

DETAILS

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APPROVAL

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1 Definition of Terms and Acronyms

Adobe PDF	Adobe Acrobat Portable Document Format http://www.adobe.com
CEPS	Common Electronic Purse Standard
DTI	Department of Trade and Industry of the Republic of South Africa
EMS	Electronic Management System, including an electronic vehicle management and fare collection system
EMS Project Team	DTI, NDoT, CSIR
EMV	Europay MasterCard Visa – A consortium of entities that have produced standards for chip based credit and debit cards
GMT	Greenwich Mean Time
Government	The DTI and any other Relevant Authority
Lead Supplier	The lead supplier of a consortium that will take overall responsibility for Project Management and the successful delivery and commissioning of the system
MS Word	Microsoft Word (Word Processor Software)
NDoT	National Department of Transport of the Republic of South Africa
NTV	New Taxi Vehicle – either a mini- or midi-bus vehicle
Project Sponsor	Means the organisation that is primarily driving the project – in this case the DTI
RFP	In the context of this document, RFP means an abridged Request for Proposal. This was deemed necessary due to the very tight timescales of the project
SAPS	South African Police Services
SARB	South African Reserve Bank
SAST	South African Standard Time – GMT + 2 hours
SMME	Small, Medium and Micro Enterprises
South African Minibus Taxi Industry	Consists of over 40 000 taxi operators in South Africa, who own over 120 000 vehicles and are organised into primary route associations as well as national and provincial structures
Taxi	Either mini- and / or midi-bus taxi
Taxi Operator	Is an owner of either mini- and / or midi-bus which is permitted to carry fare paying public transport passengers on a mostly unscheduled basis on specific routes

Taxi Co-operatives	A democratically controlled organization wherein a number of persons and / or taxi operators have voluntarily joined together to achieve a common end and are making equitable contributions to the capital required and accepting a fair share of the risks and benefits of the undertaking in which members actively participate
Ticket	The ticket referred to in the text of this document means an electronic method of paying for the trip on a taxi
Token	The token can represent any monetary value, as well as different fare structures e.g. monthly, weekly. A token value is a value that can only be used for transport.
URS	User Requirement Statement

2 Introduction

The Minibus Taxi Recapitalisation Project forms part of an initiative by the South African Government to formalize the South African Minibus Taxi Industry. This project needs to be seen within the context of an integrated, inter-modal transport system that would enhance customer convenience, service credibility and safety.

Two main parts to the project are defined:

- I. The New Taxi Vehicle (NTV) part, and the
- II. Electronic Management System (EMS) part.

Each part is specified separately and the project is structured such that each part may be awarded independently. This document focuses on the EMS part.

The overall objective of the EMS requirement is to satisfy the need for risk mitigation by the financiers. The risk mitigation will be provided by the EMS through electronic monitoring and control of the new taxis, as well as control of the fares and other transactions. There is a strong requirement to integrate the EMS with the NTV to ensure the integrity of the EMS.

The objectives for the EMS within the Taxi Recapitalisation Project are:

- I. Promote and support an integrated and inter-modal transport system (bus, rail and minibus taxi),
- II. Effectively harness current technological developments in the electronic payment and transaction field,
- III. Make optimum use of existing infrastructure and ensure a fully comprehensive system to service the widest possible spectrum of customers. Existing infrastructure includes road, banking, etc.,
- IV. Ensure efficient and effective integration of the EMS in the new Taxi system and other public transport,
- V. Promote the migration from a cash-based to a cash-less traveller transaction system.

2.1 Information Provided – Disclaimer (**Legal opinion required)

The information provided in this document was obtained from several sources and is offered in good faith for the guidance of the respondents. Any estimates and projections contained in this document involve elements of subjective judgement and analysis that may or may not be correct. None of the government, the EMS Project Team or its advisers make any representation or warranty, express or implied, or accept any responsibility or liability, as to the accuracy or completeness of the information contained in this document or any other written or oral information made available to the respondents. Nothing contained in this document or otherwise may be relied on as a promise or representation, whether as to past, present or future.

This document does not purport to contain all of the information that may be required to evaluate the project and any recipient of this document should conduct its own independent financial or other analysis of the project and of the information contained or referred to in this document and should obtain such professional advice as is deemed necessary.

This document supercedes all information concerning the project, which may have been previously communicated whether orally or in writing or otherwise.

This document is not intended to form the basis of a decision to enter into any transaction with respect to the project or any other investment decision and does not constitute an offer, invitation or recommendation to enter into any such transaction or decision.

2.2 Confidentiality (**Legal opinion required)

This document contains confidential information regarding the taxi industry in the Republic of South Africa. By accepting this document, the recipient agrees that it:

- I. Will cause its members / directors, officers, employees, agents, advisers and representatives (and where applicable, those of its participating members) to use this document only to evaluate possible participation in the project and for no other purpose,
- II. Will not divulge or distribute any such information or pass any copies of this document to any other person (except for such other persons use for the same purpose and provided such other person undertakes to observe these confidentiality requirements) without the prior written approval of the project sponsor,
- III. Will return this document together with all copies thereof to the Department of Trade and Industry (DTI) promptly upon requested to do so.

Each recipient agrees to maintain the confidentiality of all information supplied to it in connection with the process (whether in text, chart, picture or other form), and agrees to keep its own response to this document confidential, whether or not it is among the final recommended respondents.

The government, the EMS Project Team and the advisers will maintain the confidentiality of information designated by a respondent as confidential when it submits its response, except where otherwise required by law or as may be required by the DTI for purposes of evaluation and selection of respondents.

2.3 Reservation of Rights: Decisions Final (**Legal opinion required)

The government reserves the right to approve or reject any or all proposals or parts thereof and / or to terminate any respondents further participation at any time prior to approval of the proposals without stating the reasons therefore. The decision of the Government in that regard is final. Neither the government, project team nor advisers shall incur any responsibility or liability for any such approval, rejection or termination.

The decision as to which respondents the government enters into negotiations with is final, and no reasons are required to be given as to the inclusion or exclusion of any respondent in such negotiations. The project teams decisions in terms of its recommendations to the government are final, confidential, and may not be challenged.

The project team reserves the right to amend or modify any of the documents, procedures, or due dates herein at any time without prior notice. Any such amendments or modifications shall be communicated to respondents in writing and respondents shall be obliged to acknowledge receipt of such notification within twenty four (24) hours by e-mail address contained in section 4.1 of this document.

No claim may be brought against the government, project team or advisers by any unsuccessful respondent, including, without limitation, as a result of any amendment or modification described above.

2.4 Governing Law (**Legal opinion required)

This document and the transactions arising therefrom shall be governed by and construed according to the law of the Republic of South Africa.

3 Background Information

Public transport is one of the priorities of government and recent developments in this area, relating to the use of advanced technologies, have prompted the National Department of Transport (NDoT) to take action to ensure that short-term decisions do not cause longer-term interoperability and compatibility problems. Two spheres of development (i.e. Commuter Rail initiative and the Taxi recapitalisation initiative) have resulted in the need to focus on the coordination of advanced technology projects in public transport.

The taxi recapitalisation project called for tenders with respect to a vehicle and related EMS technology. Due to advancement in technology and a greater clarity in terms of user requirements, which incorporates the inter-modal integration to facilitate traveller convenience, this request for proposal (RFP) has been initiated.

In order to meet the objectives set by NDoT and the DTI, the Taxi Recapitalisation Project aims to:

- I. Improve the quality of service of the taxis,
- II. Improve the safety of travellers,
- III. Affordable operations,
- IV. Improve the convenience to travellers,
- V. Migrate from a cash-based fare payment system to a cashless fare payment system,
- VI. Monitor route operation, usage and revenue,
- VII. Monitor critical parameters in the vehicle and report deviations.

Currently there are approximately one hundred and twenty six thousand (126 000) taxi vehicles in South Africa. On average, they are ten (10) years old and are therefore not fit for public transport operation. The replacement value of the current fleet is roughly R15 billion.

The estimated annual turnover in the taxi industry is at least R10 billion nationally. Minibus taxis carry over 60% of public transport users and about 30% of all workers countrywide. The average urban trip length is 18km. Most of the transferring passengers on public transport modes are transferring from a minibus taxi to another minibus taxi as opposed to an alternative mode of transport, such as busses or trains.

The South African Taxi Industry does not operate on a distance based fare system. There are no fare meters in the taxis and routes tend to be restricted to defined areas. The taxis also do not have fixed stopping points (unlike the bus industry), but rather tend to stop and pick up & drop off passengers as and when required.

4 Rules and Procedures

4.1 Delivery Date, Contacts and Addresses

The final delivery date for your response is noon South African Standard Time (SAST) on 6 November 2000.

An electronic copy of your response (MS Word or Adobe PDF) must be e-mailed to:

taxirecap@icomtek.co.za

AND

Ten (10) printed and bound copies of your response must be delivered to:

Department of Trade and Industry (DTI)

Attention: Mr S Singh

10th Floor, House of Trade and Industry

226 Prinsloo Street

Pretoria

0001

NOTE: Faxed responses will not be accepted.

4.2 Requests for Information Clarification

All requests for additional information must be e-mailed on or before 17:00 SAST on 25 October 2000 to:

taxirecap@icomtek.co.za

All queries and responses to queries will be distributed to all respondents.

4.3 General Conditions

The respondent must state his ability to fulfil the requirements of this RFP, which will place him under obligation when accepting a following order. The EMS Project Team considers this RFP and any annexures sufficiently detailed, if the project team does not receive written requests for additional information.

4.4 Response Format

The response must contain the following information:

- I. Your company's name,
- II. Contact person details,
- III. Name and function of responsible manager,
- IV. The signature of the responsible manager,
- V. Electronic copy of document to be e-mailed in either MS Word or Adobe PDF format.

The required response format is included as Annexure A in this document, and a summary questionnaire is included as Annexure B. Please ensure also that all questions asked in Section 9 of this document are answered and are included in your response.

If the supplier notes impediments or possibilities for improvement, he must clearly report these in the form of a supplement. These supplements should be included as separate items in the response.

The DTI reserves the right to use the entire proposed system or portions thereof in the final solution.

An example of Annexure B completed:

Requirement #	Sub-section	Short Description	Yes	No	Possible	Comment Ref
7.1.1	1a	Passenger trips per taxi per period per route	X			
	1b	Passenger fares revenue per taxi per period per route	X			
	2	Monitoring & logging of route deviation		X		1
	3	Monitoring & logging of speed violations			X	2

Comments:

1. Our system operates on a beacon-based methodology for approximating vehicle position, and thus will not be able to provide for the monitoring and logging of route deviations.
2. This function will depend on the routes that the taxis are operating on, and the definition of the speed limit. If the speed limit were specified at 80km/h irrespective of the area, then our system can satisfy this requirement.

5 Purpose of RFP

5.1 Purpose

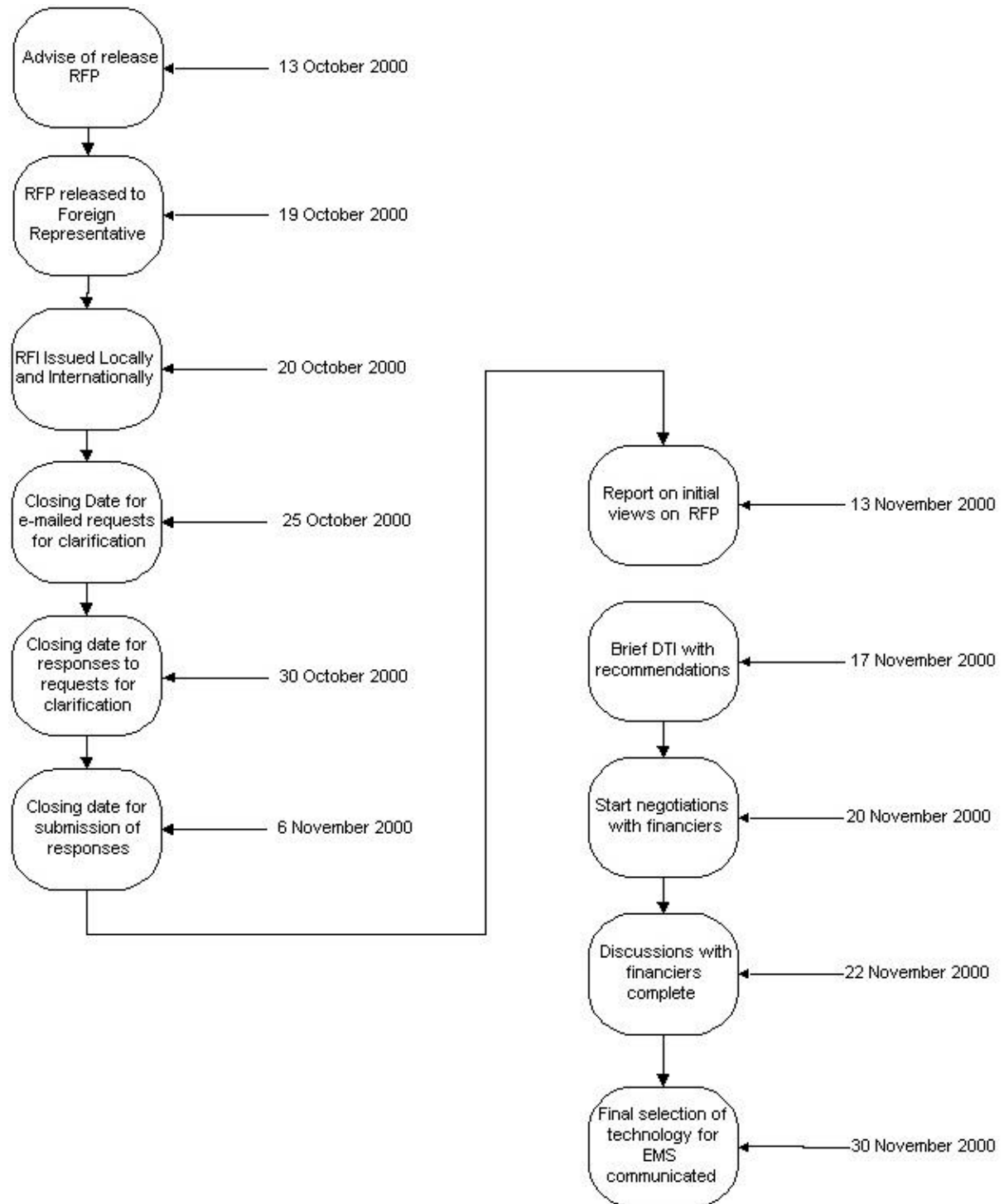
This document serves as an invitation to potential suppliers to provide technical solutions to the requirements as stated in this document. With the help of their knowledge and expertise in the field, these suppliers are invited to indicate relevant technical solutions for the EMS. This RFP describes the expectations of the DTI for the EMS, in the form of possible User Requirements as well as a conceptual system.

5.2 Schedule of Dates

Date	Activity
13 October 2000	Advise of release of RFP
19 October 2000	RFP released to foreign representatives
20 October 2000	RFP issued (Locally and Internationally)
25 October 2000	Closing date for e-mailed requests for clarification
30 October 2000	Closing date for responses to requests for clarification
6 November 2000	Closing date for submission of responses
13 November 2000	Report on initial views on RFP
17 November 2000	Brief DTI with recommendations
20 November 2000	Start negotiations with financiers
22 November 2000	Discussions with financiers complete
30 November 2000	Final selection of technology for EMS communicated

5.3 Process Diagram

The RFP process that will be followed is shown in the diagram below:



6 What is being asked of suppliers

The DTI requires the response to be in the form of a proposal that indicates technology solutions for the requirements as stated in section 7.

The selected supplier is expected to supply a turnkey solution to the problem. The selected supplier may be part of a consortium, but only one member of the consortium will be seen as the lead supplier and will thus be responsible for the overall project management and deployment of the turnkey solution.

The response must provide answers to the following questions:

- I. What user needs, or parts of user needs can your company support?
- II. What user needs, or parts of user needs will be supported by other members of the consortium?
- III. What technologies would you use to support these needs?
- IV. Alternative solutions that can be offered?
- V. Indicate timescales for development / integration of the system?
- VI. What future technologies would provide a better solution to the problem?

The response must be in the format as prescribed in Annexure A. Please ensure that your response includes a completed Annexure B, signed by duly authorised signatory of your company. Please also answer all the questions in section 9 of this document.

Please refer to the example in Section 4.4 of this document.

7 Brief

The needs for the systems have been grouped into eight (8) major classes of users:

- I. Regulatory Authorities – This class includes users such as the DTI, NDoT, the law enforcement agencies, etc.
- II. Financiers – This class includes all the persons / institutions that will provide funding to finance the purchase of the minibus taxis.
- III. South African Reserve Bank – This is the regulatory authority for money transactions.
- IV. Insurers – This class includes all persons / institutions that will provide insurance services for the new vehicles.
- V. Taxi Operator – This class includes all persons who own taxis, either as a fleet owner or as a Driver / Owner.
- VI. Taxi Driver – This class include all persons who drive taxis, either as an employee of an owner, or as a Driver / Owner.
- VII. Vehicle Manufacturers – Parties responsible for supply and maintenance of the minibus taxis.
- VIII. Traveller – This class of user includes all persons who utilize the taxi as a form of transport.

Each one of these classes of user needs will be addressed separately.

The User Needs included below represent the minimum requirement. Additional solutions, features or functionality will be considered, only if the base case criteria have been satisfied. Final judgement of the aforementioned resides with the evaluation team.

7.1 Regulatory Authority User Needs

Initial users contained within this class include NDoT, DTI, SAPS and the Regional Traffic Departments. Each of these users will be addressed separately. The primary needs of the Regulatory Authorities are to reduce incidents of negligent / unlawful driving and to encourage inter-modal transport.

7.1.1 National Department of Transport (NDoT)

Transport planning. The NDoT, through its relationship with provincial and local authorities, is responsible for the long-term planning of transport systems in South Africa. The Taxi Recapitalisation project presents an opportunity to collect valuable information for this purpose. The ideal would be to collect this information for use at the three levels of government (national, provincial & local), without the need for creating additional infrastructure (back-end systems), i.e. using existing processes and systems (Refer to the National Land Transport Transition Act of 2000). The following information is the minimum required:

1. Minibus transport utilization figures:
 - a. Passenger trips per taxi per period per route
 - b. Passenger fare revenue per taxi per period per route

Monitoring of compliance to regulations. Officials from the provincial authorities (awaiting confirmation) should be able to interrogate a vehicle on request for the following information:

2. **Route information.** Taxis are assigned designated routes by the NDoT in which fares can be collected. Any deviation from these routes, while collecting fares, should be recorded.
3. **Speed violation.** Violation of the maximum allowed speed should be recorded.
4. **Overloading.** Violation of the maximum permissible weight the taxi is licensed to carry
5. **Driver working periods.** The system needs to monitor and log the amount of time that a driver is operating the taxi per day

Base information. The above points indicate the minimum requirements. These can be verified against a log kept in the vehicle. The following mechanisms (data) can be used to obtain the required information:

6. Driver information for every time the vehicle is started, read from a chip card.
7. Vehicle information, including vehicle identity and designated routes.
8. Position with date-time stamp. It is suggested that position is recorded every 5 minutes, should the vehicle be moving. The log file needs to store at least 1 month's data.

System requirements.

9. The system needs to have a log file "playback" facility that indicates vehicular position and status on a PC based electronic map
10. In order to avoid possible monopolies of the EMS, the system must make use of non-proprietary protocols and open interfaces to backend systems
11. To ensure the EMS will not become obsolete, the system must make use of internationally accepted standards of norms (where applicable)
12. Real time tracking and monitoring would be advantageous, but it is not a prescribed requirement. Cost implication of real time tracking and monitoring should be addressed if the proposed system is able to provide it.

General Requirements.

13. The Fare Collection portion of the system needs to make use of chip card technology.
14. All proposed cards must comply with the relevant ISO specifications (e.g. ISO 14443A, ISO 14443B, ISO 7816 e.t.c.)
15. If an electronic purse application is used, it must be CEPS compliant.
16. If a token based system is proposed, it must make use of open standards (e.g. Mifare)
17. All South African Reserve Bank (SARB) guidelines and requirements for electronic transactions must be complied with.
18. To ensure interoperability the tickets must be contactless. Cognisance must be taken of the processes that are underway to invite tenders on the Home Affairs National Identification System, the Electronic Toll System of the South African National Roads Agency and the Automated Fare Collection and Control System of the South African Rail Commuter Corporation.

19. If a credit / debit chip card solution is proposed, the card must comply to Europay, MasterCard, Visa (EMV) specifications
20. E-purse applications must be contact loadable and unloadable (to comply with SARB requirements)

7.1.2 Department of Trade and Industry (DTI)

Primary objectives of the DTI include:

1. Ensuring the EMS is integrated into the NTV
2. Encouraging manufacturing and industry for the production of these systems
3. Promotion of Black Economic Empowerment

7.1.3 South African Police Services (SAPS)

The following needs have been identified as requirements:

1. In order to facilitate the quick return of stolen vehicles to their rightful owners, and the quick identification of taxis at roadblocks, the system must be able to securely and uniquely identify the vehicle
2. The system must ensure that the unique vehicle identity cannot be changed or modified in any way

7.1.4 Regional Traffic Authorities

In order to enhance the ability of the Regional Traffic Authorities to monitor and react to traffic violations by the taxis, the following needs have been identified as requirements:

1. The EMS must monitor and log all instances of:
 - a. Speed violations
 - b. Overloading
2. The Regional Traffic Authorities need to be able to easily check and verify the drivers identification, the drivers permit and route information

7.2 Financiers

In order to mitigate the risks of non-payment of vehicle finance loans, the following needs have been identified as requirements:

1. The system must:
 - a. Provide a fare transaction history log
 - b. Be a cashless system
 - c. Route all financial transactions through the South African Banking system
 - d. Be secure so that fraudulent tickets cannot be used
2. All transactions that are routed through the Banking system need to be traceable
3. To enable the financiers to do comprehensive asset management, a downloadable electronic maintenance record is required

7.3 South African Reserve Bank (SARB)

In order to mitigate the risk of fraudulent transactions, the following requirements have been identified:

1. The SARB guidelines and regulations for systemic risk management must be followed
2. The SARB guidelines and regulations for deposit taking must be followed
3. The SARB guidelines and regulations for electronic payment systems must be followed
4. If an electronic purse (e-purse) is used, it must be a contact purse. Rand value transactions may not be contactless unless there is user intervention (i.e. the user must physically approve the transaction prior to any deductions being made)

7.4 Insurers

In order to mitigate the risks of vehicle theft within the Taxi Industry, the following needs have been identified as requirements:

1. All vehicles need to be fitted with a Vehicle Security Association of South Africa (VESA) approved tracking and recovery system – <http://www.vesa.co.za>

7.5 Taxi Operators

7.5.1 Taxi Operators (Taxi Owners)

The primary objective of the Taxi Owner is to add value to his service and to reduce costs for his business. In order to meet these objectives the following needs have been identified as requirements:

1. In order to protect the operators interests and eliminate fraudulent activities, the EMS needs to provide financial and passenger data, which can be extracted and made available to the operator, by:
 - a. Logging the fares collected over a period of time– typically per shift
 - b. Providing an audit trail of fares collected over a period of time– typically per shift
 - c. Providing an audit trail of passengers transported over a period of time– typically per shift
2. In order to limit vehicular abuse and illegal use of the vehicle by the driver, the EMS needs to provide operational data by monitoring and logging all instances of:
 - a. Speed violations
 - b. Excessive braking
 - c. Excessive engine revolutions
 - d. Excessive acceleration
 - e. Overloading
 - f. Excessive engine idling time

3. The system needs to monitor the fuel system to prevent the theft of fuel from the vehicle.
4. To prevent unauthorised use of the vehicle the following needs have been identified:
 - a. If the drivers license data on the chip card is invalid the taxi should not start
 - b. Any attempts to start the taxi need to be stored in the log file

7.5.2 Taxi Operators Association / Taxi Co-operatives

The primary objectives of the Taxi Owners Association are:

1. The market branding of their association,
2. The improvement of services offered to travellers,
3. To increase the market share of their members,
4. To attract new members to the association.
5. To enhance the credibility of the taxi industry

In order to achieve these objectives, the following needs have been identified as requirements. The EMS needs to be able to:

1. Be branded with the appropriate Taxi Association / Co-operative logo / details
2. Support a loyalty scheme to enable regular users to benefit from regular use of the Associations / Co-operatives taxis.
3. Provide some benefits for the Taxi Associations / Co-operatives members

7.6 Taxi Drivers

It should be noted that it is possible that the Taxi Owner and the Taxi Driver may or may not be the same person.

The following needs have been identified as requirements:

1. To ensure that the traveller has sufficient funds to pay for the trip, the fare needs to be deducted as the traveller enters the taxi.
2. To stop "fare evasion", the driver needs to know that the traveller boarding the taxi has paid the fare.
3. The driver must be able to intervene with the system, should it be required e.g. in assisting a visually impaired traveller.

7.7 Minibus Taxi Suppliers

To assist the vehicle suppliers with their scheduled maintenance activities, the following needs have been identified:

1. Monitoring and reduction of vehicle abuse and reckless driving by monitoring and logging all instances of:
 - a. Excessive braking
 - b. Excessive acceleration
 - c. Excessive engine idling time
 - d. Excessive engine revolutions.
2. To ensure no unauthorised access to the EMS, the following needs have been identified as requirements:
 - a. Any attempt at unauthorised access must be logged for future action
 - b. The system must be secure, rugged and suited to the environment in which it will be deployed
 - c. In order to extend the life of the vehicle, the EMS must be able to indicate to the Driver when a regular inspection and maintenance event is scheduled. The system should make provision for several warnings to the Driver prior to the event, and also make provision for immobilizing the vehicle should the scheduled inspection and maintenance event not be completed within the allowed time. Notification of these event need to be logged in the log file
3. The respondent will be responsible for:
 - a. Training the drivers in the use of the EMS
 - b. Training the maintenance staff to do regular maintenance and inspection of the EMS. The conceptual scenario in this instance is that there will be taxi ranks that will provide fuel, proper ablution facilities, a maintenance workshop, a shop e.t.c. It is envisaged that the maintenance staff for the EMS would also be based at the rank, and provide a first and second line maintenance service to the taxi industry.

7.8 Travellers

1. In order to maintain the security and integrity of the fare collection system on the travellers side, the following needs have been identified as requirements:
 - a. The system must provide for multiple ticket option selections with the costs per ticket (e.g. 1 Stage – R2.50, 2 Stage - R3.50, Return R5.00, Weekly e.t.c)
 - b. The traveller needs to be able to expediently authorize the deduction of the fare before it is deducted. This will ensure that only the required fare is deducted, and it will empower the traveller to decide whether he / she is prepared to pay the fare for the trip or to seek alternative transport
 - c. The fare deducted, as well as the available balance, needs to be clearly indicated to the traveller
 - d. The information displayed must be visible to the traveller only, and not to other persons in the vicinity

- e. The display must be properly backlit to enable the traveller to clearly see the display even in low light / dark conditions
2. One of the main objectives of the EMS is to make traveling more convenient for the traveller. In order to achieve this objective, the following needs have been identified as requirements:
 - a. The payment of fares process needs to be simple, quick, and convenient for the traveller
 - b. The EMS must be robust, reliable and durable so as not to inconvenience the traveller
 - c. The traveller should not have to carry cash on his / her person for taxi fares
 - d. The traveller needs to be able to use the card on taxis, busses and trains
3. To enable the traveller to easily manage his / her available funds on the ticket, the following needs have been identified as requirements:
 - a. The traveller must be able to query the available balance on the ticket (off the NTV). This will enable the traveller to manage available funds on the ticket
 - b. The traveller needs to be able to reload / recharge the ticket conveniently
 - c. The cost to the traveller of reloading his / her ticket must be as low as possible
4. For increased convenience, the ticket needs to be reloadable, but a disposable ticket may need to be used in the deployment phase. The following needs for reload facilities have been identified as requirements. The reload facilities need to be:
 - a. Widespread
 - b. Easily accessible to travellers
 - c. Available 24 hours per day, 7 days per week
 - d. Cater for semi-literate travellers
 - e. User friendly

7.9 General EMS Requirements

The general EMS requirements are not direct requirements of any of the previously identified classes of users. The requirements are applicable to the EMS as a whole. The following needs have been identified as requirements:

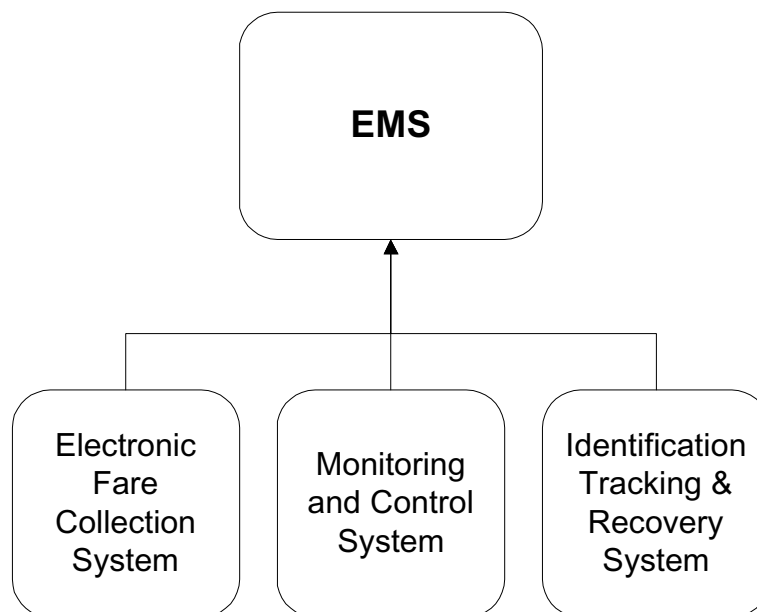
1. The log file needs to be securely downloadable to a backend system. The backend system is conceptually a Management Information System (MIS) that is contained on either a centralised or regional database that will receive and store the log files from individual taxis. Authorised users (e.g. NDoT, Taxi Operators) will then be able to query the log files and produce statistical reports (e.g. Route violation report per region e.t.c.). The user interface to this database should be easy to operate (possibly a simple Graphical User Interface). Access to the data would have to be controlled using password / smart card access control. The method of downloading the log file from the taxi is currently unclear, and will probably be dictated by the cost implications of such a download system.
2. The EMS needs to be easily maintainable
3. The system needs to be easily scalable in terms of functionality, volume of data handled, number of units deployed
4. The system should have a "Built-in Test" diagnostic facility with indicator lights showing faulty modules. This is to facilitate easy first line maintenance at taxi depots
5. The system needs to be modular to facilitate easy repair by replacement of modules
6. The system must be constructed in such a way as to prevent un-authorized access to the modules and the system
7. The system must be able to operate under poor lighting conditions.
8. The financial (fare collection) transactions and the log file data must be separated
9. There must be a methodology to ensure that the log file is regularly downloaded. A methodology to ensure that the operator / driver is forced / incentivised to download the log file regularly must be suggested.
10. The EMS (Electronic Fare Collection Sub-system) must be able to handle off-line transactions

8 Conceptual System Design

The system design information contained in this section is only one of several possible solutions for the EMS. It is not intended to be prescriptive nor is it a recommended system design. It is simply for information purposes and could possibly clear up some possible queries and assist the respondents in the preparation of their responses.

The EMS has been conceptually divided into three (3) major components:

- I. Electronic Fare Collection System – concerned with payment of fares,
- II. Monitoring and Control System – concerned with monitoring vehicle environmental parameters,
- III. Identification and Tracking System – concerned with identifying the driver, the vehicle and tracking the vehicles position,



COMPONENTS OF THE EMS

The three systems are unique but would have to be integrated with one another.

The core components of the EMS for minibus taxi recapitalisation are as follows:

1. An Electronic Fare Collection system that is based on the use of smart card technology. This will provide operators with greater security in collecting fares and will also provide information for fleet management. The collection of revenue into a single account for each operator will also lower the risks to financial organizations.
2. A Monitoring and Control System that will monitor the vehicular environment and will provide information on overloading, speeding, harsh acceleration / deceleration, e.t.c. This system will also be able to shut down the engine if certain parameters are exceeded.
3. A Vehicle Identification, Tracking and Recovery System. This system will provide operators with information for fleet management purposes and will, through a tracking and recovery system, lower the risks to financial and insurance organisations.

It is envisaged that the system will be packaged in an integrated way such that electronic systems can be shared for each of the three components of the system. It is also envisaged that a central database be developed and an effective method of managing and distributing fare revenue be devised. In all cases regulations with respect to the use of electronic money need to be adhered to.

9 Questions to be answered by potential suppliers

1. What happens if the Electronic Fare Collection system on the taxi fails?
2. What happens if the traveller does not have sufficient funds / coupons on the ticket to pay the fare?
3. What happens if the traveller only has cash / or the traveller has a defective ticket?
4. Who will be responsible for managing the risk of counterfeit tickets?
5. Who controls the pool of cash (from unredeemed tickets / value), if one exists?
6. What are typical Mean Time Between Failure (MTBF) and Mean Time To Repair (MTTR) figures for the envisaged system?
7. What about refundability issues. Who will be entitled to claim a refund and from whom in the event of a dispute?
8. How will your system handle changes to the fare structure (increases e.t.c.)?
9. How is the software / firmware in the terminals / readers going to be managed w.r.t. upgrades and version control?
10. How much local content does the EMS contain?
11. How do you intend to ensure system integrity?
12. What is the respondents approach to system integrity?
13. What is the Black Empowerment component of the proposal?
14. What is the economic development component of the proposal?
15. Is the EMS based on mature technology?
16. Are there systems elsewhere that employ similar technologies?
17. How will the system handle off-line transactions?
18. How do you propose to manage ticket distribution and reload facility distribution?
19. How is the system going to deal with the settlement function between multiple NTV operators?
20. How is the system going to deal with the settlement function between multiple modes of public transport?
21. How is the system going to deal with the settlement function between inter-modal public transport schemes?
22. What are the implications of using Mifare as a standard protocol?
23. How many jobs will your proposed system generate in South Africa?
24. What is the level of the Foreign Direct Investment (FDI) into South Africa as a result of your proposed system?
25. What is the technology transfer component of your proposal?
26. What is the Human Resources Development component of your proposal?
27. What are the SMME development opportunities through outsourcing / insourcing of upstream, downstream or side stream manufacturing opportunities?
28. Give an indication of the export potential of domestically generated products and services as a result of your proposal.

29. What is the Black Economic Empowerment component of your proposal?
30. Who are your strategic partners?
31. Provide an organogram of your consortium, clearly indicating equity and asset base.

10 Configuration control

Document History

Version	Date	Status	Editor	Filename
1 - 9	10/16/00 9:03 AM	Draft	GC	Electronic Management System RFP v9
10	10/19/00 8:16 AM	Final	GC	Electronic Management System RFP 10 Final

Revision History

Version	Date	Changes
1 - 9	19 October 2000	User Requirement refined and added as they were identified
10	20 October 2000	Final document generated and sent to DTI

Authorisation History

Version	Date	Status	Reference
10	20 October 2000	Final	Mr S Singh (DTI)

11 Annexure A – Response Format

Please ensure that the following format is used for your response. Any additional information you may wish to supply may be included as annexures to your response.

1. Compliance to the requirements stated in this document. Please indicate clearly whether or not you are able to comply with the requirements as laid out in this document.
2. Risks. Please identify any possible risk you foresee in the delivery, execution or the technology employed in the project.
3. What technology do you propose to use:
 - a. System Architecture – provide a diagram(s) indicating the system architecture.
 - b. System Integrity – describe how you propose to ensure system integrity.
 - c. Redundancy – do you intend to have any built-in redundancy?
 - d. Security – describe how you propose to ensure system security from a physical as well as a data security point of view.
4. Affordability
 - a. Level of compliance to the current requirements?
 - b. How long have you been in business?
 - c. What are the key cost drivers of the system?
 - d. What are the indicative capital and running costs of the proposed system?
 - e. Where has a similar system been rolled out?
5. Deployment
 - a. How do you intend to ensure that sufficient training is given to the operators, and maintenance personnel?
 - b. How do intend to deploy the system?
 - c. What is your proposed roll out strategy?
6. Any Annexures or additional relevant information you may wish to convey to the evaluators.

Please note that your response must include the issues addressed in this annexure, as well as Annexure B, and your answers to the questions in Section 9 of this document.

12 Annexure B – Compliance to stated requirements

Please complete the following checklist and include it in your response. If your response to any of the requirements is “No” or “Possible”, please clarify your response by adding a comment at the end of the checklist and inserting the relevant comment reference in the last column of the checklist.

Requirement #	Sub-section	Short Description	Yes	No	Possible	Comment Ref
7.1.1	1a	Passenger trips per taxi per period per route				
	1b	Passenger fares revenue per taxi per period per route				
	2	Monitoring & logging of route deviation				
	3	Monitoring & logging of speed violations				
	4	Monitoring & logging of overloading				
	5	Monitoring & logging of driver working periods				
	6	Reading driver information from a chip card				
	7	Reading vehicle identity and designated routes from a chip card				
	8	Logging of position / time / date stamp every 5 minutes				
	9	Log file playback facility on a PC based map				
	10	Make use of non-proprietary protocols & open interfaces				
	11	Make use of internationally acceptable standards				
	12	Real time tracking and monitoring				
	13	Fare collection system based on chip card technology				
	14	Card compliance to relevant ISO specifications				
	15	Electronic purse CEPS compliant				
	16	Non-proprietary open standard for token based system				
	17	South African Reserve Bank guidelines and requirements complied with				
	18	Make use of contactless cards				
	19	EMV compliance in the case of Credit / Debit cards being used				
20	E-purse applications must be contact loadable and unloadable					

Requirement #	Sub-section	Short Description	Yes	No	Possible	Comment Ref
7.1.2	1	Encourage the growth and establishment of SMME				
	2	Make use of Black Empowerment businesses				
	3	Ensure the EMS is integrated into the minibus taxi				
7.1.3	1	Secure and unique vehicle identification stored in the EMS				
	2	Ensure that the vehicle identification can not be changed				
7.1.4	1a	Monitor and log all instances of speed violations				
	1b	Monitor and log all instances of overloading				
	2	Easy way to check and verify drivers identification, permit and route details				
7.2	1a	Fare transaction history log				
	1b	Cashless				
	1c	Route all financial transactions through the SA Bank system				
	1d	Secure system to prevent the use of fraudulent tickets				
	2	Transactions routed through the banking system need to be traceable				
	3	Downloadable electronic maintenance record				
7.3	1	Compliance to SARB guidelines for systemic risk management				
	2	Compliance to SARB guidelines for deposit taking compliance				
	3	Compliance to SARB guidelines for electronic payment systems compliance				
	4	User intervention for all deductions from electronic purse				
7.4	1	VESA approved vehicle tracking and recovery system				

Requirement #	Sub-section	Short Description	Yes	No	Possible	Comment Ref
7.5.1	1a	Logging of fares taken per period				
	1b	Provision of an audit trail of fares collected				
	1c	Provision of an audit trail of passengers carried per period				
	2a	Monitor & logging of speed violations				
	2b	Monitor & logging of excessive braking				
	2c	Monitor & logging of excessive engine revolutions				
	2d	Monitor & logging of excessive acceleration				
	2e	Monitor & logging of overloading				
	2f	Monitor & logging of excessive engine idling time				
	3	Monitoring of fuel system				
	4a	Preventing the taxi from operating if the drivers license data is invalid				
	4b	Logging of unauthorised attempts to start the vehicle				
7.5.2	1	Electronic Fare Collection instrument must be able to be branded				
	2	Support of a loyalty scheme				
	3	Provide benefits to members				
7.6	1	Fare deduction upon entry into the taxi				
	2	Confirmation that the person boarding the taxi has paid the required fare				
	3	Driver intervention to assist travellers (e.g. Visually impaired)				

Requirement #	Sub-section	Short Description	Yes	No	Possible	Comment Ref
7.7	1a	Monitoring & logging of excessive braking				
	1b	Monitoring & logging of excessive acceleration				
	1c	Monitoring & logging of excessive engine idling time				
	1d	Monitoring & logging of excessive engine revolutions				
	2a	Logging of attempted unauthorised access				
	2b	System to be secure, rugged and suited to the operational environment				
	2c	Inspection and maintenance event warnings to the driver				
	3a	Training of the drivers to use the EMS				
	3b	Training of the maintenance staff				
7.8	1a	Provision of multiple option tickets				
	1b	Expedient authorisation of fare deduction by traveller				
	1c	Fare deducted & available balance clearly indicated to traveller				
	1d	Information displayed must be visible only to the traveller				
	1e	Display must be properly backlit				
	2a	Payment of fare process must be simple, quick & convenient				
	2b	EMS must be robust, reliable & durable				
	2c	The traveller should not have to carry cash for taxi fares				
	2d	The traveller must be able to use the ticket on taxis, busses and trains				
	3a	The traveller must be able to query the available balance on the ticket (off the NTV)				
	3b	The traveller must be able to reload / recharge the ticket conveniently				
	3c	Cost of reloading / recharging must be as low as possible				

Requirement #	Sub-section	Short Description	Yes	No	Possible	Comment Ref
7.8	4a	Reload facilities – widespread				
	4b	Reload facilities – easily accessible				
	4c	Reload facilities – available 24 hours per day, 7 days per week				
	4d	Cater for semi-literate travellers				
	4e	Reload facilities – user friendly				
7.9	1	Log file must be securely downloadable to a backend system				
	2	EMS must be easily maintainable				
	3	Easily scalable in terms of functionality, volume of data handled and number of units deployed				
	4	Built-in test diagnostic facility				
	5	Modular in design				
	6	Constructed to ensure no unauthorised access				
	7	System must operate under poor lighting conditions				
	8	The financial (fare) transactions & the log file data must be separate				
	9	Methodology to ensure that the log file is regularly downloaded				
	10	The fare collection system must be able to handle off-line transactions				

Comments: