

REQUEST FOR INFORMATION (RFI) FOR PROCUREMENT OF
UNMANNED MCM SUITE FOR MCMVs

1. The Ministry of Defence, Government of India, intends to procure 12 x Unmanned Mine Counter Measures (MCM) Suite comprising of Autonomous Surface Vessels (ASVs), Heavy Weight Autonomous Underwater Vehicles (AUVs), Remotely Operated Vehicles (ROVs) for use onboard Indian Naval Mine Counter Measures Vessels(MCMVs) under Buy (Indian-IDDm), Buy(Indian) and Buy & Make (Indian - with buy content 0%) categories only iaw Defence Acquisition Procedure - 2020.

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 equipment. Few important technical parameters of the proposed equipment are also mentioned.

(b) **Part II.** The second part of the RFI states the methodology of seeking response of vendors. Submission of incomplete response format will render the vendor liable for rejection.

(c) **Part III.** Guidelines for Framing Criteria for Vendor Selection/Pre-Qualification in Buy Indian (IDDm) and Buy (Indian) and Buy & Make (Indian - with buy content 0%) cases.

PART - I

3. **Intended Use.** The Unmanned MCM suite is envisaged to be used for MCM operations from MCMVs.

4. **Important Technical Parameters.** The broad Operational Requirements and Technical Parameters sought for the Unmanned MCM Suite are at ***Appendix A*** to this RFI. Vendors may also utilise this opportunity to recommend various inputs to determine the capabilities proposed in terms of Essential Parameters-A, Essential Parameters-B and Enhanced Performance Parameters

iaw Para 14 of Chapter II of DAP 2020 or as amended from time to time for development of SQRs.

5. Vendors should confirm 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 (RFP)' would be issued soliciting technical and commercial offers together, but in two separate sealed envelopes. The validity of commercial offers should be at least 18 months from the date of submission of offers.

(b) The technical offers would be evaluated by a Technical Evaluation Committee (TEC) to check its compliance with RFP.

(c) The equipment of all TEC cleared vendors would be put through Field Evaluation Trials (FET) on a No Cost No Commitment (NCNC) basis. A Staff Evaluation would be carried out to analyse the result of field evaluation and shortlist the Unmanned MCM Suite for introduction into service.

(d) Amongst the vendors cleared by staff evaluation, a Contract Negotiations Committee would decide the lowest cost bidder (L1) and conclude the appropriate contract.

(e) Vendor would be bound to provide product support for the time period specified in the RFP, which would include spares and maintenance tools/jigs/ fixtures/ documentations for training for 'Operator Level' and component level repairs.

(f) The vendor would be required to accept the general conditions of contract given in the Standard Contract Document at Chapter VI of DAP 20.

(g) **Integrity Pact.** An integrity pact along with appropriate Earnest Money Deposit (EMD) is a mandatory requirement in the instant case (Refer Annexure I to Appendix O of Schedule I of Chapter II of DAP 2020 or as amended from time to time).

(h) **Performance-cum-Warranty Bond.** Performance - cum - Warranty Bond both equal to 3%-10% value of the contract inclusive of taxes and duties is required to be submitted after signing of contract.

(j) **Transfer of Technology (ToT).** Govt is desirous of license production of equipment after acquiring ToT in the case. Vendors is to indicate willingness to provide ToT (know-how and know-why) alongwith exact scope that can be provided in each area (ASVs, Command and Control System, Mission Modules, etc) alongwith BQ (item wise).

(k) **Transfer of Production (ToP).** Willingness to provide ToP (including DPR) for setting up facility for manufacture of ASVs/system components in India, procurement order specifications for Commercially Off the Shelf (COTS) tools/ Jigs, QA/QC etc., supply of proprietary jigs/fixtures as required, manufacturing drawings, QA/QC procedures, procurement order specification for raw material/ components etc. as required may be indicated.

6. **Cost.** Vendors are to include the cost of all systems/sub-systems, including onboard Control Station, associated systems/devices, Installation, Technical and Operator Manual, Product Support Package, Training, Training Aids, Simulators, Maintenance, Special Maintenance Tools, On Board Spares (OBS) and Comprehensive Maintenance Contract (CMC) including taxes. Tax/ custom duty component should be included in the cost of equipment.

7. The vendor is required to indicate whether the equipment has been supplied by them to any other country and details thereof. The vendor may also indicate if the equipment has been offered to any other Governmental agencies within India and if so, unit price (without taxes/custom duties) and year in which it was supplied. The differences between these versions of equipment and the equipment presently being offered may also be highlighted. In case of a developmental system, the same needs to be indicated with developmental timelines.

8. **Field Evaluation Trials (FET).** The firms/vendors are to indicate their willingness for the conduct of FET in India. The firm/vendors are to indicate the modalities for the conduct of FET. The firms/vendors are to specify parameters of the trials for which evaluation is proposed to be carried out by actual trials/ demonstration/ simulation/ certification/ documentation.

9. **Compliance with DAP 20.** The procurement of the Unmanned MCM suite would be guided by DAP-20. All firms/vendors are advised to be conversant and in compliance with the same. If the vendor/firm is unable to comply with any provision/clause of DAP-20, the same is to be indicated with reasons. The vendors/firms are to indicate acceptability to the terms of payment as per DAP-20. The vendors are required to indicate or otherwise to the conditions of the RFI and with all provisions of DAP-20, and respond to the queries pertaining to the operational and technical requirements placed at ***Appendix A.***

10. **Delivery Schedule.** Vendors/firms to indicate tentative delivery schedule for supply of the equipment after conclusion of contract. Separate timelines for delivery may be indicated for each of the categories viz. Buy Indian (IDDM) and Buy (Indian) and Buy & Make (Indian - with buy content 0%), wherever applicable.

11. **Indigenous Content/ Categorisation.** Vendors are to provide defining attributes as per ***Appendix A to Chapter II of DAP-20.*** This is imperative for defining procurement category. The vendors are to provide suitable inputs towards arriving at categorisation with justification for not opting higher categorisation. The vendors are to also indicate willingness/unwillingness to indigenously design and develop the required equipment. Vendors are also required to indicate indigenous content percentage on cost basis of the total contract value. Vendors are to provide following details registered with authorised agency with regard to the systems/sub-systems, where applicable or may be asked to furnish any other documentation to substantiate their claim on voluntary basis:-

- (a) IPR documentation.
- (b) Patents.
- (c) Design registration.
- (d) Copy right.
- (e) Any other such document.

12. **Training.** The vendor would also be required to impart training to the Buyer in operation and first line maintenance of the system at buyer nominated location.

13. **Undertaking.** Vendors/Firms are to provide an undertaking that they have not been banned/ debarred from doing business dealings with MoD/Gol/any other Government organisation and there is no enquiry going on by CBI/ED/any other Government agency against them.

PART - II

14. **Procedure for Response.**

(a) Vendors must fill the form of response as given in ***Appendix B, Appendix C and Appendix D*** to this RFI. Apart from filling details about company, details about the exact product meeting other generic technical specifications should also be carefully filled. Additional literature on the product can also be attached with the form.

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

The Commodore (Staff Requirements)
Directorate of Staff Requirements (DSR)
Ministry of Defence, Naval Headquarters
Room No 206, D Block
Defence Offices Complex
Africa Avenue, New Delhi - 110023

(c) Last date of acceptance of filled form is **Eight Weeks** from the date of uploading of RFI on website. The vendors short listed for issue of RFP would be intimated.

(d) Vendors may interact with the project officer for any queries/ clarifications to this RFI at under mentioned address:-

Capt (SR) ASW
Directorate of Staff Requirements
Ministry of Defence, Naval Headquarters
Room No 206, D Block
Defence Offices Complex

Africa Avenue, New Delhi - 110023

Tel: 011-26771337

Fax: +91 11 26771320

Email ID: dsr@navy.gov.in

15. The Government of India invites responses to this request only from Original Equipment Manufacturers (OEM)/ Authorised Vendors). The end user of the equipment is the Indian Navy.

16. 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 2020.

PART - III

**GUIDELINES FOR FRAMING CRITERIA FOR VENDOR SELECTION/
PREQUALIFICATION IN 'BUY (INDIAN-IDDMM)' 'BUY (INDIAN)'
AND 'BUY & MAKE (INDIAN)' CASES**

17. The guidelines prescribed for short-listing/ pre-qualification of Indian vendors in Buy (Indian-IDDMM), Buy (Indian) & Buy & Make (Indian) cases are enumerated in the succeeding paragraphs. **Paragraph 18** deals with the parameters that may be considered for short-listing of vendors, whereas **Paragraph 19** amplifies the process for applying selected parameters to the process of Vendor Short listing.

18. **Parameters.**

(a) **General Parameters.**

(i) Applicant Entity should be an Indian Vendor as defined at Paragraph 20 of Chapter I of DAP 2020 for procurement under Buy (Indian-IDDMM), Buy(Indian) and Buy & Make (Indian - with buy content 0%) categories only.

(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) Vendor 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 Vendors.

(ii) Minimum **two years'** experience in Unmanned Underwater Systems. If not, then cumulative experience of at **least three years in above areas**, resulting in gaining of competence for manufacturing the proposed product.

(iii) Experience of not less than **one year/ one project** in integration of systems/ equipment shall be required.

(c) **Financial Parameters.**

(i) **Average Annual Turnover.** Minimum average annual turnover for last three financial years, ending 31st March of the previous financial year, should not be less than 30% of estimated cost of the Buy (Indian-IDD) and Buy (Indian) project and for Buy & Make (Indian) should not be less than 30% of estimated cost of the Make portion.

(ii) **Net Worth.** Net worth of entities, ending 31st March of the previous financial year, should not be less than 5% of the estimated cost of the Buy (Indian-IDD) and Buy (Indian) project and for Buy & Make (Indian) should not be less than 5% of estimated cost of the Make portion. For orders above ₹ 5000 crores, the Net worth of group companies can be considered on production of suitable documentary assurance.

(iii) **Insolvency.** The entity should not be under insolvency resolution as per Indian Bankruptcy Code at any stage of procurement process from the issuing of RFP to the signing of contract.

(iv) **Credit Rating (Desirable Financial Parameter).** Long term credit rating equivalent to CRISIL rating on Corporate Credit Scale as **CCR-BBB or better**, and **SME-04 or better** for

SMEs issued by credit rating agencies recognized by SEBI. Credit rating should be as on 31st March of the previous financial year.

(Note 1: All the above Financial Parameters, except Paragraph 18(c)(iii) above (Insolvency) will not be applicable for Capital Acquisition cases where estimated cost is ₹150 crores and below. However, Net worth of entities should not be **negative**.

Note 2: The turnover and net worth of the vendor shall be rounded off to the nearest lower ten/ hundred crores so as to keep the estimated cost of procurement confidential).

(d) **Other Parameters.**

(i) **Industrial License (IL).** Vendors should be either holding a valid defence industrial license or should have applied for the same before responding to RFP. In any case the vendor 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.

19. **Stipulations for Applying Parameters.**

(a) **Areas like manufacturing/ electronics/ explosives etc.** referred to at Para 18(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 fulfillment of the Financial Parameters, in which case reliance must be placed on the Holding Company towards fulfillment 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 fulfillment 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) Vendors 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 18(c).

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

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

20. **Start Ups/ MSMEs.** Startups would be defined as per G.S.R. 127 (E) dated 19 Feb 2019 (as amended from time to time). For procurement cases where the estimated cost is not exceeding ₹100 crores/ year based on delivery schedule at the time of seeking AoN or ₹ 150 crores, whichever is higher, to encourage the Start Ups/ MSMEs and build Industrial ecosystem, the recognised Start Ups/ MSMEs in the relevant fields may be considered for issue of RFP without any stipulation of Financial parameters, except Para 18(c)(iii) above (Insolvency) and with General and Technical parameters to be decided on case to case basis.

(Note: Start Ups should not be confused with new entrants who may be high/ mid-sized groups having financial support and manufacturing experiences and now venturing into Defence Production).

Appendix A
(Refers to Para 4)

OPERATIONAL REQUIREMENTS - UNMANNED MCM SUITE

1. **System Composition.** The unmanned MCM Suite should be an integrated system encompassing a wide range of MCM equipment which are interfaced through a Command and Control System. The basic configuration of the Unmanned MCM suite of MCMVs must include the following: -

- (a) Autonomous Surface Vessels (ASVs) for mine reconnaissance and transporting unmanned tool box into the mine field for MCM operations.
- (b) Heavy Weight Autonomous Underwater Vehicles (HWAUVs) deployed from ASV/ MCMVs for mine reconnaissance including route survey, mine detection and identification.
- (c) Mine Identification and Disposal System (MIDS) including Remotely Operated Vehicle (ROVs) deployed from ASVs for mine disposal using mine classification and neutralisation tools.
- (d) MCM Command and Control system for Mission Planning, Execution and Evaluation. MCM Command and control station would be utilise for controlling ASVs, HWAUVs and ROVs from MCMVs.
- (e) Hull Mounted Mine and Obstacle Avoidance Sonar for MCMVs.
- (f) Launch and Recovery System onboard MCMVs for launch and recovery of ASVs and HWAUVs.
- (g) Mission payload of ASVs, HWAUV and ROVs to undertake Mine Detection, Identification, Classification, Localisation and Mine Neutralisation.

Autonomous Surface Vehicle

2. **Role.** The Autonomous Surface Vehicle (ASV) should be capable of being launched from Mine Counter Measure Vessels of Indian Navy. ASV should be suitable for MCM mission under the category of Compact Autonomous Surface Craft - All Domain Effects (CASCADE) of Indian Navy. ASV is to be capable of undertaking the following:-

- (a) Transportation of HWAUVs and ROVs from MCMVs to Mine Field for undertaking complete MCM operations viz. Detection, Identification, Classification and neutralisation of Ground and Moored Mines.
- (b) Mine detection and localisation using integral payload.
- (c) Mine neutralisation using integrated ROVs onboard ASV.

3. **Modes of Operation.** The ASV should be capable of offering varied levels of autonomy:-

- (a) **Remote/ Autonomous.** The vessel should enable remote controlled and autonomous operations from the Command and Control Station onboard MCMVs.
- (b) **Minimally Manned Mode.** The ASV should also be capable of being operated in minimally manned mode with fitment of enclosed bridge and local steering controls for operation by onboard crew.
- (c) **Operations Under Loss of Communication.** In case of loss of communication with the Command Centre the vessel should be capable of proceeding on the pre - planned way points/ pre-programmed route designated during mission planning.

4. **Control Mechanism.** Each ASV is to be controlled through a Control Station onboard MCMVs. The Control Station should be capable of undertaking all Command Control and Communications (C³) functions. The control station is to be compatible for integration onboard a mother ship and be designed in a manner that a maximum of two operators would be able to carry out all the envisaged missions.

5. **Vessel Specifications.** The ASVs should possess the following general specifications: -

(a) **Dimensions.**

- (i) Length - Not more than 13 m
- (ii) Breadth - Not more than 3.5 m
- (iii) Draught - Not more than 1.0 m
- (iv) Total Weight - Not more than 14T.

(b) **Speed.**

- (i) Max speed - More than 20 kn.
- (ii) Operating speed for MCM ops - 1-10 kn.

(c) **Sea State of Operation.** The vessel should be capable of being launched up to Sea State 4, operated up to Sea State 5 and should be survivable up to Sea State 6.

(d) **Endurance.** The vehicle should have an endurance of atleast 100 - 120 h at Economical Speed.

6. **Navigation Aids.** The ASV is to be equipped with IRPCS compliant navigational aids and a Bridge Management System, necessary to enable its mission accomplishment. These would include Navigation Radar, AIS, GPS/ DGPS, Gyro, Inertial Navigation System, Echo Sounder, Met Instruments etc. The vessel should also be equipped with a suitable Positioning System to meet its envisaged roles including launch, recovery and control of HWAUV/ROVs.

7. **Electro - Optical Sensor.** The vessel should have a suitable EO/IR camera so as to provide increased situational awareness at sea.

8. **Mission Payload.** The ASV is to be equipped with a Modular MCM Module that is capable of detection, localisation, classification and neutralisation of Ground and Moored Mines up to depths of at least 300 m.

The MCM Module should also be capable of being employed for undertaking bottom mapping and route survey up to depths of 300 m. The mission payload configuration should be of an advanced flexible design based on open architecture providing easy future growth and upgrades. Elements of the vessel's MCM module are to include the following:-

(a) **Mine & Obstacle Avoidance Sonar.** The Mine & Obstacle Avoidance Sonar (MOAS) should be a forward looking multi beam sonar capable of detecting mines and other obstacles underwater. It should provide real time range and bearing of detected objects. The sonar should be capable of being controlled by the sonar operator from the Control Station onboard MCMVs or onboard ASVs during autonomous or manned operations respectively.

(b) **Towed Synthetic Aperture Sonar.** The vessel should have a suitable towed synthetic aperture sonar capable of high resolution along with advanced processing techniques. The sonar should provide efficient performance at operating speed and complete bottom coverage. The system should be capable of being remotely operated by the operator from the Control Station onboard MCMVs or ASVs during autonomous or manned operations respectively.

(c) **Mine Identification and Neutralisation System.** The MCM payload should encompass of a suitable Mine Identification and Neutralisation system which would allow the operator to remotely dispose or detonate the selected targets. The mine disposal system should be able to be mounted on the ROV as an additional component when required for mine neutralisation. System should have capability to place mine disposal charges onto the target.

9. **Network Requirements.** The ASV - MCM should be capable of operating in a networked environment, with the network architecture/ standardised protocols finalised jointly with the *IN*. The network architecture should be scalable and upward compatible with future vessels to be inducted in the *IN*.

10. **Artificial Intelligence and Machine Learning.** Inclusion of AI and ML based image and pattern recognition of electro optic payload to assist in autonomous operations. This will also require provisioning of library for classification and a direct link with land data centers for image correlation.

11. **Communication.** The following should be catered on the ASV for communication:-

(a) SATCOM is to fitted onboard the vessel. It should be compatible with Indian Satellite and as redundancy fitted with INMARSAT terminal.

(b) Additional communication system viz MSS MII/INMARSAT/ISAT phones for minimally manned mode operations.

(c) The ASV should be capable of operating in a networked environment, with the network architecture/ standardised protocols finalised jointly with the *IN*. The network architecture should be scalable and upward compatible with future vessels to be inducted in the *IN*.

12. **Cyber Security.** It is to be ensured that hardware and software used in the ASV, does not contain embedded malicious code. The vessel should have suitable cyber security measures including end to end encryption of data being transmitted to the control station.

Heavy Weight Autonomous Underwater Vehicles

13. **Role.** Autonomous Underwater Vehicle (AUV) should be an autonomous device that is driven through the water by a propulsion system, controlled and piloted by an internal computer with an option of remote piloting in addition to autonomous navigation through a pre-planned track or way points. The AUVs should be designed for high hydrodynamic stability, high manoeuvrability and low acoustic noise using non-corrosive material to meet MCM mission requirements. AUV is to be deployable from MCMV/ ASV/ Shore for undertaking the following:-

(a) Pre feed the mission in the AUV through Mission Control Station. The parameters would include way points (GPS Coordinates), depth and speed of operations (variable between way points) and time of run.

(b) Navigate manually (with remote control) from *IN* platform/ shore and autonomous mode.

(c) Safely navigate through waypoints to detect and identify sea mines or Mine Like Object (MILO) through bottom mapping using Synthetic Aperture Sonar (SAS) or Sonar with similar functionality.

(d) Modular or replaceable data storage device containing the mission data would be processed at Mission Control Station.

(e) Control will be exercised through either V/UHF or Satellite data link or underwater acoustic modem.

14. **Design Features.** The AUV shall be capable of being launched/recovered from MCMVs, ASVs and other ships of Indian Navy.

15. **Modes of Operation.** The AUV should be able to operate in the following modes:-

(a) Autonomous.

(b) Manual (remotely controlled through Control Station).

16. **AUV Specifications.** The AUV should possess the following general specifications: -

(a) Length - not greater than 07 metres

(b) Width - not greater than 01 metres

(c) Weight in Air - not more than 1500 Kg

(d) Buoyancy - Positively buoyant

(e) Sea State - Up to Sea State 5

17. **Propulsion.** The AUV should incorporate suitable propulsion for high hydrodynamic efficiency and low acoustic noise.

18. **Navigation Aids.** The AUV is to be equipped with a hybrid navigation suite to allow accurate navigation, position and orientation in both surface and submerged operation modes.

19. **Command Control and Communication System.** The details of Command, Control and Communication System are as follows:-

- (a) **Underwater Acoustic.** The underwater acoustic communications system should be bi-directional to monitor the telemetry from the vehicle and to send commands to the vehicle.
- (b) **Radio Frequency.** The radio link will be used when the vehicle is on the surface in order to transfer data between the vehicle and the control ship and to manually control the vehicle on surface.
- (c) **Wi Fi.** The Wi Fi radio link will be used when the vehicle is in surface, close to the ship. It will be used to down load acquired data or upload new mission parameters without recovering the vehicle.
- (d) **Satellite Communication.** To communicate with the vehicle on surface to receive and send commands satellite link.

20. **Mission Planning and Control System.** The mission planning and control system must comprise of hardware and software for mission planning, initialisation of vehicle, status presentation, interactive command, control and communication integrated with MCM Command and Control System of MCMVs.

21. **Launch & Recovery System.** The AUV is to be able to be launched and recovered from jetty as well from ship with suitable crane capacity in addition to be deployed from ASVs. Suitable hard points on the AUV are to be provided catering for roll and pitch experienced at sea. The launch and recovery system for AUVs should enable safe launch and recovery of AUVs.

22. **Mission Planning, Control & Analysis Unit.** Should assist operator in undertaking Mission Planning, launch AUV, Control of AUV during mission and Post-mission analysis, with chart underlay, in both manual and autonomous mode using computer aided detection/ classification. The System should be integrated with MCM Command and Control System onboard MCMV for centralised control.

23. **Payloads.** The AUV should have interchangeable payload section and incorporate a universal interface which would facilitate inclusion of new/ different payloads. Any combination of payloads fulfilling essential

requirements of the main system (AUVs) to size, weight and power consumption can be incorporated into the payload system. The payloads should be able to be operated simultaneously without interference. The AUV is to be capable of undertaking missions elucidated in Para 13 above.

24. **Cyber Security Aspects.** The vehicle should have suitable cyber security measures including encryption of data being transmitted to the control station.

25. **Data Recorder.** The AUV is to be equipped with a secure Data Storage System (DSS) with sufficient capacity to store mission data as per endurance.

26. **Containerised Solution.** The AUV system should be transportable in a container through air freight or ship in the standard container. The container is to be designed to accommodate all associated accessories and payloads. All functions for complete operation including charging, mission planning, launch, recovery, command, control and communication.

Mine Identification and Disposal System

27. The MCM payload should encompass of a suitable Mine Identification and Neutralisation system which would allow the operator to remotely dispose or detonate the selected targets. The MIDS is to be capable of being deployed from ASVs for undertaking MCM Operations. The system is to have following subcomponents:-

(a) **Remotely Operated Vehicle.** ROVs are to be equipped with High Definition SONAR, Video Camera or suitable payload for localisation and identification of mines. ROVs should carry charge explosives or shaped charges and should be capable of being guided close to the mine, using a fiber optic cable, before exploding the charge, thus destroying the mine. ROVs should be supplied either as separate Inspection and Combat versions or as non-expendable combined version which utilizes shaped charges and/or special devices for mine neutralization.

(b) **ROV Specifications.** The ROVs should possess the following general specifications: -

- | | | | |
|-------|--------------------|---|---|
| (i) | Length | - | not greater than 03 m |
| (ii) | Width/ Diameter | - | not greater than 1.5 m |
| (iii) | Height | - | not greater than 1.5 m |
| (iv) | Weight in Air | - | not greater than 750 Kg |
| (v) | Depth of Operation | - | Up to 300 m. |
| (vi) | Mode of Operation | - | Battery operated and remotely controlled. |

(c) **Mine Disposal System.** The mine disposal system should be able to be mounted on the ASV as an additional component when required for mine neutralisation. System should have capability to place mine disposal shaped charges onto the target.

(d) **Fire Control System.** The fire control system will reside in the mission control station onboard MCMVs and will require dual key activation to power the fire control and system. Mission Control Station will then transmit fire control signals to the ASV via datalink from the ASV to the ROVs via the umbilical or tether, and then acoustically telemetered to the mine disposal system using encrypted acoustic signals.

(e) **Launch and Recovery System.** Launch and recovery system of should be powered from the ASV supplies and should be capable of ensuring safe launch and recovery of the ROVs from the ASV up to sea state 4. The systems should be lightweight and easily removable for ease of service or replacement in the event of breakdown.

MCM Command and Control System

28. **Role.** MCM C² System should be capable of Planning, Execution, Evaluation, Data Management and Support all MCM Missions through

Unmanned MCM systems. The system should be capable of being interfaced with various ship borne sensors, Combat Management System, and all MCM equipment including Unmanned Aerial Vehicle and also with the Mine Warfare Data Centre of Indian Navy.

29. The details regarding the operational features of MCM C² System are as follows:-

(a) **Planning**. The system should be able to define various aspects of any type of MCM Ops (survey/exploratory/clearance) to be carried out in a systematic manner to assist the MCM planning staff onboard MCMVs. This includes the environmental effects and performance prediction of sensors.

(b) **Execution**. The system should execute the planned mission automatically with provision for monitoring and controlling the various subsystems involved in MCM Ops.

(c) **Evaluation**. The results and reports of task accomplished should be generated by the system for carrying out de-brief. The system should also have the capability to record and play back. The system therefore should have capabilities like; tactical scenario recording, report generation, own ship data record, track history, environmental data, engagement diary and video recording of all sensors.

(d) **Data Management**. System should be capable of generating and storing high volume data (collation of environmental/ acoustic/ contact/ target data) and create a database of information (threat library) that can be used for tactical support during future planning and execution. The system should also carry out data analysis, and archiving.

(e) **Support**. The system should be able to support and integrate all MCM equipment (SONARs information support, AUV/ROV Planning, Supervision and Control of mine sweeping/hunting) and interface all subsystems involved in navigation, communication and monitoring overall safety aspects (like correlation of radar tracks/AIS and relative velocity /collision course calculations). An external storage device (hard disk) must be provided for long-term archiving of information.

30. **Operator Consoles.**

(a) **Mission Commanders Console.** This console is to have functionality to carry out mission planning, monitoring and analysis. Additionally, Mission commander console should be able to control and monitor ASV status, produce a consolidated picture of the ASV System assets, supervise and carry out coordinated and integrated deployment of ASVs from MCMVs.

(b) **ASV Operator Console.** This console should be able to perform mission planning, control and monitoring of individual ASV and all its payloads.

(c) **Fire Control System.** Fire control system for operation of the mine disposal system.

Hull Mounted Mine and Obstacle Avoidance Sonar for MCMVs

31. **Role.** The Hull Mounted Mine and Obstacle Avoidance Sonar for MCMVs is to primarily locate and classify all types of ground and moored mines and to be capable of being employed for channel and route survey.

32. **Operational Capabilities.** The SONAR should be capable of Mine Detection, Tracking and Classification. The essential operational capabilities are as follows:-

(a) Capable of detection and classification of ground and moored mine in shallow and deep waters.

(b) High frequency and small size transducer with modular design capable for fitment onboard surface platforms.

(c) The system should have advance digital signal processing capable of real time processing of imaging data.

(d) The sonar should have high resolution for underwater imaging with suitable range resolution and bearing resolution for MCM operations.

(e) The system should have wide angle coverage in both horizontal and vertical plane. The SONAR search sector should be selectable. Search sector size should not be too large to cause operator to miss displayed object.

(f) Systems should be ruggedized, designed for marine application and be able to withstand extreme environmental conditions.

(g) The system should be able to integrate with suitable precision position fixing system.

(h) The sonar should be able to undertake search, bottom mapping in multi speeds in sea depths of 10m to 300m.

(j) Sonar data should be compatible with the MCM C2 System onboard MCMV and shore based Mine Warfare Data Centre (MWDC) of Indian Navy.

(k) The SONAR should be capable of detecting a GRP target of diameter 0.5 m on sea bottom. Target may be partly buried up in mud/sand/ coral.

(l) Classification aids in terms of target shape, echo structure, shadow shape and target length (size) are essential features.

(m) Should be, as far as possible a single operator SONAR.

(n) Depth measurement of moored mines should be possible.

(p) Should be able to classify a target from the images stored in its data bank, either from previous missions or images separately fed data bank using Artificial Intelligence.

33. **General Characteristics.**

(a) The SONAR should be capable of multi frequency operation and use adaptive pulse shaping for optimum utilization of environmental conditions.

- (b) The SONAR transducer should be tillable to allow for optimum coverage of sea bottom at different ranges in different sea conditions.
- (c) The directing gear and SONAR trunk should be capable of being accommodated in the existing hull.
- (d) The SONAR should easily interface with a selected CMS system capable of route surveillance operation. Specification for this interface will be mutually decided.
- (e) The SONAR should have a built-in simulator or alternately accept data stored on magnetic tapes / cartridges from previous missions for simulated replay/operator training. The SONAR should be supplied with a facility for recording / replaying of data.
- (f) The SONAR should be able to carry out sustained operations without deterioration in its performance with assured detection ranges at ship's speed not less than 08 Knots.
- (g) The SONAR should have automatic mine avoidance mode for search in ahead sector.
- (h) The SONAR should have inbuilt SRP and performance prediction module to generate most suitable mode for operation in the existing conditions.

34. **Design Features.** The salient aspects of design features are as mentioned:-

- (a) Compact Design through use of state-of-the-art electronic components for high speed signal processing and display.
- (b) Simple operation of the entire system by one/two operators with easy interactive operation, well-organized colour-coded displays and high level of redundancy for back up modes.
- (c) Multiple automated functions for different stages and methods of mine hunting operations.

- (d) System flexibility by complete modular design in hardware and software.
- (e) Substantial growth potential for up gradation in future.
- (f) Capable for interface with MCM Command and Control System, Mine Disposal System, navigation sensors, sound velocity/bathy thermograph probe, printer and Tactical data System.

35. **Modes of Operation.** Sonar must have the following modes of operations:-

- (a) **Search/Detection Mode.** This mode should enable detection of small and stealthy mines and other small objects of size 0.50 sq meters on the sea bed.
- (b) **Classification Mode.** This mode should enable classification of mine like objects.
- (c) **Maintenance Mode.** This mode should allow maintenance personnel to carry out system checks.

36. **Sea State.** Capable of operating with no degradation in performance up to Sea State 4 in Detection and Classification Mode. .

37. **Computer Aided Detection and Classification.** The system should be able to:-

- (a) Classify targets based on known characteristics of mines.
- (b) Provide automated detection, classification and threat assessment.
- (c) Interact with SONAR recorded database to exchange information and retrieve data.

38. **Data Analysis.** The following is to be provided for Data analysis:-

- (a) Digital image recording facility and playback facility with portable data storage device capable of storing digital data.

- (b) Data analysis software as part of Command and Control System for planning route survey missions.
- (c) Digital comparison of recorded data.
- (d) Facility for integration of Electronic Chart.
- (e) Digital stitching software for stitching/ joining the bottom mapped areas.
- (f) The system should be capable of exporting data in a format compatible to that of other sub systems and the Mine Warfare Data Centre (MWDC) for analysis and preparation of bottom texture mapping.

Launch and Recovery System

39. **Launch and Recovery System.** The launch and recovery systems onboard MCMV for ASV and HWAUV should enable safe launch and recovery and should have the following characteristics:-

- (a) Easy to Maintain with simple in design and corrosion resistant.
- (b) The launch and recovery system should be integrated with MCM Command and Control system onboard MCMV.
- (c) The system should be operated electro-hydraulically with adequate fail safe features. Redundancy of electro-hydraulic is to be catered. In case of complete failure, manual method should be available.

REQUEST FOR INFORMATION QUESTIONNAIRE

Ser	Specification/ Parameters/ Information Required	Vendor Information	Recommendation (Essential Parameter A or B or Enhanced Performance Parameter ¹)
<u>Autonomous Surface Vessel</u>			
1.	What is the proposed system composition? Request provide brief description of components of ASV including Control Station, launch mechanism from ship and Support Equipment.		
2.	What is the length, breadth, draught, weight and sea worthiness of the AUV? Request provide brief description of dimensions and technical details.		
3.	<p>What is the Hull form of ASV? Request provide following details iro Hull Form: -</p> <p>(a) Material of Hull.</p> <p>(b) Proposed Hull design (to be supported by adequate model testing to prove the efficiency of the design).</p> <p>(c) UW Shock grading of Hull.</p> <p>(d) Reserve Buoyancy of the vessel.</p> <p>(e) Preliminary stability and damage stability calculations.</p> <p>(f) Stealth features.</p>		

¹ As per provisions of Para 14 of Chapter II of DAP-2020

Ser	Specification/ Parameters/ Information Required	Vendor Information	Recommendation (Essential Parameter A or B or Enhanced Performance Parameter ¹)
4.	<p>What are the power requirements of the ASV? Request provide following details iro Power requirement: -</p> <p>(a) Type and capacity of Power Generation system onboard.</p> <p>(b) General power requirements onboard.</p> <p>(c) Type of Power Management System onboard.</p> <p>(d) Type and rating of equipment fitted onboard.</p> <p>(e) EMI/EMC issues.</p> <p>(f) Details of backup supplies to equipment.</p>		
5.	<p>What are the capabilities of Navigation System of ASV?</p> <p>Request provide List of Nav Equipment (Nav Radar, AIS, DGPS/GPS, IRNSS, Gyro, Echo sounder Electronic Chart Display, Data Recorders, Met instruments etc) along with Technical Parameters/ capability of each equipment.</p>		
6.	<p>(a) What are the capabilities of Communication System onboard ASV for Line of Sight and Beyond Line of Sight Communications with the Control Station onboard MCMV?</p>		

Ser	Specification/ Parameters/ Information Required	Vendor Information	Recommendation (Essential Parameter A or B or Enhanced Performance Parameter ¹)
	(b) What are the capabilities for Data Link for transferring payload data to Control Station onboard MCMV.		
7.	What are the navigational lighting and sound signaling system		
8.	What is proposed propulsion system onboard ASV?		
9.	What are the safety aspects of ASV?		
10.	Provide details of anchoring system onboard ASVs.		
11.	Provide details for inclusion of AI and ML based image and pattern recognition of electro optic payload to assist in autonomous operations.		
12.	What are the lifesaving and seamanship gears of the vessel should be provided as per applicable Class Rules/HSC Code.		
13.	What are the fire fighting arrangements available onboard ASVs		
14.	<p>What are the Mission payloads? Request provide details of mission Payloads:-</p> <p>(a) Types of Sonar (Mine/Obstacle Avoidance, Towed Synthetic Aperture Sonar).</p> <p>(b) Key parameters of Sonars (Source Level, Operating Frequency, resolution and other key performance parameters).</p> <p>(c) Details of transportation of HWAUV, Mine Disposal System, ROVs into the mine field for MCM operations.</p>		

Ser	Specification/ Parameters/ Information Required	Vendor Information	Recommendation (Essential Parameter A or B or Enhanced Performance Parameter ¹)
15.	What are the details/ specifications of the equipment required to launch the vessel at Sea from MCMV?		
16.	Availability of a specialised cradle for transportation and stowage ashore of the ASVs is to be provided.		
17.	What are the capabilities of ASV for deploying the payload viz. towed sonar, forward looking sonar, ROVs, HWAUVs for complete MCM operations.		
18.	What is the size and weight of obstruction avoidance sonar (OA)?		
19.	What is the instrumentation available in the towed system or the SAS operation?		
20.	What are mine sweeping capability utilising ASV with towed acoustic and influence sweep equipment capable of sweeping and neutralising influence mines		
21.	What is the capability of ASV for towing of Clip On Sweep of IN with Tow load of approx. 18 tons.		
22.	Describe the Control Station of the ASV highlighting the following aspects:- (a) Control Station Layout. (b) Details of connectivity with ASV. (c) Information available in the Control Station. (d) Details of features such as Mission Planning, Mission Control, Remote BITE of ASV, Sensors performance prediction etc.		

Ser	Specification/ Parameters/ Information Required	Vendor Information	Recommendation (Essential Parameter A or B or Enhanced Performance Parameter ¹)
23.	Being an Autonomous Vessel, collision avoidance is a critical aspect to be incorporated in the vessel. Description of the collision avoidance system, algorithm used and details of testing undertaken/planned be elaborated.		
24.	What is the manpower required to operate the vessel in various configurations?		
25.	How and where are the NCNC trials proposed to be undertaken?		
26.	What is the envisaged service life of the ASV? Is there a requirement of major maintenance/overhaul of the vessel during its service life?		
27.	Indicate willingness to offer comprehensive AMC and/or Rate Repair Contract. Brief scope and cost of the AMC/RRC to be indicated.		
<u>Heavy Weight Autonomous Underwater Vehicle</u>			
28.	What is weight and dimensions of the AUVs ? What is the buoyancy ?		
29.	What is the maximum sea state up to which the vehicle can be operated?		
30.	What is the speed of the vehicle during various operations? What is the economical speed/cruise speed?		
31.	What the degree of stability of the vehicle in water wrt course, roll, depth keeping and climb/dive rate?		
32.	What is the endurance of the AUVs with respect to the following:- (a) Operating speed.		

Ser	Specification/ Parameters/ Information Required	Vendor Information	Recommendation (Essential Parameter A or B or Enhanced Performance Parameter ¹)
	(b) Payload versus battery packs and weight considerations.		
33.	Provide details of maneuverability of the vehicle in azimuth and depth. Does it have a cut off mechanism to surface the AUV, in case the vehicle crosses the desired depth.		
34.	What is the type and life of batteries used to cater for the endurance requirements? What is the shelf life of a battery? Details of redundancy of battery pack available in the vehicle.		
35.	How will the AUV be deployed from ASV and MCMV?		
36.	How will the AUV be recovered post deployment by ASV/ MCMV?		
37.	What are the various modules of the AUV?		
38.	Details of the launch and recovery system along with dimensions and weight. Provide the platform and space requirements for fitment of launch and recovery system.		
39.	What is the data recording capability of the AUVs? How is the mission data downloaded, transmitted to MCM Command and Control System, replayed and analysed?		
40.	<p><u>Control and Guidance.</u> Details on following issues may be provided:-</p> <p>(a) Sub-systems on the AUV for control and guidance.</p> <p>(b) Communication link with control platform on ship/shore.</p>		

Ser	Specification/ Parameters/ Information Required	Vendor Information	Recommendation (Essential Parameter A or B or Enhanced Performance Parameter ¹)
	<p>(c) Degree of stability wrt Roll, Course, Depth and Climb/dive rate.</p> <p>(d) Method of tracking the AUVs when deployed. Accuracy of track.</p> <p>(e) Frequency of updating position from GPS, Type and accuracy of Inertial Navigation System.</p>		
41.	<p><u>Payloads.</u> Details on following issues may be provided:-</p> <p>(a) Types of payloads with weight, dimensions and capability parameters of sensors.</p> <p>(b) Mechanical and Electrical interfaces.</p> <p>(c) Vehicle design to accommodate additional payloads.</p> <p>(d) Operational and technical parameters of the payloads sensors along with details of OEMs.</p> <p>(e) Sweep width of sensors wrt operating depth of AUVs and sea bottom.</p>		
42.	Is interferometric SSS capability provided in the SSS?		
43.	Is AUV provides Synthetic aperture sonar functionality along with SSS sonar?		
44.	What are the frequencies available for dual frequency SSS?		

Ser	Specification/ Parameters/ Information Required	Vendor Information	Recommendation (Essential Parameter A or B or Enhanced Performance Parameter ¹)
45.	Size weight and power requirement of each of the payloads.		
46.	Accuracy and power requirement of USBL.		
47.	Size weight, frequency, coverage and power requirements of sub bottom profiler.		
48.	What is the configuration of underwater communication system in terms of frequency, number of transducers, power requirement, source level, band width, size, and weight?		
49.	What are the ranges and corresponding data rate of acoustic communication system?		
50.	<p><u>AUV Control Station</u>. Provide details on followings:-</p> <p>(a) Data link/ communication link with the vehicle (RF and underwater).</p> <p>(b) Mission planning aids.</p> <p>(c) Type of missions and supervisory control.</p> <p>(d) Obstacle avoidance.</p> <p>(e) Online recording and analysis of data transmitted by AUVs.</p> <p>(f) Emergency tracking and recovery functions.</p> <p>(g) Mission analysis features and displays formats of results.</p>		

Ser	Specification/ Parameters/ Information Required	Vendor Information	Recommendation (Essential Parameter A or B or Enhanced Performance Parameter ¹)
	<p>(h) Does the AUV or the onboard system have Automatic Target Recognition capability?</p> <p>(j) Methodology of launch and recovery, requirement of crane/ additional fitments with dimensions and weight.</p>		
51.	Does the AUV control station have external interface with Mine neutralization system, ROVs, MCM Command Control System.		
52.	In case the integration of the MCM suite is undertaken by another vendor, will the system interface details be provided to the MCM suite integrator.		
53.	What is the estimated cost of the equipment when supplied as part of complete MCM suite and as an individual subsystem?		
54.	What are the stowage arrangements required onboard MCMVs for the AUV?		
55.	Which all modes the AUV can operate in, independent, tethered etc?		
<u>Mine Identification and Disposal System</u>			
56.	How does the mine neutralization system explode the mine post detection by sonar? Can the system neutralize Ground, Moored and Drifting mines?		
57.	How does the Remotely Operated Vehicle(ROV) destroy the mine? What are the characteristics of the explosive charge whether shaped or not? Is the ROV reusable?		

Ser	Specification/ Parameters/ Information Required	Vendor Information	Recommendation (Essential Parameter A or B or Enhanced Performance Parameter ¹)
58.	How is the ROV controlled/guided to the target? What are the control equipment required on the MCMV?		
59.	What are the payloads carried on the ROV for detection and identification of the mine? How is the information exchanged between ROV and ASV?		
60.	What is the maximum range for mine neutralization /identification?		
61.	Type and quantity of explosive used in ROV?		
62.	How does the ROV undertake classification and identification of moored and ground mines? Is the capability available both on ROV used for inspection and neutralization?		
63.	How is the launch and recovery operation of ROV undertaken from ASV?		
64.	What is the maximum speed, endurance, maneuverability, navigation accuracy of the ROV?		
65.	What is the maximum sea state and environmental conditions in which the ROV can operate?		
66.	What is the safeties mechanism incorporated on the ROV to aid recovery? What are safeties wrt explosive charge carried by the ROV for mine neutralization?		
67.	Is the ROV capable of dynamic positioning, hovering and accurate position keeping?		
68.	Does the ROV have an exercise version for training? Also does the ROV has a simulator for training of operators ashore?		
69.	What are stowage arrangements required onboard the ship?		

Ser	Specification/ Parameters/ Information Required	Vendor Information	Recommendation (Essential Parameter A or B or Enhanced Performance Parameter ¹)
70.	Can the ROV undertake duel tasking of mine hunting as well as neutralisation?		
71.	What is the estimated cost of the equipment when supplied as a part of complete MCM Suite and as an individual subsystem?		
<u>MCM Command and Control System</u>			
72.	What are the subsystems of the MCM Command and Control System?		
73.	Provide details of the modules of the MCM Command and Control System required to accomplish Mine Hunting, Mine Identification and Neutralization and Mine Sweeping operations.		
74.	How does the Command and Control system is able to integrate the various modules of the MCM suite to achieve its task?		
75.	Does the firm has the capability to integrate MCM equipment of other vendors as part of MCM Command Control System? Can the MCM Command & Control System OEM ready to share the interface protocols with the other system OEMs?		
76.	How is the function of planning and scheduling of Mine hunting, Mine sweeping and bottom mapping missions undertaken ?		
77.	Does the MCM Command and Control System have sonar performance prediction capability, alongwith compiling and displaying underwater scenario.		
78.	Features for displaying support information of ECDIS/Radar.		

Ser	Specification/ Parameters/ Information Required	Vendor Information	Recommendation (Essential Parameter A or B or Enhanced Performance Parameter ¹)
79.	How does the system manage multiple sonar contracts of different sensors?		
80.	How does system monitor operation of hull mounted sonar, ASVs, AUVs, Mine Disposal System, ROVs?		
81.	How does the system generate & manage mine and sea bottom database ?		
82.	How is logging of events undertaken during the mission ?		
83.	How is the communication envisaged with other system onboard other MCMV ? What are the frequency of operations and bandwidth of wireless links?		
84.	How is the post mission analysis undertaken ?		
85.	What could be the provisions and capability of Data storage and would the system be capable of exchanging information with Mine Warfare Data Centre (MWDC) of Indian Navy?		
86.	What is estimated cost of the equipment when supplied as complete MCM Suite and as individual subsystems?		
87.	Will the OEM be able to share the interface protocol for integrating with the data link used by Indian Navy ?		
88.	Will the Command and Control system be able to process inputs from various navigational equipment and provide integrated positional and navigational data.		

Ser	Specification/ Parameters/ Information Required	Vendor Information	Recommendation (Essential Parameter A or B or Enhanced Performance Parameter ¹)
89.	What would be the capability of the system for simultaneous and continuous integration and mosaic information from various MCM, nav and other sensors ?		
<u>Mine and Obstacle Avoidance Sonar</u>			
90.	Provide details on the parameters of the sonar (such as frequency, bandwidth, source level, resolution, range, coverage, size & weight etc.		
91.	What are the features of the sonar that help of cover the depth of 10m to 300m.		
92.	Features of the sonar helps to comply the requirements of detection of partially buried targets and depth measurement of moored mines.		
93.	Please incorporate the detection coverage rate with the parameters of the sonar.		
94.	What is the size and weight of obstruction avoidance sonar (OA)?		
95.	Is interferometric SSS capability provided in the SSS?		
96.	Is AUV provides Synthetic aperture sonar functionality along with SSS sonar?		
97.	What are the frequencies available for dual frequency SSS?		
98.	Size weight and power requirement of each of the payloads.		
99.	Accuracy and power requirement of USBL.		
100.	Size weight, frequency, coverage and power requirements of sub bottom profiler.		

Ser	Specification/ Parameters/ Information Required	Vendor Information	Recommendation (Essential Parameter A or B or Enhanced Performance Parameter ¹)
101.	What is the configuration of underwater communication system in terms of frequency, number of transducers, power requirement, source level, band width, size, and weight?		
102.	What are the ranges and corresponding data rate of acoustic communication system?		
<u>Launch and Recovery System</u>			
103.	What is the proposed Launch and Recovery System (LARS) onboard MCMVs for deployment of ASV and HWAUV.		
104.	What are the dimensions and weight of the proposed LARS.		
105.	What are the capability of LARS for deployment of ASV in higher sea state 4.		
106.	The system should be interfaced with MCM Command and Control system for automatic operations.		
<u>Product Support</u>			
107.	What are the envisaged facilities for product support? Are you willing to set up repair facilities in India or would the repair facilities be provided through an authorised service representative?		
108.	What are the obsolescence management and provision of system upgrades during the life cycle?		
109.	What is the operational life of each Systems?		
110.	What are the maintenance requirements for the system and frequency?		

Ser	Specification/ Parameters/ Information Required	Vendor Information	Recommendation (Essential Parameter A or B or Enhanced Performance Parameter ¹)
111.	What are the warranty conditions of each System? How long would it be valid?		
112.	To ensure Repair and Maintenance support, what is the proposed methodology for 'Operator (O)', Intermediate (I)' and 'Depot (D)' Level repairs and maintenance?		
113.	What is the preferred mode of Repair and Maintenance support - Engineering Support Package, Comprehensive Annual Maintenance Contract (including spares) (CAMC), Annual Maintenance Contracts (AMC) or Rate Repair Contracts (RRC)?		
114.	List of onboard and B&D spares (if applicable) to be enclosed.		
115.	For how many years would support in terms of maintenance/ availability of spares be provided		
116.	What is the type and depth of documentation that would be offered for training, operation and maintenance of the system?		
117.	<p>What are the standard specifications of the ASV, HWAUVs and ROVs being followed with respect to operations and safety :-</p> <ul style="list-style-type: none"> (a) Environmental test specifications. (b) Shock test specifications. (c) Vibration test. (d) Corrosion resistance. (e) User documentation. 		

Ser	Specification/ Parameters/ Information Required	Vendor Information	Recommendation (Essential Parameter A or B or Enhanced Performance Parameter ¹)
118.	Is your company the OEM or authorised vendor of the equipment?		
119.	If not OEM, provide details of MoU with foreign OEM or proof of partnership.		
120.	Is the OEM willing to provide IPR (in case foreign OEM)?		
121.	Turnover of your company for three financial years.		
122.	Any customers to whom you have supplied the said equipment?		
123.	Other naval equipment being manufactured by your company?		
124.	Other naval equipment supplied by your company to the Indian Navy/ Indian Coast Guard?		
125.	Details of foreign firm and exact scope license production for License production of the equipment in India?		
126.	Provide Details of Transfer of Technology of the equipment		
127.	What is the mode of Field evaluation trials (Physical trials/ documentation/ certification/ simulation) and trial methodology		
128.	Are you willing for Field Trial Evaluation of the equipment in India on a No Cost No Commitment basis?		
129.	Provide details on capability of systems to undertake self-diagnoses and system reboot for crash-recovery post deployment while under autonomous operations.		

Ser	Specification/ Parameters/ Information Required	Vendor Information	Recommendation (Essential Parameter A or B or Enhanced Performance Parameter ¹)
130.	Provide details on reliability to include AI/ML based data analysis on envisaged operating hours of individual modules vis-à-vis Mean Time Between Critical Failures (MTBCF). Mean Time Between Failure (MTBF) and Mean Time To Recover(MTTR).		
131.	Provide details of maintenance routines required to be carried out during operational cycle of vessel and associated equipment to be feasible for undertaking at sea/ floating condition also, while on mother ship to be included.		
132.	Provide details for ensuring maintenance envelopes on the vessels to cater for all activities essential for ensuring performance parameters of payloads.		
133.	Provide details on graceful degradation of systems resulting in reduced performance parameter rather complete shutdown.		
134.	Provide details on redundancies to ensure all time availability of system to be included.		
135.	Provide details on ensuring any removable module connected through backplane/ jacks/ detachable connectors/ harness is to be termed as Line Replacement Unit (LRU). These LRUs are to be accessible at sea with ease.		
136.	Provide details on the design to cater for minimal single point of failure for the entire system and if such exists its reliability to be assured.		

Ser	Specification/ Parameters/ Information Required	Vendor Information	Recommendation (Essential Parameter A or B or Enhanced Performance Parameter ¹)
137.	Provide details on built-in test to provide coverage of above 95% LRUs by type, which shall include all critical LRUs required for optimum availability of the system.		
138.	Provide details on details to be shared regarding repairable LRUs/ Shop Replaceable Units (SRUs)/ modules/ blocks which shall be repaired up to component level at the repair facility offered for the system indicating all critical and high population module.		
139.	Provide details on keep alive policy while the vessels are stowed on mother ship/ ashore for sonar and other sensors and electronic equipment to be minimal to be included.		
<u>Training</u>			
140.	What are training requirements and methodology?		
141.	Is there a provision of simulator for training of operators?		
142.	What are the manpower requirements for manning of system and undertaking maintenance activities?		
143.	Compliance with provisions of DAP 2020 and RFI (Non-compliance with Para/clause along with reasons to be specified).		
144.	Firms to indicate ToT with partners for procurement of the system.		
145.	Suggestions for alternatives, if any, to meet operational requirements.		

Ser	Specification/ Parameters/ Information Required	Vendor Information	Recommendation (Essential Parameter A or B or Enhanced Performance Parameter ¹)
146.	<p>An estimated Budgetary Quote be provided for the following:-</p> <ul style="list-style-type: none"> (a) ASV with sensor payload. (b) HWAUV with sensor payload (c) ROVs with mine neutralisation payloads. (d) MCM Command and Control System. (e) Cost of other sub-systems (Control Station, associated equipment etc). (f) Manufacturer Recommended List of Spares (OBS and B&D spares). (g) Training of personnel including operator and maintainer training, training aids and packages. The number of personnel proposed should be indicated. (h) Special Tools and Test Equipment. (j) Documentation. (k) Cost of AMC/RRC. (l) Any other costs envisaged. 		
147.	Provide detail on proving of the system on a simulator to appreciate the complexities of the project.		

Ser	Specification/ Parameters/ Information Required	Vendor Information	Recommendation (Essential Parameter A or B or Enhanced Performance Parameter ¹)
<u>General</u>			
148.	Provide details of enabling niche technologies employed		
149.	Provide details of enabling Dual-use Technologies employed		
150.	Provide details of Indigenous technologies employed along with the Indigenous Content envisaged by value & by percentage.		
151.	Provide details of foreign technologies employed along with any critical dependence on the employed foreign technologies.		
152.	Provide details of important content envisaged by value and by percentage.		
153.	Autonomous operations require AI/ML algorithm with self-learning capability. What is the progressive learning growth of the autonomous algorithm with deployment/ exploitation.		
154.	Provide details of deploying modular system for minimal computation/ analysis systems.		
155.	Provide details of fitment of cooling system for optimal performance of sonar and electronic equipment.		

Appendix B
(Refers to Para 14)

REQUEST FOR INFORMATION: PROCEDURE FOR RESPONSE

Request for Information for Unmanned MCM Suite for MCMVs

1. The Indian Navy is planning to procure 12 Unmanned MCM Suite. With the view to identify probable vendors who can undertake the said project, OEMs/ Authorised Vendors are requested to forward information on the product which they can offer. The parameters/ broad specifications of the item are mentioned in the questionnaire attached as per **Appendix A** to this RFI. In addition, the vendors are required to furnish details as per proforma at **Appendix B, C and D** to this RFI.
2. Apart from the information as per the Appendices the vendors may also forward technical details/product brochures/literature etc pertaining to the item in question.
3. The required information/ details may please be forwarded at the following address:-

The Commodore (Staff Requirements)
Integrated Headquarters of Ministry of Defence (Navy)
Directorate of Staff Requirements (DSR)
Room No 206, D Block
Defence Office Complex
Africa Avenue
New Delhi 110023
Fax: +91 11 26771320
Email ID: dsr@navy.gov.in

Appendix C
(Refers to Para 14)

VENDOR INFORMATION PROFORMA

1. **Name of the Vendor/ Company/ Firm.**

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

2. **Type (Tick the Relevant Category).**

Original Equipment Manufacturer (OEM) Yes/No
 Authorised Vendor 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/ Agent (if any).**

Name & Address:

Pin Code: _____ Tel: _____ Fax: _____

Email: _____

5. **Financial Details.** Category of Industry (Large/ Medium/ Small Scale): _____

6. Certification by Quality Assurance Organisation.

<u>Name of Agency</u>	<u>Certification</u>	<u>Applicable from (Date & Year)</u>	<u>Valid till (Date & Year)</u>

7. Details of Registration.

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

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

Name of Organisation	Membership Number
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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.** It is certified that the above information is true and any changes will be intimated at the earliest.

Note: Paragraph 44 and Appendix F to Chapter II of DAP 2020 may be referred.

(Authorised Signatory)

ADDITIONAL INPUTS

1. **Delivery Schedule.**

- (a) Proposed delivery timelines for supply of the required quantities.
- (b) Annual Production capacity and capability to increase the production capacity to meet the delivery schedule requirements of Indian Navy.

2. **Acquisition Categorisation.**

- (a) Is the MCM Suite indigenously designed and developed?
- (b) Indigenous Content (IC) (in percentage) of the System iaw Chapter I of DAP 20.
- (c) Proposed acquisition categorisation of MCM Suite iaw Para 8 to 12 of Chapter I of DAP 20.
- (d) Transfer of Technology (ToT) of critical technologies/ Niche technologies as per specified range, depth and scope from foreign OEM (if applicable).

3. **Indigenous Raw Material (Military Material).**

- (a) Major input material (in terms of cost) for manufacturing of Unmanned MCM Suite.
- (b) Availability of major input material in the India and known sources with material designation, standard/ code and grade, and test standards.
- (c) Vendor's likely plan for sourcing the material(s).

(d) Likely cost of material(s) if sourced from Indian Vendors as compared to their import cost.

(e) The vendor may indicate willingness to setup dedicated manufacturing line, including design, integration and manufacturing processes in India.

4. **Miscellaneous.**

(a) **Payment Terms.** All vendors are to indicate acceptability to the terms of payment as per DAP-20.

(b) **Undertaking Regarding Debarment.** An undertaking has to be provided by the vendor that in the past they have never been banned/ debarred from doing business dealing with MoD/ GoI/ or any other Govt organisation.

(c) **Export Clearance.** The vendor may provide Information with respect to restrictions related to export in its country and how long will it take to get clearance.

(Authorised Signatory)