Expression of Interest (EOI)

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Part 1

1. Preamble :

a.1 Brief introduction of Lab/Estt: DRDO Young Scientist Lab-Artificial Intelligence is a Lab of DRDO, under Ministry of Defence and is situated at Dr. Raja Ramanna Complex, Raj Bhavan Circle, Bengaluru – 560 001.

a.2 Brief introduction of EOI :

- This EOI is to get the proposal for integration and testing of AI algorithms for a translation application and deployment of the integrated code on a custom made edge device.
- The Lab is in the process of firming up the RFP and pre-qualify the vendors based on their responses and its evaluation by a Technical Evaluation Committee for the above mentioned software cum hardware development activity.
- Being a high end software development contract, Execution of the intended Contract requires multi-disciplinary expertise from the bidders in the areas of detailed engineering, complex software development and the company should posses human resources which are highly skilled and capable of understanding and executing the AI specific tasks assigned by the Laboratory.

a.3 The objective of this EOI is to firm up the RFP (Request for Proposal) and to pre-qualify the vendors based on their responses and its evaluation by a Technical Evaluation Committee.
This EoI will lead to issuing of RFPs to the firms found capable of executing the development contract by DYSL-AI, DRDO. The RFP will subsequently lead to contract and contract may subsequently lead to placement of production contracts on successful completion of the contract.

2. Scope of work:

Responsibility of the applicant shall include but not limited to:-

For Integration of AI algorithms and deployment

- Efficient AI algorithm integration and deployment mechanism on the edge device should be brought out.
- The mechanism should support the capability to cascade multiple deep learning models in the deployment pipeline.
- The mechanism should support real time and offline translation.
- The mechanism should support plug and play architecture for translation.
- The system should provide inference timing analysis for the all the AI models under integration.
- On the designed pipeline, DYSL-AI should be able to deploy multiple applications.

- Workforce as specified in para 5.2, should be available on premises in DYSL-AI for the purpose of coding and integration of AI algorithm on edge device. The proposal should include plan for deployment of the same.
- The manpower should have expertise in translation and speech processing/synthesis to augment DYSL-AI scientists in implementation of translation & speech processing /synthesis AI models on edge device
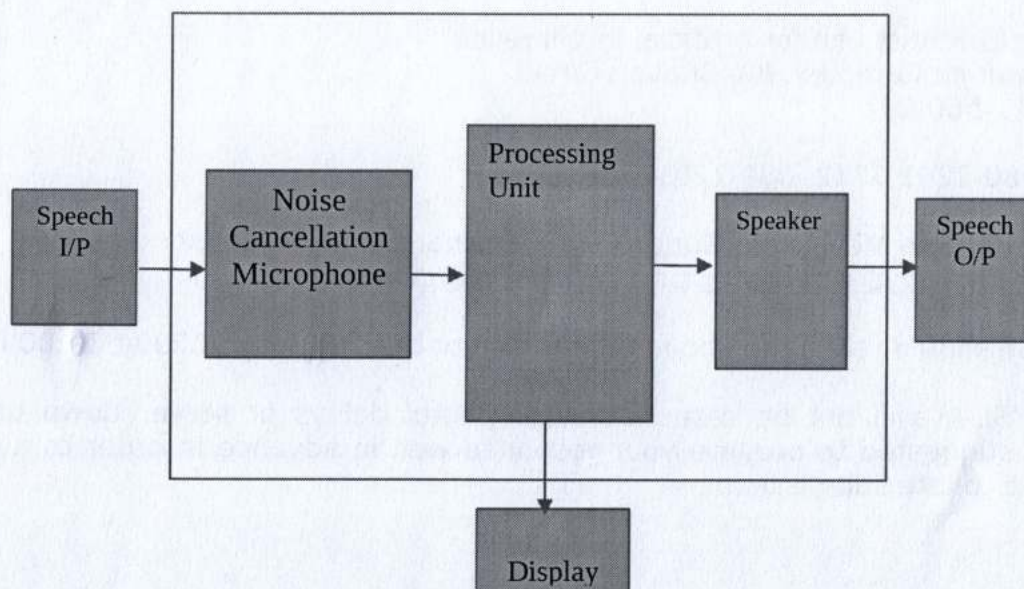
For Custom Edge Device

- The Electronic design architecture for the custom electronic device should be presented to DYSL-AI
- Electronic design specifications should also be drafted after testing multiple System On Modules with DYSL-AI algorithm.
- A propotype device using System on Module, along with translation algorithm should be demonstrated within 6 weeks from EOI.
- The edge device should support a lightweight Linux/embedded operating system
- It should additionally support audio recording, compression and security features.
- The product design proposal for the custom edge device should also be brought out including the electromechanical Integration & tooling.

Draft of generalized specification for the custom edge device

Block Diagram :

MIL Grade Device

Draft Specifications for the edge device:

a) Processing unit with at least

- CPU 8-core Arm 64-bit, CPU clock >=2 Ghz (Preferable)

- Memory : 16 GB Ram 128-bit LPDDR4

- Storage : 64 GB eMMC

- Should operate with compatible battery for approx 4 Hrs operational time

b) AI accelerator (with greater than 50 Teraops performance)

c) Noise cancellation microphone chip interfaced with Processing unit

d) Ruggudized switches for device reboot/ on off, volume control, brightness control.

e) Button for coming to home screen/push to talk.

f) Compatible low power lcd/led/E ink display for low light visualization and operation with gloves.

g) Device should boot up with a lightweight embedded software .

3. Procedure for response : The response can be either through defproc portal or through post

The response should be addressed to
The Director,
DRDO Young Scientist Lab for Artificial Intelligence
Dr. Raja Ramanna Complex, Raj Bhavan Circle
BENGALURU – 560 001

Phone No. 080-2201 7712, 080-22017706

Contact Person: Shri Meva Ram Gurjar / Shri. Prakhar Bapat, Scientist
Email ID: mrgurjar.dysl-ai@gov.in, prakhar.dysl-ai@gov.in,

The response should reach the above address on or before 19 May 2023 at 16:00 Hrs

Director, DYSL-AI will not be responsible for postal delays or server down time. Hence, it is suggested to prepare your response well in advance in order to avoid rejection due to late submission.

4. Section A: Instructions/Notes:

4.1 : General

(a) All copies of documents submitted along with EOI should be clear, legible and self certified by the authorized representative of the applicant.

(b) Lab/Estt reserves the right to physically check the original documents / certificates, the copies of which are submitted along with the EOI

(c) The applicant language of Communication for all activities connected to this EOI and tasks thereof shall be in English.

(d) Lab/Estt reserves the right to cancel this process of EOI at any time without any financial or otherwise liability and without assigning any reasons thereof.

(e) The applicant must give a declaration stating that under the existing regulations of their country, there is no bar or restrictions on the Applicant for participation in this EOI.

(f) The applicant may kindly note that shortlisted firm will be required to sign a Non Disclosure Agreement (NDA) at a later date as required by Lab/Estt.

(g) The applicant must meet the minimum criteria regarding the "applicants specific and particular experience criteria", specified in this document, as demonstrated by the applicants responses provided in the Forms at Part 2.

(h) The applicants may note that mere meeting of the minimum criteria does not entitle any company/firm/organization the right for appointment.

(i) Lab/Estt will not be responsible/ liable to any party in any way for costs associated in preparation & submission of EOI.

(j) Lab/Estt is also not obliged to share clarification related questions with other respondents than the one who seeks clarification.

(k) Lab/Estt reserves the right to accept or reject any EOI proposal without signing any reasons whatsoever.

(l) This Labs/Estt reserves the right to withdraw the EOI and change or vary any part thereof or foreclose the EOI at any stage.

4.2 : Important

a) Although the instant EoI shall be for firming up the specification and selection of vendors required during the development stage, the winner of the bid would also be nominated as "Development cum Production Partner" DcPP(s) subject to success in Technical trials.

b) Development cum Production Partner(s)- DcPP is referred to the industry (ies) which is/are identified and involved as partner/partners from the initial stages of the development phase. The prototype for trial will be realised by DcPP(s). DcPP(s) would also be responsible for production of the system during the production phase and subsequent life cycle support. DcPP(s) shall carry out production of DRDO system and also provide warranty, maintenance and product support during its life cycle.

c) Unit cost of the system without Non Recurring Expenditure would become the basis for calculating the unit cost during the production phase.

d) In the production phase and thereafter, DcPP(s) shall be the Single Point of Contact (SPoC) and shall be responsible for supply, maintenance and support during the entire life cycle of the product.

e) Supply chain established during the development of the system needs to be continued by the DcPP(s) in the production phase. If there is any change in the supply chain, the same shall be with the approval of DYSL-AI.

f) Not withstanding the above, INTELLECTUAL PROPERTY RIGHTS (IPR) developed under the developmental contract, funded by DYSL-AI, DRDO, will be the property of DYSL-AI, DRDO, Govt. of India. The firm should provide technical know-how/ design data for production of the item to the DYSL-AI or any other designated production agency nominated by the DYSL-AI, DRDO. The firm will, however, be permitted to receive, upon demand, a royalty free license to use these intellectual properties for its own purposes, which specifically excludes sale or licensing to any third party other than the ones provided in separate agreement between DYSL-AI and the firm, if any.

g) The selected industry should sign a Non Disclosure Agreement (NDA) at a later date as required by Lab/Estt

h) Manufacturing drawings prepared during the development phase shall be the property of the DRDO/ Ministry of Defence and will be handed over to DRDO whenever required. Further, these will also not be used by the development partner for any purpose other than stated in the contract, without the written consent of DRDO. All dies/ tools/die sets/ jigs/ fixtures/ moulds fabricated under the contract which are charged separately will be returned to the Lab/Estt unless specified otherwise in the contract

i) Return of Documents: Documents, specifications, drawings issued to development partner(s) or prepared by them will be property of DRDO and the same will be returned to DRDO on demand. Any loss or damage to these documents shall be recovered from the development partner.

j) The firm would also be required to submit technical document stipulating guarantee for the design, material, workmanship and performance of the equipment for a specific period.

4.3 : Submission of Information/Documents: Information should be submitted in the formats specified in this document. The Pre-qualification documents shall be submitted as follows:-

    (a) Two (hard) copies with all supporting documents.
    (b) One digital copy (on PD) of entire documentation.
    (c) With covering letter duly signed by Authorized Representative of the company with company's seal. Document in support of authorization granted to authorize representative to be submitted.

4.4 : Failure by the applicant to provide information/documents, which is essential to evaluate the applicant's qualifications, or to provide timely clarification or substantiation of the information supplied may result in disqualification of the applicant.

4.5 Any information/clarification regarding this subject matter can be obtained from:-
Contact details id of contact person of Lab/Estt (Address, phone, email-id)

DRDO Young Scientist Lab for Artificial Intelligence
Dr. Raja Ramanna Complex, Raj Bhavan Circle
BENGALURU – 560 001

Phone No. 080-2201 7712
Contact Person: Shri. Prakhar Bapat, Scientist
Email ID: prakhar.dysl-ai@gov.in, stores.dysl-ai@gov.in

Part 2 : Forms

5.1 : Form A – Specific Experience
Format for presenting past experience
5.2 Form B – Skilled Workforce requirement shall include following type of manpower but not limited to :

S. No	Type of Manpower	Educational Qualification	Minimum Experience
1	AI specialists (3)	**For Speech Processing and Synthesis (1)** **Essential:** • PHD degree from computer science/ECE/Electronics department from reputed institutes with specialization in deep learning, speech recognition, processing and synthesis area • Proven experience with ML, deep learning, neural speech synthesis , and software libraries such PyTorch, Tensorflow, Keras **For Translation (1)** **Essential:** • PHD degree from computer science/ECE/Electronics department from reputed institutes with specialization in deep learning, natural language processing area • Proven experience with ML, deep learning, NLP and software libraries such PyTorch, Tensorflow, Keras **For AI on edge(1)** **Essential:** • PHD degree from computer science/ ECE/Electronics department from reputed institutes with specialization in deep learning, AI on edge, Hardware aware AI algorithm optimization	**Desirable:** 2Years experience working in AI based software development

		• Proven experience with MLOPS, deep learning,software libraries such PyTorch, Tensorflow, TensorRT, PyTorchMobile.	
2	AI Engineers (6)	**Essential:** • Bachelor's degree B.E./Btech in computer science/ECE/electronics from reputed institute with working knowledge of Python, NLP, speech signals and software libraries such PyTorch, Tensorflow, Keras, TensorRT , PyTorch Mobile. **Desirable:** • Master's M.E./Mtech/MCA/Msc. in relevant AI domain from tier I institutes	2 Years experience working in AI software development

The above requirement of manpower is indicative and shall be mutually agreed upon during the detailed discussion with the vendor as per the final RFP to be issued by Lab/Estt.

The vendor should have had experience in executing a similar contract or should have had proven capability in carrying out similar type of work, as brought out in Annexure `A'

In addition, the vendor can specify if he has executed any contracts of similar nature with any other Labs of DRDO

The vendor can also bring out any other relevant points ·

5.3 Form C
Willingness/ Undertaking Format
(To be enclosed as part of Expression of Interest proposal on the letterhead of the company)

Date

To

The Director
DRDO Young Scientists Laboratory – Artificial Intelligence
Dr. Raja Ramanna Complex
Raj Bhavan Circle, High Grounds
BENGALURU

Reference: Expression of Interest No. --------------------- dated-------------- 2021

Dear Sir,

We hereby confirm that we have examined the lab/Estt EOI document dated ---------
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We hereby confirm the following:

i) That we agree to all terms and conditions of the EOI document.

ii) ...

iii) ...

Yours faithfully,

(Applicant Head Signature)

5.4 Form D - Summary Sheet: Organization Structure / Legal Status/ Current Contract Commitments / Works in Progress

The Applicant firm shall submit with EOI, the organization structure , legal status of the applicant, place of Registration, principal place of business and brief on business activities undertaken by the applicant, the ownership details, shareholder pattern, details of manpower viz. discipline and geographical location wise permanent manpower strength for providing support in execution of proposed project, names and addresses of the present Directors and the Senior management and such other relevant details as the Applicant may like to share in the following format.

a) Corporate ....

b) Corporate Structure ....

c) Applicant's Technical Capacity (State total number of professional staff indicating each Individual's experience/ qualification): ....
....

d) Applicant's Facilities and Experience ....
....

Name & Signature of authorized representative of the Applicant:

Name and Stamp of Company:

Date:

e) Applicant should provide information on their work performed in the last **2** years and also the current commitments on all contracts that have been awarded, or for which a letter of intent or acceptance has been received , or for contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued in the following format.

Year	Project Name/Client	Contract No. & Date	Value of Contract	Stipulated Period of Completion	Actual date of completion

5.5 Form E – Financial Capability

5.5.1 The Applicant shall furnish complete audited annual financial year statements for last **2** years including balance sheets, profit & loss account statement, Audit Reports and all other schedules of immediate preceding financial year, self-certification of being not under liquidation, court receivership or similar proceeding. For any of the past 3 financial years, the vendor has had an annual turnover of more than 2 Crores. The company should be positive net worth firm for the last three years. (In support of the claim, vendor needs to submit copies of balance sheet, profit & Loss account duly audited, pertaining to the previous 3 years).

5.5.2 Applicant should provide financial information to demonstrate firm's capability for assessment of the financial status by Lab/Estt. If necessary, use separate sheets to provide complete banker information.

5.5.3 Applicant should have positive net worth

Banker	Name of the banker(s)	
	Address of Banker(s)	
	Telephone	**Contact name and title of Senior Bank official**
	Fax	**E-mail**

5.6 Form F - Litigation /Arbitration History

Applicant should provide information on history of Court litigation or arbitration proceedings resulting from contracts executed in the last **2** years or currently under execution. The information should also be provided for any significant sub-contractors.

Year	Decree/Award for or against Applicant	Name of client, cause of litigation, and matter in dispute	Disputed amount (current value)

Part 3 – COMPLIANCE TABLE

Compliance to all EOI Clauses

Sl. No.	Section/Para	Compliance of para/sub para of the Main	Reasons/ Justifications for non-compliance/ Suggestions (if any)	Remarks
1	Part-1; Section 4.1			
	(a) To (m) Please specify deviations if any in remarks column			
	4.2			
	4.3			
	Part-2 (Furnishing/non furnishing of documents demanded in the following section may please be indicated with reasons for non-furnishing if any)			
	5.2			
	5.3			
	5.4			
	5.5.1			
	5.5.3			
	5.6			
	Appendix A			

Appendix A

Technical eligibility Criteria

1) The applicant should have at least 5 years of experience in electronic design and development /Mobile device design and development.

2) The applicant should have at least 2 years of experience in AI application development and deployment on an edge AI device.

3) Availability of Qualified personnel: The firm should have on its permanent roll at least 10 AI Engineers continuously for the period of last 3 years.

4) Availability of in-house QA practices/ Standards: These should be clearly brought out in the proposal.

5) The vendor should have experience of having carried out similar work (work involving combined hardware and AI software development) at any organisation of repute. The vendor should have the capability to develop edge device and prove the performance of AI algorithm on the edge device. A self declaration certificate along with write-up on technical capabilities the firm possesses for matching the above criteria needs to be enclosed with the response.