Expression of Interest (EOI)
for
Development of IoT Leveraged Process Flow for Smart Manufacturing System
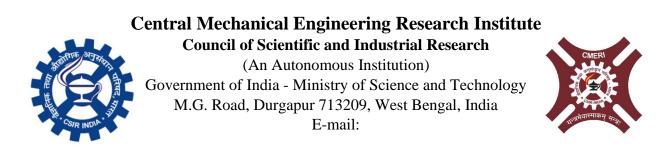
Contents   **Page No.**

1. Text of Advertisement

Central Mechanical Engineering Research Institute
Council of Scientific and Industrial Research
(An Autonomous Institution)
Government of India - Ministry of Science and Technology
M.G. Road, Durgapur 713209, West Bengal, India
E-mail:

Invitation for Expression of Interest

Central Mechanical Engineering Research Institute (CSIR-CMERI), Durgapur, under the aegis of Council of Scientific and Industrial Research (CSIR), Ministry of Science and Technology, Govt. of India, invites expression of interest (EOI) for "Development of IoT Leveraged Process Flow for Smart Manufacturing System". The EOI document containing details of scope of work, eligibility criteria instructions, pre-qualification criteria etc. along with necessary formats for submission is attached. The eligible firms may submit their responses in sealed envelopes in prescribed format addressing to The Director, CSIR- Central Mechanical Engineering Research Institute (CSIR-CMERI), M.G. Road, City Centre, Durgapur, 713209, West Bengal, India by 31st October 2020 till 3:30 PM

2. Brief Objective and Scope of Work

2.1 Introduction

The Central Mechanical Engineering Research Institute (CSIR-CMERI), Durgapur is the apex National R&D Institute under the aegis of Council of Scientific and Industrial Research, Ministry of Science and Technology, Govt. of India, for mechanical engineering. Being the only national level research institute in this field, CSIR-CMERIs mandate is to serve industry through research and development of mechanical engineering technologies, so that India's dependence on foreign collaboration is substantially reduced in strategic and economy sectors. Besides, the institute is facilitating innovations and inventions for establishing the claims of Indian talent in international fields where Indian products shall ultimately compete. In the new millennium, CMERI is poised to expand its horizon of research activities so as to steer the country forward in cutting-edge and sunrise fields.

2.1.1 Quality policy of the institute
Research and Development Activities to ensure satisfaction of customers regarding quality, delivery and cost of our technology and services, enabling them to guarantee performance to the end-user of the resultant products in terms of function, life-cycle cost and safety through continual improvement of the quality management system.

2.1.2 Quality objectives of the institute

- Be a Centre of excellence and the forerunner of new technologies.
- Be a customer driven R&D organization focused, agile and innovative.
- Train, motivate and provide growth–oriented environment to our employee and encourage creativity and team-work to achieve peak performance.
- Network with industries, other R&D and academic organizations and competent individuals to synergize efforts.
- Ensure competitiveness of our technology and services through continual improvement.
- Provide complete technology package comprising design and manufacturing know-how, consultancy and training, wherever necessary

2.2 Scope of Work

CSIR-CMERI wishes to empanel interested firms for developing algorithm and software for robot driven wire arc additive manufacturing system and invites Expression of Interest (EOI) from the reputed firms under the following categories:

A. Development of slicing algorithm form CAD solid model components generating G-code files for tool path – Guidelines: ISO 6983-1:2009 - Automation systems and integration
B. Develop the translation strategy to convert the G-code files created by the slicing algorithm into a robot programming language file, for instance RAPID.

C. Interfacing of generated tool path with the robot simulation software (Preferably in RobotStudio) using necessary Libraries/ API Calls and standard interfaces provided in the software.

Applicants should apply for all categories for the entire scope of the work.

3. Eligibility criteria

Eligibility criteria are divided into two subparts viz general requirements and technical requirements:

3.1 General Requirements for all categories

- The firm should be able to provide services for required types of software development.
- The firm shall practise interactive software development life cycle (SDLC) to have inputs and feedback from CSIR-CMERI
- The firms should be able to work with the subject area of industrial robot programming, CAD related algorithm development, software coding, Machine Code transfer / conversion algorithm development and implementation, interactive graphical user interface development etc. in compliance with Industry 4 PI.
- Firm should be able to provide techno-legal solutions to the software related matters.
- The firm must have the requisite infrastructure, manpower, in-house capability and also prior experience on similar category of work in mission critical applications
- The firm should not be black listed or have litigation that may have an impact on the delivery of services.
- The firm must be legally registered.

3.2 Technical requirements under different categories

Design of software for wire arc additive manufacturing system may consist of many modules as needs arises during various phases of SDLC. Details of three core categories/modules under this software development viz. category A, B and C are given below. **The firm shall provide copy of complete source code to CSIR-CMERI along with the executables/libraries etc. of the developed software.**

Category A: Development of slicing algorithm form CAD solid model components generating G-code files for tool path.

- Capability to parse 3D model/CAD model *.stl, or *.step.
- Capability to use user defined function for import of new extension files.
- Capability in GUI to display model after import in a graphical window.
- Capability to orient the imported model in the desired axis and rescale it if necessary.
- Customised slicing for each subpart of imported model and ability to use user defined slicing algorithms.

Category B: Develop the translation strategy to convert the G-code files created by the slicing algorithm into a robot programming language file, for instance RAPID.

- Capability of GUI to configure coordinates by translation algorithm.
- Capability to generate programme in robot language, for instance RAPID, from sliced geometry.
- Intelligence to detect loops in Sliced G-Code and optimise them in translated code for robots. This feature is needed to keep translated code easy to manage by humans.
- Capability in GUI to show loop detection in G-Code
- Capability in GUI to identify various task automatically/manually and assign each task to different robots with scheduling (task/signal from external interface).

Category C: Interfacing of generated tool path with the robot simulation software (Preferably in RobotStudio) using necessary Libraries/ API Calls and standard interfaces provided in the software.

- Capability to select various filling geometry for a group of slices/ single slice.
- Capability to partition group of slices/single slice and use different filling geometry for each part.
- Capability to edit the filling geometry on the fly thorough a GUI.

4. Pre-qualification Criteria

CSIR-CMERI shall evaluate the firms for short listing, inter-alia based on their past experience of handling similar types of work, strength of their man power and financial strength of the firm. CSIR-CMERI will assign scores to the response of each firm based on weightage assigned to each of the criteria are as under.

CSIR-CMERI would call for a presentation before experts committee only if the firm qualifies 50 out of 70 marks (Sl. 1, 2 and 3 of the below mentioned Table). CSIR –CMERI shall short list the Firms after the presentation before experts committee (either personally or through video conferencing for Sl No 4.0) and qualifying marks are 80 out of 100 marks. All the firms who have got the minimum threshold of marks as above will only qualify for further participation in the subsequent process.

Selection Criteria

Sl. No.	Criteria	Max. marks (%)
1.	**Past Experience of the firm [Format 2 and 3]**	40
1.1	Number of years' experience to relevant category (minimum 03 years or more experience in the relevant field.)	
1.2	Working with any Govt./ PSU/ Autonomous/ Universities/R&D organizations	
2.	**Experience of Key Personnel Qualifications [Format-4]**	20
2.1	Academic Qualification	
2.2	Activities carried out in last 5 years	
3.	**Financial strength of the Firm [Format-5]**	10
4.	Presentation before experts (by VC or in person)	30
	Total	**100**

5. Terms and Conditions

5.1 GENERAL

i. CSIR-CMERI invites services under different categories (A, B and C of Sl. 3.2). Applicants should apply for all categories for the entire scope of the work. Incomplete or partial submission of EOI in any means will not be considered for further processing. Mere fulfilling the criteria does not give assurance of empanelment and the decision taken by the competent authority is full and final in this regard. The competent authority is not liable to give any explanation of any kind regarding the selection process at any point of time.

ii. The eligible Industry/Enterprise will be treated as R&D Partner to CSIR-CMERI in this development and CSIR-CMERI will provide full physical access to Wire Arc Additive Manufacturing Facility at Durgapur for code testing/debugging and other allied activities in this regard. Full R&D and logistical support will also be provided by CSIR-CMERI.

iii. This is a joint and collaborative research endeavour addressing R&D gaps in Wire Arc Additive Manufacturing Process. CSIR-CMERI will not make any payment/remuneration to eligible Industry/Enterprise for execution of defined scope of the work. Individual cost of development as per the scope is to be borne by eligible Industry/Enterprise.

iv. The eligible Industry/Enterprise has to provide the source code along with the compiled version of the developed software.

v. The ownership of Intellectual property and/or knowledgebase will be on 50:50 equal sharing basis between CSIR (represented by CSIR-CMERI) and the eligible Industry/Enterprise. IPR if any, shall be filed by CSIR, jointly in the name of the eligible Industry/Enterprise and CSIR-CMERI.

vi. In this regard, a separate agreement is to be executed subsequently between eligible Industry/Enterprise and CSIR-CMERI after evaluation of submitted EOI and acceptance by eligible Industry/Enterprise.

5.2 PERIOD OF EMPANELMENT

The empanelment of the firms shall be initially for a period of one year and may be extended for another year only after satisfactory performance of the empanelled firm on the same terms and conditions.

5.3 SUBMISSION REQUIREMENT

The firms are requested to send 'Applicants consent form' (Format 1 signed in original) with the following documents addressed to **The Director, CSIR- Central Mechanical Engineering Research Institute (CMERI), M.G. Road, City Centre, Durgapur, 713209, West Bengal, India**.

The Envelop should be clearly marked as '**Confidential EOI Document for Development of IoT Leveraged Process Flow for Smart Manufacturing System**.

1: Organizational Contact Details as per Format-2
2: Experience in Related Fields as per Format-3
3: Experience of Key Personnel as per Format-4
4: Financial strength of the company as per Format-5
5: Additional information as per Format-6
6: Declaration as per Format-7

All the proposal should reach us latest by **31st October 2020 till 3:30 PM.** No postal delay would be admitted. Same shall be opened on 2nd Nov-2020 at 11:00 AM at CSIR-CMERI Durgapur.

If desired, the firms may attend the opening of EOI responses on 2nd November 2020 at 11:00 AM, at CSIR-CMERI Durgapur They shall bring letter of authority to participate in the EoI opening process.

6. Formats for applying

Below are the formats for applying to the EOI for Development of IoT Leveraged Process Flow for Smart Manufacturing System.

FORMAT-1

Applicant's consent Form
To The Director, CSIR- Central Mechanical Engineering Research Institute (CMERI), M.G. Road, City Centre, Durgapur, 713209, West Bengal, India. Subject: Submission of Expression of Interest for "Development of IoT Leveraged Process Flow for Smart Manufacturing System". Dear Sir, In response to the Invitation for Expressions of Interest (EOI) published on for "Development of IoT Leveraged Process Flow for Smart Manufacturing System" we would like to Express Interest to carry out the Services under all the categories as instructed, we attach following documents in sealed envelopes: 1. Firm Contact Details (Format-2) 2. Experience in related fields (Format-3) 3. Experience of key personnel (Format-4) 4. Financial strength of the organization (Format-5) 5. Additional information (Format-6) 6. Declaration (Format-7)   Sincerely Yours,   Signature of the applicant   [Full name of applicant]   Stamp & date   Encl: as above Note: This is to be furnished on the letter head of the organization.

FORMAT-2

Firm Contact Details	
Name of Firm :	
Type of Registration of firm:	
Year of Registration of firm:	
Registered Address :	
Contact Address:	
Telephone :	
Contact Person :	
Mobile No.	
Fax :	

Signature of the applicant

Full name of the applicant

Stamp & Date

FORMAT-3

	Experience in Related Fields	
Overview of the past experience of the Firm in Handling Intellectual Property and other related work.	

S. No.	Items	Particulars
1.	Experience & details of work done with any Govt/Public sector Undertaking (Publicly funded) /Autonomous/universities/R&D Organization	
2.	Experience & details of work done with others than S. No. 1	
3.	Other relevant experiences	

Signature of the applicant

[Full name of applicant]

Stamp & date

FORMAT-4

Experience of Key Personnel
Overview of the qualification and past experience of the key personnel Name: Designation: Date of Birth: Qualifications: Experience: (Activities carried out in last 5 years)   **Note:** Information regarding best three key personnel may be provided. They should be on the payroll of the applicant. Separate sheet may be used for each individual. Each individual will be evaluated separately and then average of the all personnel will be taken for final evaluation.

Signature of the applicant

[Full name of applicant]

Stamp & date

FORMAT-5

Financial Strength of the Firm

Annual turnover for last three Financial Years

S.No.	Year	Turnover
1.		
2.		
3.		

Note: Please attach auditor's certificate (certified copy) in support of your claim.

Signature of the applicant

[Full name of applicant]

Stamp & date

FORMAT-6

Additional Information

1. List all attachments related to the previous sections.

S.No.	Description	No. of pages (From- to)

2. Additional information to support the eligibility. (Not more than 2 pages).

Signature of the applicant

[Full name of applicant]

Stamp & date

Note: Separate sheet may be used if necessary.

FORMAT-7

Declaration

We hereby confirm that we are interested to work with CSIR-CMERI in Development of IoT Leveraged Process Flow for Smart Manufacturing System under all categories and all the information provided herewith is genuine and accurate to the best of our knowledge.

We also confirm that our firm has not been black listed or has any litigation or any conflict of interest that may impact on the delivery of services.

Authorized Person's Signature:

Name and Designation:

Date of Signature:

Note: This declaration is to be furnished on the letter head of the organization.