Additional Tender Terms & Conditions

(Supply of IPMS for 01TS for ICG Project)

Integrity Pact shall be signed on each page by the authorized representative of the bidder and submit/upload along with the Part-I bid, shall render the bid liable for rejection.
Bidder to note that the shortfall information/documents shall be sought only in case of historical documents which pre-existed at the time of the tender opening i.e submitted along with original bid and which have not undergone change since then.

1. DESCRIPTION & SCOPE OF WORK:

(a) **MAIN EQUIPMENT/ ITEM/ SYSTEM**:

Procurement, STW, HATs, SATs, Trials & Commissioning of IPMS for Yard 16101 of CGP as per TSP No. IPMS/TS/5033, Rev 02 dtd.23.05.2025 for 01 Training Ship.

(b) **ON BOARD SPARES (OBS):**

OBS for sufficient quantity for exploitation & on-board maintenance up to 2 years from date of completion of " Standard Warranty" (As mentioned in cl no.21 & warranty cl no. 35 of TSP) is required to be provided along with the main equipment. Please refer TSP for more details.

(i) OBS will be ordered along with the main equipment.

(ii) It is mandatory to quote OBS for 2 year of exploitation period as per Format Placed at Appendix-10 of Section-II of TSP of 01 TS.

(iii) For ranking the bids OBS cost will be considered.

(c) **DOCUMENTATION:**

As per: TSP No. IPMS/TS/5033, Rev 02 dtd.23.05.2025 for 01 Training Ship.

***Note:** Two sets of hard copy of Technical documents to be submitted along with offer to HOS Design - CGP.

(d) **TRAINING:**

Training package is to be provided as stipulated in TSP cl no. 33. The cost

towards training is to be quoted against the line item on lump-sum basis.

(e) **EXTENSION OF WARRANTY:**

Supplier shall mandatorily indicate, in the offer, the monthly rate for extended warranty period, in the event of expiry of warranty period as detailed above along with the attendant commercial terms and conditions if any. MDL will avail this service if required.

(f) **BASE & DEPOT (B&D) SPARES:**

(i) Base & Depot spares are to cover spares requirement for major maintenance/overhaul requirements for 5 years including two refits.

(ii) B&D spares list along with Comprehensive Part Identification list(CPIL)/Manufacturers recommended list of Spares (MRLS) for five-year exploitation and maintenance.

(iii) Itemized list with cost along with a copy of the maintenance schedule for the equipment is to be provided in the offer. Itemized list (in LMS format to be submitted in soft copy in excel) of Base & Depot spares should be as per Appendix-10 of Section-II of TSP.
(iv) The B & D Spares shall be procured by MDL on behalf of Indian Coastguard. The B & D spares shall be ordered at a later date after ranging and scaling of the spares done by Indian Coast Guard.
(v) The delivery of B & D Spares shall be prior to the commissioning of ship. The tentative delivery date for the supply of B & D Spares shall be indicated in the tender enquiry.
(vi) **The B&D spares** ordered by MDL shall be delivered to **CGSD (Mumbai) for 01 TS.**
(vii) Itemized prices for B&D spares (along with the part no) for five year's exploitation period with price validity for 18 months from the tender closing date to be submitted along with the offer.
(viii) B&D spare rates will not be loaded at the time of ranking.
(ix) After ranging & scaling by Indian Coast Guard (ICG), order for finalized/approved B&D spares would be placed separately by MDL on behalf of ICG.
(x) It is mandatory to quote for B & D Spares. Bidders not quoting for B&D Spares falls under rejection criteria. MDL reserves the right to negotiate prices quoted for B&D Spares.

Note:
(a) Bidders shall quote for all line item in the tender, failing of which offer of the firm falls under rejection criteria.
(b) MDL reserves the right to invoke the option of Extension of warranty. It is not mandatory for MDL to avail these services. However, firm has to render these services if & when called for.

2. EARNEST MONEY DEPOSIT: NA being Limited Tender

3. PRE-QUALIFICATION CRITERIA:

a) **TECHNICAL PRE-QUALIFICATION:**

Firms with proven experience of designing, manufacturing,
supplying and successfully commissioning of IMCS/IPMS to Indian Navy / Indian Coast Guard / any Ocean going vessel shall only be considered. The relevant purchase order copies, documents like Delivery Challans or Inspection Release note and Invoice copies of the executed project to be submitted along with the Technical offer. The main software of IPMS should be indigenously built.

Supporting Documents:
i. Vendor shall submit their experience details including work completion certificates and relevant Purchase orders/ Delivery Challan/ Invoice for having this type of equipment.
ii. Vendor shall submit a declaration in their letterhead that there is no adverse reports from any of their customers for this type of equipment supplied by them. In case any such adverse report/ remark exist, the details of the same may be furnished along with the reference purchase order and customer details.
iii. Vendor shall submit a declaration in their letterhead that the main software of IPMS in indigenously built.

b) **COMMERCIAL PRE-QUALIFICATION:** Not applicable

4. VALIDITY PERIOD OF OFFER:

(a) **MAIN EQUIPMENT, OBS & DOCUMENTATION:**

(a) Bid / Offer shall have the **validity period of 180 days** from the tender closing date.
(b) In case the day up to which the bids are to remain valid falls on/ subsequently declared a holiday or closed day for MDL, the bid validity shall automatically be deemed to be extended up to the next working day.
(c) In exceptional circumstances, before the expiry of the original time limit, MDL may request the bidders to extend the validity period for a specified additional period. The request and the bidders' responses shall be made in writing or electronically. A bidder may agree to or reject the request. A bidder who has agreed to MDL's request for extension of bid validity, in no case, he shall be permitted to modify his bid.

(b) **B&D SPARES:** Prices quoted for B&D spares should be **valid for a period of 18 months** from the tender closing date.

5. SUBMISSION OF OFFER : Offer must be submitted in two parts as follows:

a) PART I (TECHNO COMMERCIAL BID):

The bidder shall ensure following are essentially included in the Part-I bid:

i) **Pre-Qualification Documents as required.**
ii) **Declaration of "Local Content"** as specified in the tender.
iii) **On Board spares (OBS) list** with cost breakup in percentage of total OBS cost for 2-years exploitation period (as per Appendix 10 of Sec-II of TSP) sought in **"Blank Rate Sheet." [Excel sheet, which also comprises sub-sheets for OBS List and B&D sheets. Firms to take note].**
iv) **List of B&D spares** with itemized cost breakup in percentage (%) (as per Appendix 10 of Sec-II of TSP) sought in **"Blank Rate Sheet."**
v) Bank details for payment by RTGS/NEFT, cancelled cheque, ECS Mandate etc.
vi) Shop Establishment Certificate, or registration certificate from registrar of firms or certificate of incorporation from Registrar of Companies
vii) If EMD exemption requested, documents supporting EMD exemptions as below:
   (a) Permanent MDL registration certificate (not temporary registered) or Existing DPSU registration certificate like HAL etc
   (b) OEM certificate of the tendered item or
   (c) Registration with NSIC "Single Point Registration Scheme for the tendered product", or
   (d) Start-up recognised by DIPP, or
   (e) Green Channel status vendors.
vi) Additional Documents as per tender documents and as per TSP annexures, **Submission of offer to MDL:** Supplier/Bidder/ Vendor to ensure that two sets of hard of "Technical offer" is sent to "HOS(D-CGP), Kind Attn: Mr. R K Jangid, CM (D- L&Wn), Mazagon Dock Shipbuilders Limited, 3nd Floor, West Block, Dockyard Road, Mumbai - 400010" Tel. no. 022 23763383, 022 23763029.

b) PART-II (PRICE BID):

(i) Prices for each of the listed items has to be uploaded on GEM.
(ii) Additional B&D Prices to be uploaded in Additional Financial Documents, in Gem, as under:

Financial Document Required/वित्तीय दस्तावेज की आवश्यकता है।	Yes

6. BID REJECTION CRITERIA:

(i) Failure to submit sufficient or complete details for evaluation of the bids within a week.
(ii) Incomplete / misleading / ambiguous bids in the considered opinion of TNC /CNC.
(iii) Bidders not quoting for all the line items in the tender, under attached excel "Blank Rate Sheet" as attached in the tender.
(iv) Bid with technical requirements and or terms not acceptable to MDL/Customers/External agency nominated as applicable.
(v) Any deviation sought, which is not accepted to MDL.
(vi) Non submission of Earnest Money Deposit. It is a non-negotiable document.
(vii) Bidders not submitting self-certification for local content for the tendered items.
(viii) Bid received from non –local supplier i.e. Bidder who submit their quote with less than 20% local content of the tendered item.
(ix) Bidders not submitting list of OBS with itemized cost breakup in percentage (%) as per format as provided in the attached **"Blank Rate Sheet".**
(x) Bidders not submitting corresponding B&D price list (actual prices) in financial bid / price bid, as per the breakup provided in "%" sheet stated at sr (ix) above. Firms to note that these prices shall not be loaded during grant of the order, and is a mandatory requirement by CGP for their R&S activity later.
(xi) Non-Submission of "Integrity Pact" for the tendered tender.
(xii) Any deviation w.r.t. of tender documents.

7. DELIVERY PERIOD/COMPLETION SCHEDULE:

Details / Yard	Main Equipment, OBS & Documentation	**Services**	Warranty Extension
16101	PO + 06 months	PO + 13 months	PO delivery + Standard Warranty 36 Months as per TSP + "X- Additional Month/s" **amongst** the **quoted additional 12 additional Months**

The given schedule for the services e.g. HAT,SAT,Conectorisation,STW,Trials and commissioning, training is tentative; the exact schedule will be communicated 15 days in advance.

8. CONSIGNEE/DELIVERY LOCATION:

(A) MAIN EQUIPMENT, DOCUMENTS AND OBS:

Store IN-Charge
Anik Chembur Bond Store,
Mazagon Dock Shipbuilder Ltd,

Kurla Mahul Road, Mumbai-400074.
Tel: 022-255 40404/44838/43123.

(B) B&D SPARES OF 01 TS: CGSD (Mumbai)

9. WARRANTY/GUARANTEE:

a) The equipment / item along with associated auxiliaries/components supplied shall be warranted / guaranteed for satisfactory Performance for the period of Forty-Eight (48) months from the date of delivery of equipment to MDL or thirty-six (36) months after planned delivery date of ship to ICG whichever is later as per. This is to be referred as Standard Warranty.
b) The tentative planned delivery date for all ships are tabulated below:

Yard No	Planned delivery date
16101	December - 2026

c) The Supplier cannot absolve their responsibility for warranty of material even though it is inspected by & approved by the inspection authorities.
d) If the defects are not remedied within a reasonable/stipulated time, MDL may proceed to rectify the defects at the supplier's risk & cost, but without prejudice to MDL's rights under the contract.
e) During the period of warranty / guarantee if any defect noticed in the equipment / item supplied, the supplier/ contractor will have to rectify such defects immediately at no extra cost to MDL.

10. PERFORMANCE SECURITY (EPBG):

(a) Performance Security for an amount equal to 5% of order value payable in Indian Rupees shall be submitted.

(b) Performance Security is to be furnished as per GeM after notification of the award of contract and it should remain valid for a period of 60 (sixty) days beyond the date of completion of all contractual obligations of the supplier, including warranty obligations.

11. PRESERVATION: As per **Clause no. 31** of referred TSP's of ICGP:

12. TAXES & DUTIES: To be included in the submitted quote, as per GEM & Govt. guidelines.

13. INSPECTION:

(a) Drawing & QAP approval: ABS & IRS. **Cost for the Drawing & QAP approval shall be borne by vendor.**
(b) Pre-Dispatch Inspection: By ABS & IRS. **Cost for the inspection shall be borne by vendor.**
(c) Receipt Inspection: By MDL & CGRPT(MBI).
(d) The decision of the Inspecting Authority or their representatives, as the case may be, on any question of the intent, meaning and the scope of Specifications / Standards shall be final, conclusive and binding on the Bidder/ Supplier / Contractor.
(e) **Inspection Agency:** ABS and IRS class **(Both).**

Address and details of Third Party Inspection (TPI) agency are as below:

ABS
AMERICAN BUREAU OF SHIPPING
298, 3rd FLOOR, CITY ICE BUILDING,
PERIN NARIMAN STREET, FORT, MUMBAI, 400001
8850902844
absmumbai@eagle.org
vnavuduri@eagle.org

IRS
INDIAN REGISTER OF SHIPPING
52A, ADI SHANKARACHARYA MARG,
OPP POWAI LAKE, POWAI, MUMBAI 400072
9999031504
k.dhawan@irclass.org
amitabh.dube@irclass.org
www.irclass.org

14. PAYMENT TERMS:

(a) **Main Equipment, OBS & Documentation**:

(i) On receipt of Invoice, 95 % of Payment shall be made within 15 days from generation of Consignee 0 &Acceptance Certificate (CRAC) of material and as reduced by any deductibles and / or the amount leviable towards liquidated damages, if any plus 100% taxes, duties etc. as applicable.

(ii) Payment of the balance of the value of the supplies may be payable and as reduced by any deductibles and / or the amount leviable towards liquidated damages, if any, on submission & confirmation of PS of equivalent amount valid up to warranty period plus 60 day's claim period.

(b) **Services/Training**:

100% payment for all of the training included in the same order will be admissible for payment within 15 days from Generation of CRAC & submission of original Work Completion Certificate, along with SAP Service Sheet signed by CM or above of production/planning dept. and ink signed invoice.

(c) **Warranty Extension (If applicable) :**

100% payment for warranty extension charges wherever included in the same order will be admissible for payment will be made within 15 days from date of start of extended warranty period against submission of Invoice, Guarantee Certificate for additional warranty & extension of original PSBG.

15. INTEGRITY PACT (IP):

The Integrity pact essentially envisages the agreement between prospective vendors / bidders & buyers committing the person/officials of both the parties not to exercise any corrupt influence on any aspects of the contract. Only those vendors/bidders who enter into such an integrity pact with the buyer would be competent to participate in the bid. Therefore, on-acceptance and non-

submission of IP by the vendors/bidders shall render the bid liable for rejection. The format of integrity Pact is enclosed with tender documents. IP shall be submitted on plain paper.

The 'Integrity pact' dully filled as per enclosed format to be submitted along with the offer. Bidders to ensure that each page of Integrity pact shall be duly signed by the bidder. Non-submission of Integrity Pact by the bidders duly signed on each page along with Part-I bid shall be categorical rejected. Bidders shall send original IP immediately to MDL post submission of bid.

Independent External Monitors (IEM): The following Independent External Monitors (IEMs) will have the power to access the entire project document and examine any complaints received by him. In case of any change in IEMs it will be informed accordingly.
For any administrative enquires and clarification on tender, bidders shall contact Commercial Dealing Executive. In case of issues related to Integrity Pact (IP) please contact Independent External Monitor (IEM) whose details are as below:

(i) Mr. M.N. Krishnamurthy, IPS (Retd) - Email id: krishnamurthymn19@gmail.com

(ii) Mr. Deepak Kashyap, IRTS, (Retd) - Emailid: deepakkashyapnd02@gmail.com

16. **BOOK EXAMINATION CLAUSE:** In case it is found to the satisfaction of MDL that the Supplier has engaged an Agent or paid commission or influenced any person to obtain the contract as described in clauses relating to Agents/Agency Commission and penalty for use of undue influence, the supplier, on a specific request of MDL shall provide necessary information/inspection of the relevant financial documents/information.

17. **OPTION CLAUSE :** Applicable, GEM GTC to be referred.

18. **EXCHANGE RATE VARIATION (ERV) :** Not Applicable, prices shall be fixed for entire contract period.

19. **CONTACT DETAILS FOR QUERIES**: In case of any clarifications regarding tender condition/TSP/specification, bidders are requested to contact the following person, before the closing date of the tender.

Design Dept.	Mr. R K Jangid	+91 22 2376 3383	rkjangid@mazdock.com
	Mr. Sriram V.	+91 22 2376 3029	sriram@mazdock.com
Commercial Dept.	Mr. D S Chavan	+91 22 23762782	dschavan@mazdock.com
	Mr Hemant V Mishra Manager (C-CGP)	+91 22 23762764	hvmishra@mazdock.com

20. We look forward to receive your most competitive and reasonable offer against this tender.

Integrity Pact (IP) Format

Mazagon Dock Shipbuilders Limited (MDL) hereinafter referred to as **"The Principal/Buyer"**

And.....hereinafter referred to as **"The Bidder/ Contractor"**

Preamble

	The Principal/Buyer intends to award, under laid down organizational procedures, contract/s for .....The Principal/Buyer values full compliance with all relevant laws of the land rules, regulations, economic use of resources and of fairness / transparency in its relations with its Bidder(s) and /or Contractor(s). In order to achieve these goals, the Principal/Buyer will appoint an Independent External Monitor (IEM), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1 - Commitments of the Principal/Buyer:

(1)		The Principal/Buyer commits itself to take all measures necessary to prevent corruption and to observe the following principles:
	a)	No employee of the Principal/Buyer, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
	b)	The Principal/Buyer will during the tender process treat all Bidder(s) with equity and reason. The Principal/Buyer will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.
	c)	The Principal/Buyer will exclude from the process all known prejudiced persons.
	d)	The Principal/Buyer undertakes to scrupulously follow the tender containing Standard Terms & Conditions (STAC) and General Terms & Conditions (GT&C) in respect of procurement contracts for goods, services and civil works.
(2)		If the Principal/Buyer obtains information on the conduct of any of its employees which is a criminal offence under the relevant Anti Corruption Laws of India, or if there be a substantive suspicion in this regard, the Principal/Buyer will inform the Chief Vigilance Officer, MDL and in addition can initiate disciplinary actions.

Section 2 - Commitments of the Bidder(s)/Contractor(s):

(1)		The Bidder(s)/Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.
	a)	The Bidder(s)/Contractor(s) will not, directly or through any other persons or firm, offer promise or give to any of the Principal/Buyer's employees involved in the tender process or the execution of the contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage or any kind whatsoever during the tender process or during the execution of the contract.
	b)	The Bidder(s)/Contractor(s) will not enter with other Bidders into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.
	c)	The Bidder(s)/Contractor(s) will not commit any offence under the relevant Anti-Corruption Laws of India; further the Bidder(s)/Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to other, any information or document provided by the Principal/Buyer as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

	d)	The Bidder(s)/Contractor(s) of foreign origin shall disclose the name and address of the Agents/representatives in India, if any. Similarly, the Bidder(s)/Contractor(s) of Indian Nationality shall furnish the name and address of the foreign principals, if any. All payments made to the Indian Agent/representative have to be in Indian Rupees only. Further details as mentioned in the "Guidelines of Indian Agents of Foreign suppliers" shall be disclosed by the Bidders(s)/Contractor(s). Copy of the "Guidelines on Indian Agents of Foreign Suppliers" as annexed and marked as Annexure-A.
	e)	The Bidder(s)/Contractor(s) will when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.
	f)	The Bidder (s)/Contractor(s), their agents, representatives shall not do such things so as to interfere with the procedures laid down in the Principal/Buyer's tender containing the Standard Terms and Conditions (STAC) and General Terms and Conditions (GT&C) in respect of procurement contracts for goods, services and civil works.
	g)	The Bidder commits to refrain from giving any complaint directly or through any other manner without supporting it with full and verifiable facts.
(2)	The Bidder(s)/Contractor(s) will not instigate third persons to commit offences outlines above or be an accessory to such offences.	

Section 3 - Disqualification from tender process and exclusion from future contracts:

	If the Bidder(s)/Contractor(s) before contract award or during execution of Contract has committed a transgression through a violation of Section 2, above or in any other form such as to put his reliability or credibility as Bidder(s) in question, the Principal/Buyer is entitled to disqualify the Bidder(s)/Contractor(s) from the tender process or to terminate the contract, if already signed for such reason, as per the procedure mentioned in the "Guidelines on Banning of business dealings" Copy of the "Guidelines on Banning of business dealings" is annexed and marked as Annexure-B.	
	1)	If the Bidder(s)/Contractor(s) has committed a transgression through a violation of Section 2 such as to put his reliability or credibility into question, the Principal/Buyer is entitled also to exclude the Bidder(s)/Contractor(s) from future contract award processes. The imposition and duration of the exclusion will be determined by the severity of the transgression. The severity will be determined by the circumstances of the case, in particular the number of transgressions, the position of the transgressors within the company hierarchy of the Bidder(s) and the amount of the damage. The exclusion will be imposed for a minimum of six months and maximum of five years, which may be further extended at the discretion of the Principal/Buyer.
	2)	A transgression is considered to have occurred, if the Principal/Buyer after due consideration of the available evidence, concludes that no reasonable doubt is possible.
	3)	The Bidder (s) accepts and undertakes to respect and uphold the Principal/Buyer's absolute right to resort to and impose such exclusion and further accepts and undertakes not to challenge or question such exclusion on any ground, including the lack of any hearing before the decision to resort to such exclusion is taken. This undertaking is given freely and after obtaining legal advice.
	4)	If the Bidder(s)/Contractor(s) can prove that he has restored/ recouped the damage caused by him and has installed a suitable corruption prevention system, the Principal/Buyer may revoke the exclusion prematurely.

Section 4 – Sanctions for Violation:

(1)	Any breach of the aforesaid provisions by the Bidder or any one employed by him or acting on his behalf (whether with or without the knowledge of the Bidder) or the commission of any offence by the Bidder or any one employed by him or acting on his behalf, as defined in

	Chapter IX of the Indian Penal Code, 1860 or the Prevention of Corruption Act 1988 or any other Act enacted for the prevention of corruption shall entitle the Principal/Buyer to take all or any one of the following actions, wherever required –	
	a)	To immediately call off the pre-contract negotiations without assigning any reason or giving any compensation to the Bidder. However, the proceedings with the other Bidder (s) would continue.
	b)	The Earnest Money Deposit/Security Deposit/Performance Bond shall stand forfeited either fully or partially, as decided by the Principal/Buyer, and the Principal/Buyer shall not be required to assign any reason there for.
	c)	To immediately cancel the contract, if already signed, without giving any compensation to the Bidder.
	d)	To recover all sums already paid by the Principal/Buyer, in case of an Indian Bidder with interest thereon at 2% higher than the prevailing Base Rate of SBI, and in case of a Bidder from a country other than India with interest thereon at 2% higher than the LIBOR. If any outstanding payment is due to the Bidder from the Buyer in connection with any other contract for any other Defence stores, such outstanding payment could also be utilized to recover the aforesaid sum and interest.
	e)	To en-cash the advance Bank Guarantee and Performance Bond/Warranty bond, if furnished by the Bidder, in order to recover the payments, already made by the Principal/Buyer, along with interest.
	f)	To cancel all or any other contracts with the Bidder.
	g)	To debar the Bidder from entering into any bid from Principal/Buyer for a minimum period of five years, which may be further extended at the discretion of the Principal/Buyer.
	h)	To recover all sums paid in violation of this Pact by Bidder(s) to any middleman or agent or broker with a view to securing the contract.
	i)	If the Bidder or any employee of the Bidder or any person acting on behalf of the Bidder, either directly or indirectly, is closely related to any of the officers of the Buyer, or alternatively, if any close relative of an officer of the Buyer has financial interest/stake in the Bidder's firm, the same shall be disclosed by the Bidder at the time of filing of tender. Any failure to disclose the interest involved shall entitle the Buyer to rescind the contract without payment of any compensation to the Bidder.
		The term 'close relative' for this purpose would mean spouse whether residing with the Principal/Buyer's employee/employees or not, but not include a spouse separated from the Principal/Buyer's employee/employees by a decree or order of a competent court; son or daughter or step son or step daughter and wholly dependent upon Principal/Buyer's employee/employees, but does not include a child or step child who is no longer in any way dependent upon the Principal/Buyer's employee/employees or of whose custody the Principal/Buyer's employee/employees has been deprived of by or under any law; any other person related, whether by blood or marriage, to the Principal/Buyer's employee/employees or to the Principal/Buyer's employee/employees wife or husband and wholly dependent upon Principal/Buyer's employee/employees.
	j)	The Bidder shall not lend to or borrow any money from or enter into any monetary dealings or transactions, directly or indirectly, with any employee of the Principal/Buyer, and if he does so, the Principal/Buyer shall be entitled forthwith to rescind the contract and all other contracts with the Bidder. The Bidder shall be liable to pay compensation for any loss or damage to the Principal/Buyer resulting from such rescission and the Principal/Buyer shall be entitled to deduct the amount so payable from the money(s) due to the Bidder.
	k)	In cases where Irrevocable Letters of Credit have been received in respect of any contract signed by the Principal/Buyer with the Bidder, the same shall not be opened.
(2)	The decision of the Principal/Buyer to the effect that a breach of the provisions of this Integrity Pact has been committed by the Bidder shall be final and binding on the Bidder, however, the same Bidder can approach the Monitor(s) appointed for the purposes of this Pact.	

Section 5 - Previous Transgression:

(1)	The Bidder declares that no previous transgressions occurred in the last three years with any other company in any country conforming to the anti-corruption approach or with any other public sector enterprise in India that could justify his exclusion from the tender process.

(2)	If the bidder makes incorrect statement on this subject, he can be disqualified from the tender process or further action can be taken.

Section 6 - Equal treatment of all Bidders/Contractor(s)/Subcontractors:

(1)	The Bidder(s)/Contractor(s) undertake(s) to demand from all subcontractors a commitment in conformity with this integrity Pact, and to submit it to the Principal before contract signing.
2)	The Principal/Buyer will enter into agreements with identical conditions as this one with all bidders, contractors and subcontractors.
(3)	The Principal/Buyer will disqualify from the tender process all bidders who do not sign this Pact or violate its provisions.

Section 7 - Criminal charges against violation Bidder(s)/Contractor(s)/ Subcontractor(s):

(1)	If the Principal/Buyer obtains knowledge of conduct of a Bidder, Contractor or subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor of subcontractor which constitutes corruption or if the Principal has substantive suspicion in this regard, the Principal/Buyer will inform the same to the Chief Vigilance Officer, MDL.

Section 8 - Independent External Monitor/Monitors:

(1)	The Principal/Buyer appoints competent and credible independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively whether and to what extent the parties comply with the obligations under this agreement.
(2)	The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the Chairman & Managing Director of the Principal/Buyer.
(3)	The Bidder(s)/Contractor(s) accepts that the Monitor has the right to access without restriction to all project documentation of the Principal/Buyer including that provided by the Contractor. The Contractor will also grant the Monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his project documentation. The same is applicable to Subcontractors. The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/Contractor(s)/Subcontractor(s) with confidentiality.
(4)	The Principal/Buyer will provide to the Monitor sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual relations, between the Principal/Buyer and the Contractor. The parties offer to the Monitor the option to participate in such meetings.
(5)	As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal/Buyer and request the Management to discontinue or take corrective action, or to take other relevant action. The Monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action. However, the Monitor shall give an opportunity to the Bidder(s)/Contractor(s) to present its case before making its recommendation to the Principal/Buyer.
(6)	The Monitor will submit a written report to the Chairman & Managing Director of the Principal within 8 to 10 weeks from the date of reference or intimation to him by the Principal/Buyer and, should the occasion arise, submit proposals for correcting problematic situations.
(7)	Monitor shall be entitle to compensation on the same terms as being extended to / provided to Independent Directors on the Board of Principal/Buyer.
(8)	If the Monitor has reported to the Chairman & Managing Director of the Principal, a substantiated suspicion of an offence under relevant Anti-Corruption Laws of India and the Chairman & Managing Director of the Principal/Buyer has not, within the reasonable time taken visible action to proceed against such offence or reported it to the Chief Vigilance Officer, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.
(9)	The word 'Monitor' would include both singular and plural.

Section 9 - Pact Duration:

	This pact begins when both parties have legally signed it. It expires for the Contractor **12 months** after the last payment under the contract and for all other Bidders **06** months after the contract has been awarded. If any claim is made / lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified above unless it is discharged / determined by Chairman & Managing Director of the Principal/Buyer.

Section 10 - Other provisions:

(1)	This agreement is subject to Indian Law, place of performance and jurisdiction is the Registered Office of the Principal/Buyer, i.e. Mumbai (For MDL). The Arbitration clauses provided in the main tender document/ contract shall not be applicable for any issue/dispute arising under this Integrity pact.
(2)	Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.
(3)	If the Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.
(4)	Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

Section 11 – Fall Clause: #

"The Bidder undertakes that it has not supplied/is not supplying similar products/ systems or subsystems at a price lower than that offered in the present bid in respect of any other Ministry/Department of the Government of India or PSU and if it is found at any stage that similar product/systems or sub systems was supplied by the Bidder to any other Ministry/Department of the Government of India or a PSU at a lower price, then that very price, with due allowance of elapsed time, will be applicable to the present case and the difference in the cost would be refunded by the Bidder to the Principal/Buyer, if the contract has already been concluded."

For & on behalf of	For & on behalf of
Mazagon Dockshipbuilders Limited	Bidder/Contractor
(Office Seal)	(Office Seal)
Place_____	
Date_____	
Witness 1:	Witness 2:
(Name & Address)	(Name & Address
_____	_____

Format for Compliance Certificate w.r.t. Land Border Clause

Declaration of Compliance of Order (Public Procurement No.1, 2 & 3) dtd 23 Jul 2020 & 24 Jul 2020 on Restrictions under Rule 144 (xi) of the General Financial Rules (GFRs), 2017

This declaration must form part of all tenders & it contains general information and serves as a declaration form for all bidders. (Before completing this declaration, bidders must study the General Conditions, Definitions, Govt Directives applicable in respect of Public Procurement No.1, 2 & 3) dtd 23 Jul 2020 & 24 Jul 2020 and OM No F.7/10/2021/-PPD(1) dated 23.02.2023 on Restrictions under Rule 144 (xi) of the General Financial Rules (GFRs), 2017& prescribed tender conditions).

DECLARATION BY AUTHORISED SIGNATORY OF THE FIRM

I, the undersigned, ... (*full names*),
do hereby declare, in my capacity as .....
of M/s .....(*name of bidder entity*), that:

1) The facts contained herein are within my own personal knowledge.

2) I have read the Order (Public Procurement No.1, 2 & 3) dtd 23 Jul 2020 & 24 Jul 2020 and OM No F.7/10/2021/-PPD(1) dated 23.02.2023 on the subject of Restrictions under Rule 144 (xi) of the General Financial Rules (GFRs), 2017 regarding restrictions on procurement from a bidder of a country which shares a land border with India and comply to all the provisions of the Order

3) I certify that M/s .....(*name of bidder entity*) *is not from such a country or, is from such a country (strike out whichever is not applicable.* I hereby certify that this SUPPLIER fulfills all requirements in this regard and is eligible to be considered. [Where applicable, evidence of valid registration by the Competent Authority is attached]

4) I understand that the submission of incorrect data and / or if certificate / declaration given by M/s .....(*name of bidder entity*) is found to be false, this would be a ground for immediate termination and further legal action in accordance with law as per Clause 12 of the Public Order on Restrictions under Rule 144 (xi) of the General Financial Rules (GFRs), 2017

AUTHORISED SIGNATURE: _____ **DATE:** _____

Seal / Stamp of Bidder

PROCUREMENT OF IPMS SYSTEM FOR 01TS OF CGP

Sr. No.	Material / Service Details	Quantity/unit
1	Material Details: - TS - SUPPLY OF INTEGRATED PLATFORM MANAGEMENT SYSTEM & FOLLOWING SUB SYSTEM AS PER TSP. a) ADDRESSABLE FIRE DETECTION SYSTEM. b) FLOOD ALARM & BRILGE ALARM SYSTEM. c) FIRE DETECTION LOOP CABLE & ETHERNET CABLE. d) TANK LEVEL INDICATION SYSTEM. e) DOOR & HATCH SENSOR. f) EOT SYSTEM. g) GENERAL ALARM SYSTEM. h) DCHQ CONSOLE i) MCR CONSOLE j) DYNAMIC POSITIONING SYSTEM K) RCS SYSTEM FOR PROPULSION CONTROL L)OTHER SYSTEM AS PER TSP	1 SET
2	Material Details:- DOCUMENTATION FOR IPMS & SUB SYSTEM AS PER TSP	1 NOS
3	Material Details:- ON BOARD SPARES FOR IPMS & SUB SYSTEM AS PER TSP	1 NOS
4	Service Description:- SERVICES OF CONNECTORISATION HATS, SATs, STW, TRIALS & COMMISSIONING.	1 AU
5	Service Description:- SERVICES FOR TRAINNING	1 AU
6	Service Description: - Delivery date for warranty extension charges are tentative end date. The warranty extension changes will be applicable post standard warranty as per tsp.	12 MONTH

MAZAGON DOCK SHIPBUILDERS LIMITED

(A Govt. Of India Undertaking)

DOCKYARD ROAD, MUMBAI - 400 010

SHIPBUILDING DESIGN ELECTRICAL

TECHNICAL SPECIFICATION FOR INTEGRATED PLATFORM MANAGEMENT SYSTEM (IPMS)

PROJECT	:	01 TS
YARD NOS MDL	:	16101
CLIENT	:	Indian Coast Guard
DOCUMENT NO	:	IPMS/TS/5033
ICG HQ REFERENCE / APPROVAL	:	Class notation + A1 (E) (Government Service) + AMS NIBS +ACC,FFV1-NS CS-Ready, HELIDK(SRF) by ABS or equivalent of LRS/DNV/GL/BV/IRS/NK

REV.	DESCRIPTION	DATE	AUTHORISED BY
2	Incorporation of CGHQ comments received vide letter SA/0157/01TS/Elect Eqpt Dated 16 May 2025	23.05.2025	
1	Incorporation of CGHQ comments received vide letter SA/0157/01TS/Elect Eqpt. Dated 07 Apr 2025	29.04.2025	
0	TSP prepared based on Build Specs of Training Ship for ICG	10.3.2025	

Prepared By	Checked By	Checked By	Approved By
RK Jangid CM(D-L)	Ravindra Manwatkar CM (D-E)	Sudhir Sonawane CM/DPE (D-L)	Pradeep Modak DGM/HOS (D-L)

CONTENTS

	SECTION I:
	INTRODUCTION
1.	This General Specifications relate to Design, approval of the equipment by the classification society, Manufacture and Supply of one ship set of Equipment for Project 01 Training Ship (TS) of Indian Coast Guard.
2.	Project 01 TS consist of Diesel Engine propulsion system comprises of two propulsion plants, each plant consisting of one Diesel Engine driving a Controllable Pitch Propeller and External Fi-Fi pump through single input and twin output Reduction Gearbox and respective shaft line. Each propulsion plant broadly comprises of: (a) One Diesel Engine of minimum 5000 KW power output. (b) One single input, twin-output Reduction Gearbox with built in thrust block. (c) One set of shafting along with associated components (d) One Controllable Pitch Propeller (e) Propulsion plant support systems (for Diesel engines, Gearboxes, Shafting & CPP) (f) Associated Controls & Monitoring System.
3	Class notation for Training Ship is: + A1 (E) (Government Service) + AMS NIBS +ACC,FFV1-NS CS-Ready, HELIDK(SRF) by ABS or equivalent LRS/DNV/GL/BV/IRS/NK
4	The Supplier should submit the quotation based on the General Conditions & Requirements (GCR) and the Technical Requirement for Procurement of each equipment. Should there be any discrepancies between the GCR and the Technical requirement of each equipment, the technical requirement/ specification shall prevail.
5.	(a) The reference list of the equipment fitted in Indian or International Navy / Coast Guard or similar platform such as ocean going vessel, Offshore Platforms and Oil-Rigs to be submitted along with the offer. (b) The Year of production of equipment and system to be of latest manufacture (during or after Year 2023). This is to confirm to the current production standards and should have 100% of the defined life at the time of delivery. (other than permitted running hours during assembly / acceptance trials)

GENERAL CONDITIONS & REQUIREMENTS

1. **Subject** : The general conditions and requirements specified in this chapter are intended to meet the functional requirements of a Training platform with integral helicopter capable for operation in oceans environment and performance of all the ICG charter of duties.

2. **Ship's Basic Particulars**

Project 01 - TS class of ships would be Training ships for cadets. Ship's basic particulars, are indicated below: -

Table 1

PARTICULARS		REFERENCE DATA
Ship's dimensions	Length overall (LOA)	107 m
	Beam (water line)	15.2 m
	Draft (deep displacement)	4.02 m
Ship's displacement	Deep displacement	Around 3300Tonnes
Endurance	At cruising speed of 12 to 15 knots	7500 NM
Expected ship's life		25 Years
Operating profile	Continuous slow speeds	Below 8 knots
	Cruising	12 - 15 knots
	Maximum	20 knots
Unrestricted continuous rating of Diesel engine, at 45 degree centigrade ambient temperature		Min 5000 KW

3. **Reference Environmental Conditions:**

3.1 The equipment shall be suitable for marine applications and achieve specified performance smoothly under tropical marine conditions.

3.2 The equipment is to be designed for continuous operation & survival under the environmental conditions specified for ambient conditions as specified table below:-

Table 2

Sr. No.	Design Parameter	Value
(a)	Air Temperature	Minimum of 5 deg C and Maximum of 45 deg C
(b)	Sea water temperature	32 deg C
(c)	Relative humidity	90% at 35 deg C
(d)	Atmospheric pressure	750 mm of Hg column (1000mbar)

3.3 **Seaway Conditions:** Seaway conditions are defined at a sea water temperature of 1 to + 32 Deg. C, Ambient air temperature of 5 to 45 Deg. C and humidity up to 90% at 35 Deg. C. Salinity of water up to 35000 ppm. The equipment shall be capable of efficient and unrestricted operation without any deviation from its normal operating parameters under

the seaway conditions, as below:-

Table 3

Operational (up to sea state 7 and up to a significant wave height of 8.65 M)	
Roll	Maximum ± 22.5 degree
Pitch	Maximum ± 7.5 degree
Survival (up to sea state 7 and up to a significant wave height of 8.65 M)	
List	Maximum 15 degree from vertical (permanent)
Trim	Maximum 05 degree

3.4 **Complement :**

(a)	Officers	12
(b)	Subordinate Officers(SOs)/ Enrolled P ersonnel(EPs)	95
(c)	Training Staff	
	(i) Officers.	08
	(ii) SOs/EPs	38
(d)	Under Trainee officers	70
	Total	223

3.5 **Propulsion Plant Operating Profile:** The ship is to be available for exploitation for minimum of 190 days in a year. Each shaft is expected to clock a minimum of 3500 running hours per year. Operational cycle of the ship will be around 36 months.

3.6 **Service life of ship:** The expected service life of ship is 25 years @ 4500 hrs. annual exploitation

4 **Ship's Support Systems Supplies:**

Following ship's support supplies shall be available for the propulsion system. For electrical supplies, in case of different requirements (voltage/frequency, etc.), the equipment supplier shall provide suitable provision (transformer/converter/UPS, etc.).

Table 4

Sr. No	SYSTEM	SUPPLIES	REMARKS
(a)	Fuel system	Low sulphur high flash high speed diesel (LSHFHSD)	Indian equivalent
(b)	Lube oil system	Indian equivalent to be indicated by OEM	Indian Oil Ltd HPCL, BPCL equivalent
(c)	Compressed air system	High pressure air at working pressure of 30 bar & 30 cu m/hr. Suitable reduction available for working pressure at 30 bar & 7 bar.	Any other pressure requirement shall be met by the equipment supplier.
(e)	Fresh water system	Fresh water at 3 bar (approx.) shall be provided by ship's fresh water system.	Specific requirements to be indicated by equipment supplier.
(f)	Electrical	415 V AC @ 50 Hz, 3 phase 230 V AC @ 50 Hz, 1 phase 24 V DC	Any other power requirement shall be met by the equipment supplier.

5. **Noise & Vibration:**

5.1 Design of the equipment along with its associated auxiliaries/accessories/controls and mounting system, should ensure minimal vibration and noise.

5.2 All components of the equipment and accessories are to be designed for ensuring resistance to misalignment due to forces of vibration.

5.3 Suitable flexible hoses, bellows and noise reduction clamps are to be used for associated piping connections with the main equipment/auxiliaries.

3.5 Specific requirements on Noise & Vibration are to be as per respective equipment Technical Specification for Procurement.

3.6 Noise and Vibration levels of the equipment shall meet the classification rules and guidelines.

6. **Noise Levels in Machinery Spaces:**

Permissible noise levels in machinery spaces are to be in accordance ISO-6954:2000.
The noise criteria for the compartments are as follows:

Sr. No.	Compartments	DB(A)
1.	Machinery spaces	110
2.	MCR	75
3.	Work places	85
4.	Non Specific workshops	90
5.	Bridge and Chartroom	65
6.	Radio Rooms	65
7.	Cabins	60
8.	Dining Hall/Offices	65
9.	Service spaces (galley, pantry)	75
10.	Normally unoccupied spaces	90

7. **Vibration Isolators (Anti Vibration Mounts) :**

7.1 For resiliently mounted equipment, the mounting system shall be capable of attenuating the vibrations of the offered equipment within the limit specified in Technical requirement.

7.2 The installation and connections of the equipment shall account for the extreme displacements that may occur under loading conditions. Wherever necessary, suitable stops/snubbers shall be provided to prevent excessive motion.

7.3 Vibration measurements are to be carried out as per ISO 4868(XII)/latest amendment

8. **IP Rating for Electrical Equipment:**

IP rating for associated electrical equipment enclosure is IP 44. Specific IP rating to be as per Technical requirement in Section II.

9. **Availability/ Reliability/ Redundancy/ Self Sufficiency: -**

Maximum time required for bringing the equipment to full operational condition while undertaking daily, weekly and monthly maintenance routines, are to be indicated by the equipment supplier.
Equipment should be robust in design for ensuring high reliability, ease of operation and minimum maintenance.

10 **Documentation:**

Various documentation will be submitted by the equipment supplier as per the scope of supply and responsibility. Quality documentation is to be submitted in comprehensive and time bound manner for meeting ship's detailed design and production targets as well as equipment production and delivery schedule. Documentation to be submitted by the

equipment supplier are broadly indicated below:

Table 5

Sr. No.	Documentation	Remarks
(a)	Binding design documentation	For progressing with detailed design, integration & installation.
(b)	(i) Quality Assurance Plan (QAP) (ii) Binding Drawings of IPMS & its sub systems including architecture, critical components. (iii) FAT procedure & FAT trial document.	For approval by ABS and IRS.
(c)	Equipment STW/HATs/SATs documentation	For preparing installation inspection/Test and trials documentation.
(d)	Technical Manuals for equipment operation, maintenance, logistics, etc.	For ship's crew, training and repair organizations.

10.1 All documentation (including documents, drawings, data, reports, manuals, etc.) should be in English language. Dimensional details in the drawings should be as per scale. Technical data and parameters should be in metric units (SI Units).

10.2 Following file/formats would be acceptable:

(a) Documents, data & reports in MS-WORD/EXCEL, as applicable
(b) Data base files in ACCESS
(c) Orthographic drawings (2D) in DXF/DWG format
(d) 3D model of external topography of the equipment only in AVEVA MARINE/.STP format of max size of 5 MB

Above drawings/data are to be submitted in soft copies in latest software version.

10.3 Hard documents to be provided suitably grouped (section wise H, E, L, Navigation & Communication etc.) indexed and in moisture proof bound folders.

10.4 **Binding Design Documentation:** Comprehensive list of binding design documentation is to be submitted by equipment supplier, along with time schedule:
Binding Data: Three copies (one set for MDL, Two sets for ICG) and three sets on CD ROM of the following binding drawings/documents are to be supplied by the OEM within one month of placement of order:-
(In addition to hard copies, all equipment drawings are also to be submitted in .stp format)
(a)Block diagram of the system
(b)Installation documents if any covering detailed procedure for installation with sequence of activities.
(c)Installation drawings indicating overall dimensions, C.G., weight, maintenance envelope, IP, rating, shock mount details, mounting arrangement, bolting plan, lifting points, material specification etc. of each unit
(d)Recommended arrangement of devices in nominated compartments.
(e)Inter unit-cabling diagram with cables specifications.
(f)Cable connection Schedule.
(g)Power supply scheme for the system.
(h)Heat dissipation of individual units in compartment & in close loop ventilation system, as required for the system
(i)Parts identification list, indicating part no, qty., maker's name, Specification etc.
(j)Requirements for support systems such as fire fighting, communication, lighting etc.
(k)Cable length limitation etc., if any.
(l)Detailed foundation drawing including bolting plan.

	(m)Power consumption of each equipment (n) Any other design data/details, calculations, analysis, specifications, drawings, etc., as applicable (o) Shipping/Unshipping requirements (p) Training Plan (q) Preservation and Reperservation and upkeep procedure
11.	**Documentation Associated with Quality Assurance Plan, Equipment Manufacturing & FATs/Test & Trials**
	Documentation associated with quality assurance plan (QAP), equipment manufacturing and FATs(Factory Acceptance Tests), will be submitted by the equipment supplier in time bound manner, well in advance for approval by the designated classification society. • While preliminary quality assurance & test plan shall be submitted by the equipment supplier along with the technical offer, detailed QAP is to be submitted within 45 days after placement of equipment order, for approval of ABS and IRS class. • Prior to commencement of equipment production activities, equipment supplier shall consult designated Classes. • Documentation associated with equipment manufacturing would be submitted by equipment supplier progressively in time bound manner, for approval by designated classes. • Documentation associated with equipment FATs procedure shall also be submitted by equipment supplier well in advance in time bound manner, for approval by the designated classification society.
12	**Documentation Associated with STW/HATs/SATs:**
	Documentation associated with equipment setting To Work (STW)/ Harbour Acceptance Trials (HATs)/ Sea Acceptance Trials (SATs), shall be submitted by the equipment supplier within the agreed time schedule, with designated classification society and Shipyard/ Indian Coastguard. HATs/SATs documents shall include HATs/SATs schedule, procedure, pre-requisites, data to be recorded, time interval for data recording, formats for data recording, safety and precautions to be observed during trials, estimated time of the trials and all other relevant data/information required for the successful completion of the trials.
13.	**Technical Manuals for Equipment (Operation, Maintenance & Logistics)**
	The technical manuals/documentation pertaining to equipment & its associated auxiliaries/support systems, shall include technical description/information, specifications, drawings, performance data, installation, operational & maintenance requirements, spares & logistics, etc., in systematic, structured & comprehensive manner. 13.1 Under operating instructions, pre-starting inspection/checks, starting & shutdown procedures, functional parameters, trouble shooting, fault analysis, precautions, etc. to be suitably covered. 13.2 Procedures for undertaking all maintenance routines till the end of service life (for the entire life cycle) (including major overhaul), are to be clearly specified along with preservation/ de-preservation & upkeep requirements (when equipment is not in use, during long refit of ship). 13.3 Procedures for setting to work, test & trials of equipment are also to be well documented. 13.4 Following technical manuals/documentation (in hard and soft form) shall be provided by the equipment supplier along with equipment supply.

Table 7

Description	Content	Number of copies
Technical Manuals	Technical Description and Operating Instructions Manual	7
	On board Maintenance Manual	7
	Field and Depot Maintenance Manual	7
	Installation and Testing Manual	7
	Parts and Tools Catalogue including CPL & PIL in ILMS/SLMS Format	7
Technical Documentation	Installation Drawings	7
	As fitted Drawings	7
	Applicable Standards Utilised	7
	Test Procedure and Documentation	7
	Certified Test Reports (FATs, Material Test Certificates, Calibration Certificates, Weight Certificate etc.) & Records (including Type Test Certificate). Class certification	7

NOTE: 1) Draft copy of the above listed Manuals & Documentations (in hard and soft form) shall be prepared by the supplier and shall be submitted to shipyards for comments & to classification society under copy to MDL/ICG for approval, well ahead of the delivery date of the equipment. Approval on the same shall be given within two weeks of receipt of the Manuals & Documentations complete in all respects & required format.

2) Delivery of main equipment shall be considered completed only on receipt of all approved Manuals & Documentations as detailed in Table -7 above.

3) All Manuals & Documentations should be categorised as per the above subject/content description only.

14 **Quality Assurance And Testing:**

Quality assurance and testing requirements, pertaining to IPMS & sub-systems should confirm to standard conditions of quality assurance of ABS and IRS.

15. **Design Standards:**

Following rules and regulations as applicable shall be met:

(a) Nominated Classification Society Class Rules.

(b) International load line reg. 1966 as amended by Protocol of 1988 and any other subsequent amendments.

(c) IMO/MARPOL-73/78 reg and any further / latest amendments including

MS Act 58 and their rules.

(d) COLREG 72 and any further/ latest amendments.

(e) IMO /Anti Fouling System.

(f) International tonnage 1969 and any further/ latest amendments.

(g) SOLAS 1992 as amended in 2002 and any further / latest amendments.

(h) Stability standard as per NES 109.

(i) Naval Magazine Explosive Regulations (NMER).

(j) Helo deck Regulation as per IRS Rules and Regulations for construction of Coast Guard Vessels (Ch-5, Section -8) or equivalent ABS/LRS/BV/DNV/GL/NK rules.

(k) Superior/higher specifications of standard are acceptable subject to proving and satisfactory trial by Yard.

During execution of the project, following organizations would be associated for ship design, construction, quality control and Ship trials/acceptance:-

(a) Design : shipyard /nominated classification society
(b) Construction : shipyard and CGRPT Mumbai, at shipyard
(c) Quality control : Nominated classification society
(d) Ship Trials : Indian coast Guard /shipyard

16. **Quality Assurance:**

Design and production of equipment should conform to the best worldwide engineering practices, for ensuring high quality, reliability, durability, ease of operation and maintenance for meeting the ship's requirements.

- During equipment production the equipment shall be subjected to various stage inspections. Equipment supplier shall ensure high quality of production as per approved quality assurance plan. Quality assurance should meet the specified standards and intent of ISO 9001: 2015 (quality management systems) or its latest version.

- During equipment production, any deviation to the QAP/finalized specifications/standards shall be brought to the notice of designated classification society and Shipyard/ICG, along with valid reasons and recommended solution, without any compromise on quality, reliability and performance of the equipment.

17. **FATs-(Factory Acceptance Trials)(Acceptance Test Procedure)ATP(QAP document)**

a. Factory Acceptance Trials (FATs): The supplier shall prepare a Factory Acceptance Trials (FATs) schedule. Personnel from Indian Coast Guard will be present during such trials. The schedule should state how the supplier would demonstrate that the delivered system will meet the functional and performance requirements indicated as per ICG SOTR.

The factory acceptance trials procedure shall comprise of

(a) Functional Tests
(b) Verification of design, especially firmware and software
(c) Test equipment used, calibration requirements

(d) Pass/Fail criteria
(e) Expected duration and time schedule

The FATs schedule after being formulated by the supplier should be forwarded to CGHQ, for vetting and approval at least 03 months prior to the trials.

For conducting equipment official FATs, around 12 weeks advance notice shall be given by equipment supplier to designated classification society/Shipyard/ICG, for participation in FATs.

The fully integrated equipment would be subjected to FATS by a team nominated by ICG. The FATs would be carried out in accordance with FATS document approved by ICG.

b. Harbour Acceptance Trials (HATs)/Sea Acceptance Trails- The supplier is required to provide necessary representative(s) to assist during HATs (procedure to be approved by the ICG).

Harbour Acceptance Trials/Sea Acceptance Trials: - On board trials shall be conducted by Shipyard based upon HATs/SATs documentation and ship's trials schedule, which would be planned by shipyard in consultation of equipment suppliers/Trial organizations/Indian Coast Guard. Draft HATs/SATs schedule to be submitted by the firm for concurrence of ICG.

During equipment setting to work and HATs/SATs, equipment suppliers shall assist and offer the respective equipment trials for their successful completion. Equipment testing, tuning and any defect rectification during on board trials shall be undertaken by the equipment supplier in efficient and effective manner.

HATS/SATS documents shall include HATs/SATs schedule, procedure, pre-requisites, data to be recorded, time interval for data recording, formats for data recording, safety and precautions to be observed during trials, estimated time of the trials and all other relevant data/information required for the successful completion of the trials.

Shipyard will prepare GRAQs (General Requirement of Acceptance of Quality), trial document, based on the HATs/SATs document submitted by the supplier. The same shall be forwarded to the supplier for their vetting.

HATs/SATs shall be carried out to the satisfaction of ICG as per approved HATs/SATs documents.

18. **Maintenance & Logistics**

Equipment supplier shall ensure high reliability and low maintenance of equipment.
While equipment maintenance and repair between major overhauls would be carried out in-situ on-board the ship, major maintenance/overhaul would be undertaken ashore by repair organization.
Equipment design should therefore ensure ease of maintenance and accessibility to important sub-assemblies/components/accessories.
Suitable provisions (such as inspection windows, etc.) as feasible, are to be made for ease of in-situ visual inspection of important sub-assemblies/components/accessories for routine inspection, checks and maintenance, without dismantling the equipment assembly/components.
Equipment supplier shall provide maintenance schedules, planned maintenance intervals and procedure for undertaking maintenance of equipment on-board and ashore.

19. **Spares:**

Installation & Commissioning Consumable, On-Board Spares, Base & Depot Spares, special tools, test equipment, etc., are to be recommended by equipment supplier, taking into account operational and maintenance requirements of the equipment. Equipment supplier shall submit comprehensive list of all types of spares & tools under appropriate category along with the technical offer. Different categories of spares & tools shall be supplied, in consultation with Shipyard/ICG, based upon ranging and scaling by ICG.

Documentation for equipment spares shall include Comprehensive Part List (CPL) & Part Identification List (PIL), for meeting ICG's Logistics Management System (LMS)/Ship's Logistics Management System (SLMS) requirements. All details on spares are to be submitted by equipment supplier in compatible format in electronic media.

20. **Installation Tools and Commissioning Consumables:**

- Installation Tools: Special tools, jigs and fixtures & test equipment required for flushing, setting to work, testing & tuning, on-board trials (HATs/SATs) and post CST inspection of critical internal parts and reassembly of the equipment and its auxiliary systems shall be supplied. Tools shall be ordered along with the main equipment & delivered along with the main equipment.
- Commissioning Consumables: The Commissioning consumables (first charge like coolants, greases, special oil, filters, gaskets, refrigerant etc.) shall be included in the scope of supply. Commissioning consumables shall be delivered before STW of the main equipment, tentative schedule of which shall be indicated in the Tender Enquiry.
- An itemised list with cost for the same is also to be indicated in the offer to facilitate their procurement in future, if required.
- One set of standard tools adequate for undertaking the maintenance onboard should be supplied along with the offer.

21. **On Board Spares (OBS):**

a. The manufacturer's recommended list of On-Board Spares (MRL-OBS) required for servicing and maintenance, including breakdown maintenance for two years of operation after completion of the standard warranty period, should be included in the scope of supply. A list of On-Board Spares along with the maintenance schedule is to be submitted. The On-Board Spares and special tools shall cater to all on-board maintenance routines and possible repair requirements. Preservation requirements of On-Board Spares, if any, shall be indicated in the offer. The list of On-Board Spares required for auxiliary equipment/system shall also be indicated in the offer.

b. The On-Board Spares shall be ordered along with the main equipment. In case of any defect or deficiency observed in OBS while handing over of OBS to ship's Crew, the same may be made good by the respective OEM without any cost implications.

c. An item-wise list with cost (in LMS format to be submitted in soft copy in Excel) of On-Board Spares, special tools, and test equipment should be as per Annexure.

d. The Manufacturer's Recommended List of On-Board Spares has to be recommended based on the likely consumption rate of the spares and on the exploitation pattern of the equipment.

e. Firms quoting lesser Manufacturer's Recommended List of On-Board Spares in terms of range and depth will have to make good deficiencies at their cost without any financial responsibility or liability to ICG/MDL within 30 days of intimation to render equipment operational.

f. A certificate of sufficiency of Manufacturer's Recommended List of On-Board

Spares is to be submitted by the firm for 03 years of operation of the ship.

g. MDL/ICG would have the option to amend the Manufacturer's Recommended List of On-Board Spares proposed by the firm during the Technical Negotiation of the equipment within quoted price to ensure its sufficiency, based on its past experience of the exploitation of the same or similar equipment.

h. The Manufacturer's Recommended List of On-Board Spares should also include the spare conforming to Classification Society rule requirements for the vessel.

22. **Five-Year Base & Depot Spares/Comprehensive Part Lists**

Base & depot spares are to cover spares requirements for major maintenance/overhaul requirements for **5 years** including two refits.

- Recommendation for insurance, on long term storage may be indicated. The firm is to submit Comprehensive Part Identification List (CPIL) and Manufacturer Recommended List of Spares (MRLS) for five years exploitation and maintenance.
- Itemized list with cost in editable format along with a copy of the maintenance schedule for the equipment is to be provided in the offer. Itemized list (in LMS format to be submitted in soft copy in excel) of Base & Depot spares should be as per **Annexure.**
- The B & D Spares shall be procured by MDL on behalf of Indian Coastguard. The B & D Spares shall be ordered at a later date, after ranging and scaling of the Spares done by Indian Coast Guard.
- The delivery of B&D Spares shall be prior to the Commissioning of the First of Class Ship. Delivery date for the supply of B & D Spares shall be indicated in the Tender Enquiry
- Quotation for MRL-B&D along with part no for five years exploitation with price validity for 18 months to be supplied along with the offer with item wise cost.

23. **INDIGENISATION / LOCAL SUPPORT:**

(Applicable to equipment with import content)
The supplier is to indicate if the equipment is original OEM supply or manufactured in INDIA under license (specifying the import content). The manufacturer is to engage into a co-operation with a reputed manufacturer of similar equipment's in India and accordingly plan for progressive indigenization.

In this respect, the equipment manufacturer shall confirm that he will be able to authorize priority works at his works and provide the necessary local support as required to meet the ship construction and trial programme and provide the necessary after sale support to the ICG. Future plans for indigenous production of the equipment associated control/monitoring devices and transfers of technology are to be indicated in the proposal for consideration of Indian Coast Guard Headquarters.

24. **Product Support:**

Equipment supplier is to provide product support for ship's life of 25 years. In case the equipment is likely to be obsolescent, the supplier shall notify the Coast Guard with at least two years prior notice, along with valid reasons and recommended solution.

(a) The firm/OEM to submit undertaking to provide product support for minimum period of 25 years from date of delivery of the vessel.
(b) Undertaking for upgrade/currency of software for all equipment min 05 years from date of delivery of vessel. In case of obsolescence within 05 years from date of delivery of the Training ship, the same to be upgraded without any additional cost.
(c) Firm to indicate after sales and product support facilities in India with response time for attending defect onboard ship should be 03-04 days.

	(d) All upgradation and modification carried out on equipment during its life cycle must to be intimated to ICG. Further, any upgradation/modification during guarantee period of the equipment same to be included free of cost. (e) Firm should agree to enter into the rate contract / All-inclusive Annual maintenance contract (AIAMC) with ICG for maintenance and supply of spares.
25.	**Operational Cycle: The operating refit cycle of ship is as follows:** (a) 1st and 2nd Ops refit cycle – Operation cycle of 24 months followed by a refit. (b) 3rd and 4th Ops refit cycle – Operation cycle of 18 month followed by a refit. (c) Balance Ops and refit cycle – Operation cycle of 15 month followed by a refit. (d) First three refits are short refit (SR) followed by a normal refit (NR). Second NR will be medium repair (MR). (e) Short refit is for duration of 04 months. Normal refit is for duration of 05 months and medium refit for duration of 12 months.
26.	**Interchangeability:** Equipment design is to ensure that components and parts having same dimensions and characteristics should be inter-changeable between different units of similar kind in the ship, without affecting the specified equipment performance.
27.	**Tally and Diagram Plates:**
	All tallies and diagram plates shall be as per OEM Standards and must generally indicate the following- Manufacture's Name- Manufacturer's Serial No. Type/Model:- Year of Manufacture.- Electrical parameters viz. Ratings, Voltage, Frequency, Current, Insulation details etc as applicable- Weight of Equipment.- IP Rating of the equipment.- Danger labels in Red colour with white lettering are to be provided on all electrical equipment operating on 150Volts or higher. Other important instructions are to be given on tally plate. Tally of JB/Panel and other equipment internal diagram plate to be prepared by OEM. Cable Tallies as per approved system drawing to be prepared by OEM. Cable tallies should be supply for both the ends.
28.	**Instruction Plates:**
	Instruction plates listing the starting/shut-down procedure and precautions in brief are to be prominently displayed on the equipment. The Instruction plates are to be SS/ chrome plated. Equipment is to be supplied with a set of instruction plates duly mounted on equipment or supplied loose.
29.	**Painting Specification:**
	Paint of standard marine quality to be applied to the equipment. Details to be forwarded with the offer. Painting of machinery and electric equipment shall be as per the manufacturer's standard but finish colour shall be in accordance with painting schedule, wherever specified.
30.	**Lifting Arrangement:**
	Equipment components weighing more than 40 kilograms are to be provided with eyebolts/lifting arrangement, for ease of handling/lifting on board the ship or ashore. During transportation/transit of equipment, adequate provisions (such as supports, locking arrangement, jacking, etc.) are to be made for preventing any damage to the equipment & its associated components. Any component requiring special handling shall be clearly marked and appropriate handling instructions shall be provided by equipment supplier. One set of special lifting gear (if any) shall be supplied to shipyard.
31	**Preservation / Conditioning:**
	Equipment supplier is to provide high quality packing for the complete scope of supply along with handling arrangements. The package/container should display clear instructions for stowage, handling, care and accessibility for inspection of equipment preservation condition.

Equipment shall be supplied with Initial preservation for a period of 12 months for tropical conditions and protected against high humidity. The equipment are to be preserved on delivery as per the standard marine engineering practice. Closing plates/plugs/caps (duly filled with nitrogen gas) are to be provided on all openings.

For re-preservation requirements, at shipyard or on board ship beyond initial preservation period, suitable provision is to be catered for by equipment supplier. Equipment supplier shall provide re-preservation & upkeep procedure, preservatives/consumables and technical assistance/supervision to the shipyard, as per requirements.

Preservation requirement, procedures and schedule for main equipment, OBS and B & D Spares are to be indicated in the offer.

32. **Packing & Shipping:**

a. All equipment shall be adequately packed and protected with supports to ensure adequate protection during all methods of transportation. Each unit within a package/container shall be clearly marked in English for identification. The container shall clearly indicate the commodity description with caution marks, weight, size, etc.

b. A separate document giving complete details & instruction for storage, preservation, handling & transportation after delivery shall be supplied & a copy must be included with the shipping document. The supplier should indicate the delivery schedule port of embarkation, transport, packing, preservation, insurance etc.

c. The instrumentation, sensors and meters etc. which are fitted on the equipment are to be removed from the equipment and shall be staggered delivered according to shipyard schedule in a separate suitable box/packing during STW.

d. Following items shall be packed in separate containers/boxes with proper colour coding (with description) & list of their contents in English for their easy identification and traceability:

   a. Deliverables related to Main Equipment (to be marked in green colour).
   b. Deliverables related to Auxiliary Equipment (to be marked in green colour).
   c. Deliverables related to Installation material and Tools related to Main & Auxiliary Equipment (to be marked in green colour).
   d. Commissioning consumables and Tools (to be marked in green colour).
   e. On Board spares and Tools (to be marked in red colour) in SPTA boxes.
   f. Base & Depot Spares (to be marked in red colour).
   g. Documentation (to be marked in blue colour).
   h. The list of actual deliverables against each of the above serials shall be forwarded to shipyards in soft copy (MS Excel format) with required part nos. within one week of finalization of PNC in order to detail them in the purchase order.
   i. Packing list should give further breakup of items, wherever particular item is quantified by set.

33. **Training :**

a. The equipment supplier is to impart training, to ship's crew, on aspects related to operation, installation, maintenance and repair of the equipment.

b. For imparting training, complete training package in hard & soft form (including suitable training material, dockets, computer based aids, etc.), is to be provided by the supplier to the participants.

c. Training would be conducted by the equipment supplier at Shipyard/ On-board Ship. Training plan will be submitted by the equipment supplier, along with the technical offer. Training is required to cover the following aspects (but not limited to):

ii) Design and installation
iii) Operation and trouble shooting
iv) Control & monitoring
v) Upkeep and routine maintenance
vi) On board maintenance including major repairs and overhaul.

d.IPMS supplier shall provide training to 06+04 personals of Ship's staff/support staff At OEM"s premises for 02 weeks.

34. **Security of Information**

The information contained in this document is not to be divulged to any other firm/third party without the prior permission of the Indian Coast Guard and MDL. Adequate measures are to be taken to ensure safe custody of this document.

35. **Warranty:**

a.The equipment along with associated auxiliaries/components shall be warranted by the equipment supplier for the stipulated performance for a period of Fourty Eight (48) months from the date of delivery of equipment to MDL or Thirty Six (36) months after planned delivery date (D) (mentioned in succeeding Para) of the ship by shipyard MDL to the Indian Coast Guard whichever is later. This is to be referred as 'Standard Warranty'.

b.During the said period of 'Standard Warranty', the equipment supplied shall be warranted against any malfunction, defects, material failure, non-compliance to ordered specifications, sub-optimal performance, design deficiency, poor workmanship and quality. Any expenditure on account of equipment malfunction, repair or supply of spares against warranty defects shall be borne by the equipment supplier. If any defective part is required to be taken back to OEM's factory/works (i.e. importing and re-exporting from Country of origin) for the purpose of service, the entire liability including expenditure towards the same shall be borne by the supplier. The spare parts required / consumed for scheduled servicing & maintenance activities in the period of 'Standard Warranty' shall also be provided by the OEM without any commercial implication.

c.The Supplier warrants for a period of Thirty six (36) months from date of acceptance of the Training ship by the Indian Coast Guard at the designated Indian port or as applicable, that the vessel and the associated equipment and service supplied under this contract and each component used in the manufacture there of shall be free from all types of defects/failures.

d.In case of systems/equipment, which have not completed trials prior delivery, the warranty of that particular system/equipment and service would commence from the day of successful completion of trials. The Supplier will undertake update (if any) of software's for all equipment up to 5 years from the date of acceptance of the vessel.

e.If within the period of warranty, the Training ship and (or) stores and (or) spares are reported by the Shipyard to have failed to perform as per the specifications, the Supplier shall either replace or rectify the same free of charge, maximum within 15 days of notification of such defect by the Shipyard provided that the goods are used and maintained by the Shipyard as per instructions contained in the operating Manual.

f. Warranty of the equipment would be extended by user in log book, Spares and all consumables required for warranty repairs shall be provided free of cost by Supplier. All activities including diagnosis, rectification, calibration, transportation etc., required for making equipment serviceable and available would be Supplier's responsibility.

g. The Supplier also undertakes to diagnose, test, adjust, calibrate and repair/replace the goods/equipment arising due to accidents by neglect or misuse by the operator or damage due to transportation of the goods during the warranty period, at the cost mutually agreed to between the Shipyard and the Supplier subject to acceptability by the Shipyard. The Supplier shall intimate the assignable cause of the failures.

h. Supplier hereby warrants that necessary service and repair backup during the warranty period, shall be provided by the Supplier and he will ensure that cumulative downtime period for the Training Ship and or the fitted equipment /system equipment does not exceed 45 days of the warranty period. Thereafter, the Shipyard reserves the right to make good the defects at Suppliers risk and cost.

i. If the associated equipment and service, spares of Training Ship fails frequently and/or, the cumulative down time exceeds 45 days of the warranty period or a common defect is noticed repeatedly with respect to a particular item/component/sub-component, that complete item/ equipment shall be replaced free of cost by the Supplier within 45 days of receipt of the notification from the Shipyard duly modified/upgraded through design improvement in all equipment supplied/yet to be supplied and Engineering Support Package (ESP) supplied/yet to be supplied. Thereafter, the Shipyard reserves the right to make the defects at Supplier risk and cost.

j. In case the complete delivery of the ESP is delayed beyond the period stipulated in this contract, then the Supplier undertakes that the warranty period for the goods/stores shall be extended to that extent.

k. The Supplier warrants that the Training ship, the associated equipment and service supplied will conform to the Temperature and Humidity conditions as mentioned in this document.

l. The Supplier agrees to provide back to back warranty of equipment /system or any other item whose specified warranty by the OEM is more than ~~12~~ 36 months and shall extend the same warranty to the Shipyard at no. additional terms and conditions.

m. **Extension of Warranty:** Supplier shall mandatorily indicate, in the offer, the annual rate for extended warranty period, in the event of expiry of warranty period as detailed above along with the attendant commercial terms and conditions if any

36 **Planned Ship Delivery date(D):**

The planned date for delivery of the Ships to the Indian Coastguard by MDL are tabulated below:

Ship no.	Yard No.	Planned Delivery date
1	16101	December 2026

37. **Weight Recording / Weight Certificate**

Weights of all components are to be recorded and a suitable certificate shall be submitted, by the equipment supplier. The designated inspection authorities shall countersign such certificates. Format for weight control data sheet, is placed at **Annexure 6** of this document.

a. Net weight of each component is to be recorded in presence of designated inspection authority and the weight certificate is to be submitted by the equipment supplier, along with equipment supply. Format for weight certificate, is placed at

	Annexure 7 of this document. b.The supplier shall have to submit, reasons for variation between allocated weight and actual/certified weight for each and every item, wherever applicable, to Coast Guard and MDL for their consideration and further necessary action.
38.	**Technical Assistance:**
38.1	The Supplier shall provide the necessary representative(s) **as and when required,** in carrying out inspection and supervise the work that is done on the equipment, during the following phases: (a) Preparation for installation of equipment by shipyard. (b) Monitoring of proper equipment preservation during storage. (c) On-board erection and alignment. (d) Setting to Work (including fitment of latest calibrated instrumentation). (e) Harbour Trials. (f) Assistance in trouble shooting. (g) Customer Sea Trials (h) Post CST equipment Inspections. (i) Final Machinery Trials. (j) Assistance in operation during equipment guarantee period.
38.2	The supplier shall indicate total cost for executing all technical assistance activities mentioned above, in the price bid. Activity-wise cost break up shall also be given in the price bid, to facilitate the payment on satisfactory completion of the activity
38.3	Shipyard has to progress on ship construction activities, simultaneously on ships of the coastguard project or on ships of different projects. View this, there shall be every likelihood of clash of requirement of technical assistance. In such eventuality, in order to avoid delays on one ship due to similar work requirement on other ship, supplier shall depute their dedicated separate/independent team of supervisors/specialists for required technical assistance, on the required ships. Rotation of supervisors/specialist amongst the various ships/projects shall be avoided.
38.4	The supplier shall provide checklist for installation, setting to work, HATs & SATs to the shipyards to ensure the completeness of the activities by shipyards in order to avoid waiting period of the supplier specialists.
39	**Receipt Inspection**
	Receipt inspection for the major equipment shall be carried out in the presence of OEM rep to verify completeness of the scope of supply and intactness of the supplied equipment. Defective / damaged parts and deficiency, if any, in supply shall be made good by OEM free of cost. OEM shall be intimated the date of receipt inspection.
40	**Price**
	Price bid shall include cost of all deliverables and services as mentioned in tender. Break-up in percentage of total quoted cost of main equipment for its various components shall be indicated by the supplier. Non-indigenous equipment Suppliers are to indicate the import content in USD/EURO.
41.	**Compliance Matrix:**
	Para-wise compliance matrix, including paras which are not applicable, as per the technical specifications (contained in this document) shall be submitted by the equipment supplier along with the technical offer, in the format as per Annexure (preferably in excel sheet). The technical offer received without Compliance Matrix shall be liable for rejection.
42.	**OEM's Responsibility:**
	a. OEM to prepare system drawing/cable drawing in autocad. dwg format. b. OEM to prepare cable schedule, connection schedule of the system. c. Connectorisation of the delivered equipment and termination of the cable will be done by OEM onboard. d. Interfacing of third party equipment/System and handshaking of data will be OEM's

	responsibility to prove system onboard.

	Section –II
43.	**TECHNICAL SPECIFICATION & REQUIREMENTS**
43.1	**Technical Requirement:** The Requirements covers Design, Manufacturing, Testing, Supply, Preservation, connectorisation, calibration, Commissioning, Trials, training, documentation and Support requirements of Integrated Platform Management System for 01 Training ship as per various clauses stipulated in this TSP on turnkey basis with a single point responsibility by IPMS vendor. The IPMS vendor is to ensure that the Services of Engineers required for connectorisation, STW, HATs, SATs & Commissioning of IPMS per ship is considered by them.
43.2	The system should be supplied as per various clauses stipulated in this technical specification and Class requirement (ABS & IRS both). Monitoring and control system provisions shall be in compliance with ABS notation "+AMS NIBS +ACC" and IPMS system shall be as per Class rules. The system supplied shall be complete with all the items and accessories required for normal functioning and as per the technical specification mentioned under PART II. The system should be PLC based with provision for upgradation and growth margin by use in future. The system to be provided with three different login levels i.e watch keeper, Technical officer and Admin with different credentials in the software.
43.2.1	The material used in the construction of the propulsion control safety and alarm/monitoring system should ensure continued satisfactory operation under conditions of moisture & vibration encountered onboard ship and of the highest marine quality which shall be suitable for the equipment application and service. Suitable ventilation to be provided for console & RTUs.
43.3	IPMS to be unit certified by the ABS & IRS both classes. QAP & FATs document will be approved by class (ABS & IRS both). Binding drawing of IPMS, all sub systems including critical components & IPMS architecture are to be approved by the class. FATs will be witnessed by reps of class, shipyard & ICG. The IPMS supplier to arrange all document approval, FATs & inspection formalities at their own & the charges for these activities & unit certification are to be borne by the IPMS supplier.
43.4	The ship is installed with various systems and equipment that are to be interfaced with IPMS. These ship's systems and equipment are supplied by various vendors/OEMs. The vendor/OEM data base for communication will be given by shipyard. The various ship's systems are to be interfaced using Hardwired and/or other standard serial link with industry protocols such as MODBUS RTU, MODBUS TCP/IP, Profibus, NMEA etc. Suitable protocols and Gateways, if required, are to be catered by IPMS vendors for the above interfaces.
43.5	The IPMS vendor is to undertake a systematic interaction programme with these vendors under intimation to MDL for establishing co-ordination and exchange of information, which is required to interface IPMS with these ship's systems/equipment. The exchange of information to be continuously followed up by IPMS supplier for any change in interface data to be incorporated in IPMS in consultation with shipyard. Single point responsibility of proving the IPMS, its equipment supplied and IPMS interfacing with other ship's systems/equipment shall be borne by the IPMS supplier. The IPMS supplier will be responsible for resolving all interface issues with other machineries and equipment suppliers. All P&I Diagrams, Control and Monitoring Function Documents etc. are to be discussed with the respective equipment OEMs and their concurrence obtained. Shipyard will facilitate in case there is no response from other system OEM in providing data/information.
43.6	Critical components, sensors, transmitters, detectors etc. which are part of IPMS & sub-systems are to be type approved by ABS/IRS or any IACS acceptable to both ABS & IRS.
43.7	IPMS supplier to finalize entire power supply scheme through UPS considering reliability &

	redundancy for Units/Sub-system. Input power for all UPS will be fed from two different sections of switchboards as main & back up power supply of 415V, 3 phase, 50hz / 230V 50 Hz single phase. In case of main supply fails it should automatically change over to back up power supply without any interruption. In addition to the above, UPS should cater for minimum 30 minutes operation of IPMS in case of total power failure & during transition from main to back up power supply as per class rule (ABS & IRS). The system should have facility for seamless switch over of power supply in case of interruption of power.
43.8	IP protection of the IPMS cabinets, panels, JBs, sensors, transmitters etc. shall be as per the class requirement.
43.9	PLC based RTUs are to be designed to work in machinery compartment with temperature of 55 degree Celsius. RTUs should be suitable for satisfactory operation in machinery compartment with suitable IP protection. Suitable ventilation as per maker standard to be provided for the each cabinet (RTU). Remote terminal units (RTUs) to provide sufficient capacity and flexibility to achieve an input/output signal count of 3000 out of which 1000 will be physical hardwired I/Os (DI,DO,AI and AO) & 2000 are serial link I/Os (MODBUS RTU, MODBUS TCP-IP, NMEA, CANBUS etc.) complete with electronics & power supply units. Minimum 4 TRUs are to be considered in the scope of supply. No of RTUs are to be proposed by IPMS system OEM as per IPMS configuration, distribution of IOs and meet class requirement. Number of I/O cards in each cabinet shall be finalized during detailed design stage. In addition, suitable signal converters to make it compatible with field sensors, if required for interfacing from different external systems to be included in the scope of supply. Suitable junction boxes as required to be provided if number of incoming cables are more.
43.10	The RTU/interface units must be suitable for receiving the Parameter/Field signals from the ship systems located at different locations through RTU/interface unit for alarm, monitoring and control functions: a) Two main engines b) Two gear boxes (one per shaft line) c) Two CPP systems (one per shaft line) d) Four diesel generator sets e) Steering system f) Fin stabilizer system g) AC & refrigeration system h) For various auxiliaries (Fuel oil pumps Air Compressors, Bilge & Ballast pumps) i) Ventilation fans in machinery spaces (Fwd E/R, Aft E/R, Steering gear,) j) High flow tank level detection of tanks k) Continuous tank level measurement of ready use Fuel oil tanks and - Fuel Oil storage tanks l) alarming and monitoring of fire detection System m) Monitoring of open/close condition of doors and hatches. n) The details of alarm, parameters monitored for propulsion main engines, gear box, CPP hydraulic system, stern gear along with remote start/stop requirements (on Bridge and Machinery Control Room). o) Details of alarm, parameters monitored for fire detection & flood alarm & Bilge system. p) Any other systems meeting the class requirement shall be finalised during interface meetings. The RTU/interface units should have adequate ventilation/cooling fans to meet tropical environment conditions inside machinery compartment.
44	**Functional Requirements:** Integrated Platform Management System (IPMS) consisting of Integrated Machinery Control System, Damage Control System, fire detection system, flood alarm / bilge level monitoring, tank level indication system and on-board team training system in accordance with Class rules (ABS & IRS). The fire monitoring and bilge level monitoring systems to be integrated with the IPMS. IPMS feature should also have interface with APMS & power generation system. IPMS should have suitable interface for Vibration Monitoring for

	main propulsion equipment. All equipment/ systems that are integrated with IPMS should have capability to operate in stand-alone mode. The IPMS provided system should be flexible, scalable and easy to reconfigure. It shall have a two level architecture with a supervisory level and a data acquisition and control level. Dual redundant data- bus for data communication routed for optimum survivability should be provided. A training programme should be integrated with the system for all on-board operators. **The main software of IPMS should be indigenously built.**
44.1	(a) **Purpose.** The purpose of this system is to provide automatic control and monitoring of all the ship's platform machinery and systems, mainly the following to enable unattended operation in machinery spaces during normal sailing and in harbour;- (i) Monitoring of Propulsion machinery (DE, GB, CPP & Shafting). (ii) Monitoring of Bow thruster (iii) Monitoring of Automatic power Generation and Distribution System: Automatic Power Generation and Distribution System will be procured separately as part of Main switchboard supply. Interface to the extent of monitoring the power management functions/ parameters in IPMS to be provided. IPMS will be monitoring the relevant input signals provided from the PMS . Monitoring status of motorised breakers in MSB also to be ensured. (iv) Monitoring & Control of Auxiliary Machinery and system (v) Monitoring of Steering Gear & Fin Stabilisation System (vi) Damage Control & Fire Fighting (Internal and External) System including stability. (vii) On-board Team Training system **(viii)** Tank Content System **(ix)** Navigation Equipment.
44.2	(b) **Design Requirements.** The system shall be digital type based on microprocessor design and provide increased operation capability through the use of Digital Control System Technology. The system should be capable of interfacing and processing about 3000 analogue/digital inputs and outputs from/to (1000 Hardwired & 2000 through serial link communication via MODBUS RTU/MODBUS TCP/IP, NMEA etc.) various equipment/machinery with the help of remote terminal units. The design is to be such as to achieve the following:- (i) To comply the rules for system integration of all computer based systems for Instrumentation and automation as per class requirement (ABS&IRS). (ii) Provide on-board embedded operator training capability. (iii) Provide for growth margin of 25% (I/Os in RTUs) of the system capability in terms of empty slots. (iv) Connect sensors and actuators for critical machinery to more than one remote terminal unit and / or consoles as practicable. (v) Provide proven multifunction and fully redundant consoles which can assume any and all the monitoring and control functions viz. propulsion, auxiliary, damage control and steering. (vi) Provide MTTR of equal to or better than 30 minutes and critical function MTBF of not less than 8000 Hrs. Web page based diagnostic and repair shall be preferred. **(vii)** Provide interchange of cards to other similar units in the ship and perform the function at the new unit without any software changes.
44.3	(c) The system topology shall have a double redundant control network data bus with recovery features in the event of failure of either of the two redundant buses. The IPMS components are to be geographically distributed throughout the ship and in close proximity to the machinery being controlled. All monitoring and control signal are to be communicated over the data bus. A fiber optic Data bus in accordance with ISO 9314 FDDI (Fiber Distributed Data Interface) standard to be provided. 1000 mtrs of fibre optic cables to be supplied by firm. The fibre optic cable must be flame retardant,

	suitable for marine application & meet the ABS&IRS class requirements.
44.4	(d) The system is to be designed to prevent unauthorized modification of the programs and data and operation software of consoles and other vital IPMS components are not to be lost under any circumstances from disk drives.
44.5	(e) The hardware and software must be modular in design to cater maximum maintainability must also cater to component obsolescence The catastrophic failure of the systems is not permitted. In the event of degradation of the system through multiple failures, continuous operation of the vital components must be maintained. The system must be easily expandable, reconfigurable and updateable to meet changing operational requirements, as well as future machinery plant upgrades. Control and monitoring should also be possible in the traditional semi-automatic/manual manner.
44.6	(f) The system is to be of fail-safe type and designed to preclude detrimental mechanical and thermal overload. To preclude damage to the controlled machinery, means are to be fitted to disable the starting mechanism after designated unsuccessful starting. The system is to be also designed to maintain the controlled machinery with in pre-set parameters and to ensure the machinery operation in correct sequences and time intervals.
44.7	(g) Alarms are to be both audible and visual and are to be provided at the control stations. Alarms are to clearly identify the system and service of the faulted machinery or its components. Visual alarms are to be displayed in a distinguishable manner such that alarms for similar machinery or systems are grouped together and the colors representing a particular function or conditions remain uniform. When displayed the alarms are to appear in the sequence as the incoming signals are received. Alarming of incoming fault signals are to automatically appear on the screen, to alert the on duty personnel, regardless of whether computer and display unit are in a mode other than the monitoring mode.
44.8	(h) Safety systems are to be of the fail safe type and are to respond automatically to fault conditions that may endanger the machinery or safety of crew. Unless otherwise required or specially approved the automatic action is to cause the machinery to take the least drastic action first, as approximately by reducing its normal operative output or switching to a stand by machinery and last by stopping it.
44.9	(i) Adequate nos of display consoles to be provided in Bridge, Training Bridge, MCR and DCHQ. Slave display of IPMS shall be provided in EO and LO cabins to monitor the parameters.
44.10	(j) The system architecture should cater for 100% redundancy with dual redundant data bus. Dual redundant data-bus for data communication routed for optimum survivability should be provided. The system shall function on/IP/latest protocol and shall have at least 1 GBPS speed processors. The RTUs and system processors should not be loaded more than 70% during peak loading of the system. Sufficient cooling arrangements for the RTUs and processors of IPMS to be catered in system design.
45	The following features are also to be catered while design of the system: i) Built in test facility for identification, location and indication to the operator of any fault that might have occurred in the system. ii) Built in test messages should be graphically presented on the console screens for rapid identification of faulty areas. iii) Provision to be made to initiate a built in test facility of any other IPMS equipment from any other display/console units by use of proper pass word or other means of authentication.

	iv) Results of built in tests of any of the IPMS equipment is to be available at any of the display units/consoles v) Provision for display of IPMS maintenance and operation manual in the system. vi) Provision of diagnostic and software tools to enable trouble shooting up to component level. vii) System to cater for adequate no. of alarms within the memory which should be accessible/ retrievable at later stage for analysis.
46	**Operating requirement:** The following sub components/functions will generally be included to cater for the various operational requirements. Any other component/ functions as required by the system designer for the satisfactory operation of the system must be provided. a) Remote Terminal Units/Interface units as mentioned above. b) Damage Control System Functionality including stability. c) Fibre Optic for Ethernet network / FDDI Data Transmission Bus. d) Data Logging Printers (02 nos Data logging printers of Laser type to be provided in MCR & DCHQ. The printer and the system should be able to take print out of important running parameters of all major machinery in a specified format. e) Integrated Fire Detection System & flood alarm system. f) Tank Level monitoring system. g) High Bilge Level alarm monitoring system. h) Ethernet cable (Cat 7 or Cat 6)
47	**Consoles & Displays requirements:** Multifunction workstation (MFW) shall be fully redundant and multi- functional capable of performing the functions of other consoles. However, access to the platform functions shall be based on a predetermined protocol (station-in-control). Only one console shall be in control of a particular function at any given time. Transfer of control between consoles shall be implemented based on a predetermined hierarchy and protocol. Operators shall be required to assume station-in-control before any operator action can be initiated. Operator authentication shall be by means of passwords, keys or other means. Further, the provision for local direct control for each of the equipment groups must continue to be available despite provision and remote control and monitoring capability of the equipment on the IPMS consoles. The minimum man machine interfaces shall be provided as per class rule/System requirements. There will 4 nos consoles as below :- a) Wheel House/Bridge– 01 (Console will be supplied by IBS Vendor for mounting IPMS equipment also.) b) Trainee Bridge Console – 1 (Console will be supplied by IBS Vendor for mounting IPMS equipment also) c) MCR Console – 1 (Console with components mounted to be supplied by IPMS Vendor) d) DCHQ Console 1 (Console with components mounted to be supplied by IPMS Vendor)
48	**Multifunction Work Station (MFW):** The MFW should present ships operation on the Multifunction workstations. Alarm, group, channel and graphic pages can be selected via a user friendly operator keyboard or track ball. Graphic pages to be available for each application in order to provide mimic overviews of ships machinery Control commands can be entered via the operator keyboard and track-ball to start the propulsion sets. Each MFW to operate completely stand alone and to be connected to the redundant network.
48.1	The mimic presented on the MFW to contain full color graphical presentations of the ships overview and installations. Mimic presented on operator workstation should be in the form of pages and pages should be arranged based on each main engine. gearbox CPP shafting system, main diesel generator sets, Piping system schematic and other selected auxiliaries

	from the point of simplicity .(The number of mimic pages will be finalised during detailed design.) Mimic pages to be finalised in consultation with ICG. Any additional features as per past experiences sought by CG, same to be provisioned during FAT/prior depart of the equipment. The alarm/interlocks to be finalized during interface meeting with provision to add any signals within the equipment total IO quantity mentioned.
48.2	It should also generally have mimic pages for the Thrusters. Harbour Generator, FiFi system, Steering gear, Stabilizer, DC&FF system and Auxiliary machineries/ Systems such as LO, Fuel oil, Air Compressor, AVCAT, AC plants, Ref plants, Ballasting/de- ballasting, Fire Fighting, Bilge system, stability, Tank gauging, NOVEC system, Fire detection, Flood & bilge alarms etc. In addition, it should have the provision for inclusion of additional mimic pages as applicable. All mimic pages to be customized to suit CG & MDL requirements. Mimic diagram of all the Propulsion related piping systems will be provided in MFWs. Mimic drawing of following Propulsion related piping systems are given below:- (i) F.O service system (ii) L.O service system (iii) F.W. Cooling system (iv) S.W. Cooling system (v) Staring air system (vi) CPP Hydraulic system (vii) Exhaust System
48.3	The size, colour and density of the text and graphic information displayed on the operator work stations are to be such that it may be easily readable from the normal operator position under all operational lighting conditions. The brightness and contrast are to be capable of being adjusted. The text and graphic information on the operator station to be finalised after discussion with ICG.
48.4	Alarms displayed are to appear in the sequence as the incoming signals are received. Alarming of tile incoming fault signals are to appear on the screen regardless of the mode of the operator or SIC.
48.5	Three no of type approved 26-28" TFT MFWs in MCR for the control monitoring of propulsion and associated system. One no of type approved 26-28" TFT MFWs MFW in MSB.
48.6	One no of type approved MFW for control and monitoring of propulsion and machinery auxiliaries to be mounted on Bridge console (in IBS Scope of supply) to be supplied loose along with all necessary hardware.
48.7	One no of type approved 26-28" TFT MFW to be mounted on damage control console in DCHQ for carrying out the functions related to damage control, stability and fire fighting. DCHQ have multifunction workstation (Integrated Platform Management system) for monitoring:- (i) Fire/smoke/bilge alarm and indications. (ii) Control of fire pump, ballast system, sprinklers. (iii) Ship stability including damage control and monitoring. (iv) Open/ Close indications of doors/hatches (v) Tanks plan with soundings (vi) Decks layout. (vii) Digital Draft /trim/list indication. (viii) Galley Hot plate Indication lamp
48.8	One no of type approved 26-28" TFT MFW of platform management control console shall be in Training Bridge having monitoring and surveillance facility only. IPMS supplier need to interface with RCS lever to be fitted in training bridge which will be used for only training purpose. RCS supplier will provide data in serial link to IPMS for representation of RCS

	parameters and same to be depicted on mimic page in Training bridge MFW.
49	**Interface Control Document:** The IPMS supplier shall produce the interface control document(ICD) and validate the same based on the information obtained from various machinery suppliers, the yard and the ICG. The ICD shall be the governing document for all interfaces between platform machinery. systems and the IPMS. The ICD shall be kept under strict configuration control. After the ICD is frozen, it shall not be modified without permission from the PDOECL/CG. At least three interface meetings will be held at CGHQ/MDL along with IPMS supplier, machinery vendors and coast guard staff are present to ensure proper coordination and control and control interface issues. **Test Plan procedures & Report:** The IPMS supplier shall develop computer program test plans, procedures and reports for all IPMS software as indicated in + AMS NIBS +ACC notation of ABS & IRS Class rules.
50	**Network & Redundancy requirement:** Monitoring and Control of stations to be as follows:- i) Machinery Control Room (MCR) - Primary Control Station ii) Wheel house - secondary Control Station iii) Damage Control headquarter for damage Control & fire fighting tasks iv) Monitoring station at Training Bridge The above mentioned three station are to be connected via a redundant local area network with the use of redundant servers and play a key role in distributing management and control functions. The work stations are to be interconnected by network hubs and network switches. The same must be elaborated in the offer. The IPMS System should integrate with the Integrated Bridge System (IBS). IPMS should have a flexibility to provide a data link to third part supplied IBS. Necessary hardware required for the smooth interface to be included in the scope of supply. The system design specification and installation is to be capable of operating under environmental conditions to comply minimum standards as laid down for computerized automation under ABS & IRS class rule.
51	**IPMS interface for remote monitoring of Ships Equipment & Auxiliaries on MFWs:** Following are the tentative list of Equipment Parameters need to be interfaced on MFWs:
51.1	**Diesel Generator Sets:** i) Generators engine start & stop indication. ii) Lube oil low pressure and high temp. alarm and trip for each generator. iii) Jacket Water temperature high alarm and very high trip for each generator. iv) RPM and over speed trip for each generator. v) Alternator winding temperature high-alarm for each generator. **vi)** FW expansion tank low level alarm for all generators. vii) Any other parameters as required by Genset manufacturers. viii) Any other interlocks/alarms as per the class requirement shall be included by the IPMS OEM .
51.2	**Power Management System:** APMS is not in scope of supply of IPMS. APMS will be procured separately. APMS to be interfaced with IPMS through serial link RS 485 or MODBUS TCP/IP for monitoring of motorized breakers or MSB, Electrical parameters such as voltage, current, frequency power to be displayed on MFW. Monitoring of parameters and status will be carried out through all multifunction workstations. It is responsibility of the IPMS supplier to interact with MSB supplier and ensure that the monitoring functions are achieved successfully. All necessary monitoring and alarm functions are required to be carried out by the system to

	meet class/OEM requirement. Monitoring status of the motorized breakers of the main switch board. Providing necessary signals for display of MIMIC diagram on the Multifunction Workstation clearly indicating the status of the Main Switchboard and Generator parameter.
51.3	**Propulsion System Equipment:** Remote control System (RCS) for propulsion control (Main Engines, Gear Box & CPP) will be supplied by Propulsion package supplier. RCS system is to be interfaced with IPMS and RCS mimic pages are to be displayed in IPMS for monitoring. The Tentative (preliminary) Clutching interlocks, remote start interlocks of propulsion system equipment are listed below. These Clutching interlocks, remote start interlocks will be provided by RCS OEM and same are to be interfaced and displayed on IPMS mimic pages. The list will be finalized during interface meeting at the time of detail engineering. Any additional signal required by the ICG, RCS OEM and as required by Class are to be included in IPMS scope. Clutching signals will be provided by RCS OEM, Clutching is interlocked if: (i) Pitch is not in zero position (ii) Propeller oil pressure is low (iii) Engine speed is not in the range of clutching speed. (iv) Jacket water temperature is low (v) G.B turning motor is engaged. The unlocks may be overridden by "safeties off " push button. (vi) G.B lube oil pressure low. (vii) Control is not in MCR (viii) There is a stop order (normal or safety) (ix) There is a declutching order. Remote starting interlocks: (i) Control of engine is not in MCR (ii) Turning gear is disengaged (engine & RG) (iii) Main engine lube oil priming pressure is insufficient (iv) The clutch is disengaged (v) The speed setting is too high (vi) The safety stop is not reset. (vii) There is a failure on speed sensing (included in safety stop not reset) (viii) The speed on engine is above xx rpm. (The exact rpm will be indicated during detailed interface meetings) (ix) The interlocks may be overridden by "safeties off "push button except safety stop not reset & engine speed above xx rpm.
51.4	**Main Engine:** The main engine parameters are required to be monitored in real time through MODBUS RTU and physical RS485 / MODBUS TCP IP interface as per class requirement. IPMS supplier shall prepare entire mimic pages which includes all parameters including auxiliaries. Necessary audio visual alarms & trip indications are required to be provided as per class & OEM recommendation. The Tentative (preliminary) alarms, trips & interlocks of Main Engine are listed below. These alarms, trips & interlocks will be provided by Main engine OEM and same are to be interfaced and displayed on IPMS mimic pages. The list will be finalized during interface meeting at the time of detail engineering. Any additional signal required by the ICG, main engine OEM and as required by Class are to be included in IPMS scope. Tentative alarms, Tips & interlocks of main Engine: (i) LO priming flow low (start interlock) – Alarm

(ii) LO pressure at engine inlet, low – Alarm
(iii) LO temperature at engine outlet - Alarm
(iv) Very high LO temperature at engine outlet- Trip
(v) Low LO level pressure low- Trip
(vi) Low LO level in engine sump – Alarm
(vii) High FW temperature – Alarm
(viii) Very high F.W. temperature – Power reduction/trip
(ix) Low level in F.W. expansion tank – Alarm
(x) Low F.W. pressure – Alarm
(xi) Low FO pressure – Alarm
(xii) Main Engine Over speed – Trip
(xiii) Charge air temperature at cooler inlet and outlet
(xiv) Main engine exhaust gas temperature for all cylinders
(xv) Main engine fuel rack position
(xvi) Main engine tachometer
(xvii) Main engine running hour meter
(xviii) Main engine bearing temperature very high – Trip
(xix) Turning gear engaged and disengaged
(xx) Main engine priming pump running
(xxi) LO priming pump pressure
(xxii) Turbo charger tacho meter
(xxiii) Main engine start and stop
(xxiv) Emergency stop (with protective cover)
(xxv) Speed control
(xxvi) Fuel rack indication/Fuel injection %
(xxvii) Engine speed
(xxviii) Lub oil filter clogging
(xxix) Main engine priming pump start/stop

<u>Shut down signals will be provided by ME OEM, Main Engine should shut down when:</u>

(ix) Emergency stop (push-button)
(x) Over speed
(xi) Watch dog or major fault (Digital governor)
(xii) ME very low lubricating oil pressure
(xiii) ME very high bearing temperature
(xiv) ME very low level in fresh water tank.
(xv) ME very high fresh water temperature
(xvi) ME very high lubricating oil temperature
(xvii) Reduction gear safety stop

51.5 **<u>Gear Box</u>:**

The Gear Box parameters are required to be monitored in real time through MODBUS RTU and physical RS485 / MODBUS TCP IP interface as per class requirement. IPMS supplier shall prepare entire mimic pages which includes all parameters including auxiliaries. Necessary audio visual alarms & trip indications are required to be provided as per class &

OEM recommendation. The Tentative (preliminary) alarms, trips & interlocks of Gear Box are listed below. These alarms, trips & interlocks will be provided by Gear Box OEM and same are to be interfaced and displayed on IPMS mimic pages. The list will be finalized during interface meeting at the time of detail engineering. Any additional signal required by the ICG, Gear Box OEM and as required by Class are to be included in IPMS scope.

Tentative alarms, Tips & interlocks of Gear Box:

(i) Gear box lube oil pressure after filter low – Alarm
(ii) Gear box lube oil temperature at gear inlet, high – Alarm
(iii) Clutch oil pressure low –Alarm
(iv) Gear box bearing temperature high – Alarm
(v) Gear box lube oil standby pump running indication
(vi) Gear box lube oil filter differential pressure high – Alarm
(vii) Turning gear engaged and disengaged.
(viii) Locking gear engaged
(ix) Clutch disengaged
(x) Gear box LO standby pump & SW standby pump start/stop
(xi) Gear box S.W. standby pump running indication
(xii) Gear box very low lube oil pressure trip.

Remote start/stop, running, fault & local/remote indications of following equipment to be provided from MFWs screen by the firm.

(i) G.B Lub oil priming pump: 2 Nos
(ii) G.B Standby SW pump: 2 Nos

51.6 **CPP & Shafting:**

The CPP & Shafting parameters are required to be monitored in real time through MODBUS RTU and physical RS485 / MODBUS TCP IP interface as per class requirement. IPMS supplier shall prepare entire mimic pages which includes all parameters including auxiliaries. Necessary audio visual alarms & trip indications are required to be provided as per class & OEM recommendation.

a) Torsion meter parameters are to be indicated in mimic page. Following parameters are to be indicated.
Shaft RPM
Thust
Power

Tentative alarms, Tips & interlocks of CPP:

(i) Discharge line pressure & OD box pressure (actuating unit) low- Alarm
(ii) CPP OD box (actuating unit temp) high - Alarm
(iii) CPP hydraulic oil tank level low – Alarm
(iv) CPP hydraulic main oil filter clogging indication.
(v) Propeller shaft RPM (Analogue display shall be also provided)
(vi) Electric motor driven CPP pump running indication
(vii) Zero pitch on propeller
(viii) Oil pump pressure indication (separately for driven pump & electric driven)
(ix) Propeller pitch indicator
(x) Shaft bearing temperature (Inboard Plummer bearing)
(xi) Provision of monitoring stern tube cooling sea water flow/Pressure

	(xii) Stern tube cooling water temperature monitoring (xiii) Stern tube cooling water high temperature
51.7	**AC Plant, Refrigeration & Ventilation:** Following signals are to be monitored in IPMS as per OEM recommendation. All system parameter monitoring, Audio/visual alarm indications and incorporation of protection devices are to be provided. As per OEM recommendation potential free contacts will be provided for the following indications and alarm (PT-100 or 4-20mA signal will be provided for all measured parameters):- AC Plant: i) Sea water pump 1,2 & 3 running ii) Chilled water pump 1,2 & 3 running iii) AC compressor -1 running indication iv) AC compressor -2 running indication v) AC compressor -3 running indication vi) AC compressor-1, 2 & 3 refrigerant pressure high alarm vii) AC compressor-1,2 & 3 refrigerant pressure low alarm **Refrigeration Plant:** viii) Refrigeration sea water pump 1& 2 running ix) Refrigeration plant 1 & 2 high pressure alarm x) Temperature monitoring indication panel for cool and cold rooms xi) Temperature (PT-100 or 4-20 mA will be provided) reading of cold room will be supplied by Ref plant, same will be interfaced with IPMS. xii) Cold room entrance door status, xiii) Cool room entrance door status. **Ventilation:** xiv) Remote operation and monitoring of ATU's/Fans, as per OEM recommendation. xv) Control & Monitoring of ventilation fans in machinery spaces (Fwd E/R, Aft E/R, Auxiliary E/R, Steering gear). xvi) Man locked in cold room alarm.
51.8	**Hydrophore Pump-2** nos: Running, Falt & local/remote indication of FW Hydrophone pump No. 1& 2. Any other interlocks/alarms as per the class requirement shall be include in IPMS.
51.9	**Fuel oil purifiers 02 Nos:** Fuel oil purifier running, fault & local/remote indication. Following alarm for interface with IPMS system as per OEM recommendation:- i) FO Low pressure at separator outlet ii) FO High pressure at separator outlet iii) Sludge tank level High iv) No oil flow v) Indications for Emergency stop and Feed pump tripping In case of oil flow to be repeated to IPMS System. **vi)** Any other interlocks/alarms meeting the class requirement shall be finalised during interface meetings. **vii)** Auto cut-off of FO purifier to prevent overflow of the tanks.
51.10	Following pumps are to be provided with remote Star/stop, Running, local/remote & fault indication: i) Fire pumps (02 nos) ii) Ballast pumps (02 nos)

	iii) Bilge pumps (02 nos) iv) Gear Box standby SW cooling pump (02 nos) v) Gear Box standby LO pump (02 nos) vi) CPP hydraulic pumps 2 Nos vii) Ventilation fans (Machinery fans): Quantity will be indicated during detail design. viii) Any other pumps meeting the class requirement shall be included in IPMS. ix) FOT pump and AVCAT pumps
51.11	**External fire Fighting System:** The IPMS system should be able to be monitor External FIFI system and Water mist/ sprinkling system, pumps valves and common alarm to be monitored from IPMS as applicable. Running indication, potential free contacts shall be provided. Status of remotely operated valves if any to be shown on the MIMIC page. Any other interlocks/alarms as per the class requirement shall be finalised included in IPMS. **Fire main system:** Pressure sensors for working pressure range 0-10 bar for measuring the fireman pressure (2nos) are to be included in IPMS scope of supply & same shall be interfaced with IPMS.
51.12	**Sewage treatment plant & Vacuum Toilet system:** i) STP Running indication (02 nos.) ii) Vacuum toilet Plant Running indication (02 no.) iii) STP/Vacuum Plant failure alarm & indication. iv) Potential free contacts shall be provided for above functions. **v)** Any other system parameter monitoring as per OEM recommendation/class shall be finalised during interface meetings. **vi)** H_2S gas detection warning and alarm
51.13	**RO Plant (4 Nos.):** Status monitoring of all system equipment and system parameter indications as per OEM recommendation on MFW shall be provided. Any other interlocks/alarms meeting the class requirement shall be finalised during interface meetings.
51.14	**Air Compressors (02 Nos.)** i) Status indication (On/Off) ii) Alarm indications and protection device incorporation as per OEM recommendations iii) System Air pressure monitoring iv) Air bottles pressure monitoring (02nos) v) Any other interlocks/alarms meeting the class requirement shall be finalised during interface meetings.
51.15	**Steering Gear:** i) System parameter monitoring and alarm indications. ii) Running indications for steering gear Hydraulic pumps PORT and STBD to be provided.

	iii) Rudder angle indication Analogue type on MFWs iv) Steering gear hydraulic oil tank level low - Alarm v) Steering gear hydraulic oil temperature high - Alarm vi) Any other interlocks/alarms meeting the class requirement shall be finalised during interface meetings.
51.16	**Bow Thruster (01 No.)** i) Running indication of Bow Thruster ii) Parameters of bow thruster **iii)** Any other parameter as recommended by OEM/class shall be finalised during interface meetings.
51.17	**Fin Stabilizers:** The fin angle display page for fin stabilizer with mimic page indicating the following as per OEM recommendation: - i) Fin stabilizer motor (PORT & STBD) running indications. ii) Hydraulic Oil pressure low alarm iii) Hydraulic oil level Low alarm iv) Control failure alarm v) Rolling Period. vi) Rolling Angle. vii) Draft viii) Trend. ix) Starting & stopping will be possible remotely from bridge. x) Any other interlocks/alarms meeting the class requirement shall be finalised during interface meetings.
51.18	**Eco friendly gas based fire fighting system(NOVEC or equivalent):** i) Pressure low Alarm for all Bottles as per design ii) N2 cylinder Pressure low Alarm for all N2 cylinder Bottles iii) Release indication in respective compartments. **iv)** Any other interlocks/alarms meeting the class requirement shall be finalised during interface meetings.
51.19	**VDR:** IPMS is to be interfaced with VDR for recording data. Necessary feed/ Signal to be provided to the VDR. The details of signals and the format in which the signals are to be provided to VDR will be intimated during TNC/ Interface meetings. Following feed/signal to be provided for VDR interface:- a) Engine order & Response through Maneuvering system, Alarm system. b) Watertight Door & Fire Door status through indication system. c) Bow thruster d) Steering gear, Fire detection system, APMS and Flood detection e) Any other alarms meeting the class requirement shall be finalised during interface meetings.
51.20	**IBS:** IBS is to be interfaced with IPMS for data exchange and development of mimic pages. following Data received from IBS to be displayed on the IPMS: a) Wind Speed b) Heading & position c) Ship speed d) Depth e) Any other alarms meeting the class requirement shall be finalised during interface meetings.

	f) Propulsion & DA overview mimic pages (02 Nos) are to be provided by IPMS for monitoring in Ops rooms IBS panel. Necessary interface protocol is to be provided by IPMS.
51.21	**Conning position:** One in No display is to be provided in emergency conning position for viewing machinery parameters. The following Data will be made available by the respective equipment suppliers to IPMS for relay to conning station:- g) Rudder Angle h) Propeller Speed i) Propeller pitch j) Thrust {Ahead/Astern) k) Bow Thruster Percentage Thrust with Direction and all other parameters to meet class notation requirement. l) Any other alarms meeting the class requirement shall be finalised during interface meetings.
51.22	**Shafting System:** Integration of shafting system with IPMS for monitoring of important parameters like, cooling water rate for shaft seal from flow meter, inboard shaft bearing temperature etc.
52	**Technical details for sub systems of IPMS:**
52.1	**General Alarm System:** A general alarm system shall be provided having push on the bridge console and bells in all important spaces as per Class rules. This system shall work on 24V. DC. General alarm system meeting ABS & IRS class requirements to be supplied. Electronic general alarm control unit, for releasing of automatic emergency signals to the crew by push switches for "General Alarm" and "Fire Alarm". Manual selectable signal by red push button for acoustical signal operation. General alarm control unit combined for fire and general alarm with push button/reset push button for fire and push button for general alarm shall be provided. General alarm signal unit should have two different tones for fire and general alarm and the quality and location of these general alarms units should be as per ABS& IRS rule.
52.2	**Extension Alarm System:** i) Watch responsibility indication on duty engineer select and indication, engineer call function, sounds off acknowledge function test. ii) One will be provided for installation in EO cabin. iii) 02 numbers Watch cabin with display unit consisting of LCD display with touch screen with on duty engineer indication, engineer call indication, sound off push button and buzzer. Function and Lamp test pushbuttons. **iv)** When alarm are not acknowledge at the operation workstations in a presets period of time (2 minutes) the system ids to activate the Extension alarm.
52.4	**Addressable Fire Detection System:** A Fire Detection System as per class (ABS & IRS) shall be provided and integrated to Integrated Platform Management System (IPMS). The list of sensors for compartments to be finalized in consultation with CGHQ. Same to be shared for CGHQ approval prior approval of class. ICG has the provision to include additional sensors based on past experience and service requirement.
52.5	Fire & Smoke Detection System components (like detectors, manual call points, isolators, flashers & hooters, panels etc.) must be suitable for marine environment and type approved from any IACS society.
52.6	Fire / Flood-detection/H2S/ NOVEC gas warning system with audio visual alarms and automatic system generated voice announcement with location of the compartment shall be integrated with main broadcast/general alarm and IPMS.

52.7	Necessary provision is to be provided on the fire detection system for interface with Fixed fire fighting system and trip of ventilation fans in machinery spaces and trip of fuel oil transfer pumps. The requirement/ no. of trips zone wise will be indicated during detailed engineering. Necessary relay outputs with terminals for cable connection should be provided for the following: a) Ventilation fans (trip). b) Fuel oil transfer pumps (trip). c) Initiation of alarm signal on MB/SRE d) Fire fighting system (Novec) e) Heat detector for galley f) Spare - 2 nos
52.8	Indicative list and quantity of sensors given below. However complete system with type of sensor are to be supplied as per class rule requirements (ABS & IRS).
52.9	The Fire & Smoke Detection System also shall be interfaced with IPMS through Serial communication (Modbus RTU/Modbus TCP IP). Monitoring, address of each detector, alarms and mimic page is to be made available on operating workstations.
52.10	The fire detection sensors interconnection (loop) cable of 3000 Mtr is included in the scope of supply of the IPMS firm.
52.11	Fire hazard compartment (like paint store, battery room etc.) are required to be installed with suitable intrinsically safe type fire detection sensors/detectors.
52.12	**Flood & bilge alarm system:** Flood detection system shall be provided as per ABS & IRS class and integrated with the IPMS. In addition, Helo hangar, Magazine compartments used for storing explosive ordinance or stores flammable material will have Flood Alarm sensor. Flood sensor should be provided for cofferdam & Void spaces.
52.13	A suitable flood detection system shall be provided with indication in MCR and Wheel House for main Machinery Rooms & other compartments below water line level and shall form part of IPMS. The system should also have a standalone alarm panel located in MCR, Quarter master post and wheel house which shall work on 24V DC. The alarm system to be integrated with broadcast system of the ship.
52.14	Flood detection system with audio visual alarms and automatic system generated voice announcement with location of the compartment shall be integrated with main broadcast/general alarm and IPMS.
52.15	Flood & bilge alarm system components (like Sensors, Junction boxes, flashers & hooters, panels etc.) must be suitable for marine environment and type approved from any IACS society.
52.16	Indicative list and quantity of sensors given below. However complete system with type of sensor Junction boxes and other accessories are to be supplied as per class rule requirements (ABS & IRS). Sensors being located in Bilge area, should be suitable for satisfactory operation in submerged condition with suitable IP protection. Flood sensors with 05 meter tail cable having two level of alarm (high & very high) - 30 Nos. Junction boxes/connection boxes- 30 Nos for dual sensors or 60 Nos. for single-single sensors. Bilge alarm sensors 05 meter tail cables - 24 Nos with 24 Junction boxes.
52.17	Fire hazard compartment are required to be installed with suitable intrinsically safe type flood sensors.
52.18	**Door & Hatch Sensors:** Appx. 80 Nos. of type approved Doors and Hatches limit switch / proximity switches along with JB/CB are to be supplied and connected in IPMS for monitoring. Sensors should be suitable for satisfactory operation with suitable IP protection as per the class (ABS & IRS). Mimic drawing indicating doors and hatches open/close position to be provided. Open/close indication of watertight doors & Hatches to be part of IPMS.
52.19	**Inclinometer**: Inclinometers are to be provided for monitoring list & trim in IPMS and should be capable of operation in the following conditions:- (a) Roll: +/- 22.5 deg. period of roll 10 sec. (b) Pitch: 7.5 deg. fore and aft of centre line. Period 6 seconds.

	(c) List: 15 deg. from vertical (permanent) either side. (d) Trim: 5 deg. The accuracy of inclinometer shall be +/- 0.1 degrees.
52.20	**Engine Order Telegraph:** Two sets of Engine Order Telegraph (EOT) for two nos. of shafts between Wheel house, MCR and of local Control Position with audio visual indication.
52.21	**Tank Level Indication System:** TLI system is to be provided as per class (ABS & IRS both).
52.22	The electronic type liquid level indicating systems shall be provided to all Fluid tanks and Ballast Tanks. In addition tank content gauges shall be provided for all fuel, lube oil, fresh water and AVCAT tanks. The liquid level indicator shall be co-related with the applicable tank capacity Curve. Scales shall be of digital type to provide readings, suitable for the application. These tank content gauges shall indicate the containments in the tanks in Kilo Litres and also give 'LOW' and 'HIGH LEVEL' alarms for Fluid Tanks, in machinery control room. Tank content readings shall be a part of integrated Platform Management system. All fluid tanks shall be integrated with the IPMS.
52.23	All Tanks are to be fitted with independent level sensors. Firm to supply sensors & forward installation drawing of tank content level measurement sensor indicating all mechanical provisions required like flanges, packing etc. All these mechanical provisions should be included in firm's scope of supply. The sensors must be complete with cable gland, tail cable of 5 meters and junction boxes. Sensors being located in Bilge area, should be suitable for satisfactory operation in submerged condition with suitable IP protection.
52.24	Tank contents system shall be provided by connecting tank measurement sensors to the RTU's/interface modules. Processing for monitoring and alarm is also to be undertaken by IPMS. TLI sensors will be removable type without emptying of tanks. For fuel oil, Lub oil and Hazardous tanks, suitable intrinsically safe type sensors/transmitters are to be supplied. The Tank level sensors for AVCAT tanks to be explosion proof.
52.25	Detailed drawings of mounting arrangements showing removal procedure for tank top /side entry type will be required to supplied within 2 weekss for installation point of view.
52.26	Sensors & other accessories for TLI system should be type approved from classification society. Necessary Type Approval Certificate from the classification society is required to be provided by the supplier. Indicative list and quantity of sensors indicated at **Appendix-**.10 However complete system with type of sensor Junction boxes and other accessories are to be supplied as per class rule requirements (ABS & IRS).
53	**Main Control Room (MCR) instrumentation:** One control room console to be included in scope of supply. The preliminary Guidance drawing of the console with limiting dimensions along with the machinery Control Room layout is to be provided. Firm should design the console accordingly and forward detailed proposal along with dimensional drawing of the machinery control console. The maintenance space requirements and distance required for cable entry at the bottom to be indicated in the drawing. The proposed console drawing to be submitted along with the technical offer. MCP to be manufactured from sea water resistant Aluminium/Marine grade steel plate. IP protection will be as per ABS and IRS class rule requirements. The console to be mounted on anti-vibration mounts. The MCR to be manufactured assembled and tested as per ABS and IRS rules. The MCR to be aesthetically and functionally of international quality. Following components should be mounted on the MCR console supplied by IPMS supplier. Necessary cut outs cable termination provision to be catered in the scope of supply. Additional items finalized during detailed design for MCR consoles are to be included. The hard-wired control as part of MCR console for auxiliary machinery should be in accordance with Class requirement. If MCR console size found inadequate, then same may be considered for bulk mounted arrangement. Monitoring and Control System. Console designed to accommodate the delivery systems as described below. a) 3x independent working MFW with 26-28' TFT. (IPMS Scope of supply)

b) 3x Flush mounted membrane keyboard with integrated trackball, protection class IP 56. (IPMS Scope of supply)
c) 1x Alarm /Journal Printer (IPMS Scope of supply)
d) 2x Analogue indicator for Engine Speed (Propulsion package scope of supply)
e) 2x Analogue indicator for Shaft Speed (Propulsion package scope of supply)
f) 2x Propeller pitch indicator (Propulsion package scope of supply)
g) 2x Combinatory lever for Engine speed and propeller pitch control. (Propulsion package scope of supply)
h) 2x Drop in plate, 1 each for PORT and STBD. Dropping plate for propulsion control which includes engine, CPP & Gear box controls.
   (i) 2x push button for emergency Engine RPM control
   (ii) 2x push button for emergency pitch control
   (iii) 1x push button for main engine Clutch and Declutch
   (iv) 1x push button for Fi-Fi PTO Clutch and declutch
   (v) 1x ready for operation indication lamp
   (vi) 2x propulsion diesel Engine Star/Stop/Emergency
   (vii) Stop Push-buttons (Emergency stop "Hardwired")
i) Engine Telegraph System, 2x Engine telegraph system, (2x panels in bridge, 2x MCR and one in each engine room for communication). (IPMS Scope of supply).
j) Deliverables by other equipment OEM to be installed on MCR console. Details will be given during detailed engineering
   i) MB/SRE equipment: 1no
   ii) Auto Telephone : 1no
   iii) Intercom system : 1no
   iv) Drop in plate for External Fire fighting pump : 1no
   v) Digital heading Gyro repeater: 1no
   vi) Rudder angle indicator: 2 no
   vii) Any other items as required by Owner during detailed engineering.
k) Any other item for monitoring and control system as required by class to be supplied for mounting on MCR console.
l) One independent working Flush mounted MFW for control and monitoring of propulsion machinery and auxiliaries to be mounted on IBS console (Not in scope supply of IPMS) to be supplied loose along with all necessary hardware (membrane keyboard with integrated trackball etc.).
m) 2x Engine telegraph system.
n) Emergency stop push buttons with protective cover to be provided for the following:
   FO Transfer pumps 02 Nos.
   Lo Transfer Pumps 02 Nos.
   Incinerator 01 No.
   Bilge Pumps 02 Nos.
   Ballast Pumps 02 Nos.
   DA 04 Nos.
   Fire pumps 02 Nos.
   Harbour DA 01 Nos.
   Ventilation Fans 04 Nos.
o) Any other E stops as required by class to be supplied for mounting on MCR console.
p) Any additional requirement by class to meet the notation to be provided without any additional cost.

54 **Damage Control HQ.**

Damage control HQ Aluminium/marine grade steel console to be manufactured from sea water resistant Aluminium/marine grade steel plate The console should be within limiting dimensions

	of approximately (LxWxH) 1500 mm x 900 mm x 1200 mm. Firm should forward detailed dimensional drawing of machinery control console including maintenance space requirements and distance required for cable entry at the bottom/top. IP protection to be as per ABS and IRS class requirements. The console to be aesthetically and functionally of international quality and should be fitted with the following: a) One independent 26-28" TFT MFW for Damage control & Ship Stability management. b) One flush mounted membrane keyboard with integrated trackball, protection class IP 56. c) MB/SRE equipment: 1 no (MBSRE Scope) d) Auto telephone: 1no (Auto telephone Scope) e) Intercom system: 1no (Intercom Scope) f) Ventilation fans crash stop buttons 04 Nos. (IPMS Scope) g) 2 nos. start/stop push buttons/soft start to be provided for fire pump as per class requirement. (IPMS Scope) h) LO & FO transfer & purifiers E Stops 08 Nos. i) Bilge & Ballast Pump E stop 02 Nos. j) Any other item as required as per class rule are to be included in the scope of supply.
54.1	**Damage Control system Module:** Damage control system module shall be a full stability package that allows the operator to see the impact of the damages and ship conditions on the stability of the vessel. Control and monitoring are to be provided in MFW for the following: i) Fire pumps ii) Bilge and Ballast and sprinkler pumps. iii) Major Fire Fighting system and sprinkling system. a) Surveillance of designated compartment for detection of fire/smoke with suitable sensors to activate fire alarms with audio/visual in the affected compartments, DCHQ/MCR/wheel house, EO/LO's cabins general alley ways. Information on suspected place of fire to be available in bridge/DCHQ. b) Display picture in plan and profile on the console to indicate exact location (name of compartment). c) Isometric view of deck layout. d) Heat rise detection, smoke detection, U/V and I/R heat detectors incorporation. e) Remote operation of the ventilation fans in the event of fire with display of ventilation fans switched off. f) Location of de-flooding arrangement (fixed and portable) of respective compartment to be included in the digital kill card of respective compartment. g) Digital kill card to be part of Damage control system. In the event of activations of fire alarms in any compartment, the damage control system should prompt from sequence of actions to be taken with digital kill card of the compartment.
55	**Connections boxes/Sockets for IPMS displays in LO & EO Cabines:** Provision for plugging of displays at LO & EO cabins shall be provided for monitoring of all parameters on the displays provided by IPMS OEM. Firm to provide necessary software for viewing the data at aforesaid locations.
56	**Light Calling Column Devices:** Audio and Visual Fire Alarm Signalling Units to provide as per class requirement. One Light Calling Column master Unit 24V DC, complete with signal in/output control circuit with terminal lists, installed on one mounting plate. The unit for 24 V DC power supply is provided with 7 triangle symbol for the following:-

	a) General Alarm {Fire/Lifeboat Alarm) b) Fire Engine Room c) Eco friendly gas based FF System Alarm (NOVEC) d) Engine-Alarm e) Telephone f) Engine Telegraph g) H_2S gas alarm h) 2 Rotating beacon (Red + Yellow) i) 1Electronic multitone sounder j) 1Siren
57	**Engine Room Light Calling Column Devices:** Two Light Calling Column Sub-Unit 24V DC with cabinet provided with 6 triangle symbol lamps for the following:- a) General Alarm {Fire/Lifeboat Alarm) b) Fire Engine Room c) Eco friendly gas based FF System Alarm d) Engine-Alarm e) Telephone f) Engine Telegraph g) H_2S gas alarm h) 2 Rotating beacon (Red + Yellow) i) 1Electronic multitone sounder j) 1Siren
58	**Artificial Intelligence**. The vessel is equipped with artificial Intelligence for predictive maintenance of major equipment (not in the IPMS scope of supply). IPMS should have facility to interface & provide data to AI OEM. AI OEM will develop software for separated AI capable predictive maintenance system equipped with self-learning algorithm for analysis of major machinery viz. Main Engine, DAs, GBs, Shafting, HP Compressor, Fire & GS Pump, Bilge & GS pumps and AC & Ref System parameters as inputs from IPMS to perform functions. Necessary arrangement for the interface with AI System to be included in the scope of supply.
59	**Scope of On Board Stability System:** Stability Software shall be provided through a standalone system at DCHQ. The software shall be able to perform multiple iterations for various de-flooding scenarios. All the hardware (like PC, Key board, mouse, track ball, display etc.) required for standalone system is to be included in scope of supply of IPMS. The scope of work for development of on board stability software (OBSS) is placed on **Annexure-11**
60	**Connectorisation**
60.1	Termination of cable to all the equipment in the scope of supply of IPMS vendor (including AFDS, Flood/bilge system and other systems mentioned in scope of supply) shall be carried out by IPMS vendor. Required assistance will be provided by the yard. Further, Suppliers are to offer no of mandays with visits expected for the proposed system including connectorisation/termination.
60.2	The scope of work is limited to carryout connection of cable at all IPMS supplied equipment. The other end of the cables which is to be connected to ship's equipment/system will be done by MDL.
60.3	IPMS vendor is to note that all equipment of IPMS including system cables will be installed by MDL on-board the ship and after that IPMS vendor is to commence cable connection work as per decided project schedule and upon receipt of intimation of MDL.
60.4	IPMS vendor is to note that various drawing and document details are required to be generated based on which the cable connection work will be undertaken. These details are to be generated by IPMS vendor at various stages of system Design and Development. As a

	minimum information, following drawings/documents which will support cable connection work are enlisted in their chronology of development: (a) Input-Output signal list (IO List) (b) IPMS Block Diagram / configuration Diagram (c) IPMS cable Diagram (d) IPMS cable form list (e) IPMS cable connection schedule / check-wire schedule
60.5	**Inter-Connection Document (ICD) and Input-Output Signal list**. IPMS vendor is to initiate development of Interconnecting Document and Input-Output signal list based on the system Input / Output signals. Firm is to indicate tentative format for development of IO list in their technical bid for scrutiny and deliberation during TNC.
60.6	**Selection of cables**: The selection of types of interconnecting multicore cables will be based on type and number of signals it will be carrying and same will be finalised jointly by MDL and IPMS vendor. All necessary feedback of signal characteristics (Analogue/Digital), cable length restrictions, precautions, etc are to be given by IPMS vendor while selecting the cable.
60.7	**IPMS block diagram**: This diagram will re-present the overall system configuration in terms of blocks. Separate block diagrams for each of the system networks mainly Main System, Fire detection system, flood alarm system, etc are to be generated indicating hierarchy of system equipment in the network. The IPMS vendor is to develop these diagrams in AUTO CAD.
60.8	**IPMS cable diagram**: This detailed system configuration diagram will give clear information of interconnection of various system equipment with each other as well as interfacing with ship's equipment / systems. The details of cable interconnecting the same in terms of its number, pattern type, etc are to be mentioned clearly. As far as possible, a separate drawing sheet(s) is to be maintained for each of the IPMS equipment indicating elaborative details of cables connecting to equipment, location details, references of other drawings sheets, details of ships equipment/system to which equipment is interconnected, etc. The IPMS vendor is to develop these diagrams in AUTO CAD.
60.9	**IPMS Cable Form List**: Based on the selected cable type, IPMS vendor is to develop a cable form list in MS EXCEL as per the format placed as **Appendix-4**:
60.10	**IPMS Cable Connection Schedule**: The cable core connection schedule is to be developed by IPMS vendor in consultation with MDL. This document will be controlled jointly by IPMS vendor and MDL. IPMS vendor is to interact with suppliers of various ships equipment/system directly under intimation of MDL for obtaining required electrical drawing details for developing complete cable connection details. All necessary coordination will be extended by shipyard in this regard. IPMS vendor is to develop connection schedule in MS EXCEL as per the format placed as **Appendix-9**.
60.11	**Responsibility Matrix for cable connection work By IPMS Vendor Development of all required drawings/documents:** (a) The cables are to be secured inside IPMS equipment through the cable glands. The supply of cable glands are to be included in scope of the IPMS vendor (b) Splicing & slicing the cable and Identification of cable core numbers (c) To carry out megger test of the cable cores in coordination with MDL before terminating the cable core. (d) Undertaking and completion of all interconnecting cable core with core identification number at IPMS equipment as per cable connection schedule developed by IPMS vendor. Supply & connection of cable lugs, number ferrules and other necessary material for cable connection work are in the scope of IPMS vendor.
60.12	**Check-Wire Schedule:** After the completion of cable connectorisation work by IPMS vendor, a joint activity by MDL and IPMS vendor will be undertaken for ensuring correctness and continuity of cable connections at both the IPMS and ship's equipment ends and required insulation level of the cable. This will be done as per Check-Wire schedule drawing developed by IPMS vendor. Once, the check wire schedule is successfully done IPMS vendor is to undertake powering 'ON' of IPMS equipment and progress STW activities of system as per approved documentation.
61	**Scope of Supply per Ship:**
61.1	07 Nos. of Multi-Functional Displays with Type approved 26"-28" LCD/LED displays, Flush

	mounted membrane keyboard with integrated trackball & installation material (One MFW for bridge, 03 MFW for MCR, one MFW for DCHQ, one MFW for Training bridge & One MFW for MSB.)
61.2	Two 26"-28" LCD/LED displays for EO & LO cabins for monitoring of machinery parameters.
61.3	One display for emergency conning position.
61.4	One MFW with 26"-28" LCD/LED displays, keyboard integrated trackball/mouse for OBSS.
61.5	Two Nos. Data Logging printers (One for MCR & One for DCHQ).
61.6	Interface cabinets / Remote terminal units (RTUs) complete with power supplies including network switches, gateway computers etc. with installation material. Firm to supply RTUs considering No. of I/Os mentioned above and 25% growth margin in terms of empty slots.
61.7	Uninterruptible power supplies (UPSs) with auto change over switch & adequate back up as per class requirement including installation material. (Approximate Kw rating to be defined by the vendor). Batteries for all UPSs are to be supplied loose three month before start of setting to work, Firm date will be intimated in advance by shipyard. All the indications on UPS shall be provided as per class rules. UPS to be provided for minimum 30 minutes operation of the system.
61.8	1000 meters of Fibre Optic data bus cables (with requisite termination connectors) in accordance with ISO 9314 FDDI (Fiber Distributed Data Interface) standard for redundant network connections of IPMS.
61.9	1500 Mtrs of Ethernet cable (Cat 6 or Cat7) with requisite end connectors.
61.10	Standalone complete set of fire & smoke detection system including Control Panel, repeater panel, all types of detectors/sensors, Manual Call Points, short circuit isolators, relay boxes, Hooters, beacons & other accessories as per Class requirement (ABS & IRS) with installation material. Indicative list and quantity of sensors given below. However complete system with type of sensor are to be supplied as per class rule requirements: Optical smoke and heat detectors-105 Nos Heat Detector -10 Nos Combined (Multi) smoke & heat detector-35 Nos Optical smoke and heat detectors (X. proof)-8 Nos Manual call points-35 Nos. IR Flame detectors- 5 Nos. Audio visual fire alarm signaling units are to be provided as per class rule. Short circuit isolators, relay boxes, Sounders, bells and other accessories as per OEM design/class rule. Fire detection System to be in standalone and 24 DC supply Any other sensor/accessories required as per class rule (ABS & IRS).
61.11	Cable- Fire detection sensors interconnection (loop) cable of 3000 Meters complying Class rule (ABS&IRS).
61.12	Complete set of flood alarm and bilge system including Control Panel, repeater panel, sensors , Junction boxes, connection boxes, hooters & sounders & accessories with suitable IP rating as per Class requirement (ABS & IRS) with installation material. Flood detection system shall be provided with indication in MCR and Wheel House for main Machinery Rooms & other compartments below water line level and shall form part of IPMS. The system should also have a standalone alarm panel located in MCR, Quarter master post and wheel house which shall work on 24V DC. Indicative list and quantity of sensors given below. However complete system with type of sensor are to be supplied as per class rule requirements: Flood sensors with 05 meter tail cable having two level of alarm (high & very high) - 30 Nos. Junction boxes/connection boxes- 30 Nos for dual sensors or 60 Nos. for single-single sensors. Bilge alarm sensors 05 meter tail cables - 24 Nos with 24 Junction boxes.

61.13	Tank Level system including 38 No. of IP 68 sensors with 5 mtrs of cable, JBs/CBs, Flanges, ball valves for side mounted sensors & other accessories with installation material for proper functioning of TLIS as per specifications mentioned in TSP & **annexure-.10** The system should meet class requirement (ABS & IRS).
61.14	Sensors for Doors and hatches with suitable JB/CB- 80 Nos.
61.15	Inclinometer for list & trim measurement as per ship data -02 Sets.
61.16	Two sets of Engine Order Telegraph (EOT) for Two nos. of shafts between Wheel house, MCR and of local Control Position with audio visual indication.
61.17	A general alarm system shall be provided having push on the bridge console and bells in all important spaces as per Class rules.
61.18	MCR Console to be included in scope of supply. Approx. indicative dimensions-length 3800 mm, width 800 mm, height-1200 mm. Following components should be mounted on the MCR console supplied by IPMS supplier. Necessary cut outs cable termination provision to be catered in the scope of supply. Additional items finalized during detailed design for MCR consoles are to be included. MCP to be manufactured from MS sheet steel, IP protection as per ABS & IRS class rule requirement. The maintenance space requirement and distance required for cable entry at the bottom to be indicate in the drawing. The proposed console drawing to be submitted along with the technical offer. The console to be mounted on anti vibrations mounts. the MCP is to be manufactured assembled, tested as per ABS&IRS rule requirements. The MCP to be aesthetically and functionally of international quality.
61.19	Damage control HQ console (One No). to be included in scope of supply. Approx indicative dimensions is (LxWxH) 1500 mm x 900 mm x 1200 mm. Drawing of the consoles to be forwarded along with the offer. The console to be mounted on anti vibrations mounts. MCP/console is to be manufactured assembled, tested as per ABS&IRS rule requirements. The MCP to be aesthetically and functionally of international quality.
61.20	Cable connectorisation work for IPMS supplied equipment end as per scope mentioned above.
61.21	Required numbers of cable glands, cable lugs, ferrules, vibration mounts, installation material etc. for IPMS equipment (including AFDS, Flood & bilge system and all other system mentioned in IPMS scope of supply) are to be supplied.
61.22	Stability Software shall be provided through a standalone system at DCHQ. The software shall be able to perform multiple iterations for various de-flooding scenarios. All the hardware (like PC, Key board, mouse, track ball, display etc.) required for standalone system is to be included in scope of supply of IPMS. The scope of work for development of on board stability software (OBSS) is placed on **Annexure-11**
61.23	Audio and Visual Fire Alarm Signaling Units to provide as per class requirement. One Light Calling Column master Unit 24V DC, complete with signal in/output control circuit with terminal lists, installed on one mounting plate. The unit for 24 V DC power supply is provided with 7 triangle symbols mentioned in para 56 of TSP.
61.24	Two Light Calling Column Sub-Unit.
61.25	All Emergency stops push buttons, start stop push buttons & indication lamps as mentioned in TSP.
61.26	(i) 2x pressure transmitter firemain system (0-10bar) (ii) 2x Sensors for Engine room temperature (Ambient temperature 45 degree). (iii) 1x Flow switch for magazine firemain sprinking system. (iv) 1 No. Pressure transmitter (0-10 Bar) for FW hydrophore system to be installed on the pipeline
61.27	The firm/OEM should have spare serviceability in India. Critical/routine spares viz. IO modules, Sensors, Contactors, Relays, Switches etc to be supplied on placement of PO (or) under guarantee (as applicable) within 02-03 weeks. Below mentioned indicative list of OBS per ship are to be considered by IPMS OEM.

Ser	Description	Qty in nos
(i)	MFD with Keyboard	01
(ii)	Console cooling Fan	02
(iii)	Breaker On/Off switch (1 set consisting 01 of each	01

		type	
	(iv)	Push Button (1 set consisting 01 of each type)	01
	(v)	Indication lamp (1 set consisting 01 of each type)	01
	(vi)	Buzzer (1 set consisting 01 of each type)	01
	(vii)	PLC Accessories (1 set consisting 01 of each type as per OEM recomendation)	01
	(viii)	DI Card	01
	(ix)	DO card	01
	(x)	AI Card	01
	(xi)	Fuse (1 set consisting 01 nos. fuse of each type)	01
	(xii)	Door & Hatch Sensor	04
	(xiii)	Detector loop module	01
	(xiv)	Smoke & Heat detector with Detector Base	03 each
	(xv)	Manual Call Point	02
	(xvi)	Multi sensor (Smoke & Heat detector)	03
	(xvii)	Hooter with Falsh	01
	(xviii)	SMPS	01
	(xix)	Tank Sensor	03
	(xx)	Flood sensor	02
	(xxi)	Serial converter/Interface module	01
	(xxii)	Bilge Sensor	03
	(xxiii)	Connector for DI/DO	02
62	**Certificate of Conformity:-** The offer should be complete with CERTIFICATE OF CONFORMITY as per format detailed at Appendix-3.		
63	**Cable Form list, Connectors & Plugs, shock mounts, diamensional detail:** Firm to submit cable form list as per format mentioned in annexure 3, Connectors & Plugs as per annexure 4 & diamension details as per annexure 5.		

Compliance Matrix

EQUIPMENT DESCRIPTION:	EQUIPMENT NO. :

The form shall be completed by Supplier & shall be supplied along with the equipment.

SUPPLIER'S NAME		Ref. Drg. No.	
ADDRESS		Part No.	
TELEPHONE NO.			
ORDER NO.		EQPT. NO.	

S No.	Tender Specifications Para reference	Brief Description as per Relevant Tender Specifications	Compliance to Tender Specifications	Deviations if any, with Reasons	Remarks if any

SUPPLIER'S COMPANY SEAL		SUPPLIER'S SIGNATURE & DATE

APPENDIX - 1.

DEVIATION LIST

The Bidder shall fill in this form for the deviations of their bid from the requirements as stated in the Purchase technical Specification. If there are no deviations, Bidder shall fill in "NIL" in the 'Deviation column. Bidder shall sign/date and affix his company seal.

SR. No.	DOCUMENT No./ CLAUSE No.	1. REQUIREMENT	DEVIATION WITH REASONS	COAST GUARD/ SHIPYARD REACTIONS

BIDDER'S COMPANY SEAL BIDDER'S SIGNATURE & DATE

A-ACCEPTED N-NOT ACCEPTED C-CONDITIONAL ACCEPTANCE

SHIPYARD/ COAST GUARD COMMENTS ON DEVIATION.

APPENDIX- 2.

CERTIFICATE OF CONFORMITY

(To be filled in by the ***SUPPLIER*** & submitted as part of the Offer)

M/s. _____

With reference to the subject **Requisition** received along with the MDL Inquiry and our QUOTATION No. _____ Dated _____ we hereby confirm / clarify the following:

1. **REGISTRATION WITH DQA (WP) / DQA (N) / MDL:**
   We are NOT Registered / already REGISTERED (*) with _____ for manufacture and supply of following items
   (a) _____
   (b) _____

2. **PAST PERFORMANCE:**
   We have NOT Supplied / have SUPPLIED (*) identical / similar (*) ITEM to MDL in the past. The relevant Order references are given below :
   (a) _____
   (b) _____

3. **REQUISITION / DRAWINGS / SPECIFICATIONS / SOR:**
   We ARE NOT / ARE (*) fully aware of the relevant Drawings / Specifications / TSP etc. indicated in the REQUISITION and the related Documents.

4. **DEVIATION:**
   The OFFER is fully in compliance with the Requisition WITHOUT any deviation / EXCEPT for the deviations listed in the attached format (*).

5. **BINDING DATA:**

   OUR Drawings with necessary BINDING DATA such as Overall Dimensions, SEATING Details / Bolting Plan, Connection / Interface Details, Face to Face Dimensions is ENCLOSED / NOT Enclosed (*) with the offer. We have noted that any change in Binding Data shall require specific approval from MDL/IHQ of MoD (N).

6. **DOCUMENTS / DATA:**
   The following Technical Documents / DATA SHEETS are enclosed herewith
   (a) (To be specified if applicable)

For M/s. _____

Signature: Date : _____

Stamp:

(*) Strike out which is *NOT APPLICABLE.*

APPENDIX-3.

CABLE FORM LIST

SR NO	CABLE NO	CABLE PATTERN NO	CABLE SPEC DESCRIPTION	FROM UNIT	TO UNIT	OD	LENGTH	ANY SPECIFIC INSTRUCTIONS FOR CABLE LAYING

APPENDIX-4.

LIST OF CONNECTOR PLUGS, HEAT SHRINK BOOTS & ADAPTERS

CONNECTOR			CABLE		ADAPTOR		BOOT HEAT SHRINK
PART NO	SHELL SIZE	PINS	PART NO	SHEATH IN MM	PART NO	ENTRY SIZE	PART NO

APPENDIX-5.

TABLE-1 FORMAT FOR PROVIDING DIMENSIONAL DETAILS

SR NO	DEVICE	DIMENSIONS (WXHXD)	Wt IN KG	HEAT DISSIPATION DATA	POWER CONSUMPTION

TABLE-2 DETAILS OF SHOCK MOUNTS USED

SL No.	Type of shock mounts	Part Number	Used In	Qty.

TABLE-3 DIMENSIONAL DETAILS OF SHOCKMOUNTS

SR NO	SHOCK MOUNT TYPE	PART NO	DIMENSIONS

APPENDIX- 6.

WEIGHT CONTROL DATA SHEET

EQUIPMENT DESCRIPTION		EQUIPMENT NO.	
COMPARTMENT (IF KNOWN)		LOCATION (IF KNOWN)	

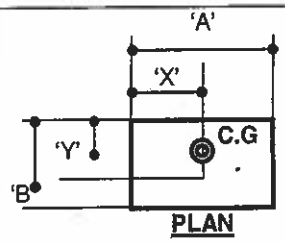
SWBD :

☐ TOLERANCE ESTIMATE ☐ PRELIMINARY (CALC) ☐ DESIGN EST. ☐ M.T.O (CALC) ☐ WEIGHED ±% ☐ TOLERANCE CODE

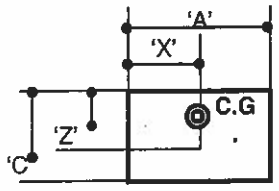
1. WEIGHT (Kg.)

(a)	DRY	Kg ±	%
(b)	FLUID	Kg ±	%
(c)	OPERATING	Kg ±	%
(d)	TEST	Kg ±	%
(e)	TOTAL	Kg ±	%

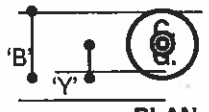
2. EQUIPMENT DIMENSIONAL DATA (mm) & Co-ordinates of CoG



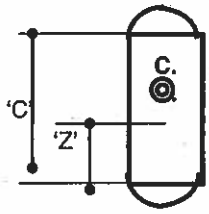
PLAN



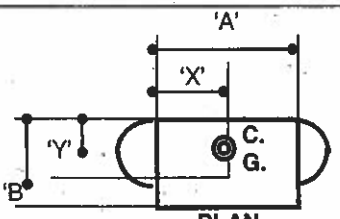
ELEVATION



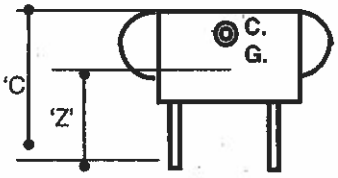
PLAN



ELEVATION



PLAN



ELEVATION

OVERALL SIZE		CENTRE OF GRAVITY	
'A'(LENGTH)		'X'	
'B'(BREADTH)		'Y'	
'C' (HEIGHT)		'Z'	

NOTE :

- ALL OFFERS SHALL INCLUDE THIS DATA SHEET DULY FILLED IN BY THE SUPPLIER (SIGNED, DATED & SEAL AFFIXED).
- ALL FINISHED ITEMS SHALL BE WEIGHED & A CERTIFICATE SHALL BE PROVIDED AS PER ATTACHED SHEET.
- SEPARATE SHEETS SHALL BE COMPLETED FOR EACH INSTALLED EQUIPMENT.
- ORIGIN OF 'X', 'Y' AND 'Z' TO BE INDICIATED.

SUPPLIER'S SEAL

SUPPLIER'S SIGNATURE & DATE

APPENDIX - 7.

WEIGHT CERTIFICATE

EQUIPMENT DESCRIPTION:	EQUIPMENT NO. :

The form shall be completed by Supplier & shall be supplied along with the equipment.

SUPPLIER'S NAME		Ref. Drg. No.	
ADDRESS		Part No.	
TELEPHONE NO.			
ORDER NO.		EQPT. NO.	

METHOD OF WEIGHING:
Supplier shall prescribe Method & Equipment Used:

	DATE OF LAST CALIBRATION	SPECIFIED ACCURACY REQUIREMENT
	NOTE :-	

RESULT OF WEIGHING TOTAL EQUIPMENT DRY WEIGHT ☐
(Excluding packing, temporary protection etc.)

ALLOCATED WEIGHT ☐
(Weight estimate agreed by purchaser
and supplier based on order specs).

REASONS FOR VARIATION BETWEEN ALLOCATED WEIGHT AND CERTIFIED WEIGHT:

WEIGHING ADDRESS:	WITNESSED BY	
	FOR SUPPLIER	FOR PURCHASER
	Representative	Representative
Date:	Signature / Date & Seal	Signature/Date & Seal

APPENDIX-8.

TABLE OF CONNECTIONS FORMAT

SR NO	CABLE NO	CABLE TYPE	NO: OF CORES	FROM DEVICE	CONN REF	TERMINAL / PIN NO	TO DEVICE	CONN REF	TERMINAL / PIN NO	SIGNAL
1	CAB-1	XXX 3 CORE CABLE	1	DEV-A	P1	1	DEV-B	J1	1	
			2			2			2	
			3			3			3	

Appendix-9

TIMELINES FOR TASKS AND DELIVERABLES (Durations) FOR IPMS ACOUSTIC HAILING DEVICE

		FOR MDL		
	Activity	Yard 16101		
		From	To	Duration (Months)
	Placement of order	**P**		
1	Binding Data	P	P+1	01
2	QAP	P	P+2	01
3	Manufacturing Drawing	P	P+1	01
4	FAT & Certification	E-3	E-1	02
5	**Equipment Supply**	**E**		
6	**Documentation**	**E**		
7	Preservation	E	E+12	12
	(a) In Stores **OR**	E	E+12	12
	(b) On- board	E	E+12	12
8	**Services of Engineers**			
	(a) Installation	E	E+ 6	06
	(b) STW	E+ 6	E+ 12	06
	(c) HATs	E+ 12	E+ 13	01
	(d) SATs	E+ 13	E+ 14*	01
	(e) For Routines	NA	NA	NA
	(f) Training	E+ 13	D*	02*
9	OBS for three years	E	NA	NA
10	Warranty	E+20 or D+12 whichever is later		
11	B&D Spares	D-6	D-3	03

* - These end dates will be indicated as calendar dates in the Purchase Order.

P- Placement of Purchase Order, E- Equipment Delivery, D- Planned Delivery

Appendix-10

MANUFACTURER'S RECOMMENDED LIST OF SPARES TOOLS AND SOFTWARE (MRL-OBS)

VESSEL/ EQUIPMENT: 01 TRAINING SHIP

Sr No	Eqpt Part No./ Model no./Sl No.	Eqpt Description	OEM Name	Vendor Name	Illustrated Spare Part List (ISPL) Referance/ Part No. of	Desc of Spare	Country of Origin	Unit Price	Seller Order No. & Date	Currency Code	Total Qty	VED* Category	Recommended scale for 01 Training Ship	Remarks

MANUFACTURER'S RECOMMENDED LIST OF SPARES (MRL-B&D)

VESSEL/ EQUIPMENT: 01 TRAINING SHIP

Ser No	Eqpt Part No./ Model no./Sl No.	Eqpt Description	OEM Name	Vendor Name	Illustrated Spare Part List (ISPL) Referance/ Part No. of Spare	Desc of Spare	Country of Origin	Unit Price	Seller Order No. & Date	Currency Code	Total Qty	VED* Category	Recommended scale for 01 Training Ship	Remarks

*VED- VITAL / ESSENTIAL/ DESIRABLE analysis of spares to be carried out by OEM prior to submission to the Buyer.

Original Equipment Manufacturer (OEM): _____ (Complete Address)

1. Data regarding maintenance spares/stores like lubricants, sealing compound, gases should be given separately giving source of supply.
2. Data furnished as OBD and B&D should also include software backups, as applicable
3. In "Remarks" column following information (if applicable) be given:-
   a) If an item has a shelf/operational life it be marked as 'G' and life be indicated
   b) Matching set of components be indicated.
   c) Item which can be locally manufactured in India should be marked 'LM'.
   d) Items which cannot be manufactured in India due to sophisticated design/ technology may be marked as 'SI' (Special Item).
   e) If a component/assembly is common to other similar equipment offered by the OEM earlier, these should be marked 'CM' and Name of the equipment be indicated.
4. OBS and B&D spares list should be drawn out of the 'Part List' of the equipment, which should be separately given as part of Technical Manuals.

5. If the main equipment consists of other equipment, then OBS and B&D spares list should be prepared for them under proper heads. OBS and B&D spares list is to be prepared as per the maintenance concept of the customer.
6. Items provided along with the equipment as spares should also be included in OBS and B&D list
7. Modules/ Shop Replaceable Unit (SRU) / assemblies should be listed and their components should be included under them so as to relate each item of spare to their module / SRO / assembly.
8. OBS and B&D list for test equipment should also be provided on the similar format.
9. Cost to be indicated in Price bid only.

Appendix-10

TANK LEVEL INDICATION SENSOR LIST

SR. NO.	DESCRIPTION	Frame from	Frame To	Position	Sensor Entry
1	FO RU TANK #01 (s)	70	80-300	P	SIDE
2	FO RU TANK #02 (p)	70	80-300	S	SIDE
3	FO RU TANK #04	102+300	112	S	SIDE
4	FO RU TANK #03	102+300	112	P	SIDE
5	L.O TANK # 01	105+430	111-430	S	SIDE
6	L.O TANK #02	105+430	111-430	P	SIDE
7	L.O TANK # 03				SIDE
8	L.O TANK # 04				SIDE
9	FWD TRIM TANK	7+230	11-300	C	TOP
10	BALLAST TANK #01	12+300	15-300	C	TOP
11	F.W TANK #01	36+300	40-300	C	TOP
12	L.O TANK # 05				SIDE
13	L.O TANK # 06				SIDE
14	F.O TANK #01	42+300	56-300	P	TOP
15	F.O TANK #02	42+300	56-300	S	TOP
16	F.O TANK #03	55+300	63	C	TOP
17	F.O TANK #04	63	70	C	TOP
18	F.O TANK #05	70	84-300	S	TOP
19	F.O TANK #06	70	84-300	P	TOP
20	F.O TANK #07	83+300	91	C	TOP
21	F.O TANK #09	91	112	S	TOP
22	F.O TANK #08	91	112	P	TOP
23	F.O TANK #11	112	124	S	TOP
24	F.O TANK #10	112	124	C	TOP
25	F.O TANK #12	112	124	P	TOP
26	BALLAST TANK #03	126	135	S	TOP
27	AVCAT TANK	126	131	C	TOP
28	BALLAST TANK #02	126	135	P	TOP
29	F.W TANK #02	135	147-300	S	TOP
30	FOAM TANK	135	138	P	TOP
31	WATER MIST	135	138	P	TOP
32	F.W TANK #04	138	141	C	TOP
33	BALLAST TANK #04	141	148-300	C	TOP
34	F.W TANK #03	135	148-300	P	TOP
35	AVCAT SERVICE TANK	130	130	P	SIDE
36	BILGE HOLDING TANK	88+300	91	P	TOP
37	SLUDGE TANK	88+300	91	S	TOP
38	DIRTY TANK	88+300	91	S	TOP

Appendix-11

MAZAGON DOCK SHIPBUILDERS LIMITED

SCOPE OF WORK FOR DEVELOPMENT OF ONBOARD STABILITY SOFTWARE (OBSS)

FOR

TRAINING SHIP

1033-10	00	06 Mar 25	Rahul Babu SE (D-FDG)	Kartheek Doppala M(D-FDG)	Sapna Dipu AGM(D-FDG)
Doc No	**Rev**	**Issue date**	**Prepared**	**Checked**	**Approved**

TABLE OF CONTENTS

Contents

SCOPE OF WORK FOR DEVELOPMENT OF ONBOARD STABILITY SOFTWARE (OBSS): TRAINING SHIP

1. **BACK-GROUND:**. The. MDL has drawn up the Scope of Work for the development of the OBSS which includes development of the software, verification and validation in *'Aveva Marine'* software and onboard Training Ship Y-16101. The SoW is elaborated in the succeeding paragraphs.

2. OVERVIEW OF THE SCOPE OF WORK

Task No.	Activity	Task
1.	Development of the OBSS (One time Activity)	Importing of 3D CAD hull, tank and water tight zone model. The complete hull, tank and water tight zone (up to 10 Deck) model shall be provided by MDL
2.		Incorporation of permeability
3.		Intact Stability calculations
4.		Damage Stability calculations
5.		Countermeasures
6.		Development of GUI for input data entry and output data display
7.	Verification of parameters generated by Firm's Software	Correctness of hull, tank and water tight zone model
8.		Incorporation of structural and damage permeabilities
9.		Intact Stability calculations
10.		Damage Stability calculations
11.		Countermeasures
12.		Development of GUI for input data entry and output data display
13.	Installation and validation onboard for Training Ship	To be carried out in the ship.

Display of damage section in plan, profile and three dimensional view with advanced graphic features. Operator's decision aids like location of DC parties/assignment of DC parties, Kill cards etc.

3. INPUTS FROM MDL :

Task nos	Task	Input	Format
1	Importing of 3D CAD model	3D CAD model	.sat
		Tank plan with capacity and Centre of gravity	pdf
		List of water tight zone and its volumes	pdf
		GA with water tight zone showing the water tight boundaries	AutoCAD drawing
		Ship's reference system	pdf
		Hydrostatic values at even keel, at one meter trim forward and one meter trim aft	pdf
		Location of Manual sounding tubes for tanks	.pdf
2	Incorporation of permeability	Damage and Structural permeability for tanks and water	pdf

Task nos	Task	Input	Format
		tight zone.	
3	Intact Stability calculations	(a) General Ship data required to carry out stability calculations: (i) Keel and Shell Thickness (ii) Forward and Aft draft marking with locations (iii) Lightship and co-ordinates of Centre of gravity of the ship(See Note-1) (iv) Fixed loads for Deep condition (See Note-1) (v) Fixed loads for all other conditions except deep(See Note-1) (vi) Deck Edge points (vii) Unprotected openings (viii) Profile points of the vessel (ix) Definition of damage cases (b) NES 109 Stability criteria inputs	pdf
4	Damage Stability calculations		
9 to 12	Verification of the OBSS software	Sample Stability calculations: Intact (deep and lightest sea going loading) and damage (two cases, one each at each loading condition) stability calculation outputs from *'Aveva Marine'* software.	pdf
13	Installation and validation onboard for TS	Lightship and Centre of gravity values of the ship post Inclining experiment of ship.	pdf

Note-1: Provision should be made in OBSS for editing the following information with administrative authorization:

(a) Lightship and centers of gravity
(b) Fixed loads at any condition

4. ACTIVITIES (TASKS) INVOLVED IN THE DEVELOPMENT OF OBSS

(a) **Development of the** *software (Tasks No 1 to 6)* **(One time activity) :** The Task shall be performed sequentially and for each of the task no 1 to 4, the firm shall demonstrate in excel and pdf that the software are within the acceptance criteria defined at Para (5) vis a vis the values provided by MDL as part of inputs.

(i) **Task nos 1- 3D CAD Model:** Firm shall ensure complete import of the hull, tanks and water tight zone as per the input data in the 3D CAD model in OBSS.

(ii) **Task no.2-Incorporation of Permeability:** Firm shall incorporate structural and damage permeability as per the input data for all the tanks and water tight zone.

(iii) **Task nos 3 & 4- Intact and Damage Stability:**

(aa) Incorporation of lightship and Centre of gravity: The lightship and center of gravities that will be provided by MDL as an input will be the estimated values. Provision shall be made available in the software for incorporation of the data post inclining of the ship. Firm to incorporate provision in OBSS to modify these values with administrator authority.

(ab) Tanks of same contents shall be grouped together.

(ac) OBSS shall carry out intact and damage stability calculations as per Def-stan 02-109(NES 109) issue 1

(ad) The output table shall contain the data indicated at the output of the sample intact and damage stability calculations provided by MDL.

(ae) Verification of the intact and damage stability criteria values of the OBSS output prepared by Firm shall be carried out against the stability criteria values prepared by MDL (based on NES 109).

(iv) **Task no. 5-Countermeasures :**

(aa) Based on the damage scenario, the countermeasures shall give the best suitable option based on the following:

i. De-flooding options available in the water tight zone
ii. Ballasting and De-ballasting options
iii. Fluid transfers

(ab) Expected condition of the vessel post applying the corrective action shall be displayed. The display window shall contain the following; however the report shall be as the sample stability output:

- Draft(At AP, AT FP, MIDSHIP, AFT marks and FWD Marks) and propeller
- Displacement
- List
- Trim
- GM
- KG
- KG fluid
- FSC
- LCG
- TCG
- GZ diagram
- NES 109 criteria status as shown in the sample stability output.

(v) **Task no 6- Development of GUI for input data entry and output data display:**

(aa) **Mode of operation**: In this module two modes of operations are required:

- Real Time Mode
- Simulation mode

(01) **Real time mode:** The real time mode of operation is the real condition of the ship in terms of stability based on signals from tank level sensors. In this mode of operation, the output function should consist of the calculation of the hydrostatics parameters of the ship based on the input from tank sensors.

(02) The selection of the real time mode of operation should be based on a window for e.g.

Real time mode	Simulation mode

(03) **Simulation mode:** Using this mode the operator should able to simulate different stability conditions of the ship. In the simulations mode, the default values shall be from the real time mode with an option to edit the values of tanks, water tight zone volumes and density and also with a 'clear all' option if the user wants to begin the simulations from ab initio.

(04) Real time mode & simulation mode to be differentiated by color coding of the page or any other method.

(05) **Grouping of Water tight zones/ Tanks :** The water tight zone shall be grouped separately and similar tanks shall be grouped together. E.g.: FW tanks shall be grouped together.

(ab) **Input procedure for simulation mode**

(01) **Input Data entry for Fixed Load(same in real time mode)**: The following procedure may be considered.

i. There shall be provision to add solid loads to the fixed loads already defined in the systems. Provision shall also be available to edit the fixed loads data.

ii. The window to enter data to have following options :

- Name of the load
- Weight of the load in T
- Dimension of the load
- Coordinates of Centre of Gravity w.r.t to ship (X, Y, Z)

(02) **Procedure to Input Data for Tank Level**

The window to enter data may have following options:

- % Fill[as a numeric value or in bar form with % values indicated by moving cursor]
- Innage (m)
- Mass (T)
- Group – (Fuel oil, Ballast etc.)

(03) **Procedure to input damage data**

(i) The water tight zones and tanks for carrying out damage stability calculations shall be selected by a tick box adjacent to it. Further, the user shall be able to select multiple water tight zone by dragging the tick box.

(ii) There should be a provision to select tanks and water tight zone from plan or profile of the ship. (In real-time and simulation mode, water tight zones with flood sensors on may be highlighted.)

(ac) **Output data display** (May be called as output mode): In the output mode the status of ship to be displayed. The status should include the following;
However the report shall be as the sample stability output.

- Draft (At AP, FP, MIDSHIP, AFT marks and FWD Marks) and propeller

- Displacement
- List
- Trim
- GM
- GZ diagram
- NES 109 criteria status as shown in the sample stability output

(ad) **General Features:**

(i) **Report generation**: GUI shall have features on report generation of any condition with date and time stamp.

(ii) **Saving and Reloading of the conditions**: User shall be able to save a case generated in any condition and also load the same when required.

(iii) **Indication of faulty sensors:** In real-time mode, the faulty sensors shall be indicated.

(iv) **Status connection**: The status of the connection to the server/Modbus shall be indicated.

Note-2: Finalization of the GUI: Prior to finalization of the GUI, the structure shall be forwarded to MDL for comments and approval.

(b) Verification of the Parameters generated by software *(Task No 7 to 12)*:

The verification of the software shall be carried out for the following:

(i) **Task No.7 :**

Firm shall forward the following outputs:

(aa) Hydrostatic data at even keel and for two trimmed water lines i.e. Trim by 2m FWD and 2m AFT directions in excel and pdf

(ab) Cross curves of stability in excel and pdf

(ac) Tank volumes (100% volumes) along with the center of gravity as well as the volumes including the structural and damage permeability and calibration data to be provided in excel and pdf.

(ii) **Task No.8**:

(aa) Firm to forward details demonstrating how structural and damage permeabilities have been incorporated for all the tanks, water tight zones at each level in excel and pdf.

(ab) Firm to forward the water tight zone and volumes (100% and volumes after incorporating permeabilities) along with the difference in percentage with baseline value as MDL value in pdf and excel formats.

(ac) Firm to forward details of FSM at 95% and 85 % tank loading in excel and pdf.

(iii) **Task No.9:** Firm to forward intact stability results for three loading conditions provided in input data. Firm to demonstrate that all the output parameters from OBSS are within the acceptable limits in excel and pdf.

(iv) **Task No.10**: Firm to forward damage stability results for 6 damage cases for the above three loading conditions provided in input data. Firm to demonstrate all the output parameters from OBSS are within the acceptable limits in excel and pdf.

(v) **Task No.11&12:** Firm to forward the outputs sheets displaying countermeasures options for the damage cases indicated at Task 10. The expected condition of the vessel post application of countermeasures shall also be forwarded as outputs

(c) Installation and validation onboard (Task no 13):

(i) **Installation:** Firm shall install the software on TS and the following tasks are to be carried out for validation of the software:

(aa) **Tank volumes:** Firm shall demonstrate the real time tank volumes are being utilized for the intact and damage stability calculations and the tank volumes are inclusive of the structural permeability.

(ab) **Intact and damage stability output:** Firm shall generate an output for an intact and damage case using the real time tank volumes. Firm to also simulate a loading condition and corresponding intact and damage output for which the input data will be handed over during validation.

5. Acceptance Criteria For Verification & Validation Of OBSS Results

Base Line Value	Description	Verification of Parameters (Deviation)	Validation Onboard (Deviation)
MDL's *'Aveva Marine'* software Input (Hull Form Dependent)	Displacement	2% from Baseline value	2% from Baseline value
	Longitudinal center of buoyancy from AP	1%/50cm max. from Baseline value	1%/50cm max. from Baseline value
	Vertical center of buoyancy from BL	1%/5cm max. from Baseline value	1%/5cm max. from Baseline value
	Transverse center of buoyancy	0.5% of B / 5cm max. from baseline value	0.5% of B / 5cm max. from baseline value
	Longitudinal center of floatation from AP	1% / 50cm max. from baseline value	1% / 50cm max. from baseline value
	Moment to trim 1cm	2% from baseline value	2% from baseline value
	Transverse metacentric height	1% /5cm max. from baseline value	1% /5cm max. from baseline value
	Longitudinal metacentric height	1% /50cm max. from baseline value	1% /50cm max. from baseline value
	Cross curves of stability	5cm from baseline value	5cm from baseline value
MDL's *Aveva Marine'* software Input (Water tight zone Dependent)	Volume or deadweight	2% from baseline value	2% from baseline value
	Longitudinal center of gravity from AP	1% /50cm max from baseline value	1% /50cm max from baseline value
	Vertical center of gravity	1% /5cm max. from baseline value	1% /5cm max. from baseline value
	Transverse center of gravity	0.5% of B / 5cm max. from baseline value	0.5% of B / 5cm max. from baseline value

Base Line Value	Description	Verification of Parameters (Deviation)	Validation Onboard (Deviation)
	Free surface moment	2% from baseline value	2% from baseline value
	Shifting moment	5% from baseline value	5% from baseline value
	Level of contents	2% from baseline value	2% from baseline value
MDL's *Aveva Marine'* software Input (Trim and Stability)	Draughts (forward, aft, mean)	1% /5cm max. from baseline value	1% /5cm max. from baseline value
	GMt	1% /5cm max. from baseline value	1% /5cm max. from baseline value
	GZ values	5% /5cm max. from baseline value	5% /5cm max. from baseline value
	FS correction	2% from baseline value	2% from baseline value
	Down-flooding angle	2% from baseline value	2% from baseline value
	Equilibrium angle	1% from baseline value	1% from baseline value
	Distance to unprotected openings or margin line from WL, if applicable	+/- 5%/ 5cm from baseline value	+/- 5%/ 5cm from baseline value
	Areas under righting arm curve	5% or 0.0012 m rad from baseline value	5% or 0.0012 m rad from baseline value
Deviation(%) =	$\frac{\text{(Baseline value – OEM's value)}}{\text{Baseline value}}$ x 100		

6. **DELIVERABLES**: The following are the deliverables for carrying out the various tasks of OBSS development:

(a)

Task Nos	Activity	Deliverables to be submitted to MDL
(1-6)	Development of OBSS	Report on completion of the development of the software
(7-12)	Verification of parameters generated by Firm's software	Verification report
13	Installation onboard	See Note-3

NOTE-3 :

(i) Software installation on TS.

(ii) The real time tank volumes and demonstration of incorporation of the structural and damage permeability.

(iii) One set of intact stability results with the real time tank data and one set of intact stability results with a simulated loading condition.

(iv) One set of damage stability results with real time tank data and one set of damage results with a simulated loading condition and damage case.

7. CERITIFICATION OF DELIVERABLES :

Certification of the deliverables shall be done by MDL

8. TIME FRAMES

Sl. No	Deliverable	Timeline
(a)	Development of ***software***	D+2 months

Sl. No	Deliverable	Timeline
(b)	Verification of the Parameters generated by software	D+3 months
(c)	Installation and Validation of OBSS on-board TS	D+10 months

D- Date of inputs from MDL

Annexure-B-1

DECLARATION CERTIFICATE FOR LOCAL CONTENT
(Tender value Less than Rs 10 Crores)

This declaration must form part of all tenders & it contains general information and serves as a declaration form for all bidders. (Before completing this declaration, bidders must study the General Conditions, Definitions, Govt. Directives applicable in respect of Local Content & prescribed tender conditions).

LOCAL CONTENT DECLARATION BY CHIEF FINANCIAL OFFICER OR OTHER LEGALLY RESPONSIBLE PERSON NOMINATED IN WRITING BY CHIEF EXECUTIVE OR SENIOR MEMBER/PERSON WITH MANAGEMENT RESPONSIBILITY (CORPORATION, PARTNERSHIP OR INDIVIDUAL)

IN RESPECT OF BID/ TENDER No: ……
……..

ISSUED BY (Name of Firm): ……

NB: The obligation to complete, duly sign and submit this declaration cannot be transferred to an external authorized representative, auditor or any other third party acting on behalf of the bidder.

I, the undersigned, ……..... (full names),
do hereby declare, in my capacity as …….……. of .....(name of bidder entity), the following:

(a) The facts contained herein are within my own personal knowledge.

(b) I have read and understood the requirement of local content (LC) and same is specified as percentage calculated in accordance with the definition provided at clause 2 of revised Public Procurement (preference to Make in India) Order 2017.

“Local content” as per above order means the amount of value added in India which shall be the total value of items procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all customs duties) as a proportion of the total value in percent.”

(c) I have satisfied myself that the goods/services/works to be delivered in terms of the above specified bid comply with the local content requirements as specified in the tender for ‘Class-I Local Supplier’ / ‘Class-II Local Supplier’, and as above.

(d)

i) I seek benefits against the following policy:

1) PPP MSE Order 2012 ☐

2) PPP MII 2017 ☐

(e) The local content calculated using the definition given above are as under:

Tender Item Sr. No.	Local content calculated as above %	Location of local value addition

Attach separate sheet duly signed if the space not sufficient.

NB: Local content percentage shall be declared item wise or tender wise strictly as per the terms of the tender.

(f) I accept that the Procurement Authority / Institution / MDL / Nodal Ministry has the right to request that the local content be verified in terms of the requirements of revised Public Procurement (preference to Make in India) Order 2017 dated 19.07.2024 and I shall furnish the document / information on demand. Failure on my part to furnish the data will be treated as false declaration as per PPP MII Order 2017. In case of contract being awarded, I undertake to retain the relevant documents for 7 years from date of execution.

(g) I understand that the submission of incorrect data, or data that are not verifiable as described in revised Public Procurement (preference to Make in India) Order 2017, may result in the Procurement Authority / Nodal Ministry / MDL imposing any or all of the remedies as provided for in Clause 9 of the Revised Public Procurement (preference to Make in India) Order 2017 dated 19.07.2024.

SIGNATURE: _____ **DATE: _____**

Seal / Stamp of Bidders

MANUFACTURER'S RECOMMENDED LIST OF SPARES FOR GEM/2025/B/6319380 (PROCUREMENT OF IPMS SYSTEM FOR 01 TS OF ICGP)

Note:

1) Bidders are requested to indicate "Quoted/ Not Quoted" as applicable against each line item & upload this blank rate sheet along with Part1 of their offer. The actual prices are to be quoted in the online BOQ (price bid) only.

2) For details of Delivery Schedule, Please refer the Tender Enquiry form attached with the Tender.

3) This Excel work book contains three sheets. Bidders are requested to fill and submit blank rate sheet and B & D details as per format provided only

Bidder Name									
ITEM NO	MATERIAL DESCRIPTION	Total Qty	UNIT	Yard No	Currency in which prices are quoted	Basic Unit Rates	Type of GST e.g.IGST/CGST and SGSTetc.	GST (in %)	HSN Code
1	Material Details:- TS - SUPPLY OF INTEGRATED PLATFORM MANAGEMENT SYSTEM & FOLLOWING SUB SYSTEM AS PER TSP. a) ADDRESSABLE FIRE DETECTION SYSTEM. b) FLOOD ALARM & BRILGE ALARM SYSTEM. c) FIRE DETECTION LOOP CABLE & ETHERNET CABLE. d) TANK LEVEL INDICATION SYSTEM. e) DOOR & HATCH SENSOR. f) EOT SYSTEM. g) GENERAL ALARM SYSTEM. h) DCHQ CONSOLE i) MCR CONSOLE j) OTHER SYSTEM AS PER TSP	1	SET	16101	INR	QUOTED/NOT QUOTED			
2	Material Details:- DOCUMENTATION FOR IPMS & SUB SYSTEM AS PER TSP	1	NOS	16101	INR	QUOTED/NOT QUOTED			
3	Material Details:- ON BOARD SPARES FOR IPMS & SUB SYSTEM AS PER TSP	1	NOS	16101	INR	QUOTED/NOT QUOTED			
4	Material Description:- SERVICES OF CONNECTORISATION HATS, SATs, STW, TRIALS & COMMISSIONING.	1	AU	16101	INR	QUOTED/NOT QUOTED			
5	Material Description:-SERVICES FOR TRAINNING	1	AU	16101	INR	QUOTED/NOT QUOTED			
6	Material Description:-MONTHLY WARRANTY EXTENSION CHARGES -Delivery date for warranty extension charges are tentative end date. The warranty extension changes will be applicable post standard warranty as per tsp.	12	MONTH	16101	INR	QUOTED/NOT QUOTED			
	B&D Spares For IPMS System For 01 TS	1	SET	16101	INR	QUOTED/NOT QUOTED			

MANUFACTURER'S RECOMMENDED LIST OF OBS SPARES FOR PROCUREMENT OF IPMS SYSTEM FOR 01 TS OF ICGP (GEM/2025/B/6319380)

Note:
1) Bidders are requested to indicate total value of each spare in percentage of total value quoted for OBS Spares. E.g. If total value quoted for total OBS Spare is 100 and this contains spare A & B. Spare A cost 60 & Spare B cost 40. Then 60% to be indicated in the last column
2) Prices are not to be indicated in this sheet.
3) The same is as per requirement of the TSP.

Bidder Name

Sr No	Eqpt Part no/Model no/Sl no	Eqpt Description	OEM Name	Vendor Name	Iilustrated Spare Part List (ISPL) reference/ Part no of spare	Description of spare	Country of origin	Seller order no & Date	Currency code	Total qty	VED* category	Recommended scale	Remarks	Total value of spare in terms of % of total OBS quoted value
1														
2														
3														
4														
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MANUFACTURER'S RECOMMENDED LIST OF B&D SPARES FOR PROCUREMENT OF IPMS SYSTEM FOR 01 TS OF ICGP (GEM/2025/B/6319380)

Note:
1) Bidders are requested to indicate total value of each spare in percentage of total value quoted for B & D Spares. E.g. If total value quoted for total B & D Spare is 100 and this contains spare A & B. Spare A cost 60 & Spare B cost 40. Then 60% to be indicated in the last column
2) Prices are not to be indicated in this sheet.
3) The same is as per requirement of the TSP.

Bidder Name

Sr No	Eqpt Part no/Model no/Sl no	Eqpt Description	OEM Name	Vendor Name	Iilustrated Spare Part List (ISPL) reference/ Part no of spare	Description of spare	Country of origin	Seller order no & Date	Currency code	Total qty	VED* category	Recommended scale	Remarks	Total value of spare in terms of % of total B&D quoted value
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BoQ as per Corrigendum -I

Item Number	Item Title	Item Description	Item Quantity	Unit of Measure	Consignee ID	Delivery Period (In number of days)
1	Mat No -150000000000087507-TS - SUPPLY OF INTEGRATED PLATFORM MANAGEMENT SYSTEM and FOLLOWING SUB SYSTEM AS PER TSP A- ADDRESSABLE FIRE DETECTION SYSTEM- B- FLOOD ALARM and BRILGE ALARM SYSTEM-C-FIRE DETECTION LOOP CABLE and ETHERNET CABLE-D- TANK LEVEL INDICATION SYSTEM-E- DOOR and HATCH SENSOR-F- EOT SYSTEM-G- GENERAL ALARM SYSTEM-H- DCHQ CONSOLE-I- MCR CONSOLE-J-OTHER SYSTEM AS PER TSP	TS - SUPPLY OF INTEGRATED PLATFORM MANAGEMENT SYSTEM & FOLLOWING SUB SYSTEM AS PER TSPa- ADDRESSABLE FIRE DETECTION SYSTEM-b- FLOOD ALARM & BRILGE ALARM SYSTEM-c-FIRE DETECTION LOOP CABLE and ETHERNET CABLE-d- TANK LEVEL INDICATION SYSTEM-e DOOR and HATCH SENSOR-f-EOT SYSTEM-g-GENERAL ALARM SYSTEM-h- DCHQ CONSOLE-i- MCR CONSOLE-j-OTHER SYSTEM AS PER TSP	1	SET	sbk_mdlstores	180
2	Mat No -150000000000087512- DOCUMENTATION FOR IPMS and SUB SYSTEM AS PER TSP	DOCUMENTATION FOR IPMS and SUB SYSTEM AS PER TSP	1	NOS	sbk_mdlstores	180
3	Mat No-150000000000087513- ON BOARD SPARES FOR IPMS and SUB SYSTEM AS PER TSP	ON BOARD SPARES FOR IPMS and SUB SYSTEM AS PER TSP	1	NOS	sbk_mdlstores	180
4	SERVICES OF CONNECTORISATION HATS SATs STW TRIALS and COMMISSIONING	SERVICES OF CONNECTORISATION HATS SATs STW TRIALS and C	1	AU	sbk_mdlstores	390
5	SERVICES FOR TRAINNING	SERVICES FOR TRAINNING	1	AU	sbk_mdlstores	390
6	MONTHLY WARRANTY EXTENSION CHARGES-Delivery date for warranty extension charges are tentative end date. The warrantyextension changes will be applicable post standard warranty as per tsp	warranty extension charges are tentative end date. The warrantyextension changes will be applicable post standard	12	MONTH	sbk_mdlstores	2034