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Tender documentation

Procurement of a new Toll collection system and spare equipment for the new Toll collection system

Notice to interested parties with the goal of market analysis

Markets Analysis - information to be provided by interested parties

Contents

1 Introduction

Croatian Motorways Ltd. (HAC) is planning to implement a new Tolling system on the Croatian highway network and will soon publish Tender documentation for the Design and development of new Tolling system.
Croatia currently uses closed toll collection systems where the largest part of the network uses a toll charging system that offers payment by cash, bank cards as well as prepaid or postpaid ETC (popularly known in Croatia as ENC) accounts. Tolling is proportional to the distance travelled and depends on the vehicle category. Toll collection system consists of Toll plazas where on the entrance magnetic ticket or the ENC device registers entrance into the system, at the second toll plaza (exit destination) the vehicle is classified by the toll plaza attendant (in manual lanes) and by the automatic classification system (double check in case of manual classification), and the distance is calculated according to the ticket or ENC information.

The goal of implementation of new Tolling system is a complete renewal of the current tolling system in Croatia including the implementation of a new Electronic Toll Collection (ETC) system, based on a non-barrier multi-lane free flow (MLFF) solution with cashless payment methods.

The toll in the new ETC system will be charged according to the distance travelled and vehicle category. The new system will charge tolls for all category of vehicles. Every motorway location where vehicles must be identified (charging and control points) will have a gantry with DSRC readers installed, facilitating communication with the On-Board Units (OBU) installed inside the vehicles. The charging point gantries will also have cameras to detect the passage of occasional users' vehicles. The main characteristics of the technologies selected for the new ETC system are DSRC technology used for charging OBU users and ALPR technology used for charging occasional users and enforcement of all vehicles.

2 General scope of the works under the project

The implementation of this project will involve the execution of tasks of different nature which, although complementary and required for the successful performance of the new system, may need to be executed by different stakeholders or contractors according to their specificities and expertise requirements.

The project will be structured in:

- Implementation of the new tolling system, including:
    - Supply, installation, commissioning and testing of roadside systems (charging points), central system, remote monitoring systems and mobile enforcement units.
    - Civil works required for the construction of new gantries.
    - Improvements in customer sales services and user interfaces.
    - Maintenance services.
    - Training.

3 Scope of works

- The scope of works, which will be a turnkey project, consists of the detailed design, supply, installation and start of operation of the new tolling system for HAC motorways in the toll network. The scope of works includes the following:

- Design, supply, installation, commissioning and testing of the required multi lane free flow charging points, which will be used to detect, charge and enforce all the vehicles that pass through the defined toll domain in Croatia.

- Design, supply, installation, commissioning and testing of the required mobile enforcement units, which will be used to detect, enforce and charge the violators that use the road infrastructure in the abovementioned toll domain without being registered, including blacklisted users as well as registered users with debts.

- Design, supply, installation, commissioning and testing of the required communication network equipment, cable and infrastructure needed to connect and integrate the new charging points into the existing road communication network of each toll charger.

- Design, supply, installation, commissioning and testing of the required electrical equipment, cable and infrastructure needed to connect the charging points with the existing power infrastructure of each toll charger.

- Design, supply, installation, commissioning and testing of the required DSRC testers that will be engaged to test the OBUs used in the system.

- Design, supply, installation, commissioning and testing of the central system that will be required to manage the overall operation of the new tolling system in coherence with the defined architecture and operational model.

- Supply, installation, commissioning and testing of new methods for customer registration and management in the new tolling system, including the following:

    - Dedicated lanes for easy registration of user license plates at the main toll plazas near
    - the borders with neighboring countries on HAC highways.
    - Kiosks for easy registration of user license plates on HAC highways.

4 New Tolling Solution

The new ETC system will be based on a non-barrier multilane free flow (MLFF) solution with cashless payment methods that will charge according to the distance travelled and the vehicle category, as in the current system.

The foregoing technical solution will entail the following technologies selected for this purpose: DSRC technology used for charging OBUs users and ALPR technology used for charging occasional users and enforcement of all vehicles.

4.1 General Architecture

The architecture of the new tolling system includes all the subsystems required to collect toll payment in free flow, without stopping of vehicles, as well as to enforce those users who fail to register or who fail to pay the toll despite being registered.

Users will be registered in the new tolling system according to their license plate number or will be associated with an authorized DSRC OBU, provided by the Toll Service Provider (TSP) (HAC). Registered vehicles will use the infrastructure of the defined toll domain passing through the sections in which multi lane free flow gantries (charging points) will be installed to detect vehicle parameters, identify and classify the vehicle and obtain the information about the passage itself (transaction):

- Vehicle parameters: license plate, vehicle class and related classification parameters.
- Transaction information: number of ENC devices, time, lane & gantry, speed.

All the aforesaid parameters will be sent to the central system that will gather the data about all the transactions from all the MLFF charging points and perform the following activities:

- Store the transactions.
- Review the manual images.
- Process violations for transactions made by non-registered vehicles or registered users with debt.
- Transfer the transactions to the corresponding ERP for those transactions made by
- registered users.

The ERP of the corresponding toll charger will maintain the present architecture and will not be a part of the scope of works. The new tolling system will include new user interfaces to enhance the user registering methods and improve the customer relationship.

The new tolling architecture will consist of the following main systems:

- Users will be allowed to enter into the infrastructure with a registered OBU or license plate number (LPN). The OBU is a device used by the driver to pay for the tolling infrastructure. In case of heavy vehicles, the OBU is mandatory while it is optional for light vehicles. Light vehicles without the OBU are identified in the system with the LP. OBU registered users will constitute the clients of any TSP (HAC or Bina Istra), whereas

LP registered users will be classified as HAC clients only.

- The road side system (RSS) will be needed to charge vehicles or detect those vehicles authorized to use the infrastructure. The road side system will send transaction information to the central system. The RSS will also entail the mobile enforcement units for detection of violations. The communication between the mobile enforcement units and the central system will be a two-way communication. The RSS will be installed in the tolling infrastructure of HAC.

- The central system will manage the transactions and determine if they are authorized passings or not. An authorized passing means a vehicle passing through the system with an authorized OBU or an authorized license plate. The transaction is sent to the ERP to manage the payment or debit the account. On the other hand, in case of a non-authorized passing, the central system will manage the transaction, obtain the information about the user and initiate the violation processing. The central system will be operated and managed by HAC.

- Remote monitoring system (RMS). The RMS will manage the overall system status data (RSS and CS), providing monitoring and maintenance services. This system will enable monitoring of all aspects of the tolling system and maintenance management.

- Customer Sales Service will manage the user accounts and payments according to the information received from the central system as well as the interfaces with users and other stakeholders. It will be composed of the ERP (which is out of the scope of works) and the user interfaces available for user registration as well as for interaction with the tolling system. The new user interfaces under the scope of works will enhance the registration methods and the customer relationships in HAC.

4.2 General requirements

The design of the solution will comply with the following principles:

- Expandability of the solution. The interface between the RSS – MLFF charging points and the CS will be based on an interface control document issued and approved by the Client during the detailed design of the project. The characteristics defined under the abovesaid document will allow the Client to expand the number of charging points on new highways by contracting different MLFF integrators independently from any supplier.

- The CS will be designed to be functional for all electronic toll service providers interested to be included in the new tolling system in accordance with the rules and procedures defined under the abovementioned interface control document to be approved and issued by the Client during the detailed design project.

- All the OBUs used in the system should be linked to a license plate of vehicle registered

by users in the ERP of their respective TSP.

- The solution will accept the existing OBUs of HAC once their owners have agreed to migrate their OBUs to the new system and link them with the LP of the vehicle identified by users.

- To guarantee the scalability of the solution and potential future extensions of the system in a fair play, the solution should be open. Taking into account the international market practices according to which a charging point is an integral solution (blackbox) the design of which depends of the supplier, the solution will be open in terms of communication between the RSS and the software in central offices (CS and RMS). As a result, the communication protocol between the RSS and the CS and between the RSS and the RMS will be developed by the Contractor. The foregoing communication protocol will become the property of the Client as part of developments under this contract.

- The solution will allow the movement of vehicles at rated speeds without any path constraint.

- The new tolling system will be configured to suit any new tariff structure that may be defined to suit any new legal framework (as GDPR) or tariff framework. The solution will be designed to accept different tariff structures in the future, according to new parameters and criteria. The CS will apply the tariffs in line with the rating structure agreed and defined by each toll charger, but the final invoicing of the Client will be calculated by the ERP of each toll service provider according to their policy.

- The different elements of the new tolling system will be synchronized in order to guarantee coherence in the time stamp of the event in the system (transactions, alarms, etc.). The abovementioned synchronization will be based on the implementation of the Network Time Protocol (NTP) to synchronize all the elements with the time server defined by the Client through the available communication network.

5 Market Analysis

According to the Public Procurement Act of Croatia, before the official publishment of Tender documentation HAC must publish the Tender documentation with all its annexes on Premarket consultation in order to collect objections and recommendations on the Tender documentation (technical specifications, Terms of reference) from interested companies.
The documentation will be published on the web page of Electronic Public Procurement Bulletin of the Republic of Croatia (https://eojn.nn.hr/Oglasnik/). We are currently doing market analysis of potential bidders in the procurement of the new Tolling system. With this market analysis we would like to determine if the minimal requirements for this procurement are prescribed without discrimination and without narrowing the competition.
With that in mind we would kindly ask you if you could answer the following questions:

1. If the minimum requirement would be experience in development of the Central system that can manage at least 50.000 transactions per day and at least 100.000 images per day, would you be able to fulfill the requirement?

2. If the minimum requirement would be development of at least one non-barrier based Tolling system that has been in operation for a minimum 12 months continuously, would you be able to fulfill the requirement?

3. Do you have experts that have experience in projects related to the establishment of a multi-lane free flow toll collection system (Multi Lane Free Flow - MLFF) with at least 10 toll points where the expert participated as a project manager or project director or a person responsible for the overall management of the project?

4. Do you have experts that have experience in development and/or establishment of a central system for toll collection with the application of the MLFF solution with a minimum of 100,000.00 payment transactions and 200,000 images per day?

We would be grateful if you could send us the answers on the above-mentioned questions and if possible the information on the particular projects where you acquired the experience that is similar to the one stated in questions.

6 Other conditions

Based on all the information received, HAC will compile procurement documentation.

Interested business entities can submit additional questions to the e-mail address novi-sustav-naplate@hac.hr by 14.11.2022. at the latest.

HAC will publicly publish all information arising from additional questions online in the same way as this notice.