REQUEST FOR INFORMATION (RFI)
FOR PROCUREMENT OF MINE COUNTER MEASURE VESSELS (MCMVs)

1. The Ministry of Defence, Government of India, intends to procure 12 (twelve) Mine Counter Measure Vessels (MCMVs) for the Indian Navy (*IN*) from registered Indian Shipyards. The MCMVs would be constructed in a phased manner over a period of 08 (eight) years. The order is planned to be split between L1 and L2 Shipyard in the ration of 8:4.

2. This Request for Information (RFI) consists of three parts as indicated below:-

(a) **Part I**. The first part of the RFI incorporates operational characteristics and features that should be met by the MCMVs. Few important technical parameters of the proposed MCMVs are also mentioned.

(b) **Part II**. The second part of the RFI states the methodology of seeking responses of Shipyards. **Submission of incomplete response format will render the Shipyard liable for rejection. It is highlighted that in accordance with Paras 13, 70 and 92 of Chapter XII of DAP 20, there is a need to undertake capacity assessment of a shipyard prior recommending for issuance of RFP for ship or yard craft construction irrespective of shipyard's response to this RFI** (Appendix C to Chapter XII of DAP 20 relevant).

(c) **Part III**. Guidelines for Framing Criteria for Shipbuilding cases.

3. Apart from the information sought as per the Appendices, the shipyards may also forward technical details/ brochure/ preliminary design/ literature, etc., as deemed appropriate with respect to this said RFI for Procurement of 12 x Mine Counter Measure Vessels (MCMVs).

PART- I

4. **The Intended Use of MCMVs (Operational Requirements)**. The MCMVs should be able to carry out Operational Roles, including Mine Counter Measures operations using Unmanned MCM Suite, Channel Mapping, Route Survey and Sanitisation, Search and Rescue (SAR) and Humanitarian Assistance and Disaster Relief (HADR), Mine Laying, Local Naval Defence as well as Constabulary Roles, e.g. Coastal surveillance, MIO and VBSS Operations in Indian Maritime Zones.

5. **Quantity Required and Anticipated Delivery Time Frames**. 12 (twelve) MCMVs are planned to be acquired. The anticipated delivery time lines for the MCMVs is proposed between **2030 to 2037**. The order is planned to be split between L1 and L2 Shipyards in the ration of 8:4, wherein L2 shipyard will be required to construct the ships at the L1 cost. **Shipyards are to indicate their comments on the build period and timelines for delivery.**

6. **Important Parameters**. Specifications of the MCMVs are included in the Staff Requirements placed at **Appendix A** of this document. Detailed specifications will be given in the Request for Proposal (RFP) which will be issued to Shipyards who have responded to the Request for Information (RFI) and must meet the Qualification Criteria, after verifying their credentials and capabilities to construct the MCMVs. Further following details are to be submitted:-

(a) Feasibility to design and build the MCMVs with specifications indicated at **Appendix A.** The shipyards are required to furnish details for each of the operational and technical parameters as brought out in **Appendix A**. Any modification to the parameter/specifications listed at **Appendix A**, can be suggested by the Shipyard, suitable justification(s) is to be submitted by the Shipyard.

(b) Shipyard is to submit the concept design for the upcoming indigenous technologies, if any, which will meet the intended purpose of the MCMVs and enhance its employability.

(c) Agreement and/ or collaboration with firms with regard to Design and Production Monitoring Technology to be indicated and clearly highlighted in the response. The details of design ToT, Construction ToT, and maintenance ToT, if any, with exact Scope of ToT be forwarded along with indicative costing.

(d) Experience in building/ supply of Ships which meet the requirements as listed in this RFI, along with details of customer/ clients and cost per MCMVs, delivery date will have to be submitted.

(e) Whether the Shipyard would be able to comply with all provisions of DAP 20 or not. If not, which Para/ Clause of DAP 20 would not be agreed to, with reasons, needs to be submitted.

(f) Budgetary quote of the MCMVs with detailed break up of cost is to be submitted. This should include **Basic Cost of MCMVs, PMS, Handling of B&D spares, OBS, Special Maintenance Tools/ STTE, Training and Training Aggregate, Freight/ Transit Insurance Cost and AMC (as applicable).** All entities factored in the costing are to be indicated in the break up. Details of import duties, if any applicable, to be indicated separately. Cost estimate is to be inclusive of taxes and tax amount to be reflected in the BQ provided.

(g) Price Variation Clause (PVC) will be applicable in this case i.a.w **Annexure VIII to Appendix M** of DAP-20.

(h) Information on whether the offered MCMVs/ design is in use by any other Navy/ Indian Customer is also to be indicated.

(j) The MCMVs will be operated by Manpower/ Crew as mentioned in **Appendix A**. Training to ***IN*** personnel on operation and maintenance along with schedules is to be imparted by the shipyard/ OEM of equipment at Shipyards/ OEM premises and (or) ***IN*** premises. Shipyard to indicate acceptance for the same. Shipyard is also required to indicate feasibility of provisioning of simulator for imparting Operational Training for MCMVs (proposal to be forwarded for examination).

(k) Shipyards may consider this RFI as advance information to obtain requisite Government clearances on export/ import clearances (if applicable) setting up of necessary infrastructure both in terms of manpower and material requirements.

(l) Shipyard have to confirm its acceptance with the terms of payment as per Chapter XII, Section B, Para 79 and Appendix B to Chapter XII of DAP 20 and amendment thereof.

(m) Willingness for Option Clause as per Para 93 of Chapter II of DAP 20.

(n) Willingness to participate in the bid for procurement of 12 x Mine Counter Measure Vessels (MCMVs).

(p) The tentative delivery schedule/ build period for supply of the MCMVs after conclusion of contract including the build strategy.

(q) The shipyard is to submit copy of Government license relevant for ship construction/ building activity.

(r) Shipyard is to indicate the compliance and/ or conformity to various industrial and classification society rules and standards related to operations and safety such as ISI, CE, MIL spec, etc., for various components/ sub-components of the MCMVs as applicable.

(s) Shipyard has to indicate inputs/ details wrt obsolescence management and upgradation of the component/ parts of equipment of the MCMVs which may become obsolete during the life cycle of the MCMVs as per provisions of DAP 20 and amendments thereof.

(t) Shipyards to provide inputs on maintenance philosophy (ESP, AMC, PBL, etc.,), In this regard, Para 51 and Appendix- F of Chapter II of DAP 20 is relevant.

(u) Shipyards are required to provide following details:-

(i) Displacement / dimensions of the MCMVs.

(ii) Proposed Delivery Schedule of the MCMVs.

(iii) Details pertaining to Capacity, infrastructure, financial status of the shipyard to be furnished and how it is intended to be used to meet the delivery schedule of the MCMVs.

(iv) Utilisation of Indigenous Military material and software and plan for material sourcing and cost implications vis-à-vis foreign sourcing materials i.a.w Para 11 and 13 of Chapter-II of DAP-20.

(v) Past experience of shipyard in executing similar projects.

(vi) Details of present order book status to be furnished.

7. The Shipyard should conform that following conditions are acceptable: -

(a) The solicitation of offers will be as per ‘Single Stage-Two Bid System’. It would imply that a ‘Request for Proposal’ would be issued soliciting the Technical and Commercial offers together, but in two separate sealed envelopes. The validity of Commercial offers would be at least 18 months from the date of submission of offers.

(b) The financial assessment parameters would be evaluated by a Financial Parameter Evaluation Team (FPET) constituted by SHQ prior to Technical Evaluation Committee (TEC). The technical offers would be evaluated by a Technical Evaluation Committee (TEC) to check its compliance with.

(c) Amongst the Shipyards cleared by TEC, a Contract Negotiations Committee (CNC) would decide the lowest cost bidder (L1) and also second lowest cost bidder (L2). Contract will be first concluded with the L1 bidder for 08 (eight) ships and L2 shipyard will be asked to conclude a separate contract for 04 (four) ships, to be delivered at the same cost as agreed with L1 bidder. The L2 shipyard will be required to adhere to the basic design of the ship of the L1 bidder (or a common basic design mutually agreed upon), including commonality in sizing, layout and major equipment fit. Accordingly, the relevant drawings as well as technical documentations (including SOTRs/ GRAQs etc) will be commonly approved for both the Shipyards.

(d) The proposed timeline for acquisition of 12 x MCMVs by ***IN*** from L1 and L2 shipyard are enumerated below:-

L1 Shipyard		**L2 Shipyard**	
Ship 1	D + 4 year	Ship 1	D + 5 years
Ship 2	+ 1 year	Ship 2	+ 1 year
Ship 3		Ship 3	
Ship 4	+ 1 year	Ship 4	+ 1 year
Ship 5			
Ship 6	+ 1 year		
Ship 7			
Ship 8	+ 1 year		
Total	**08 years**		**07 years**

D:- Date of signing of contract

(e) Shipyard would be bound to provide product support for time period specified in the RFP, which includes spares and maintenance tools/ jigs/ fixtures for field and component level repairs. Documentation for training/ maintenance/repairs are also to be provided.

(f) The Shipyard would be required to accept the general conditions of contract given in the Standard Contract Document at **Chapter VI of DAP 2020.**

(g) **Integrity Pact (if applicable)**. An integrity pact is a mandatory requirement in the instant case **(**Refer **Annexure I to Appendix - O of Schedule I, Chapter II of DAP -20)**.

(i) **Pre Contract Integrity Pact (PCIP)**. All Shipyards will be required to submit a PCIP for **all procurement schemes above Rs 20 crores** along with their technical and commercial offers. **Earnest Money Deposit (EMD) will act as security for PCIP till signing of contract**. **Format of EMD is given at Annexure I to Appendix O of schedule I to Chapter-II of DAP-20. Post signing of contract, PCIP will be covered by PWBG till completion of contract**.

(ii) EMD would be applicable as follows:-

Estimated Cost of Procurement Scheme (Rs Crs)		**EMD Amount**
Above (not including)	**To (including)**	
-	100	Nil
100	150	30 Lakh
150	300	70 Lakh
300	1000	2 Crore
1000	2000	5 Crore
2000	3000	10 Crore
3000	5000	15 Crore
5000	-	25 Crore

(iii) EMD is not required from Micro and Small Enterprises (MSEs) as defined in MSE Procurement Policy issued by Department of Micro, Small and Medium Enterprises (MSME) or are registered with the Central Purchase Organization or the concerned Ministry or Department or Start-ups as recognized by department of industrial policy & promotion (DIPP), in accordance with the ministry of finance memorandum bearing No. F.20/2/2014-PPD (pt.) dated 25 Jul 2017 (as amended

from time to time). DPSUs will also submit all BGs and EMD as applicable while participating in multi-vendor cases with private vendors.

(iv) **Format of EMD**. The Bid Security may be accepted in the following forms, safeguarding the Buyer's interest in all respect:-

(aa) Bank Guarantee from any Indian Public or Private Schedule Commercial Bank notified by RBI or first-class banks of international repute. The format of the Bank Guarantee for Bid Security is provided at Annexure 1 to Appendix O.

(ab) Insurance Surety Bond – The format and guidelines pertaining to the same shall be issued / notified by the Ministry of Defence.

(ac) Account Payee Demand Draft, Fixed Deposit Receipt, Banker's Cheque shall be payable in an acceptable form. The Beneficiary Bank Details for furnishing the same are as follows:-

(IFSC CODE- SBIN0000691)
State Bank of India New Delhi Main Branch
C Block, 11 Parliament Street
New Delhi, Pin: 110001

(v) **Validity of EMD**. The EMD will be valid for eighteen months or till signing of contract, whichever is later. The EMD shall be extended from time to time as required by the buyer and agreed by the bidder. No interest shall be payable by the buyer to the Bidder(s) on the EMD for the period of its currency. For unsuccessful bidders EMD will be returned on declaration of successful bidder(s)

(h) **Performance-cum-Warranty Bank Guarantee**. Performance-cum-Warranty Bank Guarantee (PWBG) of an amount at the rate (x% of Contract Value, inclusive of taxes and duties) promulgated by MoD at the time of tender submission will be required to be submitted after signing of contract. Shipyard should confirm acceptability of the same.

(j) **Indigenous Content (IC)**. The construction of the MCMVs will be as per DAP 2020 and accordingly shipyards are required to submit the details regarding Indigenous Content (IC). The **categorization for the procurement is intended to be under Buy (Indian-IDDM)/ Buy (Indian).** The MCMVs must meet the minimum IC parameters iaw Para 21 of Chapter 1 of DAP 20. The Shipyards are to also comment/ provide recommendations regarding categorization and IC content as per DAP 20.

PART- II

1. **Procedure for Response**

(a) Shipyards must fill the form of response as given in **Appendix B** (as per **Annexure II to Appendix A to Chapter II of DAP 20 and Appendix C** of this document. Apart from filling details about Shipyard, details about the exact vessel/ MCMVs meeting our generic technical specifications should also be carefully filled. Additional literature on the vessel/MCMVs can also be attached with the form.

(b) The filled form should be dispatched at under mentioned address:-

Cmde (Ship Production),
Directorate of Ship Production
9th Floor, Chanakya Bhawan,
Chanakyapuri, New Delhi- 110021
Tele: 011-26886430
Fax: 011-26886426
E-mail: dsp@navy.gov.in

(c) Last date of acceptance of filled form is **08 weeks** from uploading of RFI. The Shipyards short listed for issue of RFP would be intimated.

(d) Shipyards, if required, can communicate to the project officer of DSP with below mentioned contact details for seeking clarification/ information on the documents {like Navy Order (NO), Naval Construction Document (NCD) etc} mentioned in this RFI.

Commander (SP),
Tele: 011-26886433,
Fax: 011-26886426/ 26886439
E-mail: dsp@navy.gov.in

2. The Government of India invites responses to this request only from registered Indian Shipyards who qualify the criteria as enumerated below:-

(a) Financial assessment parameters as per **Annexure II to Appendix C to Chapter XII of DAP 20**.

(b) The shipyard should have been qualified by Technical Capacity Assessment as per **Annexure I to Appendix C to Chapter XII of DAP 20** or willing to be assessed as per the aforesaid technical capacity assessment parameters.

(c) Possess infrastructure and capacity (considering the existing and future work load) for undertaking the construction of the Vessels.

(d) The shipyard should be in possession of Warship Construction License as per **Annexure I** to **Appendix C** of **Chapter XII of DAP 20** (Details to be provided)

3. The Government of India invites to this request only from Indian Shipyards. The end user of the MCMVs is the Indian Navy.

4. This information is being issued with no financial commitment and the Ministry of Defence reserves the right to change or vary any part thereof at any stage. The Government of India also reserves the right to withdraw it, should it be so necessary at any stage. The acquisition process would be carried out under the provisions of DAP- 20.

PART- III

Guidelines for Framing Criteria for Shipbuilding Cases

1. The guidelines prescribed for short-listing/ pre-qualification of Indian Shipyards in case of shipbuilding cases are detailed in Chapter XII of DAP-20, Financial Assessment Parameters as per **Annexure II to Appendix C to Chapter XII of DAP 20** and Technical Capacity Assessment Parameters as per **Annexure I to Appendix C to Chapter XII of DAP 20**. The relevant details are placed at **Appendix E**.

Appendix A
(Refers to Para 6)

SECTION A – GENERAL

1.	**Role**	**Operational Roles**. The Primary, Secondary and Constabulary roles that MCMVs are envisaged to perform are as follows: - (a) **Primary Roles**. Mine Counter Measures using unmanned MCM suite. (b) **Secondary Roles**. (i) Channel mapping, route survey and sanitisation. (ii) SAR and HADR. (iii) Mine laying. (iv) Local naval defence. (c) **Constabulary Role**. These ships would be deployed for the following constabulary role:- (i) Coastal surveillance. (ii) MIO and VBSS operations in Indian Maritime Zones.
2.	**Critical Design Drivers**	(a) Standoff MCM operation capability using unmanned MCM suite. (b) Capability to launch, recover and operate two Compact Autonomous Surface Craft – All Domain Effects (CASCADE) Autonomous Surface Vehicle (ASV), four Heavyweight Autonomous Underwater Vehicle (AUV) and one Ship launched Multi Utility Long Endurance (MULE) Multicopter or Naval Shipborne Unmanned Aerial System (NSUAS). (c) Minimum Acoustic, magnetic and pressure signature as part of ship's design
3.	**Operating Philosophy**	(a) It is envisaged that the MCMV will be deployed for MCM operation remaining outside the mine field with unmanned MCM suite operating in mine field. The MCMV will have Stand-off mine hunting and mine sweeping capabilities through onboard MCM Command & Control system and unmanned tool box for MCM operations as follows: - (i) CASCADE deployable from MCMV to operate in the minefield and transport AUVs and ROVs from mother ship to identify, classify and neutralise the mines. (ii) Conduct of wide area survey of the minefield for mine detection utilising CASCADE and Heavy Weight AUVs using side-scan and synthetic aperture sonars to detect Mine like objects (MLO). (iii) Mine identification, classification and neutralisation utilising ROVs transported by CASCADE into minefield.

		(iv) Mine sweeping utilising CASCADE with towed acoustic and influence sweep equipment capable of sweeping and neutralising influence mines. (v) Ship launched Multi Utility Long Endurance (MULE) Multicopter or Naval Shipborne Unmanned Aerial System (NSUAS) as part of MCM tool box with ISR capabilities to provide comprehensive situational awareness in the mine field and to act as relay between AUVs and Mothership. (b) MCM Command and Control system on the MCMV for the following: - (i) Plan, execute and evaluate MCM and route survey missions from MCMV. (ii) Command and Control System for CASCADE, HWAUV, ROVs, NSUAS and MULE as required.
4.	**Area of Operations**	MCMV should be capable of operating in Indian Ocean Region (IOR)
5.	**International Rules and Regulations**	The international conventions and regulations (as listed below) and as applicable to such warships are to be ensured. The rules and regulations should be duly amended in the contract as applicable to include those in force on the date of keel laying:- (a) International Convention for Safety of Life at Sea (SOLAS) as updated from time to time (b) 1972 International Convention for Prevention of Collision at Sea as updated from time to time. (c) International Convention for Prevention of Pollution from Ships (MARPOL), as per latest amendments along with latest IMO/MEPC Regulations in vogue for sewage treatment, galley waste, garbage disposal, etc. (d) ICOS (IMO- International Code of Signals). (e) ISO 9943 standards for Ventilation and Air Treatment of Galleys/Pantries along with Cooking Appliances. (f) Effluent/ emission treatment for overboard, underwater and funnel discharges, commensurate with the International Convention for Prevention of Pollution from ships 1973, Protocol 1978. (g) Rules of Navigation and Tonnage Regulations for Suez and Panama Canal Authorities, including Measurement. (h) International Convention on Load Lines, 1966 and the International Convention on Tonnage Measurement. (j) Growth Margin is to be in accordance with NES 109/ DDS079 criteria for such warships. (k) Stability Standard is to be in accordance with DEFSTAN 02- 900 Part IV and inclining experiment i.a.w NCD 0104/ 0106.

		(l) The ship is to be built as per *IN* design requirement over and above requirements of international conventions/ standards mentioned.
6.	**General Remarks**	(a) The ship should have a service life of 30 years. The ship would follow an operational cycle of ≥ 60 months, followed by a period of refit of approx. 06 months. (b) Interdocking interval is to be at least 60 months/ commensurate with the refit cycle. Design of the ship is to cater for increased inter docking interval in the way of construction of sea chests to reduce the number of valves, multiple hull valves, embedded sensors for measuring the wear down of shaft line bushes, rudder bushes and stabiliser bushes.
7.	**Dimensions**	(a) Length - 87 m ± 5% (b) Breadth - 15 m ± 5% (c) Draught - 4.1 m ± 5%
8.	**Displacement**	2800 Tons ± 10%
9.	**Speed**	(a) Max Speed ≥ 20 Knots (b) Economical Speed 14 Kn (endurance ≥ 2500 nm) (c) The ship should be able to undertake prolonged low speed running for MCM operations between 0- 6 Kn.
10.	**Endurance and Range**	Endurance ≥ 2500 nm at 14 Knots. The ship should be able to sustain at sea for approx. 8-10 days (with 25% reserve of fuel) without OTR at economical speed.
11.	**Sea Worthiness**	(a) Operational seaworthiness upto Sea State 4. (b) Transit on all headings upto Sea State 4. (c) Survivability upto Sea State 6.
12.	**Propulsion**	CODOE configuration with Two Diesel Engine and Two Electric Motors
13.	**Operating Conditions**	(a) **Operating Profile**. The broad operating profile of the ship would be as follows:- **Ser** — **Speed Regime (kts)** — **% Time** (i) 0 - 6 — 20 (ii) 6 – 14 — 60 (iii) Above 14 — 20 (b) The ship should be available for deployment at 4 hours normal notice and 30 minutes short notice. (c) **Regime of Operation**. Normal, MCM quiet regimes for various conditions of operation. (d) All machinery (other than AC plants) are to be designed to perform at rated conditions under the following environmental conditions unless otherwise specified:- (i) **Ambient Air temperature**. -10^0 C to 45^0 C. (ii) **Max Relative Humidity**. 95% at 32^0 C.

		(iii) **Ambient Sea Water Temp**. Max 35^0 C. (iv) **Salinity of Water**. Upto 36000 PPM. (e) The air conditioning plants are to be deigned to perform at rated conditions under the following environmental conditions:- (i) **Ambient Air temperature**. 41^0 C Dry Bulb (extreme ambient temperature 45^0 C). (ii) **Sea Surface Water temperature**. 38^0 C. (f) All machinery, its sub-assemblies and control systems should be able to perform continuous operations with machinery compartment conditions as follows:- (i) Normal operating conditions upto 55^0 C (ii) Operation in closed down conditions >70^0 C
14.	**Design and construction standards**	(a) 12 x MCMVs will be designed and constructed primarily to meet the ***IN*** requirements using relevant Naval standards/ specifications (i.e. NES/ Def-Stan, MIL-STD etc), ***IN*** specifications/ SOTRs and other reference documents, as indicated in the GLS. Latest versions of the standards are to be followed. The relevant Naval Equipment Standards (NES) and DEFSTAN (latest versions) will apply for overall design of machinery and equipment as well as tests and trials, not specifically mentioned by the *IN.* (b) Latest *Naval Rules and Regulations* of one of the ***IN*** approved Classification Society, viz, IRS/ ABS/ LR/ RINA/ DNV-GL/ BV for combatant vessels will be used for basic design and construction of the MCMVs. Class Notations for the project will be finalised at the TEC stage in consultation with the selected Class Society to cover all design aspects of MCMV to the maximum extent feasible. **Indicative Class notations of one of the *IN* approved Class Society are to be proposed in RFI response.** ***IN*** requirements will be catered in the design in addition to Class Rules and will be applicable superseding Class Rules for the relevant aspects. Naval Class Rules/ International Standards may be used for the aspects not specifically covered by ***IN*** requirements/ standards included in GLS in consultation with ***IN***. (c) Classification Society surveyors will undertake design/ drawing approval, construction survey and FATs/ HATs/ SATs of the equipment and overall ship as per requirement of Classification i.a.w the relevant Naval Class Rules, incorporating ***IN*** specifications. ***IN*** will undertake survey/ tests and trials for non-Class aspects of the ships (will elaborated in RFP stage), including weapons and sensors, as well as mission critical equipment as per requirements specified by ***IN***. The QAP for construction of the project, including trials, will be finalised in consultation with ***IN*** on conclusion of the contract. (d) The shipyard will be required to provide a certificate from the nominated Class Society at the time of delivery of the ships that the ship has been built to the agreed Class Notations and the design complies with all aspects of the Build Specifications. The seller shall therefore share a copy of GLS/ Build

		Specifications with the nominated Class society and finalise the contract with the selected Class Society accordingly.
15.	**Stealth Features**	(a) **Acoustic Signatures**. Maximum noise reduction is to be achieved both in hull design and selection of machinery for minimising self and radiated noise. Shock mounts to reduce vibration for machinery and equipment to achieve low acoustic noise is to be an integral part of design. Self-Noise monitoring system is to be incorporated as part of the hull mounted sonar suite. (b) **ELFE Signature**. Measures to mitigate ELFE signature to counter multi influence moored and ground mines are to be adopted. Active shaft grounding system for shaft and metallic passive grounding for main and auxiliary machinery and systems should be employed to reduce the Ship's ELF Electromagnetic signature and also to prevent corrosion. (c) **Magnetic Signatures**. The ship should have minimal magnetic signature as per ship's design with degaussing ON. (d) **Degaussing**. A computerised tri-axial DG system catering for automatic compensation of 90-95% of the ship's signature with inputs from ship's navigation system is envisaged. The degaussing system should be capable of reducing induced magnetism, it would be desirable to have features of reducing the permanent magnetic signature. (e) **Pressure Signature**. The ship is to have minimal pressure signature as part of ship design and selection of equipment.
16.	**Ergonomics**	(a) The latest ship design concepts, wrt ergonomics/functional aspects and crew comfort, are to be adopted. The equipment is to be sited, to cause least disturbance to crew, in operational compartments and living spaces. (b) Noisy equipment (such as motors, pumps and converters) are not to be fitted inside compartments like Bridge, Operations Room and Sonar Control Room. The doors, hatches and ladders are to be of modern design, to facilitate easy and safe closing/opening and speedy movement of personnel and equipment/stores within the ship. In accommodation areas and galley, modular concepts are to be catered for. (c) Modular and ergonomically designed furniture is to be fitted on board using lightweight composite (fire resistant) material. The bunks are to be provided for 110 % of the ship's complement. Accommodation is to be designed to meet broad guidelines of NES 107 and *IN* guidelines for Modular Accommodation and Habitability upgradation of *IN* ships. (d) Access arrangement and fittings are to comply with DEF STAN 02-119, DEFSTAN 02-149 and DEFSTAN 02-127. (e) Access policy and consequent design is to be iaw NES 149 or its latest version. Access fittings iaw NES 127. (f) Human factor consideration iaw DEFSTAN 00-25 or its latest version.
17.	**Shock Specifications**	The shock specifications for the ship are as follows: – (a) For equipment which affect ship's float/move/fight efficiency *IN* Shock Grade A iaw *IN* Shock Policy EG/5522/Policy dated 11 May 07.

		(b) For equipment which does not affect float/move/fight capability – NSS II *IN* Shock Policy EG/5522/Policy dated 11 May 07.
18.	**Complement**	The ships' complement should not be more than 75. Accommodation for 30% women (as officers) and 20 % women (as sailors) is to be catered iaw IHQ MoD(N)/ DOP policy NA/3102/Policy dated 02 Dec 22.
19.	**COTS Technology**	COTS technology is to be incorporated iaw extant orders in force.
20.	**Protection**	NBC Protection and Shock Protection as per current Naval Standards.
21.	**UNREP**	The ship should be able to undertake astern and abeam fuelling with tankers, light jackstay and light line transfer.
22.	**Boats**	(a) The ship is to be provided with 01 x 7m RHBs on the Boat Deck and 01 x Gemini on the quarterdeck. (b) The RHBs are to be serviced by a davit. (c) Gemini is to be serviced by a deck head mounted lowering and hoisting mechanism.
23.	**Unmanned Systems**	(a) 02 x Compact Autonomous Surface Craft – All Domain Effects (CASCADE) Autonomous Surface Vehicle (ASV). (b) 04 x Heavyweight Autonomous Underwater Vehicle (HWAUV). (c) 20 x Remotely Operated Vehicle (ROV). (d) 01 x Ship launched Multi Utility Long Endurance (MULE) Multicopter or Naval Shipborne Unmanned Aerial System (NSUAS). Generic dimension for unmanned system be catered i.a.w unmanned roadmap for ***IN*** for RFI. The equipment is being Designed and Developed And will be sourced through shipyards on completion of D&D. Details of vendors will be shared based on completion of successful trials of prototype.
24.	**LARS**	Suitable LARS for launch and recovery of CASCADE/ HWAUVs/ ROVs/ UUVs.
25.	**Op Logistic Management Information System**	A LAN system hard wired for OP logistics is to be provided for automating administrative functions onboard. External links to this LAN must be through a central location. Appropriate access control features are to be incorporated.
26.	**IPMS**	An Integrated Platform Management System (IPMS) including Battle Damage Control System (BDCS) is to be provided. The Ship Control Centre (SCC) should have consoles for control and monitoring of main propulsion system, auxiliaries, PGD and BDCS.
27.	**CIM**	A Common Information Model (CIM) for adherence by all weapon/ sensor/ CMS OEMs. The CIM to specify information structure for communication within/ across *IN* CMS and amongst all systems (weapons/ sensors) to accomplish data centric approach thereby forming the basis for interface protocols between systems. CIM to include common data structures viz range, units, precision etc.
28.	**Surveillance and Security Arrangement**	(a) Contemporary Internal/ External Security and Safety Surveillance System (CCTV System), as per IHQ MoD (N)/DSR Policy letter

		WP/0651/CCTV dated 27 Sep 12 and amendment to the Policy dated 22 Mar 18 or latest policy promulgated. (b) IPMS CCTV camera system as per SOTRs promulgated by IHQ MoD (N)/ DME.
29.	**Green Warship**	Green Warship design features, and energy efficient and environment friendly technologies are to be provided. Energy Saving Hydrodynamic Devices (ESHD) are to be fitted onboard MCMVs in order to reduce fuel consumption and Greenhouse Gas Emission.
30.	**Construction**	Construction of MCMVs should be based on modern concepts like Integrated Construction of Hull, and Integrated Composite Mast. Concept of Digital Twin, i.e. Product Data Management (PDM) and Product Life Cycle Management (PLM) are to be utilized for effective management of information throughout life cycle of the ship.
31.	**Automation and Redundancy**	MCMVs with Unmanned MCM suite are to have a great degree of automation and inbuilt redundancy.
32.	**Workshops**	In order to optimize available space onboard, various Workshops/ Laboratories, as specified in later sections, are to be co-located based on their utility to the extant feasible.
33.	**UIG**	User Interaction Group (UIG) review of compartments will be conducted as per latest policy during *Finalisation of GA Drawing, Detailed Design* and *Construction Stage For The 1st Ship Of Class.*
34.	**Design Ownership**	The Buyer reserves exclusive rights and complete ownership of the Project Design. The seller may build similar ships to the contracted design, only on explicit approval of the Buyer. On delivery of the last vessel of the class, the seller shall be legally bound to provide the Buyer all drawing and documents including ‘As Built Drawing’ of the last Ship of the project, that would be necessary for construction of the follow-on series of the vessel (s).

SECTION B – HULL

1. **Standards**. Naval

2. **Systems**.

Ser	Name	Standards
(a)	Paint Scheme	NCD 1481, 1493, 1491, 1494, 1437, 1478, 1485 and NO 53/16
(b)	Ventilation System	DEFSTAN 02-102 (Requirement for HVAC), ISO 9943 - Ventilation and Air treatment of Galleys and Pantries with Cooking Appliances
(c)	DMR 249A Steel	NCD 0249
(d)	Sewage System	NCD 3930,
(e)	Doors & Hatches	NCD 1447, 1448, 1449

3. **Equipment**.

Ser	Name	Standards
(a)	Habitability	NO 19/07, Guideline Specifications for Habitability Upgradation and Modular Accommodation onboard *IN* ships, Issue 2, Feb 2013. IHQ/ DNA Policy/ H-121/ Equipment dated 05 Apr 17, DEFSTAN 02-107 (Requirements for Accommodation), DEFSTAN 02-121 (Design of Scullery/ Galley), NES 149 (Access Policy in Surface Ships, Guidelines for Standardisation of Accommodation and Hull Compartments- 2022.
(b)	HVAC	DEFSTAN 02-102 (Requirement for HVAC), ISO 9943 - Ventilation and Air treatment of Galleys and Pantries with cooking Appliances.
(c)	Boat Davits/ for 7m RHB and lowering & hoisting mechanism for Gemini	NCD 1500, Issue 1, 2011
(d)	Anchor	NCD 3909
(e)	Chain Cable accessories not requiring Flash Butt welding	NCD 3909
(f)	Anchor Chain Cable and accessories requiring Flash Butt welding (chain cable dia > 48mm)	NCD 3909
(g)	Anchor Capstan	NCD 3901

Ser	Name	Standards
(h)	LSA - Hazardous Duty Life Jackets	NCD 3926
(j)	Provision Lift	Class Regulations on Shipboard Lifting Appliances and SOLAS.
(k)	Accommodation Ladder	IS 10943 (Specifications to Accommodation ladders), IS 8994 (Ship building and marine structures-deck machinery), SOLAS guidelines
(l)	Launch and Recovery System (LARS) for CASCADE ASVs/ HWAUVs/ ROVs/ UUVs	Naval Std. Approx dimensions/ weight details of unmanned vehicles are indicated below (*Unmapped Roadmap for IN* may be referred for further details):- (i) 02 x ASVs : 12 m length (suitable LAR mechanism to be provided). (ii) 04 x HWAUVs: 5 m length x 21 inch dia, 1.5 ton weight.(crane/ davits suitable LAR mechanism to be provided). (iii) 20 x ROV : 2 m length x 9 inch dia, 50 kgs weight (davit/ suitable LAR mechanism to be provided).

4. **Compartments**.

Ser	Name	Numbers	Equipment	Standards
(a)	Hull Store	01 (To be collocated, and also can be combined)	(i) Authorized List of Hull Husbandry Tools (ii) Authorized Hull SPTA (iii) Shelves/ racks/ lockers	DEFSTAN 02-126
(b)	Hull Workshop		(i) Modular workbench with following: - (aa) Bench vice (ab) Pipe clamp (ii) Tool drawers (iii) Anvil (iv) Bench drilling machine (v) Bench grinding machine (vi) Wood circular cutter (bench mounted) (vii) Bench mounted jig saw (viii) Portable welding machines with vacuum cleaner. (ix) Pipe cutter (x) Pipe crimping tools (xi) Racks and cupboard (xii) Space for storing portable equipment and consumable while working	(i) IHQ MoD(N) Habitability Guidelines – 2013 (as amended 2017) (ii) DEFSTAN 02-307

Ser	Name	Numbers	Equipment	Standards
(c)	Hull Office	01	(i) 03 men workstation (ii) 01 table/ chair (iii) Sitting arrangement for at least 05 personnel (iv) Books/ File Storage (v) Arrangement as per general office Standards (vi) Other standard Habitability fittings for office	IHQ(N) Habitability Guidelines – 2013 (as amended 2017)
(d)	STP Compartment	02	(i) STP and associated systems (ii) Other arrangement as per NCD 3930	(i) NCD 3930, Issue 3 (ii) DEFSTAN 02-102 (2007) (iii) DEFSTAN 02-718
(e)	Officer's cabin	As per no of officers/ and as per design	Minimum requirement iaw DEFSTAN 02-107 and IHQ MoD(N) Habitability Guidelines	(i) DEFSTAN 02-107 (ii) IHQ(N) Habitability Guidelines – 2013 (as amended 2017)
(f)	Sailor's Mess	As per no of sailors/ and as per design		
(g)	Baggage Store	02	Racks for stowage of luggage	DEFSTAN 02-126
(j)	Barber Shop	01	Mirror/ Barber Chair and table/ Cupboard/ Cleanship Gear/ Vacuum cleaner/ Music System	IHQ MoD(N) Habitability Guidelines – 2013 (as amended 2017)
(k)	Civilian's Accommodation	01	Minimum requirement iaw DEFSTAN 02-107 and IHQ(N) Habitability Guidelines as per Jr Sailor entitlement	
(l)	Tailor's shop	01	(i) Sewing Machine/ Locker (ii) Tailor Table (iii) Hanging space (iv) Arrangement for cloths (v) Locker for stowage of cloths and tools	
(m)	Canteen	01 (with combined or attached canteen store)	(i) Small Compartment augmented for Storing and selling Canteen Items (ii) Money safe (iii) Document/ record locker (iv) Other standard Habitability fittings for office	(i) IHQ(N) Habitability Guidelines – 2013 (as amended 2017) (ii) DEFSTAN 02-126

Ser	Name	Numbers	Equipment	Standards
(n)	Fuel Tanks	As per design	NA	(i) DEFSTAN 02-154, (ii) DEFSTAN 02-155 (iii) INBR 31
(p)	Fresh Water Tanks	As per design	NA	(i) DEFSTAN 02-154, (ii) DEFSTAN 02-155 (iii) INBR 31
(q)	Toilets	As per design	(i) Minimum requirement iaw DEFSTAN 02-107 and IHQ(N) Habitability Guidelines. (ii) As per design	(i) DEFSTAN 02-107 (ii) DEFSTAN 02-718 (iii) IHQ(N) Habitability Guidelines – 2013 (as amended 2017)
(r)	Laundry	01	(i) Industrial Grade Heavy duty washing and drying machine (03 nos) (ii) Ironing space with table – 04 nos (iii) Storage space for soiled, washed as well as dry clothes (iv) 01 (06 kg) Washing machine for officers and 03 (7.5 kg) automatic washing machines for sailors, suitably accommodated near bath rooms	DEFSTAN 02-123
(s)	Gears for Taking Fuel	As per Design	(i) As per RAS/ Bunkering Gear Design (ii) Standardized three roller fairlead in each location, for RAS/ FAS, if opted for	(i) DEFSTAN 07-279 (ii) DEFSTAN 22-94. (iii) BR 67 (iv) IHQ MoD (N)/ DNA letter NC/Policy/H-135/ Equipment dated 24 Oct 18
(t)	U/W Opening	As per design	As per final SFD and system Wet-end design	Nil

SECTION C – ND & CMS

1. **Systems**.

Ser	Name	Numbers	Capabilities/ Features	Standards
(a)	IBS	01	As per NSQRs	International and Naval Standards
(b)	CMS	01	Integrated with MCM and Unmanned systems Command and Control system and database system of Mine Warfare Data Centre (Ashore)	Naval Standards
(c)	NAURAN	01	As per NSQRs	Naval Standards

2. **Equipment**.

Ser	Name	Numbers	Capabilities/Features	Standards
(a)	Echo Sounder	01	As per NSQRs, Echo Sounder Transducer is to be a Diver replaceable type.	Naval Standards
(b)	Log	01	As per NSQRs	Naval Standards
(c)	AIS	02	As per NSQRs	Naval Standards
(d)	GNSS (G3I)	02	As per NSQRs	Naval Standards
(e)	ECDIS	01	As per NSQRs	Naval Standards
(f)	IFF (only Transponder)	01	As per NSQRs	International Standard
(g)	INS-SA	02	As per NSQRs	Naval Standards
(h)	Gyro Repeaters	As per Design	NA	Naval Standards
(j)	Magnetic Compass	01	Transmitting type Magnetic Compass as per NSQRs	Naval Standards
(k)	ADS-B	01	As per NSQRs	International Standards
(l)	Steering Consoles	03	As per NSQRs	Naval Standards
(m)	Night Vision Binoculars	05	As per NSQRs	Naval Standards

Ser	Name	Numbers	Capabilities/Features	Standards
(n)	WSDS/ WSDI	01	As per NSQR	Mil Std

3. **Compartments**

Ser	Name	No.	Equipment	Standards
(a)	Bridge	01	(i) ECDIS – 01 (ii) CMS V-RD - 01 (iii) IBS MFCs – 03 and MFDs- 02 (iv) Internal and external communication consoles, (v) Plotting Table -01 (vi) Steering console	Naval Regulation
(b)	Ops Room	01	(i) MCM C&C Console (ii) CMS MFC -04 (iii) Ops Room V-RD – 01 (iv) CMS CO Chair – 01 (v) IBS MFCs – 02 and MFDs- 02 (vi) Internal and external communication consoles, (vii) Auto Plotter - 01 (viii) Steering console (ix) Weapons and Sensors Control Stations (as required)	Naval Regulation
(c)	Emergency Conning Position (ECP)	01	(i) IBS MFD- 01 and POU 01 (ii) Intercom (iii) Magnetic Compass (iv) Repeaters of Echo Sounder and Log (v) SPT	Naval Regulation

Ser	Name	No.	Equipment	Standards
			(vi) Plotting Table	
(d)	Chart House	01	(i) Plotting table (ii) Stowage arrangements for charts and Nav publications (iii) Main unit of Echo Sounder (iv) IBS MFD – 01 and POU - 01	Naval Regulation

SECTION D - GUNNERY

1. **Standards**. Naval

2. **Systems and Equipment**.

Ser	Name	Numbers	Capabilities/ Features	Standards
(a)	76 mm SRGM with Autonomous FCS	01	As per NSQRs	Naval
(b)	12.7 mm SRCG	02	As per NSQRs	Naval
(c)	EOIRST	01/ 02 (as per layout design of sips)	As per NSQRs	Naval
(d)	VSHORADS	01	As per NSQRs	Naval
(e)	Directed Energy Weapons or 30 mm mountings controlled by EOIRST	02	As per NSQRs	Naval
(f)	Ship Weapon Interlock Safety System (SWISS)	01	As per NSQR	Naval
(g)	COMS	01	Fitted for arrangements shall be made for embarkation of Containerized Missile and Loitering Munitions (Medium Range and Short Range). Dimensions of 40 ft container of 30 tons for fitted for arrangement to be considered.	Naval
(h)	LM 21 MR/SR	01		Naval
(j)	ASR/ MFR	01	As per NSQRs	Naval
(K)	Autonomous FCS	01	As per NSQRs	Naval
(l)	Small Arms	As per allowance promulgated by IHQ MoD (N). Small Arms Posts and Check Fire Bell arrangement should conform to the latest policy guidelines issued by IHQ MoD (N)/ DSR.		
(m)	LRAD/AWD	02 x LRAD/ AWD		
(n)	Saluting Guns	04 x Portable Saluting Guns		

3. **Compartments**.

(a) Weapon compartments as per NSQRs and equipment binding data.

(b) Magazines and Lockers for weapons are to be provided for stowage of ammunition and are to conform to INMER. Ready Use lockers are to be provided as per latest specifications laid down by IHQ MoD (N)/ DSR. Gun Wharf/ VBSS Gear Store is to be provided. Armoury for small arms iaw IHQ MoD (N) guidelines and INMER. Pyrotechnic locker and scare charge/hand grenade locker are to be provided iaw IHQ MoD guidelines and INMER.

(c) Magazines should be fitted with CCTV/ surveillance arrangements and audio alarm systems for access control iaw latest IHQ MoD (N)/ DSR policy guidelines.

(d) The ship should be provided with CCTV coverage consisting of fixed or Pan, Tilt, Zoom (PTZ) camera, suitable multi-functional displays, joy stick control and record and replay functions for external surveillance (including gangway), internal surveillance, monitoring underwater and sensitive compartments, alleyways, magazines and armouries and for monitoring aircraft operations. The CCTV and Security system should be integrated with the ship’s CMS and conform to the guidelines issued by IHQ MoD(N)/DSR.

(e) 01 Gunnery Office

SECTION E – ASW & MCM

1. **Standards**. *Naval*

2. **Systems and Equipment**.

Ser	Name	Numbers	Capabilities/ Features	Standards
(a)	Hull Mounted Mine Hunting Sonar (HMS)	01	Forward Looking Mine & Obstacle Sonar	Naval Standards
(b)	MCM Command and Control System	01	(a) MCM Command and Control system on the MCMV for the following: - (i) Plan, execute and evaluate MCM and route survey missions from MCMV. (ii) Command and Control System for CASCADE, HWAUV, ROVs, NSUAS and MULE as required.	Naval Standards
(c)	Compact Autonomous Surface Craft – All Domain Effects (CASCADE)	02	CASCADE ASVs deployable from Ship to operate in minefield and transport smaller AUVs/UUVs/ ROVs from Ship	Naval Standards
(d)	Heavyweight Autonomous Underwater Vehicle (HWAUV)	04	Route Survey, Mine detection and identification	Naval Standards
(e)	Mine Identification and Disposal System	01	Classification and mine neutralisation using Inspection and Combat ROVs. (Atleast 20 ROVs)	Naval Standards
(f)	Launch and Recovery System(LARS) for CASCADE ASVs/ HWAUVs/ ROVs/ UUVs	02	(i) Suitable LARS for launch and recovery of ASVs, AUVs. (ii) The lifting gear should have provisions for automatic and emergency mode of operation. (iii) Limit switches and overload warning indicators are to be provisioned. (iv) High power flood light on lifting gear is to be provisioned for night operations.	Naval Standards
(g)	Expendable bathy thermograph (XBT)	01	Bathythermograph	Naval Standards

3. **Compartments**.

Ser	Name	Numbers	Equipment	Features
(a)	Sonar Instrument Room for HMS	01	Sonar Cabinets	Temperature and humidity controlled
(b)	Sonar Control Room for HMS	01	(i) Sonar operator console (ii) XBT PC	(i) Temperature and humidity controlled (ii) Acoustic shielding
(c)	MCM Command Post	01	(i) MCM Command & Control Station (ii) Control station console for Unmanned systems (ASV, AUV, ROVs, UAVs)	(i) Ergonomically designed (ii) Temperature and humidity controlled
(d)	Transducer Dome	01	HMS Transducer	(i) Acoustic transparent dome (ii) Baffles/ sound shielded to reduce self-noise
(e)	Magazine for Combat ROVs	01	Stowage of Combat ROVs	As per INMER
(f)	Magazine for demolition store and small arms ammunition	01	(i) Stowage of Small Arms ammunition and Demolition stores (ii) Detonator Locker	As per INMER
(g)	ASW Store	01	Stowage of XBT probes	As per INMER
(h)	Unmanned System Compartment	01	Heavy Weight AUV and ROVs	(i) Sheltered hangarage space for AUVs & ROVs. (ii) Temperature and humidity controlled
(j)	MCM equipment compartment	01	Stowage space for spares of Unmanned systems	Temperature and humidity controlled
(k)	Detonator Locker	01	Stowage of detonator	As per INMER
(l)	RU locker for HG & SC	01	Stowage of primed HG or SC	As per INMER
(m)	ASW Office	01	PCs and Office material, documentation etc.	Office compartment

SECTION F - SEAMANSHIP

1. **Systems**.

Ser	Name	Numbers	Capabilities/ Features	Standards
(a)	Towing arrangement	Two (Fwd and Aft Towing Arrangement)	(i) The towing arrangements and associated gear should confirm to BR 67 (Admiralty Manual of Seamanship) and *IN* Design requirements. (ii) Towing arrangements should include forward and aft towing facilities with emergency disengagement facility. (iii) The ship should be capable of towing ships of similar displacement at 8 Kn	(i) As per NATO standards. (ii) As per latest edition of DEFSTAN 07-279, DEFSTAN 22-90 and DEFSTAN 22-94. (iii) BR 67/2018
(b)	Probe Fuelling	Two sets of Abeam fuelling gears	(i) Two NATO (one each on port and stbd side) Standard Probe receiver with fuelling hoses. (ii) Breakable spool Coupling (iii) Special and general purpose Tools. (iv) Adequate stowage facilities to be provided.	
(c)	Stern Fuelling	One set of stern fuelling gear	Standardised three roller fairleads' on foxle for stern fuelling iaw IHQ MoD (N)/ DNA letter NC/Policy/H-135/ Equipment dated 24 Oct 18 should be provided.	
(d)	Light Jackstay Reception Point	Two points (one on each side for light Jackstay)one set of jackstay gear	Pad Eye arrangement for Heavy Jackstay	(i) DEFSTAN 07-279, DEFSTAN 22-94. (ii) BR 67/2018
(e)	Light Line Transfer(LLT)	One set of gears for LLT	NA	(i) BR 67/2018 (ii) INSI 03/2013
(f)	VERTREP	For forward and Aft part of Ship.	NA	Naval Standards

Ser	Name	Numbers	Capabilities/ Features	Standards
(g)	Anchors and Berthing	02 Anchors are to be provided as per *IN* design requirements	Complete mooring and berthing arrangements including capstans (two forward and two aft) and cable devices and associated gear are to be provided.	Anchor chain cable and accessories should be iaw latest version of NCD 3909 and 3914 and BR 67/2018.

2. **Equipment**.

Ser	Name	Numbers	Standards
(a)	Brow/ Gangway	Two Light weight brows of appropriate dimensions along with stowage arrangements on either side	Naval Standards
(b)	Boats	(i) 01 x 7m RHB (ii) 01 x Gemini	Naval Standards. Boats are to be provided with appropriate single point lifting arrangement for hoisting and lowering.
(c)	Shades and Covers	(i) Two sets of PVC coated nylon fabric retractable shade are to be provided for gangway area. (ii) Two sets of lightweight canvas waterproof covers for weather deck spaces/ weather deck fitting/ machinery openings as per modern merchant marine standards, along with rigging arrangement, are to be provided.	NA
(d)	Hoisting/ Lifting Gear	(i) The ship should be fitted with suitable derricks/ lifting arrangements for handling unmanned systems, Boats and stores. (ii) The lifting gear should have provisions for automatic and emergency mode of operation. (iii) Limit switches and overload warning indicators are to be provisioned. (iv) High power flood light on lifting gear is to be provisioned for night operations.design	Naval Standards
(e)	Life Saving equipment	(i) 20 x 20 men life rafts (catering for 140% Manning Plan iaw DSR Policy WP/0702/Life raft/Policy dated 21 Oct 21) (ii) 40 in nos Hazardous Duty Life Jackets (HDLJ) iaw DSR Policy letter WP/0702/HDLJ dated 29 Jul 15. (iii) General Service Life Jackets. GSLJs for 145% of Manning Plan iaw DSR WP/0702/GSLJ/Policy dated 24 Mar 21.	(i) Conforming to latest IMO/SOLAS LSA code. (ii) BR 67/2018 (Admiralty Manual of Seamanship) and latest IHQ MoD (N) Policy guidelines in force.

Ser	Name	Numbers	Standards
		(iv) Lifebuoys as per scale. (v) 08 MOB Light and Smoke Markers along with Lifebuoys. (vi) Two way Lifebuoy Alarm	
(f)	Berthing gears and fittings	(i) Adequate numbers of thin line berthing hawsers of suitable size should be provided as per *IN* design requirement (ii) In addition, adequate numbers of bollards, cleats and fairleads of suitable strength are to be provided.	iaw Art 3077 of BR 67/2018.
(g)	Seamanship Equipment	Seamanship gear including emergency gears to be provided as per BR 67 for undertaking anchoring, towing, mooring, abeam/ astern fuelling, light jackstay, light line transfer and boat operations.	Naval Standards
(h)	Safety Equipment	To be provided as per latest *IN* policy.	(i) As per latest *IN* policy. (ii) BR 67/2018

3. **Compartments**.

Ser	Name	Numbers	Location	Equipment
(a)	Paint Store	01	As per design	(i) Sufficient racks with securing arrangements are to be provided. (ii) Ladders are to be provided for getting access to the top racks. (iii) Lockers are to be provided for storing paint brushes, boxes of paint drums, etc. (iv) A dedicated area (1 m X 105 m) with coaming may be provided inside paint store for mixing of pouring of paint, so that the dripping of paint is contained in that particular area only. (v) Hair-pin shape rods are to be provided to hang small paint buckets.

Ser	Name	Numbers	Location	Equipment
(b)	Boatswain Store	01	To be collocated with paint store	(i) Sufficient racks with securing arrangement are to be provided. (ii) Ladders to be provided for getting access to the top racks.
(c)	Reel Store	02	As per design	(i) Reel store should have sufficient reels for securing ropes. Separate reels are to be provided for towing hawser. (ii) Sufficient racks with securing arrangement to be provided. (iii) Ladders to be provided for getting access to the top racks. (iv) Sufficient cleats/ hooks to be provided on bulkhead for securing of small cordages.
(d)	RAS store	01	As per design	(i) Sufficient cleats/ hooks to be provided on bulkhead for securing of small cordages. (ii) Sufficient racks with securing arrangement to be provided. (iii) Ladders to be provided for getting access to the top racks.

SECTION G – COMMUNICATION AND EW

1. **Systems**.

Ser	Name	Numbers	Capabilities/ Features	Location
(a)	ACCS	01	The ship should have an integrated communication suite with ACCS for integrating external and internal communication equipment for management, controlling, monitoring and remoting of various ship borne circuits. ACCS should be fully compatible with Data Link and SDRs. Common Aerial Working (CAW) or similar concept be used to minimize the number of Ae.	MCO
(b)	Light weight ESM System	01	EW suite consisting of an ESM system capable of detecting emitters in the Freq range from VHF to Ku band or better	EW Office
(c)	COMINT with DF	01	COMINT system with direction finding in freq range of VHF-C band or better capable of detecting various modern radars and communication equipment waveforms with capability of automatic modulation facility.	EW Office
(d)	GNSS Jammer	01	The ship should have a Global Navigation Satellite System (GNSS) jammer for jamming navigation system of adversaries.	Upper Deck

2. **Equipment**.

Ser	Name	Numbers	Capabilities/ Features	Location
(i)	SDR(Tac)	03	V/UHF and 100W HF channels. For secure voice/ data Tactical (P) and Tactical (S).	V/UHF Room, - MCO
(ii)	HD VLF-HF Rx	04	VLF/ HF Broadcast receiver	(i) MCO (ii) EW Post
(iii)	HF Portables	03	Portable HF for Voice and Data communication.	MCO
(iv)	SDR Manpack	02	V/UHF Portable for secure voice and data communication.	MCO
(v)	SDR Hand Held	04	V/UHF for secure hand held line of sight communication.	MCO
(vi)	ECL Beacon	02	SAG ‘G4’ graded on/ off line crypto system.	MCO
(vii)	Sanchar PC with hotICE card and printer	01	Signal handling device	MCO

Ser	Name	Numbers	Capabilities/ Features	Location
(j)	IBA PC	02	Integrated Broadcast Application PC for receiving VLF/ HF Broadcast.	MCO
(k)	Crypto PC	02	For encryption/ decryption of messages.	MCO
(l)	DMR 16A	01	Recording of communication.	MCO
(m)	VHF Hand Held with VOX and other accessories	30	Hand Held VHF sets for line of sight communication.	MCO
(n)	GMDSS	(i) MMB with DSC -02 (ii) INMARSAT C -01 (iii) SART -02 (iv) EPIRB -01	As per IMO regulations.	(i) Bridge (ii) Bridge Wings (iii) MCO
(p)	LINK II MOD III with LinKryptor	01 (Small ship configuration)	Data Link to provide adequate networks for enabling exchange of data, voice and video amongst platforms over V/UHF, L Band in RF and L, S and KU Band in SATCOM.	(i) MCO (ii) Bridge (iii) Ops Room (iv) EW Post
(q)	SSST Ku Band SATCOM terminal with 02 Scorpio Ver 2 Encryption device	01	Long range secure data / voice communication.	(i) MCO for Rukmani Laptop and phone (ii)SATCOM Compt for Rukmani Rack and BDE. (iii) Bridge, CO Cabin, Ops Room and MCO for Phone.
(r)	MSS SOM (with voice kit) with 02 secrecy device Gautam encryptor	02	Long range secure data/ voice communication.	MCO
(s)	UHF SATCOM terminal with indicated secrecy device	01	Long range secure data/ voice communication.	Bridge
(t)	MSS MK II with 08 secrecy device Gautam (inclusive of work station and printer)	02	For two way secure data communication	MCO
(u)	INMARSAT Maritime voice cum high speed data terminal (FBB	01	Commercial SATCOM system for data and voice communication.	MCO, Bridge

Ser	Name	Numbers	Capabilities/ Features	Location
	500) with FX & Ka Band.			
(v)	Portable ISAT Phone INMARSAT Ex- BSNL	02	Portable SATCOM Communication	MCO
(w)	Red/ Blue NCN	as per design	Red/ Blue NCN node for communication at harbour and at sea	At various location
(x)	Composite Antennae	01	Composite antenna for Communication, EW, SATCOM, IFF, GPS, Data Link etc. to enhance the efficiency of transmission whilst reducing the antenna population on upper decks and masts.	Mast
(y)	Emergency Power Supply	01	One emergency power generator must be provisioned to provide power supply to 01 SDRs, 01 HDVLF HF Rx, 01 ECL Beacon, 01 Rx Ae Exchange, 02 Signal Projectors, 01 UHF SATCOM and 03 RCUs one each at Bridge, Ops Room and MCO.	NA
(z)	Emergency Ae	02	Emergency V/UHF aerials.	Electrical Store
(aa)	Wire Aerials	04	For VLF/ HF communication.	Upper Deck
(ab)	Visual Signalling Equipment	(i) 02x Signal Projector (ii) 02x Aldis Lamp (iii) 02xFlag sets (iv) 02x Sets of Dressing Lines (v) 02 x Sets Hand Signalling Torch (vi) 02x Sets of RAS/ NUC Lights and Shapes	-	Flag Deck
(ac)	Office Equipment	(i) 02x Office Computers with printers and UPS (ii) 01X Desk Top Optical Scanner with OCR	NA	Electrical Office

Ser	Name	Numbers	Capabilities/ Features	Location
		(iii) 01X Photocopier (iv) 01x Heavy duty shredding machine (v) 01x Fax machine (vi) 01xCross cut shredding machine.		

3. **Compartments**.

Ser	Name	Numbers	Equipment	Standards
(a)	MCO	01	(i) ACCS latest version (ii) SDRs (iii) Rukmani Rack, BDE, Lap Top (iv) INMARSAT C (v) HD VLF –HF Rx latest version (vi) Data Link latest version (vii) ECL Beacon latest version (viii) DMR 16A/ latest version (ix) Crypto PCs (x) Broadcast PCs (xi) Sanchar PC latest version (xii) SECEM PC (xiii) Rukmani Phones (xiv) MSS BDE	Naval To be located on same deck as Ops Room
(b)	EW Post	01	(i) ESM System (ii) Sanchay II (iii) HD VLF-HF Rx	Naval
(c)	V/UHF Room	01	SDRs	
(d)	Flag Deck	01	(i) 02xFlag Lockers with provision of stowing vertical flags (ii) 01 Signal Projector each on Port and Stbd (iii) Dressing Lines	Naval

Ser	Name	Numbers	Equipment	Standards
(e)	Foremast	01	Antennae for following:- (i) Communication (V/UHF, L Band) (ii) EW (iii) SATCOM (iv) IFF. (v) GPS. (vi) Data Link.	Naval
(f)	CB Office	01	Stowage of classified publications	Naval

SECTION H - NBCD

1. **Standards**. Naval

2. **Systems**.

Ser	Name	Numbers	Capabilities/Features	Standards
(a)	Magazine Fire Fighting System	As per design	Rapid reaction spray system for all magazines and barbettes as part of MFFS with Auto, remote and local	DEFSTAN 00-101, INMER (INBR 1862), INBR 312 and INBR 1835 Vol I.
(b)	Magazine Flooding System	As per design	Magazine Flooding System	Para 0413(k) of INBR 312 and Para 1015 and 1019(b) of INBR 1835 Vol I.
(c)	Galley Fire Fighting System	02	Automatic Galley Fire Fighting System is to be provided in the galleys for containing galley fire. The galleys must also be provided with fire dampers in all HVAC trunkings. Additionally, indications should be provided in DCHQ, outside respective galleys and IPMS/BDCS during operation.	IHQ MoD (N)/DNBCD policies and SOTRs.
(d)	Automatic/ Remote/ Manually operated sea water system	As per design	Automatic, remote and local/manually operated sea water sprinkling system for Helo Hangar	Para 0205 (f) (ii) of INBR 312.
(e)	Helo Deck Fire Fighting System	As per design	(i) Two fixed AFFF tank with a permanent pipe to the inline inductors shall be provided in the vicinity of helo deck with adequate capacity to provide 20- 25 minutes of unhindered supply of foam when in operation. It should not hinder/ obstruct helo operations. Tank material AISI316L or Equivalent is to be used. (ii) Fire hydrants and associated accessories for helo deck fire fighting.	DEFSTAN 02-119 (NES 119) and INBR 312.
(f)	Contemporary Fixed Fire Fighting System	01 each	Contemporary Fixed Fire Fighting Systems for hazardous compartments/areas.	Class Authority & requirements as per NO (Str) 03/19.
(g)	Fire main/ Salvage/	As per design	Fire Main, Salvage/pumping arrangements and Ballasting/ De-ballasting System.	As per Chapter VII of INBR 312.

Ser	Name	Numbers	Capabilities/Features	Standards
	Pumping Arrangement			
(h)	Pre-wetting System	01	Pre-wetting System for providing a uniform and unbroken water umbrella for all exposed parts of the ship/superstructure.	DEFSTAN 02-118 (Section 8 of NES 118), Article 0827of NES 118 and INBR 312.
(j)	Addressable Fire Detection System (AFDS)	01	Addressable Fire Detection System (AFDS) is to be provided for all compartments and compartments which are likely to remain locked/ unmanned during non-working hours, to meet all requirements. The system should be integrated with the BDCS for continuous monitoring and action.	DEFSTAN-02-602/02/603 (NES 602/603), INBR 312, IHQ MoD (Navy)/ DEE Policy EE/Policy/L-74/ POWER-21 dated 21 Feb 11 and DNBCD Policy letter NB/0695/AFDS dated 19 Jan 18.
(k)	Addressable Flood Alarm System (AFAS)	01	The Flood Warning and Alarm systems (AFAS) will be part of the new BDCS system.	IHQ MoD (Navy)/DEE Policy letter EE/Policy/L-84/POWER-27 dated 02 Apr 12 and DNBCD Policy letter NB/0695/AFAS dated 24 Aug 21.
(l)	IPMS/BDCS	04	Battle Damage Control System (BDCS) is to be located in SCC/DCHQ catering for Machinery Control, Power management, Damage Control, Biological and Chemical warfare. BDCS system should be provided with a UPS of minimum capacity of 30 minutes. Display cum control panel is to be provided in DCHQ/MCR, Alternate DCHQ, Fwd and Aft DC Posts.	Chapter XI of INBR 312 and Para 33 of NO (Str) 03/19.
(m)	Smoke Clearance System	01	Smoke Clearance and Control.	Para 0203 of INBR 312.

3. **Equipment**.

Ser	Name	Numbers	Capability/ Features
(a)	Engine Driven Sea water Emergency Fire Pump	01	Engine driven sea water emergency fire pump is to be cited on the continuous communication deck for restoration of Fire main system during total power failure as per INBR 312
(b)	Enclosed Breathing Apparatus (BA) Charging System.	01	Provision for charging of BASCCA cylinders to the recommended pressure of 300 bars is to be provided from the HP air main via enclosed BA charging filling stations. The specifications should be iaw SOTRs for Enclosed BASCCA Set charging panels with filtration system iaw NB/0695/NEI/Enclosed BA Charging Panel dated 11 Sep 2017. Enclosed BA Charging system is

Ser	Name	Numbers	Capability/ Features
			to be fitted preferably at weather deck or one deck below so that fresh air is easily available for filling in the BASCCA cylinders and exhaust of the plant can be easily pass into the atmosphere.
(c)	NBC Arrangements	01	Design and material Systems requirements for NBC defence, citadel arrangements and special provisions in the ventilation system is to be in conformance with DEFSTAN 02-118 (NES 118).
(d)	Ship Installed Radiac System (SIRS)	01	Ship Installed Radiac System (SIRS) with Master Control Panel in DCHQ as per INBR 312 and DEE EED-50-42
(e)	Biological Agent Detection System	01	Contemporary Biological Agent Detection System with adequate sensing points and Master Control Panel in DCHQ/MCR.
(f)	Ship Installed Chemical Agent Detection System (SICADS)	As per design	Ship Installed Chemical Agent Detection System (SICADS) with adequate sensing points and Master Control Panel in DCHQ/MCR.
(g)	Collective Protection (Multi Citadel)		(i) Provision of collective Protection (Citadel). (ii) Manometers for measuring citadel pressure. (iii) Provision of Shelter Station and Cleansing Station. (iv) Air Conditioned stowage for heat sensitive NBC gears. (v) NBC ventilation system should be autonomous within each zone and be supplied with filtered fresh air through Total Atmospheric Control (TAC) systems. (vi) Remote operation of the NBC ventilation system should be possible through the BDCS and automated to achieve gas tight condition. All necessary indications for closure of hatches, door and flaps should be provided on the BDCS. (vii) Provision of automatic and remote operation of valves in the ventilation system to achieve close down condition on the BDCS. Further, the system is to be integrated with SIRS and SICADS.
(h)	NBC Monitoring, Detection and Cleansing Stations		(i) Requisite number of citadels is to be catered for, provision for supply of air filtered against NBC contaminants to these citadel (s) through Air Filtration Units (AFUs). The AFUs are to be fitted with replaceable NBC Ventilation filters. (ii) The ship should not be a single citadel ship, adequate redundancy for floating is to be incorporated in design. NBC filters and associated system should be provided in the HVAC system. Only indigenous filters are to be used.

Ser	Name	Numbers	Capability/ Features
			(iii) NBC Cleansing Station is to be provided to enable safe exit/entry from the citadels(s) to exposed areas on upper decks. The Cleansing Station is to have four subdivisions, viz, Undressing Area, Stripping Area, Cleansing Area and Monitoring Area. The various sub-sections of the Cleansing Station should be within their own watertight/gastight boundaries or airlocks to prevent breach of citadel. Cleansing Station, Undressing area and Stripping area. (iv) Trap hatch is to be provided between all the NBC Stripping and Cleansing compartments for passing decontaminated respirators/clothing. (v) Following compartments are to be included within Citadels:- (aa) Bridge and Ops Room. (ab) Main Signal Office (ac) Sick Bay (ad) DCHQ/MCR and DC Posts. (ae) Officer's living spaces, Class Rooms and Sailor's Accommodation, Galleys, Wardroom and Dining Halls. (af) Undressing, Stripping and Cleansing Stations. (ag)Passageways connecting all the above mentioned compartments.
(j)	NBCD Arrangements		NBCD arrangements are to be provided as per Chapter 2 of INBR 312. In addition following are also to be provided:- (i) NBCD markings of doors, hatches, compartments, NBCD equipment and systems are to be done with embossed tallies as per extant orders of *IN.* (ii) All doors of galleys and magazines should have air-tight 'peep-holes'/'viewing windows' with unbreakable glass to enable monitoring the compartment from outside when locked. (iii) Sockets for portable dewatering pumps are to be provided in each W/T Section.

Ser	Name	Numbers	Capability/ Features
			(iv) Adequate fixed eductors and ejectors for pumping out water from underwater compartments. (v) Waterline and Volumetric Markings with photo-luminescent paint in all red risk and underwater compartments (vi) Closing and locking arrangement for main power supply switches of both the galleys (hot plates and deep fat fryers). (vii) Stowage arrangements for FB 5 (X) and foam compound container near Foam Inlet Tubes. (viii) All large areas above waterline are to be provided with automatic drainage valve. (ix) CCTV System for monitoring of various, hazardous compartments, flight deck, hangar and various unmanned compartments (x) Smoke Curtains for preventing the spread of smoke.
(k)	NBCD Commn Arrangements	01 Set each	Dedicated communication facility is to be provided between DCHQ/MCR, Bridge, OPS Room, DC Posts, Main Switch Board, Cleansing Post and RPA Operation Compt.
(l)	Additional NBCD Features		The following additional NBCD features are to be provided:- (i) Each watertight section is to have remotely operable independent salvage pump, located at the lowest level possible inside the ship. (ii) Access to compartments below upper most continuous deck is to be only through the watertight sub-divisions to the extent possible. (iii) Independent ventilation system in each of the major watertight sections of the ship (to ensure smoke tight zones) iaw NES 102. The ventilation system should be grouped into separate sections to minimise the spread of smoke, blast and fire. All ventilation motors are to be provided with remote control facility. (iv) All large areas to be provided with automatic drainage valves to reduce free surface effect. (v) All fire pumps are to be positioned strategically to prevent total loss of high pressure sea-water system by location along the centreline of the ship (with the major portion situated below the water line). (vi) NBCD Class & Specification Book is to be prepared by the shipbuilder and provided to the ship prior to commissioning.

Ser	Name	Numbers	Capability/ Features
			(vii) Provision is to be made for periodic flushing of the sprinkling system with fresh water. (viii) Emergency bulk head connections are to be provided between all WT Sections above waterline for ensuring seamless connectivity of fire hoses iaw INBR 312 and NES 119. (ix) Provision of Fixed H_2S sensors display/ indication panel in SCC/DCHQ. (x) Dynamic Kill Cards are to be provided. Each software kill card should include all relevant information about all or selected compartments on the ship. (xi) NBCD Boards are to be provided in DCHQ/MCR and Alternate DCHQ. (xii) AELs and emergency lighting arrangements. (xiii) NBCD drawings are to be provided. (xiv) The CNAL will be provided by *IN* and same needs to be included as part of contract.

4. **Compartments**.

Ser	Name	Numbers	Location	Standards
(a)	DCHQ/ MCR	01	Located amidship for easy access near the center line.	As per Para 34 of NO (Str) 03/19 and INBR 312.
(b)	Alternate DCHQ	01	It should be located in a separate zone and separated from HQ 1 by at least two transverse bulkheads.	As per INBR 312 and Para 36 of NO (Str) 03/19
(c)	NBCD Lockers	As per design	Near Fwd and Aft DC Post. Adequate NBCD Lockers for stowage of DC and FF gears. Design of lockers to accommodate a part quantity of all the CNAL items.	INBR 1835 Vol II
(d)	NBCD Stores	01 (NBCD Store) and 01 NBC Store	Preferably in main communication deck with adequate space with racks for storage of NBCD items. NBC Store to be provided for Air Conditioned stowage for heat sensitive NBC gears.	As per Para 0222 (b) of INBR 312
(e)	BASCCA charging compt		Fixed enclosed BASCCA charging	

SECTION J - ENGINEERING

1. **Standards**. Naval Standards viz. Navy Orders, DME Specifications, EED, NCD, DEFSTAN, MIL STD, *IN* Policy Letters etc. as specified against each serial of Paras below is to be adhered.

2. **Whole Ship Features**.

(a) **Environmental Conditions**.

(i) All machinery (other than AC Plants) are to be designed to perform at rated conditions under the following environmental conditions unless otherwise specified:-

(aa) Ambient Air Temperature : -10^0C to 45^0C

(ab) Max Relative Humidity : 95% at 35^0C.

(ac) Surface Sea Water Temperature : 1^0C to 35^0C.

(ii) The Air Conditioning Plant is to be designed to perform at rated conditions under the following environmental conditions iaw NCD 1903, Issue 1, Aug 22:-

(aa) Ambient Air Temperature : 41^0C Dry Bulb (Extreme Ambient Temperature – 45 ^{0}C)

(ab) Surface Sea Water Temperature : 38^0C.

(iii) All machinery, its sub-assemblies and control systems should be able to perform continuous operation with machinery compartment conditions as follows:-

(aa) Normal Operating Temperature : Upto 55^0C.

(ab) Operation in Closed Down Condition : > 70^0C.

(b) **Shock Protection**. Shock protection of machinery shall be for Class 1 vessel in accordance with *IN* Shock Policy EG/5522/POLICY dated 11 May 07 and EG/POLICY/TSV/13/2016 dated 13 Dec 16.

(c) **Zoning**. Independent machinery and systems will be zoned as far as possible, within the same watertight section.

(d) **Ops cum Refit Cycle**. The engineering equipment and systems is to be designed and manufactured to meet the operation cum refit cycle is to be of approx. 60 months followed by Normal Refit (NR)/ Medium Refit (MR) in-line with Para 6 of Section A – General.

(e) **Propulsion System Integration**. A PSI study must be undertaken through independent PSI consultant having past experience of undertaking PSI study for Electric Propulsion on a Warship. SOTR for the PSI study will be approved by IHQ MoD(N)/ DME.

(f) **Documentation**. Documentation pertaining to all engineering equipment is to meet minimum IETM class 4 specification iaw JSG 0852 or MIL-STD 40051-1. Modular documentation lockers are to be provided in an Air Conditioned Space for proper storage of all documentation. Preparation and distribution of hard copy documentation is to be undertaken iaw DME 452.

(g) **On Board Spares**. The ship is to be provided with OBS for all equipment for running hours based/ periodic maintenance routines likely to fall due in the ops cycle for a period of two years and also for undertaking repairs/ defect rectification on the equipment during this period.

(h) **Base and Depot Spares**. B&D spares for five years of exploitation based on Manufacturers Recommended List of Spares (MRLS) is to be provided.

(j) **Shipping/ Unshipping**. Shipping/ Unshipping routes are to be well defined for all engineering equipment. Provision of soft patch for lowering/ removal of main propulsion and power generation equipment is to be catered for. The shipment/ unshipping route for machinery should not affect the ship's structure. Guidelines as per DEFSTAN 02-302 and IHQ MoD (N)/ DND Policy Letter CD/PSISG/400/TECH POLICY dated 04 Jul 17 are to be adhered to.

(k) **Redundancy**. Redundancy as mentioned against each serial of the PSRs is to be catered in the system design and during the selection of equipment.

3. **System**.

Ser	Name	Numbers	Capabilities/ Features	Standards
(a)	Propulsion Control System (PCS)	One System	(i) The system should be capable of controlling and monitoring Main Propulsion System components viz. Diesel Engines, Electric Propulsion Motors, Reduction Gear, Shafting accessories, Controllable Pitch Propeller and Bow Thruster. The system should be based on VME 64 open architecture with distributed control system and dual redundant optical fibre network. Remote Terminal Units (if required) should also use open architecture VME 64 VITA compliant cards. The MPP control system should comprise the following :- (aa) Onboard Training Simulator (OBTS).	As per *IN* approved SOTR.

Ser	Name	Numbers	Capabilities/ Features	Standards
			(ab) Engine Health Monitoring (EHM). (ac) Built in Test Equipment (BITE). (ad) EOT/POT. (ae) SRPM indicator iaw IHQ MoD(N)/ DME Policy letter EG/5501/TRN dated 10 Mar 22. (af) A shore based simulator for testing and tuning of major components and a training facility are also to be provided.	
(b)	Dynamic Positioning 1 System	01	DP-1 system capable of Dynamic Positioning of the ship.	As per *IN* approved SOTR including major requirements viz.*IN* specification, *IN* Shock Policy, MIL STD 740-2 (SBN), MIL STD 1474E (ABN), ISO 10816 (Vibrations) etc.
(c)	FM 200 or Benign (indigenous) Fire Fighting System for Machinery Spaces	One System	(i) The system should cater for all machinery compartments with dual shot capability for the largest compartment. (ii) The bottles of FM 200 should be distributed between Fwd and Aft compartment.	As per *IN* approved SOTR including major requirements viz.*IN* specification, *IN* Shock Policy etc.
(d)	Fire Main System	As per design	(i) The Fire main system is to be designed as per INBR 312 in consonance with Para 21(g) of Section H – NBCD and should maintain a continuous pressure of > 8 bar across ship with continuous running of one Fire Main Pump. (ii) Fire main isolating valves and fire pump suction and discharge valves will be remotely operated from MCR/ DCHQ. (iii) Each Fire pump should have zero discharge valves with PRV to avoid pulsation and knocking.	As per Chapter VII of INBR 312
(e)	Salvage System	As per design	(i) The Salvage and water drain system is to be designed as per INBR 312. (ii) Provision to undertake Functional Trials is to be provided. (iii) Salvage Pumps/ Dewatering arrangements are to be sited above Bilge Wells	As per Chapter VII of INBR 312

Ser	Name	Numbers	Capabilities/ Features	Standards
(f)	Domestic Fresh Water System with Hydrophore tank	As per design	Fresh Water system should cater for all domestic consumers.	DEFSTAN 02-728
(g)	Chilled Water System	As per design	The system is to be designed iaw DEFSTAN 02-102 and is to be provided with remotely operated valves for isolating consumer sections.	DEFSTAN 02-102
(h)	Domestic Sea Water System	As per design	(i) The system is to be stand alone and should be connected to the machinery sea water cooling system for meeting domestic sea water requirements in laundry, wash spaces and galleys etc. (ii) Interconnection from Fire Main system for emergency is to be provided.	DEFSTAN 02-719
(j)	Machinery Sea Water Cooling System	As per design	(i) The sea water cooling system is to be evenly distributed over the engine room spaces to cater for all machinery cooling requirements. (ii) The number of pumps to be fitted is to be such as to provide at least 100% redundancy over the total consumers' capacity. (iii) The Cooling Water pumps are to take suction through Sea Chests. (iv) Strainers are to be fitted in the suction line of all Cooling Water Pumps.	DEFSTAN 02-719
(k)	Air Intake and Exhaust System including Infrared Signature Suppression (IRSS) for Main Engines and Diesel Alternators	As per design	(i) Air intakes from weather deck are to be provided for the Main Engines and Generators. (ii) The design of the air intakes and exhausts are to meet the specifications as contained in DEFSTAN 02-309 and DEFSTAN 02-313. (iii) Suitable arrangements for sealing, air filtration, drainage and installation of portable equipment for measurement of air intake losses and backpressure and silencers are to be provided. (iv) Exhaust pipes and fittings are to be suitably lagged using lagging materials with suitable thickness such that the surface temperature should not be more than 35 deg C.	DEFSTAN 02-309 DEFSTAN 02-313 IRSS should confirm to specifications mentioned by NSTL post design

Ser	Name	Numbers	Capabilities/ Features	Standards
(l)	Fuel Oil System	As per design	(i) The fuel oil system is to be designed iaw DEFSTAN 02- 320 and shall consist of the Fuel Oil Service, Fuel Oil Transfer and Fuel Oil Purification (Centrifuging) System. (ii) Storage facility for adequate fuel oil to cater for endurance as specified in Para 10 of Section A – General is to be provided.	DEFSTAN 02-320
(m)	Lub Oil System	As per design	(i) The lubricating oil system is to be designed iaw DEFSTAN 02- 303 320 and shall consist of the Lub Oil Service, Lub Oil Transfer and Lub Oil Purification (Centrifuging) System. (ii) Storage facility for adequate lub oil to cater for endurance as specified in Para 10 of Section A – General is to be provided.	DEFSTAN 02-303
(n)	Bilge Pumping Out System	As per design	Bulge Pumps and Eductors are to be sited directly above the Bilge Wells.	-
(p)	HP and LP Compressed Air System	As per design	(i) A compressed air system is to be provided complying to DEFSTAN 02-314 for starting the main propulsion engines and generator engines and supplying compressed air to various electro-pneumatic equipment and systems, weapons and for other compressed air consumers. (ii) The compressed air supply of ship is to be free from moisture, oil and filtered so that it does not contains particulate matter. (iii) All Air Bottles are to be sited vertically with provision to remove condensate.	DEFSTAN 02-314
(q)	Anti-Fouling and Anti Corrosion System	As per design	(i) An anti-corrosive as well as anti-fouling protection system is to be provided for underwater inlets/ discharges and connected systems. (ii) The anti-fouling and anti-corrosive system is essential for protecting the pipelines of the Engineering sea water systems against corrosion thereby enhancing the life of the sea water pipelines in the ship. (iii) This system is to be designed in conjunction with the ICCP system and should not interfere with the functioning of the ICCP System.	As per *IN* approved SOTR.

4. **Equipment**.

Ser	Name	Numbers	Capabilities/ Features	Standards
(a)	Diesel Engine (DE)	02 each	(i) Main Propulsion of the vessel in CODOE in twin shaft configuration with two DEs and two EPMs (ii) One DE and one EPM with one Reduction Gear per shaft propelling CPP (iii) EPM to be in PTO/ PTI mode.	As per *IN* approved SOTR including major requirements viz. relevant DEFSTAN/ MIL STD/ IEC, DEFSTAN 02-313, *IN* shock policy, MIL STD 740-2 (SBN), MIL STD 1474E (ABN), ISO 10816 (Vibrations) etc.
(b)	Electric Propulsion Motor (EPM)	02		
(c)	Reduction Gearbox (RG)	02	(i) RG with two inputs - one from DE and one from PTI/ PTO EPM. Following are to be catered for:- (aa) Reduction Gearbox complete with standard accessories are to be provided. (ab) Motor driven trailing pumps are to be provided with each gearbox to cater for lubrication during shaft trailing. (ac) Motor Driven shaft turning arrangement. (ad) Shaft locking device rated to 50% of the normal torque is to be provided. (ae) SRPM indicator iaw IHQ MoD(N)/ DME Policy letter EG/5501/TRN dated 10 Mar 22.	As per *IN* approved SOTR including major requirements viz. relevant DEFSTAN 02-305, *IN* Shock Policy, MIL STD 740-2 (SBN), MIL STD 1474E (ABN), ISO 10816 (Vibrations) etc.
(d)	Shafting and CPP	02	(i) Twin shaft with Controllable Pitch Propeller is to be designed and manufactured to meet the requirement of the vessel. Following to be catered:- (aa) Non-contact type Torsion meter to be provided. (ab) Protection of shaft line components from corrosion currents and reduction of the shafts modulation of the galvanic current / associated ELFE field is to be undertaken by Active Shaft Grounding system iaw IHQ/DME policy EG/policy/TSV/02/22 dated 06 Jun 22.	As per *IN* approved SOTR including major requirements viz. DEFSTAN 02-304, *IN* Shock Policy, MIL STD 740-2 (SBN), MIL STD 1474E (ABN), ISO 10816 (Vibrations) etc.

Ser	Name	Numbers	Capabilities/ Features	Standards
(e)	Bow thruster	01	Tunnel Type Bow Thruster to enable tug independence during cast-off/coming along side and for conduct of MCM operations / controlling unmanned MCM suite.	As per *IN* approved SOTR including major requirements viz.*IN* specification, *IN* Shock Policy, MIL STD 740-2 (SBN), MIL STD 1474E (ABN), ISO 10816 (Vibrations) etc.
(f)	Diesel Alternators (3200 kW)	04	(i) Should cater for 100% redundancy for hotel load and iaw requirements mentioned in Para 30 (a) of Section K – Electrical. (ii) Load sharing of the DGs will be done using an Automatic Power Management System (APMS). All engineering requirements of auto starting of the DGs (automatic time bound priming, coolant circulation, availability of compressed air/ battery backup etc as required are to be provided. (iii) The diesel engine power is to be adequate for driving the generator set in extreme tropical conditions. (iv) Under-loading (<33%) is to be avoided in all mode of operation.	As per *IN* approved SOTR including major requirements viz. DEFSTAN 02-313, EED-Q-242(R3), DEFSTAN 02-329, IHQ MoD(N)/ DME policy letter EG/Policy/DSL/04/2015 dated 16 Apr 15, *IN* Shock Policy, MIL STD 740-2 (SBN), MIL STD 1474E (ABN), ISO 10816 (Vibrations) etc.
(g)	Emergency DA	01	(i) One (01) EDA meeting requirements mentioned in Para 30(c) of Section K - Electrical is to be provided. (ii) The EDG should be stand alone, air cooled with an electronic governor.	As per *IN* approved SOTR including major requirements viz. *IN* specification, DEFSTAN 02-313, Issue 3, EED-Q-242(R3), DEFSTAN 02-329, INBR 312, *IN* Shock Policy, MIL STD 740-2 (SBN), MIL STD 1474E (ABN), ISO 10816 (Vibrations) etc
(h)	Steering Gear	As required	Electro Hydraulic System with VME 64 based Controls catering for following:- (i) Follow-up type with redundant power packs, piping system, power supply.	As per *IN* approved SOTR including major requirements viz. DEFSTAN 02-339, DEFSTAN 02-329, *IN* Shock Policy, MIL STD 740-2 (SBN), MIL STD 1474E (ABN), ISO 10816 (Vibrations) etc.

Ser	Name	Numbers	Capabilities/ Features	Standards
			(ii) Rudder angle indicators are to be provided in the steering gear compartment, MCR, Bridge and Ops Room. (iii) Primary/ Secondary/ Emergency Steering positions are to be provided. (iv) Provision of failure indication of rudder angle indicator, gyro repeater and slave GPS display at all steering position is to be provided.	
(j)	Stabilisers	As required	(i) Electro Hydraulic Stabiliser System to meet the operational, weapon utilisation, habitability and sea worthiness requirements specified in earlier/other sections is to be provided. (ii) The system is to be suitable for providing necessary stability and reduced roll at varying sea states and wave frequencies. (iii) The system is to be complete with necessary piping, hydraulic arrangements, power supply and VME 64 control system, pumps and oil tanks.	As per *IN* approved SOTR including major requirements viz. DEFSTAN 02-339, DEFSTAN 02-329, *IN* Shock Policy, MIL STD 740-2 (SBN), MIL STD 1474E (ABN), ISO 10816 (Vibrations) etc.
(k)	AC Plants	As per calculated heat load	(i) Suitable standard capacity/ type of AC Plants iaw IHQ/DME Policy EG/4001/AUX/02 dated 28 Aug 20 will be indicated. (ii) Central AC Plants catering to the ship load, growth margin iaw NCD 1903, issue 1 dated Aug 22 and minimum reserve capacity of 100% is to be provided catering to environmental conditions below:- (aa) Ambient Air Temp – 45 deg C. (ab) Sea Water Temp – 38 deg C. (iii) Following features are mandatory:-	As per *IN* approved SOTR including major requirements viz. DEFSTAN 02-102 (Part 1), Issue 3 , DEFSTAN 02-329, *IN* Shock Policy, MIL STD 740-2 (SBN), MIL STD 1474E (ABN), ISO 10816 (Vibrations) etc

Ser	Name	Numbers	Capabilities/ Features	Standards
			(aa) Minimum four plants of equal capacity with two plants capable to cater for 100% heat load with sufficient growth margins. (ab) R134a refrigerant to be used iaw IHQ MoD(N)/ DME fax EG/4001/AUX/02 dated 27 May 22. (ac) Each plants should have independent Condenser, Evaporator, Chilled Water and Sea Water Pumps for each AC Plants. (ad) Condenser and Evaporator (Chiller) should be Shell and Tube type.	
(l)	Ref Plant	As per calculated ref load to meet the endurance of the ship	(i) Minimum two Ref Plants with 100% redundancy are to be provided to meet ship's requirement mentioned at Para 67(d) of Section N- Logistics. (ii) R134a refrigerant to be used iaw IHQ MoD(N)/ DME fax EG/4001/AUX/02 dated 27 May 22.	As per *IN* approved SOTR including major requirements viz. *IN* specification, DEFSTAN 02-159. *IN* Shock Policy, MIL STD 740-2 (SBN), MIL STD 1474E (ABN), ISO 10816 (Vibrations) etc.
(m)	Motor Driven High Pressure Air Compressor	02	(i) Electric motor driven Air Compressor of adequate capacity catering to 100% redundancy are to be provided. Minimum two nos to be installed. (ii) Adequate safety, drying and filtration provisions are to be provided. (iii) The compressors will supply compressed air to the compressed air system at a final air temperature of 40 to 45 deg C that will cater for starting of Main Propulsion and DGs, Air Whistle, weapon systems, weed clearance of sea chests, domestic ship's-husbandry purposes, Spray curtain and all sprinklers for testing. (iv) Driers, filters and dehumidifiers are to be provided on the compressed air pipelines to eliminate moisture from air.	As per *IN* approved SOTR including major requirements viz.*IN* specification, DEFSTAN 02-315, *IN* Shock Policy, MIL STD 740-2 (SBN), MIL STD 1474E (ABN), ISO 10816 (Vibrations) etc.

Ser	Name	Numbers	Capabilities/ Features	Standards
			(v) Adequate air storage reservoirs are to be provided at suitable locations and are to be sited vertically with provision to remove condensate.	
(n)	Diesel Driven High Pressure Air Compressor	01	(i) One Diesel driven air-cooled high pressure air compressor is to be provided. (ii) The capacity of the emergency air compressor is to be same as that of the motor driven compressors provided onboard. (iii) The compressor should be able to charge the complete compressed air system independently if the motor driven compressors are not available.	As per *IN* approved SOTR including major requirements viz.*IN* specification, DEFSTAN 02-315, DEFSTAN 02-313, *IN* Shock Policy, MIL STD 740-2 (SBN), MIL STD 1474E (ABN), ISO 10816 (Vibrations) etc.
(o)	Reverse Osmosis Plants	To meet the Fresh Water requirement of complement at Para 18 of Section A - General	(i) Minimum two RO Plants of adequate capacity is to be provided. (ii) Fresh Water Tank capacity is to be commensurate to the complement at Para 18 of Section A – General and in compliance to requirements at Para 4(p) of Section B- Hull. (iii) Should be capable of operation at depths > 20 m.	As per *IN* approved SOTR including major requirements viz. *IN* Specifications, *IN* Shock Policy, MIL STD 740-2 (SBN), MIL STD 1474E (ABN), ISO 10816 (Vibrations) etc.
(p)	Centrifugal Pumps	As required	(i) Self-priming pumps with adequate capacity and redundancy, where necessary, are to be provided in Fresh Water, Fire Main, Sea Water Cooling, Chilled Water, Salvage, Ballast Systems complying to DME 465. (ii) At least one in number of Emergency Diesel Driven fire pump to maintain designed fire main pressure is to be provided iaw Para 22(a) of Section H - NBCD.	As per *IN* approved SOTR including major requirements viz. DME 465, *IN* Shock Policy, MIL STD 740-2 (SBN), MIL STD 1474E (ABN), ISO 10816 (Vibrations) etc.
(q)	Positive Displacement Pumps	As required	(i) Self-priming pumps with adequate capacity and redundancy, where necessary, are to be provided in Fuel Transfer, Lub Oil Transfer, Bilge Systems. (ii) Portable L/O Transfer pumps are to be provided with all required accessories.	As per *IN* approved SOTR including major requirements viz. ISO 14847:1999, *IN* specification, *IN* Shock Policy,

Ser	Name	Numbers	Capabilities/ Features	Standards
				MIL STD 740-2 (SBN), MIL STD 1474E (ABN), ISO 10816 (Vibrations) etc.
(r)	Fuel Oil and Lub Oil Separator	Two each	(i) Two automated self-cleaning type centrifugal fuel oil separators of suitable capacity are to be provided. (ii) Two automated self-cleaning type centrifugal lub oil separators of suitable capacity are to be provided for purification of lub oil.	As per *IN* approved SOTR including major requirements viz.*IN* specification, DEFSTAN 02-323, *IN* Shock Policy, MIL STD 740-2 (SBN), MIL STD 1474E (ABN), ISO 10816 (Vibrations) etc.
(s)	Oily Water Separator	As required to meet latest IMO/ MEPC regulations	(i) The OWS of suitable capacity is required to purify bilge oil and should conform to latest IMP/ MEPC regulations in force. (ii) The system will incorporate necessary tanks, pumps, oil content monitor, indicator and alarms.	As per *IN* approved SOTR including major requirements viz.*IN* specification, DEFSTAN 02-322, *IN* Shock Policy, MIL STD 740-2 (SBN), MIL STD 1474E (ABN), ISO 10816 (Vibrations) etc.

5. **Compartments**.

Ser	Name	Numbers	Capability/ Equipment/ features
(a)	MCR	One	PCS Consoles and all Remote Control and Monitoring panels of Engineering equipment
(b)	Engineering Office	One	Work spaces with Computer and Work Stations.
(c)	Engine Room	As required	Main Propulsion and associated Auxiliaries equipment
(d)	DA Compartment	As per ship design	DA and other Auxiliaries as per detailed design
(e)	AC Compartment	As per ship design	AC Plants and other Auxiliaries as per detailed design
(f)	Pump Rooms	As per ship design	Centrifugal and PD Pumps
(g)	Refrigeration Compartment	As per ship design	Ref Plants
(h)	Stabiliser Compartment	As per ship design	As per ship design
(j)	ASP	As per ship design	Steering Gear System
(k)	Shaft Spaces	As per ship design	MPP Shaft
(l)	Engineering Store	One	Storage for On board Spares (OBS) for maintenance of the engineering equipment
(m)	Control Spares Stores	One	Storage for On board Spares (OBS) for maintenance of the PCS, DP System and other control spares.

Ser	Name	Numbers	Capability/ Equipment/ features
(n)	Engineering Work shop	One	As per DEFSTAN 02-307
(o)	Lub Oil Storage	As required	LO Storage and RU Tanks to meet the endurance of the vessel
(p)	POL Lab	One	Lab equipment as per list approved as part FOAL for the ship

SECTION K - ELECTRICAL

1. **Standard**. Naval

2. **System**.

Ser	Name	Numbers	Capability/ Features	Standards
(a)	Power Generation	As per design	(i) The Ship should be provided with suitable number of generators confirming to **EED-Q-242 (R3)** to meet electrical load satisfactorily under ships various operating regimes with 100% reserve capacity. The system shall be designed such that full load of the ship shall be shared between the generators during peak action load condition without loading the DAs beyond 80% (approx.) of normal rating. While selecting the generator a minimum growth margin of 10% of the estimated load should be catered. Further generator shall not be under loaded less than 25% during single generator operation. Generators should be suitable for unattended parallel operation. (ii) Following types of main power supplies *(not limited to)* are to be provided:- (aa) 415 V AC, 50 Hz, 3 Phase, 3 wire with floating neutral. (ab) 230 V, 50 Hz, single phase. (ac) 230 V AC, 50 Hz, 3 Phase, 4 wire derived from 415V,3 Ph, 3 wire system (obtained through secondary star connected transformer) with earthing of neutral to ship's hull along with Earth Leakage Circuit Breaker, and Double Pole Double Throw (DPDT) MCB for domestic and COTS equipment.	EED-Q-242 (R3)
(b)	Shore Supply Connection Box	02	Ships to be provided with suitable number of watertight shore supply connection boxes with enclosure protection IP 57, one each on either side of the ship on weather deck of adequate capacity to meet the harbor load of the vessel. Shore supply cable of 100 m length of suitable rating with stowage arrangement near the shore supply connection box is also to be provided. Suitable motorised shore supply arrangement to facilitate rigging of shore supply from jetty to the ship to be undertaken.	EED-Q-264
(c)	Emergency DA	01	Emergency generator confirming to EED-Q-242(R2) and DEFSTAN 02-313 Issue 3 specifications should cater for starting current of following equipment one after the other and is to be provided with starting battery as well as compressed air. It is to be sited as high as possible and capacity should cater for supply power to the following equipment (also in-line with INBR 312):- (i) Communication equipment. (ii) Emergency Lighting.	EED-Q-242(R3)

Ser	Name	Numbers	Capability/ Features	Standards
			(iii) Fire Pump (one). (iv) Salvage Pump (one). (v) Steering Gear (one steering pump). (vi) High Pressure Water Mist System. (vii) All the fire pumps, salvage pumps and steering pumps are to be hard-wired with provision to power any one of them. (viii) Facility for automatic starting and automatic loading of EDG set in case of total power failure onboard is to be provided. (ix) The EDA set is to be provided with electronic governor. (x) The EDA should be standalone, air cooled and should have an independent switchboard from where supply is distributed. (xi) The DA prime-movers should meet latest MARPOL norms on exhaust emissions in force. (xii) 95% Efficiency of alternators for all loads between 50% to 100% to be indicated (refer para 0402 of EED-Q-242 (R2)".	
(d)	Power Supply Distribution	NA	(i) Power distribution system is to be iaw NES 532 or corresponding DEFSTAN and controlled through APMS. Distribution panels will be fed from 415/230/24V 3 phase transformers or transformer rectifier-cum –battery charger will feed lighting and the small power consumers. All circuits will be protected by MCBs. (ii) In addition, following are to be catered for:- (aa) All equipment/ machinery of 0.5 KW and above rating shall be preferably arranged to operate from 415V 3 Ph distribution system. Machines below 0.5 KW rating and the lighting	NES 532

<table>
<tr><th>Ser</th><th>Name</th><th>Numbers</th><th>Capability/ Features</th><th>Standards</th></tr>
<tr><td></td><td></td><td></td><td>installation, Radar, W/T and other navigational equipment etc may be arranged for operation on 230V 1Ph, 2 wire system.

(ab) Adequate 230V AC and 24V DC sockets should be installed in all machinery compartments and upper decks.

(ac) Adequate numbers of 230V 50 Hz supply sockets are to be provided in the ship for domestic appliances.</td><td></td></tr>
<tr><td>(e)</td><td>Change Over Switches</td><td>As per design</td><td>(i) Normal and alternate source of supply for important services to be arranged through change over switches. Based on the role of equipment onboard, the critical equipment/ systems are fitted with Auto Changeover Switches (ACOS) to ensure availability of alternate power supply during partial failure/ non-availability of primary power supply. The Auto Transfer Switch (ATS) confirming to EED-50-78 are required to be installed in lieu of ACOS onboard as per power supply requirement of respective systems with embedded system software. Accordingly, the power supply change over time essential to prevent tripping of system/ equipment which require ACOS/ ATS is to be ascertained from the OEMs. For systems/ equipment with changeover time of less than 0.1 sec and not provided with UPS by the OEM, installation of ATS is to be undertaken in lieu of ACOS.

(ii) Shipyards are to be intimated for installation of ATS in lieu of ACOS based on power supply changeover times mandated by OEM’s for trip free operation of systems/equipment.

(iii) The following are the equipment broadly classified into type of change over switches:-
<table>
<tr><th><u>Ser</u></th><th>Auto Transfer Switch (ATS)</th><th>Auto Change Over Switches (ACOS)</th><th>Hand Change Over Switches</th></tr>
<tr><td>(aa)</td><td>Radar</td><td>Steering Motor</td><td>Air Conditioning</td></tr>
<tr><td>(ab)</td><td>Sonar(ac)</td><td>AER and MER auxiliaries</td><td>Fire pumps</td></tr>
<tr><td>(ac)</td><td>APMS</td><td>Boat Davits</td><td>E/R Ventilation Fans</td></tr>
<tr><td>(ad)</td><td>IPMS</td><td></td><td>Conversion Machinery Room</td></tr>
<tr><td>(ae)</td><td>IBS</td><td></td><td>General Ventilation</td></tr>
<tr><td>(af)</td><td>EW systems</td><td></td><td>Hoists and Auxiliary Engine Room auxiliaries</td></tr>
<tr><td>(ag)</td><td>CMS</td><td></td><td>Hoists and lights for ammunition</td></tr>
</table></td><td>EED-Q-264 (R2)

For ATS - EED-50-78</td></tr>
</table>

<table>
<tr><th>Ser</th><th>Name</th><th>Numbers</th><th>Capability/ Features</th><th>Standards</th></tr>
<tr><td></td><td></td><td></td><td>
<table>
<tr><td>(ah)</td><td>All Weapons and Weapon Control Systems</td><td></td><td>Coolant Pumps. Control air compressor</td></tr>
<tr><td>(aj)</td><td>--</td><td>--</td><td>E/R lighting</td></tr>
<tr><td>(ak)</td><td>--</td><td>--</td><td>Degaussing</td></tr>
</table>

(iv) In addition, HCOS is to be provided for all equipment envisaged to be provisioned with supply through Emergency Supply Connection Box (ESCB).

(v) Navigation lights to have normal and alternative supply through changeover switch in Navigation light panel.
</td><td></td></tr>
<tr><td>(f)</td><td>Main Switchboard</td><td>Minimum two

(Fwd SWBD & Aft SWBD)</td><td>Suitable number of MSBs with bus bar coupler between each generator section, switch gear and distribution boards confirming to EED-Q-264 / IN promulgated SOTRs are to be provided. APMS and SWBD to be procured from the same vendor and should comply with EED-50-48.</td><td>EED-Q-264</td></tr>
<tr><td>(g)</td><td>Emergency Switchboard</td><td>One</td><td>An Emergency switchboard is to be provided and it should totally independent source. The construction of emergency switchboard should be similar to that of Main Switchboards and installed on main deck in emergency generator room.</td><td>EED-Q-264 / IN promulgated SOTRs</td></tr>
<tr><td>(h)</td><td>Automatic Power Management System (APMS)</td><td>01</td><td>APMS should comply with EED-Q-264 and EED-50-48 and is to achieve a high level of availability, reliability with ease of maintenance and servicing. It should be fully integrated, microprocessor based, distributed architecture control system providing distributed control positions that utilizes an object oriented graphical operator interface. The APMS would be equipment Independent of IPMS with the Power Management Control Stations (Signal Interfacing Units) separate from IPMS RTUs. The number of PDU and POU would be decided at the time of finalization of contract. As a minimum one each should be catered for the APMS operation / diagnostics. Each of the switchboard compartments shall have at least one MFC besides an independent regular console in the SCC/ MCR, as specified in the deliverables. APMS and SWBD to be procured from the same vendor.</td><td>EED-Q-264 & EED-50-48 / IN promulgated SOTRs</td></tr>
</table>

Ser	Name	Numbers	Capability/ Features	Standards
(j)	Emergency Supply System	NA	(i) Main emergency supplies are to be taken from main switchboards to selected services and equipment by a system of permanent cables (emergency runs). Detailed information on emergency electrical supply systems is published in BR 2170. (ii) **Equipment Priorities**. Emergency supply capability is to be given to essential services and equipment only, in accordance with the following priorities: - (aa) Priority 1 (Float): Services and equipment required for damage control and the fire fighting activities. (ab) Priority 2 (Move): Services and equipment needed to keep the ship under way and manoeuvrable. (ac) Priority 3 (Fight): Services and equipment for close range defence of the ship. (iii) The need for an emergency supply facility is to be considered in the light of the alternative supply arrangements planned for a service or equipment. (iv) Method of Supply. The emergency supply system is to consist of the following: - (aa) Permanently run risers between decks. (ab) 180A and 400A emergency connection boxes (ECB) to terminate risers and provide connection points for portable cables. (ac) 400A portable cables to temporarily connect across compartments and 180A portable cables to connect directly to equipment. (ad) Emergency through bulkhead terminal to provide a permanent connection, between compartments through watertight bulkheads. (ae) Portable link boxes to couple portable cables. (af) Portable distribution fuse boards to provide multiple emergency supplies.	NES-532

Ser	Name	Numbers	Capability/ Features	Standards
			(ag) Portable 2 KVA, 415V/230V transformers to provide emergency lighting supplies. (ah) Portable fuse panels for 230V services and emergency lighting.	
(k)	Cabling	Based on Equipment	Cables for all lighting, power, shore supply and equipment will be EBXL or contemporary irradiated cables as per *IN* specifications **EED-50-12(R3)** and **EED-50-13(R2)**. Complete electrical installation and wiring etc to be undertaken as per NES 532, as applicable to the naval ships. Alternate supply cables to important services are to be provided and have the maximum possible vertical and horizontal separation throughout their run as far as possible.	**NES-532 EED-50-12(R3)** and **EED-50-13(R2)**.
(l)	Lighting	As per design	The ship's lighting supply would be 230V, 50 Hz, 1Ph and the ship would be fitted with LED light fittings conforming **EED-50-33 (R1).** (i) **Living Spaces**. In all spaces, lighting shall be grouped so that in the event to any supply failing, a portion of lighting shall still be available. (ii) **Engine Room & Weather Deck Light Fitting**. (aa) Engine room lighting shall be arranged so as to specially provide proper illumination to switchboards, telegraphs, lubrication pumps, gauge boards, generators control positions, dials, and indicators. (ab) Adequate number of weather deck light fitting shall be provided, with particular attention to illuminating hatch ways, bracket at position to illuminate funnel, booms, gangway areas and water proof switch sockets shall be arranged. **Magazine Lighting** (i) Primary Lighting. LED based Flame Proof Light Fittings conforming to **EED-50-33(R1)** to be used for Primary Lighting in Magazines. (ii) Emergency Lighting. LED based Flame Proof Light Fitting conforming to **EED-50-33 (R1)** is also to be used as Emergency Lighting in the Magazines. The light fittings are required to be powered using 24 V DC supply from battery banks with suitable charging arrangement located outside the magazine compartments.	**EED-50-33 (R1) EED-50-28**

Ser	Name	Numbers	Capability/ Features	Standards
			(iii) **Alleyway Lighting**. Police low level lights for movement of personnel when normal lighting is switched off shall be provided in lobbies, passages, gangways, hatchways, all sleeping billets, messes and wash place. (iv) **Darken Ship**. The lighting installation shall be so arranged so that it is possible to "darken ship" instantly. Control of group switches, red lighting, use of door switches, screens shall be as per approved plans for "darken ship". (v) **Emergency Lighting**. *"LED based AEL conforming to EED-50- 28 (R1) to be used* in machinery space, living spaces, offices, access ways and passage ways shall be fitted. These emergency lights shall switch on automatically in the event of failure of the ship's primary lighting. (vi) **Ceremonial Lighting.** Two sets of LED based ceremonial garland lights (of nylon base) and boom lights shall be provided for decorating the ship during ceremonial occasions. (vii) **Flood Lights**. Sufficient numbers of flood lights controlled by a dedicated distribution board, dedicated switch and stowage arrangements would be provided for water line illumination for enhanced security scenario. (viii) **Silhouette Lighting**.Silhouette lighting is to be provided for the ship to be identified by the helo, from the air at night. Profile of the ship should be discernible from air. (ix) **Bilge Lighting**. Sufficient numbers of LED based Bilge lights to be provided.	
(m)	Internal Communication	As per design	(i) **Analog MBSRE/Intercom**. Analog MBSRE / Intercom are to be provided iaw **EED-51-08** dated 20 Dec 13. Internal communication to be hardwired communication which will provide point to point, point to multipoint, point to all and cordless communication integrated with internal communication system. The no of groups and locations are to be decided based on type of ship and operational requirement and vetted by the user directorate. The analog MBSRE/ Intercom is required to be interfaced with ACCS communication suite being fitted onboard. The following types of intercom are to be provided:- (aa) AIO intercom (ab) Gunnery Intercom (ac) Conning Intercom (CON 1 and CON 2) (ad) Machinery Intercom (ae) Upper Deck Intercom (af) Damage control intercom	Analog MBSRE/Intercom EED-51-08 Sound Power Telephone (SPT) {EED-50-08 (R2)}

Ser	Name	Numbers	Capability/ Features	Standards
			(ag) Electrical/ maintenance Intercom (ah) ASW Intercom (aj) MCM Intercom (ak) Air Intercom (al) EW Intercom (am) Signal Intercom (an) Command Open line in Ops Room (ap) Visual Fixing Intercom in Bridge (aq) FPM Intercom (ar) Ops Room Nav plotting Intercom (ii) **Auto Telephone**. Provisioning of an independent auto telephone system through suitable digital telephone exchange capable of being connected to at least four external (P&T telephone lines) is required to be undertaken. Telephone instruments in CO cabin, HoDs, senior sailor messes and any other location as specified by the user should have speaker phone and call back facility. (iii) **Sound Power Telephone**. Provision of Sound Power telephone is to be catered onboard the ship. (iv) **Cordless Communication**. Internal communication consisting of at least 200 number of hands free sets or as defined by the user having capability to be interfaced with ship's telephone exchange to be provided. (v) Multichannel voice recorder is to be provisioned linking internal conning circuits	
(n)	EMI/EMC	NA	(i) EMI/EMC standardized procedures are to comply with NECP 500 and MIL STD 461 G. (ii) Standard procedures as per IHQ MoD (Navy) promulgated policies on EMI/EMC aspects to be followed for shipbuilding. (iii) Shipyard to fabricate a Scale Model 1:50 to facilitate RF and EMI/EMC studies on the ship. (iv) Software based EMI/EMC simulation studies to be carried out. (v) The location of all antenna is to be arrived at using modelling software like ship EDF	NECP 500 and MIL STD 461 G

Ser	Name	Numbers	Capability/ Features	Standards
(p)	Data Link	As per design	The Data Link equipment should provide adequate networks for enabling exchange of data, voice and video amongst platforms, in support of operations. It should support operations over V/UHF and L Band in RF and over L, S and Ku Band over SATCOM. The Data Link equipment should enable network enabled operations amongst Command & Control Systems onboard platforms of different origin and vintage, using existing *IN* RF radios and SATCOM channels. It should also integrate other governmental, commercial and proprietary networks including friendly foreign country networks and enable seamless interconnectivity amongst these networks whilst maintaining necessary Information Security provision. The antennae for RF and SATCOM systems should have all round hemispherical coverage enabling persistent connection. System configuration to be decided by user directorate.	Naval
(q)	Common Information Model (CIM)	As per design	In order to enable seamless exchange of information in a common/ standardised format amongst all systems integrated with each other, a Common Information Model (CIM) would be promulgated for adherence by all weapon/ sensor/ unmanned system/ CMS OEMs. The CIM would specify information structure for communication within/ across *IN* CMS and amongst all systems (weapons/ sensors) to accomplish data centric approach thereby forming the basis for interface protocols between systems. It would include common data structures viz. range, units, precision etc. This shall enable network enabled operations where various entities in the 'system of systems' communicate seamlessly.	Naval
(r)	Navigation Complex (NC)	01	(i) Ship will have Navigation Complex (NC) that will be single reference source for harmonised navigational (SHHD) information, and platform's spatial & time reference for all shipborne systems. NC will ensure temporal alignment with global reference (GNSS constellations) along with anti-jam and anti-spoof measures. All ship borne systems shall comply with *IN*'s 'Temporal Alignment Philosophy' and 'Common Information Model (CIM) required for NEC. (ii) Ship to comply with VCNS Memo P-07/22 dated 27 Oct 22 or latest for **Temporal and Geo-spatial Alignment**.	SOTRs

3. **Equipment**.

Ser	Name	Numbers	Capability/ Features	Standards
(a)	Navigation Aids	As per design	Based on the envisaged role of the platform, all the latest navigational aids including IBS with adequate redundancy are to be installed on-board.	Naval

<table>
<tr><th>Ser</th><th>Name</th><th>Numbers</th><th>Capability/ Features</th><th>Standards</th></tr>
<tr><td>(b)</td><td>Rotary/ Static Convertors</td><td>As per design</td><td>Requisite numbers of suitable static and rotary power conversion equipment to be provided. Static converter as per NES 537 and rotary converter as per NES 627.</td><td>(i) EE-50-34
(ii) Mil 461E
(iii) NES 537.
(iv) NES 627.</td></tr>
<tr><td>(c)</td><td>Transformer & Trans-Rectifier</td><td>As per design</td><td>The ship builder shall provide sufficient number of suitable capacity 3 Phase 415/230 volts transformers to cater for small domestic/ galley, lighting, wireless equipment, and navigational loads. Required number of transformers for voltage other than 230 volts which may be required for specific equipment shall be catered

(Note: All transformers, transformer rectifiers shall have a margin of 20% for future completion of the ship)</td><td>(i) EED-50-16 (4Wire) & DEFSTAN 01-535 (3 Wire).

(ii) EE-50-34</td></tr>
<tr><td>(d)</td><td>Battery and Battery charging arrangement</td><td>As per design</td><td>Fire retardant VRLA maintenance free batteries are to be provided. Transformer rectifiers cum battery charger of adequate capacity shall be fitted to boost/ trickle charge the batteries. 24V DC supply is to meet the requirement of emergency lighting, navigation light and communication. The consumer services and additional requirement of engineering and helo etc., to be specified by concerned directorates. A separate battery charging room is to be provided with acid resistant deck, working table, wash basin and water supply.</td><td>EE-50-35</td></tr>
<tr><td>(e)</td><td>UPS</td><td>As per design</td><td>Ruggedised UPS conforming to EED-50-77 to be provisioned for equipment ‘Float’ iaw IHQ MoD(N)/DEE Policy letter EE/03/9711/Policy/l-105 dated 24 Jan 17. Accordingly, supply for the following equipment are to be fed through UPS as per NSQRs promulgated by IHQ/ DEE: -
<table>
<tr><th>Sl</th><th>Equipment</th><th>Type of UPS</th></tr>
<tr><td>(a)</td><td>Navigational lights and NLCP</td><td rowspan="7">Offline/ 24V DC battery backup</td></tr>
<tr><td>(b)</td><td>Telephone Exchange</td></tr>
<tr><td>(c)</td><td>Main Broadcast</td></tr>
<tr><td>(d)</td><td>Conning and Machinery Intercom</td></tr>
<tr><td>(e)</td><td>Emergency lighting</td></tr>
<tr><td>(f)</td><td>Two Communication Sets (Below 1KW)</td></tr>
<tr><td>(g)</td><td>Flood and Fire Alarm Systems</td></tr>
<tr><td>(h)</td><td>Gyro and DDU</td><td rowspan="3">Online/ 24V DC battery backup</td></tr>
<tr><td>(j)</td><td>GPS/ AIS/ VDR/ DAT Recorder/ ECDIS</td></tr>
<tr><td>(k)</td><td>Machinery Control and Indication supplies</td></tr>
</table></td><td>EED-50-77</td></tr>
</table>

Ser	Name	Numbers	Capability/ Features	Standards
			(l) MDA/ MSS Tx/ Rx (m) GMDSS (MMB set) (n) Steering Controls and Indications (o) Two Nav COTS Radar (with least blind arc) (p) Echo Sounder and Log (q) Rukmani/ INMARSAT/ ECL Beacon	
(f)	Motor & Starters	As per design	(i) **Motors.** The applicable specifications for the AC motors are **EED-Q-071 (R4)** for IHQ nominated equipment and Classification society norms for balance motors. Enclosures of the motors shall be IP-57 in the weather/exposed deck areas. Motors, generally of squirrel case induction type as per EED-Q-071 (R4) having class 'H' insulation, continuously rated, on 415V, 3 phase. Motors efficiency should confirm to IE 2. Each motor shall have Thermistor / corresponding relay in starter panel. In the machinery spaces, motors shall be selected to meet the class rules. The motors shall have class 'F' insulation. The motors and its Enclosures shall be as per applicable Classification standards and shall be selected to suit load requirements of various auxiliaries. (ii) **Starters and Controllers**. All the starters & controllers provided shall be of totally enclosed marine type as per **EED-Q- 071(R4)**. Motors below 05 KW shall be provided with DOL starters and motors above 5 KW shall be provided with Star-Delta/soft starter having protections of over current, single phasing/phase failure, earth fault, thermal protection and under voltage. Emergency stop push buttons for machinery room ventilating fans and fuel oil transfer pumps shall be located near the machinery room entrance. The system manufacturer would be required to procure the motor and its starter through a single source i.e. the motor manufacturer. The motor manufacturer in turn shall procure the starter through IHQ MoD(N) approved vendor and shall integrate the motor starter.	EED-Q-071 (R4)
(g)	AEL	As per design	**Automatic Emergency Lanterns (AELs).** Rechargeable LED based AELs having rechargeable Ni-mH cells should be fitted in all living spaces, working areas, lobbies and escape routes. AELs shall conform to EED-50-28 (R1)	EED-50-28 (R1)
(h)	Switch Sockets	As per design	Adequate switch sockets including weather proof switch sockets is to be provisioned.	EED-50-17
(j)	Galley Power supply	As per design	Galley power supply isolating switch iaw IHQ Mod/DEE roadmap for change management EE/03/9712/Safety Audit dated 31 May 19 to be provisioned.	NO 27/06

Ser	Name	Numbers	Capability/ Features	Standards
	Isolating Switch			EE/03/9712/Safety Audit dated 31 May 19
(k)	Cable Gland	As per design	Cable glands are to be sealed using MCT and Removable Cable Gland sealing compound conforming to EED-50-80 is to be provisioned.	EED-50-80 MCT Glands IHQ MoD (N) letter EE/03/9707/Power/Policy/III Dated 01 Jul 16.
(l)	Window Wiper	As per design	Class approved Window wipers confirming to ISO 17899 as per the IHQ MoD (Navy) DEE policy EE/03/9711/Policy/Power/L-116 dated 08 Sep to be provisioned.	DEE policy EE/03/9711/ Policy/ Power / L-116
(m)	HV Mats	As per design	The High Voltage Insulated Synthetic Mats for all electrical applications are to be procured for the vessel as per specifications mentioned vide DEE fax message EE/03/9712 dated 25 Feb 19.	IS-15652-2006 DEE FAX EE/03/9712 dated 25 Feb 19.
(n)	NLCP	As per design	Navigation Light Control Panel to be procured for the vessel as per specification EED-Q-262 (R1)	EED-Q-262 (R1)
(p)	ICCP	01	(i) Cathodic protection is to be provided by means of an ICCP system. The specifications of ICCP system shall conform to latest issue of NCD 3922/ Class Rules. ICCP anodes should be diver replaceable. (ii) PLC based microprocessor controlled, Pt-Ti anode, Ag-AgCl reference electrode, Impressed Current Cathodic Protection system is to be provided with ripple between 0.01 to 0.03 percent. The system should have active shaft grounding and protection against Extremely Low Frequency Electromagnetic Signature (ELFE) and Underwater Electric Potential (UEP). (iii) Materials of sea water pipes, valves, fittings, fasteners, etc. are to be selected so as to avoid bimetallic/ galvanic corrosion. (iv) Anti-corrosive and anti-fouling system for engineering systems. (v) An anode based corrosion and anti-fouling system for the ship's sea water systems is to be provided in addition to ICCP system for hull protection. (vi) Sacrificial anodes iaw latest edition of NCD 3908.	NCD 3922// Class Rules, 3908

Ser	Name	Numbers	Capability/ Features	Standards
(q)	Degaussing	01	A computerised tri-axial DG system catering for automatic compensation of 90-95% of the ship's signature with inputs from ship's navigation system is envisaged. The degaussing system should be capable of reducing induced magnetism, it would be desirable to have features of reducing the permanent magnetic signature.	

4. **Compartments**.

Ser	Name	Numbers	Equipment	Standards
(a)	Electrical Store	03	Spare holding.	Naval
(b)	Electrical Workshop	01	In addition to standard compartment fit, Test benches, soldering bay, stripping bay, PCB repair bay is required	Naval
(c)	Electrical Office	01	In addition to standard compartment fit Workstation for admin work, cabinets, racks, cupboards for housing of files & ledgers, operator chair will be required	Naval
(d)	Switchboard	02	Control and distribution equipment.	Naval
(e)	SRE	01	Internal communication and recreational control / distribution equipment.	Naval
(f)	Gyro Compartment	As per design based on equipment fit.	All sub units of nominated equipment.	Naval
(g)	Equipment Rooms	Based on equipment fit.	All sub units of nominated equipment.	Naval
(h)	Converter Rooms	Based on equipment fit.	All sub units of nominated equipment.	Naval
(j)	BR Office	01	Cupboards and lockers	Naval

SECTION L - DIVING

1. **Equipment**. The procurement of the diving equipment should be as per NSQRs promulgated by IHQ MoD (N).

Ser	Name	Numbers	Location
(a)	Self-Contained Underwater Breathing Apparatus (SCUBA) diving set, AGA Divator 324 MKII (**Make - Interspiro AB, Sweden**) complete consisting of: - (i) Regulator unit with octopus assembly (ii) Positive Pressure Face Mask (iii) Twin Cylinder pack unit (iv) BCD Jacket	4 each	Diving Store
	(v) Mini Test kit	01 set	
	(vi) Tool Kit		
	(vii) Onboard spares for 5 yrs		
(b)	Divers U/W communication system complete (compatible with AGA Divator 324 MKII diving face mask)	02 set	Diving Store
(c)	Inflatable craft medium complete (with spares and accessories) (As per NCD 4006, Issue 3, 2014 specifications)	01	Quarter Deck
(d)	25/30 HP OBM complete with two flexible fuel tank & 5 year spares	01	Quarter Deck
(e)	5 CFM Portable HP air diesel driven compressor with 5 year spares. Working pressure upto 300 Bar.	01	As per design
(f)	Underwater Torch complete 1000 lumens, depth rating 100 mtrs (hand held)	01	Diving Store
(g)	Lamp Search (underwater) Divers complete (head mounted) with rechargeable battery, charger. Spares 2 years	04	Diving Store
(h)	Divers underwater digital camera with HD video, depth rating 50 mtrs	01	Diving Store
(j)	Jacket divers dress (Neoprene 0.5 mm and 3mm thickness) – (Small, Medium, Large 02 each)	6	Diving Store
	Trousers diver dress (Neoprene 0.5 mm and 3mm thickness) – (Small, Medium, Large 02 each)	6	Diving Store
	Boots divers dress (Neoprene 0.5 mm and 3mm thickness) – (Small, Medium, Large -02 each)	6	Diving Store
	Gloves for Divers (Neoprene 0.5 mm and 3mm thickness) in three sizes (Small, Medium, Large -02 each)	6	Diving Store
(k)	Swim fins (Graphite) with back strap	6 Pairs	Diving Store
(l)	Knife swimmers with Sheath	6	Diving Store
(m)	Life Belt	6	Diving Store
(n)	Weight belt (Diver) with four/ six pouches	6	Diving Store

Ser	Name	Numbers	Location
(p)	Buddy Line	03	Diving Store
(q)	Lead Weights (1 & 2 Kgs)	6 each	Diving Store
(r)	Float Spherical for marking (Buoyancy of 5 kgs)	02	Diving Store
(s)	Sinker Concrete 25 kgs	02	Diving Store
(t)	Divers Lifeline (8 mm) (220 mts roll)	02 rolls	Diving Store

2. **Compartments**.

Ser	Name	Numbers	Location	Equipment	Features
(a)	Diving Store	01	Adjacent to Quarterdeck/ As suitable	(i) Two cupboards with racks for storage of diving equipment and one cupboard with pigeon hole slots/ space for equipment spares. (ii) Provision for 02 light-weight steel/ metallic alloy portable boxes (iii) One lockable steel locker for storing expensive equipment (iv) Wooden rack with nylon straps to horizontally secure 04 diving sets (v) Arrangement for hanging DUCS hoses on bulkhead (size 3 to 3½ feet roll) (vi) Full length-hanging space with heavy-duty hangers to stow Neoprene suits (vii) Storage space for metal blanks supplied for underwater blanking of inlets (viii) One Work Station for Computer, printer and editing of photo/ video records	(i) AC with temperature control system (ii) One dehumidifier should be fitted in the compartment for reducing the humidity as required for rubberized gear

Ser	Name	Numbers	Location	Equipment	Features
(b)	VBSS/ Special Ops Equipment Store	01	Access to VBSS launching Point/ Boat deck	(i) Two cupboards with standard racks fitted to the bulkhead for stowage of VBSS/ Special Ops equipment (ii) Arrangement for hanging of 8 BP jackets/ vest	AC with temperature control system
(c)	POL Storage Space (RU locker)	01	Quarterdeck	One RU locker at Quarterdeck/ site of launching Inflatable crafts for storing of POL used for OBMs and Compressors	Suitable ventilation arrangement
(d)	OBM After Use Tank	01	Quarterdeck	One metallic heavy-duty, anti-corrosive tank with fresh water inlet and outlet to drains/valves	As per the size of OBM
(e)	Wooden Chokes for stowage of inflatable crafts	01	Quarterdeck	Wooden chokes for stowage of inflatable crafts	--
(f)	Portable Diving Compressor stowage space	01	Quarterdeck/ Upper deck	Stowage space	Stowage space near QD for one portable HP Air Diving Compressor with a provision of intake of air from weather deck
(g)	Blast Proof Charging Bay	01	Quarterdeck	For charging of NBCD/ diving sets from compressor	--
(h)	Fresh Water Point for after use of diving equipment	01	Quarterdeck	Fresh Water Point	One water cleansing point for carrying out after use routines of diving equipment
(j)	Davit/ Crane	01	Quarterdeck/ Inflatable craft lowering position	For hoisting/ lowering of inflatable craft and OBM	--

SECTION M - AVIATION

Operating Parameters

1. **External Environment Limitations**. As a general rule, RPA operations from ***IN*** ships along with full operational capability, are limited to ship motions not exceeding ±6° roll and ±2° pitch. The presence of the RPA in the ship shall not, in any way, diminish the ship's basic design capability to survive in extremely high sea states. The ship must provide sufficient protection for the RPA to survive the same high sea states to the extent that the RPA operations may be resumed once sea state have subsided.

2. **Internal Environment Limitations - Manned Locations**. Manned spaces, within the ship aviation facilities are to be ventilated and air conditioned to maintain an effective temperature of not more than 24º C.

3. **RPA**. The ship should be fully capable of carrying and operating (both by day and night) 01 Ship borne RPA system (NSUAS and/or MULE) in single RPA deck equivalent easily accessible space (based on RPA and associate equipment dimensions).

4. **Dimensions of RPA**

   (a) **RPA Dimensions**:
   - (i) Boxed Up - 3m x 2m x 1m. (Container Size), If option of dismantling and boxing is available.
   - (ii) Arranged for operations – 8m x 4m x 3m (the size would depend upon the NSUAS contracted. The same could be fixed wing or rotary wing.)

   (b) **Launcher & Recovery System (Max dimensions)**: 10m x 5m x 3m

   (c) **Control Station**: One room of adequate dimensions to accommodate one standard size (3m x 2m x 2m) Control Station and three Operators.

5. **General Requirement**. Open deck of the dimensions 13m X 15m.

6. **Systems and Equipment**.

Ser	Name	No.	Capabilities/ Features	Standards
(a)	CCTV System	One Set	The CCTV system supporting aviation should be a component of the ship's CCTV system. Video signals from the RPA Deck and RPA deck CCTV systems will be distributed throughout the ship via the ship's LAN and will be available at any monitor connected to the ship's CCTV system. The ship shall have a RPA Deck CCTV system to provide surveillance for safety in flying operations. The RPA Deck CCTV system shall provide full	As per NSQR

Ser	Name	No.	Capabilities/ Features	Standards
			views of the RPA Deck and flight paths and any areas that cannot be seen directly from the Operator compartment. The RPA Deck CCTV system shall be controllable from the Operator compartment. The CCTV system should comply with the specifications promulgated by IHQ MoD (N)/DSR.	
(b)	RPA Deck Status Indicating and Ordering System. INBR 1760 Chapter 6	One set	(i) RPA Deck status Indicating and Ordering Panel is required to have a dedicated control on pre-flight, launch and recovery evolution by providing enhance indication panel for smooth exchange of orders from Bridge, Operator, Ops Room and RPA deck. (ii) This system will have switches, lamps, buzzer along with a HMI based panel to enable VISUAL communication (in addition to other existing verbal communication onboard ships) between Bridge/ Command and operator during following RPA evolutions:- (aa) Arranging of RPA of deck (ab) Start/switch off engine (ac) Launch/ Recovery. (ad) Arming. (ae) Fuelling	As per SOTR

7. **Compartments**. General Standard - INBR 1760

Ser	Name	No	Location	Equipment	Features
(a)	RPA Deck	One	Stern/ Midships part of the ship	(i) **Safety Nets and Portable Safety Railing** (aa) **General**. The requirements of this Para reflect the specialised aviation support requirements for railings and stanchions and are in addition to those required by the ship as a whole. A system of safety nets and portable safety railing must be provided to surround the RPA Deck area. Safety nets shall be fitted on the outboard deck edges of the RPA Deck and shall extend the full length of each side and across the after end.	(i) **RPA Deck Dimensions**. (aa) **Length**. Min RPA deck - **15 m.** (ab) **Width**. Min RPA deck width - **13 m**. (ii) **RPA Deck Strength**. RPA deck should be capable to support operations of min 02 **Tons** RPA.

Ser	Name	No	Location	Equipment	Features
				(ab) **Safety Net Stanchion Characteristics**. The safety nets shall be supported by an arrangement of hinged stanchions attached to the outboard face of the ship's side. Quick acting RPA safety net stanchions to be provided made of suitable material so as to withstand a falling load of 150 Kg, from 1.5 m. The stanchions shall be hinged to travel outboard. In lowered position angle wrt vertical should be 70 to 75 Deg. In the fully vertical position, the safety nets shall extend not less than 1.5 meters above the level of the RPA Deck. The nets and stanchions, when in the down position, shall not protrude above the level of the RPA Deck. RPA Deck safety nets shall a Operator be capable of being raised or lowered manually.	(iii) **RPA Deck Obstruction (INBR 1760 Ch 1.5**). Fittings on RPA deck are to be limited to as few as possible. Where essentially required, permitted obstructions on the RPA deck are to be established based on clearance areas to determine the height. These areas are calculated based on the flying and landing clearances and wheel landing areas of all RPA types capable of operation from the deck. (iv) **Fuel Spill Considerations**. The RPA Deck drains and scuppers must be capable of clearing a fuel spill, cantered anywhere on the RPA deck, in less than 2 minutes with the ship in the normal trim position. The RPA Deck drains should not be connected to any other drainage systems. The RPA Deck should be cambered and will be fitted with coaming to ensure that the above requirements are met. However, any projections must not be greater than 10 mm except at the extreme deck side edge where they must not exceed 450 mm. (i) **RPA Deck Surface Finish**. The ship shall have a weatherproof, fuel resistant, non-slip RPA Deck coating. The non-skid RPA Deck coating shall

Ser	Name	No	Location	Equipment	Features
					have a coefficient of friction between **0.6 - 1.0μ** in any condition. (ii) **Fire fighting** Adequate fire fighting appendages should be available on the RPA deck
(b)	Operator Compt	One	Adjacent to the RPA deck. The location of the operator compartment should be such that it provides an unobstructed direct view of RPA approach and departure and full activities onboard RPA Deck.	(i) **Operator Equipment**. The Operator compartment shall be outfitted and equipped with following: - (aa) Operator workstation. (ab) The communications include, basic user terminals, extended user terminals including selected command and operational networks, wire free to RPA Deck personnel, broadcast to RPA Deck and access to main Ship Broadcast, UHF and VHF radio transmit and receive, etc. (ac) Control and indication of RPA Deck landing aids, RPA Deck status lights, other RPA Deck lighting, RPA crash alarm, RPA Deck AFFF monitors, other components of RPA Deck AFFF firefighting systems. (ad) Light switches and controllers of all lights/communication panels are to be located in a master illumination/ communication panel within the operator compartment with all controls at hand's reach while seated on the operator seat and able to monitor RPA operations on deck (ergonomically positioned). (ae) Height adjustable operator chair with specifications similar to Pacific Marine 'Nautic pro Marine seat' should be provided	**Location of Equipment within operator Compartment**. The workstation consoles and associated equipment and instrumentation shall be located so as not to block the user's Field of View (FOV). Access to the operator Compartment should be via an internal stairway (if located on 01 deck) or through the RPA deck. A gastight door that opens outward from the Operator Compartment shall be provided. **Noise Level**. The ambient noise level on the Operator Compartment should not exceed **65 dB**. **Operator Compartment Lighting**. Internal general-purpose white lighting (300 lux). Night red lighting shall also be installed and be controllable in intensity by means of a rheostat from zero to full intensity. **Operator Compartment Windows**. The Operator Compartment windows

Ser	Name	No	Location	Equipment	Features
				(af) Bulkhead mounted dry erase white board. (ag) Bulkhead mounted notice board. (ag) Two storage lockers of appropriate size. (ah) A 7X50 (Magnification X Objective Size) binoculars combined with a compass. (aj) Two large sized digital clocks, one showing local time, one showing Zulu Time. (ii) **Operator Workstation Equipment**. The workstation shall be outfitted and equipped with followng:- (aa) One operator's chair. (ab) One integrated multi-purpose digital display for meteorological data which includes temperature, humidity and barometric pressure and ship's household data. (ac) Internal and external communications facilities with adequate redundancy. (ad) Control panel for RPA Deck general purpose lighting. (ae) Controls for window wiping, washing and defogging systems. (af) Crash on deck alarm illuminated mushroom push button with flip-type protective guard.	with a view to the exterior of the ship and the associated window mullions shall be located and configured to provide a suitable Field of View (FOV) for the Operator. Wiper and roller sunscreens to be fitted on windows.

Ser	Name	No	Location	Equipment	Features
				(ag) Emergency AVCAT fuel shut-off illuminated mushroom push button with flip-type protective guard. (ah) Alarm panel for monitoring and acknowledging alarms. (aj) A Flight Deck Status Indicating and Ordering Panel shall be fitted. (iii) **Standby Control Station for RPA**. Dimension of control station 2m x 3m x 2m.	
(c)	Briefing Room	One	The room shall be located in the vicinity of the RPA deck preferably on the same deck.	**Specifications**. (i) The room shall be within the Citadel of the ship and be ventilated and air conditioned to ship standards. (ii) The room shall be provided with a large electronic display. The display shall be connected to a PC provided in the briefing room which can access the ship's LAN. If the ship is provided with a command and control display system, such system shall be accessible at the briefing room PC and projection of data configured onto the electronic display. (iii) A retractable/sliding white board shall be provided which will slide over the electronic display if so desired to conduct briefings. The minimum size of the white board shall be 2 m X 1.2 m. (vii) The size of the room and the seating capacity shall be dictated by the ship's aviation mission requirement. At the minimum the seating shall be sufficient for one whole RPA crew plus four seats. The seats shall be half foldable (cinema hall type) seats with rugged finish.	--

Ser	Name	No	Location	Equipment	Features
				The seats shall be ergonomically fixed (in banks of rows) facing the electronic display. (viii) Where a separate safety equipment room is not provided the briefing room may be provided with lockers and fittings to stow flying clothing (helmets, lifejackets, immersion suits etc). Adequate number of lockers of size 1.8 m X 0.8 m wide X 0.5 m deep may be provided. (ix) Stowage for charts and publications shall be provided. The storage shall as far as possible be in the form of overhead lockers affixed to the bulkhead. (x) A classified material stowage locker of 0.6 cubic meters minimum shall be provided. (x) Where the size of the room is sufficiently large owing to ship's aviation mission requirement a lectern with a table light shall be provided. The lectern shall be able to house one PC. A low powered microphone and speaker system shall be provided to conduct briefings. (xi) Display boards suitable to the size of the room may be provided to display aviation related information. The boards are to be as closely flushed with the bulkhead as possible, felt backed without any glass door. (xv) Where possible and where digital information is available from associated aviation equipment like Automatic Weather System, Landing Period Designator (LPD), HVLA panel etc, such data shall be made available through the ships LAN at the briefing room.	

Ser	Name	No	Location	Equipment	Features
(d)	Air Store	One	**Location**. The Air Store compartment shall be located as close as possible to the aviation complex. The location must take into account the handling of stores whilst embarking from alongside as well as during shifting of stores to the deck.	(i) Open metal racks shall be provided for stowage. The depth of the racks shall be a minimum of 0.7 meters. The height of the first rack shall be nominal 1 m above the deck height. Four racks shall be provided per bank. The width of the bank being 1 m. Multiple banks shall be provided to occupy the entire length of the compartment. The rack height shall be adjustable. More than one (ii) In addition to rack stowage 4 cubic metres of bulk stowage space shall be provided. Bulk stowage shall include batten and tie down arrangements to secure stores. (iii) Each rack shall have a blank name tally. (iv) A white board 3 ft X 11/2 ft shall be provided. (v) A digital thermometer affixed to the bulkhead shall be provided inside the compartment.	(i) The size and number of the compartments shall be dictated by the aviation mission of the ship. (ii) Access to the store rooms shall be through regular doors and hatches. Vertical ladders shall be avoided. (iii) Air conditioning to ship standards shall be provided in the store room. (iv) White lighting to ship store room standards shall be provided. (v) Drainage shall be provided in the room.
(e)	POL Store	One	(i) **Purpose**. To store aviation POL sufficient to support one RPA for at least 300 hours of flying. (ii) **Sitting and Access**. The POL storeroom shall be provided preferably adjacent to the RPA deck and on the same deck. If this location is not feasible, the aviation	A rack unit shall be provided complete with suitable dividers capable of storing 100 standard one litre containers. At the deck level below the rack space provision should be made for the stowage of at least one 20 litre capacity pail, one 15 capacity drum and two 25 litre drums. The shelves of the rack unit should be fitted with 'Save All' drip trays to comply with standard safety requirements. An all metal locker unit shall be provided. The locker shall contain at least three (03) adjustable shelves suitable for storage of miscellaneous oils, cleaning fluids, rust inhibiting fluids and light grease containers.	(i) **Fire Hazard**. The RPA POL storeroom is not normally within the citadel and is classified as a hazardous area. Firefighting services shall meet the standard ship's requirements for such areas. The RPA POL storeroom is classified as a Class B hazard and as such shall have fire detection and extinguishing installation meeting or exceeding the standard ship's requirements for such locations. (ii) **Environment Control**. Adequate cooling and ventilation shall be provided for ensure that POL storeroom

Ser	Name	No	Location	Equipment	Features
			POL storeroom may be collocated with ship's POL store. Provided sufficient separation is maintained between the Marine and Aviation POL to avoid any contamination. A Ready use locker to be provided in the vicinity of the RPA deck to cater for normal flying operations		temperature is maintained less than 24 Deg C under all conditions with a 4 minute forced rate of exhaust air change. **Lighting**. Lighting provided is to be by flameproof assemblies with externally operated control switches in accordance with standard ship's safety requirements for such compartments. The illumination level shall be to the ship's standard for storerooms (200 to 500 lux measured 1 metre above deck level).
(f)	Met Office INBR 1760 Section 11		**Location**. The location of the met equipment should be as per ship design ensuring non-interference from potential sources like radars, EW emissions, ship's wind flow etc	**Equipment to record the following parameters shall be provided**:- (i) Atmospheric Pressure. 50 to 1100 hPa digital barometer (ii) Atmospheric Temperature. - 50 to + 50 ^{0}C (iii) Relative Humidity. +/- 1% accuracy (iv) Wind Speed and Direction. Ultrasonic with no calibration required/ self-calibration module. (v) Sea Surface Temperature. Encapsulated thermistor (vi) Solar Radiation. Solar radiation monitor	**Wind Speed and Direction System (WSDS)/ Indicators (WSDI)**. The WSDS shall be fitted to automatically provide the wind direction and speed information relative to the ship. The sensors must be of non-rotating design (such as ultrasonic sensor) There should either no requirement of calibration or the calibration must be possible in-situ.The siting and configuration (single sensor/ twin sensor) of the WSDS sensors should meet the performance requirements in all wind on deck conditions (with specific regard to no masking/ aerodynamic/ EMI/EMC effect of rotating/ transmitting radars, communication antennae and fittings in vicinity of the sensors from 0-100 kn.

Ser	Name	No	Location	Equipment	Features
				(vii) Present weather, Visibility and cloud height. Cloud height upto 25,000 ft with least count of 50 ft, visibility up to 20,000 meters and capable of identifying up to 7 types of precipitation	

RPA Electrical Power Services

8. This section deals with the special electrical power requirements for the RPA or for portable equipment used to service the RPA , and may be broken down into three parts:-

(a) RPA Starting/ Servicing Power:-

(i) 115/200 V AC 400 Hz 3 phase 4-wire

(ii) 28 V DC, 10KW, ripple not more than 1V.

(b) Ship's Service Power – 380/440 V AC 50 Hz 3 phase.

(c) Secondary Ship's Service Power – 115/200V AC 50 Hz 1 phase.

9. **115/200 V AC 400 HZ 3 Phase 4 - Wire RPA Starting/Servicing Power**. Conversion units within the ship are to supply this power in accordance with current military/civil standards and distribute it to the RPA Deck and the RPA deck to a single receptacle mounted 50 cm above deck level on the forward portion of the RPA deck.

10. **Specifications**. For a ship which normally carries one RPA, the 400 Hz starting/ servicing system must be capable of delivering to the RPA Deck receptacles (separately and combined):-

(a) Continuous rating 50 KVA.

(b) 150% overload rating for two minutes.

(c) 200% overload rating for five seconds.

(d) Line drop limits in accordance with current standards.

(e) The line drop limits indicated above are to include the output cable assembly which is plugged into the RPA servicing receptacles.

11. **RPA Deck Output Cable**. A four wire RPA Deck Output Cable assembly shall be provided on the RPA Deck with one end suitably terminated for the RPA Deck 400 Hz power receptacle and the other end terminated in an RPA plug assembly in accordance with NATO STANAG 7073. The length of the free cable shall be sufficient to extend from the RPA Deck receptacle box to the extreme after end of the RPA Deck plus 1.5 metres. The conductors in the assembly are to be suitably sized to meet the loading and line drop limits indicated above. The cable shall feature an automatic power-kill capability when it is disconnected at the RPA end. The 400 Hz RPA ground power system station shall include a weatherproof receptacle box and a manually operated cable reel adjacent to the receptacle box.

12. **Safety/ Interlock System**. The 400 Hz power control and safety/interlock system shall:-

(a) Include a switch and “external power on” indicator light.

(b) Interface with RPA ground monitoring and control in accordance with MIL-PRF- 24021K.

(Ref:- MIL-STD-704F, RPA Electric Power Characteristics, for AC and DC normal operating characteristics, and MIL-PRF-24021K – Performance Specifications for Electrical Power Monitors External, RPA.)

13. **28V DC General**. The AC/DC conversion unit, if required by the RPA, shall be proven suitable for its intended purpose, and feature safety and electrical protection devices in accordance with standard shipboard electrical practice. It should a Operator:-

(a) Be portable by one man.

(b) Include a DC output cable of adequate length, rated to meet load and voltage drop requirements indicated above, and terminating in NATO plug assembly.

(c) Have a customised stowage in the RPA deck area.

(d) Feature/ means to secure it to the RPA Deck at all given times.

14. **440 V AC 50 HZ Ship's Service Power**. Ships service power is to be distributed to a single receptacle, 1.5 metres above deck level in a readily accessible spot on either port or starboard side of the RPA deck. The receptacle shall conform to the requirements of Electrical Design and Construction standards.

15. **115 V AC 50 HZ Secondary Ship's Service Power**. The 115 V AC, 1 phase, 50 Hz power should be terminated in four in number standard Three pin, grounded duplex receptacles. Those receptacles are to be equally spaced two to each side of the RPA deck. They should

be installed no less than 1.5 metres above deck level, and be fully accessible. Each receptacle is to be rated at 5 and 15 amps. Dependent upon specific equipment requirements, additional outlets may be fitted throughout the RPA deck.

External Voice Communications

16. **General Requirements**. The external communication system for the Air Department is to be made up of ship's standard communication units dedicated to the Air Department. The technical requirements for the VHF and UHF units required are covered in the external communications specifications for the ship. Only the outfitting requirements are covered in this section.

17. **V/UHF Units**. The Operator compartment shall be provided with two complete contemporary V/UHF Transmitter/Receivers, one for primary communication and the other for backup.

18. **Remote Control**. Transmitter/Receiver remote controls comparable to those supplied for the ship's external communication system are to be provided in the Operator compartment. A common input shall be used for V/UHF external communications and all internal communications at the Operator positions.

19. **Headset Feature**. The Operator shall use a split headset, one side for internal communication and one for external. Individual volume controls for each audio channel shall be provided and incorporated into the consoles. The headset should an OPERATOR employ active noise cancellation technology.

20. **Emergency Set**. An emergency backup V/ UHF shall be provided in the Operator position. This radio would be independent of all internal communications and with a suitable battery backup. An integral trickle charge battery pack would need to be provided.

RPA Fuelling

21. **Functional Requirement**. The aviation fuel system shall be capable of carrying out the following functions:-

(a) Transporting RPA fuel from its upper deck reception point to the RPA fuel storage tanks.

(b) Storing RPA fuel on board the ship.

(c) Cleaning and conditioning RPA fuel held on board the ship to remove water and solid contamination.

(d) Fuelling a RPA in the following modes:-

(i) While on the RPA Deck with engines shut down.

(ii) While on the RPA Deck with engines running.

(e) De-fuelling a RPA.

(f) Transferring fuel from the storage tanks to a disembarkation point on the upper deck of the ship.

22. **Performance Requirements**. The aviation fuel system shall confirm to the following requirements:-

(a) Should be capable of taking fuel at a rate of 85 cubic metres/hr. The system shall have sufficient usable RPA fuel storage capacity to sustain the selected RPA for not less than **50 flying hours**.

(b) The system shall be capable of pressure fuelling a RPA on the RPA Deck at a maximum rate of 200 to 300 litres per minute.

(c) The system shall be capable of operation in the gravity mode, limited to 100 kPa in no- flow condition.

(d) The system shall be capable of de-fuelling a RPA at a rate of 120± 20 litres per minute.

(e) Quality of fuel delivered to the RPA shall meet the standards as promulgated by NAQAS.

(f) The fuel filling nozzle to be provided should incorporate a digital flow meter.

Fuelling Compartments

23. **Physical Characteristics**. A compartment shall be provided to contain all the RPA fuel pumps and conditioning equipment. This compartment shall be fitted with forced extractors which can be switched on/off from outside the compartment.

24. **RPA Deck Fittings**. A storage area on the RPA Deck or in the RPA deck shall be provided for the RPA fuelling hose, grounding wire and connection equipment. This storage area (fuelling cabinet) shall be as compact as possible and close to the RPA fuelling position to allow rapid access to the fuelling hose and equipment. It shall a OPERATOR be positioned so that it does not interfere with RPA operation or present a safety hazard should an emergency, such as a RPA crash or fuel spill, occur. The fuelling cabinet should contain:-

(a) A hose storage device.

(b) A grounding cable reel.

(c) A communication system.

(d) Remote controls for the pumps fitted in the pump room.

(e) Fuel cleanliness monitoring/sample point.

(f) A flow meter.

(g) Storage for the RPA fuelling nozzle.

25. **Fuel Tanks**. Storage tanks with adequate redundancy for the aviation fuelling system shall be fitted on board the ship.

26. **Hose Assemblies**. The fuel piping system shall terminate on the RPA Deck in a Two inch (iaw with IHQ MoD (N)/ DME policy letter EG/POLICY/AUX/01/21 dated 12 Mar 21)internal diameter hard wall hose assembly of sufficient length to attach to the RPA fuelling connection when the RPA is parked anywhere on the RPA Deck. The fuelling hose assembly shall consist of:-

(a) A Two inch nominal diameter fuelling hose (iaw with IHQ MoD (N)/ DME policy letter EG/POLICY/AUX/01/21 dated 12 Mar 21).

(b) A contemporary nominal 2.5-inch diameter pressure fuel servicing nozzle with embedded digital flow meter.

(c) Pressure and Gravity fuelling nozzle.

(d) A static grounding reel assembly attached with the hose.

(e) The fuelling hose shall be located in such a position so that the fuelling operations can be carried out with RPA deck shutter in closed position or a suitable trap door should be provided on the face of the RPA deck door.

27. **Stowage**. When not in use, the hose assembly shall be stowed in the fuelling cabinet. It shall not require disconnection or separation for stowage purposes, and shall be withdrawn from the RPA Deck by a power assisted/ manual means. To facilitate moving the hose assembly both onto and away from the RPA Deck area, suitable guides, rollers, or similar devices shall be provided to control the hose during passage through confined spaces, and around obstructions.

Fuel Conditioning Equipment

28. **Temperature Indicating Device**. A temperature indicating device shall be fitted to each fuel pump to protect against fuel being inadvertently re-circulated through the pumps pressure relief system and the fuel subsequently heating above its flash point. This temperature indicating device shall sound an audible alarm in the ship's Machinery Control Room when the fuel temperature exceeds 40 Deg C.

29. **Flow Measuring Device**. The system shall be equipped with a fuel flow measuring device. This device shall measure in litres and be capable of operating at a flow rate up to 300 litres per minute. A read out from this unit, which is capable of being zeroed, shall an OPERATOR be provided at RPA deck in close proximity to the fuelling point and in the Operator compartment. Inline fuel quality analyser as per INBR 3000 to be included in the system.

30. **Safety Feature**. All equipment in the pump room shall be explosion proof in accordance with current regulations.

31. **Communication**. A hands free wireless headset shall be provided to service tank and RPA deck for obstruction free and reliable communication.

SECTION N - LOGISTICS

1. **Equipment**.

Ser	Name	Numbers	Capabilities /Features	Standards
(a)	Refrigerator	1	500 Ltr	COTS
(b)	Water Cooler with inbuilt RO purifier	1	Customised	
(c)	Microwave Oven COTS	1	30 Ltr	
(d)	Dishwasher	1	Customised	
(e)	Ice Cream machine	1	10 Kgs	
(f)	Tea/Coffee Making Machine (Portable)	1	50 Cups/hr	
(g)	Work Counter	2	Customised	
(h)	Juice Extractor (Portable)	1	5 Ltr	
(j)	Tea/Coffee Making Machine (Portable)	1	50 Cups/hr	
(k)	Water Dispenser hot and Cold (Portable)	1	20 Ltr	
(l)	Microwave Oven COTS (Portable)	1	20 Ltr	
(m)	Cocktail Station for Wardroom	1	Customised	

2. **Compartments**.

Ser	Name	Numbers	Eqpt	Features
(a)	Galley	01	Galley Equipment	(i) Galley and Ward Room (WR)/ Dining Halls (DH) should be located on same deck to facilitate easy movement of ration / provisions. (ii) In case, Galley and WR/DH are located on different decks, they should be vertically aligned with elevator facility. (iii) Common Galley is to be provided for officers and sailors. (iv) All doors providing access to the galley should have see-through/ glass inspection windows for assessment of the galley area from outside in case of fire. (v) Sufficient large washing areas to accommodate cleaning of large utensils with water guns are to be provisioned in the galley.

Ser	Name	Numbers	Eqpt	Features
				(vi) The galley should have a well-equipped Bakery with ovens along with other galley equipment positioned in such a manner that eases the chefs day to day functioning. (vii) A dedicated fire fighting system is to be provided in galley. (viii) Galley Hot Plate Indication Panel indicating operational status of Deep Fat and Hot Ranges is to be fitted outside galley entrance and in DCHQ as per extant guidelines. (ix) 'Single Isolating Switch' for switching 'Off' power supply to all galley equipment in an emergency and at the end of the day is to be provisioned at a readily accessible location adjacent to the main entrance door of galley. Locking arrangement for 'Single Isolating Switch' is also to be provided. (x) There should be a provision for high power exhaust system over the cooking ranges and air conditioning vents delivering air conditioned air blast onto the chefs working at the ranges. The ambient temperature (22-24 degree) conducive for chefs to work is to be maintained in the Galley. (xi) Deep Fry Pan and Hot plates are not to be side by side and source of water should be sufficiently away from the deep frying pan. (xii) Provision to shift cooked food from Galley to Servery / Dining Halls through a collapsible window may be provided. (xiii) Galley equipment are not to be permanently fixed to the deck. Provision for removal of Galley equipment for maintenance of equipment may be provided. (xiv) The Galley range alignment should be facing forward or aft. (xv) Adequate utensil racking arrangement for storage of large utensils may be provided.
(b)	Pantries	02	Pantry Eqpt	A pantry each is to be attached to the Captain's Cabin and Wardroom. Adequate stowage space and arrangements are to be provided at the serving counter to keep the crockery and cooked food in utensils for serving.
(c)	Sculleries	02	Sink for washing utensils	Separate dining halls to be provided for Junior and Senior Sailors. The dining halls are to have an attached scullery each. Heavy duty dish washer to be provided in Senior Sailors Dining Hall.

<table>
<tr><th>Ser</th><th>Name</th><th>Numbers</th><th>Eqpt</th><th>Features</th></tr>
<tr><td>(d)</td><td>Cool Room / Cold Room</td><td>01 each</td><td></td><td>(i) Separate compartments for Chicken/Mutton and Fish to be provided for preventing cross tainting of fish odour.

(ii) Repeater display of real time temperature of all Victualling Stores (Cool/ Cold rooms) to be centrally displayed in Logistics Office and LOGO’s Cabin

(iii) ‘Man Trapped Alarm’ should be provided in each of the Cold/ Cool Room with the indication at Bridge and DCHQ.

(iv) The Cold Rooms and Cool Rooms are to be near to Galleys for easy transfer of provisions

(v) Cold and Cool Rooms (blast frozen) are to be provided to carry poultry, mutton, fish and fresh provisions as follows. The capacity of indicated is quantum of provisions to be stocked and not the capacity of Cold / Cool Room:-

<table>
<tr><th><u>Storage</u></th><th><u>Qty</u></th><th><u>Capacity</u></th></tr>
<tr><td>Cold Room</td><td>01</td><td>0.5 Tons of Poultry/ Mutton/ Fish</td></tr>
<tr><td>Cool Room</td><td>01</td><td>03 Tons of fresh provisions</td></tr>
</table>
</td></tr>
<tr><td>(e)</td><td>Logistics Stores</td><td>03</td><td>--</td><td>(i) Adequate dunnage/ collapsible racks to be provided for stowage of items.

(ii) Removable/ re-adjustable battens are to be provided for securing of items in each rack/ bin for securing.

(iii) Store room should be provided with fixing arrangements for ELSA sets and fire extinguishers. Fire Detection/ Firefighting/ fire damper system to be installed in all stores.

(iv) Doors are to be designed so as to open fully and outwards without any obstructions to ensure maximum utilisation of stowage space and efficient store ship.

(v) Door retaining clips are to be provided.

(vi) Main broadcast loudspeaker should be audible in all store rooms.

(vii) Following Logistics stores with adequate cupboards and light duty racks are required to be provided to enable the ship to carry its own stores as per scale:-</td></tr>
</table>

Ser	Name	Numbers	Eqpt	Features
				(aa) Naval Stores - 01 (Heavy duty) (ab) Ward Room Store – 01 (Light duty) (ac) Wine Store-01 (Light duty) (viii) Adequate lighting to be provided in store rooms including contingency lighting (AELs). (ix) Bulb/ lights should not be sited above the racks in order to prevent contact with provisions/ stores when fully stacked. (x) Adequate Air conditioning/ air ventilation to be provided all store rooms. (xi) Batons to be provided for each dunnage/ rack for securing items.
(f)	Victualing Store	05	--	(i) Adequate dunnage/collapsible racks to be provided for stocking the provisions with sea securing of the provisions. Collapsible racks be provided in Mess Traps Store. (ii) Removable/ re-adjustable battens are to be provided for securing of items in each rack/ bin for securing. (iii) The Victualing stores are to be provided with adequate lighting. (iv) Victualing Stores are to be provided with de-humidifiers. (v) Store rooms should be provided with fixing arrangements for ELSA sets and fire extinguishers. Fire Detection/ Firefighting/ fire damper system to be installed in all stores. (vi) Doors are to be designed so as to open fully and outwards without any obstructions to ensure maximum utilisation of stowage space and efficient store ship. (vii) Fixed rodent repellent system is to be provided in Dry/Tinned Provision stores. (viii) Following victualing stores as per following capacities are to be provided. The capacity of indicated is quantum of provisions to be stocked and not the capacity of Victualling Room:-

<table>
<tr><th>Ser</th><th>Name</th><th>Numbers</th><th>Eqpt</th><th>Features</th></tr>
<tr><td></td><td></td><td></td><td></td><td>
<table>
<tr><th><u>Ser</u>.</th><th><u>Storages</u></th><th><u>Qty</u></th><th><u>Capacity (Tons)</u></th></tr>
<tr><td>(aa)</td><td>Tinned Provision Store</td><td>01</td><td>01</td></tr>
<tr><td>(ab)</td><td>Bagged Provision Store</td><td>01</td><td>02</td></tr>
<tr><td>(ac)</td><td>Ghee Store</td><td>01</td><td>01</td></tr>
<tr><td>(ad)</td><td>Mess Traps store</td><td>01</td><td>--</td></tr>
<tr><td>(ae)</td><td>Galley RU Store</td><td>01</td><td>0.5</td></tr>
</table>
</td></tr>
<tr><td>(g)</td><td>Wardroom</td><td>01</td><td>--</td><td>(i) The Officers' Ward Room is to consist of a dining Area and Lounge.

(ii) The lounge area is to be fitted with a 55" LED TV (or bigger), COTS home theatre system, bar counter, bottle cooler, two tea/ coffee vending machine, fixed electric fly/ insect killer and other associated fittings.

(iii) Provision for seated dining for 10 officers is to be provided.

(iv) The Pantry is to be equipped with refrigerator, deep freezer, water cooler, adequate food warmers, microwave oven, food processor, dish washer and water purifier.

(v) Sea securing arrangements are to be provided for all items.

(vi) A Wardroom Wine Store with adequate bottle racks is also to be provided in the vicinity.</td></tr>
<tr><td>(h)</td><td>Dining Halls and Galley</td><td>03</td><td>--</td><td>(i) One Senior Sailors' Dining Hall with a seating capacity for 25 personnel.

(ii) One Junior Sailors' Dining Hall with seating capacity for 40 personnel.

(iii) Following to be provided in each Dining Hall:-

(aa) One 55" LED TV (or bigger) along with COTS Home Theatre System of latest technology.

(ab) One PC connected to ship's LAN.

(ac) Electronic Display Board with screening arrangement.

(ad) Fixed electric insect/ fly killers as required.</td></tr>
</table>

Ser	Name	Numbers	Eqpt	Features
				(ae) One each of microwave oven, refrigerator, industrial water cooler with RO plant and heavy duty toaster. (iv) Serving area with Bain Marie is to be catered for each dining hall. (v) Water purifier system is to be provided in Ward Room pantry, CO's pantry, senior sailors dining hall, junior sailors dining hall, MCPO dining hall and galley. (vi) Separate modular accommodation and galleys for officers and sailors with following :- (aa) Sufficient large are to accommodate cleaning of utensils and water guns are to be provisioned in galley. (ab) Sailors galley should have well equipped bakery with oven along with galley equipment positioned in such a way that eases chefs day to day functioning. (ac) High power exhaust system over the cooking ranges and air conditioning vents delivering air blast on chefs at the ranges. Ambient air temp of 22-24 deg conducive for chefs to work is to be maintained in galley. (ad) Provision to shift cooked food from galley to dining halls through a collapsible window may be provided. (ae) Galley equipment is not be permanently fixed on deck. Provision for removal of galley equipment for maintenance is to be provided. (af) Adequate utensil racking arrangement for storage of large utensil may be provided. (ag) All doors provided in galley should have see through/glass inspection windows for assessment of galley in case of fire. (ah) Galley Indication Panel for indication of operational status of Deep Fat Fryer and Hot Plates/ ranges is to be fitted outside galley entrance.

Ser	Name	Numbers	Eqpt	Features
				(aj) Single isolating switch is to be provided for power to all galley equipment at a readily accessible location. Locking arrangement is to be provided for the single isolation switch. (ak) Deep fry pan and hot plates are not to be side by side. Source of water is to be sufficiently away from deep frying pan. (al) Compartment layout of galley is to be iaw DCV policy DCV/GE/Policy dated 13 Dec 22.
(j)	Ship's Office and Store Office	01	--	(i) The ship should be provided with co-located but separate Ship's office and Store office with minimum 02 work stations and 02 visitor chairs in each offices. (ii) Fixed PC based multimedia projector is to be fitted in Wardroom, CWC, Air Crew Briefing Room and Senior and Junior Sailors Dining Halls. (iii) Heavy duty all-in-one MFPs, cupboard shelves and lockers with electronic locking arrangement. Fax machines, and paper shredding machines are to be provided as per quantity indicated by IHQ MoD (N).
(k)	Provision Lift	01	--	Provision lift of capacity 0.3 Ton (L x B = 1mtr x 1mtr) may be provided for transfer of rations from upper deck to the victualling stores. The lift is to be near to galley to facilitate shifting of provisions from stores to galley.
(l)	Logistics Management	01	--	(i) Logistic management iaw INBR 622. (ii) e-PIL of all equipment fitted onboard is to be provided in pdf format as well as in the form of IETM(Interactive Electronic Technical Manual). (iii) In addition to the e-PIL (PDF and IETM), quantitative allowances (OBS, B&D and LTE) for all fitted equipment are to be provided in ILMS format with EASK linkage in hierarchical structure viz. Equipment, Assembly, Sub-Assembly, Spares, Kits. Images/photo capture to be included for each item/component. (iv) All necessary documentation, such as D-787, Spare Gear, Equipment Schedules etc. are also to be in conformity with the ILMS format. (v) SFD and MAINTOPS are to be prepared in consultation with INSMA and provided in electronic format.

Ser	Name	Numbers	Eqpt	Features
				(vi) 'NATO Stock Numbers' (NSNs) in respect of all items/spares must be provided. In case of imported spares, full OEM details to be provided in addition to NSN. (vii) Where the original imported spares can be replaced by indigenous equivalents/COTS items, DCAN / NSNs in respect of these alternates need to be provided. (viii) As a mandatory contractual requirement, all the above details are to be provided to the concerned Production/Design/Professional Directorates with a copy to IHQ MoD(N)/DLS.

SECTION P – ACCOMMODATION

1. **System and Equipment**. Nil

2. **Compartments**.

Ser	Name	Numbers	Location	Features	Standards
(a)	Captain's cabin	01	As per design	(i) One Captain's cabin consisting of Day and Night Cabins with attached Bath/Toilet. (ii) Clear height above decks is to be provided as per Def Stan 02-130, Part 1 and 2 (iii) Accommodation is to be as per latest modular concepts with respect to ergonomics and crew comfort. They should comply with Def Stan 02-107. (iv) Facility to secure items and furniture for sea.	DEF STAN 02-107, 02-130
(b)	Officers' Cabin	07	As per design	(i) 03 x Single Cabins for HODs. (ii) 04 x Double Bunk cabin for officers. (iii) Upto 30% of the officer's accommodation space should be suitable for women officers.	DEF STAN 02-107, 02-130
(c)	Sailors' Accommodation	09	As per Design	(i) Two x 05 men messes (not more than Two Tier bunks) for MCPOs and CPOs. (ii) Two x 10 men messes for Senior Sailors (POs). (iii) Four x 10 men messes for Junior Sailors. (iv) One x 02 bunk cabin for Regulating Staff. (v) All messes as per latest editions of 'Guideline Specifications for habitability upgradation and modular accommodation works onboard *IN* Ships.	DEF STAN 02-107, 02-130

Ser	Name	Numbers	Location	Features	Standards
				(vi) Upto 20% of the sailor's accommodation space should be suitable for women sailors.	
(d)	Recreation & Messing	As per design	As per design	(i) Officers Ward Room to consist of dining area and lounge. (ii) Ward Room to be provided with latest commercial items. Wardroom will also be the Emergency Operation Theatre. (iii) One Senior Sailors Dining Hall with seating capacity of atleast 25 sailors, with cafeteria arrangement. (iv) One Junior Sailors Dining Hall with seating capacity of atleast 40 sailors. (v) Sports equipment – Standard. (vi) All mess decks to be fitted with LAN PC and TVs. (vii) Central internet/ intranet with database library facility is to be provided and one internet terminal per mess as part of LAN. (viii) Provision of one gym/exercise area with multi trainer and other exercise equipment. (ix) Each officer's cabin to be provided with two LAN PC. (x) Sailors' Recreation Room is to have racks for 500 library books and provision for stowing 100 electronic books.	-NA-

SECTION Q - MEDICAL

1. **Standards**. NES106

2. **Systems**. **Nil**

3. **Equipment**. The ship will be provided with equipment scale **N-1 Type C by AFMSD** as per GOI MoD letter 20069/ME Scale/DGAFMS/DG2C/*IN* SHIPS/MoD/572/07/D (Med) dated 23 Jul 07 or current policy in vogue at the time of commissioning.

Ser	Name	No.	Capabilities/ Features	Location
(a)	Stretchers	10	(i) Only stretchers approved for use in *IN* will be used. (ii) The details of stretchers as follows:- (aa) Scoop Stretchers - 02 (ab) Floating Stretchers - 02 (ac) Neil Robertson Stretchers – 04 (ad) Airborne Stretchers- 02	(i) Stretchers are to be positioned suitably along the main alleyways / in suitable positions distributed along the ship, along with securing arrangements. (ii) Other stretchers can be kept at an appropriate area close to the Sickbay.
(b)	First Aid Boxes (FAB)	09 (min)	(i) The dimensions of the FAB's should be 30cm X 25cm X 15 cm. (ii) It should be fitted at a height of 155 cm from deck floor. (iii) These should be located so that they are easily accessible and have protection from weather	(i) Bridge (ii) Catwalk near foxle (port & Stbd) (iii) Catwalk near Quarter-deck (Port & Stbd) (iv) Galley (v)Near Wardroom (vi) Quarter Deck (vii) Engine Room
(c)	Cardiac defibrillator	01	COTS	Within sickbay
(d)	Multichannel ECG Machine 12 Lead	01	COTS	Within sickbay
(e)	Multi Parameter Monitor	02	COTS	Within sickbay
(f)	AED	02	COTS	Within sickbay
(g)	Oxygen concentrator	01	COTS	Within sickbay
(h)	Ophthalmoscope (Portable)	01	COTS	Within sickbay
(j)	Auroscope (Portable)	01	COTS	Within sickbay
(k)	Transport/ Portable Ventilator	01	COTS	Within sickbay

Ser	Name	No.	Capabilities/ Features	Location
(l)	Portable suction apparatus	01	COTS	Within sickbay
(m)	Doctors bag complete with all equipment	02	COTS	Within sickbay
(n)	Autoclave Unit	01	COTS	Within sickbay
(p)	Sick bay Beds	02	COTS	Within sickbay
(q)	Apparatus Oxygen Portable light weight set – 200ltr with bullnose fitting and pressure guage	02	COTS	Within sickbay

4. **Compartments**. The following to be ensured for Medical Compt as far as possible following NES 106 and IN policy as applicable: -

(a) All medical compartments and OTs are to be in close proximity of each other, as far as practicable.

(b) Direct access through doors, opening into the main alleyway to be provided to Medical space, for ease of casualty movement.

(c) All alleyways and hatches to be so designed so as to enable easy carriage of casualty stretchers.

Ser	Name	Numbers	Location	Equipment	Features
(a)	Sickbay	01	(i) The sickbay is to be located in mid-section of ship. (ii) The sick bay should be in an area which has low noise and vibration levels.	The ship will be provided with equipment scale **N-1 Type C by AFMSD** as per GOI MoD letter 20069/ME Scale/DGAFMS/DG2C//*N* SHIPS/ MoD/572/07/D (Med) dated 23 Jul 07 or current policy in vogue at the time of commissioning.	(i) Separate Air Treatment Unit (ATU) with alternate power supply. (ii) Two beds (two tiered). Every bed should have IV hanger and reading lamp, where feasible. The head end of the bed should have at least two feet of clear space (iii) Bunkbed heads in Sickbay should have Oxygen pipeline system & plug points. (iv) One table with beading and one almirah for medical accessories (v) Additional shelves/ cupboards, within the space available, for storing equipment, medicines and documents (vi) Table top Microwave – 01 no.

Ser	Name	Numbers	Location	Equipment	Features
					(vii) The door width should be sufficient for movement of patients on the stretcher by stretcher bearers. (viii)Should be spacious enough to accommodate all the authorized equipment as mentioned in para 4 above. (ix)Should have an attached WC/ bath of adequate size and ventilation. (x) The WC & Bath should have one overhead water tank and a connected online geyser. (xi)Within the space available, at least 02 modular shelves / cupboards should be provided for storing equipment, medicines and documents. (xii)Flooring of sickbay and OT should be of material, which can be cleaned easily. (xiii) Sickbay is to have a work station. The work station is to have a table, chair and a bookshelf for books/files
(b)	Dressing Room	01	Within the sick bay	One foldable good quality operation table should be located amidships of the sick bay, in this area	(i) Shadow-less OT lights should be fixed over the operation table. (ii) A washbasin with elbow operated tap should be provided (iii) A separate area in the sickbay should be designated as dressing room. (iv) A clear space for movement of personnel on all sides for Anaesthesia equipment & OT table.
(c)	Dispensary	01	Within the sickbay	-	A dispensary with adequate racks/ stowage arrangements is to be provided in the sickbay.
(d)	Medical Store	01	In vicinity of sickbay	-	(i) A double door 300L refrigerator to store perishable medicines should be provided.

Ser	Name	Numbers	Location	Equipment	Features
					(ii) Modern facilities are to be provided for clearance of used medical stores and drugs. (iii) A separate air conditioned compartment in the vicinity of the sickbay, is to be provided for storing medical equipment and expendable stores/drugs. (iv) The compartment is to be provided with adequate racks and cupboards for stocking medical equipment and stores/drugs.
(e)	First Aid Posts	At least 2	Forward & aft section of Ship	One NR stretcher, one small oxygen cylinder, one first aid box should be located at each FAP.	(i) At least two first aid posts should be suitably located, one each in forward and aft section of the ship. (ii) One cabinet for NR stretcher should be located at each FAP.
(f)	Emergency OT	01	Ward Room	A fixed table [size at least 185cm (L) x 50 cm (B) x 85 cm (H)] is to be provisioned along with securing/ fitting arrangements.	(i) The Wardroom should be designated as Emergency OT. (ii) A clear area of 1m should be available all around the OT table except head end of table where it should be 1.5m. (iii) Shadow-less OT lights are to be fitted on the ceilings of designated Emergency OT table. (iv) The Emergency OT is to be provided with a separate ATU like the Sick Bay. (v) If a separate ATU is not feasible, the air inlet should be fitted with High Efficiency Particulate Air (HEPA) filters in lieu, to cater for conditions of sterility. Laminar air flow to be ensured for surgeries.

SECTION R – INFORMATION TECHNOLOGY

1. **Standards**. Naval

2. **Systems**.

Ser	Name	Capability/ Features	Standards
(a)	ALAN	An Administrative Local Area Network (ALAN) is to be provided onboard to network all departments of the ship and should run on ship's SDN backbone. The LAN will facilitate sharing of resources (storage media, printers, applications software) and electronic mail amongst users.	The overall network architecture should conform to IEEE 802 set of standards of LANs. The standard recommended to be implemented is 802.3ae-2010 standard with full duplex switches only. Networking and subsequent connection to NUD are governed by DIT Policy IT/0622/01/Policy dated 10 Aug 15 LAN system- Servers to be housed in Server Room

3. **Equipment**.

(a) **List of deliverables are as follows**:-

Ser	Recommended Items	Quantity
	Hardware	
(i)	Blade Servers	02 with Chassis
(ii)	Desktop Personal Computers	20 + 20%
(iii)	1 KVA UPS	Qty same as No. of PCs
(iv)	Core Switches (L3)	04
(v)	Zonal (access) Switches (L2)	02
(vi)	SAN Storage	6 TB SAN and 4 TB NAS usable capacity in RAID 5 configuration.
(vii)	Network Laser Printers	02
(viii)	Scanner	03
(ix)	Standalone Laser Printer	04
(x)	Multi Function Printer	01
(xi)	Desk Jet Printer	04
(xii)	UPS 40 KVA (N+1)	01

(xiii)	Server Rack- 42 U	01
	Software	
(xiv)	Windows Server 2016 Standard edition or latest available	01
(xv)	Windows Exchange Server 2016 or latest available with 80 CALs for clients	01
(xvi)	Microsoft Office 2016 Professional edition or latest version	20
	Networking Components	
(xvii)	Fibre Optic Cable, outdoor Armoured cable	As per actuals
(xviii)	Cat 6 cable	As per actuals
(xix)	RJ 45 Connectors	As per actuals
(xx)	I/O Boxes IP 67 Compliant	03
(xxi)	I/O boxes	As per actuals
(xxii)	24 Port rack mounted LIUs with SC coupler	01
(xxiii)	24 Port rack mounted UTP CAT 6 jack panel for STP cable	02
(xxiv)	Patch Cords of various sizes	As per actuals
(xxv)	Plastic Conduit	As per actuals
	Tool Kit and Spares	
(xxvi)	L2 Switches	02
(xxvii)	Cat 6A Cable	As per actual
(xxviii)	Patch Cords- 3', 7', 9' and 15'	10 pieces each
(xxix)	Cable Preparation Tools(Crimp tool and Stripping Tool)	02 Sets
(xxx)	RJ Plug Termination Tool	02 Sets
(xxxi)	Fibre Optic Test Equipment and LAN Tester	02 Set
(xxxii)	Micro Test LAN Scanners	01 Set
(xxxiii)	RJ 45 Connector	500 Nos.

SECTION S – MET

1. **Systems**.

Ser	Name	Numbers	Capabilities/ Features	Location
(a)	Polar orbiting satellite image data receiving system (APT) or latest available system iro of obtaining Satellite images at sea.	01	(i) The system will be used to receive satellite imageries for providing wind/ weather forecast over area of operation. (ii) Equipment would consist of a Ground Station, antennae system and a computing system.	Met Post (near Bridge)

2. **Equipment/ Instruments**.

Ser	Name	Numbers	Capabilities/ Features	Standards
(a)	Precision Aneroid Barometer	02	For recording of various Met parameters , to be located near Met Post (near Bridge)	BIS No. IS 5793:1970
(b)	Max, Min, Dry & Wet Bulb Thermometer with casing	04		BIS No. IS 5981:1992
(c)	Whirling Psychrometer	02		IS 5946 : 1992
(d)	Hand Held Anemometer with wind vane	02		BIS No. IS 5799:1970
(e)	Mobile Met Kit	01		-
(f)	Digital Reference Barometer	01		-
(g)	Dedicated PC/ Laptop for accessing INMAC/ NODPAC/ Panorama data.	01	The system will be used to receive relevant METOC products/ operational forecast information from INMAC/ NODPAC servers/ Panorama data sharing mechanism through Rukmani communication systems.	PC/ Laptop as per latest configuration
(h)	AWOS	01	(i) Equipped with sensors of wind direction & speed, cloud height, temperature, humidity, visibility. (ii) Cloud height, temperature, humidity and visibility data is to be provided to conning page of IBS (iii) Equipment component located at Met Post, Bridge, RPA Operation Compt and Ops Room.	NA

3. **Compartments**.

Ser	Name	Numbers	Location	Features	Standards
(a)	Met Post	01	Near Bridge	• To accommodate Systems and instruments mentioned at Para 79 above. • Proximity to the Bridge and weather Deck with presence of porthole/ scuttle in order to observe the weather.	Naval

Appendix B
{Refers to Para 8(c)}

QUESTIONNAIRE FOR MINE COUNTER MEASURE VESSELS

1. What will be the displacement/ dimensions of the ships?

2. What are the comments on proposed Delivery Schedule of the Vessel?

3. What is the capacity/ infrastructure of the shipyard to meet the delivery schedule?

4. What would be the approximate cost of the vessel (material cost, labor cost, overheads, training cost, product support cost (if applicable), miscellaneous cost etc. and taxes) and shipyards financial capability to undertake the project?

5. What is the past experience of shipyard in similar projects?

6. What are your order book status?

7. Details to be submitted for generating/ refining/ rationalizing the SQRs prior issuance of RFP.

8. Furnish details that go into determining the cost of the scheme, including factors such as Annual Maintenance Contract (AMC), product support package, training, documentation, etc.,

9. Furnish details of capability clearance certificate to indigenously design and develop the required equipment/ platform.

10. What are the applicable key technologies and materials required for manufacturing of the equipment/ system/ platform and the extent of their availability or accessibility in case they are not available in India?

11. What is the approximate cost estimation and suggestions for alternatives to meet the same objective as mentioned in RFI?

12. What are the capabilities of Indian Shipyards to Indigenously Design, Develop and Manufacture (IDDM) the required vessels?

13. Availability of the equipment/ system/ platform in the Indian market, level of Indigenization, delivery capability, maintenance support, life time support, etc.

14. Will there be a collaboration with experienced foreign shipyard for design of the envisaged MCMVs? If so, forward information of shipyard collaboration with foreign ship yards.

Appendix C
{Refers to Para 8(c)}

SHIPYARD INFORMATION PROFORMA

1. **Name of the Shipyard/ Company/ Firm and Unique ID (if any)**.

_____

_____

(Company profile including Share Holding pattern, in brief, to be attached)

2. **Type (Tick the relevant category)**.

Original Equipment Manufacturer (OEM) Yes/ No

Authorized Shipyard of foreign Firm Yes/ No (attach details, if yes)

Others (give specific details) _____

3. **Contact Details.**

Postal Address: _____

City**:** _____ State**:** _____

Pin Code**:** _____ Tele **:** _____

Fax: _____ URL/Web Site**:** _____

Email **:** _____

4. **Local Branch/ Liaison Office in Delhi (if any)**.

Name & Address: _____

Pin code: _____Tel: _____Fax: _____ E mail: _____

5. **Financial Details**.

(a) Category of Industry(Large/ medium/ small Scale) :_____

6. **Certification by Quality Assurance Organisation.**

Name of Agency	**Certification**	**Applicable from (Date &Year)**	**Valid till (Date &Year)**

7. **Details of Registration**.

Agency	Registration No.	Validity(Date)	Equipment
GeM			
DGQA/DGAQA/ DGNAI			
OFB			
DRDO			
Any other Government Agency			

8. **Membership of FICCI/ ASSOCHAM/ CII or other Industrial Associations**.

Name of Organization : _____

Membership Number : _____

9. **Equipment/ Product Profile (to be submitted for each product separately)**

(a) Name of Product :_____
(IDDM Capability be indicated against the product)
(Should be given category wise for e.g. all products under night vision devices to be mentioned together)

(b) Description (attach technical literature): _____

(c) Whether OEM or Integrator : _____

(d) Name and address of Foreign collaborator (if any):_____

(e) Industrial License Number : _____

(f) Indigenous component of the product (in percentage): _____

(g) Status (in service / design & development stage): _____

(h) Production capacity per annum:_____

(j) Countries / agencies where equipment supplied earlier (give details of quantity supplied) : _____

(k) Estimated price of the equipment _____

10. Alternatives for meeting the objectives of the equipment set forth in the RFI.

11. Any other relevant information: _____.

12. **Declaration**

(a) It is certified that the above information is true and any changes will be intimated at the earliest.

(b) It is certified that in the past that _____ (name of firm) has never been banned/ debarred for doing business dealings with MoD/ GoI/ any other Government Organisation and that there is no inquiry going on by CBI/ ED/ any other Government agency against the firm.

(Authorised Signatory)

Appendix D
{Refers to Para 8(c)}

ADDITIONAL INFORMATION PROFORMA (INDIAN SHIPYARDS)

1.	Year Established							
2.	Type of Organisation size/Classification of Yard							
3.	Organisation setup and availability of skilled Manpower							
4.	Details of design, planning and production facilities/infrastructure including slipways/ dry docks and wet basin/water front (attach brochures etc.)							
5.	Annual build capacity (in tonnage)							
6.	Details of future expansion and business development planned							
7.	Vessels delivered in last 05 years. (attach previous order copies for MCMVs/similar vessels only)							
	Yard	Customer	Type of vessel	Dwt,grt	Order date	Start production	Contractual delivery	Actual delivery
8.	Total orders in hand (however, attach order copies for similar ships/ crafts only)							
	Yard	Customer	Type of vessel	Dwt, grt	Order date	Start production	% completed	Expected delivery
9	Financial information (in INR for Indian Shipyards and in US dollars for foreign Shipyards)							
	(a)	Annual turnover in the last three financial years (year wise)						
	(b)	Profits made						
	(c)	Net Worth = equity+ reserves						
	(d)	Debt/Equity ratio						
	(e)	Quick Ratio = (current assets long term debts)/current liabilities						
	(f)	Attach copies of certified published annual report showing turnover and financial status in support of above information						
10	Detailed specifications of MCMVs offered to meet the specified requirements and build period from date of order							
11	Detailed specifications of commercially off the shelf (COTs) design of MCMVs, if available for outright adoption for the current project, if any.							

(Authorised Signatory)

Appendix E
{Refers to Para 12}

GUIDELINES FOR FRAMING CRITERIA FOR SHIPYARD SELECTION/ PREQUALIFICATION IN 'BUY (INDIAN-IDDM)

1. The guidelines prescribed for short-listing/ pre-qualification of Indian Shipyards in Buy (Indian-IDDM) cases are enumerated in the succeeding paragraphs. Paragraph 2 deals with the parameters that may be considered for short-listing of Shipyards, whereas Paragraph 3 amplifies the process for applying selected parameters to the process of Shipyard Short listing.

2. **Parameters**.

(a) **General Parameters.**

(i) Applicant Entity should be an Indian shipyard as defined at Paragraph 20 of Chapter I of DAP 2020.

(ii) Business dealing with applicant Entity or any of its allied entities should not have been suspended or banned, by MoD/ SHQ or any Government Department or organization (as defined in Guidelines for Penalties in Business Dealings with Entities issued vide Ministry of Defence, D(Vigilance) MoD ID No 31013/I/2006-D(Vig) Vol II dated 21 Nov 2016). None of the Promoters and Directors of applicant entity should be a wilful defaulter.

(iii) "Entities" will include companies, with whom the Ministry of Defence has entered into, or intends to enter into, or could enter into contracts or agreements.

(iv) "Applicant entity" may be a company, subsidiary, an associate company (as defined in the Companies Act, 2013), a consortium or a Joint Venture (JV).

(b) **Technical Parameters**.

(i) Shipyards shall be a manufacturing entity or a system integrator of defence equipment and not a trading company, except in cases where the OEM participates only through its authorised Shipyards.

(ii) Minimum **two years**' experience in **broad areas like manufacturing/ electronics/ explosives etc. as applicable in the instant procurement case**. If not, then cumulative experience of at least three years in above areas, resulting in gaining of competence for manufacturing the proposed product. (In case the SHQ feels that for a particular equipment a lesser experience could be accepted, then the same should be got approved by the competent authority before including the same in the RFP).

(iii) Where product involves integration, previous experience of not less than one year/ one project in integration of systems/ equipment shall be required.

(iv) For RFI of Shipbuilding cases (acquisition of Ships, Yard crafts & Submarines), **technical capacity assessment parameters stipulated at Annexure I to Appendix C, chapter XII, DAP-20** shall be followed.

(c) **Financial Parameters**. For RFI of Shipbuilding cases (acquisition of Ships, Yard crafts & Submarines), f**inancial parameters stipulated at Annexure II to Appendix C, Chapter XII, DAP-20** shall be followed**.**

(d) **Other Parameters**.

(i) **Industrial License (IL)**. Shipyards should be either holding a valid defence industrial license or should have applied for the same before responding to RFP. In any case the shipyard must confirm holding of IL before commencement of FET. (Items requiring IL will be as per DIPP Press Note 3 of 2014 as amended from time to time).

(ii) **Registration**. Registered for a minimum of two years (one year for SMEs). Minimum number of years not applicable for JVs constituted specifically for a project.

4. **Stipulations for Applying Parameters**.

(a) **Areas like manufacturing/ electronics/ explosives etc**. referred at Paragraph 2(b) (ii) should be defined in each case of procurement.

(b) In case the Applicant Entity is unable to meet the Financial Parameters by itself, it may rely on its **Holding Company** (as defined in the Companies Act, 2013 and amendments thereof) ("Companies Act") for fulfilment of the Financial Parameters, in which case reliance must be placed on the Holding Company towards fulfilment of **ALL** the Financial Parameters.

(c) In case the Applicant Entity is unable to meet one or more of the Technical Parameters by itself, it may rely on a Group Company (ies) for fulfilment of the Technical Parameters. A Group Company in relation to the Applicant Entity may be:-

(i) A company of which the Applicant Entity it is an Associate Company. Such company should have ownership, directly or indirectly, of at least 26% of the voting shares of the Applicant Entity.

(ii) A company which is an Associate Company of the Applicant Entity. The Applicant Entity should have ownership directly or indirectly, of at least **26%** of the voting shares of such Associate Company.

(iii) A Company with whom the Applicant Entity is commonly owned, directly or indirectly, for at least **26%** of the voting shares by another company. For example: An Applicant Company A is an Associate Company of Company B, in which B holds at least 26%. Further, C is also an Associate Company of B, in which B holds at least 26%. In this case the Applicant Company may use the credentials of C as well.

(iv) The Holding Company and Subsidiary Companies (as defined under the Companies Act) of the Applicant Entity.

(d) The Applicant entity may be a single entity or a group of entities (the "Consortium"), coming together to implement the project. In such case:-

(i) The credentials of only those members or their related entities may be counted, who have at least **26%** equity stake in the Consortium.

(ii) Each Consortium should have a designated Lead Member.

(iii) For Technical Parameters, **any of the Consortium members or their Group Companies** may meet the criteria.

(iv) For Financial Parameters; the Turnover and Net Worth of the Consortium Member shall be reckoned **proportionate to Consortium Member's equity stake** in the Consortium, and each Consortium member should meet the other criteria pertaining to Insolvency and Credit Rating. In case the Consortium Member relies on its Holding Company for any one of the above-mentioned Financial Parameters, then reliance must be placed on the Holding Company for meeting **all the financial Parameters**.

(e) Shipyard should provide all necessary self-authenticated documentation in support of their achievement of criteria. Such documentation should inter-alia include:-

(i) Details of projects/ supply orders successfully executed in the last two years.

(ii) Annual reports for three years of applicant entity, parent and associate companies, consortium and JV partners.

(iii) Details of shareholders, promoters, associated, allied and JV companies.

(iv) Details of vigilance action, viz. ongoing investigation and suspension/ debarment/ blacklisting actions against the applicant entity or any of its allied entities, parent company or consortium and JV partners, if any by any Department/agency of Central Government.

(v) A certificate from CA/CS indicating the financial parameters for the last three years as per Paragraph 2(c).

(**Note**: If a shipyard is already a supplier to MoD and/ or has already provided the above documents in such cases, it should be necessary for the shipyard to resubmit only such documentations as is necessary to update the above).

(f) Any shipyard furnishing false information will be liable for action as per existing guidelines.

(g) Based on these generic parameters, more specific criteria should be evolved by the SHQ with regard to Technical and Financial parameters {Paras 2(b) and 2(c) above} in each procurement case depending upon requirements peculiar to each case keeping in view the overall need to ensure wider Shipyard participation. The specific criteria evolved by the SHQ for each case, as per these guidelines, may be got approved by the competent authority before including the same in the RFPs.

4. The criteria for shipyard selection shall be clearly stipulated in RFPs so as to maintain transparency. Care shall be taken to ensure that the stipulated criteria are not open to subjectivity and arbitrary interpretation.

ABBREVIATIONS

Sl.	Abbreviation	Full Form
1.	ACBS	Air Circuit Breakers
2.	ACCS	Advanced Integrated Composite Communications System
3.	ACOS	Auto Changeover Switches
4.	ACS	Auxiliary Control System
5.	AED	Automatic External Defibrillator
6.	AELS	Automatic Emergency Lantern
7.	AFDS	Automatic Fire Detection and Suppression
8.	AFFF	Aqueous Film Forming Foam System
9.	AIO	Action Information Organisation
10.	AIS	Automatic Identification System
11.	ALAN	Advanced Local Area Network
12.	ALS	Advanced Life Support
13.	AMDR-3D	Automatic Missile Detection Radar – 3 Dimensional
14.	APMS	Automatic Power Management System
15.	APT	Air Pressure Testing
16.	ASP	Aft Steering Post
17.	ASW	Anti-Submarine Warfare
18.	ATDS	Anti-Torpedo Defence System
19.	ATE	Automatic Test Equipment
20.	AVCAT	Aviation Category
21.	AVR	Automatic Voltage Regulator
22.	AVRE	Audio Video Reproduction Equipment
23.	AWOS	Automatic Weather Observation System
24.	B&D Spares	Base & Depot Spares
25.	BASCCA	Breathing Apparatus Self Contained Compress Air
26.	BDCS	Battle Damage Control System
27.	BIT	Built-In Test
28.	BITE	Built-In Test Equipment
29.	BR	Book of Reference
30.	BS	Build Specification / British Standards
31.	CAD	Computer Aided Design
32.	CALS	Computer Aided Logistics Support
33.	CAM	Computer Aided Manufacture

Sl.	Abbreviation	Full Form
34.	CBRN	Chemical Biological Radiological & Nuclear
35.	CIWS	Close- In Weapon System
36.	CMS	Combat Management System
37.	CNAL	Comprehensive NBCD Allowance List
38.	CIWS	Close- In Weapon System
39.	COMINT	Communication Intelligence
40.	COTS	Commercial of The Shelf
41.	CPL	Comprehensive Part Identification List
42.	CST	Contractor's Sea Trials
43.	CTD	Colour Tactical Displays
44.	DA	Diesel Alternators
45.	DBS	Distribution Boards
46.	DC	Damage Control
47.	DC&FF	Damage Control & Fire Fighting
48.	DCHQ	Damage Control Headquarters
49.	DCP	Dry Chemical Powder
50.	ECCM	Electronic Counter Counter Measure
51.	ECDIS	Electronic Chart Display & Information System
52.	ECM	Electronic Counter Measure
53.	ECP	Emergency Conning Position
54.	ELINT	Electronic Intelligence
55.	ELSA	Emergency Life Saving Apparatus
56.	EMC	Electro Magnetic Compatibility
57.	EMI	Electro Magnetic Interference
58.	EMIPT	Electromagnetic Compatibility and Interference Prediction Tool
59.	ENC	Electronic Navigation Chart
60.	EOFCS	Electro Optical Fire Control System
61.	EOIRST	Electro Optical Infra – Red Search and Track
62.	EOT	Engine Order Telegraph
63.	EPROM	Erasable Programme Read Only Memory
64.	ESD	Electro Static Discharge
65.	ESM	Electronic Support Measure
66.	ESS	Environmental Stress Screening
67.	FATS	Factory Acceptance Trials

Sl.	Abbreviation	Full Form
68.	FCP	Fire Control Panel
69.	FCS	Fire Control System
70.	FCR	Fire Control Radar
71.	FDCS	Flight Deck Communication System
72.	FDO	Flight Deck Officer
73.	FLYCO	Flying Control Post
74.	FOV	Field of View
75.	FOST	Flag Officer Sea Training
76.	FPP	Fixed Pitch Propellers
77.	FRP	Fiber Reinforcement Plastic
78.	GLS	Guideline Specification
79.	GMDSS	Global Maritime Distress and Safety Service
80.	GPS	Global Positioning System
81.	GSLJS	General Service Life Jackets
82.	HATS	Harbour Acceptance Trials
83.	HCOS	Hand Change Over Switches
84.	HDLJS	Hazardous Duty Life Jackets
85.	HF	High Frequency
86.	HMS	Hull Mounted Sonar
87.	HPU	Hydraulic Power Pack
88.	HSDM	High Speed Data Modem
89.	IAC	Integrated ASW Computer
90.	IBS	Integrated Bridge System
91.	ICAF	Integrated Compressed Air Foam System (for Cooling)
92.	ICCP	Impressed Current Cathodic Protection System
93.	ICM	Inter Connectivity Matrix
94.	IDD	Interface Definition Document
95.	IETM	Interactive Electronic Technical Manual
96.	IFF	Identification of Friend & Foe
97.	ILMS	Integrated Logistics Management System
98.	IMCS	Integrated Machinery Control System
99.	IMD	Indian Metrology Department
100.	IMO	International Maritime Organization
101.	INBR	Indian Navy Book of Reference
102.	INCAT	Indian Naval Catalogue

Sl.	Abbreviation	Full Form
103.	INCRETE	Indian Navy Common Range Electrical Test Equipment
104.	IPMCS	Integrated Propulsion Machinery Control System
105.	IPMS	Integrated Platform Management System
106.	IRPCS	International Regulations for Preventing Collisions at Sea
107.	IRSS	Infra-Red Suppression Support Device
108.	IRL	Indigenous Rocket Launcher
109.	ITF	Installation Test Firing
110.	JSDH	Junior Sailor Dining Hall
111.	LAN	Local Area Network
112.	LFH	Limited Fire Hazard
113.	LFVDS	Low Frequency Variable Depth Sonar
114.	LOA	Length Over All
115.	LSHSD	Low Sulphur High Speed Diesel
116.	LSO	Landing Safety Officer
117.	MARPOL	Marine Pollution (International Convention for the Prevention of Pollution from Ships
118.	MCR	Machinery Control Room
119.	MFCS	Multi-Function Consoles
120.	MFD	Multi-Function Displays
121.	MFW	Multi-Function Workstation
122.	MIL	Military Specification
123.	MIO	Maritime Interdiction Operations
124.	MMB	Mobile Maritime Broadcast
125.	MMI	Man Machine Interface
126.	MR GUN	Medium Range Gun
127.	MRLS	Manufacturer Recommended List of Spares
128.	MSO	Main Signal Office
129.	MTBF	Mean Time Between Failure
130.	MTTR	Mean Time to Repair
131.	NBCD	Nuclear Biological Chemical & Defence
132.	NBCDO	Nuclear Biological Chemical Defence Organisation
133.	NCD	Naval Construction Document
134.	NEC	Naval EMC Center
135.	NECP -500	Naval EMC Center Publication
136.	NES	Naval Engineering Standards
137.	NIST	National Institute of Standards & Technology

Sl.	Abbreviation	Full Form
138.	NLCP	Navigational Light Control Panel
139.	NMER	Naval Magazine and Explosive Regulations
140.	NTP	Network Time Protocol
141.	NO	Navy Order
142.	NPOL	National Physical Oceanographic Laboratory
143.	NSQRS	Naval Staff Qualitative Requirements
144.	NVD	Night Vision Device
145.	NVG	Night Vision Goggle
146.	OBMS	Out Board Motor
147.	OBS	On Board Spares
148.	ODA	Offshore Defence Advisory
149.	OEM	Original Equipment Manufacturer
150.	P&S	Port & Starboard
151.	PIL	Part Identification List
152.	PMS	Project Monitoring System
153.	POL	Petroleum Oil and Lubricants
154.	PSI	Propulsion System Integration
155.	RFP	Request for Proposal
156.	RHIBS	Rigid Hull Inflatable Boat
157.	RLG/FOG	Ring Laser Gyro / Fibre Optic Gyro
158.	RU STORE	Ready Use Store
159.	SADL	Stand Alone Data Link
160.	SAG	Surface Action Group
161.	SAM	Surface to Air Missile
162.	SAP	System Application Programming
163.	SAS	Ship Alongside Supply
164.	SATS	Sea Acceptance Trials
165.	SCB	Shore Power Circuit Breaker
166.	SDN	Ship Data Network
167.	SECEM	Secure Email
168.	SFD	Ship Fit Definition
169.	SHF	Super High Frequency
170.	SHHD	Ship House Holding Data
171.	SHIPEDF	Ship Electromagnetic Design Framework
172.	SHOL	Ship Helicopter Operating Limitations

Sl.	Abbreviation	Full Form
173.	SIA	System Integration Authority
174.	SIRS	Ship Installed Radiac System
175.	SOLAS	Safety of Life at Sea
176.	SOTRS	Statement of Technical Requirement
177.	SRGM	Short Range Gun Mount
178.	SRSAM	Short Range Surface to Air Missile
179.	SSST	Small Ship Satellite Terminal
180.	SPM	Shock Pulse Monitoring System
181.	SSM	Surface to Surface Missile
182.	SSCBS	Shore Supply Connection Boxes
183.	STP	Sewage Treatment Plant
184.	STPS	Shielded Twisted Pair
185.	STW	Setting To Work
186.	SWL	Safe Working Load
187.	TACS	Total Atmospheric Control System
188.	TBO	Time Between Overhaul
189.	TDP	Technical Data Package
190.	TEC	Technical Evaluation Committee
191.	TNC	Technical Negotiation Committee
192.	UHF	Ultra-High Frequency
193.	UHF SATCOM	Ultra-High Frequency Satellite Communication
194.	UPS	Uninterrupted Power Supply
195.	USG	Ultrasonography
196.	UTP	Unshielded Twisted Pair
197.	VA	Vulnerability Assessment
198.	VBSS	Visit Board Search Seizure
199.	VCBS	Vacuum Circuit Breaker
200.	VCS	Voice Control System
201.	VHF	Very High Frequency
202.	VLF	Very Low Frequency
203.	VPNS	Virtual Private Network
204.	WAN	Wide Area Network
205.	WESEE	Weapon & Electronics System Equipment Establishment
206.	WMO	World Meteorological Organization
207.	WOT	Warship Overseeing Team

Sl.	Abbreviation	Full Form
208.	WPS	Warship Production Superintendent
209.	WSDS	Wind Speed & Direction System
210.	UWCS	Underwater Wire-Less Communication System