents including its annexure and schedules.

Ref: Tender No. IMU/NMC/PUR/2023-24/0041 Dated 09.03.2024

Sr. No.	Particular	Price (inclusive of GST)
1	Price for 02 Full Mission Ship Maneuvering Simulator (FMSMS) including 5 yrs warranty	
2	Price for comprehensive maintenance for 05 years immediately after warranty	
3	Price for non comprehensive maintenance for 05 years immediately after warranty	

The bids will be evaluated as below:

Group-A (1+2) : The price of the equipment + Comprehensive Maintenance (5 years)
Group-B (1+3): The price of the equipment + Non-Comprehensive Maintenance (5 years)

IMU will evaluate the bids either for Group A or Group B and L1 will be decided accordingly.

Authorized Signature with seal