

प्रौद्योगिकी स्थानांतरण केलिए पसंद की अभिव्यक्ति

EXPRESSION OF INTEREST for TRANSFER OF TECHNOLOGY

अनुकूलन यातायात नियंत्रण प्रणाली सॉफ्टवेयर

समग्र सिग्नल नियंत्रण रणनीति एनहान्स्ड –वर्षन
कोसिकोस्टइ -एनवी

Adaptive Traffic Control System Software

Composite Signal Control Strategy - Enhanced Version

“CoSiCoSt-EnV”



प्रगत संगणन विकास केंद्र

भारत सरकार), इलेक्ट्रॉनिक्स और सूचना प्रौद्योगिकी मंत्रालय का आर एवं डी संगठन(एमईआईटीवाई)

तिरुवनंतपुरम, केरल 695033

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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)

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Table of Contents

SL No.	Section	Page No.
1	Introduction	3
2	Brief about C-DAC	3
3	Brief description about the technology to be transferred	3
4	Invitation for Expression of Interest	4
5	Who can Apply	5
6	How to Apply	5
7	TOT Agreement (How to Subscribe to CoSiCoSt-EnV)	5
8	Software licenses for Implementation	6
9	Subscription Validity & Renewal of TOT agreement	6
10	C-DAC Deliverables	6
11	Training for TOT Partners	7
12	Field implementation support	7
13	Direct implementation by C-DAC	8
14	Rates for One Time License, Software License and Subscription renewal	8
15	Annexure-I (Part A & Part B) – (2 pages)	11
16	Annexure-II (Product brochure) – (2 pages)	13

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 subscribe, acquire licenses, market, sell and implement Adaptive Traffic Management solutions using “**Composite Signal Control Strategy – Enhanced Version (CoSiCoSt-EnV)**” on non-exclusive basis.

This document also gives details about

- The product
- The 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

Composite Signal Control Strategy- Enhanced version (CoSiCoSt-EnV) - is an Adaptive Traffic Control System (ATCS) software algorithm used in the implementation of Advanced Traffic Management System (ATMS). ATMS solution is a suite of two components (1) the Traffic signal controller and (2) the ATCS software that includes the data acquisition system and user management application (TraMM-EnV) and the ATCS control algorithm software, CoSiCoSt-EnV. TraMM-EnV is a standalone software used for remote monitoring and management of traffic signals. CoSiCoSt-EnV is an Adaptive Traffic Control System (ATCS) software which shall co-exist with TraMM-EnV software. Installation of CoSiCoSt-EnV software requires the existence of TraMM-EnV software in

the same server. The traffic signal controllers installed at individual traffic junctions in a road traffic network are networked to the ATCS application hosted at the Traffic Management Centre for remote monitoring and real time signal control for improving mobility, travel time and reduction in automobile pollution.

The EOI for the Technology Transfer of TraMM-EnV software was released earlier. The enhanced CoSiCoSt (CoSiCoSt-EnV) software is made compatible to TraMM-EnV software. CoSiCoSt-EnV software uses improved transition methods and additional data analytics are introduced to provide reports on travel time, delay, volume counts, etc are derived from utilized green timings. Please refer product datasheet for more information (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. This EOI invitation contains all the charges involved for procurement of subscription as well as software licenses. The charges mentioned here are non-negotiable.
- 4.3. This invitation of EOI will be open till 31st March 2022. No companies can become TOT partner of C-DAC for this product as per the terms and conditions specified in this EOI invitation after the EOI closure date.
- 4.4. Interested companies may submit the expression of interest (see section 5.0 and section 6.0)
- 4.5. Once an Expression of Interest is received at C-DAC, the same will be evaluated within 4 days of receipt of the EOI at C-DAC.
- 4.6. After the evaluation draft 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 License fee (See Section 8). The company then become eligible for procurement of software licenses for the prescribed period from C-DAC.
- 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. Who can Apply

Any Indian Company or Start Ups willing to acquire licenses, market, sell and implement traffic management solutions can apply.

Companies (Existing TOT partner) already having the TOT subscription license for TraMM-EnV software can apply for the Transfer of Technology (TOT) for CoSiCoSt-EnV software directly.

New Companies (New TOT partner) can also apply for the Transfer of Technology (TOT) of CoSiCoSt-EnV software, but they also need to apply separately for the Transfer of Technology (TOT) of TraMM-EnV software because installation of CoSiCoSt-EnV requires an instance of TraMM-EnV software. For the TOT of TraMM-EnV Software, companies can respond to the EOI available at C-DAC web site (www.cdac.in).

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 (How to Subscribe to CoSiCoSt-EnV)

- 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 license fee (TOT subscription fee) and sign the TOT agreement to become TOT partner of C-DAC for CoSiCoSt-EnV software. Onetime license fee is specified in Table 1 of Section 14
- 7.3. CDAC shall sign the technology transfer agreement with the technology partner on receiving the onetime TOT license fee.
- 7.4. The license will be granted on Non-Exclusive basis.
- 7.5. **No TOT partner will be allowed to quote based on the above charges unless he enters into an agreement and pays the TOT subscription fees. The subscription fees are non-refundable. In case any party offer /quotes the rates without an agreement with CDAC, CDAC will not honour the rates/ will not give the ToT to such party.**

8. Software licenses for Site Implementation

- 8.1. The software licenses can be purchased by TOT partner only if the partner has a valid TOT subscription with C-DAC. These software licenses are needed for the partner to implement the ATMS solutions in various cities.
- 8.2. The TOT partner will be granted license to implement CoSiCoSt-EnV software in the server based on the licenses purchased by them.

Server License Fee is the license fee applicable for the deployable version of CoSiCoSt-EnV software in a physical server / Virtual machine

- 8.3. The details of software license fee are mentioned in Table 2 of Section 14
- 8.4. The software will have a one year period of warranty support from the date of purchase of server software license. During this period, any updates/releases in CoSiCoSt-EnV software shall be made available to the client through the ToT partner. For the period beyond one year warranty support, ToT partner has to pay C-DAC an AMC support charge of 10% of the cost of server software license fee procured for that project site.

9. Subscription Validity & Renewal of TOT agreement

- 9.1. Payment of one time TOT license fee grants the partner subscription of CoSiCoSt-EnV software for a period of **3 years** from the date of signing of the agreement
- 9.2. For continued support beyond 3 years the partner shall be required to renew the ToT agreement by paying the TOT subscription charges of Rs. 2.00 Lakhs plus applicable taxes before the expiry of valid subscription, which will be valid for a further extended period of two years.
- 9.3. The partner should have a valid TOT license and software licence subscription for TraMM-EnV software also, to renew the subscription validity of CoSiCoSt-EnV software.
- 9.4. 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.
- 9.5. 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.
- 9.6. The partner should have a valid TOT license subscription for purchasing new software licenses from C-DAC.

10. C-DAC Deliverables

- 10.1. On payment of one-time TOT license fee and signing of ToT agreement, the following items shall be provided by C-DAC to the TOT partner for product marketing support and POC installation
 - i. TOT Partnership certificate
 - ii. Product data sheet file in psd/cdr format
 - iii. Demo version of CoSiCoSt-EnV software license with a validity of 30 days and a limit of 10 junctions in one corridor.
 - iv. System Architecture & Functional description manual (Technical)
 - v. Installation manual

- 10.2. On payment of software license fee the following items shall be provided by C-DAC to the TOT partner for the deployment of software
 - i. Subscription license certificate for CoSiCoSt-EnV software
 - ii. Software with a valid license downloadable from C-DAC FTP site after getting a commercial order.

11. Training for TOT Partners

- 11.1. C-DAC shall arrange two days product level marketing/ sales training on CoSiCoSt-EnV software to the ToT partner at C-DAC(T) after signing of TOT agreement.
- 11.2. Upon payment of software subscription license fee, product implementation level training for installation, configuration and administration of CoSiCoSt-EnV software shall be provided up to three working days.
- 11.3. The training will be conducted at C-DAC(T) premises.
- 11.4. The travel and boarding and lodging expenses of the trainee(s) during the period of training shall be borne by the ToT partner.
- 11.5. 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.
- 11.6. 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.

12. Field implementation support

- 12.1. C-DAC(T) shall provide remote support to the ToT partner for installation and configuration of CoSiCoSt-EnV software during the subscription period.
- 12.2. If any onsite support is requested by the ToT partner, C-DAC shall support on mutually agreed terms and conditions.
- 12.3. 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.

13. Direct implementation by C-DAC

- 13.1. C-DAC reserves the right to implement CoSiCoSt-EnV solution directly at sites where C-DAC is awarded ATCS / ATMS orders for implementation directly by the end user.
- 13.2. If CDAC is implementing CoSiCoSt-EnV directly, then the cost at which C-DAC will be offering the solution to the end user will be 140% of the software license cost finalised by C-DAC.

14. Licensing policy for One Time TOT subscription License and Software subscription License

Table-1: Onetime TOT License Subscription fee			
Sl. No.	Partner Type	Onetime License fee (Exclusive of taxes)	Payment terms
1	New ToT Partner (Agency who wish to take ToT for CoSiCoSt-EnV software, afresh)	Rs3,00,000 /-	Single instalment
2	Existing Partner (Agency already having CoSiCoSt software compatible for TraMM (previous version of TraMM-EnV) and wish to take ToT for CoSiCoSt-EnV software compatible with TraMM-EnV)	Rs1,50,000 /-	Single instalment

3	Start-ups (Agency who wish to take ToT for CoSiCoSt-EnV software, afresh)	Rs 3,00,000 /-	<p>Specific benefits for Govt. recognized (like DIPP registered) Startups: Payment can be made in two instalments. 1st instalment – 10% of the approved cost (To be paid at the time of signing of MOA)</p> <p>2nd instalment –Balance 90% of the approved cost (to be paid within one year period)</p> <p>Failing to complete the subscription activation by the agency within 12 months of making the first instalment of subscription fee is liable to get terminated automatically and, whatever money paid to C-DAC for acquiring the license will be forfeited. The agency cannot claim any refund for the amount of initial payments, what so ever be.</p> <p>If the Startup company wishes to enter into TOT at a later date, then the company has to respond to the EOI open at that time and the terms and conditions will be as per the EOI prevalent at that time.</p>
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Table 2 : Software Subscription License Fee Details (For TOT Partner)			
SI No	Software	Per License Cost (Exclusive of taxes)	Remarks
1	Server Software License fee (standalone deployment)	Rs25,00,000/-	Instance of TraMM-EnV server is required for CoSiCoSt-EnV server installation.

			<p>One CoSiCoSt-EnV server license can serve up to 500 junctions maximum.</p> <p>The total no. of junction support of CoSiCoSt-EnV server depends on the no. of junction licenses associated with that instance of TraMM-EnV server.</p> <p>Cost of license to be paid at time of placing order on C-DAC</p>
2	Server Software License fee (for deployment in High Availability (HA) mode)	Rs 31,25,000/-	<p>Required only if HA is an end user requirement</p> <p>One CoSiCoSt-EnV server license can serve up to 500 junctions maximum.</p> <p>The total no. of junction support of CoSiCoSt-EnV server depend on the no. of junction licenses associated with that instance of TraMM-EnV server.</p> <p>Cost of license to be paid at time of placing order on C-DAC</p>

For any queries please contact:

Section Head (Technology Promotion Centre)
Vellayambalam, C-DAC, Thiruvananthapuram
Contact:98470 69184, 0471 2727508, 0471 2723333 (extn: 220/450),
email: tpc@cdac.in

15. 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:

16. Annexure – II

Product Brochure

CoSiCoSt-EnV

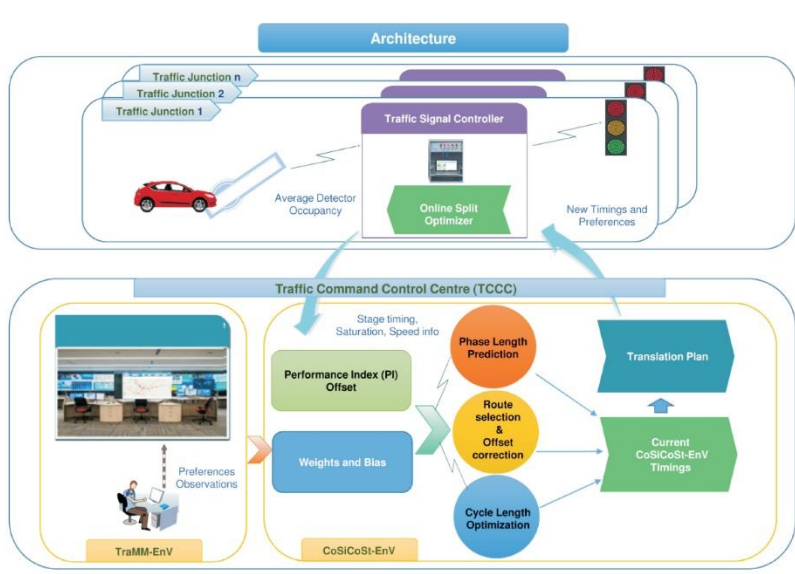
**Composite Signal Control Strategy-
Enhanced Version**



Composite Signal Control Strategy- Enhanced Version (CoSiCoSt-EnV) is an Adaptive Traffic Control System (ATCS) software algorithm that optimizes signal timings of a road traffic network in runtime. CoSiCoSt-EnV is used in the implementation of Advanced Traffic Management System (ATMS). The ATMS suite comprises Traffic signal controllers operating at the intersection level and ATCS application running at the Traffic Management Centre (TMC). The ATCS application constitutes the data acquisition, remote monitoring and user management system (TraMM-EnV) and the ATCS control algorithm, CoSiCoSt-EnV. The traffic signal controllers installed at individual traffic junctions in a road traffic network are networked to the ATCS application hosted at the TMC for real time signal control and remote monitoring of signal operation. Composite Signal Control Strategy (CoSiCoSt) developed by C-DAC Thiruvananthapuram optimizes a weighted combination of delay and stops of a road traffic network in real-time improving mobility, travel time, reduction in stopped delay, congestion levels, queue lengths and hence diminution in automobile pollution. CoSiCoSt is designed to cater the typical Indian driving and traffic conditions such as non-lane based driving in mixed traffic flow and non-standard junction geometry. CoSiCoSt bears an Indian Patent (No: 239258 Title: A Method for Synchronizing Heterogeneous Road Traffic and System thereof) jointly owned by the Ministry of Electronics and Information Technology (MeitY) and C-DAC.

C-DAC Urban Traffic Control Equipment (CUTE) and Wireless Traffic Control System (WiTraC) are the state-of-the-art Vehicle Actuated Adaptive Traffic Signal Controllers developed by C-DAC that functions as junction controllers in the ATMS environment.

CoSiCoSt-EnV is developed in India in line with the 'Make in India - Atmanirbar Bharat' policy of the Union Government.



The diagram illustrates the architecture of the CoSiCoSt-EnV system. It is divided into two main sections: **Architecture** and **Traffic Command Control Centre (TCCC)**.

Architecture: This section shows multiple **Traffic Junctions** (labeled 1, 2, ..., n) connected to a central **Traffic Signal Controller**. The controller receives **Average Detector Occupancy** data from the junctions and sends **New Timings and Preferences** back to them. A red car is shown at a junction, and a traffic light is shown next to the controller.

Traffic Command Control Centre (TCCC): This section is the central hub for the system. It receives **Preferences Observations** from the **TraMM-EnV** (Traffic Management and Monitoring - Enhanced Version) system. The TCCC processes this data through several modules: **Performance Index (PI) Offset**, **Weights and Bias**, **Phase Length Prediction**, **Route selection & Offset correction**, and **Cycle Length Optimization**. These modules generate a **Translation Plan**, which is used to determine the **Current CoSiCoSt-EnV Timings**. The TCCC also provides **Stage timing, Saturation, Speed info** to the Traffic Signal Controller.

SALIENT FEATURES

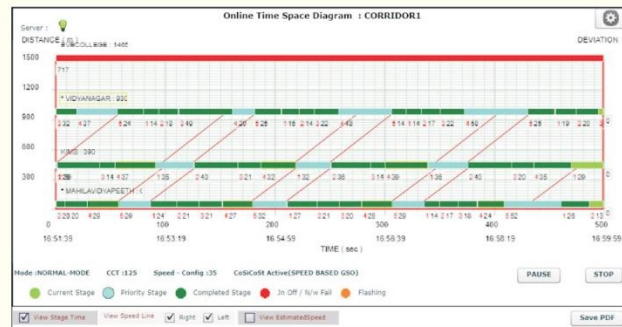
- ⊙ Highly Scalable
 - ✧ Isolated VA to Full-fledged Adaptive Signal Control
- ⊙ Easy Installation
 - ✧ User-friendly Configuration interface
 - *Remote Programming of Junction Controllers
 - *On-the-fly automatic configuration update
 - *Configuration Mismatch Alerts
 - *Configurable Reports, Views and Charts
 - *Graphical representation of traffic network, junctions and signals
 - ✧ Self-calibrating in runtime
 - *Dynamic identification of Critical Junction
 - *Dynamic identification of Priority Phase
 - *Estimation of Critical Cycle lengths
 - *Estimation and distribution of optimum Phase lengths
 - *Dynamic selection of Priority Route
 - ✧ Quick and Smooth Offset correction
 - *Signal coordination achieved without pre-programmed coordinated signal plans
 - *Dynamic Selection of Transition Modes
 - ✧ Flexible Algorithm Execution
 - *Signal time optimization on selected traffic network
- ⊙ Minimum Transition Cost
 - ✧ Phase length updates maintaining signal coordination
 - ✧ Phase length adjustments within signal cycle
- ⊙ Better Progression without progression band bias
 - ✧ Signal phases other than Priority Phase pre-empted based on real-time demand
 - ✧ Time saved on other phases automatically added to the priority phase for early opening
- ⊙ Adaptive Signal Control
 - ✧ Cycle length updates during continuous demand drop / cycle saturation
 - ✧ Phase lengths predicted and distributed in every signal cycle
 - ✧ Signal coordination verified in every signal cycle
 - ✧ Offset deviations corrected within five signal cycles
- ⊙ Special Features
 - ✧ Logical Quit (LQ) of traffic junctions under abnormal conditions
 - ✧ Automatic reversion of LQ junctions
 - ✧ Filters for handling non-lane based driving and mixed traffic flow
 - ✧ Features for executing complex phasing schemes at non-standard traffic junctions
 - ✧ Methods to handle ATCS operation interruption
 - *Power interruption
 - *Communication interruption
 - *Manual Mode control
 - *Emergency Service Vehicle Priority Signal
 - ✧ Green-wave invocation on selected routes from TMC
 - ✧ Enhanced user management
 - ✧ Advanced fault reporting and event logging

SUPPORT

- ⊙ Multi-vendor representation for supply, installation, operation and maintenance
- ⊙ In-house R&D support from C-DAC for training and customization

OPERATING PLATFORM

- ⊙ Windows Server 2016 or above



Intelligent Transportation and Networking Section
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