Bharat Heavy Electricals Limited

(A Government of India Undertaking)

Delhi – 110 049

India

Notice for Inviting

Expression of Interest for joint development / technology collaboration (with IPR) of 127 mm Medium Calibre Gun (MCG) for Indian Navy under Make-I Category

EoI Ref No.: BHEL/AA/TL/0207

Date: 11th October, 2023

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Section-1
Disclaimer

The information contained in this Expression of Interest (EoI) document has been provided to the Prospective Collaborator(s), by or on behalf of Bharat Heavy Electricals Limited (BHEL) on the terms and conditions set out in this EoI document and terms & conditions specified below:

1. The purpose of this EoI document is to provide the Prospective Collaborator(s) with information to assist the formulation of their proposal. This EoI document does not purport to contain all the information the Prospective Collaborator may require. This EoI document may not be appropriate for all persons, and it is not possible for BHEL, its employees or advisors to consider the business/investment objectives, financial situation and particular needs of each Prospective Collaborator who reads or uses this EoI document. Each Prospective Collaborator should conduct his own investigations & analysis and should check the accuracy, reliability and completeness of the information in this EoI document and where necessary obtain independent advice from appropriate sources.

2. BHEL, its employees and advisors make no representation or warranty and shall incur no liability under any law, statute, rules or regulations as to the accuracy, reliability or completeness of the EoI document.

3. BHEL may, in its absolute discretion, but without being under any obligation to do so, modify, amend or supplement the information in this EoI document.

4. The issue of this EoI does not imply that BHEL is bound to select and shortlist any or all the Prospective Collaborator(s). Even after selection of suitable Prospective Collaborator, BHEL is not bound to proceed ahead with the Prospective Collaborator and in no case be responsible or liable for any commercial and consequential liabilities in any manner whatsoever.

5. The Prospective Collaborator(s) shall bear all costs associated with the preparation, technical discussion/presentation and submission of response against this EoI. BHEL shall in no case be responsible or liable for these costs regardless of the conduct or outcome of the EoI process.

6. Canvassing in any form by the Prospective Collaborator(s) or by any other agency on their behalf shall lead to disqualification of their Expression of Interest.

7. Notwithstanding anything contained in this EoI, BHEL reserves the right to accept or reject any application and to annul the EoI process and reject all applications, at any time without any liability or any obligation for such acceptance, rejection or annulment and without assigning any reasons, thereof. In the event that BHEL rejects or annuls all the applications,

it may at its discretion, invite all eligible Prospective Collaborators to submit fresh applications.

8. BHEL reserves the right to disqualify any applicant during or after completion of EoI process, if it is found there was a material misrepresentation by any such applicant or the applicant fails to provide within the specified time, supplemental information sought by BHEL.

9. BHEL reserves the right to verify all statements, information and documents submitted by the applicant in response to the EoI. Any such verification or lack of such verification by BHEL shall not relieve the applicant of his obligations or liabilities hereunder nor will it affect any rights of BHEL.

Section-2
Schedule of EoI Process & Contact Details

A. Schedule of EoI process:

The schedule of activities during the EoI Process shall be as follows:

Sl. No.	Description	Date
1.	Issue of EoI document	11th October, 2023
2.	Last date of submission of EoI response	1st November 2023

B. Contact Details:

Additional General Manager
Corporate Technology Management (CTM)
Bharat Heavy Electricals Limited
BHEL House, Siri Fort
New Delhi – 110049, India
Phone: +91 11 66337377 / 7198
Mobile: +91 9958181792 / +91 7838293044
Email: techeoi@bhel.in

In case any amendment/corrigendum to this EoI is issued, it shall be notified only at **www.bhel.com.**

Section- 3
Details of Expression of Interest (EoI)

3.1 Introduction:

This Expression of Interest (EoI) seeks responses from Original Equipment Manufacturers (OEMs), who are willing to be associated with BHEL through joint development / technology collaboration (with transfer of ownership of IPR) of 127 mm Medium Calibre Gun (MCG) for Indian Navy under Make-I Category to enable BHEL to design, develop, engineer, manufacture, assemble, test, supply, integrate, commission, maintain, operate, repair, overhaul/retrofit, service, troubleshoot and sell 127 mm MCG system.

The 127 MM Medium Calibre Gun (MCG) system for Naval applications plays a dual role of both anti-surface and anti-air weapons. They can take on the vessels in the sea or targets on shore as well as incoming enemy aircraft. They are also used for naval gunfire support or breaching operations. These guns are used to help the military in carrying out landing or amphibious operations on the shore. Further, Indian Navy has decided to procure 127mm MCG under Make-I Category of Defence Acquisition Procedure (DAP) 2020 (DAP copy is available on Ministry of Defence (MoD), Govt. of India website: https://www.ddpmod.gov.in/sites/default/files/DAP%202020%20%2011%20Nov%2021_0.pdf).

3.2 About BHEL:

BHEL is an integrated power plant equipment manufacturer and largest engineering & manufacturing enterprise of its kind in India, catering to core infrastructure sectors of Indian economy viz. Energy, Transportation, Oil & Gas, Industrial, Renewable & non-conventional energy and defence. BHEL is listed on both major stock exchanges of India (BSE and NSE), wherein the Govt of India (GoI) is holding 63.17% of its equity. To position the company as global industrial giant, GoI categorized BHEL as “Maharatna Company” in 2013, empowering the company with enhanced autonomy in decision-making.

BHEL has 16 manufacturing units, 4 power sector regions, 8 service centers and 4 regional offices besides a host of project sites spread all over India and abroad. The annual turnover of BHEL for the year 2022-23 was around USD $2.8 Billion. Highly skilled and committed manpower of approx. 29000 employees, state-of-art manufacturing facilities and technologies have helped BHEL to deliver a consistent track record of performance. With the current order book exceeding US $ 14 Billion, BHEL is poised for an excellent future growth.

Our ongoing major technology tie-ups include Siemens Energy Global GmbH & Co. KG., Germany (for Steam Turbines, Generators and Condensers); MHI, Japan (for Flue Gas Desulfurization Systems); Leonardo S.p.A, Italy (for Super Rapid Gun Mount); GE Tech GmbH, Switzerland (for Steam Turbine for Nuclear Power Plant and for Gas Turbines); Vogt Power International, USA (for Heat Recovery Steam Generators); Indian Space Research Organization (ISRO) (for Space Grade Lithium-Ion Cells); CSIR-IIP (PVSA-based Medical Oxygen Plant); NANO Co. Ltd., Korea (for SCR Catalysts); HLB Power Co. Ltd., Korea (for Gates

[*Note: Currency conversion rate considered: 1 US $=Rs. 82.1 as on 31st March 2023]

and Dampers); Kawasaki Heavy Industries, Japan (for Stainless Steel Coaches for Metros); Valmet Automation Oy, Finland (for DCS System), Sumitomo SHI FW, Finland (CFBC Boilers) and Babcock Power Environmental Inc., USA (for Selective Catalytic Reduction Systems).

For more details about the entire range of BHEL's products and operations please visit our website http://www.bhel.com.

3.3 BHEL in Defence Sector:

BHEL presence in Defence business is more than three decades with proven track record of being competitive, quality products, reliable supplies and life time product support. In the field of Defence, BHEL has long term association with Ministry of Defence (MOD) and key Indian Organizations viz. Indian Armed Forces, Defence Shipyards, DRDO Labs, HAL, erstwhile OFB, Indian Coast Guard for various projects including but not limited to the following -

1. Manufacture & supply 76/62 Super Rapid Gun Mount, since 1994, in collaboration with M/s Leonardo, Italy.
2. Integrated Platform Management System for Warships.
3. Manufactured and supplied Armored Recovery Vehicles to Indian Army.
4. BHEL was part of development team for Main Battle Tank (MBT) Arjun and has integrated tanks & supplied Gun Control System for MBT Arjun.
5. Castings & Forgings for Defence and Strategic applications.
6. Designed, engineered, manufactured and supplied Launchers for Trishul Missile & Brahmos Missiles.
7. Designed, engineered, manufactured and supplied Permanent Magnet Based Motors & Frequency converters, Bidirectional converters, alternators, mechanical auxiliaries, Turbines, Turbo-generators, condensers for warship and submarines.
8. One of select few firms worldwide with proven capability of design, engineering, manufacturing & testing of Compact Heat Exchangers & Pump Modules for Aerospace applications.
9. Long term association with various ISRO centres and is a regular manufacturer and supplier of Space Grade Li-ion cells & Batteries, Solar Panels for Satellites & Launch Vehicles, Hot forming of Titanium Shells/ Domes and Cryogenic Tanks.
10. Core capability for machining & fabrication of exotic materials including Al-alloys, Titanium alloys etc.

3.4 Scope of Cooperation:

BHEL is seeking Expression of Interest(s) from Original Equipment Manufacturer(s) (OEMs) / Prospective Collaborator(s) for joint development/technology collaboration (with transfer of ownership of IPR) of 127 mm Medium Calibre Gun (MCG) for Indian Navy under Make-I Category of DAP 2020 to enable BHEL to design, develop, engineer, manufacture,

assemble, test, supply, integrate, commission, maintain, operate, repair, overhaul/retrofit, service, troubleshoot and sell 127 mm Medium Calibre Naval Gun. (DAP copy is available on Ministry of Defence (MoD), Govt. of India website https://www.ddpmod.gov.in/sites/default/files/DAP%202020%20%2011%20Nov%2021_0.pdf).

Interested OEMs/Prospective Collaborator(s) meeting the PQR requirement as specified in clause 3.5 below are invited to submit their response to this EoI, as per indicative scope of technology transfer given in **Annexure-1**.

Based on this EoI process, BHEL intends to shortlist and select suitable partner for participation in the 127 mm Medium Calibre Gun (MCG) program of Indian Navy under Make-I Category of DAP 2020. The selected partner will associate with BHEL for the preparation of response to EoI issued by MoD for the subject program, prepare detailed project report in compliance to DAP 2020, participate in technical discussions/evaluation, assist in preparation of commercial offer for prototype & procurement phase. On BHEL's selection as Development Agency & receipt of Project Sanction order (PSO) for the program from MoD, the partner will be required to jointly design, develop, engineer, manufacture, integrate, test & prove the 127mm MCG to meet the required performance. After proving of the MCG, partner will jointly manufacture & supply the gun system as per agreed work share during the procurement phase. BHEL will enter into a binding Memorandum of Understanding (MoU) & Non-Disclosure Agreement (NDA) with the selected partner till the receipt of PSO.

Further, BHEL will enter into a long-term Technology Collaboration Agreement (TCA) / Partnership Agreement (with transfer of ownership of IPR or joint development) as per indicative scope at **Annexure-1** to execute the contract(s) for 127 mm MCG with selected partner after award of PSO by MoD. Detailed techno-commercial negotiations shall be held with the shortlisted Prospective Collaborator(s) to finalize the long-term TCA / Partnership Agreement with the selected party.

3.5 Prequalification Requirements (PQRs):

The Prospective Collaborator(s) shall meet all the following qualification requirements as on the closing date of the EoI:

a) The Prospective Collaborator should have designed, developed, engineered, manufactured, integrated & successfully tested and proven at least 1 (one) no. 127 mm Medium Caliber Naval Gun, meeting the broad technical specifications mentioned at Annexure-3.

OR

b) The Prospective Collaborator should have designed, developed, engineered, manufactured, integrated & successfully tested and proven Medium Caliber Naval Gun with bore size close to 127 mm and the Prospective Collaborator should be ready to jointly develop 127 mm Medium Caliber Naval Gun with BHEL to meet the broad technical specifications mentioned at Annexure-3.

Note: Relevant documentary evidence to substantiate the fulfillment of above requirements to be furnished along with response.

3.6 Instructions:

3.6.1 The interested Prospective Collaborator(s) should submit their response(s) along with enclosed annexures on or before **1st November 2023.**

Annexure-1: Indicative Scope of Technology Transfer

Annexure-2: Prospective Collaborator's Experience

Annexure-3: Indicative operational characteristics/features of 127mm MCG for Naval application

Annexure-4: Reference List: The Prospective Collaborator's major supplies in last 10 years

3.6.2 The response shall necessarily be accompanied with the following details:

1. Company Background
2. Product Profile
3. Technical details
4. Reference list of customers
5. Annual audited financial reports for last 3 (three) years.

3.6.3 **Language:** All correspondences and documents related to the EoI response shall be in the English language, provided that any printed literature furnished by the Prospective Collaborator(s) may be written in another language, as long as such literature is accompanied by a translation of its pertinent passages in the English language in which case, for purposes of interpretation of the bid, the English translation shall govern.

3.6.4 The indicative operational characteristics/features of 127mm MCG for Naval application is enclosed at Annexure-3. The Prospective Collaborator to support BHEL to develop 127 mm MCG to meet the parameters as required by the Indian Navy as and when defined explicitly.

3.6.5 The Prospective Collaborator(s) shall abide by the terms & conditions, as applicable, of the EoI.

3.6.6 All pages of the response against this EoI shall be duly signed by the authorized signatory.

3.6.7 Multiple proposals from the same Prospective Collaborator should not be submitted.

3.6.8 BHEL at its discretion shall inspect the Prospective Collaborator's works / office / reference site premises for the purpose of evaluation, as deemed necessary before selection of Collaborator. BHEL decision in this regard shall be final.

3.6.9 Any Prospective Collaborator which has been debarred/blacklisted by Central/State Governments of India or by any entity controlled by Central/State Governments of India from participating in any of their project, as on date of submission of EoI, shall not be eligible to submit the EoI.

3.6.10 BHEL shall receive applications pursuant to this EoI in accordance with the terms set forth herein, as modified, altered, amended and clarified from time to time by BHEL, and all applications shall be submitted in accordance with such terms on or before the date specified in this EoI for submission of applications.

3.7 Confidentiality:

Information relating to the examination, clarification, evaluation and comparison of EoI and recommendations shall not be disclosed to Prospective Collaborator(s). Any effort by Prospective Collaborator(s) to influence BHEL in processing of EoI or selection decisions may result in the rejection of the response against EoI.

3.8 Governing Laws and Jurisdiction:

The EoI process shall be governed by, and construed in accordance with the laws of India and the Courts at New Delhi (India) shall have exclusive jurisdiction over all disputes arising under, pursuant to and / or in connection with the EoI process.

Annexure-1

Indicative Scope of Joint Development/Technology Transfer with IPR

(a)	Collaboration for joint development / Transfer of state-of-the-art technology (with transfer of ownership of IPR) relating to design, development, engineer, manufacture, assemble, test, supply, integrate, commission, maintain, operate, repair, overhaul/retrofit, service, troubleshoot and sell 127 mm MCG for Indian Navy under Make–I Category of DAP 2020.
(b)	Transfer of upgrades/improvements/modifications/developments to BHEL be ensured by the Prospective Collaborator(s) during the period of TCA for taking care of new market requirements and obsolescence. Subsequent updates required due to component obsolescence or updates implemented by Prospective Collaborator(s) due to safety consideration would also be provided.
(c)	Assistance in planning & establishing the new manufacturing, assembly and testing facilities & processes/ suitable augmentation at BHEL's existing facilities/processes by way of expert advice in terms of identifying, sizing & selection and preparation of specification of equipment/machinery required for manufacturing, their layout and foundation etc. Deputation of Collaborator's expert for commissioning of the manufacturing facilities, design of special tools and dies, jigs & fixtures etc.
(d)	Support through engineering services from Collaborator's design office / manufacturing facilities for products.
(e)	Training of BHEL engineers to design, develop, engineer, manufacture, assemble, test, supply, integrate, commission, maintain, operate, repair, overhaul/retrofit, service, troubleshoot and sell of 127 mm MCG for Indian Navy.
(f)	Deputation of Collaborator's experts to assist BHEL in joint development/absorption of the technology for products.
(g)	Joint Development/Transfer of applicable Proprietary software/computer programs including logics and source code, if any.
(h)	During the field trials and regular operation, if any modifications/updates are carried out to improve the performance/reliability of the system, the same shall also be transferred to BHEL with complete know-how and know-why.
(i)	Technology being proposed should be the latest/ state-of-the-art being marketed by the Prospective Collaborator.
(j)	Transfer of information to enable BHEL to source/procure those items, which Prospective Collaborator sources from other vendors (as these are not manufactured by the Prospective Collaborator) for use in 127 mm MCG for Indian Navy.

Signature & Seal
Authorized Signatory of the Prospective Collaborator

Annexure-2

Prospective Collaborator's Experience of 127 mm Medium Calibre Naval Gun

Sl. No.	Requirement	Response (YES/NO) and remarks, if any
(a)	Whether the Prospective Collaborator is an Original Equipment Manufacturer (OEM) of the proposed 127 mm or similar MCG for Naval application.	
(b)	Whether documentary evidence to substantiate the PQRs specified at Clause 3.5 has been submitted by the Prospective Collaborator.	
(c)	Whether the Prospective Collaborator has designed, developed, engineered, manufactured, integrated & successfully tested and proven at least 1 (one) no. 127 mm Medium Caliber Naval Gun, meeting the broad technical specifications mentioned at Annexure-3.	
(d)	Whether the Prospective Collaborator has designed, developed, engineered, manufactured, integrated & successfully tested and proven Medium Caliber Naval Gun with bore size close to 127 mm and the Prospective Collaborator is ready to jointly develop 127 mm Medium Caliber Naval Gun with BHEL to meet the broad technical specifications mentioned at Annexure-3.	
(e)	Whether the Prospective Collaborator has supplied at least one (1) No. 127 mm or similar MCG which is operational / successfully inducted for Naval applications.	
(f)	Whether Prospective Collaborator is willing to participate under the Make–I Category of DAP 2020. (DAP copy is available on Ministry of Defence (MoD), Govt. of India website https://www.ddpmod.gov.in/sites/default/files/DAP%202020%20%2011%20Nov%2021_0.pdf).	
(g)	Whether Prospective Collaborator agrees to support BHEL during interactions with the Indian Navy/MoD for initial screening, participation in the tender and subsequent qualification process by way of deputing their experts to India and providing the required information and clarifications as required/sought by Indian Navy/ MoD.	
(h)	Whether information on market share has been enclosed.	

Sl. No.	Requirement	Response (YES/NO) and remarks, if any
(i)	Whether Prospective Collaborator's detailed reference list have been enclosed.	
(j)	Whether Prospective Collaborator's annual audited financial reports for last 3 years have been enclosed.	
(k)	Whether the 127 mm MCG offered for technology transfer is the latest being marketed by the Prospective Collaborator.	
(l)	Whether letters / documentary evidence from customers (end users) for satisfactory operation of 127 mm or similar Medium Caliber Naval Gun which is being offered to BHEL under this EoI have been enclosed.	
(m)	Whether the Prospective Collaborator owns the IPRs for the technology being proposed for transfer under the Technology Collaboration Agreement (TCA) or have an unencumbered right from the owner of the IPRs to transfer the ownership of IPR. If yes, whether list of such IPRs is enclosed.	
(n)	What is the maximum range of the Medium Caliber Naval Gun with conventional NATO standard 5" ammunition (in km)?	
(o)	What is the life of the barrel with conventional ammunition (in rounds)?	
(p)	What are the traverse and elevation speeds of the MCG in deg/sec?	Traverse: Elevation:
(q)	For how long (minutes) can the MCG fire continuously at the max ROF (Rate of Fire) without reaching the Hot Gun Condition.	

Signature & Seal

Authorized Signatory of the Prospective Collaborator

Annexure-3

Indicative operational characteristics/features of 127mm Medium Calibre Gun (MCG) for Naval application

Sl. No.	Parameter	Compliance (Yes/No) or Offered Spec.
a)	**Calibre:** The gun and ammunition should be of 127 mm caliber (NATO Standard)	
b)	**Modes of Control:** The gun should have the following modes of control: - i. Integrated Control from Combat Management System (CMS) ii. Autonomous Control from FCS iii. Local Control from Local Position (Turret) or Gun Control Panel or Gun Bay	
c)	**Modes of Ammunition Loading:** The MCG should have the following modes of loading: - i. Automatic: Ammunition can be loaded into hoist for automatic round advancement to the firing mechanism (breech). ii. Stand-By: Ammunition can be loaded in case of failure of Auto mode.	
d)	**Rate of Fire:** The rate of fire of MCG should be ≥ 15 rounds per minute.	
e)	**Operational Capability:** The gun should also be able to operate in the following conditions: - i. Roll ≤ + 15˚ (Single significant amplitude) ii. Pitch ≤ + 4˚ (Single significant amplitude) iii. Arc of traverse of mounting to be ≥ ± 155˚ iv. Arc of elevation of mounting to be between - 12˚ to ≥ + 65˚	
f)	**Continuous Operation:** The gun should be able to continuously operate for at least 8 hrs. without overheating the servos, amplidynes, & associated systems.	
g)	**Weight:** The total weight of MCG, inclusive of its barbette, but excluding the weight of ammunition, should be ≤ 35 tons.	

Sl. No.	Parameter	Compliance (Yes/No) or Offered Spec.
h)	**Type of Ammunition & Fuzes:** The gun should be capable of firing conventional NATO standard 5" ammunition with all the following type of fuzes: - i. DA Fuze ii. VT Fuze iii. Proximity Fuze iv. Dummy Fuze for Practice Rounds	
i)	**Gun Control Console (GCC):** The MCG should have a suitable GCC which should perform the electric/electronic functions necessary to control the Gun. This GCC should act as suitable interface between the Gun & Fire Control System. (FCS).	
j)	**Military Specifications/ Standards:** The following specifications or Equivalent international standards should be adhered to: - i. Environmental conditions as per MIL STD 810G or equivalent standard ii. Shock requirements as per BR 3021 (1) NSS Gr II or equivalent standard. iii. Software standards as per IEEE 12207 or equivalent standard.	

Signature & Seal
Authorized Signatory of the Prospective Collaborator

Annexure-4

Reference List: The Prospective Collaborator shall furnish a summary of their product reference (127 mm or similar Medium Caliber Naval Gun) as detailed below for major supplies in the last 10 years

Sl. No.	Project name/location	Year of Supply	Year of Commissioning

Signature & Seal
Authorized Signatory of the Prospective Collaborator