

EXPRESSION OF INTEREST
for
TRANSFER OF TECHNOLOGY

Cellular Vehicle to Everything (C-V2X) Communication Platform

Invited by



Centre for Development of Advanced Computing (C-DAC)

A Scientific Society under the Ministry of Electronics & Information Technology (MeitY), Government of India

Hyderabad Centre

Plot 6&7, Hardware Park, Srisailem Highway,
Hyderabad, Telangana- 501510, India

Tel: +91-9100034446

Website: www.cdac.in

EoI No.: CDACH/EoI/0924/ToT-CV2X dated 13.09.2024.

Last date for submission of proposals: **04.10.2024**

The EoI document may be downloaded from

<https://eprocure.gov.in>

www.cdac.in

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ACTIVITY SCHEDULE

Sr. No.	EoI No. & Date of Release	CDACH/EoI/0924/ToT-CV2X Dated 13.09.2024
1	Last Date of Sending Queries	27.09.2024 @ 17.00 AM
2	e-mail for Sending queries	partner@cdac.in
3	Last Date of Submission of Proposals	04.10.2024 @ 17.00 hrs
5	Date of Opening of Proposals	07.10.2024 @ 11.00 hrs
6	Place of Opening of Proposals	Centre for Development of Advanced Computing (C-DAC), Plot 6&7, Hardware Park, Srisaïlam Highway, Hyderabad, Telangana- 501510

1. Introduction

Centre for Development of Advanced Computing (C-DAC) invites “**Expression of Interest**” (EOI) from **INDIAN COMPANIES (Firms/Companies registered under the Indian Laws)** for transfer of technology (ToT) from C-DAC and to subscribe, acquire licenses, market, sell and implement “**C-V2X Communication Platform**” targeting **Vehicular Communication Applications** on non-exclusive basis.

This EOI is in continuation of the previous EOI: **CDACH/EoI/24/ToT-CV2X dated 22.03.2024** for the TOT of “**C-V2X Communication Platform**” targeting **Vehicular Communication Applications** inviting interested bidders to respond with their company details, collaboration details, sales projections and financial bid and their estimated cost payable for the onetime TOT license fee and royalty fee. After evaluation of the technical & financial bids by the TOT committee as per the TOT policy guidelines of C-DAC, the Competent Authority of C-DAC has approved the rates for TOT fee and royalty fee and the same is now published as part of this RFP.

EOI is invited on behalf of M/s C-DAC, Hyderabad from reputed firms / companies registered in India, with relevant experience / insights in the manufacturing / marketing / implementation of **C-V2X Communication Platform** / similar electronic products through Transfer of Technology (ToT). The C-V2X product line is designed & developed by C-DAC as part of project funded by **Technology Innovation Hub on Autonomous Navigation and Data Acquisition Systems (TiHAN)** at IIT Hyderabad under the National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS), Department of Science and Technology (DST), Govt. of India and is available for Transfer of Technology (ToT) for the industry to manufacture, market and implement for various client projects.

This document details about the product, terms and conditions for companies to propose their Expression of Interest and how to enter into Transfer of Technology (ToT) agreement based on the terms given herein.

2. Brief about C-DAC

Centre for Development of Advanced Computing (C-DAC) is the premier R&D organization of the Ministry of Electronics and Information Technology (MeitY), Govt. of India for carrying out R&D in IT, Electronics, and associated areas. It is a National Centre of Excellence, pioneering application-oriented research, design and development in Electronics and Information Technology.

The Centre has contributed significantly to the growth of the industry in general and the electronics sector in particular through the indigenous development of commercially viable systems and products, foreign technology absorption, adaptation and upgrades, consultancy and training and turnkey implementation of contract projects. The Centre has several firsts to its credits and is the recipient of prestigious national level awards for excellence in application- oriented R & D.

The Mission mode programmes of C-DAC include High Performance Computing, Grid and Cloud Computing, Multilingual Computing & Heritage Computing, Professional Electronics, VLSI and Embedded systems, Software technologies, Cyber Security & Cyber Forensics, Health Informatics, Intelligent Transportation Systems and others.

3. Brief description about the technology to be transferred.

C-DAC as part of project funded by Technology Innovation Hub on Autonomous Navigation and Data Acquisition Systems (**TiHAN**) at IIT Hyderabad under the National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS), Department of Science and Technology (DST), Govt. of India developed an indigenously developed Cellular - Vehicle to Everything (C-V2X) platform comprising On-Board Unit (OBU) and Road Side Unit (RSU) devices, with the V2X communication stack, adhering to the 3GPP Release 14/15 specifications for vehicular communication. C-V2X, a global solution for high speed, low latency vehicular networks, supports Vehicle-to-Vehicle (V2V), Vehicle-to-Pedestrian (V2P), Vehicle-to-Infrastructure (V2I) and Vehicle-to-Network(V2N) communications, thereby allowing vehicles to communicate with other road users and the road side infrastructure for enhancing road safety and building a collaborative Intelligent Transportation System.

The C-DAC C-V2X product line for ToT and Licensing includes.

1. C-V2X Hardware Platforms for ToT

- a. CV2X based On Board Unit (OBU) device & Embedded Linux based Software SDK
- b. CV2X based Road Side Unit (RSU) device & Embedded Linux based Software SDK

2. C-V2X Software Platform for Licensing

- a. IEEE 1609.x WAVE Stack Binaries for Embedded Linux Platforms

3.1 C-V2X Hardware Platforms for ToT

a. C-V2X based On Board Unit (OBU) & Embedded Linux based Software SDK

C-V2X OBU is a powerful in-vehicle device which allows vehicles to communicate with nearby vehicles and road infrastructures, enabling a plethora of cooperative applications aimed at reducing road hazard situations as well as enhancing traffic efficiency and individual driving comfort. Compatible with V2X communication stack with the following connectivity options:

- C-V2X with Autotalks chipset supporting 3GPP R15

- Bluetooth v5.1

Core Features	
Processor	NXP i.MX 6 /8 Quad Core ARM Cortex-A9 800 MHz / 1.2GHz SMARC Compliant
OS	Embedded Linux
Positioning	Advanced GNSS with DR,RTK capability
I/O Features	CAN Bus Interface 1x mini PCIe interface Serial ports - RS232 (optional) Digital Inputs/outputs (optional)
Ethernet	10/100/1000 Mbit/sec
Display	HDMI Interface
USB	2 x USB 2.0 port
Storage	16 GB Internal Flash
Power Supply	9V-36V



The Software Development Kit (SDK) is based on YOCTO Embedded Linux Build Platform for developers to build their customized applications. This consists of a set of

- Toolchain
- Libraries
- Headers
- API Document
- User Manual
- Sample Application Code with Templates

b. C-V2X based Road Side Unit (RSU) & Embedded Linux based Software SDK

C-V2X RSU is an edge computing device in an IP65 rated weatherproof enclosure, which supports V2X communication with nearby vehicles and road users, leading to safety and non-safety applications for intelligent transport systems. Compatible with V2X communication stack with the following connectivity options:

- C-V2X with Autotalks chipset supporting 3GPP R15
- Cellular 4G (LTE)/3G/2G, upgradable to 5G NR

Core Features	
Processor	NXP i.MX 6/8 Quad Core ARM Cortex-A9 800 MHz, 1.2GHz SMARC Compliant
OS	Embedded Linux
I/O Features	Serial ports - RS232 (optional) 1x mini PCIe interface Digital Inputs/outputs (expandable)
Ethernet	10/100/1000 Mbit/sec
Storage	SD Card
Power Supply	12/24 V



The Software Development Kit (SDK) is based on YOCTO Embedded Linux Build Platform for developers to build their customized applications. This consists of a set of

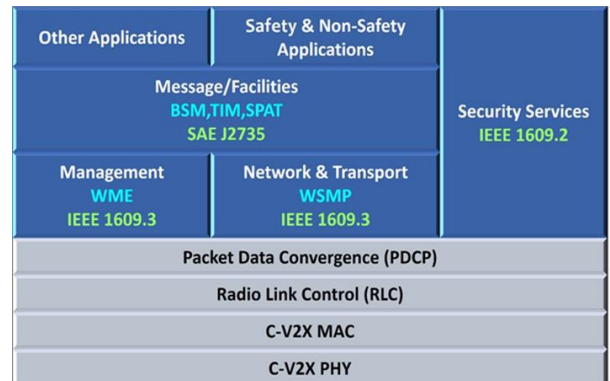
- Toolchain
- Libraries
- Headers
- API Document
- User Manual
- Sample Application Code with Templates

3.2 C-V2X Software Platform for Licensing

a. IEEE 1609.x WAVE Stack Binaries

The V2X Communication Stack implemented is compliant with the IEEE 1609 standard for low latency and high-speed vehicular communication requirements.

- Network and transport layer communication for data and control messages in accordance with the 1609.3-2020 specifications.
- Security services for data message transactions are implemented in conformance to the 1609.2-2016 specifications.
- SAEJ2735-2022 message dictionary formats for compliance with vehicle standards and requirements.



All the above developed stack components are provided as binaries for realizing C-V2X functionality.

Note:

- 1) *A license key will be required to be generated on a per device basis for making the stack binaries operational on target hardware platforms.*
- 2) *Bidders who have their own hardware platform and intend to purchase on software license are required to provide the embedded Linux SDK for generation of stack binaries. However, point no 1 remains applicable for the purchase.*

4. Invitation for Expression of Interest

- 4.1 C-DAC invites “Expression of Interest” (EOI) in the format given in Annexure-1 (Part A & Part B). Companies can become TOT partner of C-DAC based on the information furnished in Annexure – 1.
- 4.2 Companies can become ToT partners of C-DAC for the furtherance of proposed products, if they agree to pay one-time ToT fees fixed by C-DAC and subject to assessment of the firm’s credentials carried out by C-DAC based on the information furnished in Annexure–I.
- 4.3 ToT fee is one time (down payment), finalised by the TOT Committee (constituted by the Competent Authority) as per the terms of reference finalised by C-DAC and approved by DG C-DAC and Perpetual royalty fee per device shall also be payable for the subsequent sale of each device.
- 4.4 This invitation of EOI will be kept open till 04/10/2024. Companies cannot participate in this EOI invitation after the EOI closure date. However, C-DAC reserves the right to extend the date at the same/ revised terms and conditions after the due date.
- 4.5 Interested companies may submit the EOI as provided in section 5.0
- 4.6 The draft ToT agreement will be shared with eligible companies. If the company agrees to the terms and conditions of the agreement, the agreement can be signed after payment of the onetime ToT fee as stipulated in the payment terms for that product. The company then becomes eligible for purchase of C-V2X Software Platform license keys on a per device basis.
- 4.7 Participation in this EOI does not guarantee any association with C-DAC, unless the agreement is signed.
- 4.8 The technology is offered on non-exclusive basis.
- 4.9 The submission of the EOI shall include all such documents that are specified herein to prove the authenticity of their offer and any claim made therein. All cost and expenses associated with submission of EOI shall be borne by the bidder while submitting the EOI and C-DAC shall have no liability, in any manner in this regard, or if it decides to terminate the process of short listing for any reason whatsoever.

- 4.10 C-DAC reserves the right of rejecting any offer without assigning reasons.
- 4.11 There is neither a business guarantee nor any commitment for funding support from C-DAC to the selected ToT partner.

5 How to Apply

Any reputed **firms / companies registered under prevailing India laws**, including MSMEs or Start Ups and existing ToT partners of C-DAC willing to acquire licenses, manufacture, market, sell and implement “C-V2X Communication Platform” can apply.

Interested companies/firms may submit EOI by filling the template provided in **Annexure -I (Part-A & Part-B)** along with supporting documents placed envelope and shall be super scribed as “**EOI for ToT - C-V2X**” and addressed to:

Centre for Development of Advanced Computing
Plot No. 6 & 7, Hardware Park,
Srisaïlam Highway, Pahadi Shareef via (Keshavagiri Post)
Hyderabad - 501510 - Telangana (India)
Phone: +91-9100034446/7/8 / Fax: +91-9100034450
Email: partner@cdac.in

6 Memorandum of Agreement (MoA) for ToT Engagement

- 6.1 The ToT partner is selected based on the expression of interest submitted by interested companies.
- 6.2 If selected, the company shall pay onetime ToT fee, enter into a Memorandum of Agreement (MoA) and sign the agreement to become ToT partner of C-DAC. The onetime ToT fee can be paid in 2 instalments (30% one-time ToT fee at signing of the agreement and the remaining after all design files and documentation are handed over to the ToT Partner, within 1 year of the agreement).
- 6.3 C-DAC shall sign the technology transfer agreement with the firms on receiving the Onetime ToT fee as stipulated in the payment terms.
- 6.4 The TOT license shall be perpetual and will be granted on Non-Exclusive basis.
- 6.5 The onetime TOT fee is non-refundable.
- 6.6 The ToT agreement is liable to get terminated if the ToT partner fails to manufacture the products according to the said KNOW-HOW within a period of 12 months from the effective date of signing

the agreement. If the ToT partner is unable to set-up production within 12 months due to unavoidable circumstances and causes beyond his control, the ToT partner shall make a request in writing for extension of the time limit before the expiry of the date giving detailed reasons. This request will be carefully examined and considered by C-DAC. The decision of C-DAC in this regard shall be final and binding on the ToT partner.

6.7 Right of the IPR generated by C-DAC on the C-V2X Communication Platform and other applications used with the Know-how shall remain with C-DAC.

6.8 The ToT partner shall employ his best endeavour to commercialize the said development and sell the equipment on a commercial scale within India and abroad at prices to be fixed by him.

6.9 The ToT partner shall report progress of manufacture every three months to C-DAC, till it comes into production. Thereafter, it may report half-yearly regarding the number of equipment made and sold as a part of utilization of the said KNOW-HOW.

6.10 Any modifications / improvements which the ToT partner may consider essential while in the process of commercial production of the equipment covered under this ToT may be introduced only with prior permission of C-DAC in writing. Any such modification and improvement shall constitute an integral part of the said KNOW-HOW.

6.11 The ToT partner shall notify to C-DAC the change, if any, in its Registered Office / Manufacturing Plant within 15 days of such changes and shall also notify the changes in MoA within the aforesaid stipulated period.

6.12 The ToT partner shall not on its own name or in the name of any third party, file any patent Application for the grant of patent of the said KNOW-HOW hereby licensed and shall also not oppose at any time any patent application made by C-DAC.

7 MoA Validity & Renewal

7.1 Payment of onetime ToT fee grants the partner, MoA validity for a period of 3 years from the date of signing of the agreement.

7.2 For continued support beyond 3 years the partner can renew the ToT agreement before the expiry of validity of the MOA, which will be valid for a further extended period based on the terms and conditions prevailing at that time

7.3 If the renewal is initiated after the stipulated period, a fresh MoA need to be signed by the company based on the EOI conditions prevailing at that time.

7.4 After five years (from the date of signing the MoA) a new MoA is to be signed by the company based on the EOI conditions prevailing at that time.

7.5 The partner should have a valid ToT MoA (not expired) for providing any technical support on the ToT deliverables made by C-DAC.

7.6 Any customisation requirements of the ToT partner shall be entertained by C-DAC only if a valid ToT subscription exists. Such customisations shall be undertaken by C-DAC at cost basis on mutually agreed terms and conditions in contract mode.

8 ToT Deliverables

8.1 On payment of one-time license fee and signing of Memorandum of Agreement (MoA), the following list of items shall be provided by C-DAC to the ToT partner for production, product marketing support and PoC demonstration.

1) C-V2X based OBU & Embedded Linux based Software SDK

1. ToT Partnership certificate
2. Technical Manual
3. Bill of Materials
4. Sourcing Details
5. Assembly Details
6. PCB Gerber files
7. Binary Files
8. Schematics & design files
9. Software SDK
10. Test plan & Procedure document
11. Two Numbers of C-V2X Software Platform license keys

2) C-V2X based RSU & Embedded Linux based Software SDK

1. ToT Partnership certificate
2. Technical Manual
3. Bill of Materials
4. Sourcing Details
5. Assembly Details
6. PCB Gerber files
7. Binary Files
8. Schematics & design files
9. Software SDK
10. Test plan & Procedure document.
11. Two Numbers of C-V2X Software Platform license keys

3) C-V2X Software Platform

1. ToT Partnership certificate
2. C-V2X Stack Binaries

3. User Manual
4. Sample Application Code with Templates
5. API Documents
6. Test Reports
7. Two Numbers of C-V2X Software Platform license keys

9 Training for ToT Partners

- 9.1 C-DAC shall arrange one day product level introductory training to the ToT partner at Hyderabad Centre (C-DAC Hyd)/Thiruvananthapuram Centre (C-DAC Tvm) after signing of ToT agreement.
- 9.2 Upon 100% payment of onetime ToT subscription license fee detailed production level training and on application development of C-V2X Communication Platform shall be provided up to three working days.
- 9.3 The training will be conducted at C-DAC Hyd/C-DAC Tvm premises.
- 9.4 The travel and boarding and lodging expenses of the trainee(s) during the period of training shall be borne by the ToT partner.
- 9.5 For training requested outside C-DAC Hyd/C-DAC Tvm premises air travel, boarding and lodging charges of C-DAC Hyd/C-DAC Tvm officials shall be borne by the ToT partner. C-DAC shall also charge manpower as per C-DAC rules prevailing at the time of training for outstation training. Nomination of the C-DAC trainers and period of stay for outstation training will be decided by C-DAC on mutual consultation, depending on the type of training requested. Additional training may also be given by C-DAC either at the premises of C-DAC Hyd/C-DAC Tvm or at the location identified by the ToT partner on payment basis at mutually agreed terms and conditions.

10 Technical Support

- 10.1 C-DAC shall provide remote support to the ToT partner for installation and configuration of C-V2X Communication Platform during the period of MoA on case-to-case basis upon mutually agreed terms and conditions.
- 10.2 If any onsite support is requested by the ToT partner, C-DAC Hyd/C-DAC Tvm shall support on mutually agreed terms and conditions.
- 10.3 For onsite support outside C-DAC premises travel, boarding and lodging charges of C-DAC Hyd/C-DAC Tvm officials shall be borne by the ToT partner. C-DAC shall also charge manpower as per C-DAC rules prevailing at the time of support request for outstation support. Size of the C-DAC Hyd/C-DAC Tvm team and period of stay for outstation support shall be decided by C-DAC Hyd/C-DAC Tvm on mutual consultation, depending on the type of support requested.

Direct implementation by C-DAC

10.4 C-DAC reserves the right to implement C-V2X Communication Platform solution directly at sites where C-DAC is awarded orders for implementation directly by the end user.

10.5 If C-DAC is implementing C-V2X Communication Platform directly, then the cost at which C-DAC will be offering the solution to the end user will be 140% of the product cost finalized by C-DAC as part of the ToT.

11 Payment Terms for One Time ToT Fee and Software License

The final ToT fees and Royalty finalized by the committee and approved by the competent authority are detailed below for your reference.

C-V2X OBU with Embedded Linux based Software SDK		
TOT fee	Rs. 5 Lakhs	
Royalty fee per device	Rs. 8220/-	upto 100 units
	Rs. 4110/-	>100 upto 500 units
	Rs. 2055/-	> 500 units upto 1000
	Rs. 1028/-	>1000 units upto 5000
	Rs. 514/-	>5000 units
Payment Terms		
TOT fee	Rs. 1.5 Lakh at the time of signing of MOA	
	Rs. 3.5 Lakh at the time of handing over of TOT documents	
Royalty fee	Partner may download device specific license keys from ToT server on payment of royalty charges.	

C-V2X RSU with Embedded Linux based Software SDK		
TOT fee	Rs. 10 Lakhs	
Royalty fee per device	Rs. 6359/-	upto 100 units
	Rs. 3179/-	>100 units upto 500 units
	Rs. 1590/-	> 500 units upto 1000
	Rs. 795/-	>1000 units upto 5000
	Rs. 398/-	>5000 units
Payment Terms		
TOT fee	Rs. 3.0 Lakhs at the time of signing of MOA	
	Rs. 7.0 Lakhs at the time of handing over of TOT documents	
Royalty fee	Partner may download device specific license keys from ToT server on payment of royalty charges.	

C-V2X Software SDK		
One Time Licensing fee	Rs. 4.0 Lakhs	
Royalty fee per License	Rs. 534/-	upto 1000 Licenses
	Rs. 268/-	>1000 upto 5000 Licenses
	Rs. 134/-	> 5000 Licenses
Payment Terms		
One Time Licensing fee	Rs. 1.2 Lakh at the time of signing of MOA	
	Rs. 2.8 Lakh at the time of handing over of TOT documents	
Royalty fee	Partner may download device specific license keys from ToT server on payment of royalty charges.	

All above charges are exclusive of taxes.

For any queries please contact:

Dr. S V Srikanth

Scientist E

Centre for Development of Advanced Computing

Plot No. 6 & 7, Hardware Park,

Sy No. 1/1, Srisaïlam Highway,

Pahadi Shareef Via (Keshavagiri Post)

Hyderabad - 501510 - Telangana (India)

Phone:040-29564386

Mail:**partner@cdac.in**

Annexure –I

(To be submitted in sealed envelope)

(Part-A) : Company Profile of the bidder

A.	Company Profile
1.	Name of the Organization: Website:
2.	Name of the Contact Person: Address: Mobile: Landline: Fax: E-Mail:
3.	Year of Incorporation:
4.	Type of Organization a. Public Sector/ Limited/Private Limited/ Partnership/Proprietary/ Society/ Any other b. Whether 'Foreign Equity Participation (Please give name of foreign equity participant and percentage thereof) c. Names of Directors of the Board/ Proprietors d. Name and address of NRI(s), if any
5.	Category of the firm: Large/Medium/Small scale unit / Others
6.	Address of the Registered Office: (Include Certificate of Registration)
7.	Number of Offices with addresses (Excluding Registered Office): India, Abroad.....
8.	Certificate of registration as a manufacturing unit
9.	Permanent Account Number
10.	GST Reg. No.
11.	ISO or any equivalent Certification

(Part B): Technical Expertise of the bidder

B.	ESSENTIAL REQUIREMENTS
1.	The organization must be a reputed firm/company/SME/startup/R&D company incorporated in India.
2.	The turnover is to be supported by financial statements of accounts/ Annual reports duly certified by a Chartered accountant/ Balance sheets of last 3 years/ Income tax returns for the last 3 years period.
3.	Company profile, giving details of current activities and management/ personnel structure including evidence of incorporation. The company should be registered and ISO or equivalent certified.
4.	Details of absorption of technology for a product/knowhow that has been taken up on production scale in the past may also be given
5.	The manpower strength (Technical: Mechanical, Electrical, Electronics, Software & Non-Technical etc.) at various levels to be furnished. Technical: a. B.E./ B. TECH/PhD b. DIPLOMA c. SKILLED TECHNICIANS d. UNSKILLED
6.	The list of machine tools /equipment/software/facilities available related with work to be furnished.
7.	The in-house technological expertise available to be furnished
8.	The list of equipment available for inspection and quality control to be furnished.
9.	The industry should have adequate space for undertaking this work. Available space - Covered & Open and location details to be furnished.
10.	List of products/technologies worked with as regular activity in last three years. Give the list of products/technologies with general specifications and the customers.
11.	List of PSUs/Govt. customers – with contact details (Address, Telephone no., Contact Person)
12.	The details of sales, marketing, and maintenance network to be furnished
13.	The list of technical collaborators for various ongoing products may be furnished
14.	The bidder shall provide details of the sub-vendors in case they propose to employ for Part-work.
C.	Expression of Interest: Spell out the extent of interest and envisaged market potential

I hereby declare that the above information is true to the best of my knowledge.

Signature with Name & Seal:

Place:

Date: