प्रौद्योगिकी स्थानांतरण के लिए पसंद की अभिव्यक्ति

EXPRESSION OF INTEREST for TRANSFER OF TECHNOLOGY

ट्रैफिक सिग्नल नियंत्रक के लिए C-V2X हार्डवेयर एडाप्टर (C-V2X HAT)

C-V2X Hardware Adapter for Traffic signal Controller (CV2X -HAT)

प्रगत संगणन विकास केंद्र

(इलेक्ट्रॉनिकी और सूचना प्रौद्योगिकी मंत्रालय, -**भारत सरकार**)

तिरुवनंतपुरम, केरल 695033

द्वारा जारी ।

टेलीफोन: 0471 2727508 फैक्स: 0471 2723456 ईमेल: **tpc@cdac.in**

वेब साइट: **www.cdac.in**

Issued by

CENTRE FOR DEVELOPMENT OF ADVANCED COMPUTING

(The Premier R&D organization of the Ministry of Electronics and Information Technology (MeitY), Govt. of India)

Thiruvananthapuram, Kerala, 695033

Phone: 0471 2727508 Fax: 0471 2723456 Email: **tpc@cdac.in**

Website: www.cdac.in

Table of Contents

1. Introduction

Centre for Development of Advanced Computing (C-DAC) invites "**Expression of Interest**" (EOI) from Indian companies for transfer of technology (ToT) from C-DAC and to manufacture, market, sell and deploy **C-V2X Hardware Adapter for Traffic signal Controller** on non-exclusive basis.

Through this EOI, sealed financial H1 bid is invited on behalf of M/s Technology Promotion Centre, CDAC, Thiruvananthapuram from reputed firms involved in manufacturing, installation and maintaining traffic signal controllers through Transfer of Technology (ToT). The following product was developed by C-DAC with the funding from TiHAN (Technology Innovation Hub on Autonomous Navigation) and is available for Transfer of Technology (ToT) for the industry to manufacture, market and implement for various client projects.

1. C-V2X Hardware Adapter for Traffic signal Controller (CV2X-HAT)

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.

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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

The C-V2X (Cellular Vehicle-to-Everything) hardware adapter is a cutting-edge solution that upgrades traditional traffic signal controllers, making them C-V2X-ready and enabling direct communication between traffic infrastructure and vehicles. This enhancement facilitates the seamless exchange of critical information enabling support for wide range of V2X applications.

These include real-time traffic signal updates to vehicles, emergency vehicle pre-emption, bus priority systems, pedestrian safety improvements, Green Light Optimal Speed Advisory (GLOSA), intersection collision avoidance, and more.

Integrating C-V2X communication into traffic signals significantly enhances road safety, traffic flow, and emergency response times. Real-time updates help drivers anticipate signal changes, while prioritization for emergency and public transit vehicles reduces delays and increases operational efficiency. This technology also gathers valuable traffic data, allowing for adaptive signal control to relieve congestion and support urban planning. By reducing vehicle idle time, C-V2X further contributes to lowering emissions, promoting a cleaner and more sustainable urban environment.

Hardware is powered by a 64-bit Cortex A-76 processor. The adapter hardware connects to the Roadside Unit (RSU) via Ethernet and interfaces with the traffic signal controller through an RS232 port. It is designed to work seamlessly with any RSU that supports the J2735 and NTCIP 1202 standards. The traffic signal controller must operate with C-DAC's SPaT protocol version 1.0. While C-DAC's own traffic signal controller is already compatible with this protocol, third-party controllers will need to communicate with the RSU using the specified protocol. To facilitate this integration, C-DAC shall provide the protocol document and necessary one-time technical support as needed for its integration.

Please refer product datasheet for detailed specification (refer Annexure II)

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 – I, subject to the assessment by the C-DAC.

4.2. Expression of Interest (EOI) also seeks from interested industry vendors to offer the best price for onetime TOT licensee cost and Royalty cost for the above-mentioned product.

4.3. The minimum base price for the TOT has been finalised by the TOT Committee (constituted by the Competent Authority) as per the terms of reference finalised by C-DAC. The vendor offering the highest price as per the template mentioned in Annexure III shall be designated as H1 price. If the value of H1 price is more than the minimum base price finalised by C-DAC, then H1 bid shall be considered as the final price.. If the value of H1 bid is less than the minimum base price finalised by C-DAC, then the base price finalised by C-DAC shall be considered as the final price.

4.4. ToT is offered with all hardware know how to manufacture the units along with the Binary executables will be provided.

4.5. This invitation of EOI will be open till **25/02/2025**. No companies can offer the price for this product in this EOI invitation after the EOI closure date. The financial bids received till the last date of EOI shall only be evaluated to arrive at the final cost of TOT license.

4.6. If there are no respondents to the EOI, the base cost already finalised by the TOT Committee shall be fixed as the license cost for the TOT.
4.7. Interested companies may submit the expression of interest (see section 5.0, section 6.0 and Annexure III)
4.8. The EOI bids received from the vendors shall be evaluated to discover the best H1 bid.
4.9. After the evaluation, the cost finalised by C-DAC for the TOT will be informed to all the bidders who have participated in the EOI.
4.10. The draft ToT agreement will be shared with the eligible company. If the company agree to the terms and conditions of the agreement, the agreement can be signed after payment of the onetime TOT license fee as stipulated in the payment terms for that product. The company then become eligible and qualified as a TOT partner of CDAC.
4.11. Participation in this EOI does not guarantee any association with C-DAC, unless the agreement is signed.
4.12. The technology is offered on non-exclusive basis.
4.13. 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.
4.14. C-DAC reserves the right of rejecting any offer without assigning reasons.
4.15. There is neither a business guarantee nor any commitment for funding support from C-DAC to the selected TOT partner.

5. Who can Apply

Any Indian Company including MSMEs or Start Ups who are OEM/Reseller of Traffic signal controller hardware/ V2X Hardware can apply for TOT.

6. How to Apply

Interested companies may send expression of interest by filling the template as per Annexure – 1 along with supporting documents to

Head, Technology Promotion Centre
Centre for Development of Advanced Computing (CDAC)
Vellayambalam, Thiruvananthapuram, Kerala, India, 695033
Phone: 0471 2727508 Fax: 0471 2723456
Email: **tpc@cdac.in** Website: **www.cdac.in**

7. TOT Agreement

7.1. The TOT partner is selected based on the expression of interest submitted by interested companies.
7.2. If selected, the company shall pay onetime TOT license subscription fee and sign the TOT agreement to become TOT partner of C-DAC. Onetime TOT license subscription fee finalised by C-DAC shall be informed to all the bidders who have participated in the EOI.

7.3. CDAC shall sign the technology transfer agreement with the company on receiving the onetime TOT license fee.

7.4. The license will be granted on Non-Exclusive basis.

7.5. The "C-V2X Hardware Adapter for Traffic signal Controller " technology shall be transferred only after completing the full ToT payment.

7.6. No TOT partner will be allowed to quote for "C-V2X Hardware Adapter for Traffic signal Controller " unless he enters into an agreement with CDAC and pays the one time TOT fees. The TOT fees are non-refundable. In case any party offers /quotes the rates for any projects without TOT agreement with CDAC, CDAC will not be responsible for any such event.

8. One time TOT license Subscription Validity & Renewal of TOT agreement

8.1. Payment of one time TOT license fee grants the partner for manufacturing, marketing and selling "C-V2X Hardware Adapter for Traffic signal Controller", for a period of **3 years** from the date of signing of the agreement

8.2. For continued support beyond 3 years the partner shall be required to renew the ToT agreement by paying the fee defined by C-DAC before the expiry of valid subscription, which will be valid for a further extended period of two years.

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

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

8.5. The partner should have a valid TOT subscription licenses for providing any technical support on the TOT deliverables made by C-DAC.

8.6. Any customisation requirements of the TOT partner shall be entertained by CDAC only if a valid TOT subscription exists. Such customisations shall be undertaken by CDAC at cost basis on mutually agreed terms and conditions.

9. C-DAC Deliverables

9.1. On payment of one-time license fee and signing of ToT agreement, the following list of items shall be provided by C-DAC to the TOT partner for production, product marketing support and PoC demonstration.

1. Technical Manual
2. Bill of Materials
3. Sourcing Details
4. Assembly Details
5. PCB Gerber files
6. Binary Files
7. Schematics
8. Test plan & Procedures
9. Training

10. Training for TOT Partners

10.1. C-DAC shall arrange product level introductory training to the ToT partner at C-DAC(T) after signing of TOT agreement.

10.2. Upon 100% payment of one time TOT subscription license fee detailed production level training and for software application training for installation, configuration and administration of CV2X Adapter shall be provided up to two working days.

10.3. The training will be conducted at C-DAC(T) premises.

10.4. The travel and boarding and lodging expenses of the trainee(s) during the period of training shall be borne by the ToT partner.

10.5. For training requested outside C-DAC (T) premises air travel, boarding and lodging charges of C-DAC (T) 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.

10.6. Additional training may also be given by C-DAC either at the premises of C-DAC (T) or at the location identified by the ToT partner on payment basis at mutually agreed terms and conditions.

11. Field implementation support

11.1. C-DAC(T) shall provide remote support to the ToT partner for installation and configuration of CV2X adapter during the subscription period on case to case basis upon mutually agreed terms and conditions.

11.2. If any onsite support is requested by the ToT partner, C-DAC shall support on mutually agreed terms and conditions.

11.3. For onsite support outside C-DAC premises travel, boarding and lodging charges of C-DAC (T) 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 team and period of stay for outstation support shall be decided by C-DAC on mutual consultation, depending on the type of support requested.

12. Direct implementation by C-DAC

12.1. C-DAC reserves the right to implement CV2X Adapter solution directly at sites where C-DAC is awarded ATCS / ATMS orders for implementation directly by the end user.

12.2. If CDAC is implementing CV2X Adapter directly, then the cost at which C-DAC will be offering the solution to the end user will be 140% of the cost finalised by C-DAC.

a) **Payment terms for One Time TOT subscription License**

Indian Companies including MSME and start-up shall pay the one-time TOT fee upon signing the agreement and the handover of TOT deliverables

For any queries please contact:

Section Head (Technology Promotion Centre)

Vellayambalam, C-DAC, Thiruvananthapuram
Contact: 0471 2727508, 0471 2723333 (extn: 220/450),
email: **tpc@cdac.in**

Annexure –I (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/ Anyother 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

Annexure – I (Part B)
Technical Collaborations 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.

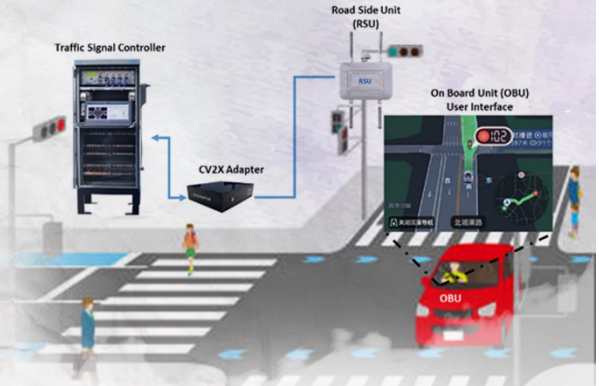
Signature with Name & Seal:

Place: Date:

Annexure II

C-V2X Hardware Adapter for Traffic signal Controller datasheet

C-V2X Hardware Adapter for Traffic signal controllers (C-V2X HAT)



The Centre for Development of Advanced Computing (C-DAC), with funding from TiHAN (Technology Innovation Hub on Autonomous Navigation), has developed a C-V2X hardware adapter that upgrades any existing traffic signal controller to be C-V2X compatible.This adapter along with CV2X RSU and OBU addresses a range of V2X use cases, including real-time traffic signal information dissemination, emergency vehicle pre-emption, bus priority systems, pedestrian safety enhancements, Green Light Optimal Speed Advisory (GLOSA), and intersection collision avoidance. C-V2X communication in traffic signals improves road safety, traffic flow, and emergency response times.

The adapter hardware receives signal timing information from the traffic signal controller through an RS232 port and transmits SPaT (Signal Phase and Timing) data to the Roadside Unit (RSU) using the TSCBM (Traffic Signal Controller Broadcast Message) protocol, compliant with the NEMA TS-10 standard outlined in NTCIP 1202. This message packet includes the status of sixteen signal phases (green, amber, red), the remaining time for the current phase, and the intersection mode (e.g., Auto or Manual). The TSCBM packet is sent via Ethernet to the RSU every 100 milliseconds. The RSU then broadcasts this SPaT data to OBUs (Onboard Units) to support information dissemination and enable various use cases.

Specification

CPU	64-bit quad core processor
Memory	4GB SDRAM& SD Card up to 128 GB
Operating system	Debian GNU/Linux12
Real Time Clock (RTC)	On-board
RTC Update	Through GNSS
Central server connectivity	Gigabit Ethernet, 4G
Configuration & firmware update	Through webserver
RSU communication	Through Gigabit Ethernet
Traffic controller communication	Through RS232 port
SPaT Transmission Interval	Every 100ms
Power	24V DC,15W

Intelligent Transportation and Networking Group
CENTRE FOR DEVELOPMENT OF ADVANCED COMPUTING
R&D Organization of the Ministry of Electronics & Information Technology
Government of India, Vellayambalam, Thiruvananthapuram – 695033, Kerala
Tel: +91 471 2723333 , Fax: +91471 2723456, Website: www.cdac.in

Annexure-III Financial Bid Format

(To be submitted by the bidder in sealed envelope)

Price bid for One Time TOT License Subscription cost & Royalty fee

Sl. No	Hardware Product	One Time ToT Fee (Rs.)	Royalty Fee (Rs.)	Expected sales volume per year
1	C-V2X Hardware Adapter for Traffic signal Controller			