REPUBLIC OF MACEDONIA
CITY OF SKOPJE
PUBLIC TRANSPORT COMPANY SKOPJE
bul. Aleksandar Makedonski, Number 10

TENDER DOCUMENTATION

FOR AWARDING PUBLIC PROCUREMENT CONTRACT AND IMPLEMENTING A PROCUREMENT OF AUTOMATIC VEHICLE LOCATION SYSTEM AND SMART TICKETING SYSTEM IN THE JSP SKOPJE VEHICLES

No. 70/2012

Skopje
December 2012

Content
ANNOUNCEMENT FOR SUBMITTING A PUBLIC PROCUREMENT CONTRACT
No.70/2012

I. INVITATION TO SUBMIT A BID

PUBLIC TRANSPORT COMPANY – JSP SKOPJE

_____

number and date

JSP SKOPJE
NQP SHKUP

INVITATION TO SUBMIT A BID

Dear Sir/Madam,

PUBLIC TRANSPORT COMPANY – JSP SKOPJE with an address at bul. Aleksandar Makedonski No. 10, Skopje (hereinafter: Contracting Authority), contact telephone number +389 2 3174 979 (working hours 7 to 15:00), fax 389 2 3174 260 e-mail: nenad@jsp.com.mk, contact person Nenad Kuzmanovski, needs to procure automatic vehicle location system and smart ticketing system in JSP Skopje vehicles.

For that purpose, the contracting authority, hereby, implements procedure to reward a Public procurement contract for works using an open procedure, in accordance with article 64 of the Law on Public Procurement ("Official Gazette of the Republic of Macedonia" no. 136/07, 130/08, 97/2010, 53/2011 and 185/2011), and therefore it published the advertisement number 70/2012.

We kindly ask you to submit to us your bid for the above subject of the public procurement contract. Enclosed to this invitation please find attached the tender documentation which contains and information which will help you to prepare the bid. The tender documentation costs 3,090.00MKD/50.00 Euros.

The aforementioned fee shall be paid to the following bank account of the Contracting Authority: Denar account 280 105 100 714 312 Alpha Bank-AD Skopje, that is foreign currency account IBAN CODE: MK 07280102000288568, SWIFT: KRSKMK2X to the JSP SKOPJE, designating the following – Tender documentation fee for Public Procurement No.70/2012

The bidders who have collected the tender documentation can also collect the forms enclosed to the tender documentation upon request sent to olgica@jsp.com.mk.

The bidders can sent their offer via regular mail or submit them in the Archives of the Contracting Authority by 13:00 local time on 07.03.2013, the latest.

Thank you in advance for your cooperation.

Skopje
31.12.2012

Authorised person
_____

II. INSTRUCTION FOR THE BIDDERS

1. Contracting Authority

The Contracting Authority is Pubic Transport Company JSP Skopje, registered in Skopje on blvd. Aleksandar Makedonski No.10, Republic of Macedonia.

2. Right to participate in the Public Call

2.1. Domestic and foreign legal entities are entitled to participate in the public call, under the terms and conditions set out in the Law on Public Procurement, the Public Call and this Tender Documentation.
The participation in the Public Call, the domestic and foreign entities may be:
- individual (individual application and realisation of the Contract);
- individual with engaged sub-contractor/-s (individual application with certain parts of the Contract realisation given to subcontractor/-s);
- group of bidders (Consortium) submitting joint offer.

Individual participation

2.2. Individual participation on the Public Call shall be in cases when domestic or foreign legal entity submits offer and implements the Contract for automatic vehicle location system and smart ticketing system in JSP Skopje vehicles (hereinafter: Contract).

2.3. In case when the selected most favourable bidder is foreign legal entity, it shall be bound to provide Service Centre in Skopje, Republic Macedonia not later than 7 days prior to signing the Contract, and it shall be responsible for equipment servicing and functioning of the System subject to this Contract.

2.4 Providing the bidder – foreign legal entity does not provide Service Centre referred to in the sub-point 2.3, the Contracting Authority shall sign the Contract with the second best bidder and activate the Bid Guarantee from the most favourable (first-ranged) bidder.

Individual participation with engaged sub-contractor/-s

2.5. Individual participation with subcontractor/-s in the Public call shall have domestic or foreign entity providing it submits offer but engages other domestic or foreign entity as subcontractor for the realisation of the Contract as sub-contractor for certain parts of the Contract and regulate the relationship for such engagement with separate Contract.

2.6. In cases referred to in the sub-point 2.5. of this Tender documentation, the offer must list each sub-contractor/-s, and the Bidder shall submit the documentation referred to in the point 9 of this tender documentation, proving that the sub-contractor/-s fill in the conditions regarding:

- Personal circumstances
- Capability to perform a professional activity,
- Technical or professional capability

2.7. The obligations of the sub-contractor/-s shall be under solidar and unlimited responsibility of the legal entity selected as most favourable bidder.

Group of sub-contractors (Consortium)

2.8. Group of bidders (Consortium) is also entitled to submit offer with no obligation to join in appropriate legal form.

2.9. The Consortium should have an appointed member/representative for communication with the Contracting authority and with the Consortium members and who shall have the authority to undertake all actions on the behalf and for the account of the Consortium during the procedure for awarding the Contract.

2.10. In case of an offer submitted by a Consortium, the offer should be accompanied by a written Letter of authorisation signed by all Consortium members authorising a member/representative to submit offer and undertake all actions referred to in the sub-point 2.9. on their behalf and account (Form 2A from the Tender Documentation).

2.11. In case when the Consortium is selected as the most favourable bidder, the Public Call Contract shall be signed by all Consortium members individually, or by an authorised Consortium member/representative.

2.12. All Consortium members shall be individually, solidary and responsible without limitations in front of the Contracting party for the implementation of the Contract obligations.

2.13. Within the procedure for awarding Contract for public procurement, each bidder can participate with a single offer. All offers shall be dismissed providing the bidder:

- participate in more than one offer either individually and/or as a Consortium member;

- participate as sub-contractor in other individual offer and/or offer submitted by a Consortium.

3. Subject of the Public Procurement Contract

3.1. Subject of the Public Procurement Contract (hereinafter: PPC) shall be purchase, installation, servicing of the automatic vehicle location system and smart ticketing system in 500 JSP SKOPJE vehicles, including installation of 3 (three) smart ticketing machines on locations in the City area (hereinafter: System), in accordance with the conditions defined in the Tender Documentation.

The System comprises of two systems (sub-systems):

- automatic vehicle location system, regulation and control over the transport service, and
- electronic (intelligent) ticketing system so called smart tickets.

4.1 Type of procedure for awarding Public Procurement Contract

4.1.1 Public Procurement Contract shall be awarded by applying international public call upon an open procedure, which shall be finalised by electronic auction as a final phase of the procedure.

4.1.2 Call for awarding the Public Procurement Contract No. 70/2012 in question shall be published in the Official Gazette of the Republic of Macedonia, Electronic System for Public Procurement of the Public Procurement Bureau and the Official public medium of the EU or in the appropriate business publication or technical and professional newsletter available to the wider international professional and other public.

4.1.3 This procedure shall not be realised through electronic means via Electronic system for Public Procurement (ESPP), except in the part of electronic auction which shall be implemented via ESPP (https://www.e-nabavki.gov.mk).

4.1.4 More details about the use of the electronic means for domestic and foreign economic operator: In order to participate in the electronic auction please register yourself on ESPP. The economic operator can register on the ESPP by filling-in a registration form - comprising part of ESPP[1], and ESPP shall automatically process the data from the registration form, generate code and submit it on the registered e-mail of the economic operator. More details on the registration and use of the system can be found on the web page (https://www.e-nabavki.gov.mk) and in the ESPP Manual dedicated for the economic operators which can be downloaded from the ESPP main page in the part „Economic operators".

4.1.5 More details about the electronic auction: Contracting authority shall use electronic auction as a final phase of the open procedure. The initial price on the electronic auction shall be the lowest price of the accepted offers in the first phase of the procedure. The subject if the electronic auction shall be the total price including the costs and discounts, import customs fees excluded of VAT, that is, initially submitted prices of all qualified bidders. Prior to the electronic auction realised in a procedure where the most favourable bid was selected, the Committee shall perform full evaluation of the initially submitted bids, awarding points for each criteria element of the economically most favourable bid. Based upon the conducted evaluation and awarded points, initial ranking list is established of all qualified bidders. The bidders can decrease their initially submitted prices on the electronic auction and increase the awarded points of the element price whilst the other elements remain unchanged during the e-auction and after it. Invitations for e-auction shall be sent in an electronic form via ESPP after the complete evaluation of the initial bids, to all economic operators who had submitted acceptable bids in the first phase of the procedure and who are registered in the ESPP.

Invitation for participation in the auction shall be sent electronically on the e-mail addresses of the contact person given in the Offer Form and who shall be pre-registered in the ESPP.

4.2 Bid price

4.2.1 The offered price shall contain all expenditures and discounts of the economic operator and it shall be given without VAT, which shall be given separately. The offered price shall include all import fees, if applicable, and they shall be given separately. Therefore, subject to the evaluation shall be the total offered price including import customs fees and excluded VAT.

4.2.2 Bid price shall be written with numbers and letters.

4.2.3 Providing certain offer contains unusually low price - significantly lower than real market price rising suspicion regarding realisation of the Contract, the Contracting Authority shall require written explanation on details of the offer regarded as relevant to justify the price of the offer, prior to the rejection of the offer. Providing the economic operator can not explain in writing the reasons for such offer within **2 days** of the date of submitting the request, or the Committee decides not to accept the explanation, the offer shall be rejected.

4.3 Bid currency

4.3.1 The bid price shall be expressed in denars or in Euros. The Macedonian denar shall be used as a currency for bid evaluation purposes. The exchange rates used shall be the exchange rates of the National Bank of the Republic of Macedonia, and the rates of exchange shall be those applicable 14 days before the final deadline for bid submission.

4.4 Deadline, manner and conditions of payment

4.4.1 The bidder shall accept the following deadline and manner of payment.

The bidder shall agree for the Contracting authority to pay the Total amount for purchasing of the System to be paid on 3 (three) equal instalments.

The manner and deadline of the payment shall be defined in the Contract for the procurement in question.

4.4.2 Fee for e-Cloud

The Bidder shall agree for the monthly servicing fee upon **e-Cloud** principle, in accordance with the requirements given in the Tender Documentation – Technical specification to be 0.6% of the offered procurement price submitted as final offer.

5. Manner of implementation of the Contract for Public Procurement (PPC)

5.1. The bidder is bound to realize the PPC in the following manner:

- develop Main project and in case of deviation from the implemented situation from the Main project to develop the Project for the implemented situation;
- deliver the equipment and materials needed for mounting the System;
- mount the System;
- maintain the System in the duration of the Contract
- train part of the employees of the Contracting Authority as per the tender documentation;
- perform all other obligations set out in the Tender Documentation and in the Contract.

5.2. Deadline for submission and mounting of the System, training of the personnel and one month probation of the system shall be 300 (three hundred) days from the date of entry into force of this Contract.

5.3. Funding sources

5.3.1 Contracting Authority intended to finance the Contract for purchasing the equipment in question with the funds granted by the City of Skopje Budget 2013/15 – capital subsidies for Public Enterprises as per the Decision from the Council of City of Skopje. The funds are limited to the amount defined in the Decision.

5.3.2 In accordance with the Decision from the City of Skopje Council, the funds have been transferred on special (earmarked) account of the Contracting Authority intended for procurement of the System referred to in the point 3.1 The special account No._____ within _____Bank AD Skopje.

5.3.3 The funds of the Contracting body shall not be used for payment of person and entities, import of goods in cases when such payment or import is banned by a Decision from the UN Security Council in accordance with the Chapter 7 from the UN Charter.

6. Amendments and derogations in the realisation of PPC

Amendments and derogations in the terms, conditions and realisation of PPC shall be permitted solely upon written consent from the Contracting authority and it will be subject to Contract Annex signed by the Contracting parties.

7. Duration of the PPC

Duration of the Contract shall be 3 years and 10 months (three years and ten months) commencing at the date of entry into force of this Contract.

Duration of the Contract may be prolonged upon manner, terms and conditions set out in the Contract, and in accordance with the Law on Public Procurement and Law on Obligations.

8. Criteria on verifying the bidders' capability

In order to participate in the Contract awarding procedure, that is, in order for the offers to be evaluated, the bidders need to be selected as qualified. For the purpose of qualification, the bidders will have to submit documentation to prove their:

- Personal circumstances,
- Capability to perform a professional activity,
- Economic and financial circumstances,
- Technical or professional capability,
-

The requested documentation shall be submitted in original or as a copy verified by the bidder, stamped and signed by the authorised person, with a notification "Authentic to the original".

When examining the completeness and validity of the documents for verifying the bidders' capability and during the bids' evaluation, Public Procurement Committee may request clarifications of submitted and additional documents from the bidder, providing there is no significant deviations from the requested documents.

No changes to the bid, except correction of arithmetic errors may be requested or allowed by the commission or by the economic operator.

9. Proving the capability

9.1. Personal circumstances

9.1.1 The contracting authority shall exclude from the procedure for awarding a public procurement contract, any economic operator that:

- Within the last five years has had a legally effective judgment pronounced against him/her for participation in a criminal organization, corruption, fraud or money laundering;

- Is subject to a bankruptcy procedure or a liquidation procedure;

- Has unpaid taxes, contributions or other public dues;

- That has a criminal sanction for performed criminal acts for legal entities or side sanction involving prohibition to participate in public call proceedings, public procurement contracts and contracts for public-private partnership imposed against him/her

- That has a criminal sanction for performed criminal acts for legal entities or side sanction involving temporary or permanent ban for performing specific activity imposed against him/her, and

- That has a misdemeanour sanction involving prohibition to perform a profession, activity or duty, or prohibition to perform a specific activity, imposed against him/her.

9.1.2 To prove his/her personal circumstance, the economic operator shall submit the following documents:

- Statement of the economic operator that, within the last five years, he/she has not had any legally effective judgment for participation in a criminal organization, corruption, fraud or money laundering, pronounced against him/her;

- Confirmation that he/she is not subject to a bankruptcy procedure opened by a competent authority;

- Confirmation that he/she is not subject to a liquidation procedure opened by a competent authority;

- Confirmation of paid taxes, contributions and other public dues issued by a competent authority in the country where the economic operator is registered;

- Confirmation from the Registry of criminal sanction for not performed criminal acts for legal entities or side sanction involving prohibition to participate in public call proceedings, public procurement contracts and contracts for public-private partnership imposed against him/her

- Confirmation from the Registry of criminal sanction for not performed criminal acts for legal entities or side sanction involving temporary or permanent ban for performing specific activity imposed against him/her, and

- Confirmation that there is no legally effective judgment imposing a misdemeanour sanction involving prohibition to perform a profession, activity or duty, or prohibition to perform a specific activity, imposed against him/her.

9.1.3 The statement from indent 1, sub item 9.1.2 shall be prepared and signed by the economic operator himself/herself and it need not be notarized by a competent authority.

9.1.4 The confirmation that no bankruptcy procedure or liquidation procedure has been opened against the economic operator, along with the confirmations from the Registry on performed criminal sanctions referred to in the indents 2 and 3, sub-point 9.1.2 shall be issued by competent authorities in the country where the economic operator is registered. In the Republic of Macedonia, a competent authority to issue such confirmation is the Central Registry of the Republic of Macedonia or the competent court.

9.1.5 The confirmation of paid taxes, contributions and other public dues shall be issued by a competent authority in the country where the economic operator is registered. In the Republic of Macedonia, the competent authority to issue such certificates shall be the Public Revenue Office.

9.1.6 The confirmation stipulated in indents 5, 6 and 7, sub point 9.1.2 shall be issued by the competent authority in the country where the economic operator is registered. In the Republic of Macedonia, the competent authority to issue such confirmation shall be the Central Registry of the Republic of Macedonia.

9.1.7 The documents stipulated in sub-item 9.1.2 may not be older than 6 (six months) counted backwards from the final deadline for submission of the bids.

The Committee shall accept document to prove the personal circumstance issued on the day of public opening of the bids, but not later than the day of adopting the Decision for selection of the most favourable bidder.

9.1.8 Providing the country of registration of the economic operator does not issue the documents referred to in the sub-points 9.1.2 or in cases they do not cover the aforementioned cases, the economic operator may submit a statement notarised with the authorised body.

9.2. Capability to perform a professional activity

9.2.1. To prove the capability to perform a professional activity, the economic operator will have to submit a document for a registered activity as a proof that the operator is registered as a natural person or a legal entity to perform an activity related to the public procurement contract or proof of membership in an appropriate professional association in accordance with the regulations of the country where the operator is registered.

For the domestic bidders this shall be DRD Form issued by the Central Registry of the Republic of Macedonia as a proof that the legal entity is registered or in case when the bidder is foreign legal entity, proof that the entity is a member of proper professional association in accordance with the regulation in country where registered, issued by the authorised body, or that it belongs to proper professional association or organisation registered in the appropriate Registry, or any other proof in accordance with the registration of the country where registered.

9.3. Economic and financial circumstance

9.3.1. In order to be qualify as capable to perform the Public Procurement Contract at hand from an economic and financial status point of view, the economic operator needs to prove fulfilment of at least that in the past 3 (three) years (2009, 2010 and 2011) the entity did not report losses in its operations and gains total income of at least 30,000,000.00 (thirty million) Euros and minimum profit of 3,000,000.00 (three million) Euros.

The bids not complying the conditions referred to in the paragraph 1 of this sub-item shall be deemed unacceptable and shall not be evaluated.

9.3.2. Providing the operator performs the activity less than 3 years, the minimum condition for proving the economic and financial condition shall be not reported losses in its operations and a total income of at least 10,000,000.00 (ten million) Euros and minimum profit of 1,000,000.00 (one million) Euros, in the operating period.

9.3.3. In order to prove the economic and financial situation, the bidder shall submit Balance Sheet and Income Sheet for the previous 3 (three) years (2009, 2010 and 2011), that is for the period of operations provided it is shorter than three years.

9.3.4. The economic and financial capability of the economic operator can be supported by another entity, including the capability of the new group offer (Consortium of bidders) irrespective of the legal relations between the economic operator and the other entity and the operator shall have an obligation to submit the required documentation referred to in the point 9 of this tender documentation to that the other entity fulfils the conditions regarding:

- Personal circumstances,
- Economic and financial circumstances,
- Technical or professional capability,

If the economic operator proves its economic and financial capability by referring to the support from another entity, the operator shall have an obligation to prove this support by providing valid

evidence that the other entity shall make available the appropriate financial resources to the economic operator.

9.3.5. The Balance Sheet and the Income Statement shall be issued by competent authorities in the country where the economic operator is registered. In the Republic of Macedonia, a competent authority to issue such confirmation is the Central Registry of the Republic of Macedonia.

9.3.6. Providing the bidders submit an offer as a group of bidders (Consortium), the economic and financial capability shall be proven by taking into account all the resources of the Consortium members, and the carrier need to fulfil minimum 50% of the required criteria.

9.4. Technical or professional capability

9.4.1. In order to get qualified as capable for execution of the PPC from the point of view of technical and professional capability, the bidder needs to submit:

- Reference list of contract/-s for implemented project with offered solution for minimum of 250 city-line buses, with an average minimum of 120.000 (hundred and twenty) transactions (validation) per day, operational in the previous 3 years, listing the amounts, dates, along with minimum of 1 (one) recommendation for successful implementation;

As a proof of aforementioned the bidder fills-in the Form 3A enclosed to this Tender documentation, signed and stamped by the bidder's responsible person and submits certificate/s issued by the Contracting authority where the system was implemented.

- Proof (Statement) of availability of properly qualified technical personnel required for mounting of the whole equipment and quality control, that the bidder can use;

As a proof of available properly qualified technical personnel the bidder fills-in the Form 4A enclosed to this Tender documentation, signed and stamped by the bidder's responsible person.

- Report (Statement) on devices and technical equipment available to the bidder intended for the implementation of this Contract, and measures used by the candidate to provide high-quality delivery and mounting of the System.

As a proof of available technical capacity and measures necessary for provide high-quality delivery and mounting of the System, the bidder fills-in the Form 5A enclosed to this Tender documentation, signed and stamped by the bidder's responsible person.

9.4.2. The capability of the economic operator can be supported by another entity, including the capability of the members of given group offer (Consortium of bidders) irrespective of the legal relations between the economic operator and the other entity, the operator shall have an obligation to prove this support by providing documents referred to in the point 9 of this Tender documentation, proving that the other entity meets the conditions regarding:

- Personal circumstances,
- Capability to perform professional activity, and
- Technical or professional capability

9.4.3. Providing the Contracting authority suspects the documents for determining the capability of the bidder, it holds the right to require information directly from the competent bodies issuing the documents to determine the bidders/s capability.

10. Clarification (interpreting) the tender documentation

10.1. The interested bidders who collected the tender documentation may require clarifications, thereof or point out to certain tortuousness or omissions in the documentation, exclusively in writing, in 6 days the latest prior the final deadline for bid submission.

10.2. Interested bidder may require clarifications of the tender documentation, tortuousness or omissions, thereof in writing addressed to: bul. Aleksandar Makedonski No.10, fax +389 2 3174 260, or on e-mail address nenad@jsp.com.mk designated: "Questions to the Public Procurement Committee"

10.3. Additional clarification via telephone or verbally is not be allowed.

10.4. Clarifications shall be submitted to all interested bidders within 3 days who collected the tender documentation, without disclosing the identity of the interested bidder requesting the clarification.

10.5. All additional information and clarifications related to the bid shall in writing present comprising part of the tender documentation.

11. CHANGES AND ADDITIONS TO THE TENDER DOCUMENTATION

11.1. The Contracting authority shall retain the right to, no later than 6 days before the expiration of the final deadline for submission of the bids, to make changes or additions to the tender documentation, about which it shall inform all economic operators that have acquired the tender documentation

11.2. In case of modifying the tender documentation, the Contracting authority can extend the final deadline for bid submission on request by the economic operator and it shall allow at least 6 working days for submission of bids after having disclosed the clarifications/additions to the economic operators.

11.3. In case of extending the final deadline, the Contracting authority shall be obligated to inform in writing all economic operators that have acquired the tender documentation.

12. Preparation and submission of bids

12.1. Preparation of the bid

The bid shall be prepared in accordance with the conditions set out in the Public Call and the Tender Documentation and it is submitted on the original bid form, enclosed to the tender documentation.

12.1.1. Preparation and filling-in the bid

Interested bidder prepares one original of the Bid form.

The Bid form must contain filled–in all requested positions and all required data.

Bid form is filled-in (written) in one original, written with indelible ink and signed by the responsible person of the economic operator. In cases of Consortium the bid shall be signed by all members of the Consortium. All pages of the bid, except the unaltered print literature shall be initialled by the person that signs the bid. Any writing between lines, erasure or writing over previous texts shall be valid only if signed or initialled by the individual that signs the bid.

Providing the bid is not filled in as requested in the tender documentation, the bid shall be rejected as unacceptable.

12.1.2. The provisions in the sub-point 12.1.1. shall be applicable for the filling-in of the other forms - comprising part of the Tender documentation.

12.2. Content of the bid

Comprising part of the bid, apart from the Bid form (1A), shall be:

- Documents for determination of the personal circumstance (given in point 9 of the tender documentation);
- Contract Model (given in the Annex 1 of this tender documentation);
- Bid form 1A (given in the Annex 2 of this tender documentation);
- Bidder's reference list (given in the Annex 3A in the Annex 2 of this tender documentation);
- Statement Form 4A for bidder's sufficient personnel (given in the Annex 2 of this tender documentation);
- Statement Form 5A for bidder's sufficient technical personnel (given in the Annex 2 of this tender documentation);
- Statement Form that bidder's Design project meets the technical specification with Table 6A (given in the Annex 2 of this tender documentation);
- Statement Form 7A that bidder's designated a work team (given in the Annex 2 of this tender documentation);
- Statement Form 8A that the bidder is not subjected to
  - legally effective judgment pronounced against him/her for participation in a criminal organization, corruption, fraud or money laundering (given in the Annex 2 of this tender documentation);
- Form 9A for the List of confidential information (given in the Annex 2 of this tender documentation);
- Statement form 10A proving that the bidder accepts the conditions of the Public call (given in the Annex of this tender documentation) signed and stamped by the bidder's responsible person;
- Form 11A – Specification of additional equipment with guaranteed prices in Euros,
- Bid guarantee (in original).

Providing the bidder applies as Consortium submitting joint offer, Statement Form 2A from all Consortium members submitting joint bid (given in the Annex 2 of this tender documentation).

12.2.1. Type and number of forms depends on the bidder's application (individual, individual with sub-contractor or as a Group of bidders - Consortium).

12.2.2. Comprising part of the Technical documentation shall be:

- **Design solution** as a basis for the implementation of the PPC, prepared based upon the technical specification given in the tender documentation listing the minimum requirements.

  The bidder selected as the most favourable one and who will be rewarded a Contract shall be bound to develop a Main project based upon the Design solution. The Main project shall be a basis for purchasing equipment, mount the equipment and software along with the complete implementation of the System in accordance with the conditions and requirements given in the Tender documentation;

- **Detailed equipment specification** (hardware and software) shall contain:
  - name of the equipment with basic features and minimum standards;
  - equipment manufacturer and quantity, and
  - software specification.

- **System and Software installation dynamics** divided by phases (development of Main project, probation of the System and final acceptance of the System) which must be in accordance with the requirements by the Contracting authority given in the technical specification in the Tender documentation.

Providing the bidder's technical documentation does not satisfy the minimum requirement contained in the Technical specification in the Tender documentation, it shall be considered unacceptable.

12.2.3. A bid submitted on a form that does not contain all the elements in accordance with the tender documentation shall be considered unacceptable.

12.3. Bid language

The bid, as well as the complete correspondence and documents exchanged between the Contracting authority and the bidder shall be submitted in the Macedonian language and its Cyrillic letter. The printed literature comprising part of the bid may be in another language, providing they are accompanied by a correct translation in Macedonian language. In case of translation, each page needs to be signed and stamped by an authorized person of the bidder verifying the correctness of the translation.

12.4. Period of bid validity

Bids shall be valid at least 180 days from the opening day of the bid. Bids that are valid for a period shorter than the period prescribed in this point of the Tender documentation shall be rejected by the contracting authority as unacceptable.

12.5. Alternative bids

Alternative bids are not allowed.

12.6. Sealing the bids

The economic operator shall enclose the original copy of the bid, forms referred to in the sub-point 12.2 of the Tender documentation (type and number depend on the bidder's form of application), signed Contract Model and Bid guarantee in sealed internal envelope which shall have the full name and address of the economic operator with a notification "Offer" written on the upper left angle of the envelope.
The technical documentation shall be submitted in another sealed inner envelope containing the name of the bidder with its full address and titled "Technical documentation" written in the upper left angle of the envelope.
Documents confirming bidder's capability shall be submitted in separate sealed inner envelope containing the name of the bidder and its full and correct address, and notification "Documents confirming capability" in the upper left angle of the envelope.

The inner envelopes are submitted in sealed external envelope:
- addressed to the full and accurate address to the Contracting authority;
- containing the number of the Public call; and
- "Do not open" notice shall be written in the upper left corner, preventing opening prior to set time and date for bid opening.

Providing all envelopes are not sealed and marked as required, the Contracting authority shall not be held responsible for any untimely or incomplete reception of the bids or for any premature bid opening.

12.7. Single bid principle

One bidder can apply with a single bid regardless applying individually, or as a member in the group of bidders. In contrary all bids with containing same bidder shall be rejected.

12.8. Modification, replacement or withdrawal of a bid

The bidders who have collected a tender documentation may modify, replace or withdraw their bids after bid submission before the final deadline for bid submission.
The bidders may not modify, replace or withdraw their bids after the final deadline for bid submission.
The modifications, replacements and withdrawals of the bids submitted to the Contracting Authority prior to the deadline for bid submission should be prepared, enveloped, marked and submitted as per the instructions for bit application and the front side of the envelope containing the modification/replacement/withdrawal shall be labelled with “modification”, “replacement” or “withdrawal” respectively.

13. Bid submission

13.1. Bids may be submitted only by bidders who have collected stamped copy of the Tender documentation from the Contracting authority.

13.2. Deadline for bid submission is 07**.03.2013** at 13:00 local time.

13.3. The bids shall be submitted on the following address: bul Aleksandar Makedonski No. 10 Skopje, R. Macedonia.

13.4. The bidders can submit their bids via regular mail or personally in the Archives of the Contracting Authority.

13.5. The bidders may modify, replace or withdraw their bids in writing before the final deadline for bid submission in an envelope containing label (designating “modification”, “replacement” or “withdrawal” respectively) in the Archives of the Contacting Authority.

13.6. The bidders may not modify, replace or withdraw their bids after the final deadline for bid submission.

14. Bid expenses

The bidder shall take all the expenses related to preparation and submission of the bid, and the Contracting authority shall not be held responsible for those expenses, regardless of the Bid procedure and results from the Public procurement.

The expenses rising from the bid preparation and submission shall be borne by the bidder and they shall not be recognised.

The bidder shall borne the risks related to bid submission, including force majeure.

15. Bid financial guarantees

Bid financial guarantee shall be:

- Bid guarantee;
- Performance guarantee for timely and high-quality implementation of the System; and
- Performance guarantee for high-quality System functioning in the warranty period.

The guarantees shall be issued in Euros or in denar counter-value as per the average exchange rate of the NBRM on the day of its issuance.

Providing the bidder submits guarantee from foreign bank, it should be acceptable for the Contracting authority.

The financial guarantee shall be entitled to the Contracting authority.

Basic information about the Contracting authority:

- PUBLIC TRANSPORT COMPANY SKOPJE – Skopje, Republic of Macedonia.
- bul. “Aleksandar Makeodnski“ No 10,
- Unique registration number 4057040
- Unique tax number 4030955261454
- Denar bank account: 280 105 100 714 312, Foreign currency account: IBAN CODE: MK07280102000288568, SWIFT: KRSKMK2X , Alpha Bank AD

The Contraciting authority may not return back the financial guarantee prior to the validity deadline.

Providing there is an extension of the deadlines of the contracting obligations during the Contract implementation, the validity of the Guarantee for timely and high-quality System implementation and Performance guarantee for the high-quality System functioning.

15.1. Bid guarantee

15.1.1. As part of the bid, the bidder shall provide a bid guarantee in the amount of at least 2% of the total bid value.

15.1.2. The bid guarantee shall be in the form of deposited funds or in a form of bank guarantee, issued by a banking institution selected by the bidder and acceptable by the contracting authority

15.1.3. The bid guarantee shall be in the form of deposited funds by the bidder, the funds shall be transferred to the following gyro account 280 105 100 714 312 in Alpha Bank.

15.1.4. In case of bank guarantee, it should:

а) contain non-puttable, unconditional, payable on first call and without objection right;

б) be submitted in original (copies shall not be acceptable);

в) be valid upon the end of 14 days for the first-ranked bidder, including the date of Contract signing;

г) for all other bidders who participated in the procedure for rewarding PPC, it should be valid until the 7 day from the date of adoption of decision for the most favourable bid.

15.1.5. Each bid that does not contain a bid guarantee shall be rejected by the Contracting authority as incomplete and unacceptable.

15.1.6. The guarantee shall be invoked if:

- withdraws its bid after the deadline for submission of bids;
- the most favourable bidder refuse to sign the Procurement Contract

- the most favourable bidder signing the Contract fails to provide a performance guarantee for timely and high-quality execution of the Contract within 7 days from the date of signing the Procurement Contract.

15.2. Performance guarantee for timely and high-quality implementation of the System

15.2.1. The most favourable bidder bounds to submit original Performance guarantee for timely and high-quality implementation of the System.

The Guarantee should contain a clause that it is non-puttable, unconditional, payable on first call and without objection right with a possibility for partial realisation and renewable to an amount of 5% (five percents) of the offered price in the final Bid.

15.2.2. Guarantee referred to in the sub-point 15.2.1. shall be submitted within 7 days from the date of Contract signing and it shall be valid for 30 days after the final acceptance of the System.

15.2.3 Performance guarantee for timely and high-quality implementation of the Contract shall be invoked providing the procurement carrier does not fulfil some of the PPC obligations within the prescribed period, which shall be the subject of written notification sent to the procurement carrier. Provided Performance guarantee for timely and high-quality implementation of the Contract is invoked, the Contracting authority shall publish negative reference on the ESPP.

15.3. Performance guarantee for high-quality System functioning in the warranty period

15.3.1. The most favourable bidder bounds to submit Performance guarantee for high-quality System functioning in the warranty period.

15.3.2. The guarantee should contain a clause that it is non-puttable, unconditional, payable on first call and without objection right with a possibility for partial realisation and renewable to a amount of 15% of the offered price in the final Bid.

15.3.2. Guarantee referred to in the sub-point 15.3.1. shall be submitted within 7 days from the date of final acceptance of the System and it shall be valid for 30 days after the Contract validity date.

15.3.4. The Guarantee referred to in the sub-point 15.3.1. shall be renewable each 12 months.

15.3.5 The Performance guarantee for high-quality System functioning shall be invoked in cases and in a manner set out in the Contract.

16. Criterion for awarding a public procurement contract (Economically most favourable bid):

16.1 The acceptable bid shell be the one fully satisfying all conditions and mandatory minimum requirement s for proving bidder’s capability defined in the tender documentation.
16.2 The most favourable bidder shall be the one offering economically most favourable offer.
16.3 Criterion for evaluation of the economically most favourable bid:

Note: When evaluating the below listed criteria, the Contracting authority shall include external professional persons.

Criteria	Points

16.3.1 Total price of the procurement **- 50 points**
(after the e-auction)

16.3.2 Reference list – contract(s) of implemented projects with **- 10 points**
the offered Solution with at least 250 buses operating on city lines in an EU Member State, with average min. 120.000 (hundred and twenty thousand) transactions (validations) per day, operational in the past 3 years

16.3.3 Reference list of implemented projects with offered **- 5 points**
solution from an EU city with a participation of several legal entities in the city-line transport and income share (clearing) between them, operational for minimum of 3 years.

16.3.4 Quality of offered solution **- 35 points, as follows:**

16.3.4.1. Module for development of timetables and drivers rosters
- 6 points

16.3.4.2. Module for real-time monitoring of vehicles
- 6 points

16.3.4.3. Technical solution
- 5 points

16.3.4.4. Module for dynamic graphic layout of numbers of passengers per vehicles / line and workload of the bus stands
- 5 points

16.3.4.5. System possibility for parallel use of Mifare and Calypso cards
- 5 points

proof – reference list of implemented projects with Calypso and Mifare cards

16. 3.4.6. Mobile Payment where the mobile device communicates with the validator
- 8 points
as follows:

16.3.4.6.1. number / types of mobile telephones supporting mobile payment
- 4 point

16.3.4.6.2. duration of payment operations - 2 points

16.3.4.6.3 transaction safety
- 1 point

16.3.4.6.4 .simplicity of control procedure - 1 point

Total
100 points

16.2 The interpretation of criteria into points when selecting economically the most favourable offer, the Contracting authority evaluates in accordance with the following methodology:

16.3.1. Price (50 points) – the bid shall be evaluated in percents compared to the lowest offer bid and such bid shall be multiplied with the maximum number of points and the sum shall be divided with the subject bid price using the following formulae:

$$\text{Number of points} = \frac{\text{lowest offered price} \times \text{maximum number of points}}{\text{bid price}}, \text{ or}$$

$$S = \frac{C_{min} \cdot X}{C};$$

interpretation of the symbols:
S = awarded points
C= bid price
Cmin = lowest offered price
X = maximum number of points

16.3.2. Proof for the criterion No.3.2 shall be stamped copy of the Contact for each implemented solution, respectively, reference from the Contractor for successfully implemented contract, Statement from the Contractor for the total number of system validation in 2011 and contact data of the Contractor. During the evaluation, upon a request from the Contracting authority, the bidder shall organise onsite visit of one of the pointed locations where system has been implemented.

16.3.3 Proof for the criterion No. 3.3 shall be Notification from the bidder stating that among implemented solutions there are several transport entities and that there is income sharing (clearing) existing among them (The bidder shall submit contact data of all participants in the implemented transport solution). During the evaluation, upon a request from the Contracting authority, the bidder shall organise onsite visit of one of the pointed locations where system has been implemented.

For the criteria No. 3.4.1, 3.4.2, 3.4.3, 3.4.4 and 3.4.6, the bidder must mandatory prepare and organise presentation of the offered solution. The date and time of the presentation shall be agreed with each bidder individually on the day of opening the bids.

The bidder must provide all necessary technical pre-requisites for the presentation of the offered application (proper software and hardware) at the location of the Contracting authority. For the purposes of detailed evaluation, the whole equipment should be left available to the Committee up to the finalisation of the procedure.

When presenting the bidders' solutions, the Contracting authority shall compare the functional and analytical features and advantages of the offered solutions and in accordance with the presentations and independent evaluation by the Committee, shall perform proper evaluation.

For the criteria 3.4.1, the possibility for creating timetables and drivers schedules shall be evaluated along with the possibility to minimise the needed vehicles and personnel to satisfy the set out transport services, possibility to develop graphical and numerical timetable, taking into account prevously collected data on the line workload, possibility for prompt development of alternative timetables, form of output reports, possibility to "harmonise" the timetables and avoiding large descrepances in the time intervals between busses and other functionalities of the aplication.

For the criteria 3.4.2 possibility to monitor vehicles in real time on vector and raster maps shall be evaluated, possibility of prompt grouping and monitoring the vehicles in accordance with different criteria (allocation to auto base, line, carrier, corridor, driver's organisational unit), visual clearance and legibility of offered maps and diagrams, possibility of alternative routes, communication between Dispatch centre and the vehicles and group of vehicles, generating proposal for correction of current irregularities when implementing the planned timetable, possibility to generate activity report for each dispatcher, possibility to reproduce the on-going of the timetable in another prior time interval along with other application functionality.

For the criteria 3.4.3 the technical solution for the Data centre shall be evaluated, along with the server infrastructure, architecture of the network solution, devices and manner of communication between individual parts of the system, manner of data protection and access limitation etc. For such purpose, the bidder should allow access to the Committee to their Data centre to be presented with the given details of the presentation.

For the criterion 3.4.4 the possibility for monitoring of average number of passengers shall be evaluated, along with the workload of the bus stands based upon passenger validation data on each bus stand. This application should provide real time graphical and numerical indicators.

For the criterion No. 3.4.5, the bidder shall submit proof in a form of signed separate copy of the Contract for each implemented solution, statement from the Contractor then the project was satisfactory implemented and functional with Calypso and Mifare cards along with the contact data of the Contractor.

For the criterion 3.4.6.1 types of mobile phones which can be used for payment shall be evaluated. The bidder should submit statement about types of mobile phones which can be used for payment and demonstrate the payment.

For the criterion .4.6.2 the duration of the payment operation via mobile phones shall be evaluated including the preparation time for the payment to the payment detection by the validator.

For the criterion 3.4.6.3 transaction safety of the mobile payment shall be evaluated.

For the criterion 3.4.6.4 the simplicity of the control procedure for mobile phone payment shall be evaluated, in terms of duration of the control and eventual possibility for the misuse by the passenger.

17. Public opening of the bids

17.1. Public opening of the bids shall be held on 07.03.2013 at 13:00 hours local time at the premises of the Contracting authority, meeting room, bul "Aleksandar Makedonski" No. 10, Skopje.

17.2. The bidder may have his/her authorised representative at the public opening of the offers, and the authorized representatives shall bring with them to the public opening an authorization signed by a responsible person which shall be given in writing to the Committee for Public Procurement (hereinafter: the Committee).

17.3. The authorized representatives of the bidders can participate in the procedure of the public bid opening by providing their comments in the minutes of the bid opening.

18. Confidential information

18.1. Contracting authority shall protect the information designated by the bidder as confidential, especially in cases of business secrecy or royalty rights, except in cases where the Contracting authority is duly bound to submit these information to the authorities (initiating a complaint, administrative dispute or similar). For that purpose, the bidder should submit a List of confidential information in the Form 9A enclosed to this tender documentation and it shall submit it along with his/her offer.

18.2. Providing the bidder does not submit the List of confidential information along with the offer, the Contracting authority shall regard the subjected offer does not contain confidential information.

18.3. The bid price shall under no circumstance be regarded as confidential information.

19. Notifying the bidders

All bidders participating in the Public Procurement procedure shall be notified in writing about the selection of the most favourable bid, within a period of 3 days after the decision about awarding the Contract. Enclosed to the notification, the Contracting authority shall submit a copy of the decision and justification, thereof.

20. Legal protection

Each bidder, along with any economic operator who collected tender documentation, can at any time during the procedure submit claim to the Public Procurement Committee and simultaneously to the State Committee acting upon complaints from public procurements.

Unsatisfied bidders along with the entities who have collected the Tender documentation are entitled to submit a complaint against the Decision for selection.

21. Rights and obligation of the Contracting authority and the bidders

Mutual rights and obligations of the Contracting authority and the bidder related to the realisation of the PPC shall be defined in the PP Model Contract, enclosed to this Tender documentation.

22. Signing the PP Contract

PP Contract shall be signed with the most favourable bidder (after the finalisation of the Decision for selection of the most favourable bidder) in deadline not longer than 180 days from the day of opening the bids.

Contracting authority may sign the PP Contract with the second-ranked bidder under the same conditions and in the same deadline applicable for the first-ranked bidder, provided the first-ranked bidder failed to comply the conditions and did not sign the PP Contract within the deadline referred to in the paragraph 1 of this point, and the deadline for signing the Contract commences at the moment of submission of the written invitation to the second-ranked bidder.

Duration of the Contract shall be 3 (three) years and 10 (ten) months, as of the date of its entry into force.

23. Application of the legislation

Any issue not regulated in the tender documentation shall be subject to the Law on Public Procurements and the Law on Obligations.

III. Contract Model[2]

CONTRACT
FOR THE PROCUREMENT AND IMPLEMENTATION OF THE AUTOMATIC VEHICLE LOCATION SYSTEM AND THE SMART TICKETING SYSTEM IN THE VEHICLES OF JSP SKOPJE

Pursuant to Article …. of the Public Procurement Law (The Official Gazette of the Republic of Macedonia No. 136/2007, 130/2008, 97/2010, 53/2011 and 185/2011),

[2] The text of the Contract is not final and shall be finalized depending on the Economic Operator's Bid, under the condition the so defined text is not deviating from the basic elements contained in the TenderD.

Contracting parties:

1. **Public Transport Enterprise SKOPJE,** headquartered at Bul. Aleksandar Makedonski br. 10, Skopje, represented by its Director Mišo Nikolov (henceforward: Contracting Authroity), on the one hand,

and

2. _____
represented by _____ (henceforward: Carrier of the Procurement), on the other

On _____ 2013 concluded the following

CONTRACT
FOR THE PROCUREMENT AND IMPLEMENTATION OF THE AUTOMATIC VEHICLE LOCATION SYSTEM AND THE SMART TICKETING SYSTEM IN THE VEHICLES OF JSP SKOPJE

Subject of the Contract

Article 1

The Carrier of the Procurement for the procurement, installation, commissioning, and maintenance of the automatic vehicle location system and the electronic (intelligent) smart ticketing system in 500 buses of the Contracting Authority (henceforward: the System), and the provision of the functioning of the System until the end of this contract, regulates the mutual rights and obligations of the Contracting Authority and the duration of this contract, in accordance with the Public Advertisement No. 70/2012 published on ESPP, the Official Gazette of the Rep[ublic of Macedonia No. 05 of 9 January 2013, and with the Tender Documentation No. _____/2013 and the accepted Bid No. _____, which are an integral part of this contract.
The System consists of two systems (sub-systems):

- system for automatic vehicle location, regulation and control of the transport service, and
- the electronic (intelligent) ticketing system with the so-called smart (henceforward: smart) tickets.

Contract Duration

Article 2

The duration of the public procurement contract (henceforward: PPC) is 3 years and 10 months, counting from the day of its entry into force.

Manner of Realisation of the PPC

Article 3

The Contracting Parties agree that the Carrier of the Procurement realises the PPC in the following manner:

- To elaborate the Main Project, and in case of deviation of the completion status from the Main Project to also elaborate the Completion Status Project;
- To procure and deliver the equipment and the materials necessary for the installation of the System;
- To deliver and install equipment of 8 (eight) points of sale for the production of personalised tickets and the sale and recharging of all types of tickets, and to deliver and install equipment in 50 points of sale which can sell and recharge all types of tickets;
- To implement training as stipulated in the tender documentation to some of the staff with the Contracting Authority;
- To carry out the installation, functioning and maintenance of the equipment for ticket personalisation and recharging;
- To enable the communication of all parts of the System with the Operational Control Centre;
- To install 500 fiscal printers in the buses of the Contracting Authority;
- To install and bring into function 3 (three) autonomous ticketing printers
- To install 40 information displays and to bring into function 50 information displays
- To provide the so-called eCloud support i.e. the overall server infrastructure (the hardware and the systemic software) necessary for the unobstructed and high performance functioning of the System, hosted at the Data Centre that meets and incorporates the international standards of information technology safety, observing thereby the rules for noise and other emission (radiation) limits, located in the Republic of Macedonia.
- To provide the data transfer including GPRS communication between the parts of the System, whereby the information from the vehicles to the Centre shall be transferred every 10 seconds;
- To maintain the functioning of the System in the course of the duration of the PPC;
- To carry out all other obligations stipulated in the tender documentation and in this contract.

The provision of a sale point, both for personalised tickets and for the recharging of tickets, shall mean the provision of the equipment, hardware and software, and the necessary linking. In one word, the Carrier of the Procurement shall have to provide for a full functionality of the sale point.

Elaboration of the Main Project

Article 4

The Carrier of the Procurement undertakes, within 30 days from the day of entry into force of this PPC, to submit to the Contracting Authority the Main Project for the System.
Along with the Main Project for the System, the Carrier of the Procurement shall also submit:

- ANNEX 1: Training Plan for Users of the System that has to correspond to the requirement by the Contracting Authority stipulated in the technical specification and the tender documentation.
- ANNEX 2: Inspection and Testing Plan for the System that has to correspond to the requirement by the Contracting Authority stipulated in the technical specification and the tender documentation.

- ANNEX 3: Regular Maintenance Plan and Procedure for the System that has to correspond to the requirement by the Contracting Authority stipulated in the technical specification and the tender documentation.
- ANNEX 4: Emergency Maintenance Plan and Procedure for the System that has to correspond to the requirement by the Contracting Authority stipulated in the technical specification and the tender documentation.

The Carrier of the Procurement undertakes to cover into the Main Project a detailed technical elaboration of the two sub-systems within the System: the smart ticketing sub-system and the public transport vehicle management sub-system, according to the specified equipment, and the elaboration shall also have to include the necessary elements for the incorporation of the equipment.
The Main Project must in all aspect correspond to the requirements of the technical specification stipulated in the tender documentation, whereas the basis for its elaboration is the preliminary design annexed to the Carrier of the Procurement's bid.
In case the Carrier of the Procurement delays the submission of the Main Project by fault of his own, the Contracting Authority shall charge him the Contractual Penalty.

Installation of the System

Article 5

The installation of the System starts from the day of adoption of the Main Project together with its annexes by the Contracting Authority.
The installation shall be carried out through defined stages and dynamics as foreseen in the Dynamics Plan for the Equipment and Software Installation (henceforward: Dynamics Plan) which represents an integral part of the Carrier of the Procurement's bid.
The Contracting Authority shall preserve the right to make amendments in the Dynamics Plan in agreement with the Carrier of the Procurement.

Article 6

The installation of the System shall have to be carried out in accordance with the Main Project and
in accordance with the existing regulations, standards and norms on quality stipulated in the technical specification and tender documentation.
The Carrier of the Procurement undertakes to apply the state-of-the-art technology and technical & technological solutions when incorporating the equipment in the System that shall improve its functionality, by way of employing patented i.e. branded technology that the Carrier of the Procurement has available.
The Carrier of the Procurement undertakes to implement the full software that shall provide for the functioning of the System.
The Carrier of the Procurement undertakes, in case minor amendments arise in the regulations throughout the duration of the PPC, to make the necessary alterations in the software. The Carrier of the Procurement shall make these alterations at his own expense.
In case the Contracting Authority asks for significant alterations in the software, such an alteration shall be regulated by way of an annex to this contract.

Article 7

The Carrier of the Procurement undertakes to install and commission the System (the final commitment of the System) within the deadline of _____ days from the day of entry into force of this PPC.

In case the Carrier of the Procurement fails to implement the System by fault of his own, within the deadline of Paragraph 1 of this Article, the Contracting Authority may allow for an additional deadline for the installation and commissioning of the System, but not longer than 15 days.
In case the Carrier of the Procurement delays the installation and commissioning of the System (the final commitment of the System) by fault of his own, the Contracting Authority shall charge a Contractual Penalty for each day of the delay.
In case the Carrier of the Procurement fails to install and commission the System within the additionally allowed deadline and/or the final commitment is not carried out, this contract shall be deemed terminated by fault of the Carrier of the Procurement, and the Contracting Authority shall fully invoke the Guarantee of Article 31 of this contract.

System Installation Monitoring Commission

Article 8

The Contracting Authority, for the purpose of adoption of the Main Project and monitoring of the installation of the System, shall establish a special System Installation Monitoring Commission (henceforward: Monitoring Commission).
The Contracting Authority may, instead of the Monitoring Commission, entrust the activities of Paragraph 1 of this Article to another professional institution, at his own expense.
The Commission of Paragraph 1 of this Article shall carry out the control of the compliance of:

- The Main Project with the requirements of the technical specification stipulated in the tender documentation;
- The installed system (completion status) with the Main Project and the requirements of the technical specification stipulated in the tender documentation;

The Monitoring Commission shall carry out the control and verification of the quality of the implementation of all types of activities and the application of regulations, standards and technical norms during the installation of the full System and shall draw up a report on its own work that shall be submitted to the Contracting Authority.
The tasks and the subject of activities of the Monitoring Commission shall be more closely defined in the Commission Establishment Decision which shall have to comply in all aspects with this contract.

System Commitment Commission

Article 9

The Contracting Authority, in addition to the Monitoring Commission, shall also establish the Commitment Commission that shall undertake:

- the commitment of each completed stage (completion status) of the installation of the System;
- provisional commissioning of the full System;
- final commissioning of the full System.

The tasks and the subject of activities of the Commitment Commission shall be more closely defined in the Commission Establishment Decision which shall have to comply in all aspects with this contract.

Article 10

The Commitment Commission shall undertake the commitment of each stage of the System within the deadline of 3 (three) days from the day of completion of each stage of implementation of a part of the System, with a mandatory presence of a representative from the Carrier of the Procurement.

After each inspection carried out on a part of the System of Paragraph 1 of this Article the Commission shall draw up minutes for the inspection made, that shall be submitted to the Contracting Authority not later than 3 days from the day of commitment.
In case the Commission identifies shortcomings, it shall order the Carrier of the Procurement to eliminate those shortcomings within a deadline stipulated in the minutes.
The commitment procedure shall be repeated until the successful commitment of each stage in the implementation of the System within the deadline of Article 9 of this contract.

Temporary and Final Commitment of the System

Article 11

During the temporary and the final commitment of the implemented System, the Commission shall, upon the inspection, draw up minutes for the inspection made, that shall be submitted to the Contracting Authority not later than three days from the day of commitment.
In case the Commission identifies shortcomings during the commitment of Paragraph 1 of this Article, it shall order the Carrier of the Procurement to eliminate those shortcomings within a deadline stipulated in the minutes.
In case when the Carrier of the Procurement fails to eliminate the shortcomings within the deadline of Paragraph 2 of this Article, the Contracting Authority shall have the right to invoke the Guarantee for the Timely and Quality Installation of the System in the amount necessary to eliminate the shortcomings.

Article 12

The temporary commitment of the System is the commitment that takes place upon the completion of the implementation of the full System prepared for a trial work.
The Carrier of the Procurement undertakes to prepare the System for a trial work (temporary commitment of the System) within a deadline of _____ (____) days from the day of elaboration of the Main Project, but not later than 300 (three hundred) days from the day of entry into force of the PPC.
In case the Carrier of the Procurement delays the preparation of the System for a trial work by fault of his own, the Contracting Authority shall charge him the Contractual Penalty for each day of the delay.
From the day when the temporary commitment was made shall start the trial work period of the System that shall last no longer than 30 (thirty) days.
The trial work means the testing of the full System, whereby the System is commissioned to a full functionality.
The Carrier of the Procurement undertakes, upon completion of the trial period, to eliminate al the identified shortcomings in the functioning of the System.

Article 13

The Carrier of the Procurement undertakes, not later than 10 days before the completion of the trial period, to submit an application to the Contracting Authority for a the final commitment of the System.
The final commitment of the System means the commitment of the full System that had been brought into the condition of a full functioning.
During the final commitment of the System, the Commitment Commission shall verify whether the installation of the System is compliant with the technical specification stipulated in the tender documentation, the Main Project or the Completion Status Project, and also whether the obligations had been met that were undertaken by the Carrier of the Procurement under the provisions of this PPC.

The final commitment of the System shall be confirmed by way of signing the commitment protocol, which shall be signed by the Commitment Commission and the Carrier of the Procurement.

Functioning of the System

Article 14

The Carrier of the Procurement undertakes to secure the continuous functioning of the System, starting from its final commitment until the expiration of the validity period of this contract.
In case the System fails to function for 24 hours, the penal provisions of this contract shall apply.

Article 15

The Carrier of the Procurement shall have to provide the so-called eCloud support for the System. This includes the provision of the hardware (servers), system software, database, communication devices, etc. that shall be installed in their Data Centre. The Carrier of the Procurement undertakes to provide high performances of the applications for the automatic vehicle location and the smart ticketing subject to this procurement. He shall also enable its connection to other parts of the System.

For the services of Paragraph 1 of this Article, the Contracting Authority shall pay to the Carrier of the Procurement a monthly fee for the **eCloud** service in the amount of **0.6%** of the value of the procurement of this contract. This monthly fee shall also include the maintenance of the applicative software for the AVL and STS as well as the costs for the full generated GPRS traffi.

Article 16

The Data Centre shall have to meet the highest standards for the provision of a permanent and continuous functioning of the System, data safety, protection against unauthorised access, fire protection, and other safety standards, in all aspects compliant with the requirements of the tender documentation and the technical documentation.

System Functioning Monitoring Commission

Article 17

For the purposes of monitoring the functioning of the System, the Contracting Authority shall establish a the System Functioning Monitoring Commission.
The tasks and the subject of activities of the Commission of Paragraph 1 of this Article shall be more closely defined in the Commission Establishment Decision which shall have to comply in all aspects with this contract.

Training of Some of the Staff with the Contracting Authority

Article 18

In compliance with the Training Plan (Annex 1 of Article 4 of this contract) in the course of the implementation of the System, and not later than the final commitment of the System, the Carrier of the Procurement shall implement training of persons appointed by the Contracting Authority.
The Contracting Authority shall provide the training premises, at his own expense.
The Carrier of the Procurement undertakes to provide for the Contracting Authority in the meaning of Paragraph 1 of this Article, the training equipment and materials in Macedonian language.

Data & Information Confidentiality

Article 19

The Contracting Authority shall be authorised to enter and update the data (on timetable, vehicles, drivers, tariffs, etc.) in the System database.
The Contracting Authority shall have the right to ownership of all the data in the System database, and these shall be considered a business secret.

Article 20

The Carrier of the Procurement undertakes to keep all the data and information that he may learn in the course of the realisation of this contract as a business secret.
The Carrier of the Procurement shall not have the right to use data from the database outside the System, nor to report them or transfer them to other persons without prior authorisation. In the contrary case, the Contracting Authority shall have the right to claim criminal liability from the Carrier of the Procurement and to claim compensation of the incurred damage, under the law.
The obligations of Paragraph 1 of this Article shall remain valid even after the termination of the contract.

Article 21

The Carrier of the Procurement undertakes to implement all the measures necessary to prevent the loss of data from the System in whatsoever circumstances (in case of software error, communication line problems, or electric power shortage in the data feeding, transmission or updating processes, etc.).
In case of data loss that has not originated through a fault of the Contracting Authority's staff, the responsibility for the data loss shall be borne by the Carrier of the Procurement, who shall then have the obligation to compensate the damage and reconstruct the lost data at his own expense.

Obligations by the Contracting Authority and by the Carrier of the Procurement

Article 22

Contracting Authority undertakes:

- To commit the work premises and to provide the conditions for the hardware and software installation to a functioning level 0, 1 and 2 of the System;
- Within the internal safety regulations to enable to the Carrier of the Procurement unlimited access to premises and vehicles where the equipment of the System shall be installed;
- To provide for the Carrier of the Procurement the use of data necessary for the elaboration of the Main Project and the System software;
- To appoint person(s) responsible for the hardware and software operation;
- In an interval of every two months to consider the requests by the Carrier of the Procurement relating to the improvement of the System.

Article 23

In order to realise the PPC, the Carrier of the Procurement undertakes:

- To deliver the equipment in its original packaging, suitable for transport of that type of equipment to the place of delivery and installation;

- The delivered equipment and containers shall have to include a certificate of origin and a producer's certificate vouching for the genuine product, and timely and in writing to inform the Contracting Authority about the time of each delivery of the elements of the System;
- To submit to the Contracting Authority the full technical documentation for the entire equipment delivered (hardware and software) with notarised product warranties and description of the entire system, with a detailed description of each function and each sub-system, user manual and technical maintenance manual, technical description and technical characteristics, hardware handling, measuring and maintenance methods, hardware and software installation and configuration, sketches and graphs, etc.
- To submit a detailed functional description of the hardware and software that shall be installed (functional description of the System and its elements);
- To submit the accompanying documentation and literature referring to the technical characteristics, quality and the technical documentation. The documentation referred to herein may be in the English language, in a paper or electronic form, under the condition accurate translation into Macedonian language is provided for the adequate parts. The Contracting Authority shall preserve the right, for a part of the documentation submitted in English, to allow to the Carrier of the Procurement a deadline for the submission of translation of that part of the documentation;
- To designate a work team headed by a manager, who shall be responsible for the implementation, and to notify the Contracting Authority thereof in writing.
- To install the equipment and to integrate it in the information system of the Contracting Authority, to test it and commission it according to the Inspection and Testing Plan (Annex 2 of Article 4 of this contract);
- In case there are deviations from the completion status of the Main Project, not later than one month from the day of the final commitment of the System by the Contracting Authority's Commission, to submit to the Contracting Authority a Project in both paper and electronic form that shall include the real distribution of the equipment and its connection points and also the software configuration. The Completion Status Project must contain a detailed specification of all the hardware elements and devices in the vehicles;
- To submit a detailed description of all the installed software components;
- To submit the flow charts of all the functional interdependencies and interrelations of the installed hardware and software components;
- To submit all the relevant technical descriptions, sketches and flow charts;
- Before commission of the System to enter the data on the coordinates of the bus stops, lines and bus stop distances.
- In the shortest possible period and without obstructing the operation of the System to replace the appropriate parts of the equipment or the integral equipment that shall manifest an error originating from the same reason twice within a period of one year from the temporary commitment.
- Before commencing the installation of the equipment, to submit a certificate of electromagnetic compatibility.

Article 24

In order to realise the PPC, the Carrier of the Procurement undertakes:

- To elaborate the Main Project, and in case of deviations from the completion status of the Main Project, to elaborate a Completion Status Project;
- To procure the equipment and the materials;
- To implement the equipment and the software;
- To implement the training according to the Training Plan;
- To inform the passengers about the usage methods of the System;
- To procure all the types of tickets;
- To carry out the installation and functioning of the equipment for ticket personalisation and ticket recharging;
- To organise the passenger complaint service;
- To enable the communication of all parts of the System with the Operational Control Centre;
- To keep the full System in a state of quality functioning throughout the guarantee period;

Article 25

The Contracting Authority shall inform the Carrier of the Procurement about each relocation of the equipment in the vehicles, the car base or the Control Centre.
In case of need to relocate the equipment of Paragraph 1 of this Article, the Carrier of the Procurement shall carry out disassembly and reassembly of the equipment within an agreed deadline.
The relocation of the equipment shall be regulated by way of an annex to this contract.

Article 26

The Carrier of the Procurement undertakes, in the course of the duration of this contract, to incorporate technical alterations and innovation in the equipment and software, following the manufacturer's instructions and in accordance with the work safety regulations and the regulations enhancing the safety of the equipment or the software, without additional costs.
The Carrier of the Procurement may, in the course of duration of this contract, and by a written consent by the Contracting Authority, incorporate technical alterations and innovations that enhance the functionality and the capacities of the equipment and the software.
The incorporation of the technical alterations and innovations of Paragraph 2of this Article shall be regulated by way of annex to this contract.

Article 27

The Carrier of the Procurement undertakes, in the course of the duration of this contract, to maintain the fully installed equipment and software as part of its regular and emergency maintenance and in accordance with the plans and procedures of annexes 3 and 4, of Article 4 of this contract, following the requirements of the tender documentation.

Article 28

The Carrier of the Procurement undertakes, on the territory of the city, for the purpose of sale of the tickets, and following the list provided by the Contracting Authority, to equip 8 (eight) points of sale for the issuance of personalised tickets and the sale of recharging of tickets, and 50 points of sale that shall sell and recharge the non-personalised tickets, to install 3 automatic vendor machines for the sale and recharging of the non-personalised tickets, to provide and install 500 fiscal printers in the buses of the Contracting Authority.

The Carrier of the Procurement undertakes to fulfil the obligation of Paragraph 1 of this Article before the temporary commitment of the System.

Value of the Contract

Article 29

The total value of the Contract for the Procurement, Installation and Commissioning of the System, in all aspects compliant with the subject of the contract of Article 1 of this contract, shall amount to _____ (in writing: ___) euros/denars, to which the VAT is calculated in the amount of _____ (in writing: ____) euros/denars, or a grand total of _____ (in writing: _____) euros/denars.

Payment Terms

Article 30

The Contracting Authority undertakes to pay the price of the completed procurement, installation and commissioning of the System, subject to this contract, in 3 (three) equal annual instalment, upon submission of an invoice.
The subject to this contract shall be considered fully realised when the System Commitment Protocol is signed.

Guarantee for a Timely and Quality Implementation of the System

Article 31

The Carrier of the Procurement undertakes within a deadline of 7 days from the signing of the PPC to submit to the Contracting Authority an original Bank Guarantee for a timely and quality implementation of the System, whose period of validity shall be 30 days longer than the expiration of the deadline for the final commitment of the System.
The Guarantee shall include a clause that it is “irrevocable, unconditional and payable upon first invocation and without the right to objection, partially payable and renewable” in the amount of 5% of the value of the PPC or _____ (_____) euros/denars.
In case of partial payment of the Guarantee before the final commitment of the System, the Carrier of the Procurement undertakes to renew it within a deadline of 15 days from the day when the Guarantee was partially paid.
If, within the defined deadline of Paragraph 3 of this Article, the Carrier of the Procurement fails to renew the Guarantee, the PPC shall be deemed terminated by fault of the Carrier of the Procurement, and the Contracting Authority shall collect the remaining part of the Guarantee.
If, within the defined deadline of Paragraph 1 of this Article, the Carrier of the Procurement fails to renew the Guarantee, this contract shall not instigate legal action, and the Contracting Authority shall have the right to collect the Guarantee for the participation in the procedure.

Invocation of the Guarantee for a Timely and Quality Implementation of the System

Article 32

The Contracting Authority shall partially invoke the Guarantee to collect the Contractual Penalty of Article 40 of this contract in the amount of the Contractual Penalty that needs to be collected, in case the Carrier of the Procurement, by fault of his own, delays:

- The elaboration of the Main Project (Article 4 of this contract);
- The temporary commitment of the System (Article 12 of this contract);

- The training of some of the staff with the Contracting Authority (Article 18 of this contract);
- The equipment of 8 (eight) points of sale for the issuance of personalised tickets, and also for the sale and recharging of all types of tickets, and of 50 points of sale that shall sell and recharge all types of tickets (Article 28 of this contract);
- The installation of 3 automatic vendor machines for the issuance and recharging of the non-personalised tickets (Article 28 of this contract);
- The provision and installation of 500 fiscal printers in the buses of the Contracting Authority (Article 28 of this contract); and
- The installation and commissioning of the System (Article 7 of this contract), or its final commitment (Article 13 of this contract).

The Contracting Authority shall invoke and collect the Guarantee in full if the Carrier of the Procurement, within the additionally allowed deadline, and by fault of his own, fails to install and commission the System, that is, its final commitment is not made (Article 13 of this contract).

The Contracting Authority shall invoke and collect the Guarantee in full if the Carrier of the Procurement fails to provide the Guarantee for the quality functioning of the System within the deadline of Article 33 of this contract.

The Contracting Authority shall invoke and collect the Guarantee in full in all cases when this contract is deemed terminated by fault of the Carrier of the Procurement, or when it becomes unilaterally terminated by the Carrier of the Procurement during the validity period of the Guarantee, due to reasons that cannot be ascribed to the Contracting Authority.

Guarantee for quality functioning of the System

Article 33

Within 7 days from the expiry of the performance guarantee for the System, the Carrier of the Procurement shall be obliged to submit to the Contracting Authority an original bank guarantee for quality functioning of the System for a duration of 3 years and 10 months, with an obligation to successively renew it within 15 days from the date the last guarantee ceased to be valid, and the guarantee is valid for another 30 days after the Contract expires.
The guarantee should include a clause "non-revocable, non-conditional, payable upon first call without a right to object, with an option for partial realisation and renewable", in the amount of 15% of the PPC value or _____ EUR/denars (_____) EUR/denars.
If the Carrier of the Procurement fails to furnish the Guarantee within the deadline stipulated in paragraph 1 of this Article, the PP Contract will be deemed as terminated due to non-compliance by the Carrier of the Procurement, and the Contracting Authority will invoke the Guarantee referred to in Article 31 of this Contract.
If the Carrier of the Procurement fails to furnish the Guarantee within the deadline stipulated in paragraph 1 of this Article, the PP Contract will be deemed as terminated due to non-compliance by the Carrier of the Procurement, and the Contracting Authority will invoke the Guarantee referred to in Article 31 of this Contract.

Activation of the Guarantee for quality functioning of the System

Article 34

In case the System is not functional between the final acceptance and the expiration date of the PP Contract, or the shortcomings are not rectified within the deadlines set in Appendices 3 and 4 and Article 4 of this Contract, or the obligations which are subject of this Contract and the Bid are not fulfilled, the Contracting Authority will activate and collect in full the Guarantee.

The Contracting Authority will activate the Guarantee in full in all cases when this Contract is deemed terminated due to fault of the Carrier of the Procurement, or is unilaterally terminated by the Carrier of the Procurement for the duration of the Guarantee, due to reasons that may not be attributed to the Contracting Authority.
In case the Guarantee of Article 33 in this Contract is not activated, it will be returned to the Carrier of the Procurement within 30 days from the expiration of the PP Contract.

Collection of guarantees and compensation claims

Article 35

The Contracting Authority has the right to collect the Guarantees even when their amount exceeds the suffered damages, as well as in cases when no damages have occurred.
If the damages suffered by the Contracting Authority are exceeding the Guarantee amounts, it shall have the right to claim the difference up to the full amount of the claim compensation.

Contractual penalty

Article 36

In case the deadlines stipulated in Article 4 of this Contract have been broken, and due to reasons that may be attributed to the Carrier of the Procurement, the Carrier of the Procurement shall be obliged to pay a fine to the Contracting Authority in the amount of 6 000 (six thousand) EUR, expressed in equivalent denar value according to the middle exchange rate of NBRM on the day of payment for each extra day after the deadline, upon the defined deadline schedules in the Schedule Plan, and not more than 200 000 (two hundred thousand) EUR.
In case the Carrier of the Procurement fails to ensure functioning of the complete System in the period between the final acceptance and the expiration date of the Contract, or fails to rectify the shortcomings that have occurred within the deadlines set in accordance with the Plan and Appendices 3 and 4 and Article 4 of this Contract, due to reasons that may not be attributed to the Contracting Authority, the Carrier of the Procurement shall be obliged to pay to the Contracting Authority a fine of 4 000 EUR expressed in equivalent denar value according to the middle exchange rate of NBRM at the day of payment for each day after the deadline, and not more than 400 000 (four hundred thousand) EUR.
The Carrier of the Procurement shall not be obliged to pay a contractual penalty in case the non-fulfilment of the contractual obligations or the violation of the deadlines were not due to its fault.

Mutual Contract termination

Article 37

The contracting parties may decide to terminate the PPC with mutually agreement by both contracting parties, irrespective of the realisation status, at any moment, and in such case they shall determine the conditions and consequences of the termination, as well as resolve their mutual rights and obligations arising from this Contract.
Only a written agreement on the termination between the contracting parties will have a legal effect.

Unilateral Contract termination

Article 38

When this Contract expressely states that the Contract will be deemed as terminated, or there is a possibility to unilaterally terminate the Contract, as well as in other cases when one of the contracting parties fails to meet its responsibilities undertaken with this Contract, in a manner and under conditions and deadlines envisaged thereof, the Contract will be deemed as terminated, when one of the contracting parties will immediately inform the other contracting party, in writing, the it deems the Contract as terminated.
By exception from paragraph 1 of this Article, in case when the Contract does not envisage additional deadline for meeting the obligation, one contracting party may maintain the Contract in force, if it immediately informs the other contracting party that it provides an extended deadline for meeting the undertaken responsibilities.
If one contracting party allows the other contracting party an extended deadline in order to meet the undertaken responsibilities, and the other contracting party fails to meet the obligations within said deadline, the Contract will be deemed as terminated after the expiry of the extended deadline.
The extended deadline referred to in paragraph 2 of this Article shall not prevent the Contracting Authority to collect the contractual penalty referred to in Article 36 of this Contract.

Unilateral Contract termination by the Carrier of the Procurement

Article 39

The Carrier of the Procurement may terminate this Contract before the expiry date thereof with unilaterally expressed willingness to do so in writing.
The termination deadline referred to in paragraph 1 of this Article shall be 120 days.

Unilateral Contract termination by the Contracting Authority

Article 40

The Contracting Authority may terminate the Contract in the following cases:

- If the Carrier of the Procurement fails to install or make operational the System even with the extended deadline (Article 7, paragraph 4 of this Contract);
- If the System is not functioning in accordance with the manner, terms and deadlines envisaged in the Contract;
- In other cases defined in the Contract.

The Contracting Authority may terminate this Contract with unilateral expression of willingness to do so in writing.
The termination deadline referred to in paragraph 1 of this Article shall be 30 days.

Bankrupcy or Liquidation of the Carrier of the Procurement

Article 41

The Contract will be deemed terminated due to fault of the Carrier of the Procurement in case a bankrupcy or liquidation procedure is initiated thereof.

Force Majeure

Article 42

The contracting parties agree that none of the contracting shall be liable to the other contracting party due to violation or non-performance of this Contract in case of Force Majeure.

In the cases referred to in paragraph 1 of this Article, the contracting parties shall agree to new terms and deadlines for fulfilment of this Contract or shall mutually terminate it.
Force Majeure shall mean events outside the control of the contracting parties that may not be opposed to or influenced in any way, thus making the implementation of this Contract impossible.

Accidental deterioration or destruction

Article 43

For the duration of the PP Contract, and until the completion of the contractual obligations, the risk of deterioration or damages to the equipment shall be at the expense of the Carrier of the Procurement.
The Contracting Authority shall be obliged to undertake all measures in order to protect the equipment in the operating control centre against accidental deterioration and damages.
In the event mentioned in paragraph 1 of this Article, the Carrier of the Procurement shall have no right to compensation claim for suffered damages.

Extension of the PPC

Article 44

The period for which this Contract is signed may be extended with an Annex in special cases as follows:

- If the System functioning has been interrupted or delayed due to objective reasons which may not have been envisaged during the preparation of the Main Project, for which an expert opinion is given by a Commission appointed by the Contracting Authority;
- In the event of Force Majeure;
- If the functioning of the System becomes interrupted or delayed due to administrative obstacles (administrative measures, decisions of state bodies, regulations or similar) for which the Carrier of the Procurement is not responsible;
- In other cases envisaged in the Law.

Contracts with third parties

Article 45

The provisions of this Contract signed by the Carrier of the Procurement and third parties for the purpose of fulfilling the obligations of this Contract, shall be subject to the provisions in this Contract and must be in compliance thereof.

Article 46

The Carrier of the Procurement shall be liable for the damanges that have occurred due to its own fault: in case of complete or partial realisation of the contractual obligations, the damages that have occurred due to System shortcomings, as well as damages due to omission by the Carrier of the Procurement or by third parties contracted by the Carrier of the Procurement, for the amount of the actual damages and incurred losses, provided the damages suffered by the Contracting Authority is higher than the amounts of the guarantees referred to in Article 31 and 33 of this Contract.

Incurred losses shall be the revenues of the Contracting Authority generated in a period during which the failure was rectified commensurate to the average daily revenues in the last 3 months prior to the occurrence of the failure.

Article 47

The Carrier of the Procurement shall not be responsible for any data loss as a result of additional actions, software and hardware modification caused by unauthorised use by the employees of the Contracting Authority.
In case the employees of the Contracting Authority followed the enclosed instructions furnished by the Carrier of the Procurement, the responsibility for the data loss shall be covered by the Carrier of the Procurement, with an obligation to compensate the damages and reconstruct the lost data on its own expense.

Article 48

None of the contracting parties shall be entitled to assign this Contract or any of its rights and obligations to third parties without consent of the other contracting party.

Valid Law

Article 49

This Contract and the relations between the Contracting Authority and the Carrier of the Procurement shall be conducted and considered in accordance with the laws and regulations in the Republic of Macedonia.

Applicable Laws

Article 50

The provisions in the Public Procurement Law, Contractual Law and other positive legislation in the Republic of Macedonia shall apply to all issues not regulated in this Contract.

Dispute resolution

Article 51

The contracting parties are willing to negotiate in good will and resolve any disputes, misunderstandings or requests arising from and/or in relation to the Contract, including, without any limitations related to its existence, validity or termination.

For the purpose of such negotiations, the contracting parties will assign their representatives within 7 days fom the date when the other contracting party has received in writing the detailed notification for dispute.
In case both contracting parties fail to come to mutual agreement in relation to the dispute subject within 30 days from the date of receipt of the detailed explanation on the dispute, each of the contracting parties shall retain the right to initiate proceedings before the competent court in the Republic of Macedonia to resolve the dispute.

Confidentiality

Article 52

The contracting parties, their employees and consultants hereby agree that they will treat as confidential all documents related to this Contract, including the Contract itself, information of

technical and commercial nature, as well as the documents related to the financial and other indicators related to the PPC, and shall prevent access to third parties thereof, except in cases where it is required by the valid regulations in the Republic of Macedonia or when they need to be presented before competent authorities in order to obtain the resepctive approvals and permits related to the PPC.
The obligations of the contracting parties stipulated in this Article shall remain in force after the Contract termination.

Notifications

Article 53

All notifications between the contracting parties will be in writing and will be delivered by courier or via registered mail.

Amendments and supplements

Article 54

The amendments and supplements to this Contract will be made in writing in a form of an Annex to this Contract, in accordance with the Public Procurement Law and the Contractual Law.

Separability

Article 55

If any of the provisions in the Contract, is fully or partially void or unenforceable:

- The remaining provisions will remain in effect without any changes; and
- The contracting parties will convene as soon as possible in order to conduct good will negotiations to replace the void or unenforceable provisions with new ones that will become legally valid and will be as relevant as possible to the realisation of the goals of this Contract.

Contract language

Article 56

This Contract is drafted in Macedonian.
All amendments, additions and appendices to the Contract will also be drafted in Macedonian.
The language of written communication between the contracting parties shall be Macedonian.

Appendices

Article 57

The following appendices are comprising part of this Contract:

- Appendix 1 – Tender Documentation with technical specifications; and
- Appendix 2 – Bid of the selected Bidder.

The Contract and all of its appendices shall represent a whole unit.
In case of differences between the Contract and the appendices, the Contract provisions shall prevail.

Entry into force

Article 58

This Contract shall enter into force on the day the performance guarantee is delivered.

Number of Contract copies

Article 59

This Contract is drafted in 6 (six) equal copies, of which 3 (three) copies for each contracting party.

FOR THE CONTRACTING AUTHORITY PROCUREMENT	**FOR THE CARRIER OF THE**
Director	**Responsible person**
_____	_____
M.Sc. Mišo Nikolov	

IV. TECHNICAL SPECIFICATION

OF THE TENDER DOCUMENTATION FOR PROCUREMENT, INSTALLATION AND MAINTENANCE OF AN AUTOMATIC VEHICLE LOCATION SYSTEM AND SMART TICKETING SYSTEM OF JSP SKOPJE

Introduction

The Vision and Mission of JSP SKOPJE (hereinafter: JSP) is to become an efficient, contemporary organised and rational enterprise that will meet all needs of the citizens for a fast and efficient public inner and outer city transport (JGPPP), thus providing normal functioning and performance of everyday duties of the citizens, legal persons and state bodies existing in the City of Skopje.

The inner and outer city system for mass transportation of passengers is a very complex system and its survival requires long-term, optimal, permanent and high quality solutions for improving the system, the service quality, the efficiency and the management. It is necessary to increase the attractiveness of the public transport for the citizens and the visitors of the capital city

At the moment, there is no single communication system for traffic control and management, but JSP vehicles are partially equipped with a radio-telecommunication system and are connected to a Dispatching Centre which controls and regulates the traffic only on the lines maintained by JSP, whereas the private transport vehicles are not part of such management system. Additionally, the ticketing system is obsolete and is performed by validating paper tickets in the vehicles. The validation devices are over 20-year old technology, which is not manufactured anymore, and the procurement of spare parts and maintenance is also difficult.

Hence, there is a need to realise a project for contemporary, efficient and well-maintained vehicle location system, regulation and control of the transport service, as well as introduction of a contemporary system for ticketing, monitoring and controlling the transport of passengers, thus providing a contemporary system thereof.

The introduction of an automatic vehicle location system and a smart ticketing system is expected to achieve many economic and social benefits. Such benefits will arise from increasing the quality of transport services, strictly following the prescribed timetables, as well as allowing timely corrections and reducing the waiting time in accordance with the existent traffic situation in the City. Concerning the ticketing, this project will enable easy and swift ticketing by reducing the delay time at the bus stops. Also, there is a possibility to establish various payment methods (possibility to introduce various tariff systems). Concerning the notification of passengers, the benefits are expected in the timely provision of audio and video information on bus arrivals at the bus stops via the information displays at such bus stops, as well as via SMS messages and the Internet. One should not neglect the fuel savings due to the transport rationalisation and the reduced stopping time of the vehicles at the bus stops, thus reducing air pollution, as well as protecting the environment by replacing the paper tickets, which usually end up on the streets or the city greenery, with smart/chip card tickets that will last for at least 10 years.

General Requirements

In order to avoid additional investments, the Bidder should offer an integrated solution for an automatic vehicle location system and a smart ticketing system with contactless cards. Apart from the common hardware components which will be installed in the vehicles (GPS device, driver control unit and similar), and the single two-way data transfer system, a common control centre is also required, including hardware and software for storage and processing of the needed data. Therefore, we will consider it as a single System with two Sub-systems. The data generated by the System will be sensitive and must be protected from misuse. The access to the data must be clearly delimited, i.e., various user profiles should be defined. Also, the data should be stored on servers in secure premises with controlled access and clearly defined security protocols.

The System should use standardised components, if possible (hardware and software). All communication interfaces to external systems should be standardised or open.

All utilised components should be in compliance with the following conditions:

- Electromagnetic Interference (EMI) and emissions should be in compliance with internationally recognised standards.
- Electromagnetic Compatibility (EMC) and immunity should be in compliance with internationally recognised standards.
- The human health safety should be in compliance with internationally recognised standards.
- Operational temperature: between -20 and 50 degrees Celsius.
- Resistance to drops and vibrations, applicable to the vibrating operational part of the buses.
- The overall equipment should be in compliance with the standards for resistance to humidity, dust and other environmental conditions.

Basic Requirements for the Automatic Vehicle Location Sub-system:

- Drafting timetables and bus driver rosters,
- Vehicle management along the bus line network,
- Increasing the service quality (regularity, reliability, accuracy),
- Increasing the efficiency of the public transport system,
- Optimisation and integration of the bus line network,
- Controlling the implementation of the planned timetable,
- Controlling the drivers' work (speeding, changing routes and similar),
- Possibility for timely and effective response by the transport organiser in case of unforeseen traffic situations,
- Increasing the safety level both for drivers and passengers,
- Possibility for real assessment of the realisation percentage of the planned timetable by the city authorities, in case of payment per kilometre,
- Improving the information provided to passengers.

Basic Requirements for the Smart Ticketing Sub-system with contactless cards:

- Revenue management,
- Improving and developing the tariff policies and the tariff system,
- Possibility to integrate the tariff system for all participants of the public transport of passengers and revenues settlement between the various entities participating in the transport,
- Reducing misuse of forged tickets and monthly passes which are currently being used, and use of smart cards with better security,
- Collection of data on transported passengers by categories, bus lines and corridors,
- System simplicity and accessibility to passengers,
- Enabling more types of payments, discounts and benefits depending on passenger category, number of realised trips, time of day when trips take place, and similar,

- Collection of various statistical data that will enable calculating the profitability of each line and corridor with great accuracy.

The sub-systems will be comprised of several functional assemblies. These assemblies will be described in more details below. The Bidder is not obliged to follow the criteria given in the description of the individual assemblies to the letter, since only one of the possible solutions will be presented. The Bidder is obliged to meet all required system functionalities in its solution. For the purpose, the Bidder should draft a preliminary design.

Preliminary Design

The Bidder should draft a Preliminary Design which should be in accordance with all requirements of the Contracting Authority and the technical documentation.

The Preliminary Design should contain a Logical Architecture System Model describing in details all functionalities of both sub-systems, the Sub-system for vehicle management and the Sub-system for smart ticketing. The Preliminary Design should define and present a model of the technological processes and procedures, the implementation method, the functioning and control of both sub-systems within the System.

It should also contain a hardware and network solution for the Operational Control Centre, as well as the main requirements concerning the necessary network infrastructure which should be provided in order to realise the Project (fibre optics and copper cables, Internet connection, and similar).

The Preliminary Design should particularly focus on the data protection system, as well as on the interfaces for exchanging data with other systems. The Preliminary Design should give directions concerning the System development, user training, and performance maintenance of the overall System.

The realisation should be envisaged into stages, whereas the Preliminary Design should define the implementation scope and duration of each stage, as well as envisage the occurrence of undesired distortions which may impede realisation.

The design of the two sub-systems AVL and STS should be an integrated one and should have a single access point between the two sub-systems, as well as a single database.

Used Terms and Abbreviations

The terms used in the technical specification are not general definitions and are applied only here.

Subject and Responsible Persons:

- **Contracting Authority** – JSP Skopje,
- **Bidder** – Any economic operator or consortium of operators applying as partners in the realisation of this Project,
- **Administrator** – Person administering the System,
- **Main Dispatcher** – Person that performs global traffic monitoring and supervises the work of other dispatchers,
- **Dispatcher** – Person in charge of following certain number of vehicles/lines,
- **Operator** – Person who works in the Operational Control Centre,
- **Forwarder** – Person working in the Garage on sending and receiving vehicles,
- **Transporter** – Legal or natural person in charge of the transportation,
- **Driver** – Person qualified to drive a vehicle in the inner and outer city transportation of

passengers,

- **Servicer** – Person who installs and maintains devices,
- **Passenger** - Any person using the public transport for passengers.

Vehicles:

- **Vehicle** - Transport vehicle used in the public transport of passengers in the City of Skopje,
- **Group of vehicles** – Part of the vehicle pool, defined by a common property (e.g. all vehicles, active vehicles, backup vehicles, vehicle used on the same bus line, service vehicles, vehicles operating in three shifts and similar).

Other Terms:

- **Terminal** – Location where the bus line begins or ends,
- **Bus stop** – Location where the vehicle stops to board and disembark passengers,
- **Bus line** – Planned route followed by the vehicle negotiating the city streets with a defined starting and ending terminal,
- **Garage (Autobase)** – Location for maintaining and parking the vehicles,
- **Timetable** – Plan for performing the transport tasks for each bus line,
- **Public Transport Network** – Established network of lines with adequate accompanying infrastructure (bus stops, terminals and garages).

Abbreviations:

- **System** - Automatic Vehicle Location and Smart Ticketing System with contactless cards,
- **OCC** – Operational Control Centre, Dispatching Centre
- **AVL** – Automatic Vehicle Location Sub-system,
- **STS** – Smart Ticketing Sub-system
- **GPS** – Global Positioning System, based on determining locations by using Geo-stationary Satellites,
- **GSM** – Global System for Mobile Communications, most popular and mostly used standard in the world of mobile telephony,
- **GPRS** – General Packet Radio System for GSM,
- **GIS** – Geographic Information System, system containing all relevant data related to a specific geo-location.

Automatic Vehicle Location Sub-system (AVL)

Introduction

The Public Transport Automatic Vehicle Location (AVL) Sub-system will represent the basic tool for dispatchers and traffic engineers to manage and plan the transport of passengers.

Functions

The functionality and main requirements that should be met by the AVL Sub-system will be described in more details in the following points.

Timetables

The AVL Sub-system should enable drafting timetables by the Traffic Department of JSP Skopje in cooperation of the Traffic Department of the City of Skopje. The selected timetable should be transmitted wirelessly to all vehicles. Such data transfer will occur when the timetables change. If any of the vehicles have not updated their last timetable, due to any reason, such vehicles should be marked differently on the dispatcher's display. By using this System, large volume of input data would be received in the future, thus facilitating the creation of timetables, as well as optimising the number and operation of vehicles.

When modelling/designing the timetables it is necessary to minimize the number of required vehicles and drivers in order to perform the transport service. The application must enable creation of a graphic and numeric timetable taking into account previously acquired data on the busyness of the lines calculated using the completed validations on a specific line during a specific time of the day. When the timetables are created, corridors with several passing lines should be taken into consideration in order to avoid overlapping and simultaneous arrivals of several buses at the same bus stop.

Also, the application should take into consideration the points where the lines cross each other in order to enable transfers of passengers from one to another line.

The traffic engineers will enter data on the number of vehicles, vehicle operation mode (three shifts, two shifts, split shifts) and the time interval between 2 vehicles for a specific time of the day, and the application will create the graphic timetable that will enable the traffic engineers to spot the critical points and by changing the input parameters tune up the timetable.

As soon as the traffic engineers set the optimal timetable, the application should generate all required reports such as: line timetable, bus stop timetable, passenger timetable, driver timetable, number of vehicles in use by type and garages, number of operating drivers, planned hours of effective work and waiting times, planned kilometres per line, null mileage and similar.

The application should enable fast and easy testing of the alternative timetables and saving of each tested option.

Bus Driver rosters

The AVL Sub-system should enable drafting of bus driver rosters by the Traffic Department of JSP Skopje. The bus driver roster will be compared to currently registered drivers of certain services and if there are any differences to the planner roster, the changes will be indicated on a separate display monitored by the dispatcher/duty officer. By using this System, misuse of and changing bus drivers by certain service departments without the knowledge of the superiors would be avoided in the future.

Monitoring

Automatic Vehicle Location

All vehicles should be equipped with GPS devices for automatic vehicle location and devices for wireless communication with the Control Centre. The communication with the Control Centre will be in both directions. The vehicle will send data to the Control Centre on its current position in regular time intervals (the time intervals may be altered, but the default configuration will be set to 10-second intervals), and the Control Centre will receive all necessary information. The System should enable remote configuration of the application parameters in the vehicle by the Control Centre.

Public transport vehicles will be monitored 24 hours a day. The specific location of the vehicle must be determined with a margin of error smaller than 20 metres in the area. In case the communication between the vehicle and the Centre is interrupted, all data related to the vehicle position in a certain moment should be stored in the internal memory of the vehicle computer unit (VCU). As soon as the link with the Centre is re-established, all stored and unsent data will be sent respectively.

In case a vehicle may not be located on a specific bus line, and is located on another location in the operational area, the Control Centre should automatically receive the information on that vehicle, and said vehicle should be indicated differently from the other vehicles.

Vehicles with interrupted communication should also be indicated differently than the other vehicles (e.g. in different colour).

Trip Monitoring

The AVL System should indicate a warning to the dispatcher in case a vehicle may not register for the trip or have registered too late. It should be possible to monitor the following points related to the vehicle trip:

- Vehicle sign-in,
- Departure from the garage,
- Start from the terminal,
- Sign in/replace driver,
- Register/replace bus line,
- All departures and arrivals at the terminals,
- End of the trip including the last stop-over at a terminal,
- Leaving the garage,
- Vehicle sign-out.

Monitoring while replacing driver

The AVL System should control all planned changes of the driver. Sign-ins and sign-outs of the drivers are forwarded to the database in the Control Centre.

Timetable Monitoring

The AVL System should follow all deviations from the planned timetables of all vehicles. The time tolerance may be defined as a configurable parameter. If the vehicle is moving at a velocity that will lead to deviate more that the time tolerance, the application should inform the

dispatcher who should then undertake actions (e.g. mark the vehicle in a different colour if it is late, that is, if it arrives earlier than envisaged).

Information related to the operational status

The AVL System should enable displaying all relevant information to the dispatchers, drivers and other competent personnel in an adequate manner.

Such information is:

- Basic information related to the vehicle (whether it is in use, outside or in the garage),
- Vehicle location (at which bus line, route location, location outside the route),
- Deviation from the timetable (late, within the tolerance level, earlier than envisaged),
- Information related to the driver (basic data, working hours, sign-in, sign-out),
- Unforeseen events (technical irregularities, extra-ordinary situation and similar).
-

Information display methods in the Control Centre

Vehicle Display

The System enables monitoring of at least 1000 vehicles in real-time within deteriorating the System functionality.

The dispatcher should have at his/her disposal the following overviews:

- Bus stops including their codes and abbreviations, optionally represented in vertical or horizontal orientation,
- Division of longer bus lines into two line diagrams,
- Display of vehicle groups selected by the dispatcher on an electronic map including the vehicle icon and the garage number, line and service next to it. The mouse-over action will present the active driver data, registration number and similar. There should be a zoom-in, zoom-out option, and option to drag the map over the screen. In case the mouse is pointed over a specific bus stop, its name should be shown, and in case there is an information display, the display information should also be shown.
- It should be possible to add alternative routes (secondary routes) on the display at proportional distances between the bus stops in case the vehicles must be re-directed due to traffic obstacles,
- Scale of time intervals between bus stops, depending on the distance and the current trip velocity,
- Current distances between vehicles on a bus line,
- Representation of the vehicle in various colours depending on their status in relation to the timetable (e.g. deviation from the planned interval, elapsed time passed from departure/return and similar),
- Special markers on the display for indicating vehicles which are not signed-in or are having problems communicating with the Control Centre,
- Objects that should be always available for display to the dispatcher: bus lines, bus stops on a specific bus line, vehicles, planned vehicles on a specific bus line, content of bus stop information displays (if any), as well as other predefined objects of interest to the dispatcher,
- The vehicles may be arranged into groups, according to the line, vehicle type, garage, transporter or any combination thereof (for instance: show all vehicle type LAZ on line

no. 2 from the garage Gjorče Petrov, transporter JSP Skopje),

- Vehicle location on the maps should be presented with an arrow – direction of movement,
- The System should support raster and vector maps, as well as allow changes of the coordinate system and vehicle colours.

- ***Object Zoom Function***

Detailed information on each object (driver, vehicle, bus line, bus stop and similar) should be displayed with the help of the so-called zoom function. There should be an option to define the content of the zoom window, whereas the minimal dataset should contain the vehicle number, bus line number and name, velocity, previous and next bus stop, driver information, vehicle capacity and similar.

Printing and snapshot of the zoom window in adequate text or graphic format should be enabled.

Event Table

Events relevant to a specific drive should be available to the dispatcher and upon his/her request should be presented in an adequate table. The following data is usually entered in the event table: driver reports on assaults, robbery, vehicle malfunction, accident and other extra-ordinary situation, automatic coded message from the vehicle or a system message.

When needed, the System should enable defining other events that will be monitored by the dispatcher.

When reviewing the event table, the dispatcher should be able to define priorities, showing events by priority in descending order. After an appropriate response to a specific event, the event is automatically deleted from the dispatcher's table, but is automatically stored in the System memory.

Table of initiated actions

The AVL System should enable the dispatcher to keep an operational log, i.e., table of initiated actions. The status of each action should be shown (active/inactive) and sorting actions by various criteria should also be possible. It should be possible to select one or several actions, display detailed information on the actions, modify and delete the actions.

Monitoring of deviations during Timetable execution

The dispatcher in the Controlling Centre should be automatically notified on the deviations that have occurred. It should be possible to additionally define the types of deviations and include at least the following:

- Accidents and other extra-ordinary situations,
- Deviations from previously defined values,
- Vehicles with technical defects,
- Cancelled trips.

- The occurrence of each deviation should be accompanied by a sound.

Driver information

The vehicle computer unit (VCU) represents the main interface for communication with the Operational Control Centre (OCC). This computer is equipped with a touchscreen, monitor which should display the following data in a normal state:

- Date, time,
- Vehicle and driver number,
- Bus line number,
- Status of the communication link with the OCC,
- GSM network status,
- Name of next bus stop,
- Tariff data.

All functions should be available via the menu and said functions should be ease to use. "One touch" operations should be envisaged for routine procedures.

When entering the vehicle, the driver signs-in in the System by using his/her ID card. The VCU device shall store all authentication attempts. Each unauthorised attempt to access the vehicle should also be registered. The System should be able to identify the driver and read-out the bus schedule even in case of no GPRS connection to the Data Centre. As soon as the GPRS connection is re-established the driver sign-in should be reported to the Centre. Hence, the dispatcher / duty officer will be able to monitor how many drivers are following the planned roster, and marked in different colour see the drivers operating outside the planned rosters.

Statistics

General functions

In essence, the AVL monitors the vehicles on their designated routes.

Within the software tools, the application should enable overview of the following:

- Sign-in/sign-out registration, movement of vehicle or group of vehicles:
    - Graphic display of vehicle's movement (on a line diagram and on an electronic map),
    - Passed distance in kilometres (effective, null and similar),
    - Movement velocity and speeding,
    - Completed and uncompleted one-way trips (*distance between the beginning and the end of each bus line*),
    - Number of entries in and exits from the garage,
- Overviews of data related to the bus line:
    - Deviation from the envisaged route,
    - Average velocity,
    - Elapsed time on the bus line, at the bus stop, at the terminals, and outside the bus line,
- Management overview,
- Event overview,
- Overview of unprocessed requests by the OCC,
- Overview of information sent to passengers,
- Reports on equipment errors,

- Overview of SMS messages according to message type.

Filtering and displaying of processed results according to various criteria must be enabled.

Drafting of selected monthly or periodical reports must be enabled.

All overviews must be available for a predefined group of vehicles (according to line, bus type, garage, transport, and similar).

The application must allow updates to the database concerning fuelled-up buses. Also, the application will allow free generation of reports by using any of the data fields available in the database (for instance: the report should include fields for covered distance, tanked fuel quantity, lost one-way trips and transported passengers – number of validations for specific period per bus or for a defined group of buses).

It should be possible to define data (object) for "on time" vehicle arrival (e.g. +/- 1 min. of the envisaged timetable).

All reports should be easily exported into various formats (Excel, PDF, XML and similar).

Log Files

All events are kept in the so-called log file. The log files should be easily exported into various formats (Excel, PDF, XML and similar).

Operational Log

All operational and technical data, including irregularities such as accidents, sub-system parts' failures and similar, registered by the AVL System, must be chronologically recorded in the operational log, indicating the date, time, workstation, and responsible dispatcher in the Control Centre. Maximum deviations, including event time and location, must also be recorded. The operational log must be stored in real time and be included in the regular data backups.

The application should enable log overview by certain criteria (e.g. vehicle code, bus stop code and similar), as well as by time parameters (time, hour, day, from-to date and similar).

The log must be available for manual input of data in addition to the existing records, subject to prior approval and special indication thereof, whereas deletion and modification of log data is not permitted.

It should be possible to use the data in the operational for a specific time period, hour, day, week, month, etc. depending on the needs of the dispatcher.

Vehicle Statistics

All relevant data related to the vehicles will be recorded and stored for further analysis. It should be possible to draft various reports on individual vehicles or groups of vehicles that will include the following:

- Time period of use of vehicles on and outside the bus line,
- Time period of use of backup vehicles,
- Effective, null and total distance passed in kilometres,
- Performed transport activity (location/km, driving hours, passenger/km, passenger/place/km),
- Completed / uncompleted departures (one-way trips),
- Deviations from the planned timetable,
- speeding (exceeding movement velocity).

Driver Statistics

Similar to vehicle statistics, it should be possible to generate statistical reports related to the drivers. They should include the following:

- Sign-in / sign-out, working hours,
- Monitoring of all additional entries in the work process, night shifts, standby shifts and similar, as well as calculation of night work, work on holidays, over-time,
- Monitoring of all interruptions of the work process,
- Driver replacements.

Service Scope

The AVL should enable monitoring of the scope and performance of performed services for all vehicles and bus lines individually, as well as for the transporter as a whole. For that purpose the following data should be monitored:

- Performance of planned trips,
- Registered departures (at terminal, and at certain main bus stops along the route),
- Uncompleted planned trips,
- Additional trips,
- Reallocation of vehicles per bus line,
- Distance passed: null, effective and total,
- Time period of vehicle use and number of shifts per vehicle,
- Number of vehicles active in traffic,
- Number of transported passengers (this data will be collected when the passengers use the ticket validating device),
- Average delays at bus stops per vehicle or a group of vehicles in a specific period,
- Other data requested by the Contracting Authority.

Service Quality

The AVL System should enable service quality control, that is, a possibility for the Traffic Department of the City of Skopje to monitor the realisation of the planned timetables expressed in percentages. The City of Skopje will establish certain criteria concerning the service quality to be provided by JSP SKOPJE. Depending on the performance related to the set criteria, the calculations concerning the performed services and the settlements between the City and JSP Skopje will be realised. The System will enable to include in the future other transporters under the same criteria concerning the quality service and the same calculation principles.

Service Calculations

The calculations concerning the service will be conducted for a specific time period, usually at the end of the month, and the calculation algorithm will be defined by the City of Skopje in cooperation with JSP SKOPJE and other transporters.

Management

The Vehicle Pool Management System must provide tools and functions which will assist the dispatchers in managing the regular traffic, and in case of traffic disturbances (accidents, extra-ordinary situations, special events and similar).

Procedures for Extra-ordinary Situations

The driver should be able to communicate with the Dispatching Centre with predefined messages. The Dispatching Centre (OCC) should be able to establish voice communication with the driver and depending on the circumstances inform and alert the Police, Paramedic Services, Fire Services, the teams of internal and bus line control and similar for the purpose of addressing any undesirable extra-ordinary situation. The System should provide internal procedures for operator that should be observed in case of extra-ordinary situations.

Notification of Passengers

Notification of passengers is an important function of the AVL. The notification of passengers will take place before and during the trips. The passenger notifications should be precise so that the patients may become more trusting in the System and use it more actively.

Notifications during Trips

Notification of passengers during the trips includes providing information in vehicles and at bus stops.

Notification in Vehicles

The following information should be provided to the passengers:

- Next bus stop (on the display inside the vehicle),
- Next bus stop (automatic audio message over the vehicle P.A. (public announcement) system),
- The notifications shall be on the internal displays, if any are available in the buses, as well as via an audio public announcement system.

• The System should enable interconnection to other electronic devices for notification of passengers in the vehicle, such as TFT monitors on which the trip route and other trip related parameters may be monitored.

Notification at Bus stops

Currently, there are 10 three-line one-sided information displays at 10 bus stops in Skopje with higher volume of passengers, which are part of a separate system. The AVL System should allow interconnection and integration of these information displays with the 40 information displays which are subject of this procurement. The current operator of the existing information displays will provide all required data to the Bidder who will be awarded this public procurement, such as hardware information, used protocols and similar. The displays should show the arrival time for a specific vehicle at the bus stop (bus line number, direction of the vehicle, estimated time of arrival at the bus stop in minutes). The System should allow direct presentation of any text message, when needed, sent by the Control Centre.

Management of Displayed Information

The Passenger Notification System should have two levels of control:

The first level is automatic control. AVL will estimate the current position of a specific vehicle and by using an adequate algorithm enable displaying the time of arrival at the next bus stop. The algorithm should enable accuracy of the estimated time of arrival within 1 minute range. In case of route delays due to unforeseen situations, the display should show a text message indicating the route delay.

The second level will be direct control by the Control Centre.

The workstation and the operator in charge of the information display will be able to manually type a text on each display or group of displays, in case of any deviation from the timetable for that corridor and redirection to a different route. The messages may be predefined or free text.

In case any part of this System is out of order, the displays will show no data on the vehicles in order to avoid confusion among the passengers by showing inaccurate data (it will be possible to display the date, time, temperature, and eventually a message that the system is temporarily inactive). One operator in the Control Centre will be continuously responsible for monitoring the status, responding to alarms and rectifying the faults in the Passenger Notification System.

Notification before the Trip

Notification before the trip begins when the passenger starts planning his/her trip, at home, at the office or similar. The information should be available outside the Public Transport System. One of the media that may be used for providing information to the passengers concerning the planned trip is a web-application developed by the Bidder. Apart from the planned timetable, the web-site should have a trip planner, as well as the estimated time of arrival at the requested bus stop of the respective bus line.

Also, the AVL System should include an application for passenger notification via SMS messages. The passenger sends an SMS message containing the bus stop code and the bus line number, and receives SMS message containing the next 3 consecutive vehicle arrivals at the designated bus stop on the respective bus line.

This application should be customized with accessibility for disabled persons (blind persons) and they should receive the message as an audio recording.

Database

The database described here pertains to the basic data required for drafting the reports. Parts of the database clarifying certain segments of data such as: bus line network, list of bus line codes, list of driver codes, list of vehicle codes and similar, will be entered in the so-called data tables. The data tables will be defined in accordance with the requirements and in agreement with the Contracting Authority. Several basic elements of the tables which should be created are presented below:

Network of Bus lines and Bus stops

- Table of bus lines,
- Table of bus stops,
- Table of starting and ending stations (terminals),
- Table of garages.

Timetables

- Types of timetables (winter, summer, holiday season, by section, reduced and similar),
- Timetable for each bus line.

Vehicle Data

- Vehicle identification (garage number, registration number and similar),
- Technical characteristics of the vehicle (type, model, capacity, etc.),
- Vehicle age,
- Vehicle status.

Driver Data

- Basic data, HR number, name and surname, driving shift, garage,
- Backup drivers per garage and driving shifts,
- Driver history.

Communication Plans

- Plans for Extra-ordinary Situations,
- Internal Flow of Information

Interfaces to Other Sub-systems

There is a need for a large number of interfaces for interconnection with other systems (apart from the smart ticketing system, the following may be included: video information system and video surveillance in the vehicle, system for giving way at crossroads and similar). Therefore, the Bidder should enable an open data format in the AVL Sub-system and allow the Public Partner to adapt them to interfaces of other systems.

The System must be based on an open platform, i.e. use the SIRI (Service Interface Realtime Information) standard, thus enabling easy development of independent web services as per the requirements of the Enterprise.

Additionally, the Supplier should provide support during the so-called server-to-server communication with the other external systems described herein.

Smart Ticketing Sub-system

The interface of the Smart Ticketing Sub-system is one of the most important interfaces. At the same time, the GPS data may be used for the zones in the zone tariff system.

Planning Systems

Apart from the already mentioned sub-systems, there are other sub-systems using data from the AVL System, as follows:

- Systems for statistical data processing,
- Planning systems (defining traffic models),

- Administrative systems.

Road Traffic Management

The City of Skopje is currently conducting a procedure for implementing a Traffic Management and Control System (TMCS). In that sense, that system should be able to interact with the AVL System in order to send data to the Traffic Management System concerning traffic jams at certain road sections, so that the Centre may inform other traffic participants and, if needed, change the routes according to the plans for extra-ordinary situations. The Bidder of the AVL and Smart Ticketing System should enable communication with the TMS by providing access to all necessary protocols and other technical documentation, and the interface between these two systems will be provided by the supplier of the TMS System.

Giving Way at Crossroads

Within the TMS, public transport vehicle will be given way at crossroads. For that purpose, each vehicle should be equipped with a device that will communicate directly with the signalling system at the crossroads, using the vehicle GPS data. The AVL System should be upgradeable and able to connect to this System. The Bidder should make available the GPS positioning of the buses to the TMS System, as well as put at disposal all necessary protocols and other technical documentation, and the interface between these two systems will be provided by the supplier of the TMS System.

Smart Ticketing Sub-system with Contactless Cards (STS)

Introduction

The Public Transport Smart Ticketing Sub-system should enable unique way of monitoring, managing, controlling and clearing of collected assets.

This Sub-system should enable use of the existing, but also of various tariff systems. The use of this System will tend to increase cashless charging, as well as introduce a unique payment system for the overall public transport in the City of Skopje.

Functional Blocks

The STS Sub-system will be comprised of two main functional blocks:

- Ticketing system, and
- Administrative system.

The following points describe all main functions of this Sub-system:

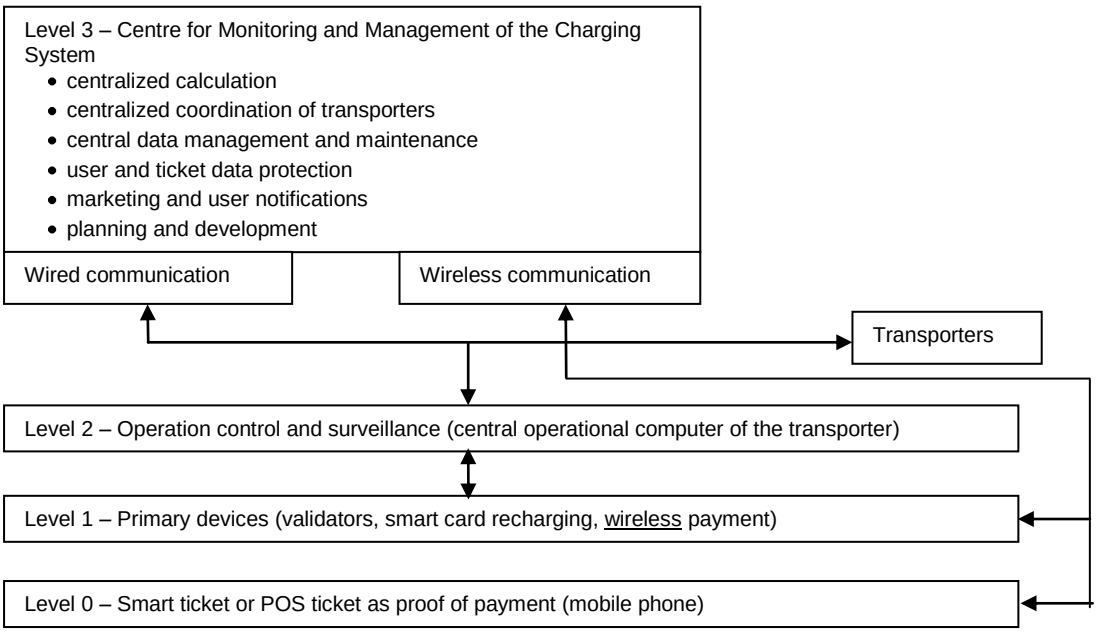

Figure 1: Structure of the Ticketing System

Ticketing System

The Ticketing System is covering the functional levels 0 and 1.

Functional Level 0

This level represents the in-vehicle payment methods that should be provided by the STS System:

- Contactless plastic smart cards/tickets (mostly used payment method),
- POS device receipts connected to the driver control unit (penalty charge ticket issued in the vehicle),

- Mobile phone payment.

The following chapters will give detailed description of various in-vehicle payment methods.

Contactless Plastic Smart Tickets

These tickets will be made of hard plastic with built-in chip and high-level protection. They will be in compliance with the following standards:

ISO/IEC 14 443 Contactless Integrated Circuit Card, that is:

ISO/IEC 14 443 – 1

ISO/IEC 14 443 – 2

ISO/IEC 14 443 – 3

ISO/IEC 14 443 – 4

Type A or Type B.

Regarding their security, they will support the AES or triple DES security standard.

The cards should have 4K read/write memory.

Aside from the Mifare type cards, it is desirable for the Smart Ticketing System to also use the Calypso type cards.

The contactless smart tickets will be used in 2 ways, as follows:

- Non-personalised (regular) smart tickets, and
- Personalised smart tickets (personal tickets with picture and identification data).

Non-personalised (regular) Smart Tickets

These types of tickets are so-called e-wallets and their function is similar to bank debit cards with a chip. The memory of the ticket itself records the amount, date of last recharge and date of last validation. This ticket may be used until it has sufficient funds to pay for the trip, and may be used not only by the person who purchased it, but also by the members of his/her family and friends.

The tickets must be validated by the vehicle validator. The tickets will not be time-limited and may be recharged indefinite number of times (as per the manufacturer's recommendation). The recharging will be organised in at least 50 points of sale in the City and the surrounding municipalities as determined upon the request of the Contracting Authority.

If the passenger requests so, the non-personalised smart tickets may be registered to only one user adding the standard identification data excluding the picture. The registration will be performed at specific points of sale. Tickets registered in such a way will have adequate protection in case of loss or theft, and will be rendered invalid and blacklisted upon reporting of being lost or stolen.

During the ticket validation, the validator should write the data concerning the ticket serial number, the ticket type, date and time of validation, bus garage number, the line and bus stop where the validation occurred and the charged amount.

Personalised Smart Tickets

Personalised smart tickets will be pre-paid periodical tickets containing the data of the ticket owner, type of benefits, and his/her picture. This ticket will not be transferable to other users. Personalised tickets will be used by the following passenger categories:

- Elementary School students,
- High School students,
- (University) Students,
- Unemployed or social cases,
- Disabled persons,
- Senior citizens,
- Collective employee tickets,
- Other subsidised users.

The tickets may be limited to a certain validity period (annually, quarterly, monthly, semi-monthly) and may be restricted to a certain zone. These tickets will allow indefinite number of trips in the designated zone. These tickets will be issued at special points of sale equipped with smart card photographing and printing devices.

The passengers will be able to use these tickets until they are valid, i.e. until the expiration of the period for which they were issued. Afterwards, they may be recharged and reused. It should be possible to recharge these tickets by paying an invoice issued to an enterprise that purchased collective tickets.

It should be possible to limit the time period when these tickets are valid (for instance the senior citizens tickets should not be valid when employees go to work and students go to school).

These tickets, even when free of charge, must be validated while entering the vehicle.

When validating the ticket, the same data should be recorded as in the case of payment with non-personalised smart tickets.

Paying for a Ticket – POS receipt from the vehicle driver

Passengers who are rarely using the public transport in Skopje may pay directly in the vehicle. By paying in cash, the passenger will receive a POS receipt containing the registration and garage number of the vehicle, as well as date and time of issuance. Such tickets will be time-limited (90 minutes from the time of issuance) and will be valid only in the vehicle where they have been issued. These tickets will be considered as penalty charge tickets and will be approx. 50% more expensive than the amount debited from the smart cards. The POS device should be either incorporated in the driver control unit or an external device connected to the VCU in such a way that all sales transactions are recorded in the same manner as the payments via the validator. Also, the GPRS System will be used to transfer data from the POS reports of all drivers, and the Centre will be able to generate adequate reports (e.g. fiscal receipts of sold tickets per driver, per bus line, per time period).

Due to the long procedure for certification of a new POS, connecting some of the already certified POS devices is hereby recommended.

When issuing a POS receipt, the same data should be recorded as in the case of payment with non-personalised smart tickets.

Mobile Phone Payment

Taking into account that on one side mobile payment reduces production and distribution expenses when compared to other payment methods, an on the other hand increases passenger comfort by providing new and simple bus ticket payment methods, the delivered system must enable mobile payment function through which the users may pay for the transport service by using their mobile phones.

This payment method should enable controllers much easier control by access to passenger mobile phones and comparing the data with that in the System.

The mobile payment should be realised in the following way:

- Validation of mobile tickets will be performed by establishing direct communication between the user's mobile phone and the validator installed in the bus. In order to achieve increased security and control, the reading zone of the validator's immediate surrounding should be limited.

- When paying with a mobile phone, the same data should be recorded as in the case of payment with non-personalised smart tickets.

- The duration of the mobile phone payment operation (i.e. payment validation) should be less than 5 seconds.

- The System should be flexible concerning the mobile phone payment, and it should be easy to add new functionalities, such as passenger transfers and similar (various types of mobile tickets in the tariff systems).

- The mobile phone payment method should be elaborated in details in the Preliminary Design and the Technical Documentation of the Bidder that will be a comprising part of the Bid.

In order to make the System compatible with the new generation of NFC mobile devices, the validators must support this technology. For the purpose of increasing the security and control when using NFC mobile devices, it is necessary to store all security information related to this technology in the internal memory of the certified device or in the SIM card of the mobile provider.

Mobile phone payment, the Bidder should enable this feature within one year from the trial run of the System. The Solution must be compliant with the requirements in the Tender Documentation and readily usable for most of the population, irrespective of the type of the mobile telephone and without any additional expenses and technical requirements.

Functional Level 1

Functions and Device Description

This level covers all functions of the passenger identification devices which may be:

- Mobile (VCU, ticket validation devices, POS ticket sales devices (POS receipt) for drivers, as well as passenger controlling devices),
- Fixed (equipment for issuing personalised tickets, ticket recharging devices, independent devices for issuing and recharging tickets, so-called ticket vending machines and similar).

The Contracting Authority requires one validator per bus installed at the front door. It is necessary to envisage a System upgrade in each bus with several validators (maximum number of validator should equal to the number of bus doors).

In order to improve installation security and minimise maintenance expenses, the overall terminal equipment comprising the Smart Ticketing System (mobile) should enable:

- Remote software upgrades, at any time of the day with minimal disruptions to the end-users,
- Remote diagnostics, which should enable problem reporting and, if possible, remote troubleshooting using the Central Device Management System.

Vehicle Computer Unit (VCU)

The vehicle VCU should provide:

- Storage of all data received from the Control Centre and dispatchers, such as planned

timetable including all amendments and updates, bus line routes, tariffs, blacklists and similar,

- Storage of data related to the ticketing system (number of validated tickets, blocked tickets, irregular tickets and similar),
- Utilisation of the ticketing application in the vehicle, taking into consideration all parameters recorded in the validator and the smart ticket itself,
- Storage of data in case of interrupted communication with the Centre,
- Data transfer (from/to OCC, from/to autobase/garage computers),
- Report on mobile phone payments,
- Printing of daily report on tickets sold via the POS device.

It should be possible to transfer a new pricelist from the OCC to all validators with a specific date of validity, so that the validator may contain two pricelists at the same time, the current one which is being used and the new one which will be used tomorrow for instance.

VCU should detect if the validator becomes non-operational and immediately send an alarm to the Control Centre stating the reasons for the failure.

Driver ticket sales

The driver should focus on the driving, and on controlling the smart ticket validation, however, the post should not become a sales point. Therefore, the driver will sell only penalty fee tickets using a POS device equipped with predefined buttons for easier issuance of tickets.

Ticket validation device - validator

The smart tickets will be read, encoded and verified by the validation device. The validator will check whether the smart ticket is authentic, blacklisted or damaged, it will read the ticket, verify its privileged tariff and credit balance. The validator will use different audio signals and a light signal to indicate each validation depending on the tariff. The validator will sound special signals for invalid tickets or blacklisted tickets. Notification thereof will also be displayed in front of the driver.

The validator will enable communication with the mobile phone during the validation of the payment for the transport service using a mobile phone.

During the validation, the validator display should show the charge for the trip and the new balance on the tickets with a predefined audio and light signal.

The Preliminary Design should separately elaborate the validation method in various tariff zones in a proposal, allowing the passenger to select the travelling zone using a touch screen or specific buttons.

Passenger Control

Passenger control will be conducted by controllers who should be equipped with a device for controlling smart tickets and a special ID card.

The controller will use his/her ID card when entering the vehicle, subject of the control. During the identification, the computer will automatically block the validator, and the validator data will be simultaneously transferred to the controlling device.

The controlling device should be lightweight, resistant to mechanical shocks and easy to use. It should be battery charged allowing at least 4-hour autonomous operation, with an integrated printer and a smart card read/write capability (e.g. block irregular smart tickets).

While executing the control function, this device should show ticket data and produce an audio signal when the ticket is validated.

In case of invalidated tickets, the controller will hear a different sound notifying the irregularity and may block the ticket. The controlling device may print a penalty fee receipt for passengers without validated tickets.

The controlling device should enable verification of completed smart card and mobile phone validations.

At the end of the controlling process, the controller signs out with his/her identification card thus putting the validator in regular operational mode.

It should be possible to transfer the data from the controlling device of the controller to the Control Centre and to draft daily and periodical reports.

Issuance of personalised tickets

Personalised ticket will be issued at eight (8) specific points of sale. These points of sale will be equipped with passenger photographing devices and smart ticket printers which will print the photograph on the smart card itself. The personalised ticket will also store the personal data of the user (name, surname, address), privileges, travelling zones and other benefits, if any. The process of issuing a personalised ticket must not last more than 5 minutes.

The point of sale and the Control Centre should have a permanent communication link.

Ticket recharging

Tickets may be recharged in the following ways:

1) At any of the fifty (50) points of sale with a recharging device, as well as at the eight (8) personalisation points,
2) Via so-called ticket vending machines, standalone assemblies installed at bus stops which autonomously issue blank smart tickets that may be recharged afterwards,
3) By paying an invoice issued to enterprises for collective employee tickets,
4) Recharging with a mobile phone.

1) Ticket recharging devices should be located at the points of sale provided by JSP Skopje. The recharging device may recharge non-personalised smart tickets and extend the validity of personalised tickets. The recharging device should have a permanent communication link to the Control Centre, and each transaction will be recorded in the Centre.

2) Purchasing and recharging of smart tickets may be done via so-called ticket vending machines, standalone assemblies installed at bus stops which autonomously issue blank smart tickets that may be recharged afterwards. These devices may use coins, banknotes, as well as credit and debit cards. The devices will be equipped with buttons or a touch screen enabling interactive communication for purchasing blank smart tickets that may be charged afterwards. If one already has a smart ticket, it may be recharged. Same as the other recharging devices, these units should have a permanent link to the Control Centre and should exchange data on the recharged smart tickets.

3) All enterprises that are clients of the Contracting Authority may make payments for the tickets of all or part of their employees. When the invoice is paid, credits will be transferred to individual smart tickets, i.e. their validity will be extended.

4) The System should enable recharging of smart tickets with a mobile phone.

Administrative System

Call Centre Tools and Support

The offered system should enable full set of functionalities and real-time information so that the system operator may establish, maintain and manage a Contact Centre for user support.

Functional Level 2

The purpose of the transporter's central system (OCC) is to manage the processes at this level and communicate with Level 3. Both levels (2 and 3) represent a so-called back-office that entails management and administrative functions.

The charging system functions at this level are comprised of:

- Collection and control of acquired funds in cash including a complete security system and exact determination of revenues,
- Management of charging media,
- Collection of damaged smart tickets,
- Complaint handling service.

Functional Level 3

The charging system centre is located on this level. In the beginning, after the implementation of the AVL and STS System, levels 2 and 3 will represent one logic unit until there is only transporter in the System, JSP Skopje. When other transporters join the System, the levels will be separated and the overall level 3 access control will be transferred to the City of Skopje. The following functions will be executed at this level:

- Central settlement point (calculation for revenue distribution),
- Central coordination of transporters,
- Central management of data, control and maintenance thereof,
- Collection of traffic and revenue data on each bus line, preparation and calculation of revenues,
- Marketing and passenger information,
- Analysis, planning and development.

Apart from these functions, functional level 3 should provide:

- Calendar with details on the automatic tariff system change,
- Collection of statistical data on sold tickets per points of sale and reporting,
- Establishing the required databases on users, trip and transfer matrices, trip requests, white/blacklists, passenger flow, average trip time, average intervals, passenger modifications and similar,
- Revenue distribution procedures,
- Preparation of data for long-term planning (tariff system and ticketing system, price policy and policy on subsidising passengers and transporters).

- The overall server infrastructure (hardware and system software) needed for uninterrupted high-performance operation of both functional levels 2 and 3 should be the ownership of the Bidder, hosted in a Data Centre compliant with and incorporating the international standards on information security observing the permitted noise levels and other emissions, located in the R. of Macedonia.

Minimum requirements of the Data Centre

- Data Centre Performance

The Data Centre should have raised anti-static floors and should guarantee seismic stability. All cables (power supply, networking (copper and fibre optics) should be located in separate channel under the raised floors, i.e. the principles of structured cabling should be complied with.

- Physical Security

The access to the data centre should be controlled via adequate access control system. The access control system should enable access with an encoded personal card with a magnetic strip.

- Video-surveillance throughout the whole Data Centre.

The whole building should be monitored with adequate video-surveillance solution. The surveillance should be 24x7 carried out by the surveillance service department, that is, the physical security personnel.

- Stable redundant power supply

In order to have uninterrupted operation of the systems in the Data Centre it needs to be equipped with a stable redundant power supply. All systems in the Data Centre will be connected to the redundant power supply. This means that in case of failure of the main grid, the UPS systems, i.e. the system for uninterrupted power supply, will automatically come online. These systems should be a combination of batteries and diesel generators. All of the components of the power supply system should also be redundant, i.e. doubled. This means that in case of failure of the main grid, the Data Centre power supply and operation will not experience any interruption.

- Professional Fire Protection

All facilities within the Data Centre will be adequately protected against fire. This system should be automatically activated in case of fire. Fire alarms should be an addressable system. Also, the Data Centre should be equipped with a modern fire suppression system.

- Professional Air Conditioning

All facilities within the Data Centre will be equipped with redundant air conditioning units connected to the redundant power supply. This means that in case of failure of the main grid, the air conditioning units in the Data Centre will not experience any interruption in their power supply nor in their operation.

- Note: The Contracting Authority retains the right to visit and conduct detailed technical inspection of the Bidder's Data Centre during the stage of the technical bid evaluation.

The solution proposed by the Bidder should be based on server based platform and enterprise level storage connected to adequate switches. The servers should be directly connected to the network infrastructure at adequate network speed. The architecture of the hardware and network solution should be described in details in the Preliminary Design.

The data from the smart ticketing system is very sensitive. The following should be provided in order to protect it:

- Limit the access in the premises of the Bidder's Data Centre,

- Set access restrictions by establishing various access levels, i.e. users with different privileges,
- The solution should provide high availability of the platform, independent of hardware failures, scalability and easy modification of server resources (disk capacity, processing capacity, memory), in order to improve the performances in case the application need to be expanded with new modules,
- Platform based on renowned brands,
- Possibility for monitoring and reporting in case of performance degradation or services interruption,
- All security upgrades of the manufacturer implemented and independent secure service operation,
- Integrated backup system for regular data backups,
- In order to achieve better system availability, the solution should envisage a secondary Data Centre in a different location, at least 50 km away from the primary location, where full data replication may be carried out within 24 hours, that is, a Disaster Recovery solutions.

- The overall server infrastructure should be connected to the following local area networks:
- 1. OCC (Dispatching Centre)
- 2. City of Skopje – Traffic Department
- 3. Transporter JSP Skopje
- 4. Transporter Sloboda Prevoz (Freedom Transport)
- 5. Transporter Mak Express
-

- For the purpose of achieving increased security, the Bidder should ensure interconnection with dedicated fibre optic links with high reliability. The Bidder should provide the required terminal equipment for establishing the data link at the side of the Contracting Authority.

- The Smart Ticketing System will have fulfilled its task if it minimises and easily records all misuse attempts by passengers. At the same time, the System should ensure the safety and trust among transporters (if several transporters join the public transport) concerning data accuracy related to charging and generated revenues. Therefore, all commercial transactions should be specially protected from misuse by any party. The solution should ensure high availability and reliability of at least 99,97% data integrity.

Management Tools and Statistics

Statistics

The STS application should enable drafting of several statistical overviews:

- Drafting reports related to the charging system,
- Management using the charging data,
- Insight in passenger flows and transport requests.

The reports should include the following:

- Data on procured, assigned and sold tickets in a certain time period according to ticket type, point of sale and similar,
- Data on the revenue generated from tickets sold in a certain time period according to ticket type, point of sale and similar,
- Data on public transport utilisation for a certain time period, according to ticket type, i.e. to passenger category, bus line, corridor and similar,
- Overview of all remaining relevant financial, traffic, organisational and usage data of interest to public transport management,
- Dynamic graphic overview (dynamic graphic data monitoring) of the number of passengers, the load of each station individually, as well as the vehicle load individually and the totals for a defined time period.

- All overviews and reports will be defined in the Contract between the Contracting Authority and the Bidder, including an option to expand and upgrade them.

Database

Well organised database is essential for the efficient operation of the Smart Ticketing System. The Bidder should be responsible for collecting and maintaining the data.

The both sub-systems, AVL and STS, should use the same database which will easily and simply generate various report types that are necessary for the business analysis of the Enterprise.

The following data, specific to the STS sub-system, should be contained in the database:

- Number of passengers (total number, per bus line, per corridor),
- Passenger categories (number of pupils, students, senior citizens and similar),
- Large clients (companies that buy collective employee tickets),
- Points of sale for personalised tickets,
- Points of sale for ticket recharging,
- Blacklists of invalid, stolen, damaged tickets and similar,
- Data on sales/recharging of ticket per point of sale and ticket category,
- Data on ticket validation per vehicle, bus stop, bus line, time of day and similar,
- Data on distributed smart tickets per points of sale, as well as minimum required stock of smart tickets per point of sale.

Interfaces to other systems

A large number of interfaces, which will be elaborated below, are needed for interconnection with other systems.

Vehicle Management Sub-system

The interface with the AVL Sub-system is one of the basic functions of the overall system. If needed, the STS may use information from the AVL on bus stop locations when calculating the amount in case of tariff system with specific borders or zones or in case of a check-in/check-out system.

Planning Systems

As already mentioned, the planning systems will be used to provide basic data such as bus line networks, timetables, etc. The planning system will include the following:

- Systems for statistical data processing,
- Planning systems (defining traffic models and tariffs),
- Administrative systems.

Interconnection with transporter/transporters

A direct link between the transporter and its vehicles is necessary in order to provide data on the current sales, tariff control and similar. If several transporters join, direct links for relevant data exchange will be established between the transporters.

Service interface

It is of great importance to have a so-called service interface for transfer, i.e. exchange of information among the drivers, the Dispatching Centre and the employees in charge of servicing in the shortest time possible. The Bidder should provide the data in adequate format, i.e. provide the communication protocols for all parts of the AVL and STS sub-systems in order to facilitate the interconnection with other systems, as required by the Contracting Authority.

New Technologies

The STS should be flexible and should enable the Contracting Authority to expand the ticket assortment, as well as upgrade the overall system with new more advanced technologies:

- Possibility to use the smart tickets to pay for other services within the competencies of the City of Skopje (parking, renting a bike, cinema, zoo, cableway, amusement park, site-seeing tours and similar),
- The System should support settings for various configurable tariff zones, The system should support tariffs organised in concentric zones, as well as distributed tariff zones, if possible; in case of distributed tariff zones, each zone should be surrounded by maximum 4 different tariff zones,
    -

Operational Control Centre

The Operational Control Centre should provide secure access to the Data Centre where all applications will be hosted, enabling the functions for receiving, sending, processing and storing of data.

The OCC should enable and facilitate the work of dispatchers, tariff management, system administration and simultaneous use of the System by all users.

The Contracting Authority will provide the necessary area for the OCC operations, including electricity and office furniture, as follows:

- 1 room will house the head dispatcher and other dispatchers, including one unoccupied post for training and testing,
- 1 room for traffic engineers,
- 1 room for tariff calculation and management,
- 1 room for the system administrator and data management,
- 1 room for the head of the Operational Control Centre (OCC).

- The Bidder selected as most favourable for this procurement shall be obliged to provide its own insight and comment whether the offered premises are satisfactory to the required conditions and what should be eventually corrected (rectified, repaired, remodelled), added or expanded.

Work position

14 work positions will be needed in the OCC:

- 2 dispatcher positions,
- 1 testing / training position that should allow on-the-job training without any impact on the regular operations. This post may also be used as a standard work position without the need of additional adaptations and without any limitations,
- 1 head dispatcher who will coordinate the work of the dispatchers and will manage the passenger notification sub-system,
- 1 administrator (computer network administration, adding new users, assigning user privileges, monitoring the system for communication and data exchange among the OCC, vehicles, garages, points of sale and similar). The administrator will detect and attempt to rectify small faults in the System,
- 1 position for data updates (entry of new and update of existing data, storing and retrieval of stored data),
- 3 traffic engineer positions (performing expert tasks related to drafting and correcting timetable, traffic flow analysis, traffic modes in case of extra ordinary situations, traffic related control and analysis),
- 1 tariff management position (performing tasks related to the tariff systems, draft pricelists of services, ticket types, passenger categories, passenger control methods, etc.),
- 1 position for preparing the calculations (preparing and controlling the data required for conducting and drafting the calculations),
- 1 head of the AVL Sub-system,
- 1 head of the STS Sub-system,
- 1 head of the Operational Control Centre – OCC.

All posts require equipment with same quality and performances that may be used irrespectively of the post (it should not be dependent on the hardware, but rather on the application used).

This is the minimum level of operational posts in the OCC and adequate expansion thereof should be possible.

Basic requirements related to the user interface

The user interface should be compliant with the Windows standards, i.e. functions and objects should be selected using a mouse and a keyboard. For each entry, the System will provide adequate response. In most of the cases, the result of any action should be shown immediately, and in case of delays due to processing, an indicator should be shown suggesting that the System is processing the request. In any case, the longest delay of the System response should not exceed 10 seconds.

The basic version of the application should contain all necessary tools depending on the user privileges. Each function should be linked to an additional help function which describes it accordingly.

Each user should be able to make individual adjustments related to the user profile which will be visible every time said user signs-in the System (e.g. font used and similar). The colours and symbols should be the same for all posts and must not be individually altered. Reset function should exist, i.e. returning to default settings should be available.

All modifications of the input parameters (bus lines, bus stops, timetable and similar) should be entered only once, and the application should automatically use such data in all required overviews and reports.

Fast transfer from one screen to another should be enabled; e.g. if the user clicks on a vehicle in the GIS overview, new window, giving more vehicle details, should appear.

All functions and operational dialogues, displays and reports should be in Macedonia.

Overview of system users

The data link connecting the OCC with the Bidder's Data Centre must provide real-time data download for at least 500 vehicles. The hardware infrastructure of the Data Centre should be scaled in such a way that 30% increase of envisaged vehicles will not deteriorate the application performance. In other words, the hardware infrastructure should be scalable.

Apart from the OCC users who will have access to the System via an independent network that will be realised within this Project, access should be provided to other users as well:

- To the users of the existing computer network of JSP Skopje (at least 30 concurrent users),
- To the users of the existing computer network of the City of Skopje, Traffic Department (10 concurrent users),
- To the users of the existing computer network of Sloboda Prevoz (10 concurrent users),
- To the users of the existing computer network of Mak Express (10 concurrent users),
- External users (citizens) will have access via Internet and via the SMS Server (at least 200 concurrent users).

The system users will be divided into groups and access rights will be assigned at group level. Users will have assigned access for specific tasks (for instance, entry and modification of data, various set of overviews, administration and similar). Each user will be registered in the System with username and password.

The system administrator may add new users, as well as delete existing users and change user rights.

Communication Interface

Organisation of wireless communication/data transfer

The System should be designed in such a way as to enable efficient and secure data transfer by using technology that provides maximum integrity and data protection during the transfer. Existent GSM/GPRS technology is envisaged for wireless communications (in order to guarantee better security, traffic will be routed via private APN).

Communication management means concurrent operation of 1000 vehicles in accordance with the required standards. Also, the System should enable operation without reducing the performance even if the number of vehicles increases by 30%.

The communication with automatic transfer of standard data will be scheduled in cycles of minimum 10-second time intervals, as described in this Chapter. Accordingly, the required communication capacity will be 3000 datagrams per minute for all vehicles.

The overall GPRS communication and data transfer among the System components will be ensured by the Bidder, and it will be incorporated as a cost in the monthly fee for the eCloud hardware and software service. The monthly fee shall also include the maintenance of the AVL and STS application software.

Communication routes

This part describes in details all communication routes and all functions that must be provided.

Communication between the Control Centre and the Driver

The communication between the dispatcher in the Control Centre and the vehicle driver is hereby described.

From the Centre to the Driver

Any exchange of messages between the dispatcher and the driver via wireless communication, as well as all information intended for the driver and the passengers send by the dispatcher, should be shown in the OCC, stored and recorded in the operational log.

The dispatcher in the Control Centre may select the vehicles he/she communicates with in several ways:

- Sending a message to one vehicle (selected from the route or by the vehicle code),
- Sending a message to several unrelated vehicles (selected from the route or by the vehicle codes),
- Sending a message to all vehicles from one operational group, and
- Sending a message to all vehicles (all vehicles from all operational groups).

There must be a possibility to move vehicles from one group into another, as well as create various vehicle groups.

Vehicle selection to which the dispatcher sends messages must be simple. The dispatcher should be able to select some of the predefined messages or type the text he/she wants to send to the driver. At the same time, as soon as the message is sent to the OCC, the following data related to said message should be recorded in the operational log (e.g.: date, time, vehicle

garage number, message text and similar).

For each message type, there should be a possibility to have an accompanying sound in the driver computer unit.

Sending encoded instructions to the driver should also be envisaged.

Apart from the text messages from the Centre to the driver, the System should provide direct audio communication between the dispatcher and the driver. This communication may be initiated only by the dispatcher, and it may be requested by the driver by pushing a button on the VCU.

From Driver to the OCC (Dispatching Centre)

The driver should have the possibility to select a predefined message to be sent to the Dispatching Centre. Three types of messages should be defined: reporting an assault/theft, reporting an accident/extra ordinary situation and other messages including a request for audio contact with the dispatcher.

The messages are displayed in the Control Centre and depending on their type may be accompanied with visual and audio signal. The messages are shown according to priority and in chronological order. All messages and their corresponding replies are recorded in the operational log in chronological order.

Message for reporting an assault/theft

The message reporting an assault/theft in the bus will be done in an inconspicuous way, e.g. double short push on a button activated by the foot.

When such message is sent by a vehicle, it should receive the highest priority in the OCC.

The reporting of an assault/theft will activate a clear audio and video signal in the Controlling Centre which will maintain the alarm until the dispatcher confirms the message receipt. The vehicle that has sent the message for reporting an assault/theft should clearly indicated in the call list. When such message is sent by the vehicle, the vehicle's current position will also be sent. The reply from the OCC, that is, the confirmation that the alarm was noticed, is sent back as an encoded message on the driver's display in the moment when the dispatcher will confirm the message receipt.

Message for reporting an accident/extra-ordinary situation

This function will be assigned to a button in VCU and should be easily selectable at any moment. The selection of this function will send a message to the Control Centre. At the same time the vehicle's current position on the route will also be sent. The message will initiate a specific audio and video signal to the Dispatcher of the Control Centre.

Communication between the Control Centre and the Vehicle

The communication between the OCC and the vehicle will be in most case automatic. The standard communication will entail sending data to all vehicles via the so-called GPRS communication system at specific time intervals which may be altered but initially fixed at 10 seconds as default setting. The time interval may have different values for so-called "regular operation" and "backup operation". The time interval during regular operation must not be longer than 30 seconds. The data which is regularly transmitted during such communication will be as follows:

- Vehicle number,

- Bus line number and direction,
- Current vehicle position.

- Apart from sending data from the vehicle to the OCC, if needed, data may be sent from the OCC to the vehicle (in case of tariff change, upload of a new blacklist and similar).

Communication Interruption

Possible causes for interrupting the communication while data is being exchanged between the OCC and the vehicle are the following:

- The vehicle is in a 'dead zone' (in a tunnel, under an overpass, outside the line-of-sight of the satellite),
- The vehicle computer is non-operational,
- The data transmission equipment is non-operational,
- Data Centre failure,
- Interrupted data transfer (central defect at the service provider or failure of the data transmission channel).

If the communication equipment in the vehicle is non-operational, no information may be exchanged.

The vehicles which are currently unreachable, should be displayed in the Dispatching Centre at their last known position from where signal was received and marked in a different colour including a note indicating interrupted communication. Also, the driver's VCU should display a message indicating interrupted communication with the Centre.

Devices in the vehicle which have lost communication with the OCC should retry to establish communications at specific time intervals, and when the communication is re-established, all accumulated, non-transferred data will be transferred from the VCU to the Control Centre.

Communication System

The Communication System should provide all required functionalities for data transfer between the Bidder's Data Centre on one side and the vehicles, OCC, garages, bus stops and transporters, if several transporters are included in the transport, on the other side.

The communication between the Data Centre and the OCC, garages, and the City of Skopje should be conducted via copper/fibre optic cable. Wireless communication will be used between the vehicles, points of sale and bus stops equipped with information displays and the Data Centre, and said communication it will be realised in a secure way by establishing a private APN.

System Administration

System administration shall be a service provided by the Bidder for which it shall receive from the Contracting Authority a so called eCloud maintenance monthly fee. This monthly fee shall include the costs for the overall GPRS traffic.

eCloud

The eCloud term in this Technical documentation shall mean provision of hardware (servers), system software and a database by the Bidder that will be installed in its Data Centre and run the applications for Automatic Vehicle Location and Smart Ticketing which are subject of the procurement. The monthly fee for the eCloud that will be paid by the Contracting Authority to the Supplier, shall cover, aside from renting the hardware, system software and database,

maintenance (after-sales support) of the application software (applications for Automatic Vehicle Location and Smart Ticketing), as well as the overall costs for the generated GPRS traffic.

Accordingly, the following issues should be carefully reviewed:

- Responsibility for the data,
- Responsibility for functioning of the system,
- Allocation of user rights,
- Data protection,
- Data archiving,
- Time synchronisation, etc.

The System must be designed in such a way as to be adaptable to the eventual modification required by the Contracting Authority.

Archiving

Current data in the System should be archived at regular time intervals. This way, the System may be restored to a previous state in case of failure. The interval and method for data backup should be configurable.

The data should be archived automatically on a daily basis, and a software tool for easy restoration of the archived data should also be provided.

Time Synchronisation

The Bidder should envisage time synchronisation between the OCC and all vehicles and other active objects in the System (points of sale, controlling devices, information displays and similar).

Equipment

Presented below is the framework description of the equipment that should be owned by the Contracting Authority, and which will enable achieving the minimum requirements for the operation of the AVL and STS System.

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Network Equipment

A gigabit network switch with at least 25% free expansion ports should be envisaged for interconnecting of the OCC independent network.

OCC Work Positions

At least 14 work positions are planned in the OCC.

All work positions should be equipped with adequate computer workstation including at least a 21" monitor. 3 work positions in the OCC occupied by dispatchers should be equipped with 2x TFT monitors each (21"), and capability to operate 2 monitors concurrently.

Peripheral Components

The equipment should include all peripheral components required for the System to function, such as local and network printers, loudspeakers and similar.

Installation of one central screen composed of 4x 46" LCD screens should also be envisaged. All these screens should operate independently and as one large screen. It should be possible to transmit the image displayed at any workstation to one or to all of the 4 video screens on the wall as a single image.

Uninterrupted Power Supply / UPS

The System should have stable power supply. In case of interruptions of the regular power supply, UPS battery that allows 30 minutes of uninterrupted operation of the overall System should be provided. A power generator, which should be activated if the interruption to the power supply lasts longer than 30 minutes and which will provide full uninterrupted operation of the OCC Centre, should also be provided.

Data Transmission Equipment

The Bidder should envisage and list in the Preliminary Design all necessary equipment for any kind of communication between the Data Centre and the other components of the System.

Vehicle Equipment

The equipment should be able to operate in harsh conditions characteristic for the public transport vehicles (vibrations, low and high temperatures, humidity, dust particles, mechanical shocks, electromagnetic fields, vandalism,…).

Electromagnetic compatibility means that the equipment in the vehicle does not interfere in the operations of other electronic devices and systems (mobile telephones, radio and TV signals, traffic light management system, in-vehicle internet hotspot devices and similar) and vice versa.

The Bidder will provide adequate certificate confirming that the equipment satisfies the conditions in the buses and is electromagnetically compatible.

The equipment installed in buses should be firmly fixed in place, but should be easily assembled and disassembled by experts in case of parts failure. Also, the equipment should have round edges for the purpose of avoiding passenger injuries.

Basic components of the vehicle equipment are as follows:

- Vehicle/driver computer unit with sufficient memory which may store all data necessary to the functioning of the System (pricing tables with various tariffs, corridors, bus lines, timetables and other operational parameters required for the functioning of the AVL and STS System). The computer will enable storing and sending data to the OCC via GPRS wireless communication. VCU will allow audio and SMS communication with the Centre.
- There should be one ticket validation devices, so-called validator, at the front door nearby the driver. The validator shall be comprised of reader of contactless smart tickets, display, loudspeaker, memory module, VCU communication module, as well as buttons or touch screens allowing the selection of trip zone prior to ticket validation on bus line with functioning zone tariff system.
- One POS device for selling tickets with POS receipts directly connected to the VCU, which will register the sales in the same way as validating a ticket.
- GPS device for determining coordinates, and the vehicle position accordingly,

- Device for wireless communication (GSM/GPRS) with the Data Centre,
- Audio and video display device for notifying the passengers in the vehicle, and
- Digital input/output interface for additional interconnection to other systems.

Vehicle Computer Unit (VCU)

The VCU should be compliant with the following technical and operational properties:

- Sufficient internal memory for storing data on:
    - Corridors, bus lines, bus stop locations,
    - Timetables,
    - Pricelists, tariffs,
    - Ticket whitelists/blacklists,
    - At least 100.000 datasets on the vehicle location and at least 20.000 datasets on ticket validations,
- Protection from data losses during communication interruptions with the Centre or during power supply failures,
- Use the vehicle power supply with adequate protection from voltage surges and other voltage fluctuations.

Validator

The validator must be compliant with the following technical and operational properties:

- Ticket reading should not last more than 1 seconds,
- The reading area should be limited to the immediate surroundings of the validator, that is, the distance between the validator and the ticket should be less than 10 cm,
- If a single ticket is unwantedly brought close to the validator twice in consecutive order, it will not be validated again, since at least 1 minute should pass before another validation is permitted with the same ticket (unless the ticket is used to pay for several persons, and in such case the driver should take action from his/her control panel),
- The communication between the ticket and validator is conducted using radio frequency (RF) technology with well protected and encoded transmission,
- This RF technology must harmless to the human health,
- The Validator shall use the power supply of the vehicle, and will be protected from voltage fluctuations by special filters,
- The validator must not be affected by the surrounding conditions, for instance humidity, vibrations, static electricity, heat, dust, corrosion, shocks and similar. The validator must be operational under all of those conditions.
- The validator screen should be large enough for displaying all necessary information and allowing user interaction (e.g. zone selection and similar).
- While validating the validator must store in its internal memory and then forward it to the VCU the following data:
    - Ticket serial number,
    - Transaction type,
    - Previous balance on the ticket and the amount deducted from the balance,

- Date and time of the transaction,
- Transaction number,
- Validator number.

During each transaction the validator must write on the ticket the following data:

- Validator number,
- Transaction type,
- Amount deducted and the new balance,
- Date and time of the transaction.

Equipment in the Traffic Department of the City of Skopje

Equipment for monitoring the vehicle on their respective bus lines, in similar way it is done by the dispatchers in the Control Centre, should be installed at the premises of the Traffic Department of the City of Skopje, the only difference being the lack of vehicle management capability. For that purpose the following equipment is envisaged:

- 2 workstations, same as in the OCC, with a 21" monitor for each,
- 4 46" LCD displays forming one large wall screen that may display images from any of this 2 workstations either on one or on all 4 LCDs of the wall screen as a single image,
- A4 laser printer,
- Equipment for communication with the Data Centre.

Equipment in the garages

The garage equipment will be comprised of:

- Administrative work position – vehicle forwarder (computer and laser printer),
- Equipment for communication with the Data Centre,
- Drivers' smart card readers (if collected cash is handed over there).

Equipment for passenger notification at bus stops

Information displays will be installed at 40+10 bus stops.

This system will provide the following:

- Data transfer management between the Data Centre and the Information Displays,
- Updating the displayed data,
- Monitoring the display status and its software and hardware functioning (whether the display is free of faults and whether there are faulty LEDs),
- Transmit status information from the display to the Data Centre.

Portable ticket controlling device

The ticket controlling device will be used by controllers when conducting passenger controls in the vehicle. It should be lightweight, powered by high-capacity battery, incorporating a smart ticket reader and writer. Also, it should have an integrated thermal printer resistant to shocks.

Equipment for issuing personalised tickets

The equipment for issuing personalised tickets shall be comprised of:

- Computer,
- Scanner,
- Digital camera connected to the computer,
- Smart card printer,
- Communication device (read/write data) with smart card,
- Laser printer for other purposes,
- Smart ticket recharging device,
- Device for communication with the Data Centre.

- 8 such points of sale should be equipped in City of Skopje at locations defined by the Contracting Authority. At those points of sale, the passengers will also be able to submit complaints concerning their smart tickets.

Equipment for recharging smart tickets

The equipment for recharging smart tickets is a device that is comprised of components for reading and writing on smart cards. Also, this device should contain a part for communicating with the Data Centre.

- The Contracting Authority has envisaged procuring 58 such devices.

Standalone devices for issuing and recharging tickets without an operator, so-called ticket vending machines

These devices are completely stand alone and will help the passengers procure a ticket at any time of the day by self-service. Three (3) such devices will be distributed in accordance with the requirements of the Contracting Authority at locations of interest where passengers should have the opportunity to recharge their smart tickets without the presence of an operator, 24 hours a day. These devices should issue empty smart tickets and recharge existing smart tickets, and the payment may be completed by using coins, banknotes and credit/debit cards. Therefore, each of these devices should be able to perform the following functions:

- LCD screen and possibility for user interaction,
- Provide audio support,
- Contactless smart card reader and writer,
- Printer of smart cards
- Reader of bank cards with magnetic strips or chips,
- Built-in thermal printer,
- Accept coins and banknotes,
- Return coins,
- Multi-lingual support (Macedonian, Albanian, English),
- Wireless communication with the Control Centre,
- Water resistant, vandal-proof enclosure,

- Power supply from the main grid, but also its own
- Battery which will enable at least 30 minutes independent functionality after the power supply failure.

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Minimum System Requirements:

- The proposed system should meet or exceed the following performance criteria:
  - Processing of at least 200.000 ticket transactions per day,
  - Processing of at least 50.000 ticket transactions per hour (during peak hours),
  - Supported terminals > 5000 terminals,
  - Average duration plastic card transaction: <0.4s
  - Average duration of mobile device transaction: <5s

Minimum requirements for the equipment to be installed at the premises of the Contracting Authority:

OCC workstation	Intel® Xeon®Quad Core 2.5GHz 8MB, RAM 4GB, Hard disk drive 250GB, Graphics card 512MB, DVD RW, Network Controller 1Gb/s
Garage computer	Intel ®Core®2 Duo 2 GXz, RAM 2 GB, Hard disk drive 250GB, Graphics card 512MB, DVD RW
Computer for issuing personalised tickets	Intel ®Core®2 Duo 2 GHz, RAM 2GB, Hard disk drive 250GB, Graphics card 512MB , DVD RW
Laptop	Intel® Xeon®Quad Core 2.Duo T6500 series processors , RAM 4GB, Hard disk drive 250GB, Graphics card 512MB, DVD RW, Network Controller 1Gb/s

System Equipment Specification with minimum planned quantities:

Operational Control Centre – OCC

1.	OCC workstation	14 units
2.	21" Monitor	14 units
3.	Switch	1 unit
4.	46" LCD	4 units
5.	A3 network laser printer	1 unit
6.	A4 laser printer	2 units
7.	Laptop	2 units
8.	Communication equipment	
9.	UPS	1 unit
10.	Power Generator	1 unit

Traffic Department of the City of Skopje

1.	Computer analogous to the OCC workstation	2 units

2.	21" Monitor	2 units
3.	A4 laser printer	1 unit
4.	46" LCD	4 units
5.	Equipment for communication with the Data Centre.	

Garage

1.	Computer	4 units
2.	19" Monitor	4 units
3.	A4 laser printer	4 units
5.	Equipment for communication with the Data Centre.	4 units
6.	Smart ticket reader	4 units

Issuance of personalised tickets

1.	Computer for issuing personalised smart tickets	8 units
2.	19" Monitor	8 units
3.	Digital camera	8 units
4.	A4 laser printer	8 units
5.	Smart card printer	8 units
6.	A4 scanner	8 units
7.	Card recharging device	8 units
8.	Equipment for communication with the Data Centre.	8 units

Vehicles

1.	Vehicle computer unit with GPS/GPRS unit and attached POS printer	500 units
2.	Vehicle installation and cabling	500 sets
3.	Validator	500 units

Ticket control

1.	Smart ticket controlling device	50 units

Additional equipment

1.	Smart ticket recharging device	50 units
2.	Device for standalone issuing and recharging of smart tickets, so-called ticket vending machine	3 units
3.	Three-line information display	40 units
4.	Plastic card with 4 kB chip	200.000 units

Additional equipment provision in the guarantee period

The bidder, according to the specified Specification for devices and segments of the System, is obliged to give guaranteed prices in Eur which will be valid for the entire duration of the guarantee period.

Additional equipment specification with guaranteed prices expressed in Euros:

	DESCRIPTION OF THE EQUIPMENT	Price in EUR
1.	Computer unit in the vehicle	
2.	GPS device	
3.	Fiscal printer	
4.	Validator	
5.	Device for smart tickets control	
6.	Device for smart tickets recharging	
7.	Digital camera	
8.	Printer for smart tickets printing	
9.	Device for autonomous smart tickets issuing and recharging so called ticket vending machine with connection	
10.	Three rows informative display with connection	
11.	Plastic card with chip 4kb (according to the technical documentation)	
12.	Cabling of one bus	

Software

The Bidder should provide the software necessary for functioning of the System. The software should be capable of complying with the following requirements, i.e. should include at least the following applications:

- Drafting timetables,
- Drafting bus driver rosters,
- Optimisation of vehicle utilisation,
- Vehicle monitoring and management application for dispatchers,
- Passenger notification in the vehicle, at the bus stops, via web-application and via SMS service,
- Database management (entry, updating, archiving),
- Smart Ticketing Sub-system (data collection and drafting reports),
- Calculation of work performance per transporter,
- Revenue settlement,
- Administration of the overall system and data protection,
- Application for remote setting of vehicle parameters and devices,
- Web-application (various statistical overviews and reports),

- Application for the transporters.

The Bidder should provide the required licences for the operation of the listed application software.

The Bidder should provide software licences for the operating system (Windows 7) and other packages (Windows Office 2007) for all computers that will be installed at the premises of JSP and the City of Skopje for this Project.

In case of several transporters, the Bidder should provide data separation, as well as transporter level access and application level access.

Tickets

The System will use contactless plastic smart tickets (incl. processor, memory and antenna for communication with the reader), POS tickets issued by the driver and a possibility to pay with a mobile phone by registering the payments in the vehicle validator.

Contactless Plastic Smart Tickets

The tickets should be functional at a distance of several centimetres away from the validator, i.e. the controlling and recharging devices.

At application level, the tickets should at least store in their memory the following data:

- Security code and algorithm,
- Serial number,
- Ticket system number,
- Card user type and applicable tariff,
- Current money balance, ticket credit balance,
- Expiration date/time of the ticket,
- Data on the last three trips (validator number, amount, date and time),
- Data on the last three recharging actions (added amount, transaction number, point of sale code, date and time of transaction).

Smart ticket standards

The contactless smart tickets must support the following standards:

ISO/IEC 14 443 Contactless Integrated Circuit Card, that is:

ISO/IEC 14 443 – 1

ISO/IEC 14 443 – 2

ISO/IEC 14 443 – 3

ISO/IEC 14 443 – 4

Type A or Type B.

The plastic tickets must support the AES or triple DES security standard.

The cards should include a 4K read/write memory.

Aside from the Mifare type cards, it is desirable for the Smart Ticketing System to also use the Calypso type cards.

System Implementation and Maintenance

System Implementation

The System implementation will include:

- Main System Project,
- System implementation and acceptance in stages,
- Trial period, and
- Final acceptance after completion of the trial period.

Main Project

The Bidder should draft a Main Project for System implementation within 30 days from the Contract signing.

The Bidder shall be obliged to include in the Main Project a detailed technical and technological elaborate of both sub-systems within this System: the AVL Sub-system and the STS Sub-system, and in accordance with the specified equipment elaborate the methods and stages for installing the equipment.

The Main Project must be compliant with the technical descriptions in the tender documentation, and the basis for its creation is the Preliminary Design that the Bidder will enclose to the documentation for participation in the public procurement. The Main Project should take into consideration the requirements concerning the required System capacities, as well as the conditions and deadlines for its implementation.

Within the Main Project, the Bidder shall be obliged to submit also:

- A Detailed Training Plan for the System users,
- System Inspection and Testing Plan,
- Plan and procedures for regular system maintenance,
- Plan and procedures for corrective system maintenance.

These appendices must be in compliance with the request of the Contracting Authority and the technical description in the tender documentation.

The approval of the Main Project will be given by a Commission established by the Contracting Authority.

System implementation in stages and System acceptance

The implementation will be carried out in predefined stages with deadlines and schedule envisaged in the System Implementation Plan.

After the completion of each stage, the Acceptance Commission will perform acceptance of said system implementation stage. The acceptance will include quantitative equipment acceptance and qualitative acceptance by verifying the functionality. The acceptance will always be conducted in the presence of Bidder's representatives. After the acceptance has been completed, the Commission will draft a Report on its activities in a form of Minutes, and after all members of the Commission and the Bidder's representative sign it, one copy will be sent to the Bidder.

During the quantitative acceptance the Commission will check the delivered and installed equipment and will review the enclosed certificates of the manufacturer. If it is established that the equipment is damaged, not new or if part of the equipment is missing, the Contracting

Authority and the Bidder will draft Minutes stating the facts discerned during the on-site verification. Any shortcomings or damages on the equipment and its parts that have occurred during the delivery due to fault of the Bidder will be rectified by the Bidder in the shortest time possible at his expense. The equipment and parts thereof which have not been delivered nor installed due to mistake will be delivered and installed in the shortest time possible in accordance with the Main Project and at the Bidder's expense.

During the qualitative acceptance the Commission will check the functionality of the System. The check will be conducted in accordance with the System Inspection and Testing Plan. The Commission may request checks which are outside the scope of the System Inspection and Testing Plan. All noticed deficiencies concerning the functioning of the System will be stated in the Minutes and a deadline for their rectification will be set. The Bidder shall be obliged to remedy any eventual remarks stated in the Minutes within the set deadline. In case of unsuccessful quality control, the procedure will be repeated within the deadline in the Minutes set for rectifying the deficiencies. The deadline shall commence at the moment the Minutes are signed by the Bidder.

After completing the overall system implementation, the Provisional Acceptance Commission will carry out the acceptance of the System.

The Bidder shall be obliged to conduct the system testing and commissioning in accordance with the System Inspection and Testing Plan.

The provisional acceptance will mark the beginning of the trial period which will last for 1-3 months. During this period the overall System will be tested. The Bidder shall be obliged to rectify all noticed deficiencies in the system operation during the trial period.

After completing the trial period, the Final Acceptance Commission will carry out the final acceptance of the System.

In case there are any differences between the actual situation and the Main Project, within one month of the final acceptance of the System, the Bidder shall be obliged to submit in written and electronic form a Project for the Actual Situation of the System.

Documentation

The accompanying documentation should contain: technical description and technical characteristics of the System, operation manual for each device, hardware maintenance manual, hardware and software installation and configuration manual.

Also, it should contain detailed functional description of the implemented hardware and software (functional description of the System and its elements).

Detailed description of all configurable system parameters and how they may be configured.

Detailed description how to use each System application.

Detailed description how the overviews and reports are configured.

The overall accompanying documentation should be in Macedonian, excluding the technical description of the hardware which may be in English.

Training

The Bidder shall be obliged to organise and conduct the training for the system users (drivers, dispatchers, forwarders, administrators, etc.) until the completion of the system implementation, that is, before the trial period. The Contracting Authority will provide the premises for conducting the training. At his own expense the Bidder will provide the trainers, equipment and documentation required for carrying out the training. The training will be in Macedonian.

The Main Project of the Bidder should include a Training Plan according to which the system

users will be trained. The Training Plan should contain the detailed content of the training, prerequisite knowledge of the trainees, number of trainees per training, training duration, schedules per days and groups and similar.

The Training Plan should envisage:

Training for bus drivers

The Bidder should provide training for the drivers on how to use the devices which are part of this System and are installed in the vehicles. The training should include:

- System sign-in,
- Bus line, direction, shift selection,
- GPS system control operations,
- Sales of POS (penalty fee) tickets,
- Communication with the Control Centre,
- Driver sign-out,
- Report on the daily turnover.

Training for dispatchers

The training of the dispatchers will be carried out by using the application for dispatchers and should include:

- Vehicle monitoring,
- Vehicle management,
- Communication with vehicles.

Training for the tariff management personnel

The training for the tariff management personnel should cover the operation of the smart ticketing application.

Training for the controllers

The training for the controllers will be carried out by using the passenger controlling devices and should include:

- Controller sign-in,
- Ticket control,
- Issuing penalty fee tickets to passengers without tickets,
- Data transfer to the OCC,
- Controller sign-out.

Training for the system administrator

The training of the system administrator should include:

- Familiarisation with the hardware components of the System,
- Organisation and familiarisation with all application within the System,

- Setting the parameters of the System.

Training for traffic expert associates

The training for the expert associates should include:

- Familiarisation with the system structure,
- Familiarisation with the application,
- How to use the vehicle monitoring and management data,
- How to generate new reports in accordance with the requirements,
- How to use the data for planning and developing the public transport.
-

Estimated number of training participants is presented in the table below:

Ser.	Description	Number of participants
1.	Driver	80
2.	Dispatcher	20
3.	Tariff management	2
4.	Controller	50
5.	System administrator	3
6.	Traffic expert associate	20

Apart from this, the Bidder will envisage and provide training for the personnel that will work on issuing personalised smart tickets, as well as for the sellers who will recharge the tickets.

System Maintenance during the Warranty Period

The system maintenance will be comprised of regular and corrective maintenance.

Regular Maintenance

The Bidder should follow the plan and procedures for regular system maintenance.

Regular maintenance will entail the following activities concerning the system equipment and software:

- Performing monitoring and preventive maintenance activities and undertaking actions for prevention of unplanned equipment failures,
- Setting the System for achieving maximum performance improvements,
- Updating the installed software with patches and new releases,
- Identification and assistance during troubleshooting related to the installed software – patches and releases,
- Troubleshooting issues related to interconnections with various software products and other devices,
- Software migration to new active platform,
- Updating the documentation while and/or after completing the modifications.

The response time for regular maintenance must not exceed 8 hours from the receipt of the request sent by the Contracting Authority. Within that timeframe, the Bidder shall inform in writing the Contracting Authority concerning the activities that will be undertaken and the timeframe for complying with the request.

The part of the regular maintenance related to preventive maintenance will be carried out in accordance with a previously defined plan and programme proposed by the Bidder and adopted by the Contracting Authority. In case the Bidder plans to derogate from the plan, the Contracting Authority must be informed in writing thereof at least 24 hours before the planned activity is undertaken.

The Bidder shall be obliged to cover all expenses for the software upgrades during the Contract validity period.

Detailed procedures for the regular maintenance will be also enclosed.

Corrective Maintenance

Corrective maintenance will entail remediation of critical problems related to the functioning of the System. The Bidder should be able to receive fault reports concerning the functioning of the System by phone or via e-mail, 24 hours a day, 7 days a week. In case of partial of full failure of the System, the Contracting Authority will notify the Bidder via e-mail of the failure within 4 hours of its occurrence, and the Bidder shall be obliged to respond within 8 hours from the receipt of the notification. When the work order or the Minutes are signed by the authorised person of the Contracting Authority, it will be deemed that the corrective action has been completed.

Taking into account that the system administration should be a service provided by the Bidder for a monthly fee (eCloud fee), besides his Bid, the Bidder should submit a template service level agreement, where the annual service availability should be at least 99,97%.

The Bidder shall be obliged to rectify all faults, that is, to provide functioning of the System at functional level 0 and functional level 1 within 24 hours from the receipt of fault notification. The Bidder may not exceed the response times for rectifying system faults at functional level 0 and functional level 1 for more than 72 hours, calculated in aggregate throughout the calendar year.

In case the number of permitted hours within the meaning of paragraphs 2 and 3 of this Article is exceeded, the Contracting Authority shall have the right to apply the penalty provisions in this Contract. The penalty provisions may be applied only for the number of hours for which the limit was exceeded.

The Bidder shall be obliged to provide all necessary spare parts required for the maintenance of the user equipment, subject of this procurement.

The Bidder must submit a detailed procedure for corrective maintenance, as well as the organogram of his 24/7 support service department in charge of receiving notifications and rectifying faults.

For each established failure or defect of the System, as defined in paragraphs 2 and 3 of this Article, the Contracting Authority and the Bidder shall be obliged to draft and sign a Report which will clearly state the type of failure and the time needed to remedy the situation.

V. FORMS

„Automatic vehicle location system and smart ticketing system”			
FORM – INSTRUCTION FOR PROVING CONDITIONS FULFILMENT			
No.	In the offer, with the Form A we hereby enclose the following:		
1.	Form 1A – Offer Form	yes	no
2.	Form B – List of mandatory documentation the bidder submits for the sub-contractor/s (filled-in, signed and stamped Form is submitted only by a bidder who applies with the sub-contractor/-s for each sub-contractor, respectively)	yes	no
3.	Form 2A – All Consortium members submitting joint bid (Form filled-in with required data, signed and stamped by all Consortium members is submitted in case of joint bid)	yes	no
4.	Form 3A – Reference list – contract(s) of implemented projects with the offered Solution with at least 250 buses operating on city lines in an EU Member State, with average min. 120.000 (hundred and twenty thousand) transactions (validations) per day, operational in the past 3 years, stating amounts, dates and minimum 1 (one) reference of satisfactory performance; To the Form 3A, please enclose: - Confirmations issued and stamped by the Contractor confirming that works related to the subject of this Public Call satisfy the project performances in accordance with the Contract, that is, its operability. In cases of submission of joint offer, the required condition shall be met by all the Consortium members jointly.	yes yes	no no
5.	Form 4A – Statement by sufficient personnel of the bidder	yes	no
6.	Form 5A – Statement for sufficient technical personnel of the bidder	yes	no
7.	Form 6A – Statement of the bidder that the Design Project meets the technical specification from the Tender documentation and the Charts in the Form 6A	yes	no
8.	Form 7A – Statement of the bidder for appointment of working team	yes	no
9.	Document for registered activity - DRD Form issued by the Central Registry of the Republic of Macedonia as a proof that the legal entity is registered. In case when the bidder is foreign legal entity, proof that the entity is a member of proper professional association in accordance with the regulation in country where registered, issued by the authorised body, or that it belongs to proper professional association or organisation registered in the appropriate Registry, or any other proof in accordance with the registration of the country where registered.	yes	no
10.	Form 8A - Statement that the bidder has not, in the past 5 years, been subjected to legally effective judgment pronounced against him/her for participation in a criminal organization, corruption, fraud or money laundering. a) providing the bidder has a registered head office in the Republic of Macedonia, it shall submit: Confirmations that there is no legally effective judgment imposing a misdemeanour/criminal sanction involving prohibition to perform a profession, activity or duty, or prohibition to perform a specific activity, imposed against him/her;	yes yes	no no

	Confirmation from the Registry of criminal sanction for not performed criminal acts for legal entities or side sanction involving prohibition to participate in public call proceedings, public procurement contracts and contracts for public-private partnership imposed against him/her Confirmations that he/she is not subject to a liquidation/bankruptcy procedure opened by a competent authority. б) providing the bidder does not registered head office in the Republic of Macedonia, it shall submit a Confirmation by the authorized body in the his/her country compulsory translated into Macedonian language by an authorized court translator. The given evidences shall not be older than 6 (six) months calculated backwards as of the deadline for submission of offers. In case of submission of joint bid, the required evidences shall be submit for each Consortium member.	yes yes	no no
11.	Confirmation of paid taxes, contributions and other public duties. a) provided the bidder has a registered headoffice in the territory of Republic of Macedonia, the competent authority to issue such certificates shall be the Public Revenue Office. b) provided the bidder does not have a registered seat in the territory of Republic of Macedonia, he/she shall submit a Certificate from the competent authority in the country of registration, accompanied by a compulsory translation into Macedonian language, stamped by the authorized translator. The given evidences shall not be older than 6 (six) months calculated backwards as of the deadline for submission of offers. In case of submission of joint bid, the required evidences shall be submit for each Consortium member.	yes yes yes yes	no no no no
12.	Balance Sheet and Income Sheet for the past 3 (three) years (2009, 2010 and 2011) the entity did not report losses in its operations and gains total income of at least 30,000,000.00 (thirty million) Euros and minimum profit of 3,000,000.00 (three million) Euros issued by the competent authority in the country where the bidder was registered. In the territory of Republic of Macedonia, the competent authority to issue such certificates shall be the Central Registry of the Republic of Macedonia. In case of submitting a jont bid, the required evidence shall be submitted to each Consortium member, and the reuired condition for the financial capacity shall be met by the Consortium members jointly.	yes	no
13.	Original bid guarantee or deposited funds in the amount of at least 2% of the total bid value which shall be non-puttable, unconditional, payable on first call and without objection right with a validity date of minimum 194 days as of the date of bid opening.	yes	no
14.	Form 9A – List of confidential information	yes	no
15.	Form 10A – Statement proving acceptance of conditions	yes	no
16.	Design solution of the Automatic vehicle location system and smart ticketing system for the public transport of the passengers	yes	no
17.	Detailed specification of the equipment	yes	no
18.	Dynamics Plan for the implementation of the equipment (hardware) and software per phases	yes	no

19.	Model Contract	yes	no
20	Form 11A-Specification for additional equipment with guaranteed prices expressed in Euros	yes	no
Documentation written in English language must be accompanied by a stamped translation from authorized Court translator. We are aware and accept the fact that in case of failure to submit all evidences for fulfilment of the tender documentation requirements, the Contracting Authority shall dismiss our offer as incomplete.			
date:_____	stamp	Signature from the authorised person _____	

This Form shall be filled-in by circling the answers „yes" or „no", meaning that the required documentation is submitted to the bid, proving fulfilment of the requirement, stipulating the date, signing and stamping it as instructed in the Instructions.
In case of joint bid, the Form shall be copied in needed number of copies, depending on the Consortium members.
Each Consortium member is bound to sign and stamp the copy of the Form A in the instructed manner.

Form B

„ Automatic vehicle location system and smart ticketing system ”			
LIST OF COMPULSORY DOCUMENTATION RELATED TO THE MANIFACTURER SUBMITTED BY THE BIDDER			
No.	Enclosed to the bid, apart from the Form B, please find:		
1.	In order to prove the capability for execution of professional activity, the bidder shall submit document for registered activity for the manufacturer, issued from the Trading Registries kept in accordance with the national regulations within the country of registration.	yes	no
3.	Statement from the responsible person of the manufacturer that in the last five years had not been subject to a legally effective judgment pronounced against him/her for participation in a criminal organization, corruption, fraud or money laundering. a) providing the bidder has a registered head office in the territory of Republic of Macedonia, it shall submit: b) Certificate that he/she is not a subject to misdemeanour sanction involving prohibition to perform a profession, activity or duty, or prohibition to perform a specific activity, imposed against him/her; c) Certificate that he/she is not a subject to criminal sanction for performed criminal acts for legal entities or side sanction involving prohibition to participate in public call proceedings, public procurement contracts and contracts for public-private partnership imposed against him/her d) Confirmation that he/she is not subject to a bankruptcy/liquidation procedure opened by a competent authority. Providing the subcontractor has a registered head office in the territory of Republic of Macedonia, the competent authority to issue such certificates shall be the competent court or the Central registry in the R.M. Providing the subcontractor does not have a registered head office in the territory of Republic of Macedonia, he/she shall submit a Certificate from the competent authority in the country of registration, accompanied by a compulsory translation into Macedonian language, stamped by the authorized translator. The given evidences shall not be older than 6 (six) months calculated backwards as of the deadline for submission of offers.	yes yes yes yes	no no no no
4.	Confirmation from the competent authority of paid taxes, contributions and other public duties. a) Provided the subcontractor has a registered head office in the territory of Republic of Macedonia, the competent authority to issue such certificates shall be the Public Revenue Office. b) provided the bidder does not have a registered seat in the territory of Republic of Macedonia, he/she shall submit a Certificate from the competent authority in the country of registration, accompanied by a compulsory translation into Macedonian language, stamped by the authorized translator. The given evidences shall not be older than 6 (six) months calculated backwards as of the deadline for submission of offers.	yes yes yes yes yes	no no no no no
5.	Balance Sheet and Income Sheet for the previous 3 (three) years (2009,	yes	no

	2010 and 2011)		
Documentation written in English language must be accompanied by a stamped translation from authorized Court translator. We are aware and accept the fact that in case of failure to submit all evidences for fulfilment of the tender documentation requirements for engagement of sub-contractor, the Contracting Authority shall dismiss our offer as incomplete.			
Date:_____	stamp	Signature of the authorised person _____	

This Form shall be filled-in by circling the answers „yes" or „no", meaning that the required documentation is submitted to the bid, proving fulfilment of the requirement, stipulating the date, signing and stamping it as instructed in the Instructions.
The Form for the Sub-contractor shall be copied, signed and stamped by the sub-contractor. The Form shall be copied in needed number of copies, depending on the number of engaged sub-contractors and shall be submitted for each one of them for signing and stamping by the bidder in the instructed manner.
The filled-in, signed and stamped Form shall be submitted by the bidder acting with sub-contractor/-s.

Form 1A

„**Automatic vehicle location system and smart ticketing system**"

BID FORM

Bidder's memorandum

Based upon Public Call for awarding the PPC for Automatic vehicle location system and smart ticketing system", No. 70/2012 from 09.01.2013, published by the Public Transport Company – JSP Skopje, with a registered head office on bul. Aleksandar Makedonski No. 10, Skopje and the tender documentation we collected, we submit the following:

OFFER

Part I – General information

WAY OF APPLYING (circle): NUMBER OF OFFER _____	1. individual application 2. application with sub-contractor/s 3. Group of bidders (Consortium)
GENERAL INFORMATION ABOUT THE BIDDER	
I	
NAME OF THE BIDDER/authorized Consortium member	
HEAD OFFICE	
RESPONSIBLE PERSON	
CONTACT PERSON	
TELEPHONE	
TELEFAX	
E-MAIL	
BANK ACCOUNT	
UNIQUE REGISTRATION NUMBER	
UNIQUE REGISTRATION NUMBER OF THE CITIZEN	
TAX NUMBER	
II	
NAME of the Consortium / subcontractor	
HEAD OFFICE	
RESPONSIBLE PERSON	
CONTACT PERSON	
TELEPHONE	
TELEFAX	
E-MAIL	
BANK ACCOUNT	
UNIQUE REGISTRATION NUMBER	
UNIQUE REGISTRATION NUMBER OF THE CITIZEN	
TAX NUMBER	

III	
NAME of the Consortium / subcontractor	
HEAD OFFICE	
RESPONSIBLE PERSON	
CONTACT PERSON	
TELEPHONE	
TELEFAX	
E-MAIL	
BANK ACCOUNT	
UNIQUE REGISTRATION NUMBER	
UNIQUE REGISTRATION NUMBER OF THE CITIZEN	
TAX NUMBER	

In case of joint bid, that is, in case bidder engages sub-contractor/s, providing the members of the Biddee group, that is, sub–contractor is bigger than 2, the first page of the offer shall be photocopied and enclosed to the Bid Form.

Part II – Technical part

1. The following forms (signed and stamped by the authorised person of the bidder) shall be enclosed to the bid:

- Form 2A – Statement from the Consortium members submitting joint bid.
- Form 3A – Reference Lists.
- Form 4A – Statement Form for bidder's sufficient personnel.
- Form 5A – Statement Form for bidder's sufficient technical personnel.
- Form 6A – Statement Form that bidder's Design project meets the technical specification with Table 6A.
- Form 7A – Statement Form that bidder's designated a work team.
- Form 8A – Statement Form that the bidder has not, in the last 5 years, subjected to legally effective judgment pronounced against him/her for participation in a criminal organization, corruption, fraud or money laundering.
- Form 9A – List of confidential information.
- Form 10A– Statement form proving that the bidder accepts the conditions.
- Form 11A – Specification of additional equipment with guaranteed prices in Euros.
- Form B – List of compulsory documentation for the sub-contractor.

Documents proving bidders capability set out in the point 9 of the Tender documentation:

- Document on registered activity
- Statement of the economic operator that, within the last five years, he/she has not had any legally effective judgment for participation in a criminal organization, corruption, fraud or money laundering, pronounced against him/her;
- Confirmation that he/she is not subject to a bankruptcy procedure opened by a competent authority;
- Confirmation that he/she is not subject to a liquidation procedure opened by a competent authority;
- Confirmation of paid taxes, contributions and other public dues issued by a competent authority in the country where the economic operator is registered;
- Confirmation from the Registry of criminal sanction for not performed criminal acts for legal entities or side sanction involving prohibition to participate in public call proceedings, public procurement contracts and contracts for public-private partnership imposed against him/her
- Confirmation from the Registry of criminal sanction for not performed criminal acts for legal entities or side sanction involving temporary or permanent ban for performing specific activity imposed against him/her, and
- Confirmation that there is no legally effective judgment imposing a misdemeanour sanction involving prohibition to perform a profession, activity or duty, or prohibition to perform a specific activity, imposed against him/her
- Balance Sheet and Income Sheet for the previous 3 (three) years (2009, 2010 and 2011) with positive financial results issued by the competent

authority in the bidder's country of registration. In the R.M. the competent body for issuing this certificate is the Central registry of R.M.

2. Comprising part of the technical documentation shall be:

- **Design solution** as a basis for the implementation of the PPC, prepared based upon the technical specification given in the tender documentation listing the minimum requirements.

  The bidder selected as the most favourable one and who will be rewarded a Contract shall be bound to develop a Main project based upon the Design solution. The Main project shall be a basis for purchasing equipment, mount the equipment and software along with the complete implementation of the System in accordance with the conditions and requirements given in the Tender documentation;

- **Detailed equipment specification** (hardware and software) shall contain:
  - name of the equipment with basic features and minimum standards;
  - equipment manufacturer and quantity, and
  - software specification.

- **System and Software installation dynamics** divided by phases (development of Main project, probation of the System and final acceptance of the System) which must be in accordance with the requirements by the Contracting authority given in the technical specification in the Tender documentation.

Part III – Financial part

1. Validity period of the offer: (minimum 180 calendar days as of the date of bid opening)	_____ calendar days
2. Total price:	_____ Euros/denars without VAT
In letters: _____ Euros/denars	
3. VAT _____ Euros/denars	

The value of the percentage participation shall be fixed and unchangeable until the final implementation of the subject to the tender documentation.

3. SYSTEM IMPLEMENTATION DEADLINE	
Required deadline:	Offered deadline:
Final deadline for the System implementation shall be 300 days as of the entry into force of the Contract subject to the Public Call	_____days

4. Financial guarantee funds:

- Original bid guarantee (original) or deposited funds in the amount of at least 2% of the total bid value which shall be non-puttable, unconditional, payable on first call and without objection right with a validity date of minimum 194 days as of the date of bid opening

- Signed and stamped Model Contract.

5. Way of payment:

The bidder shall agree for the Contracting authority to pay the Total amount for purchasing of the System to be paid on 3 (three) equal instalments. The manner and deadline of the payment shall be defined in the Contract for the procurement in question.

6. e-Cloud fee:

The Bidder shall agree for the monthly servicing fee upon **e-Cloud** principle, in accordance with the requirements given in the Tender Documentation – Technical specification to be 0.6% of the offered procurement price submitted as final offer.

7. Additional equipment in the warranty period:

The bidder is bound to provide guaranteed prices expressed in Euros applicable throughout the whole warranty period, as per the given specification of devices and System segments.

Place and date

_____

Bidder

_____

Responsible person

_____

Signature and stamp

_____

Form 2A

„Automatic vehicle location system and smart ticketing system"

STATEMENT FROM THE GROUP MEMBERS SUBMITTING JOINT BID

We, hereby act as Consortium submitting joint bid No._____ dated _____, upon a Public Call „Automatic vehicle location system and smart ticketing system".
We hereby authorise the Group member _____ from_____, to act on the behalf of other Group members in front of the Contracting Authority, receive written correspondence upon the said Call and submit the requested financial deposits which the Group members are charged for.
Providing the joint bid is evaluated as the most favourable, we are aware of the obligation to submit an original legal act for joint actions, are in accordance with the requirements of the Contracting authority, prescribed in the Instructions for developing the bid.

No.	Name and registered head office (address of the Group members	Type of work performed by the Group member	Signature of the responsible person and stamp by the group member
	Authorised group member:		Signature of the authorised person _____ stamp
			Signature of the authorised person _____ stamp
			Signature of the authorised person _____ stamp
			Signature of the authorised person _____ stamp
			Signature of the authorised person _____ stamp.

Date:_____

The Form shall be filled in with the requested information, signed and stamped in accordance with the Instructions – the Form shall be filled-in, stamped and signed by all Group members.
The Form shall be copied in case of bigger number of group members who submit joint bid, that is, larger number of information.
The Form shall be filled in, stamped and signed only by the bidders submitting the Joint bid.

Form 3A

„ Automatic vehicle location system and smart ticketing system"

BIDDERS' REFERENCE LIST

Form 3A – Reference list – contract(s) of implemented projects with the offered Solution with at least 250 buses operating on city lines in an EU Member State, with average min. 120.000 (hundred and twenty thousand) transactions (validations) per day, operational in the past 3 years, with amounts, dates long wit minimum 1 (one) confirmation of satisfactory implementation

ANNEX: The certificates issued and stamped by the Contractor verifying that the delivered works subject to this Public Call have been implemented by the bidder and that they are operational, with high-quality, the installed inner equipment is manufactured by the bidder.
The certificates must be contain Contractor's memorandum with accurate name and address of the Contractor. Contractor's certificates must be stamped and signed by the Contractor's responsible person. Providing the certificate is issued in foreign language, the bidder shall submit translation of the certificate into Macedonian language performed by authorised translator.

No.	Name and address of the Contractor	Name of the city	Date of implementation of the works	Value of the performed works	Name, contact person and telephone number of the Contractor

Date:_____

Signature of the responsible person

_____

stamp

The Form shall be filled-in, signed and stamped in accordance with the Instructions along with the requested evidences enclosed.
In case of joint bid, the filled-in Form shall be signed by all Group members and they shall submit the requested evidence (the requested condition shall be met by the Group members jointly).

The Form may be copied in case of larger number of information.

Form 4A

„Automatic vehicle location system and smart ticketing system” **STATEMENT OF AVAILABLE TECHNICAL CAPACITY**
I hereby declare to have sufficient number of engaged workforce with appropriate professional training to perform the contracting requirements in the Public Call „Automatic vehicle location system and smart ticketing system”.
Date:_____ Signature of the responsible person _____ stamp

The Form shall be filled-in, signed and stamped in accordance with the Instructions along with the requested evidences enclosed.
In case of joint bid, the filled-in Form shall be signed and stamped by all Group members.
.

Form 5A

„Automatic vehicle location system and smart ticketing system” **STATEMENT FOR BIDDER’S SUFFICIENT TECHNICAL CAPACITY**
I hereby declare to have sufficient technical capacity to perform the contracting requirements in the Public Call „Automatic vehicle location system and smart ticketing system”.
Date:_____ Signature of the responsible person _____ stamp

The Form shall be filled-in, signed and stamped in accordance with the Instructions along with the requested evidences enclosed.
In case of joint bid, the filled-in Form shall be signed and stamped by all Group members.

Form 6A

„Automatic vehicle location system and smart ticketing system”

STATEMENT FORM THAT BIDDER'S DESIGN PROJECT MEETS THE TECHNICAL SPECIFICATION IN THE TENDER DOCUMENTATION

I hereby declare that the submitted Design project “Automatic vehicle location system and smart ticketing system” meets the whole minimum technical requirements defined by the Contracting authority in the Technical specification of the Tender documentation.

Date:_____

Signature of the responsible person

_____

stamp

The Form shall be filled-in, signed and stamped in accordance with the Instructions along with the requested evidences enclosed.
In case of joint bid, the filled-in Form shall be signed and stamped by all Group members.

Table of Form 6A

NOTE FOR BIDDERS:

In the column “Comment”, the bidder shall write the number of the Annex/page/paragraph of his/her Design project meets the minimum technical requirements defined by the Contracting authority in the Tender documentation.

TECHNICAL SPECIFICATION	
Part	Comment
1. Automatic vehicle location subsystem	
1.2 Functions	
1.2.1 Timetables	
1.2.2 Monitoring	
1.2.3 Information on the operation status	
1.2.4 Statistics	
1.2.5 Management	
1.2.6 Passenger information	
1.3 Data base	
1.4 Interfaces to other systems	
2. Smart ticketing subsystem	
2.2 Functional blocks	
2.2.1 Ticketing system	
2.2.2 Functions and description of the devices	

2.2.3 Management tools and statistics	
2.3 Data base	
2.4 Interfaces to other systems	
3. Joint functions and structure	
3.1 Operational control centre	
3.2 Communication interface	
3.2.1 Organisation of wireless data communication	
3.2.2 Ways of communication	
3.3 System administration	
4. Equipment, software and tickets	
4.1 Equipment	
4.1.1 Operational OCC	
4.1.2 Vehicle equipment	
4.1.3 Equipment in the Traffic Centre for the City of Skopje	
4.1.4 Autobase/garage equipment	
4.1.5 Interconnection with existing equipment for informing passengers at 10 bus stops	
4.1.6 Portable ticket validation units	

4.1.7 Equipment for issuing personalised tickets	
4.1.8 Equipment of recharging tickets	
4.1.9 Stand-alone ticke vending machines	
4.2 Software	
4.3 Tickets	
5. System implementation and management	
5.1 System implementation	
5.1.4 Training	
5.2 System maintenance	
5.2.1 Regular maintenance	
5.2.2 Urgent maintenance	
Date:_____ stamp	Signature of responsible person _____

Each page of the Form should be filled-in, initialled, stamped, and signed by the responsible persons of the Bidder.

In case of joint bid submission, all members of the group should fill-in the Form and sign by the responsible persons of each group member.

Form 7A

„Automatic Vehicle Location System and Smart Ticketing System” **STATEMENT OF THE BIDDER FOR ASSIGNING THE WORK TEAM**
We hereby declare that in case of signing the Contract with the Contracting Authority of the public call: "Automatic Vehicle Locations System and Smart Ticketing System" we will assign a work team with a team leader.
Date:_____ stamp Signature of responsible person _____

The Form should filled-in, signed and stamped and submitted with the required proof in accordance with the Contract.

In case of joint bid submission, all members of the consortium, shall sign and stamp their own copies of the Form enclosed to the joint bid.

Form 8A

„Automatic Vehicle Location System and Smart Ticketing System”

STATEMENT THAT EFFECTIVE DECISION FOR PARTICIPATION IN CRIMINAL ORGANISATION, CORRUPTION, FRAUD OR MONEY LAUNDERING HAS NOT BEEN ISSUED AGAINST THE BIDDER

Pursuant to Article 146 of the Public Procurement Law (Official Gazette of RM no. 136/07, 130/08, 97/10, 53/11, 185/11 and 24/12 – consolidated text) I hereby give the following:

STATEMENT

I _____ director / executive director (responsible person) of the Bidder, hereby declare that myself and the legal person _____, has not been issued an effective court decisions for participation in criminal organisation, corruption, fraud or money laundering in the past five years.

Bidder:

STAMP _____
(name)

_____
(responsible persons)

In _____2013

In case of joint bid submission, all members of the consortium, shall sign and stamp their own copies of the Form enclosed to the joint bid.

Form 9A

„Automatic Vehicle Location System and Smart Ticketing System”

LIST OF CONFIDENTIAL INFORMATION

The Bidder shall write the information, number of appendix/page/paragraph in the Bid that is considered confidential.

Ser.	Confidential Information	Number of pages containing said information	Reasons why such information is deemed confidential	Time period during which the information will be confidential

Date:_____ stamp

Signature of responsible person

_____

In case of joint bid submission, all members of the consortium, shall sign and stamp their own copies of the Form enclosed to the joint bid.

Form 10A

„Automatic Vehicle Location System and Smart Ticketing System”

STATEMENT FOR ACCEPTING THE CONDITIONS

We hereby declare that by submitting the Bid, we fully accept the conditions of the Public call for awarding a PP Contract no. 70/2012 for installation of Automatic Vehicle Location System and Smart Ticketing System, published on the ESPP and in Official Gazette of the RM no.___ / 2013, the Invitation to Submit a Bid and all conditions stated in the Tender Documentation, in accordance with which we submit our Bid. We give our consent that those conditions represent an integral part of the PP Contract.

Place and Date **Bidder,**

_____ _____
(name)

_____
Responsible person

_____
(Signature and stamp)

In case of joint bid submission, all members of the consortium, shall sign and stamp their own copies of the Form enclosed to the joint bid.

Form 11A

„Automatic Vehicle Location System and Smart Ticketing System”

SPECIFICATION FOR PROCUREMENT OF ADDITIONAL EQUIPMENT WITH THE WARRANTY PERIOD

The Bidder is obliged to provide guaranteed prices for the below stated Specification of devices and system segments, in EUR which will be valid during the whole warranty period.

Specification of additional equipment with guaranteed prices in EUR:

	EQUIPMENT DESCRIPTION	Price in EUR
1.	Vehicle computer unit	
2.	GPS device	
3.	POS printer	
4.	Validator	
5.	Device for controlling smart tickets	
6.	Device for recharging smart tickets	
7.	Digital camera	
8.	Smart card printer	
9.	Stand-alone ticket vending machine and interconnection	
10.	Three-line information display and interconnection	
11.	Plastic chip card 4kB (as per the Tender Documentation)	
12.	Single bus cabling	