

**QUESTIONNAIRE - 127 MM MEDIUM CALIBRE GUN**  
**UNDER MAKE-I CATEGORY**

1. **Background.** The Ministry of Defence, Government of India, intends to procure 127 mm Medium Calibre Gun through Make-I procedure of DAP-2020, as a new induction.

2. **Description.** The 127 mm Medium Calibre Gun (MCG) would be utilised for Anti-surface, Anti-air, Naval Gunfire support and long range surface attacks modes of firing. It is intended to be a cost effective solution to target enemy air/ surface platforms and land targets at extended ranges with better accuracy. The modes of control in which 127 mm MCG is envisaged to be controlled are integrated control from Combat Management System (CMS), Autonomous control from FCS, Remote Manual Control and Local Control from Local Position (Turret). The 127 mm MCG should be able to fire in fully automatic mode. The gun should be designed to fire the Extended Range Munitions and undertake precise engagement of enemy targets at extended ranges. It is intended to be fitted on *IN* Ships of size frigate and above. The associated systems of the weapon complex include Fire Control System, cables and interface with ship borne systems.

3. **Total Quantity and Prototypes.** Indigenous development of one prototype and bulk quantity of 15 127 mm MCGs would be required by the Indian Navy. The quantity indicated for prototype and production is only an indicative requirement and is not a firm commitment. The quantity has been provided so as to enable firms to arrive at economy of scale prior providing statement of cost of production version of 127 mm Medium Calibre Gun.

4. **Questionnaire.** In order to identify prospective vendors who can undertake the said project, the vendors are requested to furnish information as elucidated in succeeding paragraphs including those at Annexure. Limiting parameters (if any) have been indicated against the relevant parameter.

**TECHNICAL SPECIFICATIONS**

Q1. Entity/ firm to specify the following:-

<u>Ser</u>	<u>Parameter</u>	<u>Vendor to Specify</u>
(a)	<b><u>General</u></b>	
	(i) <b><u>Medium Calibre Gun</u></b> . Please specify the weight, dimensions, General Arrangement (GA) of the planned 127 mm Medium Calibre Gun. Internal layouts, external appendages etc, to be provided.	
	(ii) Details of affiliation to/ classification of the equipment by any accredited classification society	
	(iii) Conformity of equipment fit to latest International regulations and standards, wherever applicable	
	(iv) <b><u>Barrel</u></b> . Please specify the service life, weight, dimensions and associated conditions of the barrel.	
	(v) <b><u>Hot Gun Condition</u></b> . What is the minimum continuous firing of rounds before reaching Hot Gun condition?	
	(vi) <b><u>Ammunition and Fuzes</u></b> . Please specify the types of NATO standard ammunition and fuzes the MCG will be able to fire.	
	(vii) <b><u>System Description</u></b> . Description of planned components of 127 mm Medium Calibre Gun including Fire Control System, modes of firing and control. Also, specify the integration and operating capabilities, accuracy and support equipment.	
	(viii) <b><u>Safety Features</u></b> . Please specify the safety features incorporated in 127 mm MCG towards ensuring safe exploitation onboard ships.	
(b)	<b><u>Operational</u></b>	
	(i) <b><u>Range</u></b> . Please specify the minimum and maximum engagement range for the 127 mm MCG	
	(ii) <b><u>Rate of Fire</u></b> . Please specify rate of fire.(Not less than 15 rounds per minute)	
	(iii) <b><u>Modes of firing</u></b> . Please provide details of various modes of firing.	
	(iv) <b><u>Modes of Control</u></b> . What are the various modes of command and control used by 127 mm MCG.	

<u>Ser</u>	<u>Parameter</u>	<u>Vendor to Specify</u>
	(v) <b><u>Interface</u></b> . What are the provisions for interfaces/ integration with external systems like tracking radars, electro-optical devices, etc.	
	(vi) <b><u>Modes of Ammunition Loading</u></b> . Please specify the modes for loading of ammunition	
	(vii) <b><u>Ammunition Handling System</u></b> . Provide the ammunition handling capability of the system for supply of ammunition. Can the system supply ammunition without human intervention to enable uninterrupted firing of the MCG?	
	(viii) <b><u>Gun Control Panel</u></b> . Specify the key features of the gun control panel.	
	(ix) <b><u>Operating Capability</u></b> . Please specify the sea/ environment conditions in which the 127 mm MCG will be able to operate viz., roll & pitch, sea state, etc. Are there any limitations/ restrictions of wind speed, roll and pitch on the operations of the 127 mm MCG from ship at sea?	
	(x) <b><u>Operating Temperature</u></b> . Specify the operating temperature range of the 127 mm MCG.	
	(xi) <b><u>Continuous Operation</u></b> . Specify the duration the gun is capable of operating continuously.	
	(xii) <b><u>Muzzle Velocity</u></b> . The muzzle velocity of the gun should not be less than 800 m/s.	
	(xiii) <b><u>Ready Rounds in Feed Drum</u></b> . What is the minimum capacity of ready rounds in the feed drum for immediate engagement?	
	(xiv) <b><u>Interconnectivity</u></b> . Which all ship systems would be required to be interfaced with the Fire Control System.	
	(xv) <b><u>Stealth Features</u></b> . Details of any stealth features which will be provided in the design/ construction of the gun.	
	(xvi) <b><u>Crew</u></b> . How many minimum personnel will be required as crew to operate the gun?	
	(xvii) <b><u>Traverse and Elevation speed</u></b> . Provide the various gun movement speeds in the traverse and elevation conditions of the MCG.	
	(xviii) <b><u>Empty Cartridge Ejection Mechanism</u></b> . Specify if the empty shells during firing should fall clear and away from the turret after ejection.	

<u>Ser</u>	<u>Parameter</u>	<u>Vendor to Specify</u>
	(xix) <u>Misfire</u> .	Specify the type of misfire removal available in MCG.
	(xx) <u>Ventilation</u> .	Specify the mechanism for ventilation (eviction of smoke from the turret).
(c)	<b><u>Maintainability and Ergonomic Parameters</u></b>	
	(i) <u>Shelf Life</u> .	What is the projected shelf life of the 127 mm MCG and its associated system when stowed onboard the ship as well as ashore?
	(ii) <u>Repair &amp; Overhaul</u> .	Specify following:-  (aa) What is the time taken for major overhaul, mean time between overhauls and overall inherent availability of MCG?  (ab) What is the Mean Time between Failure (MTBF) and Mean Time Between Repairs (MTBR) of the MCG and its associated systems?  (ac) What will be the various types of maintenance routines and their periodicity?
	(iii) <u>Integrated Logistic Support</u> .	What is the scope and depth of Manufacturer Recommended List of Spares?
	(iv) <u>Testing</u> .	How does the vendor envisage testing of the gun from shore and afloat?
	(v) <u>Trials</u> .	Is the vendor ready for Field Evaluation Trials of the prototype in Indian waters at no cost no commitment basis?
	(vi) <u>Ammunition for Trials</u> .	How much ammunition are you envisaging for the trials of the gun? Are you ready to provide ammunition for trials of the prototype?
	(vii) <u>Infrastructure (Operational and Maintenance)</u> .	Specify following:-  (aa) What is the area/ facilities required onboard ship for associated equipment and for undertaking repairs etc?

<u>Ser</u>	<u>Parameter</u>	<u>Vendor to Specify</u>
	(ab) Specify if the establishment is having ship for infrastructure requirement.	
	(ac) What facilities/ infrastructure will be setup by the Vendor/ Firm/ Company for Intermediate level maintenance and Depot level maintenance?	
	(viii) <b><u>Engineering Support Package</u></b> . Would the vendor provide customer support in terms of a Comprehensive Annual Maintenance Contract?	

Q2. **Quality Assurance**. Specify following:-

- (a) What are the QA standards that the equipment (including components) will comply to? Provide details of standard of certification like ISO 9000, etc, details of date of certification with validity and agency?
- (b) Provide details of power supply requirements for electrical/ electronic systems.
- (c) Details of std/ specifications the electrical/ electronic system will comply iro following QA requirements/ testing parameters:-
- (i) **Environmental Stress Screening (ESS)**. Provide details of standard used for ESS during manufacturing of electrical/ electronic system.
  - (ii) **EMI/EMC**. Provide details of EMI/EMC standard the system qualifies for.
  - (iii) **Shock Test**. Provide details of shock standard met by system.
  - (iv) Provide details of IP rating and applicable standard.
  - (v) Provide details of imported items/ components forming part of systems.
  - (vi) Provide details of environmental specification system.
  - (vii) Provide details of COTs item/ component used in the system.

- (viii) Provide details of all types of connectors, cables (LFH or otherwise) to be used in respect of interfacing requirement between various systems/ sub systems.
- (ix) Provide details of grade of switches, LCD/ LED employed and specifications /std it will comply to.
- (d) Gun and associated components will be tested against what all environmental specifications to retain its serviceability even after being exposed to extreme climatic sea conditions and ship motion conditions?
- (e) How the vendor/ firm/ company will ensure gun's electronically compatible with electronic components onboard ship?
- (f) Does the Vendor/ Firm/ Company has inbuilt EMI/ EMC test facility? If not, where will these tests be conducted?
- (g) Please specify QA/ control programs and guidelines, proposed to be adopted by the Firm/ Vendor/ Company.
- (h) Please specify the training, trials and other documentation that will be provided by the Vendor/ Firm/ Company.

### **Vendor Information**

Q3. Indicate Name, Address and Unique ID (if any) of the Vendor/Company/Firm.

Q4. Furnish complete postal address, details of local office/ liaison office in Delhi area (if any)/ in vicinity. Details of single Point of Contact (PoC) for clarification of queries, if any.

Q5. 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) Infrastructure and number of employees working in R&D of systems related to the product. Provide details of developmental facilities like Laboratories, inspection and quality control, and trials and testing facilities
- (e) Details of earlier contracts with Indian Ministry of Defence/ Government agencies:-

Ser	Contract Number	Equipment	Quantity	Cost

Q6. Does the firm hold any certification by Quality Assurance Organisation? If yes, the following details to be furnished: -

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

Q7. 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.

Q8. Elaborate in detail upon the capability to indigenously design and develop the required equipment along with justification and documentary evidence. The following are to be specified:-

- (a) Details of licences held by your entity/ company for any systems, ammunition or other controlled technologies applicable for this project.
- (b) Details of components that are envisaged to be imported and from where?
- (c) Provide details of similar equipment manufactured by the vendor and supplied in India/ abroad.

Q9. Integration Capability. The company to provide following details:-

(a) Has the firm successfully commissioned at least one project with a capital expenditure of not less than ₹ 500 Crores (Rupees Five Hundred Crores only) on each such plant/project. OR

(b) Successfully signed at least one contract in the product or related domain (eg. Aerospace/ shipbuilding/ armoured fighting vehicles/weapon systems / command & control systems, as the case may be) of value not less than ₹ 300 Crores (Rupees Three Hundred Crores), during the last seven (07) financial years.

Q10. Does your company/ entity have a minimum two year experience in broad areas like manufacturing/ engineering/electronics/explosives, etc, as applicable in the instant case? If not, then a cumulative experience of atleast three years in above areas, resulting in gaining of competence for manufacturing the proposed product.

Q11. Does your entity/ company hold any patents/ IP rights of critical components/ technologies related to this project? Does your company intend to acquire the IP rights for use of technical data to design the 127 mm MCG as per the technical parameters and requirements of Indian Navy?

Q12. Please list out technological expertise, IPR, design ownership and past manufacturing experience of your entity wrt design modelling and simulation, systems integration, metallurgy, electrical drive system, digital FCS, gun ordnance (barrel, breech block, loader mechanism), armament technology (recoil systems, turret drives, high pressure chamber), any other system or details applicable.

Q13. Domain Specific Criteria. Provide the following details:-

(a) Special static facilities necessary for development, fabrication or assembly of the product.

(b) Details of Design and manufacturing capabilities such as design simulators/ software, tempering and machining, specialised welding technology, high-end control systems, etc. that would be useful for manufacturing, development and fabrication of the 127 mm MCG and its subsystems.



Q14. Provide details regarding major successful projects/ products/ technologies developed/ under development involving Research and Development in the field of Medium Range guns, particularly ship borne Guns.

Q15. Does the vendor have the capability to develop 127 mm MCG prototype and produce the same indigenously?

Q16. Does the vendor have adequate infrastructure to design, develop, integrate, test and manufacture 127 mm MCG? If yes, please provide details of the same. If no, what would be the timeframe for establishing the same?

Q17. What is the approximate indigenous content (in terms of cost percentages) at both Prototype Development Stage and Production Stage (including sub-assemblies)?

Q18. What are the anticipated timelines for development of the prototype (including Quality Assessment Tests) and production of bulk quantities? Specify the timelines separately for each.

Q19. What are the likely design and development costs for 127 mm MCG prototype? What are the quantities that can be manufactured per year during production?

Q20. What is the estimated cost for the development of prototype?

Q21. How much time in months is envisaged to make available one prototype of 127 mm MCG system for field trials?

Q22. What will be the envisaged production capacity (numbers per year) of your entity, likely delivery schedule and the approximate budgetary cost of manufacture for 15 quantity 127 mm MCG?

Q23. Does the vendor have the ability to provide product support for complete life cycle of 127 mm MCG?

Q24. How will the vendor ensure continuous supply of spares for the system, especially for those components being procured ex-import, if any?

Q25. What are the vendor's recommended list of Special Maintenance Tools (SMTs), Special Test Equipment (STE), Test Jigs (TJs) and fixtures that would be required for maintenance support of life cycle for 127 mm MCG?

Q26. 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.

Q27. Is the vendor willing to transfer the technology to any DPSUs in future? If yes, will the ToT include the proprietary technologies?

Q28. What are the anticipated timelines for development of prototype post award of Project Sanction Order and production thereafter (specify timelines separately for each)? Indicate willingness to progress the prototype development under Make I and subsequent procurement under Buy (Indian IDDM) Scheme of DAP-2020.

Q29. What are the areas of uncertainty envisaged by the vendor in the design, development and production of the indigenous development of 127 mm MCG?

Q30. Indicate the approximate breakdown of IC content (in percentage) for each of the sub systems that is envisaged to be achieved. The procurement would eventually be under Buy (Indian-IDDM), hence, the willingness to meet overall IC content of 50% as per DAP-20, may be confirmed.

Q31. Will the proposing company/ vendor also be manufacturing the production grade system? If not, what is the plan for production of the system post design and development?

Q32. Will the vendor also carry out necessary R&D for future upgradations of 127 mm MCG?

Q33. The entity/firm is requested to confirm if the foreclosure criteria for Make-I category as specified in Para 20 (a), Ch - III of DAP 2020 or as amended in future by the MoD, GoI is acceptable.

Q34. Any other details/ relevant information not asked for in the questionnaire which the entity would like to submit before the Feasibility Study may be provided.

STATEMENT OF COST OF PROTOTYPE DEVELOPMENT

<u>Ser</u>	<u>Items</u>	<u>Qty</u>	<u>Imported Components Cost (I)</u>	<u>Indigenous Components Cost (II)</u>	<u>Approximate Unit Cost in INR (₹)</u> (I) + (II)	<u>Any other details</u> <u>Please mention specific IC content that will be achieved</u>
A.	Cost of fully formed 127 mm MCG	1				
B.	Cost of Fire Control System and associated equipment	1				
C.	Cost of any Special Maintenance Tools or Test Equipment	1				
D.	Project Monitoring and Admin costs	-				
E.	Cost of ToT (if any)	-				
F.	Any other Costs (please specify head)					
	<b>Total</b>					

**STATEMENT OF COST FOR PRODUCTION GRADE VERSION**  
**(QUANTITY REQUIRED - 15 NOS\*)**

<u>Ser</u>	<u>Items</u>	<u>Qty</u>	<u>Imported Components Cost (I)</u>	<u>Indigenous Components Cost (II)</u>	<u>Approximate Unit Cost in INR (₹)</u> (I)+(II)	<u>Any Other Details</u>
A.	Cost of fully formed 127 mm MCG	15				
B.	Cost of Fire Control System and associated equipment	15				
C.	Cost of Engineering Support Package (includes Spares, Training, Documentation, Special Tools & Equipment, Installation/HATs/SATs)	-				
D.	Cost of CAMC	-				
E.	Project Monitoring and Admin costs	-				
F.	Cost of ToT (if any)	-				
G.	Any other costs (please specify head)					
	<b>Total</b>					

\* Note: The quantity indicated for prototype and production is only an indicative requirement and is not a firm commitment. The quantity has been provided so as to enable firms to arrive at economy of scale prior providing statement of cost of production version of 127 mm MCG.

