GOVERNMENT OF INDIA: MINISTRY OF RAILWAYS
RESEARCH DESIGNS & STANDARDS ORGANISATION
MINISTRY OF RAILWAYS
MANAK NAGAR, LUCKNOW – 226 011.

EXPRESSION OF INTEREST (EOI) NO. CARR-SS-12/2024
FOR
DEVELOPMENT OF SPECIFICATION FOR IOT BASED REAL TIME WATER LEVEL INDICATOR FOR WATER TANKS OF LHB TYPE COACHES

Ministry of Railways, Research Designs and Standards Organisation (RDSO), Lucknow, India is interested in developing firms/specification for "**Design, supply, installation of IOT based real time water level indicator for water tanks of LHB type coaches of Indian Railway"** along with functional requirement as Annexure-C uploaded on RDSO website. Firms interested in developing of said items are requested to see the details on RDSO website *www.rdso.indianrailways.gov.in* at **HOME PAGE** under **Expression of Interest (EOI)** appearing in RED colour.#

Contact Address:

Joint Director (SS),
Carriage Directorate, Annexe-I,
Research Designs & Standards Organization (RDSO),
Ministry of Railways, Manak Nagar, Lucknow – 226011,
Uttar Pradesh, India
Mob. No. 09794863109

Email address: edcar.rdso@gmail.com, dirssrdso@gmail.com

Enclosure:

1. Proforma for response of EOI and Annexure-A
2. Model criteria of short listing Annexure –B
3. Annexure–C : Functional Requirements for framing of specification for **IOT based real time water level indicator for water tanks of LHB type coaches of Indian Railway.**

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FORMAT FOR LETTER OF RESPONSE
(MODIFY FOR USE WITH SPECIFIC EOI)

Respondents Ref No.:
Date:

Designation of officer to whom the respondent replies
Room No: ,
Building:
Research Designs & Standards Organization
Ministry of Railways
Manak Nagar
Lucknow,
INDIA 226011

Dear Sir,

Subject: RESPONSE TO – EOI FOR PARTICIPATION _____

1. We, the undersigned, offer the following information in response to the Expression of Interest sought by you vide your Notification No._____, dated _____.
2. We are duly authorized to represent and act on behalf of _____ (hereinafter the "respondent")
3. We have examined and have no reservations to the EOI Document including Addenda No(s) _____.
4. We are attaching with this letter, the copies of original documents defining: -
   a) the Respondent's legal status;
   b) its principal place of business;
   c) its place of incorporation (if respondents are corporations); or its place of registration (if respondents are cooperative institutions, partnerships or individually owned firms);
   d) Self certified financial statements of Last three years, clearly indicating the financial turn over and net worth.
   e) Copies of any market research, business studies, feasibility reports and the like sponsored by the respondent, relevant to the project under consideration
5. We shall assist MoR and/or its authorized representatives to obtain further clarification from us, if needed.
   a) RDSO and/or its authorized representatives may contact the following nodal persons for further information on any aspects of the Response:

S. No.	Contact Name	Address	Telephone	E Mail
1				
2				

6. This application is made in the full understanding that:
   a) Information furnished in response to EOI shall be used confidentially by RDSO for the purpose of development of the project.
   b) RDSO reserves the right to reject or accept any or all applications, cancel the EOI and subsequent bidding process without any obligation to inform the respondent about the grounds of same
   c) We confirm that we are interested in participating in development of the project

7. We certify that our turnover and net worth in the last three years is as under:

Financial Year	Turn over	Net worth

8. In response to the EOI we hereby submit the following additional details annexed to this application.

8.1. Details of various items being manufactured/consultancy undertaken.

8.2. Details of customer(s) and supplies made in the field of item under EoI.

8.3. Experience and expertise for the items proposed in EOI.

8.4. Details of man-power with their qualification and experience.

8.5. Detailed proposal for items proposed in EOI including alternative proposal, if any.

8.6. Details of Intellectual Property Rights (IPR) held, patent filed/held and MoU/agreement signed.

8.7. Details of ISO certification

8.8 undertaking as per Annexure-A:

9. The undersigned declare that the statements made and the information provided in the duly completed application are complete, true, and correct in every detail. We also understand that in the event of any information furnished by us being found later on to be incorrect or any material information having been suppressed, RDSO may delete our name from the list of qualified Respondents. We further understand that RDSO will give first preference to the applicants considered relevant for the purpose10. Our response is valid till (date in figures and words):_____

Yours sincerely,

(Sign)
NAME
In the Capacity of
Duly authorized to sign the response for and on behalf of
Date

Annexure-A

(To be taken on non-judicial stamp paper of appropriate value as applicable in the respective state and dully notarised & witnessed)

UNDERTAKING

I, son of …… aged about …..... Years resident of …….. do hereby solemnly affirm as under –

1. That the deponent is the Authorised signatory of *(Name of the Sole Proprietorship Concern/ Partnership Firm/ Registered Company/ Joint Venture).*

2. That the deponent declares on behalf of *(Name of the Sole Proprietorship Concern/ Partnership Firm/ Registered Company/Joint Venture)* that:

   a) In regard to matters relating to the security and integrity of the country, no charge sheet has been filed by an agency of the Government / conviction by a Court of Law for an offence committed by the ----------(name of the entity)or by any sister concern of the ----------(name of the entity) would result in disqualification.

   b) In regard to matters other than the security and integrity of the country, ----------(name of the entity) has not been convicted by a Court of Law or indicted / passed any adverse order by a regulatory authority against it or it's any sister concern which relates to a grave offence, or would constitute disqualification. Grave offence is defined to be of such a nature that it outrages the moral sense of the community.

DEPONENT

VERIFICATION

I declare that the contents of para 1 to 2 above are true as per my knowledge and nothing has been hidden.

DEPONENT

Annexure –B

THE MODEL CRITERIA FOR SHORT LISTING OF FIRMS

EOI can be for the purpose of short-listing some of the firms for further development / finalisation of the specification or it can be only to explore the technology. If EOI is for short listing, the selection criteria should be defined in the EOI.

The model criteria for short listing of firms are indicated as below:

S.No.	**Item**	**Marks**	**Remarks**
1	Turnover of the firm during last 3 years	**20**	Firm having maximum be given full marks and other as percentile.
2	Details of supplies made in the field of item under EoI	**30**	This is the turnover of supplies made in the field of item under EoI. The firm having maximum be given full marks & other as percentile.
3	Experience & expertise for item proposed under EoI	**20**	It is based on years of experience in such products 7 firm having maximum be given full marks & other as percentile.
4	Manpower & their qualification	**10**	No. of persons with profession qualification on firms direct role and percentile
5	Details of patent held & MoU/agreement with OEM	**20**	Number of such items & percentile there of.

Annexure -C

FUNCTIONAL AND INTERFACE REQUIREMENTS FOR PROVISION OF IOT BASED REAL TIME WATER LEVEL INDICATOR FOR INDIAN RAILWAY PASSENGER COACHES.

1. PREAMBLE :

Provision of **IOT BASED REAL TIME WATER LEVEL INDICATOR FOR WATER TANKS IN LHB COACHES** for generating alerts / report of low water to the monitoring officials and refilling of water tanks at the nearest watering stations to resolve frequent no water complaints on online portal, which is one of the highlighted priority of Ministry of Railways. To achieve above objective, this document covers the functional and operational requirement for air purification / disinfection system in Indian Railway passenger coaches.

List of normative standards for reference

Sl. No.	Standard	Description
1	EN50155	Railway applications — Rolling stock — Electronic equipment.
2	IEC 60571	Railway applications – Electronic equipment used on rolling stock.
3	ELRS/SPEC/ELC/0019	Technical specification for electron beam irradiated/chemically cured cross linked thin walled flexible elastomeric cables with copper conductors.

2. COACH OPERATING CONDITIONS

Air purifier / disinfection system should function with full efficiency under following coach operating conditions.

2.1. Car-body dynamics:

Equipment shall withstand satisfactorily the vibrations and shocks normally encountered in service as indicated below:

i) Maximum vertical acceleration 1.0g
ii) Maximum longitudinal acceleration 3.0g
iii) Maximum transverse acceleration 2.0g

The vibrations are of sine wave form and the frequency vibration is between 1 Hz to 50 Hz. The amplitude ‘a’ expressed in millimeters is given as a function of f, by equations

$a = 25/f$ for values of f from 1 Hz to 10 Hz.
$a = 250/f^2$ for values of f exceeding 10Hz and up to 50 Hz.

In the direction corresponding to the longitudinal movement of the vehicle, the equipment is subjected for 2 min. to 50 Hz. Vibrations of such a value that the maximum acceleration is equal to 3g.

Annexure -C

FUNCTIONAL AND INTERFACE REQUIREMENTS FOR PROVISION OF IOT BASED REAL TIME WATER LEVEL INDICATOR FOR INDIAN RAILWAY PASSENGER COACHES.

2.2. **Coach-body displacement encountered under dynamic conditions.**

i)	Vertically-	±100 mm
ii)	laterally -	±55 mm
iii)	longitudinally-	±10 mm
iv)	bogie rotation about center pivot-	$\pm 4^0$
v)	Maximum Speed of train -	160 KMPH

2.3. Ambient Condition:

(i)	Altitude	:	Sea level to 2500m
(ii)	Operating temperature	:	1^0C to 55^0C
(iii)	Max. Temperature under Sun	:	70° C
(iv)	Relative humidity	:	40% to 95%

(v) The rainfall is fairly heavy.

(vi) During dry weather, the atmosphere is likely to be dusty.

(vii) Temperature variations can be quite high in the same journey or short period of time.

(viii) Coaches operate in coastal areas with continued exposure to salt laden air.

(ix) Coaches may be subjected to frequent external washing with detergents and cleaning of toilets by cleaning agents.

(x) LHB type coach length over coupler is approximately 24 meters.

3. POWER SUPPLY AVAILABLE IN THE COACH:

110V AC / DC power supply is available in coaches. If any power is required, the equipments be so designed to withstand 30% voltage fluctuations. AC-DC / DC-DC converter fitted should be of a reputed and established brand or made in-house and be able to withstand +/- 30% voltage fluctuations, 2 KVA surge, +/- 10% ripple and complying with IEC 60571 or any equivalent international standards. Industrial Grade Components are to be used in all electrical/electronic items.

4. FUNCTIONAL REQUIREMENTS

4.1. Water tank should be fitted with hydrostatic water level sensor and output signal shall be calibrated for water tank capacity in % available water out of capacity installed.

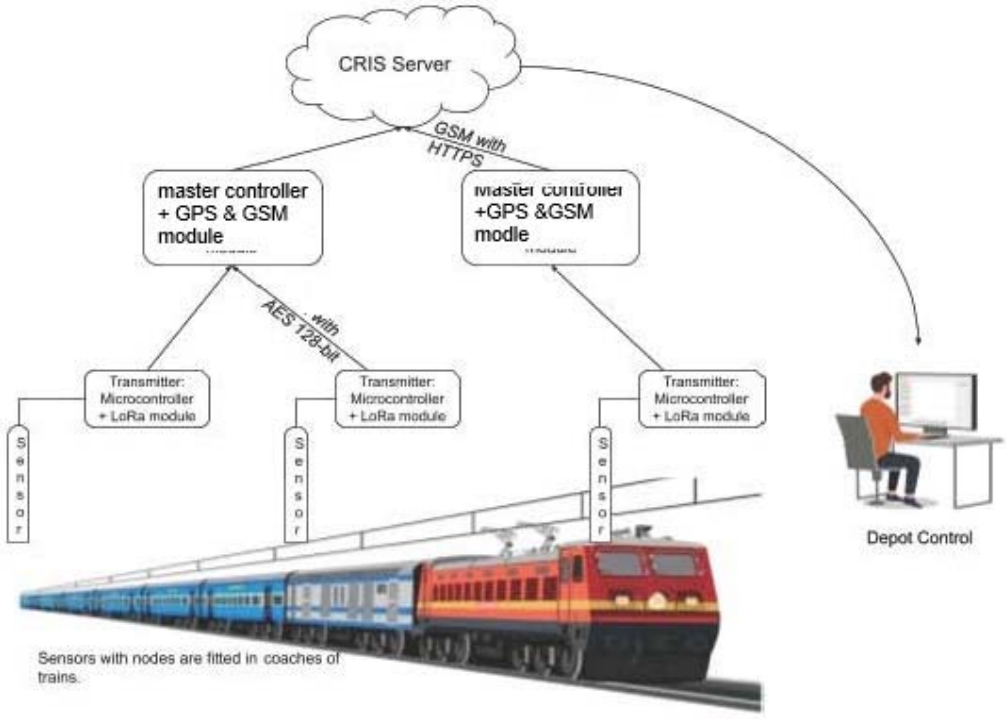
4.2. Transmitter of the signal processing should transmit digital and/or analog signal as output and output of every signal processor unit has to be connected to the master controller of the rake. In addition to the water level data, other information of each processing unit such as its location, battery health, and level sensor type etc shall also be transmitted to master controller.

4.3. Master controller unit shall consist gateway & receiver to form network with all signal processing unit. The receiver of master controller captures the data transmitted by all transmitters of water level signal processing unit and sends it to the cloud platform (preferably on CRIS sever).

FUNCTIONAL AND INTERFACE REQUIREMENTS FOR PROVISION OF IOT BASED REAL TIME WATER LEVEL INDICATOR FOR INDIAN RAILWAY PASSENGER COACHES.

4.4. The server displays the water level of the all coaches in a rakes / trains to the user depots as well as sends alert messages to the upcoming watering points in case it detects any coach running with low water level (predefined water level) / out of water (Empty water tank).

4.5. Power requirements for power supply of signal processing units and master controller shall be met with Li-Fe Po4 Batteries only, which should last for at least 6 months without recharge / exchange.



Block diagram of system architecture for real time water level indicator

4.6. WAN network between signal processor unit of each coach and master controller shall be designed with low power transceiver used for IOT devices and transceiver should be capable to form the mesh network with rake / trains master controller unit only. Communication protocol used for transceiver between master and slave unit shall be open protocol and shall be shared with other manufacturers for inter-operability purpose.

4.7. Communication protocol for transceiver between master controller and cloud server shall be as per Cloud service provider (preferably CRIS).

4.8. System design should be modular to ensure the interchangeability of devices & modules. Devices / modules interface should be interoperable for hardware / software level.

4.9. Power consumption of the complete system Per /Hour /Day shall be worked out and clearly defined.

4.10. Time required for installation of new controller and reconfiguration with master control should be clearly indicated.

4.11. Different make slave module configurability with master controller shall also be demonstrated.

5. DESIGN REQUIREMENT

5.1. Level sensor shall be fitted with lowest portion of water tank with suitable compatible pipe fitting or water column provided for this purpose.

5.2. Connection between level sensor and signal processing unit shall be made with shielded wire and shall be routed through protective conduits to prevent accidental damages in transit /service of the coaches.

5.3. Signal processing unit (slave / master controller), battery and other electronic circuit shall be housed in a IP65 Stainless enclosure unit and mounted on under frame with suitable brackets on under frame.

5.4. Master controller / slave controller unit (signal processor unit) should withstand the environmental conditions of clause no. 2 of this document and EN50155 specification for rolling stock application. Necessary test certifications shall be done by national accredited labs for this purpose.

5.5. Master controller should be capable to handle upto 32 slave nodes and Master / slave transceiver communication should be capable up to 600 Mtrs.

5.6. Master controller should have GPS module for real time location and dual SIM GSM module to support 2 different operator’s SIM for fall back connectivity of data.

5.7. All wing and cabling shall be fire retardant and as per RDSO specification ELRS/SPEC/ELC/0019 latest revision.