# Directive 2010/40/EU
# Progress Report 2017
## *Bulgaria_Ministry of Transport, Information Technology and Communications*

*October 2017*

## 1　Introduction

### 1.1　General overview of the national activities and projects

The Ministry of Transport, Information Technology and Communications prepared the Progress Report on the base of information, provided by its internal structures, the Ministry of Interior, Ministry of Regional Development and Public works, the Road Infrastructure Agency, subordinated to the Ministry of Regional Development and Public works, and respective Municipalities. The information is reflected as it is sent to the Ministry of Transport, Information Technology and Communications.

According to the Automobile Transport Act the Minister of Transport, Information Technology and Communications shall coordinate the activities for deployment and application of intelligent transport systems in the field of road transport and interfaces with other transport modes. For supporting the activity of the Minister of Transport, Information Technology and Communications an Intelligent Transport Systems Council was set up.

The Chair of the Council is the Minister of Transport, Information Technology and Communications, and Deputy Chairs are the Deputy Minister of Transport, Information Technology and Communications, a Deputy Minister of Interior and a Deputy Minister of Regional Development and Public Works.

### 1.2　General progress since 2014

## 1.3 Contact information

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# 2 Projects, activities and initiatives

## 2.1 Priority area I. *Optimal use of road, traffic and travel data*

### 2.1.1 Description of the national activities and projects

Description of the relevant initiatives, their objective, timescale, milestones, resources, lead stakeholder(s) and status:

**Road Infrastructure Agency**

In compliance with Directive 2010/40/EU within the 2007-2013 programming period, the Road Infrastructure Agency (RIA) has implemented several projects, related to intelligent transport systems. The projects implementation is in direct conformity with *Directive 2010/40/EU,* establishing a framework for the coordinated and coherent commissioning and use of Intelligent Transport Systems within the European Union, especially across the borders between the Member States, stipulating the general conditions, required by this objective. *Directive 2010/40 / EU* is applicable for ITS applications and services in the field of road transportation and their interfaces with other modes of transportation. The objective is to optimize the use of road data, traffic and travel data, the continuity of traffic management ITS services, road safety and security ITS applications and also linking transport vehicles to the transport infrastructure, detailed in *Annex 1 (Priority Areas and Actions) of Directive 2010/40/EC*.

The main objective of the European transport policy is to build a sustainable transport system, meeting the economic and social needs of society, favouring the further development of an integrated and competitive Europe. Better integration between the different modes of transportation, achieved through accelerated development and commissioning of innovative technological solutions that will contribute to improving the overall efficiency of the transport system. One of these innovative solutions is the implementation of information and communication technologies to build intelligent transport systems that will make significant contribution to optimizing the use of integrated transport networks to improve safety and security of transportation, increase the population's mobility, reduce the negative impact on the environment and climate, as well as enhance energy efficiency. At the same time, intelligent transport systems shall ensure the functioning of the domestic market and increase the level of competitiveness and employment. In pursuit of the objectives of this policy, the European Commission has set up *an Action plan for the commissioning of Intelligent Transport Systems in Europe.*

The plan is fundamental and aims at accelerating and coordinating the commissioning of intelligent transport systems in road transportation, including its interaction with other modes of

transport. Six priority areas have been outlined with a set of specific actions and a transparent timetable for their implementation:

• Optimal use of road, traffic and travel data;
• Continuity of ITS traffic and freight management services along European transport corridors and urban agglomerations;
• Road safety and security;
• Integration of the vehicle into the transport infrastructure;
• Data security, data protection and liability issues;
• EU cooperation and coordination in relation to ITS.

Project implementation in the field of Intelligent Transport Systems contributes to the above priorities and helps implement the Intelligent Transport Systems Commissioning Plan in Europe and its implementation in the Republic of Bulgaria.

### 2.1.2   Progress since 2014
Description of the progress in the area since 2014:

In recent years, the Road Infrastructure Agency (RIA) has successfully implemented a few projects in the field of intelligent transportation systems, directly related to road infrastructure development, with the objective to optimize the activities, implemented by RIA, as well as significantly enhance road safety and the public road network user access to updated information. The use of intelligent transportation systems has significantly increased worldwide, as they are continually modernized and improved. Planning, design, construction, repair and maintenance of road infrastructure should meet the requirements, arising from the directives and regulations of the European Union in this field, the existing technical standards and regulations, and should take into account and implement the best practices, proven effective in other countries.

These projects are aimed at improving the efficiency of the collection and processing of traffic data on the national road network (the NRN) and quality preparation of RIA for the implementation of road projects during the programming period up to 2020. These data shall include obtaining of the proper updated data from the automatic devices, recording road traffic, the automatic meteorological monitoring devices, data, received from users of the national road network, providing up-to-date feedback information on the traffic situation through a web-based information system, accessible from the RIA website and through a mobile application, as well as providing real-time traffic information with variable message signs (VMSs).

In 2014 RIA has successfully completed a project, funded under Priority Axis 5 'Technical Assistance' of Operational Program 'Regional Development, 2007 - 2013'. The project value is nearly 3 million BG leva, including VAT, and the nominated Contractor - is Telelink EOOD. The first automated traffic data collection system has been established in Bulgaria under this project, comprising 120 automated counter stations of second- and third-class roads, outside of the TEN-T network. One of the main objectives of the project has been to modernize the recently manual traffic count, whereas part of the count points shall be replaced with counting automation and a traffic monitoring system shall be built. The contract term is 6 months.

The technology used is a combination of cameras and inductive frames, located in the asphalt, with the help of which the counting, identification, classification and speed measurement of each vehicle at the point of traffic control (the counting point) is carried out and the storage of information in the centralized database. By identifying the vehicle, the system shall have the ability to monitor the generation of road traffic by origin, destination, direction and timing.

In order for the Road Infrastructure Agency to prioritize correctly the road sections of the public road network and to estimate the need to expand the road network and carry out rehabilitation and reconstruction, updated information shall be important in order to provide accurate traffic forecasts. Objectively collected data from automated stations shall be used in the preparation of

application forms for the grant of financial assistance under the new infrastructure projects and shall serve as grounds for the "cost-benefit" analysis (CBA).

The benefits of automated collection of traffic data shall be significant, the main advantages being the following:
- Obtaining real-time traffic information on the roads with installed automated counting gantries;
- Obtaining information on the need to carry out investment activities on the road network by the indicators of intensity and travel time saved;
- Increasing counting time - 365 days a year, 7 days a week, 24 hours a day, entirely automated;
- Reducing subjectivism and inaccuracies in the classification of vehicle types;
- Enhancing road safety, where automatic counting devices are built.
- Monitoring the meteorological situation and the state of the road surface;
- Options for centralized data collection and analysis;

In 2015 RIA has successfully completed a project, financed under the Operational Program 'Transport, 2007 - 2013' with the Ministry of Transport, Information Technology and Communications. The project value is approximately 5 million BG leva, including VAT, and the nominated Contractor is the Contrax-Infra DZZD Association. A total of 100 automatic count points have been installed under the project on motorways and first class roads, within the scope of the TEN-T network. One of the main objectives of the project is to expand the scope of public road network, where monitoring and automated collection of traffic data takes place and to integrate it in the operating Automated traffic data collection system. This activity also includes the construction of three (3) automatic devices to monitor weather conditions, located at different, heavy-traffic road sections, (mountain) passes and others.

In 2015 RIA has also successfully completed the project 'Preparing the Road Infrastructure Agency for the implementation of road projects in the programming period 2014-2020 by improving the efficiency of the collection and processing of traffic data on the national road network', financed under the OP 'Technical Assistance', under which a contract has been executed under Lot No.1 for the Supply, installation and implementation of an automated traffic data collection system on the First-class and Second-class roads in the Republic of Bulgaria. Bulgaria. A contract was signed with the Contractor 'Contrax Infra Association", worth BGN 4.2 million, VAT included. A total of one hundred (100) automated counting points have been installed under the project on primary and secondary roads. One of the main objectives of the activity is to expand the scope of the public road network, where monitoring and automated collection of traffic data shall be implemented and automation of all existing counting points in the country. The system shall include new points to complete the missing ones and to combine all others along the entire road network. Another major objective is to achieve integration with other systems of automated collection of traffic information. Using the integration options, the analysing software shall have the ability to monitor the traffic generated, by origin, destination, direction and transit times from one specified counting point to the other in all directions - on the highways, on the primary (first-class) roads, the secondary (second-class) roads and the third class country roads. The system will thus combine data from the other systems for automated collection of information and will enable the automated monitoring of traffic flow from one point to all directions in the regional road network of the country.

This activity also includes the construction of six (6) automatic devices to monitor weather conditions, located at different, heavy-traffic road sections, mountain passes and others. The six (6) automatic devices have been installed in various heavy-traffic road sections, mountain passages and others, to monitor weather conditions. Automatic devices incorporate special sensors that provide information on wind speed and wind direction, rainfall and precipitation volume, temperature levels (road surface temperature, air temperature), percentage of humidity, road pavement condition (frost- or snow-cover, wet, icy roads, etc.), freezing point (forecast on pavement freezing) and others. Collected data are sent directly to the Road Infrastructure Agency, where data analysis by the

automated software is extremely important to the RIA operators on duty, especially in the decision-making during the winter season. The information from the forecasts on eventual freezing of the road surface may be used in decisions to be taken on the proper surface treatment of roads in a timely manner and their cleaning of snow by the servicing companies. Also, in the places of close proximity to installed Variable Message Signs (VMSs), some of the  information from the automatic devices, monitoring meteorological conditions (ADMMC) may be visualized on those signs and reach the users of the national road network.

### 2.1.3   Reporting obligation under Delegated Regulation (EU) 2015/962 on the provision of EU-wide real-time traffic information services (priority action b)
*(see guidance provided in Member States experts follow up meetings)*

Measures undertaken, if any, to set up a national access point and on the modalities of its functioning:

No system has been developed at present to cover the functional requirements of a national access point for road and traffic data.

Where relevant, the list of motorways not included in the comprehensive trans-European road network and identified priority zones:

Additional information:

### 2.1.4   Reporting obligation under Delegated Regulation (EU) No 886/2013 on data and procedures for the provision, where possible, of road safety-related minimum universal traffic information free of charge to users (priority action c)
*(see guidance provided in Member States experts follow up meetings)*

Progress made in implementing the information service, including the criteria used to define its level of quality and the means used to monitor its quality:

On 17 September 2014, as a beneficiary under the Operational Program 'Technical Assistance', The RIA concluded a Grant Contract with the OPTA Managing Authority of the Council of Ministers administration - 'Training of the Road Infrastructure Agency' for the implementation of road projects in the programming period 2014-2020, by improving the effectiveness of collection and processing of traffic data under the national road network'. The project was implemented within the projected period of 14 months, the value of the project was BGN 6 million, VAT included. A tender procedure was carried out with subject-matter 'Development and commissioning at the RIA of an Intelligent Information System (IIS), including automated data collection for the road traffic of the 1st and 2nd class roads in the Republic of Bulgaria, providing real-time traffic data to the users of the Republican Road Network, including feedback to the RIA and Variable Message Signs, in three specified lots.

Within the specified Lot 2 'Developing and Commissioning of Intelligent Information System for Real-Time Data Delivery to Users of the National Road Network (NRN), including Feedback to RIA and Active Intelligent Road Conditions Analysis from Multiple Points in Real Time', a contract was signed with the Contractor 'Dekart' OOD, amounting to BGN 900 thousand, including VAT. Implementing the options of providing real-time data to users of the regional road network using mobile internet applications will also make possible the intelligent analysis of traffic information, coming from different parts of the country, in real time. This IIS module has been structured in two directions - storing, processing and digital data exchange to the users of the NRN, linking them to a central server at the RIA, storing a database of information, coming from the outside.

The main objective of the LIMA system shall be to provide the Road Infrastructure Agency with a new set of real-time traffic information, coming from the users of mobile devices, while providing road users with traffic information within the regional road network in real time. The system's centralized administration and control shall be carried out by the 'Situation and Coordination Centre' Department with the Road Infrastructure Agency by implementing a new, hardware and software, automated process. The system comprises 3 basic elements - a mobile application, a web platform, and a content management system.

Within the specified lot No.3 'Delivery, Installation and Implementation of a System of Variable Message Signs', a contract was signed with the Contractor 'System Communications' EOOD, amounting to 600,000 BG leva, including VAT. A total of 20 Variable Message Road Signs (VMSs) have been built in the framework of this activity, which are installed in different areas of the country on first-class and second-class road sections with dynamic road conditions, such as observed in the mountainous passages. The mountain passes present a good example of such road sections; they are connected with the introduction or cancellation of various types of restrictions (Shipchenski Pass, The Pass of the Republic, the Troyan Pass, the Rishki Pass, Varbishki Pass, the Pomorie Pass, the Predela Pass, the Kresna Pass, etc.). The directions of most significance, where the signs have been installed are the following: The Road I-1 Vidin - Montana, Road I-1 Mezdra - Botevgrad, Road I-1 Simitli - Strumiani, Road I-2 Rousse - Razgrad, Road I-3 Zlatna Panega - Pleven, Road I-4 Koritna – Sevlievo, Road I-5 Rousse - Byala, Road I-5 Gabrovo - Shipka, Road I-1 / I-6 / Sofia- Pernik, Road I-7 Shumen- Veliki Preslav, Road I-8 Bozhurishte- Kalotina, Road I-9 Varna - Byala, Road II-16 Novi Iskar - Svoge, Road II-19 Simitli - Bansko, Road II-86 Asenovgrad - Smolyan, Road II-18 the Sofia Ring road and others.

The development of this innovative system in Bulgaria is of great benefit to users of the NRN and also making full use of real-time information on the traffic situation, entering the RIA. The system provides fast, reliable and high-tech options to promptly notify drivers of the current traffic conditions, of the restrictions, rerouting/alternative routes, providing important information to drivers in real time of all natural disasters, accidents and other unforeseen circumstances, using modern communication and information technologies. Variable message signs (VMSs) are digital boards of dimensions 3.40 x 1.20 meters (fullmatrix), installed on steel structures. The road signs can display updated information on the traffic conditions in real time with the options of remote/distance control. A combination of two-colour LEDs visualizes both text and symbol on a road sign. The information displayed on the VMS is provided by the operators of RIA's Coordination and Situation Center, using the communication software, developed by the Contractor. VMSs are used for different situations and are easy to update on a regular basis and in real-time through remote access, in order to provide up-to-date information in real time and in the right place under different circumstances.

The results of the systems construction are as follows:
- Providing fast, reliable and high-tech options for timely notification of drivers on the road, in the event of restrictions or reporting of road-side accidents and emergencies;
-    To improve traffic safety in sections of the public road network, where variable message signs have been installed;

-    To provide drivers with important information of natural disasters, accidents and other unforeseen circumstances in real time.

Variable message signs (VMSs) are used under various circumstances and are easy to update on a regular basis and in real-time through remote access, in order to provide up-to-date information in real time and in the right place, in the following situations:

- • Unwanted conditions (flooding, icy or slippery road surfaces);
- • incidents and accidents;
- • Emergency alternative routes;
- • Fires;
- • Upcoming traffic jams;
- • Road restrictions

Results of the assessment of compliance with the requirements set out in Articles 3 to 8 of Delegated Regulation (EU) No 886/2013:

Where relevant, a description of changes to the national access point:

Additional information:

The Road Infrastructure Agency is a specific beneficiary under the Operational Program 'Transport and Transport Infrastructure' (OPTTI) for the programming period 2014 - 2020. On 12 December 2016, the Ministry of Transport, Information Technology and Communications - the Managing Authority of OPTTI and RIA signed an Administrative Agreement No. DOPTTI-18 / dated 12 December 2016 for the award of grant under project BG16M1OP001-4.001-0002 'Development and implementation of Intelligent Transport System in the scope of Trakia motorway'.

The funding of the project is under OPTA, Priority Axis 4 'Innovation in Management and Services - Implementation of Modernized Traffic Management Infrastructure, Improvement of Transport Safety and Security', Intervention Area No. 044 'Intelligent Transport Systems (including the introduction of management of demand, tax collection systems, IT monitoring, control and information systems)'. The project is co-financed by the European Union through the European Regional Development Fund, the contractual funds amounting to BGN 8,983, 608.00, including VAT and the implementation period is 36 months.

The project proposal idea is directly related to increasing the safety of motor vehicles in the scope of the Trakia Motorway, in compliance with the latest EU directives in this field. The implementation of Intelligent Transport System (ITS) provides for the modernization of the Trayanovi Vrata tunnel and the introduction of specific road accessories, located in the area of Trakia Motorway, in order to ensure maximum safety of the traffic and increase road safety. The introduction of Intelligent Transport System for automatic accident identification in the Trayanovi Vrata tunnel and the use of ITS accessories is expected to increase road safety and meet the requirements of EU Directive 2004/54 / EC. An intelligent transport system shall be developed within the project's framework and put into operation within the scope of the Trakia Motorway, containing various hardware components and centralized software for monitoring, control and traffic management in the scope of Trakia Motorway. The main activities to be implemented are the following:

- Implementation of Intelligent Automatic Accident Identification, Traffic Management and Modernization of Trayanovi Vrata Tunnel;

- Supply and installation of Variable message signs in different sections of the Trakia Motorway with real-time remote control capability;

- Supply and installation of Weigh in motion sensors;

- Supply and installation of (video) cameras for average speed measurement and monitoring of traffic with all adjoining equipment in certain sections of the Trakia Motorway.

The total indicative value of the public procurement contract is 7,261,500 BG leva, excluding VAT / 8,713,800.00 BG leva, including VAT, including unforeseen costs of 211,500 BG leva, excluding VAT. The deadline for contract performance must be 24 months.

## 2.2 Priority area II. *Continuity of traffic and freight management ITS services*

### 2.2.1 Description of the national activities and projects

Description of the relevant initiatives, their objective, timescale, milestones, resources, lead stakeholder(s) and status:

### 2.2.2 Progress since 2014
Description of the progress in the area since 2014:

## 2.3 Priority area III. *ITS road safety and security applications*

### 2.3.1 Description of the national activities and projects

Description of the relevant initiatives, their objective, timescale, milestones, resources, lead stakeholder(s) and status:

### 2.3.2 Progress since 2014
Description of the progress in the area since 2014:

In 2015, an Intelligent Information System (IIS) has been put into operation to provide real-time data to the users of the NRN, including feedback to RIA and active intelligent roadside analysis from multiple real-time collection points. Implementing the options of providing real-time data to users of the regional road network using mobile internet applications will also make possible the intelligent analysis of traffic information, coming from different parts of the country, in real time. This IIS module has been structured in two directions - storing, processing and digital data exchange to the users of the NRN, linking them to a central server at the RIA, storing a database of information, coming from the outside.

The main objective of the LIMA system shall be to provide the Road Infrastructure Agency with a new set of real-time traffic information, coming from the users of mobile devices, while providing road users with traffic information within the regional road network in real time. The system's centralized administration and control shall be carried out by the 'Situation and Coordination Centre'

Department with the Road Infrastructure Agency by implementing a new, hardware and software, automated process. The system comprises three main modules:

1. A mobile Application - As part of the IIS, a mobile application has been created, comprising a series of diverse and useful user features - traffic information in real time; routing; information about speed restrictions and recommended / maximum speed; information on road sections and facilities; accidents and prevention; automatic detection of problematic road sections and restricted access; feedback to the RIA's control center; offering alternative routes to avoid traffic jams, previously registered by the operators of the RIA; options to use offline features (when no internet connection is available). Customers have the opportunity to send feedback to RIA that enters through the mobile application and reaches duty officers at the Situation and Coordination Center of RIA, filtered with the option of being provided to other users. This software enables users to participate directly in the data collection process of RIA's network, using their smart devices. This happens automatically without the intentional interference of users, using the GPS coordinates of their telephones, built-in accelerometers, gyroscopes, compasses and other equipment. The mobile application, as well as the other elements of the System, use a master map as the 'layer' to visualize data, both for users and RIA operators. The LIMA free mobile application is fully available for all Android, iOS and Windows phones, as well as personal and laptop computers at web address: https://lima.api.bg/. In the beginning of October, LIMA was announced 'Application of the week' by several technology editions, and within the official Appstore it was in the first place of all free applications in the country. The people, travelling on the national road network can send signals of existing obstacles on their route and of incidents they have witnessed.

2. A Web Platform - As part of the IIS, a web platform has been created and implemented, allowing access to users of any device of available web browser. The web platform is an online tool for users, accessing all IIS public services, with Internet address at https://lima.api.bg/. In this part of the intelligent information system, users can check and pre-plan their route, based on the current status of the traffic situation - closed roads and passes, bypass routes, traffic restrictions and others. These data are visualized on a detailed map, used by the IIS, in the mobile application and in the administration panel. The web platform provides a dedicated web tool, through which users can track traffic data in the past. The public information provided can be distributed by target groups (for example: for drivers of vehicles, exceeding 12 tonnes different information is displayed). The implementation of this feature is required in order to achieve optimum data accuracy for all driver types. Each system user may choose a route and the system will provide traffic information, average speed for the selected road sections and approximate duration of travel, depending on the data, available with the Road Infrastructure Agency.

3. Content management system (Administrator - Management Part for the Road Infrastructure Agency) - used by the operators of RIA, representing a web platform for the management and control of all aspects of IIS, including its internal and external connectivity. This module of the system allows operators of the Road Infrastructure Agency to have full overview on what is happening throughout the regional road network, and also to control primary data sources and manage their activities. The administrative panel operates with a unified map for visualization of all data. In order to facilitate the work of RIA operators, the system has been integrated with existing internal systems at the Road Infrastructure Agency and eliminates the need to re-enter data. The administrative panel is integrated with all primary data sources, so that operators of the Road

Infrastructure Agency only control the data and approve their import into the system. This allows significantly faster workflow for operators and shortens time periods for the transfer of data from external sources to the central IIS database. In the event of any changes, implemented in the existing software of the Road Infrastructure Agency, the administrative account of IIS shall ensure that data can be automatically synchronized with the central database. A significant amount of operational data processing work is thus eliminated at the RIA. Detailed mobile user statistics will allow employees of the Road Infrastructure Agency to analyse and plan future changes in the regional road network. Operators of the Road Infrastructure Agency have the options of interactively adding data in the system, by using the map and marking certain sections of the regional road network, reflect the status of road conditions and road facilities, as well as incidents/ accidents, traffic jams, changes in traffic and many others.

### 2.3.3    112 eCall (priority action d)

National eCall PSAPs Infrastructure ready by 1st October 2017: YES / NO. If NO, please explain:

With reference to the preparation of a "Recommendation Report" to the European Commission and particularly to the progress of the republic of Bulgaria in introducing the operatively compatible „eCall System", the Ministry of Interior is providing information as follows:

As per decision of the Intelligent Transport Systems Council under the Minister of Transport, Information Technology and Communications dated 02.04.2015, the "National System 112" Directorate within the Ministry of Interior is responsible for Priority Area III of 21010/40/EC Directive – "Accommodation of 112 Centers" for receiving eCall from vehicles for harmonization of a EU-wide operative comparable eCall-System".

In order to fulfill these tasks the Ministry of Interior has participated in the HeERO 2 Project which introduced the pilot service in the Education Center 112 in Sofia. The tests were performed on two cars, equipped with eCall board systems elaborated by Bulgarian producers. The Software equipment was delivered, installed and tested within the pilot implementation of the eCall Service in 112 Center Sofia. The tests have shown that the service can be initiated from every point on the territory of the Republic of Bulgaria and two of the three mobile operators had introduced the eCall flag.

The service was finalized with an active eCall flag, PSAP integration and connection to EUCARIS or the National Register of Traffic Accidents.

All tests were carried out in the test premises of 112 Center Sofia.

The Bulgarian participants in the project were united in a consortium, consisting of 6 partners: Intelligent Transport Systems Association (БАИТС/ITS Bulgaria), Ministry of Interior, Enterprise Communications Group Ltd., "Mobiltel", "Icom", and Technical University Sofia.

Within the 2016-2017 period the Ministry of Interior participated in the project I HeERO (Infrastructure_Harmonised eCall European Pilot) in order to upgrade the architecture of the 112 Centers to implement the eCall service and its overall deployment on the territory of the Republic of Bulgaria. The main aim is: "Full implementation of the eCall system, based on telephone 112,

including delivery of equipment of incoming calls in Russe center" and „Compatibility Estimation" of 112 Centers (PSAPs) for acceptance of incoming eCalls.

The 112 National System Directorate has started in the beginning of November 2015 a tender procedure entitled "Implementation of Activities under I_HeERO European Project" before the start of the project for Bulgaria.

Due to the lack of technical support for the National System 112 the tender procedure has been delayed because the integration of the eCall service into the operating unified National System 112 is connected with the upgrade of basic software components (data bases, CTI (Computer Telephone Integration), case record system, communication software), which has to be done without interruption of the normal operation of the system. The lack of support for the National System 112 and coordination of the activities under I_HeERO poses a risk to the tests and the deployment of the service.

In November 2016 the decision was taken to secure technical support for the system and to begin with the implementation of the tender procedure.

On 28.04.2017 a public tender procedure was opened under the title „Full Implementation and deployment of eCall Service in the Republic of Bulgaria under I_HeERO European Project".

The participant who was ranked first place in the public order procedure was determined on 04.07.2017.

The company which was ranked second place issued a complaint to the Commission for Protection of Competition.

The lawyers of the Ministry of Interior have come to the conclusion that due to the complaint it could take between one month and one year till the Commission for Protection of Competition takes its decision if there is a second complaint to the Supreme Administrative Court. In case there is no second complaint to the Supreme Administrative Court the final decision of the Commission for Protection of Competition could take between one and two or three months.

At the moment a public tender procedure has been placed in order to choose a contractor for the technical support of national System 112 I_HeERO.

Having in mind the above-mentioned circumstances the leadership of the Ministry of Interior has taken the decision to ask the project coordinator, the Ministry of Economics, labor and Transport of Niedersachsen (NMVAF-Germany), to extend the time limit of the Bulgarian project I_HeERO with 12 months.


Authorities that are competent for assessing the conformity of the operations of the eCall PSAPs: name + address + contact details

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Additional information:

**Please, contact both of them!**


### 2.3.4 Reporting obligation under Delegated Regulation (EU) No 885/2013 on the provision of information services for safe and secure parking places for trucks and commercial vehicles (priority action e)

Number of different parking places and parking spaces on their territory:

220

Percentage of parking places, registered in the information service:

0

Percentage of parking places, providing dynamic information on the availability of parking spaces and the priority zones:

0

Additional information: (e.g. has a national access point been set up to provide truck parking data? Does it include dynamic data? What is the source of data (public / private)? Is data published on the European Access Point for Truck Parking hosted by DG MOVE?)

The competent authority is the Road Infrastructure Agency (RIA) and the corresponding municipalities, located along the Trans-European Road Network.

The Road Infrastructure Agency (RIA) has presently collected data on the safe and secure parking places for trucks and commercial vehicles. Data coverage is for the entire territory of Bulgaria on the roads of the national road network (Motorways, first-class, second-class and third-class roads). Data is entered into the Geographic Information System (GIS) of RIA. The parking space information shall include: name, number of parking places (average operation load), number of places (maximum capacity), GPS coordinates of the site, road number, nearest town, service company, as well as listed services, etc.

The following project has been implemented: 'Provision of GIS-based administrative e-services to citizens and businesses for the issue of permits and establishment of GIS registers for revenue activities', which is financed under Operational Program 'Administrative Capacity, 2007-2013'. A public web application has been designed under the project with information on the roadside outlets, including the places for safe and secure parking of trucks and commercial vehicles, visualized in a dynamic map, published at www.spp.api.bg.  The web application is specialized for long vehicles and/or heavy road vehicles.

Percentage of parking places registered in the information service:

Percentage of parking places providing dynamic information on the availability of parking spaces and the priority zones:

Additional information: (e.g. has a national access point been set up to provide truck parking data? Does it include dynamic data? What is the source of data (public / private)? Is data published on the European Access Point for Truck Parking hosted by DG MOVE?)

## 2.4   Priority area IV. *Linking the vehicle with the transport infrastructure*

### 2.4.1   Description of the national activities and projects

Description of the relevant initiatives, their objective, timescale, milestones, resources, lead stakeholder(s) and status:

### 2.4.2   Progress since 2014

Description of the progress in the area since 2014:

## 2.5 Other initiatives / highlights

### 2.5.1 Description of other national initiatives / highlights and projects not covered in priority areas 1-4:

Description of the relevant initiatives, their objective, timescale, milestones, resources, lead stakeholder(s) and status:

**Municipalities' Projects**

**General information provided by Ministry of Regional Development and Public works**

Projects implemented under Operational Programme "Regional Development" 2007-2013:

Project "Integrated Urban Transport of Burgas"

Project BG161PO001/1.5-01/2010/001 "Integrated Urban Transport of Burgas" amounts up to EUR 67 56 8951, 64, of which EUR 54 225 610, 12 is grant amount and EUR 8 915 528, 82 – co-financing by Burgas Municipality. The grant contract was signed on 26th of November 2010 and has duration of 62 months.

The project consists of the following components:

- integrated ticketing system;
- real-time passenger information system;
- system for management and control of public transport;
- video monitoring system.

Project "Support for Integrated Metropolitan Public Transport"

Project BG161PO001/1.5-02/2011/001 "Sofia Integrated Public Transport" amounts up to EUR 46 396 012, 88, of which EUR 40 024 658, 52 is grant amount and EUR 6 371 354,36 – co-financing by Sofia Municipality. The grant contract was signed on 23th of August 2011 and has duration of 62 months.

The project consists of the following components:

- electronic information boards;
- Intelligent transport system at 20 crossroads.

Varna Integrated Urban Transport Project

Project BG161PO001/1.5-03/2011/002 "Integrated Urban Transport of Varna" amounts up to EUR 54 492 858.41, of which EUR 46 522 178.29 is grant amount. The grant contract was signed on 9th of July 2012 and has duration of 48 months.

The project consists of the following components:

- automated ticketing system;

-       priority systems for public transit vehicles at intersections;

-       real-time passenger information system;

-       system for management and control of public transport.


Project "Modernization and Development of Sustainable Urban Transport of Plovdiv"

Project BG161PO001/1.5-03/2011/001 "Modernization and Development of Sustainable Urban Transport in Plovdiv" amounts up to EUR 21 332 327.57, of which EUR 20 456 685.93 is grant amount. The grant contract was signed on 2th of July 2012 and has duration of 43 months.

The project consists of the following components:

-       traffic management centre (TMC);

-       system for management and control of public transport (SMCPT)

The following types of systems are included in the scope of the TMC and SMCPT: Electronic Billing System, Real-time Passenger Information System, Fleet Management System, Data Communications System, and Equipment of Fleet Management Center.


Project "Modernization and Development of Sustainable Urban Transport of Stara Zagora"

Project BG161PO001/1.5-03/2011/003 „Modernization and Development of Sustainable Urban Transport of Stara Zagora" amounts up to EUR 32 472 613, 61, of which EUR 27 633 564, 73 is grant amount and EUR 4 839 048,87 co-financing by Stara Zagora Municipality.  The grant contract was signed on 5th of July 2012 and has duration of 43 months.

The project consists of the following components:

-       electronic information boards;

-       information system (telematics).


Project "Modernization and Development of Sustainable Urban Transport of Pleven"

Project BG161PO001/1.5-03/2011/004 "Modernization and Development of Sustainable Urban Transport of Pleven" amounts up to EUR 10 548 710, 65, of which EUR 9 188 763, 56 is grant amount and EUR 1 359 947, 09 – co-financing by Pleven Municipality. The grant contract was signed on 10th of July 2012 and has duration of 43 months.

The project consists of the following components:

-       system for management and control of public transport;

-       intelligent transport system.


Project "Modernization and Development of Sustainable Urban Transport of Ruse"

Project BG161PO001/1.5-03/2011/005 "Modernization and Development of Sustainable Urban Transport of Ruse" amounts up to EUR 14 958 414, 32, of which EUR 13 297 428, 46 is grant amount

and 1 429 306, 38 – co-financing by Ruse Municipality. The IMF contract was signed on 6th of August 2012 and has duration of 41 months.

The project consists of the following components:

- electronic ticketing system;

- system for management and control of public transport;

- electronic information boards.


Projects under the Operational Program "Regions for Growth" 2014-2020:

Fourteen (14) municipalities prepared Integrated Urban Transport projects within the framework of the Integrated Plans for Urban Regeneration and Development Plans of the 1st to 3rd Level Cities according to the National Spatial Development Concept 2013-2025. As of 28.07.2017 following municipalities (6) signed grant contracts with the MA of OPRG:

- Project BG16RFOP001-1.002-0003-C01 "Integrated Urban Transport in Varna - Phase II" amounts up to EUR 19 036 978, 52, of which EUR 14 979 322, 58 is grant amount and EUR 4 057 655, 93 – co-financing by Varna Municipality. The project includes a component: "Upgrading the Intelligent Transport System";

- Project BG16RFOP001-1.005-0001-C01 "Integrated Urban Transport Systems of Ruse - Phase II" amounts up to EUR 12 446 984, 45, of which EUR 12 272 444, 74 is grant amount and EUR 174 539, 70 – co-financing by Ruse Municipality. The project includes a component: "Upgrading the Intelligent Transport System";

- Project BG16RFOP001-1.007-0003-C01 "Development of Integrated Urban Transport - Pleven" amounts up to EUR 8 819 420, 30, of which EUR 8 581 972, 36 is grant amount and EUR 237 447, 94 – co-financing by Pleven Municipality. The project includes components: "Implementation of the Electronic Charging System in the MGOT of the City of Pleven" and "Implementation of a CCTV System at Key Crossroads in Pleven";

- Project BG16RFOP001-1.015-0003-C01 "Integrated Urban Transport in Sliven" amounts up to EUR 8 588 880, 94, of which EUR 7 426 781, 73 is grant amount and EUR 1 162 099, 57 – co-financing by Sliven Municipality. The project includes components: "Implementation of an Integrated Ticket System" and "Implementation of a Real-Time Passenger Information System";

- Project BG16RFOP001-1.029-0002-C01 "Integrated Urban Transport of Dupnitsa" amounts up to EUR 3 600 977, 10, of which EUR 3 494 679, 52 is grant amount and EUR 106 297, 58 – co-financing by Duptnitsa Municipality. The project includes components: "System for control of the public transport" and "Delivery and installation of 59 electronic information boards";

- Project BG16RFOP001-1.016-0003-C01 "Development of Sustainable Urban Transport of Gabrovo" amounts up to EUR 6 866 926, 38, of which EUR 4 601 626, 93 is grant amount and BGN 2 265 299, 45 – co-financing by Gabrovo Municipality. The project includes a component: "Implementation of information and communication technologies in urban transport".

As of 28.07.2017, the Managing Authority of the Operational Program "Regions for Growth" 2014-2020 does not have detailed information regarding the envisaged activities and deliveries related to the implementation of Intelligent Transport Systems in the above-mentioned cities.

**Information provided by Municipalities**

**Sofia**

**Traffic Management System in Sofia** - over the last 3 years, Sofia Municipality has implemented a traffic management system covering the busiest intersections in the city. After the introduction of the system, travel time from point A to point B was reduced by 30%.

As part of the system, a module has been integrated to prioritize urban transport vehicles as well as emergency vehicles so as to increase the competitiveness of the public transport and significantly reduce the travel time of emergency services vehicles.

**Source of funding:** The financing of the project is provided by the budget of the Sofia Municipality.

„**Sofia Integrated Urban Transport Project – II phase”**, priority axis 1 „Implementation of integrated urban development plans 2014-2020" of the Operational programme "Regions in Growth"

*Source of funding:* Total cost of all components is 124 103 238.73 leva. The requested grand is 107 333 494.62 leva and the additional Sofia Municipality financial contribution is 16 769 744.11 leva.

*Description of the activities:*
The feasibility study as well as the project proposal have been prepared by the Municipality of Sofia with the assistance of JASPERS.
The project and in particular its components are implemented after the implementation of the measures for the construction of intelligent transport solutions, which are part of the previous integrated urban transport project in Sofia, financed under the Operational Program "Regional Development" 2007-2013
The project is in line with the main guidelines for improving the transport system in Sofia and the guidelines for applying for the direct grant procedure. It is based and follows of the "Guidelines for Applicants" under the relevant procedure as well as the EU regulations, including the "Regulation on the Terms and Procedure for Implementation of Intelligent Transport Systems in the Field of Road Transport and for Interfaces with Other Transports" of the Ministry of Transport, Information Technology and Communications, good practices in the implementation of integrated intelligent transport solutions and others.

*Components in the scope of the project:*
On the basis of the analysis of the condition of the transport system of Sofia Municipality, the identified problems, the objectives of Operational Program "Regions in Growth", program and planning documents of Sofia Municipality and the possibilities for building the integrated urban transport project of Sofia, realized during the previous program in the period 2007-2013, the activities of the Intelligent Traffic Management System and the existing real-time passenger information system have been identified the following:

- On-board equipment for vehicles from the public urban transport network - upgrade;
- Transit signal priority (TSP)
- Upgrade to electronic information boards (EIB)
- Upgrading with CCTV cameras at public transport stops.

**Equipment: On-board equipment – upgrade** */implementation level – there is a procedure for selecting a contractor/*

Depending on the current state of the components of the currently implemented OPRD project 2007-2013, on-board equipment should be provided for the purposes of passenger counting and analysis. Accompanying activities - wiring in vehicles, power supply, connectivity interface, software.

- The wiring includes a power supply and a communication link with a central on-board unit in the vehicle.

- Software is required for management and statistics.

- The interface is required for data transmission, storage and processing and associated commissioning activities.

The component will provide passenger counting in the respective vehicles, processing and exchanging data in the control center.

**Equipment: Signalization for** *Signaling for switching transit priority of trams – Transit signal priority (TSP) / implementation level – there is a selected contractor/*

Transit signal priority (TSP) is an operational strategy that facilitates the movement of transit vehicles on separate routes through controlled intersections via a traffic light system. The component includes the supply of signaling equipment for priority switching over individual tramways and main transport corridors. Accompanying activities - installation, wiring and power at junction level, as well as connectivity, software and interface at control center level; Traffic flow analysis, proposal for change of traffic organization, cyclograms and intermediate times (min. and max. on all directions); Wiring - power supply and communication link with traffic control center for crossroads.

**Equipment: Upgrade of the EIB** */implementation level – there is a selected contractor/*

**Delivery and mounting of 220 electronic information boards** on public transport stops.

After the successful implementation of the project from the previous programming period, it is envisaged to upgrade the equipment with the delivery of 220 pcs. electronic information boards / EIB / as well as the following activities:

- New protocol for communication and data exchange to the EIB - software development with automatic coverage of the route changes along the routes;

- A preview of all EIBs already delivered on an interactive map with the ability to track the status of each EIB, as well as its physical condition (affected by crash, vandalism, etc.);

- Upgrading through software development with the option of selecting a vehicle type, route, direction and visualization of an EIB route map to add additional passenger information to a temporary traffic organization, route breakdown, operator change history and others.;

**Equipment: Video surveillance on public transport stations**

The component includes the delivery and installation of 24 CCTV cameras at public transport stops. Accompanying activities - delivery, installation, wiring and power at public transport stop level, software, hardware, connectivity and interface at control center level.

PTZ CCTV cameras are offered to be installed at stops along Tsar Boris III Blvd. from "Ruski Pametnik" Square to "Knyazhevo" Tram roundabout, as well as building communication to a control center.

**Software applications:** *Transit signal priority (TSP), EIT upgrade and on-board equipment for public transport network vehicles - upgrade.*
The delivery of management software is planned for the above-described components.

# Plovdiv

According to the project "Modernization and development of sustainable public transport in Plovdiv" component "Public transport management system" was completed. The component was completed according to contract 15ДГ102 from 10.02.2015, BG161PO001/1.5-03/2011/001-D10 with subject matter: "Establishment, integration and maintenance of public transport management system". Contractor is the Spanish company "Indra Systemas" SA. The public transport management system consists of Subcomponent 1 "E-ticketing" and Subcomponent 2 "Travel information & fleet management".

Contract value is 16 308 385 BGN without VAT or 19 570 062 BGN with included VAT. Value of Subcomponent 1 – "E-ticketing", is 8 537 179 BGN without VAT or 10 244 614, 80 BGN with included VAT. Value of Subcomponent 2 – "Travel information & fleet management", is 7 771 206 BGN without VAT or 9 325 447, 20 BGN with included VAT. VAT for Subcomponent 1 or amount of 1 707 435, 80 BGN is defined as inadmissible expense for the project and is at the expense of Plovdiv Municipality. The value of the free of charge financial assistance is 17 862 626, 20 BGN. 85% of it, or 15 183 232, 27, are co-financed form the European Union by the European Regional Development Fund and 15%, or 2 679 393, 93 are co-financed from the national budget of the Republic of Bulgaria.

In the coverage of Subcomponent 2 and the designated bus stops, 354 electronic information boards were delivered and mounted, each with either 1-, 3- and 5- rows, which show in real time information about the arriving busses. Thirty of the boards come with audio announcement. A smartphone application has been developed, which gives information about the location of public transport busses. It is possible via the RTPI application to change the text of the information boards.

Inventory of the delivered and mounted equipment and developed applications according to Contract 15ДГ102 from 10.02.2015, BG161PO001/1.5-03/2011/001-D10 with subject matter: "Establishment, integration and maintenance of public transport management system":
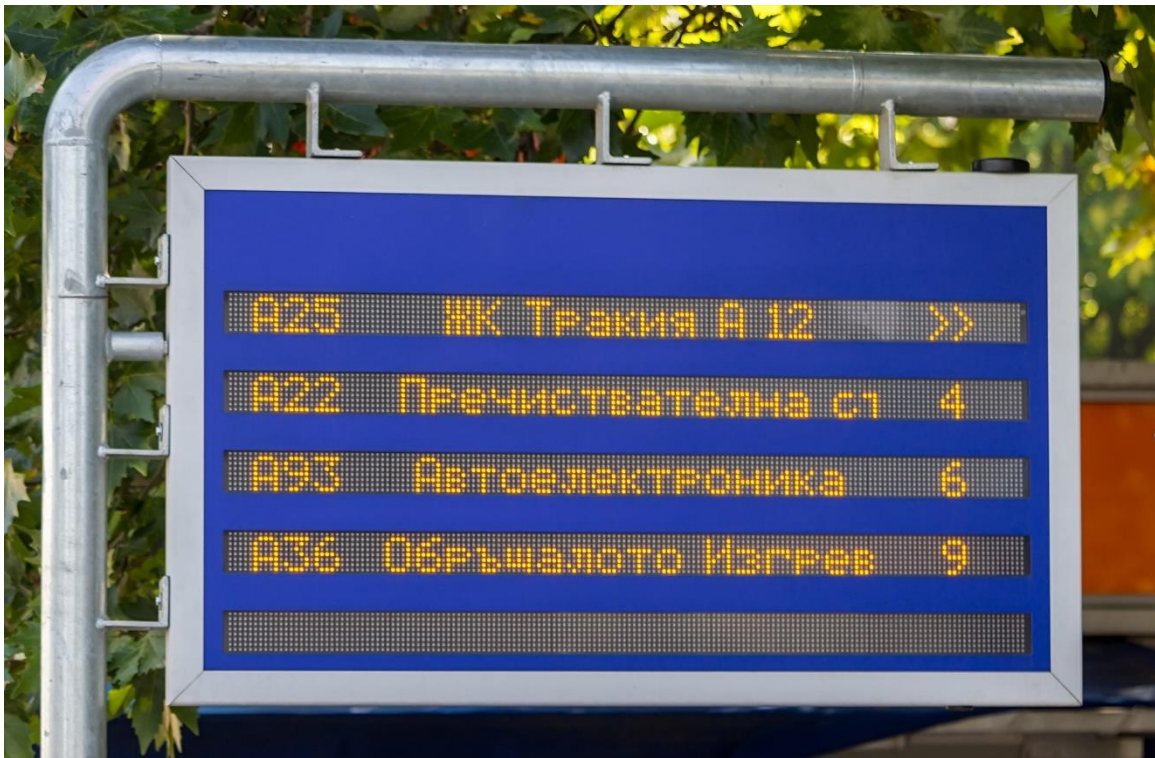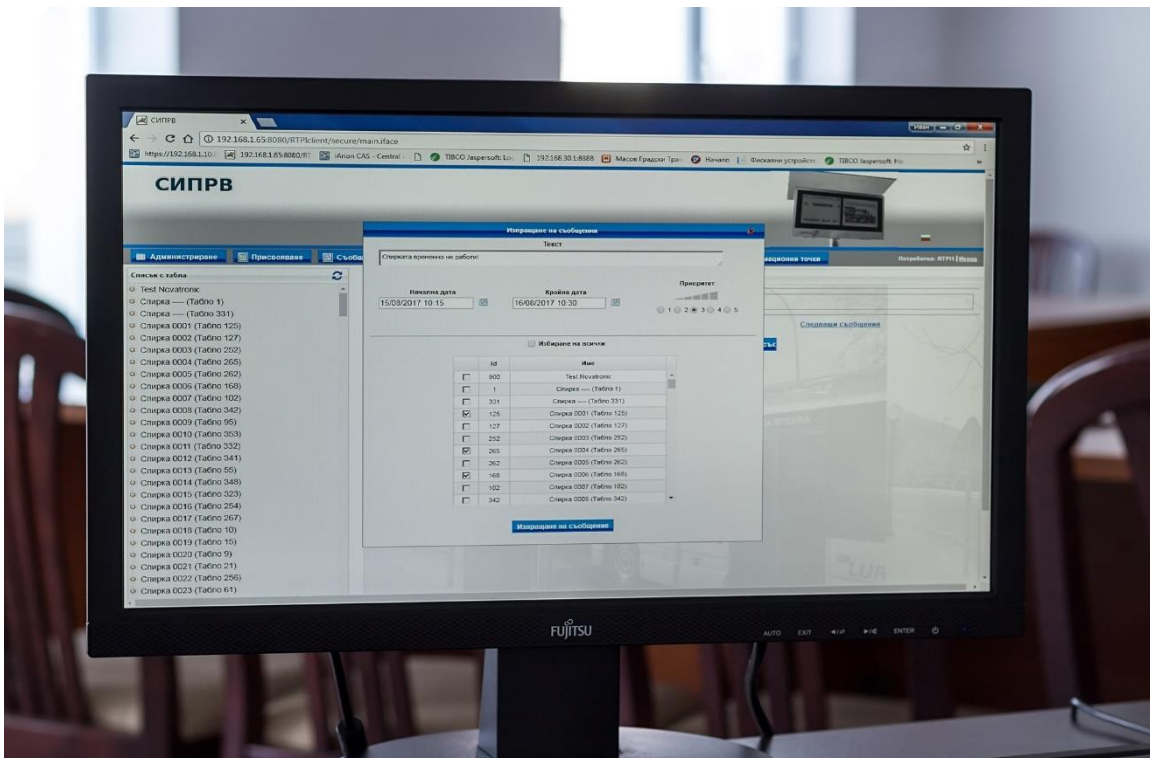
**One row displays – <u>104 pcs</u>.**

**Three row displays – <u>155 pcs</u>.**

**Five Three row displays – <u>95 pcs.</u>**



**Application RTPI** – changing the text of information boards. The application is web-based. It runs on Windows platform in the Plovdiv Traffic Control Centre.



Working station

Information board with changed text.

**Smartphone application** – in process of authorization. The application functions under the Android platform.

**Varna**

| Nr. | Component/Activity | Short description of the activity/inventory | Amount | Start date/ Period of exploitation | Proving document |
|-----|-------------------|---------------------------------------------|--------|-----------------------------------|------------------|
| 1. | **Automated ticketing system** | The elements of the system include:<br>- Ticket vending machines (TVM) for buses and bus stops;<br>- Validation devices at bus stops or on-board of PUT vehicles;<br>- Center for sales of e-cards/EC/and loading different tariff plans for their subsequent use when traveling in public transport system. Smart cards allow the processing and storage of the underlying transactions. Portable inspection units for smart cards and other types of cards checking;<br>- Back office & clearing house, which manages all ticketing | 8 317 678,55 lv. | 31.12.2016 | Order with attachments |

| Nr. | Component/Activity | Short description of the activity/inventory | Amount | Start date/ Period of exploitation | Proving document |
|---|---|---|---|---|---|
| | | transactions including system control, unit inspections and money transaction reports for operators and regulators. | | | |
| 2. | **Real time passenger information system** | Provides real-time information on board the buses, the bus stops at BRT corridor, in strategic places in the city and on the Internet site . Increases the reliability and quality of services offered to passengers in MUPT. | 4 228 709,70 lv. | 31.12.2016 | Order with attachments |
| 3. | **PUT control centre** | Receive real-time information from vehicle to MUPT, process the data, estimated time of arrival of the stops and transfers data to the relevant terminals. Fleet management by monitoring the location of vehicle, identification of delays, and the collection of operational data, which are used for | 3 209 882,92 lv. | 31.12.2016 | Order with attachments |

| | | | | | |
|---|---|---|---|---|---|
| | | adjustment work on the system. | | | |
| 4. | **Improvement of intelligent transport system** | - Coordinated management of light regulated intersections on routes on MUPT;<br>- Equipment of 84 stops with information boards passengers in real time;<br>- Build intelligent 25 hiking trails;<br>- Further development of systems for accessibility of road intersections . | Indicative amount: 2 550 422 lv. | A public tender is ongoing for choosing a sub-contractor | |

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|-----|-------------------|---------------------------------------------|--------|-----------------------------------|------------------|
| 1. | **Automated ticketing system** | The elements of the system include:<br>- Ticket vending machines (TVM) for buses and bus stops;<br>- Validation devices at bus stops or on-board of PUT vehicles;<br>- Center for sales of e-cards/EC/and loading different tariff plans for their subsequent use when traveling in public transport system. Smart cards allow the processing and storage of the underlying transactions. Portable inspection units for smart cards and other types of cards checking;<br>- Back office & clearing house, which manages all ticketing | 8 317 678,55 lv. | 31.12.2016 | Order with attachments |

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**Pleven**

### CONTENTS:

### I. ITS put into service:

Between 2014 and 2016, two systems complying with the definition of Intelligent Transport Systems (ITS) were put into service in Pleven.

Their realization was implemented within the framework of the Project "Integrated Urban Transport of Pleven", financed by Operational Program "Regional Development" 2007-2013 under scheme BG161PO001 / 1.5-03 / 2011: "Support for integrated urban transport in the 5 big cities" (Varna, Plovdiv, Rousse, Stara Zagora and Pleven) as follows:

## _System for management and control of mass public urban transport (SCM-MPUT):_

**Value with VAT under contract with a Contractor 1,090,668 BGN**

The system improves the public transport efficiency and increases its preferred use as a reliable, easy-to-access, faster, cost-effective and environmentally friendly way to get around the town.

The modernized management of public transport in Pleven is based on the integration of advanced ITS technologies through the use of the Global Positioning System (GPS), mobile communications, real-time traffic control over the service, information provision to users and operational interoperability and connectivity with other information systems contributing to improving the quality of the public transport services.

The integrated approach of the public transport management and control system covers the following activities:

✓ **Automated system for operational control and management** of public transport vehicles, including:
  - _a real-time localizing and tracking subsystem_ by installing GPS positioning devices in the vehicles - GPS receivers, radio/ GPRS/ WiFi data transmitters, onboard computers;
  - _a subsystem for informing passengers_ about and during the travelling through: light and voice notification in the vehicles;
  - lighting of 65 key stops (40% of the total number of stops on the territory of Pleven);
  - _communication environment_ for data transfer based on standard TCP/ IP protocols (using as ADSL, SHDSL, optic Fiber so GPRS, 3G, 4G wired networks), communication interfaces between vehicles, network operators, dispatchers, transport operators and data exchange channels and communications' differentiation in relation to vehicles, stops and light regulation of the traffic (to give priority to the public transport).
  _Note_: _The replaced vehicles (trolleybuses) are also included in the SCM of MPUT._

✓ **The Public Transport Management and Control Center (MCC)** is positioned in the Municipal Enterprise "Urban Mobility Center" and the activities are managed by a dispatch center with the following functionality:
  - _Data collection_ in real time, maintenance of an integrated centralized database and archive of the objects and the activity of the means of transport;
  - _Data processing_: primary processing of operational data (in real time and location) of the vehicles' movement and operation and output of current information of the monitored parameters on the electronic screen and on an electronic map of the town of Pleven; preparing daily and monthly reports and consolidated reports for the transport tasks execution; generating information reports, reports and tables related to the transport process control, preparing analyzes and follow-up activities planning;
  - _Performing monitoring and operational control_ of the MPUT's means of transport in terms of routes, timetables and compliance with the time schedule of real-time traffic;
  - _The system has possibilities for operational interaction with other institutions_ and organizations during the transport tasks implementation through organizational, functional and information compatibility with other information systems (Traffic Management System, Ticket System, Road Police, NS 112, etc.);
  - _Providing and disseminating up-to-date information_ of the passengers during the journey via an Internet portal, too;
  - _Maintaining the ITS assets_, the programming and communication tools, data security and interoperability to ensure the system's security and performance as well as its openness to expand with other ITS applications and services.

- *Interactive portal* (Citizens Information System). The portal expands the possibilities the regular users, citizens and guests to receive on-line information about the public transport trip in the town of Pleven.

Link to public site: http://cgm.pleven.bg/

For the system operation, 4 servers, 7 workstations, networking equipment, printers, and a video wall were installed.

The software used to operate the system is EuroGPS Smart Tracker Public Transportation.

### *Intelligent Traffic Management System:*

**Value with VAT under contract with a Contractor 884, 400 BGN**

The system helps to improve the city's traffic management prioritizing the public transport means and ensuring the traffic management infrastructure modernization.

ITS provides possibility to modify the cycles of 13 key traffic-light led traffic junctions, depending on traffic intensity or load based on real-time traffic reporting across these junctions.

The proper functioning of ITS is achieved through:

- ✓ A network of detectors recording the real-time traffic intensity and microprocessor controllers for automated traffic control of the selected junctions;
- ✓ Adaptive movement control has been introduced at each junction for itself;
- ✓ A Traffic Management Center (TMC) has been set up, which is integrated with the Center for Management and Control of MPUT (MCC). The two centers work together through an organized real-time feedback environment;
- ✓ A web-based solution for processing and analysis of the data generated by the detectors and the provision of the registered information on the public transport movement in real time is implemented. The software solution enables effective management of traffic lights in real time in order to prioritize the public transport movement.

The system helps optimizing the city traffic by traffic jam management, reducing urban delays and timely response to road traffic accidents. The expected ITS benefits are improved mobility, safety and limitation of harmful environmental impacts.

The software used for operating the system is a web-based application - Telelink Traffic Control Center ($T^2C^2$) and - INES+ (traffic optimization system on coordinated routes and street networks).

Link to public site: http://its.pleven.bg/

For the system operation 13 controllers, 13 priority communication devices (Priority Controller), 105 Sensys Neworks magnetic detectors, 104 LED traffic-lights sections and communication and network equipment were installed.

*In addition to the 2 ITS* under Project "Implementation of Measures to Improve the Quality of Life in the cities of Bourgas, Varna, Stara Zagora and Pleven", Grant Agreement DIR 51315001-C004. The project is financed by Operational Program "Environment" 2007-2013 under the Procedure for Direct Grant Provision of BG161PO005/ 13/1.50/01/35 "Measures for improving the quality of the ambient air by providing ecological vehicles for the urban transport", Priority Axis 1. The internal

operator Trolleybus Transport EOOD, Pleven, renovated the trolleybus park with 40 new trolleybuses. The delivery and commissioning the new trolleybuses took place by the end of September 2014.

The new trolleybuses are low-floor with modern design and technical features providing high levels of accessibility, safety and travel comfort, low traffic noise and increased energy efficiency at medium speed, and the possibility of alternative movement when the power supply is interrupted by an autonomous ICE.

In addition to these advantages, the new vehicles have an open boarding platform to deliver ITS services, applications and standard interfaces to connect to external systems. The platform architecture combines the following ITS technologies:

- GPS system for locating and tracking the vehicle in real time;
- Information system for the light and voice notification of passengers during the trip;
- CCTV for the passenger compartment and the traffic situation;
- Application for manual notification of emergency and personal safety.

The new trolleybuses have been integrated into the transport system in both the intelligent transport systems of Pleven and are already in regular operation on the lines of the urban public transport.

### II. Upcoming activities:

In implementation of Project "Development of Integrated Urban Transport in Pleven" is one of the activities planned - "***Implementation of a CCTV system at key junctions in the town of Pleven***".

The Project "Development of Integrated Urban Transport in Pleven" is financed under the OP procedure BGL6RFOP001-1.001-039 "Implementation of Integrated Urban Reconstruction and Development Plans 2014-2020".

Estimated value: 2,216,228 BGN without VAT;

Funding: Operational Program "Regions in Growth" 2014-2020

It is planned to introduce a new CCTV system by including 16 key junctions covering the main entry-exit arteries of the city to ensure 24-hour traffic monitoring; efficient traffic control and management, ensuring the security of the physical environment, traffic safety, identification and tracking of motor vehicles in case of crash, crime, etc.

The new system is expected to: help the timely respond to situations that hinder normal traffic, improve traffic control, and minimize the preconditions for road accidents in these busiest urban areas.

The same project also foresees the activities for **Implementation of an electronic charging system in the MPUT**.

Estimated value: 2,259,009 BGN without VAT;

Funding: Operational Program "Regions in Growth 2014-2020".

Implementation of Electronic Charging System in the MPUT will ensure effective and sustainable improvement of the transport service.

The system will enable:

• reorganization of the route network - lines/stops, because it allows passengers to transfer to different transport vehicles at no extra charge (free of charge);

• introduction of an electronic city card, with possibility for other payments (parking, etc.);

• generating and maintaining detailed information on the public transport management, incl. number of passengers on the line, for each vehicle, for each stop;

• generating and maintaining automatic registration and income administration.

For the introduction of the Electronic System we plan to deliver and implement the following equipment:

- board-validators - for trolleybuses and buses;

- for data transmission, incl. hardware, software licenses;
- for issuing, loading/reloading of electronic documents - ticket office, 3 workplaces, incl. hardware, software licenses;
- for exported jobs, incl. hardware, software licenses;
- vending machines for charging a sum in electronic cards;
- for the Control Center, incl. control equipment; central system; back office;
- software
- electronic cards.


### III.    Plans for implementing ITS technologies

The scope of action includes defining the objectives and priorities for using ITS in the context of the possibilities that technologies offer to solve real transport problems and challenges. The definition of the ITS's strategic role is the basis for the development of ITS Vision and the planning of actions for its realization for the innovations' sustainable development in public transport on the territory of Municipality Pleven in support of the municipal transport policy, the following planning documents have been developed and adopted: "Integrated Urban Transport Plan of Pleven, 2012-2020 (IUTP-Pleven, 2020)"; "Sustainable Urban Mobility Plan of Pleven 2015-2025" (SUMP-Pleven 2025) and "Regional ITS Action Plan of Pleven for the period 2014-2020" (RITS Action Plan of Pleven).

Pleven, alongside other major cities, faces serious challenges arising from the need to build an appropriate infrastructure/ transport network, diversify the possibilities for free movement, use of modern technologies, implement complex security and safety measures, increase the culture of traffic participants, efficient management of the processes in the urban transport system, environment protection and providing favorable conditions for life and civic activity and businesses.

**IUTP-Pleven 2020** is aimed at implementing coherent management decisions and taking solidarity measures at all levels by developing and implementing mechanisms for shared responsibility and actions for the comprehensive improvement of transport and environment key features giving **priority to mass urban public transport**.

The document outlines the following strategic objectives for the development of the municipal transport system in Pleven until 2020:

**GENERAL OBJECTIVE:** *Improvement of municipal policies and practices in the field of urban public transport and traffic to achieve a socially acceptable, cost-effective and sustainable governance model ensuring balanced territorial connectivity and full integrity with the European transport system.*

**SPECIFIC OBJECTIVE:** *Developing modern and intelligent, highly competitive urban public transport guaranteeing the environment and health protection, ensuring good quality of service, high level of awareness, mobility and accessibility, adequate to the needs of citizens and businesses.*

The Integrated Urban Transport Plan of Pleven, 2012-2020, is the first local strategic document that defines the "Leadership of Intelligent Transport Systems" (Priority 4) and identifies the first and urgent technological measures that are currently being implemented.

**SUMP-Pleven 2025** is a means of achieving a change through the specifics of pre-selected and detailed actions in the direction of optimization of the transport system of the town of Pleven.

SUMP outlines the following vision and strategic objective, as well as priorities and measures related to ITS:

**Vision**: Developing a balanced, environment friendly, energy-efficient and economically viable transport system based on modern technologies dominated by mass urban public transport, cycling and walking, in the interest of the local community and as a basis for stimulating internal integrity and sustainable development of the region.

**Specific objective**: Achieving a high level of mobility in the urban areas and adjoining areas of Pleven under the conditions of economically advantageous mobility and guaranteed environment protection with provided: maximum accessibility, safety, safety, environmentally friendly, diversified and convenient transport.

The study of the leading issues determines the various prerequisites and opens an area of eligibility in the application of the possible approaches to overcome the existing problems. SUMP has the following priority and measures related to ITS:

**Priority 1**. Improving the functional capabilities of the municipal transport system.

**Measure 1.2**. Building energy-efficient street lighting with intelligent control system.

**Priority 3**. Improving the management of urban transport and traffic.

**Measure 3.1**. Expanding the implementation of Intelligent Transport Systems.

**Measure 3.2**. Changing the parking model.

**RITS Action Plan of Pleven**. The ITS Vision takes into account the increasing impact of transport on the quality of life, its environment and economy, the need to enhance the public transport image in Pleven and the rational understanding that ITS offers the opportunity to provide a set of strategies contributing to the implementation of a variety of technological measures to overcome the transport problems. It is in this context that the basic declaration of this document is drawn, namely:

*Building an intelligent transport system in Pleven, able to offer and maintain high quality public services to its residents, guests and businesses with accessible, comfortable and secure public transport and to contribute to the development of sustainable transport networks and mobility, guaranteeing the protection of the environment and increasing the value of life in a safe and clean urban environment.*

The Action Plan proposes to implement a set of ITS measures to implement the core ITS tools which to support as much as possible the undertaken local action for technological innovation.

**Ruse**

**2.1 Priority area I: Optimal use of road, traffic and travel data**

Between June 2014 and December 2015, the Municipality of Ruse successfully implemented the activities under the **project "Integrated City Transport System of Ruse"**. The total value of the project is BGN 29 256 115, 47, of which BGN 26 007 509, 51 financed by Operational Program "Regional Development" 2007-2013 and BGN 3 248 605, 96 own contribution of the Municipality of Ruse. The project includes 8 components. Its overall objective is to achieve an efficient system of mass public passenger transport, improve transport accessibility and traffic safety; Efficient and stable improvement in the provision of the urban transport service and traffic regulation, which will help to optimally solve the existing transport problems and to implement the transport policy and the city development strategy.

Ruse Public Road Transport Control and Management Center was established within Component 2: "GPS-Based Control and Management System for Public Transport and Electronic Data Boards". The Control-Center collects real-time traffic information and vehicle traffic in the public transport and archives it, allowing traffic analysis and optimization of intersections. Within the framework of the project, besides the construction and equipment of the Center, 100 electronic light boards were delivered and installed at the busiest stops in the city. The Municipality of Ruse has installed specialized software for management and control of the urban transport and installed video surveillance of 15 key intersections in the city. Putting cameras at the city's busiest junctions will allow real-time information on traffic jams, incidents and recordings of drivers' misconduct. Electronic charging will limit possible misuse and will ensure the report of real number of passengers.

All vehicles in the city are equipped with GPS, on-board computers and visual and voice alert for the next stop.

**2.2 Priority Area II: Continuity of ITS traffic and freight management services**

In the period 13.07.2012 - 13.06.2015 the Municipality of Ruse in partnership with the Municipality Giurgiu successfully implemented **Project "Improving the Accessibility of Euro region Ruse - Giurgiu with Pan-European Transport Corridor 9",** financed under the Romania-Bulgaria Cross-Border Cooperation Program 2007 - 2013.

Within the framework of the project, a common information system was developed for gathering and processing of traffic information, delivered and installed LED-display panels, information and communication equipment (ICT), through which the registration of passing cars and occurrence of unforeseen events on the road infrastructure to reduce the critical points and busy sections of Pan-European Transport Corridor 9 and the related roads passing through the territories of the two municipalities of Ruse and Giurgiu.

The developed system processes the information on both sides of the border and it accumulates in a common database. The collected data makes it easier for users of the Euro region's transport infrastructure to provide real-time traffic information at the entry / exit points of transport corridor 9 and can offer other alternatives for crossing. The collected traffic information allows the municipalities of Ruse and Giurgiu to regularly analyze the traffic in the area and to plan common actions for its better organization. The system is maintained by the transport experts in the two municipalities and allows the planning of adequate future measures for the development of the transport infrastructure of the region on the basis of the needs of its users.

The collection of traffic data is performed through dedicated cameras and sensors, providing real-time video surveillance of road traffic and traffic conditions. The system's processed information is visualized on LED display in the form of messages in three languages (Bulgarian, Romanian and English). The collected information from Traffic Tracking Devices is transferred to the built-in Ethernet network. Traffic information is available via an Internet portal with an interface.

**Project: "Integrated urban transport system of the city of Ruse - 2 stage"**

Ruse is the only city in Bulgaria that has an approved project to upgrade urban transport improvements during the new programming period. The objectives of the project, which are being implemented between January 2017 and January 2021, are to increase the attractiveness of public transport, improve accessibility, functionality and achieve improved mobility within the Ruse Municipality, prioritize bicycle and pedestrian paths, Ensuring the protection of the environment and improving the transport safety in Ruse.

The total value of the project amounts to BGN 24 344 185, 59, of which the amount of the grant is BGN 24 002 815, 60 and BGN 341 369, 99 own contribution of the Municipality of Ruse.

The implementation of the project covers the implementation of 6 components identified in the detailed pre-project feasibility study in the field of integrated urban transport of the city of Ruse.

Under Component 6 - intelligent transport system upgrade - with a budget of BGN 1 803 523, 81, video surveillance is envisaged at the junction points and points through which the urban transport lines pass for the purpose of remote regulation of the traffic, tracking the workload of the Traffic and rapid response to emergencies. The measure covers the entire urban transport system in the city.

**2.3 Priority area III: Applications in the field of /about Intelligent Transport Systems for Road Safety and Security**

**2.4 Priority area IV: Connecting the vehicle to the transport infrastructure**

Between June 2014 and December 2015, the Municipality of Ruse successfully implemented the activities under the **project "Integrated City Transport System of Ruse"**. The total value of the project is BGN 29 256 115, 47, of which BGN 26 007 509, 51 financed by Operational Program "Regional Development" 2007-2013 and BGN 3 248 605, 96 own contribution of the Municipality of Ruse. The project includes 8 components. Its overall objective is to achieve an efficient system of mass public passenger transport, improve transport accessibility and traffic safety; Efficient and stable improvement in the provision of the urban transport service and traffic regulation, which will help to optimally solve the existing transport problems and to implement the transport policy and the city development strategy.

Ruse Public Road Transport Control and Management Center was established within Component 2: "GPS-Based Control and Management System for Public Transport and Electronic Data Boards". The Control-Center collects real-time traffic information and vehicle traffic in the public transport and archives it, allowing traffic analysis and optimization of intersections. Within the framework of the project, besides the construction and equipment of the Center, 100 electronic light boards were delivered and installed at the busiest stops in the city. The Municipality of Ruse has installed specialized software for management and control of the urban transport and installed video surveillance of 15 key

intersections in the city. Putting cameras at the city's busiest junctions will allow real-time information on traffic jams, incidents and recordings of drivers' misconduct. Electronic charging will limit possible misuse and will ensure the report of real number of passengers.

All vehicles in the city are equipped with GPS, on-board computers and visual and voice alert for the next stop.

**Burgas**

**For the priority actions related to provision of information services for safe and secure parking places for trucks and commercial vehicles** (Delegated regulation of the European Commission №885/2013), and in connection to the detailed specification on the priority actions under Art.5 par.1 p.5, Appendix 5 of the Bulgarian Regulation on the order and conditions for introducing of ITS in the field of the vehicle transport and for interfaces with the other types of transportation, which provides for:
'"……………..definition of the necessary measures for providing information services, based on ITS at the places for safe and secure parking of trucks, and especially in the zones for providing technical services and rest along the roads, based on:
a) availability of information about parking along the roads dedicated for the users;
b) facilitation of the electronic exchange of data between the road parking areas, the centers and the vehicles…………

*we would like to inform that:*
- *On the territory of Municipality of Burgas there are no ITS which can provide information for the places for safe and secure parking of transport vehicles yet.*
- *The Municipality of Burgas has not concluded specialized surveys which have in their scope of activities the production of concrete projections for such systems.*

*For the priority actions related to provision of reservation services for the places for safe and secure parking for transport vehicles* and in connection to the detailed specification on the priority actions under Art.5 par.1 p.6, Appendix 5 of the Bulgarian Regulation on the order and conditions for introducing of ITS in the field of the vehicle transport and for interfaces with the other types of transportation, which provides for:
" definition of the necessary measures for provision of reservation services, based on ITS at the places for safe and secure parking of transport vehicles, based on :
a) availability for the users of information related to parking along the roads;
б) facilitation of the electronic exchange of data between the road parking areas, the centers and the vehicles;
в) integration of the relevant technologies for ITS in the transport vehicles and in the road facilities for parking, in order collecting updated information about available parking areas for the purpose of providing reservation services………..."

*we would like to inform you that:*
- *On the territory of Municipality of Burgas there are no ITS which can offer reservation services for safe and secure parking places for transport vehicles,*
- *The Municipality of Burgas has not concluded specialized surveys which have in their scope of activities the production of concrete projections for such systems.*

**ADDITIONAL INFORMATION**


**DATA ABOUT the introduced in the Municipality of Burgas Integrated Transport Systems,**

**within the scope of activities of the project**

**Integrated Urban Transport for Burgas"**


In the period 2008-2016 the Municipality of Burgas developed and realized the project Integrated Urban Transport for Burgas. The total value of the investment is 123 493 333, 78 BGN. The project was financed by Operational Program "Regional Development" 2007-2013 in Bulgaria, through the European Regional Development Fund, the Bulgarian state budget, and by additional financing of the Municipality of Burgas.

The realization of the project covered the execution of a number of integrated activities and measures for improvement of the mobility in the city and optimization of the urban transport, including change of a great number of  the public bus fleet; renovation and modernization of intercity road infrastructure, public transport bus stops and terminals; introduction of a new transport scheme, based on Bus Rapid Transport lines; modernization of the bus deport of the public transport operator "Burgasbus" ЁOODa; introduction of integrated systems for management of the public transport as: electronic ticketing system, system for automatic vehicle location for the public transport fleet, CCTV system in the buses, at the bus stops and at important junctions in the city; system for providing of priority of the urban transport vehicles at the junctions; construction of a system of bicycle lanes. The monitoring and control of the systems was located in the newly established Center for Video-survey and Traffic Control of the city, for the purpose of providing the overall mobility management at one and the same place.

**THE INTEGRATED SYSTEM FOR CONTROL AND MANAGEMENT OF THE PUBLIC TRANSPORT OF BURGAS INCLUDES THE FOLLOWINNG ELEMENTS:**

1. **INTEGRATED ELECTRONIC TICKETING SYSTEM**

The new electronic ticketing system was introduced to serve for the new transport scheme of the public transport based on the BRT line and feeder lines system with for providing the urban transport service. It allows the passengers to interchange between the different transport lines with one electronic ticket. The functionalities of the integrated ticketing system include the use of electronic pass, on which you can load different transport products like single trip electronic ticket, integrated ticket for journeys with interchanges with time limitation, different transport products with discounts for the different groups of passengers with preferences, or commercial discounts. The system provides the possibility for interchanges from the BRT lines to the feeder lines and vice versa from any point in the city, for the price of one journey.

The system is open for future upgrades and integration with other services in the transport sector for the future.

The delivered equipment allows the purchasing, loading and reloading of electronic passes through :

- Sales points: Transport house, South Station Bus Terminal, Meden Rudnik Terminal, West Bus Station
- Vending machines at 7 key locations: The Central Bus Stop, Park Zornitsa Bus Stop, Municipal Hospital Bus Stop, South Station Bus Terminal, Izgrev Bus Terminal, Slaveykov Bus Terminal, Opera Bus Station
- Web-application for reloading of passes.

The integrated ticketing system includes a software for management of the system, web-app for sales of travel products, licenses, as well as hardware equipment on 77 buses operated by the urban transport operator "Burgasbus" EOOD and all the sales offices, and 7 vending machines.

## 2. SYSTEM FOR REAL TIME INFRMATION OF THE PASSENGERS

The Real Time Passenger Information System includes delivery and installation of equipment at all the bus stops of the urban transport scheme and on the board of the buses.

For the passengers of the urban transport system are provided with information on the board of the buses about the number of the line, the names of the bus stops and the current location of the bus along the route in visual and audio-format. At the bus stops the information visualized is related to the lines stopping at the bus stops; and the arrival time of the next coming bus. The web-based application which is expected to be started soon will offer general information about the transport scheme, all the lines and time-schedules, expected times of arrival and provide route planner as well.

The RTPI system includes software for management of the system, licenses and hardware equipment for 216 bus stops. 20 of them are with audio-announcement system, and 10 are with free WiFi zone. Most of the bus stops are connected through the municipal optic network.

Main functionalities

The system functions by taking into comparative analysis the time-schedule of the transport operator and the real location of the bus to calculate the time for the journey and the expected times of arrival. It uses integrated information from the electronic ticketing system and the system for automatic vehicle control. It generated regular information and statistics about the time-schedules and the quality of the service provided by the transport operator to the citizens, for the purposes of monitoring of the Urban Transport operator by the control body of the Municipality of Burgas assigned under the conditions of the Public Service Contract

SYSTEM FOR TRAFFIC MANAGEMENT OF THE URBAN TRANSPORT VEHICLES TRAFFIC
The system comprises of software for management of the system; internet and web-based applications, licenses, as well as hardware equipment for the following sub-systems:

A: SUB-SYSTEM FOR AUTOMATIC VEHICLE LOCATION,

Located at the Center for CCTV control and Traffic Management of Buras, which is accessible from the Dispatcher center of the public transport operator "Burgasbus" EOOD as well, and includes installed on the buses hardware equipment, server and communication set, licenses and software.

Main functionalities:

- Defines the location of each vehicle of the urban transport operator by using Global positioning system

- Processes the information on the location of the vehicles and sends it to the RTPI system;

- Sends information in real time to the transport operator for use of the information for exploitation and operational management of the fleet and provision of on-time service ;

- Sends information about the vehicle location to the electronic ticketing system, operated by the transport operator;

- Sends information about which is the next stop of the bus to the onboard displays and audio-information system of the buses;

- Sends signals to the system for providing priority at traffic lights in case of delays

Б: SUB-SYSTEM FOR PROVIDING PRIORITY OF THE URBAN TRANSPORT VEHICLES AT JUNCTIONS ALONG THE BUS RAPID TRANSIT LINE, including management software, liicenses, hardware equipment for:
- o   32 regulated junctions
- o   Server and communication set
-

Main functionalities

The system works in an integrated manner with the Ticketing system, AVL system, and RTPI system, by providing automated management of the traffic lights cycles to offer priority for the delayed urban transport buses

4. CCTV SYSTEM.

The system comprises of

- CCTV Sub-system on the board of the buses of the urban transport operator

and
- CCTV sub-system at 32 main junctions located along the route of the BRT line and all the bus stops in the city.

The bus CCTV system comprises of software for management, analytical software, licenses, hardware equipment for 69 buses and is accessible from the Dispatcher Center of the transport operator Burgasbus EOOD and from the City CCTV and Traffic Management Center. The Bus stop and junctions' CCTV system comprises of hardware, licenses, management and analytical software and is accessible from City CCTV and Traffic Management Center.

The installed cameras are as follows:

- 8 360° PTZ-cameras and communication set
-  63 fixed cameras, located at 21 junctions
- 216 fixed cameras at bus stops

Main functionalities:

- Possibility for transfer of image to the distant survey in real time desks in the CCTV and Traffic Management city Center, from all the users of the system without change of the address and the supporting image;

- Possibility for review of the records of each camera without termination of the current process of recording;

- Possibility for instant review of different cameras at one and the same monitor or groups of cameras in real time and on record;

- Possibility for activation of the process of recording for each camera at a triggered alert as for example after motion detection;

- Possibility for observation of a chosen area by special graphic interface, stopping of the image, zooming, etc.

- Initial analysis of the input video streams with possibility for pre-setting of events for triggering alarms based on different classes of alarms which can be set in order to limit the need of subjective constant review;

- Geo-location functionalities


**COMMUNICATION SYSTEM FOR PROVIDING THE OVERALL INTEGRATION OF THE SYSTEMS**

A: Main communication optic trace, comprising of one main and one backup optic cables, optic cable lines for connection of the different sites, which:
- provides communication connectivity and integrated operation of the systems, built within the scope of the Integrated Urban Transport of Burgas project;
- connects all the bus stops along the BRT line, 32 junctions, CCTV and Traffic Management Center, the Bus deport of the public transport operator, end terminals of the BRT line in Meden Rudnik, Izgrev and Slaveykov estates;
- total length of 15 км.
Б: Low voltage and high voltage cabling to 174 information boards at bus stops of the feeding lines
В: Hardware equipment, providing the work of the communication system and the transfer of voice messages and data, including additional equipment, servers, firewall, etc.

Main functionalities:

- Data transfer from the buses to the control center of the city and the bus operator dispatch center;

- Connectivity and transfer of data between the CCTV and Transport management center and the Dispatch center of the transport operator;

- Transfer of data from the work station of Burgasbus EOOD to the Dispatch center of the Bur depot;

- Transfer of data from the CCTV and Traffic Management Center to the bus station of the city transport;

- Voice communication between the drivers of the buses and the dispatch center;

- Function „panic" button in the buses, which to guarantee the in-time reaction in urgent situations;

- Transfer of data from the cameras on board of the buses which starts after pressing the "panic" button;

- Constant transfer of data from the cameras located at the junctions and the bus stops;

- Reservation of the communication during cutting of the main communication channel for data transfer;

- Data transfer to the NRA for the ticketing system.

**FIESIBILITY STUDIES AND OROJECTIONS FOR FURTHER DEVELOPMENT OF ITEGRATED TRANSPORT SYSTEMS IN BURGAS**

The Municipality of Burgas is beneficiary for the procedure BG16RFOP001-1.001-39 „Execution of Integrated Plans for Urban Development and Regeneration 2014-2020", priority axis 1: „Sustainable and integrated urban development" of the Operational Program "Regions in growth" 2014 – 2020 and has prepared project proposals related to the investment priorities, covered by the Integrated Plan For Urban Development and Regeneration of Burgas and the Investment Program to it for the period 2014 -2020.

The prepared project proposal with which the Municipalitty of Burgas will apply for financing is called "Integrated model for management of the urban mobility – stage I", and is included in the investment priority Integrated urban transport of the Investment Program of the city of Burgas for the period 2014 -2020.

The project includes the following activities:

- **upgrade of the urban bus rapid transport line system, which is in exploitation from the time of realization of the Integrated Urban Transport of Burgas Project, by construction of a new bus route for the BRT line which includes rehabilitation of the road structure in the sections Bulair Str.; Demokracia Str. And Stefan Stambolov Str.; construction of 4 new traffic lights crossings; establishment of a new "fast corridor" for the public transport buses along the Demokracia Boulevard by implementing new organization of traffic and optimization of parking along the street**

- **delivery and installation of Integrated city traffic management system, including upgrading of the existing and construction of new "smart" traffic lights at junctions; equipment of points for gathering traffic information at important places in the city; upgrade of the CCTV system with cameras for traffic survey**

- **construction of one 2-floor buffer car park for P&R system, located very close to the BRT line**
- **Introduction of an Integrated system for management of the parking zones in the city**

The total amount of the investment for the realization of the project "Integrated model for urban mobility – stage 1" amounts up to 11 966 744, 57 BGN.

### 2.6.1   Progress since 2014
Description of the progress in the area since 2014:

# 3   Key Performance Indicators (KPIs)

<u>Note</u>: **The EC document on "ITS KPIs for the EU" is to be used for comprehensive definitions of the KPIs and further guidance. The EU EIP Activity 5 report on "ITS Deployment and Benefit KPIs definitions" is a complementary document providing in particular estimation methods.**

*KPI will be reported separately by type of road network / priority zone / transport network and nodes (when appropriate).*

## 3.1   Deployment KPIs

### 3.1.1   Information gathering infrastructures / equipment (road KPI)
*Figures to be provided by type of network / zone.*

*Figures to distinguish fixed and mobile equipment.*

*KPI to be calculated by type of network / zone (when relevant).*

- <u>Length of road network type / road sections (in km) equipped with information gathering infrastructures & Total length of this same road network type (in km)</u>:

- <u>KPI</u> = (kilometres of road network type equipped with information gathering infrastructures / total kilometres of same road network type) x 100

### 3.1.2   Incident detection (road KPI)
*Figures to be provided by type of network / zone.*

*KPI to be calculated by type of network / zone (when relevant).*

- <u>Length of road network type / road sections (in km) equipped with ITS to detect incident & Total length of this same road network type (in km)</u>:

- <u>KPI</u> = (kilometres of road network type equipped with ITS to detect incident / total kilometres of same road network type) x 100

### 3.1.3　Traffic management and traffic control measures (road KPI)

*Figures to be provided by type of network / zone.*

*KPI to be calculated by type of network / zone (when relevant).*

- Length of road network type / road sections (in km) covered by traffic management and traffic control measures & Total length of this same road network type (in km):

- KPI = (kilometres of road network type covered by traffic management and traffic control measures / total kilometres of same road network type) x 100

### 3.1.4　Cooperative-ITS services and applications (road KPI)

*Figures to be provided by type of network / zone.*

*KPI to be calculated by type of network / zone (when relevant).*

- Length of road network type / road sections (in km) covered by C-ITS services or applications & Total length of this same road network type (in km):

- KPI = (kilometres of road network type covered by C-ITS services or applications / total kilometres of same road network type) x 100

### 3.1.5　Real-time traffic information (road KPI)

*Figures to be provided by type of network / zone / node.*

*KPI to be calculated by type of network / zone / node (when relevant), and if relevant indicate the proportion of services accessible to passengers with reduced mobility, orientation and/or communication.*

- Length of road network type / road sections (in km) with provision of real-time traffic information services & Total length of this same road network type (in km):

- KPI = (kilometres of road network type with provision of real-time traffic information services / total kilometres of same road network type) x 100

### 3.1.6　Dynamic travel information (multimodal KPI)

*Figures to be provided by type of network / zone / node.*

*KPI to be calculated by type of network / zone / node (when relevant), and if relevant indicate the proportion of services accessible to passengers with reduced mobility, orientation and/or communication.*

- Length of transport network type (in km) with provision of dynamic travel information services & Total length of this same transport network type (in km):

- Number of transport nodes (e.g. rail or bus stations) covered by dynamic travel information services & Total number of the same transport nodes:

- KPI = (kilometres of transport network type with provision of dynamic travel information services / total kilometres of same transport network type) x 100

- KPI = (number of transport nodes with provision of dynamic travel information services / total number of same transport nodes) x 100

### 3.1.7  Freight information (multimodal if possible or road KPI)
*Figures to be provided by type of network / zone / node.*

*KPI to be calculated by type of network / zone / node (when relevant), and if relevant indicate the proportion of services accessible to passengers with reduced mobility, orientation and/or communication.*

- Length of road network type / road sections (in km) with provision of freight information services & Total length of this same road network type (in km):

- Number of freight nodes (e.g. ports, logistics platforms) covered by freight information services & Total number of the same freight nodes:

- KPI = (kilometres of road network type with provision of freight information services / total kilometres of same road network type) x 100

- KPI = (number of freight nodes with provision of freight information services / total number of same freight nodes) x 100

### 3.1.8  112 eCalls (road KPI)
N.a. – will be provided through the COCOM 112 questionnaire

## 3.2  Benefits KPIs

### 3.2.1  Change in travel time (road KPI)
*Figures to be provided also include vehicle.km for the route / area considered*

KPI = ((travel time before ITS implementation or improvement – travel time after ITS implementation or improvement) / travel time before ITS implementation or improvement) x 100

### 3.2.2  Change in road accident resulting in death or injuries numbers (road KPI)
*Results shall be provided / aggregated at national level to be representative enough. If possible, distinction can be made between accidents resulting in deaths, serious injuries or slight injuries.*

*Figures to be provided also include vehicle.km for the route / area considered.*

- Number of road accident resulting in death or injuries before ITS implementation or improvement:

- Number of road accident resulting in death or injuries after ITS implementation or improvement:

### 3.2.3 Change in traffic-CO2 emissions (road KPI)

*Routes / areas where ITS has been implemented or improved should be specified. Length along / area within which the change in CO2 emissions is calculated should be long / wide enough to be representative.*

KPI = ((traffic $CO_2$ emissions before ITS implementation or improvement – traffic $CO_2$ emissions after implementation or improvement) / traffic $CO_2$ emissions before ITS implementation or improvement) x 100

## 3.3 Financial KPIs

*ITS includes any types of systems and services altogether.*

Annual investment in road ITS (as a % of total transport infrastructure investments):

Annual operating & maintenance costs of road ITS (in euros per kilometre of network covered):