QUESTIONNAIRE FOR
MINE COUNTER MEASURE – AUTONOMOUS SURFACE VESSEL (MCM-ASV)

1. **Introduction**. *IN* is examining the feasibility of inducting Mine Counter Measure Autonomous Surface Vessel (MCM-ASV). ASVs in MCM role would be versatile platforms, which could operate in both manned and unmanned configuration and could be configured either in **Mine Detection** and/or **Mine Neutralisation** role. Mine Detection would be undertaken by towed Synthetic Aperture Sonar, and neutralisation would be undertaken by operating Remotely Operated Vehicles (ROVs) from another MCM-ASV. The vessels are also envisaged to have a 'fitted for' arrangement for undertaking ASW Missions and would be capable of being launched from existing/future *IN* ships and Naval Harbours.

2. **Questionnaire**. In order to access the capability of vendors to develop MCM - ASV, questionnaire wrt MCM-ASV is enumerated in the succeeding Paras. Limiting Parameters (if any) have been indicated against the relevant parameter.

TECHNICAL SPECIFICATIONS

Q 1. Vendor to specify the following:-

Ser	Parameter	Vendor to Specify	Limiting Parameters
(a)	**Capabilities**	(i) Modular Design. General Arrangement (GA) of the ASV showing internal compartment layouts, tanks, external appendages etc) to be provided. (ii) Details of affiliation to/classification of the vessel by any accredited Classification society. (iii) Replaceable Mission Modules for ASW & MCM. (iv) Endurance and Maneuverability. (v) Low Radar, Acoustic, Magnetic, Visual and IR signatures.	Complete system (Other than the vessel) to be within a 20/40 ft containerised solution. Endurance not less than 120 hrs

Ser	Parameter	Vendor to Specify	Limiting Parameters
		(vi) Configurable in Autonomous, Minimally Manned and Remotely Controlled variants. tr (vii) Capability of being operated from ashore/onboard. (viii) Autonomous Navigation, Collision avoidance and Communication suite. (ix) Conformity of vehicle/equipment fit to latest International regulations, wherever applicable.	
(b)	**System Description**	Description of components of MCM-ASV including Control Station, launch mechanism and Support Equipment.	
(c)	**Basic Vessel Specifications**	(i) Length. (ii) Breadth. (iii) Draught. (iv) Weight in air (In Kg). (v) Seaworthiness (Max Sea State for Operation). (vi) Preliminary seakeeping and maneuvering data.	Length not more than 12 Mt.
(d)	**Hull**	(i) Material of Hull. (ii) Proposed Hull design (to be supported by adequate model testing to prove the efficiency of the design). (iii) Preliminary resistance and propulsion data. (iv) UW Shock grading of Hull.	

Ser	Parameter	Vendor to Specify	Limiting Parameters
		(v) Details of Finite Element (FE) analysis/prototype testing carried out by the firm to prove shock grading. (vi) Reserve Buoyancy of the vessel. (vii) Preliminary stability and damage stability calculations along with KG details (Centre of Gravity). (viii) Stealth features. (ix) Details of external and internal coatings/paint schemes used on the craft. (x) Repair methodology/ facilities required for undertaking hull repairs along with details of specific techniques to be used in case hull is non-metallic (xi) Structural modifications required on parent vessel for stowage, launching and operation of the vessel. (xii) Clear deck space requirements on the parent vessel for stowage, launching and operation of the vessel.	
(e)	**Power Generation and Distribution**	(i) Type and capacity of Power Generation system onboard. (ii) General power requirements onboard. (iii) Type of Power Management System onboard. (iv) Type and rating of	Power requirements of the vessel should be compatible with arrangements existing onboard *IN* ships

Ser	Parameter	Vendor to Specify	Limiting Parameters
		equipment fitted onboard. (v) EMI/EMC standards met (vi) Details of backup supplies to equipment/machinery.	
(f)	**Navigation System**	(i) Details of All-Weather Radars for Surveillance and immediate collision avoidance. (ii) Details of Gyro/INS (iii) Details of constellations with which the Satellite position system is compatible (IRNSS, DGPS,GLONASS, GALILEO etc) (iv) Details of Satellite positioning system. (v) Details of AIS, Echo sounder Electronic Chart Display, Data Recorders, Met instruments etc). (vi) Feasibility of interfacing Navigation system to ship network, if any may be indicated.	
(g)	**Communication Suite**	(i) Communication facilities for Line of Sight and Beyond Line of Sight Communications with the Control Station. (ii) Details of Data Link for transferring payload data to Control Station. (iii) Type of SATCOM Link required to be established (forward control link, return link or both). (iv) The data rates and type	-

Ser	Parameter	Vendor to Specify	Limiting Parameters
		of data on the forward and return links. (v) Latency acceptable in the network. (vi) Duration and frequency of requirement of Satcom link during operations. (vii) Band of Operations. (viii) Feasibility of compatibility with *IN* Satcom network. (ix) Security overlay, if any. (x) Feasibility of incorporating *IN* security solutions into the Satcom.	
(h)	**Propulsion/Related Machinery**	(i) Type of Propulsion. (ii) Type of Propeller and rudders (if applicable). (iii) Options in propulsion, if any. (iv) Fuel carrying capacity. (v) Equipment operating Conditions (Ambient air temp, water temp, max relative humidity, roll/pitch restrictions, etc). (vi) Details of Auxiliaries/machinery equipment (Power supply, Portable AC, Bilge pumps, hand pump, clutch pumps, grey water pump, etc). (vii) Engine health monitoring/diagnostic kit. (viii) Specify the number of running hours post which	

Ser	Parameter	Vendor to Specify	Limiting Parameters
		Major Overhaul and Top Overhaul would be required (ix) Service life of propulsion Machinery	
(j)	**Safety Aspects**	(i) Details of Water Tight Integrity aspects. (ii) Details of Fire Fighting arrangements including Automatic Fire Fighting Capabilities (if any). (iii) Details of any other Safety Related Equipment onboard, along with their method of operation. (iv) Specify bring back capability for the vessel in-case of failure of remote communication link/autonomous control	-
(k)	**MCM Module Mine Detection**	(i) Types of Sonar (Mine/Obstacle Avoidance, Towed Synthetic Aperture Sonar). (ii) Key parameters of Sonars (Source Level, Operating Frequency, resolution, optimum speed of operation, swath and other key operational performance parameters.	-
(l)	**MCM Module Mine Neutralisation**	(i) Technical Parameters of RoV. (ii) Endurance. (iii) Operating Range from Mother Vessel and Depth of Operation. (iv) Details and No of Charges carried. (v) Description of	-

Ser	Parameter	Vendor to Specify	Limiting Parameters
		lowering/recovery mechanism. (vi) Means of Communication with MCM-ASV (vii) Safety features incorporated in the system	
(m)	**Cyber Security Aspects**	(i) Details of Cyber Security measures to prevent cyber-attack. (ii) Details of anti-jamming, anti-hacking and anti-spoofing features incorporated. (iii) Any other feature incorporated	-

Q 2. What are the details/ specifications of the equipment required to launch and recover the vessel at Sea or Harbour?

Q 3. Describe the Control Station of the USV highlighting the following aspects:-

(a) Control Station Layout.

(b) Details of connectivity with MCM ASV including number of ASV-MCM that may be controlled from the Control Station.

(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.

(e) Control and Monitoring of critical parameters of all machinery.

(f) Operation and monitoring of Fixed Fire Fighting System.

(g) Availability of propulsion control with steering.

Q 4. The Control Station is required to have the capability to transfer raw and processed data to the existing Mine Warfare Data Centre of the *IN*. Interface details would be share by *IN*. The feasibility of the same may be commented upon.

Q 5. 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.

Q 6. Comment upon the redundancy aspects of mission critical modules/subsystems to obviate mission failure due to a single point failure.

Q 7. The MCM – ASV is envisaged to have a 'fitted for' arrangement to enable the vessel to undertaken ASW Missions. Towards this, the vessel would be required to have the ability to undertake fitment of Light Weight Torpedo Tubes and Active/Passive Towed Sonar at a later stage. These equipment would be buyer furnished and binding data of the same would be provided. The feasibility of incorporating such arrangement may be commented upon.

Q 8. What is the manpower required to operate the vessel in various configurations (including remote mode), including launching and recovery at sea/harbour?

Q 9. What is the proposed scope and duration of operator and maintainer training that would be provided to *IN* personnel to enable optimum exploitation of the vessel?

Q 10. What are the envisaged timelines for development of prototype post award of Project Sanction Order? Indicate willingness to progress the prototype development under Make II and subsequent development under Buy Indian IDDM Scheme.

Q 11. How and where are the prototype trials proposed to be undertaken?

Q 12. What is the envisaged service life of the MCM – ASV? Is there a requirement of major maintenance/overhaul of the vessel during its service life?

Q 13. Indicate willingness to offer comprehensive AMC and/or Rate Repair Contract (including propulsion machineries, auxiliaries and FFS). Brief scope and cost of the AMC/RRC to be indicated.

Q 14. Vendor to submit sub-system wise indicative long term sustenance, support and maintenance plan for the project.

Q 15. What arrangements (lifting appliances, boat chocks etc) would be required for lifting the MCM ASV on jetty for undertaking repairs? Deliverables that would be provided by the vendor to be highlighted.

Q 16. What are the arrangements/conditions required to be met for stowage of ASV-MCM when not in use?

Q 17. State the reliability and maintainability model and indicate percentage repairability of the system. The vendor to indicate willingness to undergo Maintenance Evaluation Trials at trial stage.

Q 18. An estimated Budgetary Quote be provided for the following:-

(a) 01 MCM-ASV in basic configuration.

(b) Mine Detection and Mine Neutralisation Payloads.

(c) Cost of other sub-systems (Control Station, associated equipment etc).

(d) Manufacturer Recommended List of Spares (OBS and B&D spares) for a duration of 05 years.

(e) Training of personnel (at India/abroad) including operator and maintainer training, training aids and packages. The number of personnel proposed should also be indicated.

(f) Special Tools and Test Equipment.

(g) Documentation.

(h) Cost of AMC/RRC.

(j) Any other costs envisaged.

(k) Details of costing as per **Annexure**.

Q 19. What Quality Assurance (QA) methodologies are proposed to be deployed by the vendor during design, development, production and trial phases to ensure delivery of a completely reliable and fail safe combat ready platform?

Q.20. What testing strategy is proposed to be used by the vendor to check the reliable operations of ASV-MCM, given the fact that it is an unmanned ocean going vessel?

Q.21. A platform centric QA approach is necessary for ASV-MCM. In view of the same, vendor may specify which of the global best practices in QA methodology for design and development of Autonomous vehicle and Robotic systems are proposed to be incorporated and how would the same be proved by the vendor?

VENDOR INFORMATION

Q 22. Indicate Name, Address and Unique ID (if any) of the Vendor/Company/Firm.

Q 23. Furnish complete postal address, details of local office/liaison office in Delhi area (if any) in New Delhi/in vicinity.

Q 24. The following details to be provided (relevant documents to be forwarded):-

(a) Category of Industry (Large/Medium/Small Scale).

(b) Annual Turnover in INR for last 03 financial years.

(c) Profit/Loss Statement of the last 03 financial years.

(d) Number of employees in firm.

(e) Details of manufacturing infrastructure that would be useful for manufacturing the MCM – USV and its subsystems.

(f) Production capacity per annum.

(g) Details of earlier contracts with Indian Ministry of Defence/Government agencies:-

Contract Number	Equipment	Quantity	Cost

Q 25. Does the firm hold any certification by Quality Assurance Organisation? If so, the following details to be furnished:-

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

Q 26. Does the vendor hold membership of FICCI/ASSOCHAM or other industrial association? If so, name of the organisation, Membership Number and relevant certification to be provided.

Q 27. Is collaboration with one or more foreign/Indian firms envisaged to design and develop the system? If so, indicate the scope of collaboration and details of ToT envisaged.

Q 28. Elaborate in detail upon the capability to indigenously design and develop the required equipment along with justification and documentary evidence. The following is to be clarified:-

(a) Is the design of the vessel and its software Indigenous?

(b) Details of components that are envisaged to be imported and from where?

(c) Also indicate willingness to share the IPR of the design.

Q 29. What are the technologies currently available with the vendor that would be harnessed towards manufacturing of the MCM USV and its associated subsystems and the extent of their availability or accessibility in case they are not available in India?

Q 30. Indicate the overall level of indigenisation that is envisaged to be achieved. Approximate breakdown of IC content (in percentage) for each of the sub systems is also to be provided. The procurement would eventually be under Buy (Indian – IDDM), hence, the willingness to meet overall IC content of 50 % as per DPP – 20, likely to be promulgated in the near future may be confirmed.

LAST DATE OF RESPONSES TO BE SUBMITTED IS 24 SEP 20

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This undertaking would be required at EOI and RFP stage (Refer para 28)

UNDERTAKING TO COMPLY WITH INDIGENOUS DESIGN

We, _____ ("Name of Vendor"), do hereby certify, undertake and confirm that:

1. The Design of _____("Named Product"), as claimed by us in response to the EOI No is owned wholly by us/by an Indian entity.

2. Further, we confirm that the Design of the Named Product, as claimed by us, has not been licensed from a foreign third party except for standard software licences such as, but not limited to OS / Database / _____(Strikeout / Specify as applicable).

3. The ownership of the Design, as claimed by us, enables us to manufacture, realise, sell, provide Through Life Support, modify and upgrade the Named Product without any encumbrances, except as specified below: (If any form of encumbrances exist on the product or any of its subsystems these should be elaborated here)

_____
_____

4. We further claim that we own the following IP Rights in relation to the design of the Named Product: (Specify any Patents, Registration of Designs, if any, held by the Vendor)

_____
_____

5. We also undertake to permit MoD/MoD appointed Specialists Committee, to inspect/ carry out technical audit at our premises of the applicable documents, such as Design Reports, Drawings, Specifications, Software Documents & Codes, Gerber files, etc, as may be reasonably necessary and required to prove the above claim of ownership of the Design of the Named Product. (Examination on site at company's premises only. Documents, in any form, are not be sought nor required to be submitted for examination outside the Company's premises)

6. Failure on our part to prove the ownership of the Design of the Named Product by us/by an Indian entity or submission of any false undertaking or claim as indicated in the response at any post contract stage of the intended procurement may make us liable to forfeiture of the PWBG to the extent of any direct losses or damages suffered by the MoD as a consequence of such false undertaking or failure to prove the ownership of the Design.

Annexure (refer para 18k of the Questionnaire)

Statement 0f Estimated Cost

Ser No	Items	Qty	Basic Unit Cost	Total Basic Cost	Basic Custo m Duty	GST/ IGST	Total Cost (including BCD & GST/IGST)	Remarks
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)
A.	Cost of **Basic Equipment.** Full break-up details may be given in separate Annexure.							
	Imported							
	Indigenous							
B.	Cost of **Installation / Commissioning/ Integration** (Where Applicable)							
	Direct Labour Cost (Details of Mandays Bookings, Rate etc may be given in sepearte Annexure.)							
	Overhead (Basis of Allocation):							
	1.Project Monitoring Cost							
	2.Other Administrative Cost etc							
C.	Cost of **Transfer of Technology** (If any)							
D.	Cost of **Special Maintenance Tools and Special Test Equipment** may be given in separate Annexure.							
	Imported							
	Indigenous							
E	**Any other** cost (to be specified seperately):							
	1 …….							
	2……							
F	**Freight and Transit Insurance** Cost (where applicable)							
	On Imported Material							
	On Indigenous Material							
G	Expected AMC cost giving year-wise break up (Basis)							
H	**Total Cost (Total of Serial No.A to G)**							