



**GOA TOURISM DEVELOPMENT CORPORATION LTD. (GTDC)**

**Expression of Interest (EOI)**

**EOI No. GTDC/PC/SE/2021-22/E-32**

**Dated: 05.01.2022**

**for**

**SUPPLY, OPERATIONS AND MAINTENANCE OF ELECTRIC  
BUSES ALONG WITH ALLIED INFRASTRUCTURE IN PANAJI  
AND SURROUNDING AREAS ON HYBRID NET COST  
CONTRACT BASIS**

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## **DISCLAIMER**

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1. The information contained in this Expression of Interest (EOI) or subsequently provided to the Applicant(s), whether verbally or in documentary or any other form by or on behalf of Goa Tourism Development Corporation Ltd (GTDC) or Kadamba Transport Corporation Limited ("KTCL") or Imagine Panaji Smart City Development Ltd ("IPSCDL") or any of its employees or advisors, is provided to the Applicant(s) on the terms and conditions set out in this EOI and such other terms and conditions subject to which such information is provided.
2. While information obtained from the public domain or external sources has not been verified for authenticity, accuracy or completeness, we have obtained information, as far as possible, from sources generally considered to be reliable, including the Revised City Development Plan for Panaji 2041, Comprehensive Mobility Plan for Goa 2020 and Charles Correa Foundation (CCF). We assume no responsibility for such information.
3. This EOI contains brief information about the Project and will assist the Authority to formulate the RFP for the process of selecting the Applicants during the RFP stage. This document is neither an agreement nor an offer by the purchaser/authority to the Applicants or any other person. The purpose of the document is to provide the Applicants with information to assist the formulation queries, feedback and suggestions towards the project.
4. The Authority, its employees and advisors make no representation or warranty and shall have no liability to any person, including any Applicant under any law, statute, rules or regulations or tort, principles of restitution or unjust enrichment or otherwise for any loss, damages, cost or expense which may arise from or be incurred or suffered on account of anything contained in this EOI or otherwise, including the accuracy, adequacy, correctness, sufficiency, completeness or reliability of this EOI and any assessment, assumption, statement or information contained therein or deemed to form part of this EOI.
5. The Authority also accepts no liability of any nature whether resulting from negligence or otherwise howsoever caused arising from reliance of any Applicant upon the statements contained in this EOI.
6. The Authority may in its absolute discretion, but without being under any obligation to do so, update, amend or supplement the information, assessment or assumptions contained in this EOI.
7. The Applicant shall bear all costs associated with or relating to the preparation and submission of its queries, feedback and suggestions including but not limited to preparation, copying, postage, delivery fees, expenses associated with any demonstrations or presentations which may be required by the Authority or any other costs incurred in connection with or relating to its Application. All such costs and expenses will remain with the Applicant and the Authority shall not be liable in any manner whatsoever for the same or for any other costs or other expenses incurred by an Applicant in preparation or submission of the Application.

## GLOSSARY

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Authority	:	Kadamba Transport Corporation Limited (“KTCL”), Goa.
GTDC	:	Goa Tourism Development Corporation Ltd., which is acting on behalf of Imagine Panaji Smart City Development Limited (“IPSCDL”) and Kadamba Transport Corporation Limited (“KTCL”) Goa, for conducting the bid process management for the said project.
Allied Infrastructure	:	Charging infrastructure for electric buses of 12 m, 9 m and 7 m, which includes Civil and Electric Transformer infrastructure.
Operator	:	The SPV, incorporated by the Successful Bidder, for entering into an Agreement with the Authority for undertaking the Project.
Commercial Operations Date	:	Date on which all the conditions precedents required for the execution of the Project are completed by the Operator.
E-buses	:	Electric Buses of 12 m and 9 m, and 7 m complying with Standards and Specifications as detailed in Annexure 1.
NIT	:	Notice inviting tender
Panaji and Surrounding Areas	:	Panaji City and surrounding villages of Taleigao, Bhatlem, Santa Cruz, Bambolim and Goa University Plateau along with neighbouring cities - Margao, Ponda, Vasco and Mapusa.
Project	:	Supply, Operations and Maintenance of Electric Buses along with Allied Infrastructure in Panaji and Surrounding Areas on Hybrid Net Cost Contract Basis
Project Proponent	:	Imagine Panaji Smart City Development Limited (“IPSCDL”), a wholly owned Government Company formed to bring about the development of smart urban infrastructural facilities / projects for Panaji City. IPSCDL will execute an MoU with the Authority which shall enable it to participate in decision making process with KTCL solely relating to change in routes and vehicle deployment.
RFP	:	Request for Proposal

## DESCRIPTION OF EOI PROCESS

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- 1) The stage of Expression of Interest (EOI) is undertaken as an industry consultation to determine credible Applicants having requisite capability for undertaking the Scope of Work, to provide their inputs on the key parameters, through Pre-NIT conference, to be adopted by the Authority which would help determining the terms and conditions of the RFP. Pre-qualification of Applicants will not be done at this stage.
- 2) Subsequent to this EOI and the finalization of the Project details, the Authority proposes to issue a Request for Proposal (RFP) for selection of interested “Bidders” for the Project.
- 3) The Authority does not, in any manner whatsoever, warrant or represent that it will subsequently proceed to release the RFP and/or initiate the RFP Stage of the Bidding Process. Accordingly, the information regarding the RFP made in this EOI are indicative in nature, purely informative, and non-binding.
- 4) The Authority in its absolute discretion may cancel, change, alter or replace the RFP Stage of the Bidding Process and/or the Project itself, without according any reason thereof or providing any prior notice to any person including the Applicants or Bidders, as the case may be.
- 5) For further details contact:  
Managing Director, GTDC  
Paryatan Bhavan, 3rd Floor,  
Patto Plaza, Panaji - 403001, India  
Ph: (0832)2437132 / 2437728  
e-mail: [md@goa-tourism.com](mailto:md@goa-tourism.com)
- 6) The Applicants are required to send their written queries, feedback or suggestions for Pre-NIT conference to: [pmu@goa-tourism.com](mailto:pmu@goa-tourism.com)

## **SCHEDULE OF EOI PROCESS**

The Authority shall endeavour to adhere to the following schedule:

<b>S.No.</b>	<b>Activity / Event</b>	<b>Date</b>
1	Advertisement for EOI issued by GTDC	05 January 2022
2	Receipt of written queries (via email) for Pre-NIT Conference	24 January 2022
3	Pre-NIT Conference	To be communicated
4	Release of RFP for the Project	To be communicated

The date and time of aforesaid activities / events will be specified by the Authority vide issuance of Corrigendum.

## 1. PROJECT BACKGROUND

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- 1.1. Goa, located on the west coast of India, is its smallest state by area (3,702 Sq. Km.) and the fourth smallest by population (1,457,723 - *Source: Census 2011*). Goa is one of the popular tourist destinations in India.
- 1.2. Panaji is one of the smallest Municipal Corporations in India with an estimated resident population of 70,991 people (*Source - Revised City Development Plan for Panaji, 2041*). The city receives a significant population on a daily basis that visits Panaji for work and services, estimated at approx. 70% of its resident population. A portion of the shifting population lives within the proximity of Panaji City in suburban locations like Taleigao, Santa Cruz, Panelim, Bambolim and Mercedes. Being a popular tourist destination, the city also attracts approx. 4,000 tourists every day (*Source: Revised City Development Plan for Panaji, 2041*).
- 1.3. According to the Census 2011, Goa has the highest per-capita vehicle ownership among states in India. The growth in number of private vehicles registered in Panaji has also shown a northward trend in the last 10 years. This sends strong signals about lack of dependency on public transportation; issues identified include limited operational routes/timings, poor frequency, limited reliability and quality of buses plying. The situation with the tourists visiting the city is similar, as they prefer to use their private vehicles in comparison to using Public Transport. These issues are leading to heavy congestion in the city during the peak hours. This situation is further aggravated with Panaji being located en route between tourism hotspots in North Goa and the Airport and railway stations in South Goa.
- 1.4. Panaji has been selected among the 100 Smart Cities under the Central Government's flagship program Smart City Mission. The Government of Goa has designated Imagine Panaji Smart City Development Limited (IPSCDL), as the State Level Nodal Agency and the State Mission Management Unit for Smart Cities Mission. The objective of IPSCDL is to bring about the development of smart urban infrastructural facilities / projects for Panaji City; and "development of Smart Transport and Eco Mobility through effective use of latest technology" is one of the priority areas for IPSCDL.
- 1.5. It is vital to strengthen the public transportation system in the city, particularly to reduce the use of private transport towards inclusive, sustainable and planned development of Goa. To facilitate a state-of-the-art public transportation system and fulfil growing passenger requirements, it is essential not only to provide clean transportation but also safe and connected transport networks.
- 1.6. Further, procurement of electric buses is planned for improvement of intrastate connectivity through implementation of electric bus connectivity between Panaji and other key cities of Goa including Margao, Mapusa, Ponda and Vasco on a hub and spoke model. The capital expenditure for these vehicles and support infrastructure would be through funds allocated for the 60<sup>th</sup> year of Goa liberation funds to KTCL.
- 1.7. In line with these objectives, IPSCDL (Project Proponent) and KTCL is desirous of introducing Intelligent Transport Infrastructure in Panaji and Surrounding Areas which would be implemented and monitored through KTCL. The project comprises the following components.
  - Procurement of e-buses along with charging infrastructure.
  - Development of Smart Bus Shelters and Platforms.

- Development of Intelligent Transport Management System (ITMS) and Smart hardware at various bus stops / platforms.
- 1.8.** On procurement of necessary infrastructure, the entire Intelligent Transport Infrastructure will be operated and managed by various private operators under the overall supervision of Kadamba Transport Corporation Ltd (“Authority”).
- 1.9.** The purpose of this EOI is to provide interested parties with the relevant information/invite regarding the project and understanding of the scope of the Project and invite feedback from interested private sector “Applicants”. The Applicants are advised to study this EOI document carefully before submitting their queries, feedback and suggestions in response to the EOI document. The feedback and suggestions received as part of the response from the industry participants to this EOI Document may or may not be used towards formalizing the RFP for the Project which is proposed to be released in the near future. No pre-qualification of Applicants is proposed to be done as part of this EOI.

## **2. PROPOSED PROJECT**

- 2.1.** In order to promote clean and green shared mobility and reduce congestion through a modal shift, this EOI is floated for the purposes of identifying reputed private entities, which broadly undertake the following activities:
- Supply of e-buses to the Authority on outright purchase basis.
  - Operations and Maintenance of e-buses on hybrid net cost contract during the term of the agreement with the Authority.
  - Supply, installation, operations and maintenance of allied infrastructure of the said e-buses.

### **2.2. Support provided by the Authority**

During the term of the agreement, the Authority shall offer the following support to the Operator:

- a) Make available necessary land (of approximately 5,000 sq.m.) to the Operator on ‘as-is where-is’ basis for development of allied infrastructure such as charging infrastructure and maintenance depot.
- b) Make available Power for operating the e-buses
  - i. Make available bare armoured cable at required load/ capacity at the boundary of the selected charging station and maintenance depot site(s), as per detailed power requirements as submitted by the Operator.
  - ii. Provide, or cause to be provided, reasonable support to the Operator in procuring sub-station at any location situated within 500 m. (five hundred meters) of the boundary of the Charging station and Maintenance Depot (s).
- c) Facilitate the Operator in securing the necessary permissions, NOCs and clearances for the Project from various statutory authorities.

### **2.3. Scope of Work of Operator**

The Operator is required to undertake the following scope of work.

#### **2.3.1. Supply of e-buses to the Authority on outright purchase basis**

- a) The Operator is required to supply e-buses to the Authority, whose requirement are as follows:



Type of e-Bus	E-bus Length (in m)	Seat Capacity	Proposed Quantity (nos.)
Standard	12 m	35+ Wheelchair + Driver	5
Midi	9 m	22 + Wheelchair + Driver	38
Mini	7 m	14 + Wheelchair + Driver	5

- b) The Operator shall ensure that all the e-buses conform to the Specifications and Standards provided by the Authority. Please refer to detailed specifications of each type of desired e-buses at Annexure 1. In addition, all the e-buses (primarily e-buses) shall conform to Urban Bus Specifications-II issued by Ministry of Urban Development (MoUD), Central Motor Vehicles Rules (CMVR) of India / Government Safety Norms, Emission and other norms, as applicable on the date of supply by the Operator. Also, e-buses shall be easily accessible for passengers with disability and wheelchair friendly,
- c) The Operator shall provide the number and category of chargers to be installed for required number of e-buses, and accordingly provide quantity of the same in the financial quote. The Operator may also explore battery swapping mechanism for e-buses.
- d) Every e-bus shall contain onboard ITMS components including eSIM for GPS device as specified in Annexure 1, the recurring cost of operating the eSIM shall be borne by the Operator. The Operator is required to co-ordinate and co-operate with the Authority or any private entities appointed by the Authority, for the purposes of integration of ITMS hardware within the e-buses.
- e) The Operator shall obtain prior approval from the Authority for colour scheme / graphics work of e-buses.
- f) The Operator is required to provide warranty for all the e-buses over a period of 3 years for body parts, chassis and electricals parts. The Operator is required to repair the e-buses in case of any major technical issues pertaining to any e-buses.
- g) The Operator shall get all the e-buses insured comprehensively so as to cover all risks of lives of passengers and third parties besides vehicles and other assets.

**2.3.2. Operations and Maintenance of e-buses:** During the term of the agreement, the Operator is required to operate and maintain the e-buses on behalf of the Authority as given below.

- a) Adhere to the 'Fleet Deployment Plan' prepared by the Authority

Fleet Deployment Plan shall contain details of number and type of e-buses, Operating Plan, Routes, frequency, stoppage plan and table of schedule providing bus headways based on peak and off-peak hour and other requirements. The Authority, at its discretion will develop the fleet deployment plan as per extant requirements and may consult the Operator for its finalization. Any deviations / deficiency from the fleet deployment plan, as specified by the Authority, will attract suitable fines / penalties, as specified in Annexure 4. The Authority may update the Fleet Deployment Plan from time to time based on its requirement and would provide the same at least two days in advance to planned operationalisation of change.

- b) Mandatory Operational Hours and Kilometers of e-buses

The Operator is required to run the e-buses as per the specified Fleet Deployment Plan, on all days of operation between 6.00 am to 9.00 pm. The mandatory

operational kilometres (“Mandatory Operational Kilometres”) per type of e-buses per annum is as follows:

Type of e-bus	Vehicle Length (in m)	Mandatory Operational km per annum per e-bus
Standard	12 m	50,000 Km.
Midi	9 m	42,000 Km.
Mini	7 m	40,000 Km.

The Authority at its discretion may direct the Operator to operate additional kilometres, which shall be communicated to the Operator at least two weeks in advance.

c) Provide sufficient number of trained and duly licensed drivers for operation of e-buses

The Operator shall ensure each driver, before their deployment, shall receive adequate training as per Good Industry Practices on driving, safety, behaviour and hygiene aspects. The drivers should be appointed only after a background check is conducted by the Operator. The Operator should provide drivers a valid ID and uniform, as suggested by Authority, at its own cost.

d) Ensure safe and successful (accident-free) operations of all the e-buses during the tenure of agreement

- The number of successful road trips by each e-bus, operated by the Operator, shall be higher than 99.95% of the total number of trips every year.
- The Operator shall ensure that the speed limit per e-bus shall not be more than speed limit specified by the competent authorities within and outside city limits.
- In addition to the Applicable Permits, the Operator shall ensure that it procures and maintains a valid Certificate of Fitness and Pollution Control Certificate from the relevant Government Instrumentalities for all the e-buses throughout the term of the Agreement in accordance with Applicable Law.
- The Operator shall ensure that the grievances from passengers on any of the following aspects is not more than 5% of total passengers travelled during any month. The grievances shall be tracked through complain register in ITMS system commissioned by the Authority.
  - Bus Operations like lack of ride comfort, seat availability, bus availability, skipping of Bus Stops, reckless driving and timeliness.
  - Working condition of ITMS hardware within e-buses, except the reasons that may be beyond the control of the Operator/ technical issues in the ITMS software.
  - Lack of cleanliness / waste management within the e-buses.
  - Safety and security within the e-buses.
  - Behaviour of Operator’s staff.

e) Collection of Ticket Fare and Advertising Revenue

- The Operator is required to collect revenues from passengers on behalf of the Authority with the help of Automatic Fare Collection System of ITMS which shall

be implemented by the Authority along with advertising revenues and deposit the same in the escrow account. At the end of term, escrow will be transferred to the Authority.

- Base fare structure will be decided by the Authority and shall be revised as per fare revision mechanism of the Authority. The applicable fare structure template is provided in Annexure 3.
- Every e-bus will be equipped with Automatic Fare Collection System (AFCS), which in turn will be connected to overall ITMS system. For the first 6 months of operations, the Operator shall provide conductors for operation of e-buses. Beyond the 6-month period, in case of any operational issues or technical difficulties related to usage of AFCS by the users, the respective e-bus driver shall have the additional responsibility to: (1) check the validity of tickets taken by passengers via smart card / ITMS application, OR (2) collect the user fare from passengers and issue tickets through electronic ticketing machines.
- In case of monthly pass / smart card system, Operator shall coordinate with the ITMS service provider and Authority for issue of vehicle passes to the passengers in the form of RFID based Smart Card which is adopted by the Authority. The cost and design of the passes for each category of passengers shall also be decided by the Authority.
- The Operator shall have rights to display advertisement of all types of media on the e-buses and the maintenance depot as well as to collect revenue generated from such advertisement on behalf of the Authority. The Operator shall submit for the approval of the Authority a proposal in relation thereof including but not limited to details such as the content of the advertisements, dimensions and material to be used for advertisement posters and the places on/ within Buses and maintenance depot where advertisements are proposed to be displayed. No display of negative content in advertisement shall be permitted on the Buses irrespective of the time of the day and scale of the advertisement.
- In case any damages occur to the e-buses while mounting or dismounting of advertisement material or equipment, the Operator shall immediately make good of such damages at its own cost.
- Advertisement rights shall be limited for the following spaces in the buses:  
Interior - LED Displays near back door and behind driver seat; Advertisement panel on the back of passenger seats / Standee passenger hand hold  
Exterior – Side (not more than 20 x 2 ft)/ Back Panel (not more than 3 x 2 ft)

f) Maintenance of e-buses

- The Operator shall maintain the e-buses in good operable conditions in accordance with the repair and maintenance manual prepared in line with Good Industry Practices at all times, during the term of the agreement. Operator shall ensure that the maintenance of e-buses is done through trained professionals at all times. Maintenance of e-buses includes and is not limited to cleaning and washing, preventive maintenance schedule, breakdown maintenance, repair / reconditioning / replacement of parts and aggregates including battery pack, minor and major body repair including refurbishing and accidental repair whenever necessary and to ensure safety of the passengers and employees of Operator and the Authority. The expenditure relating to maintenance & upkeep

of the vehicles such as tyres, spares, lubricants, wages of drivers, mechanical staff etc. is to be borne by the Operator.

g) Non-tampering with ITMS equipment within the e-bus

- The Operator shall ensure that any ITMS equipment installed on the e-buses, including any monitoring device or equipment by the Authority, is not tampered with in any manner.

h) Indemnify the Authority related to e-bus operations

- The Operator shall be solely responsible for operations of e- vehicles during the term of the Agreement. During this period, the Operator shall pay fines, compounding fees etc., imposed by any Court / Road Transport Authority u/s 86 of M.V. Act for contravention of any provision of Law vide conducting public vehicle operations including any accidents by any e-bus or any other fines/ levies/ penalties/ fees. The Operator shall be responsible for all claims that may arise due to statutory violations out of the operations to the extent not covered by insurance. The Authority shall not be responsible for any damage or loss caused due to violations / accidents, etc.

**2.3.3. Supply, installation, operations and maintenance of allied infrastructure that supports the e-buses**

- a) The Operator shall develop civil and charging infrastructure including all downstream Electric Infrastructure from the bare armoured cable connection at the boundary of the site on land arranged by the Authority such as: (1) Step-down transformer of adequate capacity, (2) all equipment and allied infrastructure such as LT and HT switch gears, (3) depot level power distribution infrastructure including cabling for making power available at chargers, required connector, etc., (4) covered cable tranches, (5) paved site and platforms for transformers and charging equipment, (5) ring metering unit (6) metering cubicle and (7) Sheds to cover chargers and e-buses.
- b) The Operator shall construct a Maintenance Depot (“Maintenance Depot”) at location identified by the Authority for undertaking preventive maintenance schedule, breakdown maintenance, repair / reconditioning / replacement of parts and aggregates including battery pack, minor and major body repair including refurbishing and accidental repair, whenever necessary.
- c) The Operator shall make available two separate meters for Charging infrastructure and Maintenance depot respectively. Electricity charges for charging of e-buses and maintenance activities shall be borne by the Operator.

**2.3.4.** The Operator shall not outsource the entire scope of work to a Third Party. However, the Operator is allowed to outsource development and maintenance of allied infrastructure and may engage services of professional agencies for security, housekeeping, sewage management, electrical, maintenance contracts, etc. The Operator shall be solely responsible to the Authority for performing the overall scope of work specified in Clause 2.3. The Operator shall not mortgage, assign or otherwise transfer or part with possession of the e-buses and allied infrastructure or any part thereof or create any interest / right in respect thereof in favour of any other person.

**2.4. Terms of Reference**

The indicative steps to be undertaken by the Successful Bidder on successful selection by the Authority are as follows:

- a) **Incorporate a new Company (Special Purpose Vehicle):** The Successful Bidder is required to incorporate a Private Limited Company under the Companies Act 2013 in order to undertake the entire scope of work specified in Clause 2.3, Volume-I, through such Special Purpose Vehicle (SPV) only.
- b) **Nomination of Authorized Representative:** The SPV must nominate a single point of contact for any communication with the Authority.

### **3. TERM OF PROJECT**

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- 3.1. The Operator shall be granted the right to conduct the project for a period of 12 (Twelve) years from the Commercial Operations Date ("Term of Project") and the term is extendable by another term of 4 years based on the health of the e-buses.
- 3.2. The Operator is required to supply the e-buses, as per requirement schedule of the Authority, within **270** days from the date of issue of Letter of Award (LOA).
- 3.3. The Operator is required to achieve the Commercial Operations Date (COD) **within 240 days** of signing the Agreement. The Operator after signing the agreement shall fulfil the following conditions before the COD.
  - a). Procure all the Applicable Permits / Licences / NOCs required for developing the charging infrastructure and allied activities.
  - b). Complete the work of construction of charging infrastructure and allied activities.
  - c). Supply of e-buses along with allied infrastructure, as per requirement schedule of the Authority.
  - d). Deploy qualified manpower and procured required materials / equipment for executing the "Minimum Service Obligations".
- 3.4. The Operator is required to undertake operations and maintenance of e-buses along with allied infrastructure for a period of 12 years from the COD and the term is extendable by another term of 4 years based on the road worthiness and health of the e-buses as assessed by the Authority.
- 3.5. On expiry of the Term of Agreement, the Operator is required to transfer e-buses and allied infrastructure to the Authority in working condition.

#### 4. MINIMUM ELIGIBILITY EXPERIENCE

4.1 During the RFP stage, the Applicant who fulfils the following minimum eligibility experience (“**Eligible Bidder**”) shall be considered by the Authority for technical evaluation of their bids.

a) **The Applicant should be a registered Legal Entity:**

Minimum Eligibility	Mandatory documents required in support of minimum eligibility
<ul style="list-style-type: none"> <li>Independent private legal entity incorporated / registered in India - proprietorship, partnership firm, Limited Liability Partnership (LLP), private limited company registered under Companies Act 2013, public limited company registered under Companies Act 2013 including Joint Ventures, government-owned entities.</li> <li>A group of entities (the “Consortium”), a combination of the above legal entities, with a formal intent to enter into a Consortium agreement subject to maximum of 3 members.</li> <li>In case of single bidder, entity shall necessarily be an OEM. In case of Consortium bids, OEM should mandatorily be part of Consortium.</li> <li>A foreign entity that is constituted under respective foreign law and not having a registered office / manufacturing facility / operation in India may participate in this tender as a Member of consortium along with an Indian legal entity as specified above.</li> </ul>	<ul style="list-style-type: none"> <li>Certificate of Incorporation / equivalent proof of legal registration of entity; and</li> <li>GST Registration certificate issued by GSTN authorities; and</li> <li>PAN Card.</li> <li>Board Resolution (only in the case of Company) allowing the Company to participate in the EOI. The Board Resolution is not mandatory in case of Proprietorship and Partnership firms.</li> </ul>

b) **The Applicant should have prior experience of supplying buses:**

Minimum Eligibility	Mandatory documents required in support of minimum eligibility
<ul style="list-style-type: none"> <li>The Applicant shall have aggregate experience of supplying a minimum 50 (Fifty) electric buses or 80 (Eighty) diesel / CNG / alternate fuel / hybrid buses anywhere in India anytime in the last 5 (five) financial years.</li> </ul>	<ul style="list-style-type: none"> <li>Work Orders / supply orders / client certificates / copy of agreement executed with the client / experience certificates as a proof for successful supply of required quantity of buses as specified in this EOI*. All documentary evidence for technical experience must be certified by Chartered Accountant.</li> </ul>

- For evaluation, any member of the Consortium exhibiting the highest relevant technical experience will be considered.

**c) The Applicant should have prior experience of operating and maintaining buses:**

Minimum Eligibility	Mandatory documents required in support of minimum eligibility
<ul style="list-style-type: none"> <li>• The Applicant shall have aggregate experience of at least 2 (two) years of operations and maintenance of a minimum 40 (Forty) electric buses or 80 (Eighty) diesel / CNG / alternate fuel / hybrid buses anywhere in India before the bid due date.</li> </ul>	<ul style="list-style-type: none"> <li>• Work Orders / supply orders / client certificates / copy of agreement executed with the client / experience certificates as a proof for O&amp;M of buses*. All documentary evidence for technical experience must be certified by Chartered Accountant.</li> </ul>

*\* In case of single entities, Aggregating the financial and technical capability of any Associates of the Applicant for the purpose of meeting the respective Qualifications Criteria required by the Applicant shall be permitted. For the purpose hereof, the word "Associate" shall mean, in relation to the Applicant, an entity which controls the Applicant (i.e. Parent) or is controlled by the Applicant (i.e. subsidiary) or is under the common control with the Applicant (i.e. sister concern). As used here, the expression "control" means, with respect to Applicant entity which is a company, the ownership of common shareholders, directly or indirectly (i.e. together with one or more of its subsidiaries / Holding companies), of at least 50% of the voting shares / shareholding of the entity. As used here, the expression "control" means, with respect to applying firm which is a partnership, the rights of common partners to at least 50% of the profits of the firm in question.*

**d) The Applicant should have a minimum financial strength:**

Minimum Eligibility	Mandatory documents required in support of minimum eligibility
<ul style="list-style-type: none"> <li>○ Average Turnover in the last 3 (three) financial years should be at least INR 20,00,00,000/- (INR Twenty Crore only) i.e. FY 2017-18, FY 2018-19, FY 2019-20.</li> <li>○ Positive Net Worth as on 31 March 2020.</li> </ul>	<ul style="list-style-type: none"> <li>• Chartered Accountant (CA) certificate certifying turnover and net worth</li> </ul>

**e) The Applicant should not have any pending litigations, conflict of interest or blacklisting as on bid due date:**

Minimum Eligibility	Mandatory documents required in support of minimum eligibility
The Applicant: 1) Should not be involved in any major litigation such as fraud, FEMA violations.	<ul style="list-style-type: none"> <li>• Certificate from the Applicant.</li> </ul>

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|---|--|
| <ol style="list-style-type: none"><li>2) Should not be involved in any conflict-of-interest situation.</li><li>3) Should not have been blacklisted by any Central Government / State Government / PSU in India.</li><li>4) Should not have defaulted in any supply or O&amp;M contracts with any Government / Government entities or PSUs or private clients in the last 7 years.</li><li>5) Should not have been blacklisted / debarred by Department of Transport / KTCL / any entity of Government of Goa in the past.</li></ol> |  |
|---|--|

- 4.2. During the RFP stage, the Applicant shall submit E-Bus specifications for each category of E-Bus along with the Bid. It shall also submit as part of the Bid, Bus Type 1 Approval (Homologation) certificate of any 9 m e-bus issued by authorized test agencies as per CMVR 126 from Institutions such as CIRT/ARAI. Additionally, it shall also provide any certification that it has obtained for its vehicles or parts tested at reputed institutes / Laboratory certified or recognized by Government of India. Offered Model Homologation to be submitted at the time of prototype inspection.
- 4.3. The Applicant meeting the minimum eligibility experience, will be notified to provide trial of each category of E-bus, for which specification has been submitted, in the presence of the Authority. Trial shall include capacity of Single Charge Range, Battery Capacity and Per day Run Km Range, charging time and seating capacity and required technical specification mentioned and the average of three days trial will be considered for evaluation.
- 4.4. The Financial bids of only those Applicants who are able meet trial conditions for each category of e-bus shall be opened (“Qualified Bidders”).
- 4.5. **Trial Run and Conditions –**
  - Base models 12 m / 9 m / 7 m e-buses should operate 200 km / 180 km / 130 km respectively with 80 % SOC, in single charge with AC. However, each category of e-bus shall be capable to operate minimum 250 km / 225 km / 180 km + 10% contingency km per e-bus of each category per day with additional proportionate opportunity charging.
  - Trial shall be conducted with laden weight (sandbag) of 3,500 kgs for 12 m e-bus, 2,500 kgs for 9 m e-bus and 1,500 kgs for 7 m e-bus.
  - AC temperature should be 24 degree centigrade as per UBS II/CMVR
  - E-bus will be stopped at every stop with door open for 1 minute.
  - Trial will be conducted at the place suggested by the Applicant, conveyance and stay and other expenses shall be borne by the Applicant.



## 5. FINANCIAL EVALUATION

5.1. During the RFP stage, the financial evaluation for the project is divided into three parts as follows:

### a) Supply of e-buses

- i. The Applicants are required to quote for category-wise price per e-bus i.e. e-bus of 12 m, 9 m and 7 m, which shall be exclusive of GST and inclusive of duties, levies, freight etc. GST shall be paid to the Operator on actuals.
- ii. The quoted price for corresponding category of E-buses shall be multiplied by number of respective category of e-buses to arrive at aggregate price of each category of E-bus and the aggregate price of each category of E-bus shall be added to arrive at **Total Price of E-buses (TPV)**. The illustration for calculation of Total Price of E-buses is as follows:

Type of e-bus	Vehicle Length (in m)	Number of E-buses	Price Quote by the Applicant per vehicle (illustrative) in INR	Aggregate Price of E-buses
Standard	12 m	5	INR 10,000	INR 50,000
Midi	9 m	38	INR 8,000	INR 3,04,000
Mini	7 m	5	INR 4,000	INR 20,000
<b>Total Price of e-buses (TPV)</b>				<b>INR 3,74,000</b>

### b) Supply of Chargers

- i. The Applicant shall offer number and category of chargers depending upon fleet deployment plan, operational hours and schedule to achieve best possible charging solution. The Applicants may quote price per offered category of charger such as slow and fast charger, which shall be exclusive of GST and inclusive of duties, levies, freight etc. GST shall be paid to the Operator on actuals.
- ii. The quoted price for corresponding category of charger shall be multiplied by the number of respective category of chargers offered to arrive at aggregate price of each category of chargers and the aggregate price of each category of charger shall be added to arrive at **Total Price of E-bus Chargers (TPC)**. The illustration for calculation of Total Price of e-bus chargers is as follows:

Type of Chargers	Number of Chargers offered (illustrative)	Price Quote by the Applicant per charger (illustrative) in INR	Aggregate Price of E-bus Chargers
Fast E-Bus Charger	3	INR 100	INR 300
Slow E-Bus Charger	8	INR 50	INR 400
<b>Total Price of E-bus Chargers (TPC)</b>			<b>INR 700</b>

### c) Operations and Maintenance of e-buses and allied infrastructure (including any civil works) during the term of the project

- i. The Applicants, based on their market assessment and feasibility, are required to quote either a **Grant/km** or **Premium/Km** to the Authority.

- ii. Grant/km shall be payable by the Authority to the Operator whereas the Premium/km shall be payable by the Operator to the Authority.
- iii. In case Grant is quoted, the Authority will pay a Grant/km up to a maximum of **INR 50 / Km, INR 46 / Km and INR 42/km for 12m, 9m and 7m e-bus**, respectively.
- iv. In respect of price payable to such Applicant by the Authority towards operation and Maintenance of category-wise e-bus and allied infrastructure (including any civil works), the Applicants are required to quote **Rate per Kilometer (INR/km)**, which shall be exclusive of GST. GST shall be paid on actuals.
- v. The Grant per Kilometer or Premium per Kilometer corresponding to each category of e-bus (12 m / 9 m / 7 m) shall be multiplied with respective mandatory operational kilometers per vehicle for each category of e-bus for the first year to arrive at aggregate Grant or aggregate Premium per e-bus for each such category of e-bus for the first year. The Grant or Premium for each category of vehicle shall be added to arrive at **Total Grant (TG) or Total Premium (TP)**.

Type of e-bus	Vehicle Length (in m.)	Grant or Premium per e-bus (illustrative) in INR per Km. (A) <i>(Grant to be quoted as positive and Premium to be quoted as negative)</i>	No. of Vehicles (B)	Mandatory Operational Km. per e-bus per annum (C)	Total Grant or Total Premium (illustrative) in INR per Km. per annum (= A*B*C)
Standard	12 m.	INR 10	5	50,000 Km.	25,00,000
Midi	9 m.	INR 8	38	42,000 Km.	1,27,68,000
Mini	7 m.	INR 5	5	40,000 Km.	10,00,000
<b>Total Grant (TG)</b>					<b>1,62,68,000</b>

**d) Total Aggregated Cost of the Project**

- i. For the purposes of evaluation only, the Aggregated Cost of the project shall be determined as follows:

$$\text{Aggregated Cost of the Project} = ((TPV + TPC) \times 50\%) + (TG \times 50\%)$$

- ii. Calculation of Aggregated Cost of the Project based on aforementioned illustration is as follows:

$$\begin{aligned} \text{Aggregated Cost of project} &= ((3,74,000 + 700) \times 50\%) + (1,62,68,000 \times 50\%) \\ &= 1,87,350 + 81,34,000 \\ &= \mathbf{83,21,350} \end{aligned}$$

- iii. The Qualified Bidder offering the Lowest Aggregated Cost of the Project shall be declared as the "SUCCESSFUL BIDDER".

- iv. The Successful Bidder shall provide complete break-up of the working for calculation of quoted Grant per km / Premium per km individually for each category of e-bus.
- v. The quoted Grant/km or quoted Premium/km shall escalate by 5% every 5 (five) years.
- vi. The Grant / Premium payable by / to Authority shall be processed monthly, based on the actual kilometers operated by the Operator subject to maximum of monthly proportionate of the Annual Mandatory Operational Kilometers.
- vii. In case, the Authority at its discretion directs the Operator to operate the e-buses for kilometers in excess of Annual Mandatory Operational Bus Kilometers, then the Operator / Authority shall pay the Premium / Grant to the Authority / Operator at 50% of the quoted Premium per km / Grant per Km.
- viii. • The operator will be given 10% revenue share of the total passenger collections between 6 am to 9 pm (i.e., Annual Mandatory Operational Bus Kilometers) and advertising revenue on all days.
- ix. For revenue Share for operations of e-buses by Operator outside Mandatory Annual Operational Kilometers on its own, the operator can retain 100% of the passenger revenue. Grant / Premium per km is not to be paid by Authority / Operator in this case.

## 6. OTHER GENERAL CONDITIONS

- 6.1. The price quote of the Successful Bidder shall be valid for a period of 365 days from date of issuance of LOA. The Authority reserves the right to increase the number of e-buses depending upon its requirement, apart from the requirement schedule as mentioned in the Clause 2.3 in Volume-I of tender documents. The Authority expects the Successful Bidder to supply up to 2 nos. (12m), 4 nos. (9m) and 2 nos. (7m) of e-buses at the price quote submitted under this tender.
- 6.2. The supply of e-buses by the Operator shall be subject to prototype approval by the Authority or third-party agency authorized by the Authority. An inspection team authorized by the Authority will visit Vehicle (Bus manufacturing site to inspect the standard of facility and may reject the vehicles if found defective and workmanship is not found satisfactory, in which case the remedial work shall be immediately made and subject to reinspection by third party agency. All expenses and charges associated with prototype inspection shall be borne by the Operator.
- 6.3. The expected delivery schedule for providing prototype and delivery of registered e-buses as per following schedule from the date of awarding the Letter of Award (the "Delivery Schedule").

Type of e-buses	e-buses Length (in m.)	Prototype Inspection	Delivery of e-buses along with installation of allied infrastructure
Standard	12 m	90 days from date of Letter of Award (LOA)	Within 270 days from issue of LOA
Midi	9 m		
Mini	7 m		

Any non-adherence to the above delivery schedule will attract fines / penalties as determined by the Authority.

- a) If the Operator fails to complete the supply of e-buses within the delivery schedule above and if the Operators is not able to cure such default (delay in e-buses) within the prescribed Delivery Schedule, the Authority shall levy/deduct pre-estimated liquidated damages @ INR 10,000/- (Rupees Ten Thousand only), per e-bus per day (including non-working days) of delay.
- 6.4. The proposed timeline for payment of Total Price of E-buses (TPV) and Total Price of E-buses Chargers (TPC) payable to the Operator is as follows:

Sr. No	Milestone	Percentage of TPV and TPC to be released
1	On successful completion of prototype inspection, as mobilization advance <i>(The Operator shall submit a bank guarantee of an amount equivalent to 30% of the TPV and TPC which shall be released by the Authority on completion of 60 days from delivery of e-vehicles to the Authority.)</i>	30%
2	On delivery of e-vehicles along with installation of allied infrastructure <i>(The Operator shall submit a bank guarantee of an amount equivalent to 40% of the TPV and TPC which shall be released by the Authority on completion of 90 days from Commercial Operations Date).</i>	40%



3	On achieving successful commercial operation of e-buses <i>(The Operator shall submit a bank guarantee of an amount equivalent to 30% of the TPV and TPC which shall be released by the authority on completion of 180 days from Commercial Operations Date, subject to satisfactory e-bus performance.)</i>	30%
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## **7. Right to cancel the EOI Process**

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- 7.1. The Authority may cancel this EOI process at any stage without assigning any reasons whatsoever and will not be liable to compensate any Applicant on any grounds whatsoever. The Applicants shall not be entitled to refund of cost of documents or other costs in case the EOI is cancelled for whatsoever reason or without assigning any reason.

## ANNEXURES

### Annexure 1

#### Technical Specifications of Electric Vehicles

E-Bus would generally be designed and manufactured in accordance with the UBS II specifications & 'Code of Practice for Bus Body Design and Approval' (AIS 052 AS amended time to time) hereinafter referred to as Bus Code as applicable to buses in India/CMVR rules/State of Goa motor vehicle rules whichever is superior.

Description	Standard Bus (12m)	Midi Bus (9m)	Mini-Bus (7m)
Body material	As per OEM	As per OEM	As per OEM
Minimum number of seats	35+Wheelchair + D	22+Wheelchair + D	14+Wheelchair + D
Gross Vehicle Weight (Max Tons)	As per OEM		
Number of doors (Flexible)	As per CMVR		
Length of vehicle in meters	12 $\pm$ (As per OEM)	9 $\pm$ (As per OEM)	7 $\pm$ (As per OEM)
Width of vehicle in meters	2,600mm (As per OEM or MVA)		
Floor Height (In mm)	400 MM with Wheelchair Accessibility Mechanism	400 – 650 MM with Wheelchair Accessibility Mechanism	400 – 900 MM with Wheelchair Accessibility Mechanism
Height with AC in meters	3,800mm (Maximum)		3100 mm (Maximum)
Wheelbase in meters	As per OEM		
Max speed (Km/hr)	75 +/- 5	75 +/- 5	75 +/- 5
Grade ability from stop at GVW	17%	17%	17%
Attain speed of 0-30 kmph in seconds	$\leq$ 10.5	$\leq$ 10.5	$\leq$ 10.5
Internal power supply	24V / 10A DC	24V / 10A DC	24V / 10A DC
Operating temperature	Up to 42°C	Up to 42°C	Up to 42°C
Minimum Battery Life in years	As per OEM	As per OEM	As per OEM
Steering System	Hydraulic power steering	Hydraulic power steering	Hydraulic power steering
Suspension System (Front & Rear)	Air Suspension	Air Suspension	Hydraulic / Air Suspension
Braking System (Front & Rear)	Disc or Drum Type	Disc or Drum Type	Disc or Drum Type
Safety features	FDAS	FDAS	FDAS
Air Conditioner Capacity	Min 37 KW	Min 28 KW	Min 16 KW

<b>Escape Roof Hatches</b>	Min 2 nos.	Min 2 nos.	Min 1 nos.
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<b>Charger Type</b>	<b>Charger Connectors</b>	<b>Rated Voltage (V)</b>
Fast	CCS (Min 50 KW)	200-750 or Higher
Fast	CHAdeMo (Min50 KW)	200-500 or Higher
Fast	Type-2AC(Min. 22KW)	380-415
Slow/Moderate	Bharat DC001(15KW)	48 or Higher
Slow/Moderate	Bharat AC001(10KW)	230

*Or any other charger Fast/Moderate/Slow as approved by BIS Standards whenever notified*

#### **Intelligent Transport Management Devices**

The ITMS project is being implemented presently by Authority appointed ITMS Service Provider which includes Automated Vehicle Locating System (AVLS), Passenger Information System (PIS), Vehicle Scheduling and Dispatch System, Incident Management System (IMS), Enterprise Management System (EMS), Business Intelligent System (BI) etc for City Bus Operation.

Authority intends each Electric Bus shall come fitted with ITMS Equipment such as PIS Display boards and Tracking Device. The Bus Operator should provide necessary fitments for ITMS on the e-buses provided under hiring as per AUTHORITY requirements.

All On board ITMS requirements should be in line with UBS II. **All requirements for ITMS should be as per UBS II/AIS 140 shall be added in the Bus.**

**The detailed Specification of ITS Devices are specified hereunder.**

<b>Specification PIS –On Bus</b>
<b>PIS System</b>
Usability/Functionality/Capability
All drivers related interfaces for PIS must be provided on Information Control Unit ICU
The route programming file to be uploaded on ICU <i>via USB up to 8GB minimum</i>
Route selection function is to be provided on ICU <i>with easy sorting of Routes</i>
All driver related route information to be displayed on ICU
Amber coloured, alphanumeric with graphic capability
In-built light sensor with continuously variable brightness control to enable the display intensity to change based on ambient light conditions
<b>Viewing distance</b>
Front, side and rear signs 30 meters minimum, for single line text, in day and night.
Inner 15 meters minimum, for single line text in day and night.
<b>Display Characteristics</b>
Fixed, scrolling and flashing mode (with fixed route number, up to 6 characters, on front, side and rear signs).
Capability to show customized graphics.
Two lines English /one-line local language.



Total display height should accommodate two lines in English language and the Individual heights of each line should be adjustable to enable one line to be larger/smaller than the second line. However, during next stop announcement only single line text is required
It should be possible to display, concurrently, different messages on each of the signs (front, rear, side and inner).
It should be able to display special signs like signs for 'PWD enable bus', 'ladies special'.
Capability to show special characters like (, ' " . ! + - * : ?)
Signs should have ability to retain the last message displayed in the memory of the sign even in the event of power failure and without the message being reloaded. from ICU. Test will be performed by disconnecting the ICU from the sign and power to the sign will be switched 'off' and 'on' to see if the Last message is retained and displayed.
Display and voice announcement in English and local languages using Microsoft fonts via window based software package –Window 8.1
The system should have a programming capability as under
Minimum 300 routes UP and DOWN (150 numbers of destinations) on front, side and rear signs.
GPS triggered next stop display on Inner sign with synchronized voice announcement for minimum 100 stops on each route.
The inner sign should be able to display and announce up to three languages, one after the other in sequence. For example make display and announcement in English, then Hindi to be followed by local language for benefit of the passengers. Display and announcements should be possible "before arrival" of the bus at the bus stop, "on arrival" of the bus at bus stop and "after departure" of the bus from the bus stop.
In event of GPS failure the above functionality should be possible through manual intervention on ICU.
Display driver and conductor ID once in between the stops on Inner sign
Inner sign should be able to display text and customized graphics and announce up to pre-recorded messages by driver selecting 1~9 on ICU display panel of the controller.
Display customized graphics plus synchronized voice announcement – preferably location based in case of Million plus population cities
Functionality of Display 'clock'-GPS based or 'Default Messages' on Inner sign
Emergency 'stop' request function- by pressing an emergency switch placed anywhere in the bus the inner sign should display 'stop' message and buzzer located near the driver makes the sound alerting the driver to stop the bus.
In case one or more signs get disconnected (malfunction), the rest of the Signs should continue to function regardless (including fresh communication from ICU)
Sign should be able to store 'diagnostic trouble codes' (DTC)', 'parameters identifiers (PID) and data should be retrievable.
To comply with test standards as per Separate List
<b>Dimensions and technical specifications of signs</b>
Display size / Board Size
Front , 1800 x 220 mm OR 800x 220 mm Rear and Side minimum 220x900 mm –one no. each AIS 052 2.2.15 Destination Board for Public Service Vehicles Inner: minimum 100 x 900 mm –one or ( Size of board 900*220 mm in front single door only)
<b>Pitch</b>
Front- maximum. H 13.4 mm x V14.1 mm
Side and rear maximum. H10.5 mm x V 14.1mm
Inner 8 x 8 mm maximum.
<b>LED and display quality front, side and rear signs</b>
Amber coloured LED, dominant wave length 591~595nm

UV resistant, diffused lens 4 mm (minimum)
Wide viewing angle 120° horizontal & 80° Vertical
Ensure enhanced readability with full clarity on scrolls and long life usage by incorporating non-multiplexed system (constant current drive circuit) with typical LED Intensity 400~700 mCd at If =20 mA,
<b>LED and display quality inner sign</b>
LED amber dot matrix viewing angle 45° all around, intensity minimum 40 mCd, dominant wave length 591 ~595 nm
<b>Structure</b>
Front ,side and rear signs : light weight structure with toughened glass fixed with UV resistant adhesive in front
Inner sign: light weight structure with poly glass /acrylic/toughened glass.
Conformal coated PCBA and ROHS Compliant
<b>ICU architecture</b>
<b>Usability/Functionality/Capability</b>
The ICU should control complete Public Information System on Bus including Destination Signs, External Amplifier and Speakers.
The Driver has to select a 'Route', from a Pre-loaded Route Data Base and all information will be displayed and or announced automatically based on Bus Location (GPS).
Provide capability to upload firmware on Signs via RS 485.
A 'beep' sound is made when vehicle speed exceeds set speed limit. The limit is configurable through Software and preset at 50 Kmph
Should be possible to check Firmware Version, Route Data base version.
<b>Technical specifications: ICU</b>
Operating Voltage 9~32 Volts
Processor : 32 bit minimum
Operating system: embedded Windows (8.1) /Linux with programming software
Memory : 256 MB minimum
Interface minimum : RS 485, RS 232, USB, GPS Antenna
Conformal coated PCB boards
Route Data upload on Controller from PC via USB port (USB 1.1, USB 2.0, FAT, FAT 32, 8 GB capacity). Devices prone to pilferage e.g. SD Card is not permitted. Buzzer indication when loading is complete
Integrated with External GPS Receiver and Antenna' via RS 232 using Standard NMEA 1083 GPRMC sentence, transmission Protocol to be provided by the Manufacturer under a 'NDA'.
In-built MP3 files storage/playback function and compatibility with external two channel amplifier minimum 10 Watts rms each suitable for 2 ~8 Ohm impedance with input for external microphone
LCD Panel (resolution 64 x 256 minimum), Illuminated with automatic brightness Control and Backlit Keypad with minimum 20 soft keys including alphanumeric.
Mounting in Radio Slot acc ISO 7736
Programming Software (including simulation, Brightness control, scroll speed control, scroll direction, Template configuration, Graphic library, customised graphics)
Amplifier, Speakers and Wire Harness (with water proof connectors)

GPS Units of following specifications shall be provided for Electric buses. GPS based Tracking Device System Functions are provided below.

- a. GPS Vehicle Tracking

- b. Vehicle Health Status
- c. Driver Assessment
- d. e-mail and SMS communication for configured alarms and events
- e. On –Board Recording and Server Log
- f. Remote Monitoring including Mobile Data Terminal Server/ Client Applications
- g. MIS
- h. Should be able to function independent of Other Systems –However it should be able to provide GPS input to PIS Controller via RS232

Main elements of the systems to be provided are given below.

- a. Analog AHD Cameras
- b. Emergency Button
- c. Data Logger (Driver Behaviour and Vehicle Health)
- d. Driver Display (Live View one or more Camera, Two way voice communication, Text messaging with Voice from back office, Driver Log in/out RFID)
- e. Wi-Fi AP (detachable for depot use)
- f. On-Line UPS (optional)
- g. All 'Applications' will be supplied and licensed for all time use.

1. Wi-Fi AP

- a. Improve working efficiency of system maintenance, saving time and cost.
- b. USB 2.0 interface, plug and play
- c. Support (802.11b/g/n) 2.4GHz LAN -10 Meters
- d. Support 'Easy configuration' via laptop or iOS, Android Mobile Terminal
- e. Image preview for 'adjust angle'
- f. Preview, Playback, Search, Setting
- g. Support external 64 GB SD card file backup
- h. Support Data Export from m DVR
- i. Transmission Rate 20 Mb/s
- j. Power supply from m DVR :500 m A @5V
- k. Operation Temperature: -10deg C ~ +50deg C
- l. Relative Humidity: <80% non-condensing
- m. Only a few units required per depot

2. Safe Driving System (data logger)

- a. Integrated 6-axis G-sensor
- b. Data Management , Analysis :Collect data of six-axis sensor and OBD II to manage driving behaviour Harsh Acceleration/braking, Sharp Turns, collision and oil consumption, speed, driving time, long idling etc
- c. Data type K line, CAN ISO 11898/ ISO15765-4 high speed, intermediate speed and low speed CAN, RS485, OBD II
- d. Acceleration  $\pm 16g$ , Angular Rate  $\pm 2000^\circ/\text{sec}$
- e. Power supply from m DVR : 500 m A @5V
- f. Operation Temperature: -10deg C ~ +60deg C
- g. Relative Humidity : 95%
- h. Ingress Protection IP 54 minimum
- i. Test compliances : As detailed later in this document

3. Driver Display Unit

- a. 7" TFT LCD Touch Screen with Arrow Keys and Number Buttons
- b. Resolution 800\*480 , Live view Video Surveillance
- c. Luminance 400cd/m<sup>2</sup>, Visual Angle 70/70/50/70 (Typ.)(CR dot 10)(Left/Right/Up/Down)
- d. Maximum Number of Display Colour 262K/16.7M(6bit/6bit+Dithering)
- e. Scale 16:9
- f. Back-light Type White LED

- g. Built –in Speaker Speaker(16Ω, 2W)x2
- h. Built-in RFID module to sign in/out, When Driver & Conductor swipe the ID card, then the SERVER will get the information and send a message to driver & conductor (and others) to inform them sign successfully. The same functionality when used in a School Bus will inform parents. Supports standard card of Mifare protocol ISO14443 Type A, working frequency 13.56MHz
- i. Two Way Voice Communication with Back Office
- j. Text Message from Back Office
- k. Live View and Play Back -One or More Camera
- l. 'Reverse camera only' when reverse gear is engaged (via digital I/O)
- m. 'Door Facing Camera only' when 'Door Open" (via digital I/O)
- n. Recording On –Green mark, 'Event' Recording –Red mark
- o. GPS Date/Time/Speed, GPS Loss, Vehicle ID, All 'Events', Channel Name, Ignition Status
- p. Power supply from m DVR: 200 m A@12V
- q. Operation Temperature: -10deg C ~ +60deg C
- r. Relative Humidity: 95%
- s. Ingress Protection IP 53 minimum
- t. Installation Bracket on Dashboard
- u. Test Compliances: As detailed later in this document

4. Performance and Durability Testing & Environmental Test

**Test Compliances for Data Logger + Driver Console (together): Verification Report of ARAI/ICAT/CIRT is mandatory.**

Sr. No	Test standards Compliance	Specifications
1	Performance parametric test	Nine points, tri temperature/tri voltage- 18V, 27V, 32V,-10°C, room temperature, +70°C test. At each test point the system will be powered on and shut down 5 times as per the supplier's designated procedure and thereafter evaluated for malfunction if any.
2	Cold	IS 9000 (Part II/Sec 4)-1977 (reaffirmed 2004) at -10°C for 2 hours in 'on' condition
3	Dry heat	IS 9000 (Part III/Sec 5)-1977: at + 70°C for 16 hours in 'on' condition.
4	Damp heat	IS 9000 (Part V/Sec 2)1981 at +25°C /+55°C, Humidity 95%, 24 hours for 6 cycles in off condition. Functional test with power in 'on' condition at start of 2nd, 4th and 6th cycle
5	Vibration standard AIS 012/AIS:062 -10g	Frequency 5~55Hz and return to 5Hz at a linear sweep period of 1 minute/complete sweep cycle and 10g at maximum frequency Excursion -1.65 mm peak to peak over the specified frequency range Test duration 60 minutes Direction of vibration –X, Y, Z axis of device as it is mounted on the vehicle. Test to be carried out in 'on' condition as per ARAI
6	Dust and water ingress protection	IS /IEC 60947-1:2004 in conjunction with IS/IEC 60529:2001
7	Fire resistant harness	Horizontal Burning rate tested as per ISO 3795, Flammability Test as per IS: 2465:1984

Sr. No	Test standards Compliance	Specifications
8	Reverse polarity protection without fuse	The component must fulfil the function- and service life requirements after being subjected to reversed polarity up to 27 V for 2 minutes. ISO 17650-2.
9	Over voltage protection	To ensure service life requirements and functionality. The component shall run for 60 minutes at 36V, without effecting the service life or function. ISO 16750-2
10	Insulation resistance	The Insulation resistance measured as per ISO 16750-2 with a voltage of 500 V DC shall not be less than 1 Mega ohm. Insulation Resistance Test will be carried out after completion of 'Damp Heat Test' and then the Test sample to be kept at room temperature for at least 0.5 hrs.
11	Salt spray test	(IS10250) 96 hours
13	EMC/EMI	AIS 004 (PART 3)
14	Operating parameters	Supply voltage 24 V $\pm$ 25%
15	Slow Increase and decrease (Ramp up/ Down)	Apply a Voltage of 0V to 27V at increasing rate of 0.5V per second for slow Increase of Power Supply. Apply a Voltage of 27V to 0V at decreasing rate of 0.5V per second for slow Increase of Power Supply.
16	ESD Test	Powered Direct Contact $\pm$ 6 kV, $\pm$ 8 kV Direct Air $\pm$ 8 kV, $\pm$ 15 kV Unpowered Direct Contact $\pm$ 6 kV $\pm$ 8 kV Direct Air $\pm$ 8 kV $\pm$ 15 kV
17	Endurance Test	Ambient Temperature, preferably 27 $\pm$ 2°C, 28 V, 100 000 cycles. Each cycle shall consist of switching ON & OFF the system with dwell time as follows: Dwell time: 10 s $\pm$ 1 s (ON condition), 4 s $\pm$ 1 s (OFF condition).
18	USB port over loading test	USB Port Pin No. 1 (+5 VDC) & Pin No. 4 (GND) to be Short Circuited with external wire in "ON" condition as shown below. The System should continue to work without any problem.
19	Improper Shut down	Battery supply shall be disconnected in the middle of operation. This shall be repeated for 100 times ON time :- 3-4 min, Off time :- 10 sec

#### Emergency/Panic Buttons

Panic button to be provided to each row of seat as per AIS 140. Integration requirement with

#### Existing ITMS System

Operator shall also ensure to supply equipment compatible with existing ITS System of Authority so as to enable smooth integration. Operator and Authority hereby agree to share interfacing protocols and Active Programming Interface with each other or Authority's appointed service provider for smooth integration of ITMS equipment provided by Operator with Authority's ITMS System.

**Annexure-2**

**Revised Fleet Deployment Plan – Panaji and Surrounding Areas**

SR NO.	ROUTE TYPE II - BUSES 12MTS, 9MTS, 7 MTS (A)	KMS (B)	SERVICE (C)	SERVICE DURATION (D)	FRQU ENCY (E)	TRIPS (F)	TOTAL KMS (B x F)	TRIP TIME	BUSES Req.	E-Buses (Mtrs)		
										12	9	7
1.	<b>Panaji B S</b> - Bambolim- Goa University- NIO Circle- <b>Dona Paula</b> - Caranzalem- Miramar-Market- <b>Panaji B S</b>	24	RING	6 am to 9 pm	15	60	1440 (160/ Vehicle)	55	9	5	4	
2	<b>Panaji B S</b> - New Patto Circle- Neogi Nagar- Mansher- <b>Taleigao</b> - St.Inez-Bhatlem- Kala Academy- <b>Panaji B S</b>	16	RING	6 am to 9 pm	15	60	960 (120/ Vehicle)	40	8		8	
3	<b>Panaji B S</b> - Old Secretariat- Church Square- Doordarshan - Joggers Park- <b>Altinho</b> - Factory & Boilers - St. Inez- Kala Academy- Market- <b>Panaji B S</b>	10	RING	6 am to 9 pm	15 / 20 (7m)	45	450 (150/Vehicle)	25	3		2	1
4	<b>Inox</b> - Vaidhya Hospital (Market)- St.Inez- Tamdi Mati- <b>Taleigao Market</b> & back.	08	ROUND TRIP	6 am to 9 pm	20	21	168 (168/ Vehicle)	25	1			1
5	<b>Panaji B S</b> - New Patto- Neugi Nagar- Bhatlem- Ram Mandir- Taligao- Durga Temple- <b>Taleigao</b> - <b>St.Cruz</b> - <b>Panaji B S</b> .	17	RING	6 am to 9 pm	15 / 20 (7m)	33	563 (188/ Vehicle)	40	3		2	1
6	Inox-Panaji Market Complex-Don Bosco H.S.- 18th June Road-Church Square-Fontainhas- Maruti Gadh-Portai-Four Pillars-St,Cruz- Aakashvani-Bambolim GMC & Back Via	08	ROUND TRIP	6 am to 9 pm	20	21	168 (168/Vehicle)	25	1			1
7	<b>Miramar</b> - Tonca -Krishi Bhavan- <b>Caculo Mall</b> - St. Inez- Don Bosco School- <b>Market</b> .	04	ROUND TRIP	6 am to 9 pm	20	21	168 (168/ Vehicle)	25	1			1
<b>Total</b>						<b>261</b>	<b>3917</b>		<b>26</b>	<b>5</b>	<b>16</b>	<b>5</b>

Changes on implementation if any will be done. In addition to the routes mentioned above, the Authority will designate routes for 9 m e-bus from Panaji and Surrounding areas to other towns of Goa such as Mapusa, Vasco, Margao and Ponda.

### Annexure-3

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#### Fare Structure

##### E-Bus Fare Structure

Sr. No	Distance	INR
1	Maximum fare up to 0-3 kms	10
2	Maximum fare from 3.1 to 8 kms: additional	5
3	For every next 8 kms or part thereof : additional	5

##### Commuter Passes

1. Day Pass for any number of commutes across routes

INR 30 per day

2. Month Pass for any number of commutes across routes

INR 600 per person

INR 300 per person in the case of Students having valid ID card and Senior Citizens having valid ID card.

**Annexure 4.**

**Deficiency and Incident Wise Damages/ Fines**

**Vehicle – Fine for deficiency**

Sr. No.	Deficiencies	Fine in Terms INR PER KM PER DAY PER E-BUS
1	Modification of the design destination board or paintwork of the exterior or interior of the bus without the authorization of Authority	5
2	Missing bus body panels on the exterior/interior of the bus	5
3	Defective or malfunctioning headlights, rear lights, brake light, turning indicators and parking lights, broken mirrors at the time of Bus Operations	20
4	Dirty vehicle (i.e. dusty handrails, chairs and floor, litter of any kind on floor, foul odour; dirty windows and glass panels, Spots) inside or outside, at the time of start of first shift in the morning	20
5	Fire Extinguisher missing or beyond expiry date	5
6	Damage to any vehicle tracking equipment or any Intelligent Transport Management System installed by Authority	20
7	Deterioration of Bus Speed or AC Performance due to inefficiency/ malfunctioning of Battery Pack AND /OR Any other System, sub system, part	10

**Bus Operation – Fine shall be applied per incident**

Sr. No.	Incidents	Fine in Terms INR PER KM PER DAY PER E-BUS
1	Arriving for a shift more than 10 min late than as given in Operating Plan for a given route for a given bus	2
2	Delay of more than 20 min beyond the end of shift.	5
3	Driver not responding to more than 3 consecutive directions sent by Authority Control Centre.	5
10	Bus breakdown inside the en-route	5 (of cancelled kms)
16	Driver not wearing clean uniform as designed by Authority	5
17	Driver in drunken state	100 (Operator shall change driver immediately)
20	Drive above speed limit set by Authority	5
21	Withdrawal of bus for one day (i.e., of different days in a month) without permission (Penalty per day)	25
22	Non-performance of schedule trips	5 (of cancelled kms)
23	Deliberate non-adherence of the schedule timings including late running	5 (Operator should change the driver before next working day)
24	Driver committing fatal accident	50 (Operator should change the driver before next working day)



<b>Sr. No.</b>	<b>Incidents</b>	<b>Fine in Terms INR PER KM PER DAY PER E-BUS</b>
25	Deliberate non-reporting to duty on time	5 (Operator should change the driver before next working day)
26	Any other offence	As fixed by the Managing Director of the Authority or officer empowered by him/her except overloading
27	Parking buses in undesignated areas without prior permission	2

However, the cap on Penalties, Fines and Liquidated Damages shall be limited to INR. 50,000 per e-bus per year during the term of the agreement.

« « « END OF EOI Document » » »