Call for Expression of Interest (EOI)

For Calling of

GLOBAL TENDER No: 2016/DEV.CELL/IGRI/4
May 2016

For


to

SCHEDULE OF TECHNICAL REQUIREMENTS
Number: TRINETRA/DEV/N/2, May 2016

EOI RESPONSE DOCUMENTS WILL BE RECEIVED UPTO 14.30 HRS. ON 01 July 2016
EOI RESPONSE DOCUMENTS WILL BE OPENED AT 15.00 HRS. ON 01 July 2016

NAME OF THE FIRM (Respondent(s)) and Address:

M/s. __________________________________________,

_____________________________________________,

_____________________________________________,

_____________________________________________,

_____________________________________________,
Important Notice to Respondents:

This current document is an Expression of Interest (EoI) published by the Government of India, Ministry of Railways to solicit and examine the response of the firms/companies/entities that are supplying or capable of supplying the Goods and Services as per the details mentioned in this document before Indian Railways finalize the specification of the equipment and services and associated conditions before entering into a contract.

The current document is therefore to explore the response from the prospective bidders.

The timelines and the quantity of units mentioned in this document are subject to change and shall be firmed up while the Technical and Commercial Bids are called for by the Indian Railways at a later date.

Final specifications and conditions of contract shall be made after going through the response and comments of the respondents, in response to this document. Invitation for Bids shall be called for after the specifications are finalized by Ministry of Railways, Government of India (Railway Board).

Some of the operational conditions of contract are briefly mentioned in this document. These are subject to change based on the examination of response received and in line with the Indian Railways Standard condition of Contract.

However, it may please be noted that the decision of Ministry of Railways, Government of India (Railway Board) shall be final while addressing the issues raised by respondents in response to this document.

Ministry of Railways, Government of India (Railway Board), may change any or all of the terms and conditions and/or technical, commercial or operating requirements in their final document from the ones, which are specified in the current Expression of Interest. The revised set of conditions and specifications that shall then be part of final Invitation for Bids document which will be published at the time of calling for Bids.

Ministry of Railways, Government of India (Railway Board) reserves the right to summarily reject any or all of the offers received in response to this Expression of Interest without assigning any reason therefor.
Indian Railways solicits response from interested companies/entities who are technically capable and are reputed in the field of machine-assisted vision systems for detecting, mapping and displaying objects and terrain under low visibility weather condition to submit their Expression of Interest (EoI) for Design, Development, and Implementation of “‘TRI-NETRA’ - Terrain imaging for diesel dRivers - INfra-red, Enhanced opTical & Radar Assisted” on Indian Railways.

1.

1.1 To facilitate the respondents in understanding of the Indian Railways operations and rolling stock, the respondents should contact Executive Director Mechanical Engineering (Development), Room No. 333, Railway Board, Raisina Road, New Delhi -110001, email: edmed@rb.railnet.gov.in who will issue them authority to contact Chief Mechanical Engineer, Northern Railway for necessary interaction with the users to understand the operation condition and maintenance methods and conditions in the field. While making this request to Executive Director Mechanical Engineering (Development), respondents must clearly and succinctly write down in their
request letter - their doubts, queries and issues, which they wish to resolve in their field visit.

1.2 This document has been published to show the Intent of Ministry of Railways Government of India (Indian Railways) to explore various technologies available in the field of ‘‘TRI-NETRA’ - Terrain imaging for diesel dRivers - INfra-red, Enhanced optical & Radar Assisted. Technical and Commercial Bids to purchase such system shall be called after the available technologies are explored and most appropriate technology is chosen by Indian Railways, based on the response submitted by the respondents in response to this document. Final specifications for ‘TRI-NETRA’ - Terrain imaging for diesel dRivers - INfra-red, Enhanced optical & Radar Assisted shall be frozen after examining the response received in response to this EoI document.

2. The respondents are required to give an undertaking expressing their willingness to enter into a comprehensive Annual Maintenance and Operation Contract (AMOC) with Indian Railways during warranty, which would be free of cost, and post warranty period for operation and maintenance of ‘‘TRI-NETRA’ - Terrain imaging for diesel dRivers - INfra-red, Enhanced optical & Radar Assisted”. AMOC will be inclusive of spares and consumables required for maintenance and operation of the same. The AMOC of the system shall be covered until the end of life of the product i.e. upto 10 years from the date of installation of the same. This would also include attention during periodical overhaul (POH) of the DMUs and locomotives in the designated workshops. However, Indian Railways reserve the right to enter into AMOC with the supplier of the ‘Terrain imaging for diesel dRivers - INfra-red, Enhanced optical & Radar Assisted’ or with any other contractor beyond the period of warranty.

3. OPERATION OF ‘‘TRI-NETRA’- Terrain imaging for diesel dRivers - INfra-red, Enhanced optical & Radar Assisted”:

(a) The supplier shall take full responsibility of not only maintenance for a period of 10 years but also day to day operation of ‘‘TRI-NETRA’ - Terrain imaging for diesel dRivers - INfra-red, Enhanced optical & Radar Assisted” supplied by him and its functioning at the end-user premises. It will be charged under the AMOC referred to in Para 2 above.

(b) To facilitate the supplier for maintaining and operating the ‘‘TRI-NETRA’ - Terrain imaging for diesel dRivers - INfra-red, Enhanced optical & Radar Assisted” systems during AMOC, if awarded to him, the railways shall provide
a suitable place in the maintenance depot/workshop/shed for maintenance of the system.

4. **DELIVERY OF EQUIPMENT AND SYSTEMS:**

For the purpose of this work, it is proposed to place the purchase order for the entire 50 systems in the beginning of the contract itself but only the first system shall be supplied by the supplier to begin with. After the trial of first system is successful for performance by Indian Railways, clearance shall be given to the firm for supplying the balance 49 system at the rate of minimum 10 (ten) systems every month till supplies are completed.

4.1 Within 1 (one) month of placement of the order, drawings and specifications indicating functional and technical details of the system shall be submitted by the firm to Railway Board for approval. The fitment drawings shall clearly indicate not only the dimensions and details critical to fitment of “TRI-NETRA’ - Terrain imaging for diesel drivers - Infra-red, Enhanced Optical & Radar Assisted” in individual type of DMU/locomotives but also those details that are critical to proper functioning of the system. Specifications & design of critical components shall also be approved by RDSO before they are fitted. Sensors and systems shall be as per existing standards for compliance for fitment on Railways coaches and locomotives. Notwithstanding any such approval, the respondents shall stand fully responsible in respect of design, manufacture and serviceability of the complete system.

4.2 Within 1 (one) month of the approval of the drawings and layouts, the supplier shall offer the first “TRI-NETRA’ - Terrain imaging for diesel drivers - Infra-red, Enhanced Optical & Radar Assisted” system for prototype inspection to Indian Railways in India. The arrangements for necessary facilities like test stand etc. shall have to be done by the supplier at his laboratory/plant in India at his cost.

4.3 Field proving trials of the supplied prototype system will be done extensively for a period of three months. The approval of the prototype system shall be given only after the completion of these field trials.

4.4 Within 1 (one) month of prototype approval by Indian Railways, the delivery of the remaining systems shall commence. Respondents are encouraged to inspect and get familiar with the Indian Railways DMUs and locomotives before submitting their proposals.

5. **SPECIAL NOTES:**

5.1 **It is proposed to place order on at least two (2) Firms.** This is required to prevent monopoly and to ensure competitive rates in roll out.
5.2 For the future, when specifications are finalized based on response to this document, the Bids shall be invited on “Two Packet System” Consisting of “Technical Offer” and “Commercial Offer”. The two offers shall be enclosed and sealed in individual envelopes superscribed “Technical Bid for ‘TRI-NETRA’-Terrain imaging for diesel dRivers - INfra-red, Enhanced opTical & Radar Assisted” and “Commercial Bid for ‘TRI-NETRA’-Terrain imaging for diesel dRivers - INfra-red, Enhanced opTical & Radar Assisted” respectively. These two envelopes then should be placed in the third envelope and should be sealed and superscribed “Technical and Commercial Bid offer for ‘TRI-NETRA’-Terrain imaging for diesel dRivers - INfra-red, Enhanced opTical & Radar Assisted”

5.2 The respondents are hereby advised to study the existing coach, wagon and locomotive design thoroughly and also the Indian Railways track structure including its layout in their own interest before submitting their proposal.

5.3 The indigenization plan for making in India the “‘TRI-NETRA’-Terrain imaging for diesel dRivers - INfra-red, Enhanced opTical & Radar Assisted” system offered against this EoI should be planned. The same shall require to be submitted along with the technical bid. Indian Railways would insist on indigenizing at least 30% of the cost of each unit by the end of three years from the date of first supply of the first set of equipment. Out of the remaining equipment, 60% indigenization of cost shall be completed by the end of five years from the date of supply of last piece. Suppliers/respondents who can indigenize the production of entire 100% of the equipment in India may kindly indicate so giving their plan of action – including the timelines. The firm who is awarded the contract must seek the “Technical Capability approval” of their Indian partner from Ministry of Railways before entering into financial commitments with the Indian partner.

5.4 All electrical/Electronic/optical equipment used in the system shall be tropicalized for use under environmental conditions prevailing in Indian Railways.

The respondents should submit their comments and compliance to the specifications in all respects and not in abstract or cryptic manner. If there are any deviations to the specifications, a deviation statement indicating the clause/sub-clause, deviation proposed and justification thereof should be enclosed.

5.5 Indian Railways reserve the right to cancel the Expression of Interest or the tender at any stage without assigning any reason.
6. **INSPECTION:**

Inspection will be carried out by Ministry of Railways or its nominated representative but the ultimate responsibility of the compliance with various statutory and demanded clauses shall lie with the supplier.

QAP as per standard format must be submitted by the respondent for the equipment that they intend to offer for sale to Indian Railways giving all relevant details of inspection procedures, reference standards, sampling plan, testing regime, etc.

7. **WARRANTY:**

The respondent will provide warranty at site for 36 months from the date of supply or 30 months from date of commissioning, whichever is earlier. During warranty, the respondents shall rectify the defects, if any, in the “TRI-NETRA’ - “Terrain imaging for diesel drivers - INfra-red, Enhanced optiCAL & Radar Assisted” system by replacing components as necessary at his cost.

If the warranty support is not provided within 72 hours of giving notice demanding the same, Indian Railways shall levy appropriate penalties for non-functioning of the system. For this purpose, even if a sub-assembly within a complete unit (one coach/wagon/locomotive) is not working, the system shall be deemed to be non-functional. Rate of penalty shall be calculated and notified at the time of calling for Request for Proposals. The rate of penalty shall be telescopic in nature so as to discourage non-compliance for long duration.

Respondent shall also undertake to ensure availability of all requisite spare parts for a minimum period of 12 years after installation of the 50 systems.

The respondent shall give an undertaking that should there be any need for modification in their system arising out of field trials or during the currency of the contract – as per the deliverable functional capability promised by the respondent, it will be carried out by the respondent without any cost to the Indian Railways.

8. **PERFORMANCE GUARANTEE BONDS AFTER REQUEST FOR PROPOSALS ARE CALLED FOR:**

(a) Contractor will have to give a Performance Guarantee Bond equivalent to 10% of the cost of the contract.

(b) Contractor will also have to give a Performance Guarantee Bond equivalent to 10% of the cost of AMOC at the time of entering into to AMOC.
9. SUBMISSION OF OFFERS WHEN BIDS ARE CALLED:

The technical bid should be placed and sealed in one envelope and the envelope should be superscribed “Technical Bid for ‘TRI-NETRA’ - Terrain imaging for diesel dRivers - INFra-red, Enhanced opTical & Radar Assisted” & commercial bid should be placed & sealed in the another separate envelope superscribed “Commercial Bid for ‘TRI-NETRA’ - Terrain imaging for diesel dRivers - INFra-red, Enhanced opTical & Radar Assisted”. Both the sealed envelopes then placed in another separate envelope and sealed & superscribed Technical & Commercial Bid for “‘TRI-NETRA’ - Terrain imaging for diesel dRivers - INFra-red, Enhanced opTical & Radar Assisted”.

When the Bids are called for, the Bid offers shall require to be submitted in triplicate, as two-packet system offers. The offers should be addressed to and submitted to:

Executive Director Mechanical Engineering (Development),
Room No. 333,
Rail Bhavan,
Raisina Road
Ministry of Railways,
New Delhi - 110001.
India

The name and address of the Respondents should clearly appear on all the envelopes. Further details of mode of submitting technical and commercial offer shall be notified while calling for bids.

10. VALIDITY OF RESPONSE TO THE EXPRESSION OF INTEREST:

10.1 The respondents must keep their response valid for consideration for a minimum period of 180 days from the last date of submission as mentioned in the cover page of this EoI.

10.2 The authorized representative of the firm submitting the document must sign each page of the respondent’s document. In absence of the signature, Indian Railways may assume that the firm has not authorized the response on such a page and such a response page/document is liable to be disregarded or not taken cognizance of.

11. LAST DATE OF RECEIPT & OPENING OF EXPRESSION OF INTEREST (EoI):

The response to EoI should reach the Executive Director Mechanical Engineering (Development), Ministry of Railways, Railway Board, Room No.333, Rail Bhavan, Raisina Road, New Delhi – 110001 not later than 14.30 hrs on 1st July 2016. The
response to EoI will be opened on the same date at 15:00 hrs. respondent’s representatives who may like to be present in the tender opening. If in case the date of offer opening falls on a gazetted holiday or is subsequently declared as such, the offers will be opened on the next working date at the appointed time as per above procedure.

12. THE REPONDENTS WILL BE SUBJECT TO FOLLOWING:

(a) - Other General Conditions of Contracts (GCC of Indian Railways) and stipulations contained in the bid documents, which are prescribed by Indian Railways when the Bids for purchase of the equipment are called for.

(b) - All taxes & duties as applicable on date of opening of tender shall be fully borne by the supplier.

(c) - Firms may indicate the rate at which they are capable of supplying the equipment to Indian Railways. If the progress of manufacture and supply or performance of the material and/or stores during inspection and tests is not considered satisfactory, the Purchaser may at his option and without any claim for compensation by the contractor, either cancel the order altogether or modify the quantity ordered.

13. The user interface for using the “‘TRI-NETRA’ - Terrain imaging for diesel dRivers - In fra-red, Enhanced optical & Radar Assisted” should be developed by the supplier to the satisfaction of Indian Railways. The supplier shall do necessary customization in the front-end interface as per the requirements of Indian Railways at the cost of supplier. This exercise shall be done to mutually acceptable demands from users.

Yours sincerely,

(Nitin Chowdhary)
Exe. Director Mech. Engg. (Dev.)
Railway Board.
for & on behalf of the President of India.

Enc: i) Copy of the Schedule of Technical Requirements
   No. ‘TRI-NETRA’ - /DEV/N/2, May 2016 for
   Development Cell Tender No. 2016/DEV.CELL/IGRI/4
   May 2016.
DRAFT FUNCTIONAL SPECIFICATIONS FOR


1. OBJECTIVE:

Indian Railway Locomotive drivers, while driving the trains, rely purely on visual clues and visual images besides the aspect of Signal to look out for obstruction on track ahead to prevent collision or mishap.

It is proposed to Purchase and install “TRI-NETRA’ - Terrain imaging for diesel dRivers - INFra-red, Enhanced opTical & Radar Assisted for locomotives and DMUs by following “Two-Packet system” of purchase. The Technical Bid” shall be opened first and evaluated and the “Financial bid” of only those bidders shall be reckoned and opened who qualify Indian Railways’ requirement as per the “Technical Bid”.

1.1 Such obstructions on track ahead are generally, but not limited to the following types:

i. Trees or similar obstructions of thickness or diameter greater than one inch, or similar obstruction(s) fallen on or across the track which might cause derailment.

ii. Disabled road vehicles which have stopped on the tracks.

iii. Boulders larger than approximately one foot diameter lying on or infringing the track.

1.2 Such obstructions may be lying/moving on/across the track structure or may be infringing the schedule of moving dimensions of Indian Railways track.

1.3 With respect to above para 1.1 and para 1.2, the decision of Indian Railways shall be final and binding.

The system may require to be fine tuned during the proving put trials. Reasonable opportunity shall be given to the vendor to do such “fine-tuning”. However, Indian Railways' decision on what would be construed as “reasonable opportunity” shall be binding on the vendor(s).

1.4 The objective of the present EOI is to enable the Locomotive Driver to visualize and warn about such infringing objects from a reasonable far away distance so as to enable him/her/her to apply brakes sufficiently in advance to stop the train well short of the infringement.

2. CHOICE OF TECHNOLOGY:

2.1 IR gives the bidders the right to choose such a technology as per their own judgement to achieve the objective required to be met is the objective stated in Item 1.
2.2 The technology adopted could be LASER based, RADAR based, Optics based, IR based or any technology that meets the end result of pre-warning the locomotive driver well in advance so as to give him/her an audio-visual warning on an ergonomically placed console in front of him/her (two consoles in each locomotive –one in each cab on either ends of the locomotive) and to enable him/her to apply brakes so as to stop the train well short of the infringement/obstruction.

2.3 **One system** of equipment is defined as all the necessary cameras/antennas/sensors for visualizing the track ahead in the direction of motion which shall be mounted on either ends of the locomotive and one set of processing computer/hardware/storage which shall be common to all the sensors/antennas/cameras. A Display console for driver shall have to be provided individually in each cabin on either side of the locomotive. System must be interlocked with the movement of the locomotive such that only that side of the equipment shall be operative which is fitted in the Cabin which is facing the direction of motion of the locomotive.

3. **BOUNDARY CONDITIONS & CONSTRAINTS WITHIN WHICH SOLUTION HAS TO BE FOUND:**

3.1 As a guidance tool for designers of such vision systems, Emergency Braking Distance (EBD) of normal passenger carrying Mail/Express trains and freight trains running on Indian Railways level track is as under: -

- Passenger train of 24 Coaches (ICF Type) at 110 kmph = 750 meters.
- Passenger train of 24 Coaches (ICF Type) at 130 kmph = 1000 meters.
- Passenger train of 24 Coaches (LHB Type) at 160 kmph = 1450 meters.
- Freight train of 58 Wagons (Air braked) at 75 kmph = 1000 meters.

3.2 Device/system must work in day as well as at night.

3.3 Device must work in all types of weathers encountered in India, including dense fog conditions, with uniformly consistent results.

3.4 Device must work on all types of terrains encountered by Indian Railways in the country.

3.5 The device must be safe in all respects to humans – both to locomotive personnel and to trespassers on railway track who are being scanned and imaged.

3.6 The device/system must be able to detect and identify obstructions as mentioned in Para 1.1 on a straight track from a distance of minimum One kilometre.

3.7 The device must not distract the driver of locomotive with too many alarms/blinking lights/flasher etc. during the course of his normal working and especially when no abnormal conditions are existing on the
track ahead.

3.8 The device must record all the events in clear video format for post-event analysis. The storage capacity must be sufficient to store at least 15 days of video.

3.9 The video so stored as above must be in a format that can be copied to a portable Hard Disk (USB) or a USB flash drive using software that shall be a part of the system installed on locomotive and it should be possible to simply copy it without need for any other devices. Quality of video so transferred should be as clear as the original video.

3.10 The display before the driver of the locomotive should be colour display. Visuals on the screen should be uncluttered with only relevant information being displayed in different colours. The colour of image which is likely to pose danger to the train should preferably be in red colour to differentiate it from other images which do not pose any threat to the train.

3.11 The power supply available on the locomotive is 72 V DC (nominal) and equipment should conform to AAR 5702 Specifications.

The system shall be powered from the locomotive battery power supply of 74 volts DC (for HHP locos) or 72 volts DC (for ALCO locos) which is as per IEC-60571 standard. The offered design shall accommodate the voltage variation permitted by the IEC standard.

Electronic equipment supplied by accumulator batteries without a voltage stabilizing device shall operate satisfactorily for all the values of the supply voltage within the range defined below (measured at the input terminals of the equipment).

The supplier of the electronic equipment shall specify its power consumption in order to enable calculations for verify the battery cabling.

Nominal voltage: $V_n$
Minimum voltage: $0.7V_n$
Rated voltage: $1.15V_n$
Maximum voltage: $1.25V_n$

Voltage fluctuations (e.g. during start-up of auxiliary equipment or voltage oscillations of battery chargers) lying between $0.6V_n$ and $1.4V_n$ and not exceeding 0.1 second shall not cause deviation in the functioning of the equipment.

Voltage fluctuations lying between $1.25V_n$ and $1.4V_n$ and not exceeding 1 second shall not cause damage – however, the equipment may not be fully functioning during these fluctuations.
3.12 The imaging system should create the image of Signal Lamp “Post” including displaying the shape of lamps/arms.

3.13 The imaging system should give the distance of the locomotive from the obstructions within accuracy of ± 5m.

3.14 If the imaging system device fails, then it should give a positive indication to the driver/loco pilot that the system has become inoperative/ unreliable/ defective. This should be an act of positive alarm to the driver. Such alarm/warning should be acknowledged by the driver through a positive act of acknowledgement.

3.15 Since this is a case of development of new technology on Indian Railways which has direct impact on safety of Indian Railways, it is proposed to award the contract to more than two bidders. The rate of the contract shall be negotiated at the time of placement of contract order. The first system (hereafter called the prototype system) shall be put through acceptance tests. If the prototype system passes all the functional tests, then the bidder shall be permitted to supply, install and commission the remaining 49 systems. Only fifty systems from each successful bidder shall be purchased for limited trial at the beginning of the project. This purchase does not confer any rights on the successful bidder to claim any right to demand further systems even if their system has passed in the current tender.

3.16 The technology used in the product being provided in the current tender must be supported by the vendor in terms of hardware and software for at least 10 (ten) years from the date of successful deployment. Any software and hardware upgrades to the system, which may be required to keep the system up and running, must be provided by the firm free of charge during these 10 (ten) years.

3.17 The above-mentioned first stage is only the proof of concept stage. IR is at liberty to modify their specifications to a different standard or functional requirement based on the outcome of the above “proof of concept”.

3.18 Subsequent purchase of such systems may follow a different system than that specified in Para 3.15, while proliferating the system, after prototype approval is successful.
3.19 The envelope of Schedule of Maximum Moving Dimensions is attached in Annexure – I.

3.20 Each bidder must specify a static Bench Test to evaluate their system before the same is fitted on Locomotive.

(Nitin Chowdhary)
Exe. Director Mech. Engg. (Dev.)
Railway Board.
for & on behalf of the President of India.

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Annexure- I

MAXIMUM MOVING DIMENSIONS OF THE PROFILE
PROPOSED FOR REVISED SCHEDULE OF DIMENSIONS.

NOTE:- ALL DIMENSIONS ARE IN MILLIMETRES
EXCEPT WHERE OTHERWISE SHOWN.

(Ditin Chowdhary)
Exe. Director Mech. Engg. (Dev.)
Railway Board.
for & on behalf of the President of India.