

# **REPUBLIC OF BULGARIA**

## **PROGRESS REPORT**

**Referring: Directive 2010/40/EU, Article 17(3)**

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

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## CONTENTS:

<b>1. Priority area I: Optimal use of road, traffic and travel data</b>	<b>page 3</b>
<b>2. Priority area II: Continuity of traffic and freight management ITS services</b>	<b>page 8</b>
<b>3. Priority area III: ITS road safety and security applications</b>	<b>page 27</b>

## IMPLEMENTATION OF CURRENT AND PLANNED ACTIVITIES

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

#### PROJECTS OF ROAD INFRASTRUCTURE AGENCY (RIA)

##### ***„Integrated System for Analysis and Evaluation of the Traffic along Highways and First Class Roads on the Territory of the Republic of Bulgaria Which Are a Part of the TEN-T Networks Financed under Operational Program Transport (2007-2013)“***

In execution of Directive 2010/40/EC with financing under Operational Program Transport 2007-2013 Road Infrastructure Agency /RIA/ implements Project „Building Up a System for Automatic Collection and Analysis of Data about the Traffic along Highways and First Class Roads in Bulgaria as a Part of the TEN-T Network“.

The implementation of this Project is in direct compliance with *Directive 2010/40/EC*, establishing the framework in support of the coordinated and consecutive introduction and use of intelligent transport systems, within the framework of the Union, in particular across the borders between the member states and establishes the general conditions needed for this purpose. *Directive 2010/40/EC* is applied for ITS (Intelligent Transport Systems) applications and services in the sphere of the automobile transport and their interfaces with other kinds of transport. The objective is the optimal use of the data about the roads, the traffic along them and the journeys, the continuity of the ITS services for traffic management, the ITS applications for road safety and security, as well as the connection of the transport vehicles with the transport infrastructure described in detail in *Annex 1 (Priority spheres and actions) of Directive 2010/40/EC*.

The main objective of the European transportation policy is the building up of a sustainable transport system, corresponding to the economic and social needs of the society and favoring the further building up an integrated and competitive Europe. The better integration amongst the kinds of transport attained through the acceleration of the development and introduction of innovative technological solutions will contribute to the improvement of the general effectiveness of the transportation system. One of these innovative solutions is the application of information and communication technologies for the building up of intelligent transport systems, which will have a significant contribution for the optimization of the use of the integrated transport networks for the improvement of the safety and the security of the transportations, the increase of the mobility of the population, the decrease of the adverse impact over the environment and the climate and the increase of the energy effectiveness. Simultaneously, the intelligent transport systems provide for the functioning of the internal market and increase the levels of competitiveness and employment. In implementation of the objectives of this policy the European Commission created an *Action Plan for Deployment of the Intelligent Transport Systems in Europe*.

The plan is fundamental and aims at the acceleration and the coordination of the introduction of intelligent transport systems in the automobile transport, inclusive of its interaction with the other kinds of transport. Six spheres of priority were outlined with a certain set of specific actions and a clearly defined schedule for their implementation:

- Optimal use of the data about the roads, the traffic and the journeys;
- Continuity of the services related to ITS for traffic management and the cargo transportations along the European transport corridors and within the urban agglomerations;
- Safety and security along the roads;
- Integration of the motor vehicle in the transport infrastructure;
- Security and protection of the data and the issues related to the responsibilities;
- Cooperation and coordination in the EU in relation to ITS.

The implementation of Project „Integrated System for Analysis and Evaluation of the Traffic along Highways and First Class Roads on the Territory of the Republic of Bulgaria Which Are a Part of the TEN-T Networks” will contribute to the attainments of the priorities stated hereinabove and will assist for the implementation of the Action Plan for the Deployment of the Intelligent Transport System in Europe and its application in the Republic of Bulgaria.

The application form for financing for the Project was approved by the Managing Authority of Operational Program Transport with the Ministry of Transport, Information Technology and Communications on 21.12.2013. In relation to Resolution No OИIT - 3/28.01.2013 of the Manager of the Managing Authority of Operational Program Transport 2007-2013 Contract No ДИИIT-3/05.02.2014 was concluded between the Managing Authority of Operational Program Transport with the Ministry of Transport, Information Technology and Communications and Road Infrastructure Agency (RIA) for granting gratuitous financial assistance for the Project.

The building up of a system for automated collection and analysis of data about the traffic along highways and first class roads in Bulgaria as a part of the TEN-T network, anticipated in the activities under this Project is the first phase (stage) of the overall integrated system and will be designed and built up as a part of an Intelligent Transport System (ITS) and a Traffic Management System (TMS). The system built up at the first stage will remain open for expansion at a later stage, which will guarantee sustainability of the investment. This unification of the system will provide possibility for dynamic reconfiguration of the various subsystems depending on the specific tasks, which are to be solved.

The implementation of this Project and the introduction of the system for analysis of the traffic along the highways and the first class roads consists of supply and assembly of reading numbers devices, counting devices – classifiers, meteorological stations, as well as cameras for measurement of the average speed of the motor vehicles. The system comprises the processes of registration, structuring and storage of the data about the intensity, the class, the average speed and the direction of the traffic of the motor vehicles. The system for analysis of the traffic consists of a server and a client’s part. The server part includes hardware and software, which will be located in the Central Institute of Road Technologies, National and European Norms and Standards (CIRTNENS), which will be responsible for the operation of the system. The hardware consists of a portal framework, where the various kinds of sensors will be installed. The hardware also includes a powerful server for data storage and a communication module for exchange of these data with the counting devices – classifiers, reading registration numbers devices, devices for measuring the average speed located on the territory of the country as well as a system / station for monitoring the meteorological conditions.

The building up of an automated system for collection of data about the traffic within the framework of the Project consists of:

- Supply and installation of 2 nos. of a central server and specialized periphery;
- 2 nos. of software for communication with the counting points, structuring, storage and extraction of information and adjustment of the counters;
- Supply and installation of 5 nos. of portable computers for control and adjustment of the counters – classifiers on the spot.
- 100 nos. of counting points with their associated equipment:
- Supply and installation of counters - classifiers – for reporting the exact number and class of the motor vehicles, in each section of the road network. They allow evaluation and forecast of the movement of the motor vehicles, as a consequence of which measures may be applied for the regulation of the traffic in the critical points. At a later stage of the development of the system, the counters will provide the user with information about delays and traffic jams;
- Supply and installation of a system for reporting the average speed – it will report the average speed of the motor vehicles moving along the highways and the first class roads on the territory of the Republic of Bulgaria. The system includes 1 number associated software and cameras / sensors;

- Supply and installation of systems for recognition of registration numbers – they contribute to the classification of the traffic, through which at this stage the direction of the traffic will be determined as well as the class of the motor vehicle;
- Supply and installation of portal frames.
- Supply and installation of 3 numbers of meteorological stations – the meteorological stations will be located in various positions along the highways and will provide information about any changes in the meteorological conditions and in particular about adverse meteorological and weather conditions.

No construction and assembly works (CAW) will be executed in the assembly of the elements of the system. The Automatic Devices Registering the Road Traffic (ADRRT) shall count, identify, classify, measure the speed and the average speed of each motor vehicle (MV) in the point of reporting the road traffic (the counting point) and store the information in the database. The identification should be made by means of recognizing the registration numbers of the motor vehicles passed (Bulgarian or foreign ones), and the recognition should be bound to exact identification of the time and the point of passing. By means of the identification of the motor vehicles the system should have the possibility to exercise monitoring over the generation of the road traffic through its origin, designation, direction and time for passing. ADRRT should provide possibility the information from them to be transferred through connection with a portable device for storage of data and through GPRS/UMTS/HSDPA /HSUPA radio modem. The software should work with the ADRRT and to conduct an additional analysis of the collected data about the road traffic. The format of the data should contain the permanent information about each motor vehicle - date, time, class, speed, registration number of the motor vehicle and others. The analyzing software should have possibility to provide for a real number of passed motor vehicles per kinds, moving along a route set up by an operator, within a time period set up by an operator as well. The ADRRT and the software related to them should be developed in such a manner, which will not allow for accidental destruction of data stored in the memory, as well as to record information in energy dependent memory for at least one (1) month. All the commands of the operator, which might result in that should warn and require confirmation of the operation prior to its performance. In event of a failure, it should be confirmed for the effect of the program to return to normal regime and the stored data should not be changed. All the ADRRT should have possibility for recording data in conformity with the options for time interval, which should include but not be limited to 5, 15, 30 and 60 minutes. The selection of time interval should be made by the operator after the review of the data. The capacity for counting should be minimum 1000 motor vehicles an hour. The ADRRT should be supplied through electricity from the electric power transmission grid (220V), and the connection should be provided for from the probably closest possible point in conformity with the location of the points for the collection of data about the road traffic. The ADRRT should provide information about the working parameters of the sensors. Further to that the ADRRT should generate and provide information about the meteorological conditions along highways and first class roads. The Automatic Devices for Monitoring Meteorological Conditions (ADMMC) should be addressable from the analyzing software. It should allow for the recording of 50 alphanumeric symbols as well as it should have its own export to send the data to the server in formats divided by a comma. The ADMMC and the software related to them should not allow for accidental destruction of data stored in the memory. The ADMMC should be supplied through electricity from the electric power transmission grid (220V). Batteries (UPS) should be connected to each point, which should be used as an alternative source of supply. All the operations should be controlled from the company software aimed at the prevention of the possibility for inappropriate use of the supply. The ADMMC should provide information about the working parameters of the sensors and recognize the registration numbers of the road vehicles. The system should have the overall possibility to count, identify, through optical recognition of the registration numbers and to classify the motor vehicles in the one direction as well as in both. Through the identification of the motor vehicles, the system should exercise

monitoring over the road traffic through its origin, designation, route and time for passing. The system should perform automatic recognition of the numbers of passed motor vehicles, with effectiveness better than 90% for the Bulgarian registration plates and better than 75% for the registration plates of the EU. The ADRRT should perform photographing through flash making use of infrared lighting that is invisible for the drivers of the motor vehicles, by which to guarantee valid registration of the passing of the motor vehicles at any time of the day and night. The analyzing software should have the possibility to provide for real volume of the traffic per kinds of motor vehicles and routes in conformity with a set of by an authorized operator time period. The recording of the data should be made with precision up to 0.1 second. The sensors should register motor vehicles moving at a speed from 10 to 200 km/h. The system should cover to a maximal degree the requirements related to the precision of the counting and the classification, measurement of the speed and work with the environment. The communication channel built up between the ADRRT and the ADMMC unit and the server should be maximally protected to a degree which shall not allow for the manipulation of the transmitted data within real time, and it should be unsusceptible to interference of radio frequencies and not exert influence over other transmission frequencies and radars. After the performance of the assembly and the commissioning of the system, 72-hour tests will be conducted as well as organized training within the framework of 2 weeks up to 30 days for 20 employees of Road Infrastructure Agency for work with the system. The training will be provided at the expense of the Contractor. The Contractor should propose the time for the training along with the questions, which should be examined during the training. The training should include all the aspects of operation and technical maintenance of the equipment of the sites, the transmission of data to the central database as well as the work and the maintenance of the data aimed at their presentation in a format acceptable for the Contracting Authority. After the completion of the time period of the training a Competence Certificate will be issued for each participant who has passed through the training. The guarantee period of the system shall be minimum three (3) years for all the components of the system inclusive of the bearing and the servicing structures, after the issuance of a Protocol for the acceptance of the entire system for operation by the Contracting Authority. The servicing maintenance of all the components of the system, inclusive of the bearing and the servicing structures after the issuance of a protocol for the acceptance of the overall system for operation by the Contracting Authority will be minimum three (3) years. Aimed at the provision of continuous and effective work of the system, prophylactics of the entire equipment installed in the counting points should be made every 6 months for the time period of the servicing maintenance.

**Time implementation of the Project:** Expected completion of the Project (in conformity with the current execution schedule) - **February 2015.**

**Financial implementation of the Project:**

**Activity 1:** *Selection of a Contractor for design, assembly and installation of the individual components of the system for automated collection and analysis of data about the traffic along highways and first class roads* - **6 979 440.00 BGN**

**Activity 2:** *Publicity and information* - **24 720.00 BGN**

**Activity 3:** *Project Management* - **122 400.00 BGN**

**Activity 4:** *Audit of the expenditures incurred under the Project* - **12 000.00 BGN**

**TOTAL: 7 138 560.00 BGN**

***„Building up a System for Automatic Collection of Data about the Traffic along the Automobile Roads in the Republic of Bulgaria“***

As a beneficiary under Operational Program Regional Development in 2011 Road Infrastructure Agency applied under Priority Axis 5: „Technical Assistance“, Scheme for Provision of Gratuitous Financial Assistance: **BG161P0001/5-01/2008 Technical Assistance for Preparation, Management, Monitoring, Evaluation, Information, Control and Strengthening of the Administrative Capacity for Implementation of Operational Program Regional Development 2007-2013**. On 23.12.2011 a Contract was signed for granting gratuitous financial assistance BG161P0001/5-01/2008/059 „Optimization of Road Infrastructure Agency for Management of Programs and Projects Financed with European Funds“. Activity 2: Building up a System for Automated Collection of Data about the Traffic along the Automobile Roads in the Republic of Bulgaria is included in the Project.

On 10.09.2013 a Contract was concluded with Contractor Telelink EAD. The term for execution of the Contract is 6 months. The total value of the Contract is 2 878 848.00 BGN inclusive of VAT. 120 points with automatic devices for registering the road traffic along the automobile roads of the second and third class were built up within the framework of the Project as well as a system with which the generated road traffic is monitored through its origin, designation, direction and time for passing.

The system comprises the processes of registration, structuring and storage of the data about the intensity of the automobile traffic and consists of server client's part. The server part includes hardware and software based in the investigation unit, which the operation of the system was assigned to. The hardware includes a powerful server for storage of the data a communication module for exchange of data with the counters-classifiers located on the territory of the country. The extraction, the transfer and the structuring of the data, the statistical processing and the taking out of standard references are allowed through the software. Further to that, it was provided a possibility about remote setting up and control of each of the counters – classifiers. The client's part includes all the counters – classifiers along with their associated modules for supply, devices for collection and transfer of the data, consoles for assembly, software and so on.

Cameras which take snapshots of the passing motor vehicles are located at each counting point from a technological point of view. The cameras are set up in such a manner that the photographs should contain solely the registration number of the passing motor vehicles. The software processes the photograph of the registration number of the passed motor vehicle in a very short time interval after which the photograph of the registration number is erased and the registration number is stored in the database as a text. Through inductive frames embedded in the asphalt, the system stores and processes information about the class of the passed motor vehicle in conformity with the Bulgarian State Standard, the speed of passing and the precise time of passing through the counting point.

The studies about the need of building up a system for automated collection of data about the traffic along the automobile roads of the second and third class were conducted by the Central Institute of Road Technologies, National and European Norms and Standards /CIRTNENS/. The location of the automatic counting points was defined in conformity with the existing main and additional counting points of roads of the second and the third class, which manual counting is performed on.

The supplied equipment consisting of inductive frameworks, metal frames, cameras, industrial computers, electronic switchboards, batteries, metal boxes and others was supplied by the Contractor Telelink EAD and all the construction and assembly activities were implemented within the framework of the term for the execution of the Contract. The operating software was introduced on all industrial computers in the 120 sites built up, which information is sent from through 3G network of the mobile operator Vivacom to a central server in Road Infrastructure

Agency. There is access to the information received from the various sites in several kinds of reports through the analyzing software in Road Infrastructure Agency.

### **Information about forthcoming actions**

In event of availability of free financial resource, Directorate Implementation of Projects under Operational Program Regional Development and EU Territorial Cooperation Programs has readiness to apply with a design proposal for financing a new project for the construction of additional automatic counting points. In conformity with information from the Central Institute of Road Technologies, National and European Norms and Standards /CIRTNENS/, it is necessary to expand the scope of the automated collection of data and to build up new automatic counting points further to those constructed under this Project and further to those, which are planned for implementation under Operational Program Transport.

Within the frameworks of „**Project for Rehabilitation of the Road Infrastructure**“, financed through *Loan 4865-BUL granted to the Government of the Republic of Bulgaria from the International Bank for Reconstruction and Development (the World Bank)*, in 2010 the procedure for selection of a Provider of a system of counters/classifiers for permanent registration of the traffic and portable scales for measurement of axial weight in movement was conducted. Two tenders were submitted and no approval was received from the Bank for the conclusion of a contract because of the too high proposed price and in conformity with clause 39.1 from the Tender Documents the tender procedure was suspended and cancelled without the selection of a winning Tenderer. With a view to the need of Road Infrastructure Agency of a system of counters/classifiers for permanent registration of the traffic and portable scales for measurement of axial weight in movement, a commencement was provided for the preparation and starting up a new procedure, and the technical specification was revised aimed at the expansion of the scope of the procurement. The second procedure started up at the end of year 2012 and five companies submitted tenders. The procedure was suspended again because of budget limitations under the Project as the budget parameters for state investment loans for 2013 were reached and their increase are respectively the continuation with the procedure was impossible.

As at this time Road Infrastructure Agency jointly with the Ministry of Regional Development elaborated and submitted for approval in the Ministry of Finance a proposal for a new loan from the International Bank for Reconstruction and Development for financing a „*Program for Rehabilitation and Modernization of the National Road Network of Regional Significance*“, which should be implemented during the time period 2016-2020. A component is included in it anticipating more effective management of the road sector and the increase of the capacity of Road Infrastructure Agency through the introduction of state-of-the-art instruments for management of the roads, sustainable development of intelligent transport systems. The indicative value of this component is **20 million Euros**.

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

### ***Systems for sustainable city transport***

In the framework of the Operational Programme “Regional Development” 2007-2013, action 1.5, “Systems for sustainable city transport” is ongoing. The concrete beneficiaries are the seventh biggest cities in Bulgaria: Sofia, Plovdiv, Varna, Burgas, Stara Zagora, Ruse and Pleven. The timeframe is 36 months.



**The Municipalities' projects are as follows:**

**Sofia Municipality**

***Project "Integrated City Transport of the Capital", financed by Regional Development Operational Program 2007 – 2013***

***Studies completed: Feasibility study for the project "Integrated City Transport of the Capital", financed by Regional Development Operational Program 2007 – 2013***

***Period of the study:*** 2010-2011r.

***Funding Source:*** The total sum of all project's components amounts at 122 482 833, 08 lv. The grant from OP "Regional Development" is 97 791 500, 00 lv. and the share of the Municipality of Sofia is 24 691 333, 08 lv.

***Activities' Description:***

The feasibility study, as well as the project proposal, have been prepared by the Municipality of Sofia with the assistance of JASPERS.

The project is coherent with the main guidelines for the improvement of Sofia Transport system, such as Priority development of the electrical transport network (metro, tram, trolleys) and development of conditions for the use of public transport, according to the Municipal Development plan.

***Project's components:***

Project includes:

- Building works
- Installation of an Intelligent Transport System for traffic management that will help priority to be given to public transport's vehicles at regulated crossroads.
- Development and installation of 600 electronic information boards, managed by a remote control at stops in the city center and the suburbs
- Marketing and Law Study to assess the opportunities and conditions for renting/ concession of public transport stops
- Buying of 50 new trolleys
- Creation of a new tram line "Seminariyata - Durvenitza" and
- Modernization of a tramline on Bulgaria blvd.

***Equipment: Intelligent Transport Systems /implementation level – choice of constructor/***

An Intelligent Transport Systems' equipment for 750 vehicles including building works is going to be installed on 20 crossroads thus enabling a priority for the public transport.

***Electronic Information Boards at public transport stops /implementation level: contractor is selected, gradual adoption of the project's implementation/***

In compliance with the best international practices, aiming at better passengers' comfort the Municipality of Sofia has installed 600 new electronic information boards at public transport stops at busy crossroads in the city center as well as the suburbs. The investment will significantly improve travelling by Sofia public transport making it more pleasant.

***Software applications: Intelligent Transport Systems***

It is planned a delivery of a software for the management of the above ITS.

### **Building works: *Intelligent Transport Systems***

Building works are going to take place at seven crossroads of the city of Sofia, aiming at enhancing the ITS implementation's effect as well as improving their usage. The crossroads proposed within the system's scope include building works for enhancing the effect of the project "Intelligent Transport System's delivery, assembly and integration for traffic management of the Municipality of Sofia". The crossroads will operate as self-dependent systems at each junction – It is not foreseen an interconnection of the traffic signaling except when junctions are located in the close proximity.

#### **Forthcoming activities:**

##### **Equipment:**

- ***Electronic Information Boards at public transport stops - scope's enlargement***  
Public Procurement procedure to follow secured financing.
- ***Intelligent Transport Systems – scope's enlargement***  
Public Procurement procedure to follow secured financing.

### **Plovdiv Municipality**

Currently the Municipality of Plovdiv is implementing a Modernization and development of sustainable city transport in Plovdiv project, financed under Grant, Contract No. BG161PO001/1.5-03/2011/001 of Operational Programme "Regional Development". The main components of the project are:

1. City transport management system (STMS)
2. Traffic lights and control
3. Bicycle alleys
4. City transport planning research

Two of the components fall within the scope of the Intelligent transportation systems:

1. City transport management system (STMS)
2. Traffic lights and control

**The City transport management system (STMS) component** consists of an Information system for travelling and fleet management and an Electronic ticket system:

- The Information system for travelling and fleet management includes:
  - Fleet management back office;
  - On-board bus subsystems will be installed in 285 transportation vehicles;
  - Bus stop displays will be installed on 354 bus stops.
- The Electronic ticket system includes:
  - On-board devices, installed in 285 transportation vehicles, which will simultaneously serve the electronic ticket sale system and the bus passenger information system;
  - 677 chip card validation devices, installed in 285 transportation vehicles;
  - Ticket vending machines (TVM), for card issue and topping-up - 285 ticket vending machines will be installed on the buses, 91 ticket vending machines will be installed at selected bus stops and in designated sheltered locations;
  - 150 manual portable control devices, used for detection of fraud and invalid cards;
  - Security and registration system, which includes all functions for the reliable management and monitoring of the integrity of the system.

**The Traffic lights and control component includes:**

- New modern controllers, installed on each of the intersections in the controlled zone - 42 controllers installed on regulated intersections and 8 controllers installed on pedestrian traffic lights.
- Traffic detectors in strategic locations, which can provide traffic information to the Traffic control center (TCC) for selection of appropriate mode of operation. A total of 130 detectors will be installed.
- Opportunity to provide right of way to public transport vehicles in 19 regulated intersections.
- 15 CCTV cameras will be situated in specific locations for performance of traffic conditions monitoring from the Traffic control center (TCC).
- Replacement of all traffic light in the controlled zone with LED technology based devices.
- Traffic control center (TCC) for traffic monitoring and adaptive management.

The progress of the project in the part Intelligent transport systems is at the stage of selection of component contractors.

1. For the implementation of the City transport management system (STMS) component, a public procurement procedure has been announced with the following subject: Construction, introduction and maintenance of a city transport management system, under the Modernization and development of sustainable city transport in Plovdiv project, financed under Grant Contract No. BG161PO001/1.5-03/2011/001, performed by the Municipality of Plovdiv in the capacity of beneficiary under Operational Programme Regional Development 2007-2013. The procedure has been opened by Resolution No. 13POII86/19.08.2013 by the Mayor of the Municipality of Plovdiv. By Resolution No. 13POII86(44)/20.02.2014 of the Mayor of the Municipality of Plovdiv, the result from the ranking of the participants and the participant determined as a contractor to the public procurement. Within the time stipulated by the law, four claims against the resolution have been filed in the Competition Protection Commission. With Resolution No. 498/15.04.2014, the Competition Protection Commission cancelled unlawful resolution No. 13POII86(44)/20.02.2014 of the Mayor of the Municipality of Plovdiv for the announcement of the result from the ranking of the participants and the participant determined as a contractor to the public procurement in reference to one of the claims and dismissed the other three. A claim was filed within the terms stipulated by the law before the Supreme Administrative Court against the resolution of the Competition Protection Commission. A case has been arranged at the Supreme Administrative Court on 07.10.2014 for hearing the claim.
2. For the implementation of the Traffic lights and control component, a public procurement procedure has been announced with the following subject: Design, construction and introduction of a Traffic control center, under the Modernization and development of sustainable city transport in Plovdiv project, financed under Grant Contract No. BG161PO001/1.5-03/2011/001, performed by the Municipality of Plovdiv in the capacity of beneficiary under Operational Programme Regional Development 2007-2013. The procedure has been opened by Resolution No. 13POII100/03.10.2013 by the Mayor of the Municipality of Plovdiv. By Resolution No. 13POII100(48)/08.04.2014 of the Mayor of the Municipality of Plovdiv, the result from the ranking of the participants and the participant determined as a contractor to the public procurement. Within the time stipulated by the law, four claims against the resolution have been filed in the Competition Protection Commission. With Resolution No. 675/20.05.2014, the Competition Protection Commission confirmed as lawful resolution No. 13POII100(48)/08.04.2014 of the Mayor of the Municipality of Plovdiv for the announcement of the result from the ranking of the participants and the participant determined as a contractor to the public procurement and dismissed the submitted claims. Two claims filed within the terms stipulated by the law before the

Supreme Administrative Court against the resolution of the Competition Protection Commission. A case has been arranged at the Supreme Administrative Court on 20.10.2014 for hearing the claims.

## **Burgas Municipality**

### ***Project "Integrated urban transport of Burgas"***

**Completed Feasibility studies:** *Feasibility studies for preparation of the Project 'Integrated urban transport of Burgas' funded under the Operational Programme 'Regional Development 2007-2013'.*

**Period of execution:** 2009-2010

**Funding:** Financial mechanism JASPERS (an initiative of the European Commission, the EIB and EBRD)

#### ***Coverage of the study:***

- Critical review of the strategy for development of public transport in the city;
- Opportunities and methods for promoting changes in mobility in urban environments- from private car use to public transport, cycling and walking;
- Critical review of the existing needs; analysis, including predictive models and studies of traffic and if it is necessary - preparation of additional new analyses and forecasts in compliance to the international standards;
- Preparation of feasibility study in accordance to the international standards, taking into account the requirements and the guidelines of the national and European legislation;
- Recommendations on potential changes in the institutional structure of the municipality relating to the public transport system and optimization of traffic management;
- Environmental assessment report.

#### ***Main conclusions and recommendations:***

Four variants are developed for development of the public transport in the city of Burgas. A detailed social, economic and environmental analysis of the preferred option has been carried out, including:

- Introduction of Bus Rapid Transit (BRT) line;
- Reconstruction of existing bus depot, construction of a diesel and CNG filling station at the bus depot.
- Reconstruction of the existing terminals and construction of Central bus station along the BRT line.
- Construction of bicycle lanes;
- Construction of four pedestrian overpasses;
- Introduction of intelligent transport management systems: electronic ticketing automatic vehicle location (AVL), and Real Time Passenger Information (RTPI) systems;
- Feasibility studies to upgrade the developed BRT system and the management, establishment of buffer parking lots and interurban bus station.

The prepared report contains recommendations for the introduction of supervised parking zone in the central part of the city and the optimization of the public transport scheme as key conditions for successful implementation of the preferred variant.

**Equipment:** Zone for paid and not paid parking

The area is managed by a centralized information system through server and call center. Every employee of the control unit has a device for checking the cars, which is equipped with GPS device, and thus their routes are monitored in real time.

Control of improperly parked vehicles, causing problems of public transport and other road users is performed by 3 pieces repatriating cars which are fitted with GPS devices, and monitored along their routes in real time. There are 3 cameras as well which also observe the execution of the jobs. The records are used in case of need for proof.

**Future Studies: Part: Feasibility studies for upgrade of Bus Rapid Transit (BRT), traffic control system; construction of buffer parking lots and an interurban bus station.**

**Period of execution:** 2014 – 2015г.

**Funding:** Operational Programme "Regional Development" 2007 - 2013.

**Coverage of the study:**

- Feasibility studies of upgrade of Bus Rapid Transit - economic, financial and ecological concept for the expansion of Bus Rapid Transit system and / or upgrade of BRT to LRT, identification of further actions or changes of the route of the BRT, the timetables, etc.
- Study on the implementation of intelligent systems for traffic management - assessment of variants in order the best the choice to be made, which answers the needs of development of an environmentally, financially and economically effective system for traffic management in Burgas.

The identified activities will cover setting various road signs related to traffic systems, measurements related to parking spaces and future road repairs. An analyses will be done which takes into account the requirements of police vehicles, emergency vehicles and vehicles offering other public services, and considers the special occasions during conduct of major public events and high traffic situations during the tourist season.

It will identify the main objectives of the system for traffic management, including deviating routes in cases of major incidents or accidents. The further development of the BRT management system will be integrated into the traffic management system development, with emphasis on the safety of pedestrians. Legal and environmental standards will also be considered.

- Study on establishment of buffer parkings - appropriate locations, developing of a concept of organization and management.
- Study on the possibilities for construction of an intercity Bus Terminal - identifying of potential sites for construction, preparation of functional specification.

**Study for introduction of an effective tariff system for the public transport**

**Period of execution:** 2014-2015

**Funding:** European Bank for Reconstruction and Development

**Coverage of the study:**

- Analysis of the municipal territory and defining of potential opportunities for tariff with zone-ticketing
- Concept of development of the tariff system
- Evaluation of the proposed tariff system
- Evaluation of the compatibility of the proposed tariff system with the upcoming electronic ticketing system;
- An action plan for implementation of the system well be produced.

***Study on introduction of measures for sustainable traffic management***

***Period of study:*** 2014 - 2015.

***Funding:*** European Bank for Reconstruction and Development

***Coverage of the study:***

- Development of a concept for the implementation and a management system for street parking;
- Development of a concept to expand pedestrian zones and entry zones "free of traffic";

***Equipment: Part: Intelligent control systems of public transport, including electronic ticketing system, automatic control of vehicle, information system of passengers and real-time video surveillance system***

***Indicative start date:*** November 2014.

***Indicative accomplishment:*** November 2015.

***Source of funding:*** Operational Programme "Regional Development" 2007 - 2013.

***Elements of the systems:***

1) Electronic Ticketing System:

- Electronic Ticketing Machines (or onboard-bus computers) with driver and passenger interfaces
- Paper Ticket Printers
- Validators/Smartcard readers at each door
- Handheld machines for use by inspectors
- Vending Machines
- Back office revenue management system and mechanism for designing tickets
- Smartcard management system including front office applications

2) System for automatic positioning of vehicles for public transport

- AVL system for information of passengers, equipment for automatic audio messaging, installation of displays for drivers, indicating compliance of movement of the buses with the schedule of movement of the 77 buses along the lines of the public transport:
- Installation of information boards at 42 stops along the route of the Bus Rapid Transit lines.
- Installation of information boards at 174 bus stops of the feeding lines of the urban transport system
- Installation of "speaking bus station" at 20 stops for visually impaired passengers.
- 3 workstations and a video-control-wall with monitors in the Transport House.
- Installation of 2 workstations in the Central Control Centre in the bus depot of the public transport operator, including monitors for surveillance.
- Equipment and software installation in Center of transport management at the Transport house and in the Control Centre in the bus depot.
- Introduction of RTPI applications for Internet, mobile and smart phones

3) Video surveillance system on buses, bus stops and intersections

- On-board video surveillance system - cameras, recording devices and storage

- System and equipment for storage and data analyses in the Transport house and the Control Centre of the bus depot.
- Supply and installation of CCTV cameras for 360 degrees observation at 8 locations along the Bus Rapid Transit line:
  - Supply and installation of fixed cameras for traffic monitoring with ability to detect registration numbers at 21 intersections along the Bus Rapid Transit line.
  - 216 fixed cameras installed at every bus stop of the urban transport system.

4) Equipment to provide priority to buses at intersections - total 32 intersections

### **Ruse Municipality**

Ruse Municipality is aiming at developing in European direction, making efforts to form a new perspective on its vision and priorities, creating effective cooperation with the EU structural funds, attracting new sources for the Municipality, creating advanced opportunities for development and supporting similar activities.

After it was selected in a call conducted by the Ministry of Regional Development and Public Work (Principal) for selection of a consultant with subject: **“Development of documentary package for modernization and sustainable urban transport in the five major cities”** under project № BG161PO001/5-01/2008/28 **„Development of documentary package for modernization and sustainable urban transport in the five major cities (Plovdiv, Stara Zagora, Varna, Ruse and Pleven)”**, approved for financing under Priority Axis 5 **„Technical Assistance”** of Operational Programme **„Regional Development 2007 – 2013“** Infraproject Consult Ltd signed a contract with the Principal for the:

***„Development of documentary package for modernization and sustainable urban transport in the city of Ruse”.***

The end result of the Contract is the elaboration of a feasibility study in the field of urban transport, as well as the development of documentary package, for applying for financing under the ERDF Operational Programme **„Regional Development”** (OPRD), priority axis 1.5. **“Systems for sustainable urban transport”**, with beneficiary Ruse Municipality. The selected project is called **„Integrated urban transport system of the city of Ruse”** (Project).

The objectives of the Project are:

- Increasing the attractiveness of the city of Ruse by improving its accessibility;
- Improving the functionality of the city within the municipality;

Increased mobility of the population, with an emphasis on environmentally friendly passenger transport: public transport, cycling and walking;

- Reducing traffic and increasing the capacity of public transport system;

Improving the environment by reducing emissions, developing trolley and bus systems with low levels of pollution;

- Improving traffic and transport safety.

The contract duration is 9.5 months and was completed in May 2012.

The project proposal was prepared on the basis of the feasibility study on project BG161PO001/5-01/2008/028, financed under Scheme of granting financial assistance: BG161PO001/5-01/2008 Technical assistance for the preparation, management, monitoring, evaluation, information, control and strengthening of the administrative capacity for the implementation of OP **“Regional Development”** 2007-2013.

Operational Programme **“Regional Development”** 2007 - 2013 sets as a strategic priority the improvement of the competitiveness and attractiveness of regions and cities by improving the economic, housing, environmental and cultural environment in urban areas. Priority Axis 1: Sustainable and integrated urban development is focused on improving the attractiveness and competitiveness of cities and urban areas. Its aim is to provide better quality of life and access to

basic services in cities, preserving their environmental potential. Public investment under this priority axis will focus on the rehabilitation and expansion of basic urban infrastructure. Operation 1.5: Sustainable Urban Transport Systems of Priority Axis 1 aims to promote accessibility and cohesion through efficient and sustainable urban transport systems.

Among the priorities of the municipality is the development of plans for traffic management, implementation of automated management and control systems through the introduction of information services to citizens. The efficient management of public transport is a major contributor to improving the quality of transport services. The implementation of public transport management system, based on GPS and electronic information boards would significantly improve the transport environment in the city.

Two of the components, set forth as activities in the approved under Operational Project „Regional Development“ 2007-2013 project „Integrated urban transport system of the city of Ruse“ in pursuance of Contract BG161PO001/1.5-03/2011/005 for granting financial assistance (period of performance of contract 36 months, from 06.08.2012) are Component 1-„Electronic fare collection system“ and Component 2 - „System for control and management of public transport and electronic information boards“.

The purpose of the introduction of electronic fare collection system in public transport is offering a modern, attractive and flexible fare collection system in public transport to the citizens of Ruse that will attract more people to use public transport. It enables passengers to easily transfer between public transport lines. It is based on contactless smart cards – loaded with “money”. The validity of the cards will be checked by validators located in the public transport vehicles, which when validated will deduct the fare for a single journey. All public transport vehicles will be equipped with validating machines.

**There will be delivered and installed:**

- 10 card loading devices, located at the ten busiest public transport stops;
- 15 card loading devices, located in major shopping centers and public buildings;
- 60 card loading devices, located in retail stores;
- data transmission equipment, software and hardware for the head office and communication infrastructure;
- 112 validating machines in vehicles;
- 4 card issuance devices;
- 20 inspection devices;
- 80 000 smart cards;
- 100 devices for visual and / or voice alert indicating the next stop in vehicles and equipment related to the notification via SMS service;

The public transport control and management system includes the following subsystems:

- Vehicle positioning systems – equipping all vehicles with on-board computers with GRS and with means for visual and voice alert indicating the next stop;
- Control system for public urban transport through a center collecting real-time information and passive type traffic management. The system allows collecting and archiving of information on traffic and the movement of public urban transport vehicles, which is to be used for traffic analysis and optimization of the work of intersections and for exercising control over the work of transport operators. The simultaneous collection, processing and analyzing of the information obtained as a result of the positioning of the public transport vehicles and the rest of the vehicle traffic in one control center provides an opportunity for feedback and correction of the public transport transition modes;
- Video surveillance system for intersections. Placing cameras at the busiest intersections in the city will allow receiving real-time information about the traffic at intersections and incidents that have occurred, which will allow better regulation of intersections and rapid response to emergencies;
- Passenger information systems – light, voice and interactive through an internet portal;



- Opportunity to be notified about the time left until the arrival of the next vehicle at less busy stops by sending SMS;
- Information services for citizens about possible routes and lines of the public urban transport through an interactive internet portal;

It is envisaged for a 100 information boards to be installed in both directions at 50 of the busiest stops.

**There will be delivered and equipped:**

- Centre for control and management of traffic, including the delivery of 2 pcs. hardware, 1 server, 8 pcs. workplace equipment, 1 pc. server;
- 100 pcs. Board computers with GPS and GPRS, adapters;
- Hardware for the head office;
- System for video surveillance, including the delivery of equipment for monitoring and control of 15 busy intersections with fiber optic, located at intersections;
- Communication system that includes the delivery of 100 pcs. devices for data transfer in vehicles;
- Delivery of 100 pcs. electronic light boards that will be installed at the stops, which will notify the time until the arrival of the next vehicle.

In connection with this in December 2013 Ruse Municipality announced an open call with subject: **„Delivery and installation of equipment for electronic fare collection system, system for control and management of traffic, system for positioning and passenger information and system for information services for citizens“** worth 3 560 180,00 leva without VAT. The procedure was completed in May 2014, but since the decision for the ranking of the participants and the choice of a contractor is appealed to the CPC, at this stage there is no realization of activities.

Ruse Municipality in partnership with Giurgiu Municipality, Romania, is implementing the project **“Improvement of the accessibility of Euroregion Ruse – Giurgiu with Pan-European transport corridor 9“** under Priority axes 1: **„Accessibility – Improved mobility and access to transport, information and communication infrastructure in the cross-border region ”**. Key area of intervention 1 **„Improvement of land and river cross-border transport facilities“** under the **“Romania-Bulgaria Cross Border Cooperation Programme 2007 – 2013”**, co-financed by the European Regional Development Fund of the EU.

The main objective of the project is to create conditions for joint planning and implementation of the common transport policy, sustainable development of transport infrastructure, improvement of the coordination of traffic and organization of the transport system of Euroregion Ruse - Giurgiu. The implementation of the project will increase the opportunity for coordination and organization of traffic on European transport corridor № 9, entrance/exit roads and highways of the Republic of Bulgaria and Republic of Romania to the connecting roads of the Euroregion and will improve the transport accessibility of border region Ruse-Giurgiu. It will create opportunity for improvement of the mobility and access to transport information and communication infrastructure in the region, by providing public access to traffic information system, thus contributing to its reduction.

The specific objectives of the project are:

- Improvement of the transport infrastructure of Euroregion Ruse-Giurgiu, through rehabilitation and modernization of main sections of the road connections to European transport corridor № 9 (Rehabilitation and modernization of transport section of main junction of the road connecting Euroregion Ruse-Giurgiu to European transport corridor № 9 – “Tutrakan” Blvd., Ruse (L=2316.16 m) and the section of the road between the centre of the city of Giurgiu, Romania and Giurgiu Customs – Ruse, including “Nicolae Balesescu” Street (L=291 m), „Vlad Tapes“ Street (L=955 m), „Bucuresti“ Blvd (L=915 m) and „Mihai Viatesi“ Blvd (L=250 m). The project will provide a convenient connection to the only bridge in the lower reaches of the Danube and better mobility and accessibility to strategic sites in Giurgiu and Ruse – border, trade zone, ports, etc.)

- Improving the accessibility of the national road network in both countries to Pan European transport corridor 9
- Improving the opportunities for tourism development in the Euroregion
- Improving the economic relations between the two municipalities – Ruse and Giurgiu.

One of the activities included in the project, is related to the development of a common system for collecting and processing of traffic information and delivery of LED – display panels, information and communication technology.

On 09.06.2014 Ruse Municipality announced an open call with subject „Delivery and installation of LED – display panels, information and communication technology (ICT) and software for joint system for collecting and processing of traffic information“ worth 738 416.20 leva without VAT. The bids were opened on 22.07.2014.

The current procurement assigns the development/production, delivery, installing, incl. installing supporting structures, building power supply, optical connection and commissioning of a common information system for collecting and processing traffic information, registration of passing vehicles and unforeseen events that occurred on the road infrastructure in order to reduce the critical points and busy sections on Pan European corridor 9 and the related routes, passing through the territories of the two municipalities Ruse and Giurgiu.

The developed system should process information from both sides of the border and it should be accumulated in a common database. It should allow exchange of information with external databases from different sources (police, emergency medical services, institutions which carry out repairs etc.). The collected data will facilitate the users (drivers, companies and institutions) of the Euroregion transport infrastructure, by providing real-time information on the traffic situation at the entry-exit points of transport corridor 9 and will be able to offer other transit options.

The collected traffic information will enable the municipalities Ruse and Giurgiu to analyze regularly the traffic in the area and to plan joint actions for its better organization. The system will be administered by transport experts in both municipalities and will allow planning of adequate future measures for the development of the transport infrastructure based on the needs of its users.

The scope of the procurement also includes the delivery of:

- Eight pcs widescreen LED-display panels
- Two pcs servers
- Two pcs server operating system and office suites – license
- 4 pcs personal computers
- 4 pcs computer operating systems – license
- 4 pcs office suites for PC – license

The system should also include 9 pcs „traffic reading“ systems, installed on the entry-exit points of the connecting roads in Euroregion Ruse-Giurgiu, as well as the necessary boards, cables and other components.

The deadline for implementation is 13.01.2015.

Among the main objectives of the municipality for the next programming period under Operational Programme „Regions in Growth“ 2014-2020 (the successor of the current OP „Regional Development“) are the implementation of „intelligent“ transport and mobility systems and the creation of integrated databases on city level in accordance with Directive 2010/40/EC of the European Parliament and of the Council of 7 July 2010 on the framework for the implementation of Intelligent Transport Systems in the field of road transport and for interfaces with the other modes of transport.

## **Pleven Municipality**

### **I. ITS in commission:**

The town has two technology-based systems:

***CCTV system for risk prevention:***

A peripheral network of high-tech digital cameras was built at four key intersections in the town. There are overview surveillance points, which are connected by wireless telecommunications with operations center. Thus opportunities were created for prevention and management of risks to public order and safety from a united center as in real time the operators can: monitor the compliance with the public order during public and special events; use data to facilitate the making of appropriate decisions; provide guidance to drivers and citizens to travel in adverse weather conditions (heavy rain, ice, snow). On one of the busiest intersections the system is equipped with terminals for recognizing license plates, which extends the functionality of the operations center - monitoring and collecting traffic data, vehicle tracking, shooting incidents and offenders of the traffic ordinance.

The system is implemented as an intelligent measure on project "Organization of the traffic to improve the physical environment in Pleven", funded by the Operational Program "Regional Development" 2007-2013, during the period 2011/2012. The operational monitoring center is located in Municipality Pleven (Municipal Administration) under the management of trained municipal employees. The newly established system is expected to assist: the timely response to situations that impede normal traffic, the improvement of the traffic control and decrease of the prerequisites for accidents in the most busy town areas.

***Electronic system of payment by SMS for short-term parking in the "blue zone" of Pleven:***

The system has three main features: self-charging per hour stay in the "blue zone", parking control and administration. The technological solution provides integrated communication environment between drivers, public parking operators (call-center, controllers and repatriation unit), the mobile operators' SMS-centers and between the payment systems of all operators. The software solution provides collection, processing data in real time, and fully automated reporting facilitating parking control and the management of information and financial flows. The payment shall be done from the drivers themselves by sending an SMS with predefined content to a single number without a code for all mobile operators. This payment method is fast, easy and intuitive tool to be used by multiple users of parking services (virtually anyone with a mobile phone). Moreover, an extension of time to use the parking by remote payment is possible without the need for drivers to come to parked cars.

The system was implemented in May 2013 with the financial support of Municipality Pleven and is based in a newly created Municipal Enterprise "Center for Urban Mobility". It is expected to facilitate the Center's activities related to the responsibilities for management of public car parks in the town and to help increase revenue from parking fees, improvement of the organization and control of parking in the blue zone, including through the application of coercive measures to discipline drivers such like imposing and collecting fines from offenders and repatriation of cars.

**II. Implementation of current and planned activities:**

Engineering activities for the introduction of two new systems are ongoing. Their implementation is carried out within project "Integrated urban transport Pleven", funded by Operational Program "Regional Development" 2007-2013 under scheme BG161PO001/1.5-03/2011: "Support for integrated urban transport in 5 major cities" (Varna, Plovdiv, Ruse, Stara Zagora and Pleven) as follows:

***Introduction of a System for management and control of the mass public transport (SMC-MPT):***

**Value with VAT under contract with Contractor: 1 090 668.00 BGN.**

**Time for execution: 11 months.**

The system is needed in order to improve the efficiency of public transport and to increase its preferred use as a reliable, easily accessible, faster, cost-effective and environment friendly mode of transport in the town than by car. The interventions are aimed at modernizing the public transport management in Pleven based on deployment and integration of advanced ITS technologies in the area of Global Positioning System (GPS), mobile communications, operational control of the transport process in real time, providing information to users and providing interoperability and connectivity with other systems contributing to improving the quality of the public transport services.

The materialization of this integrated approach on the implementation of a single, centralized system management and public transport control covers the following activities:

- **Development of an automated system for operational control and management of public transport vehicles**, including:
  - *Establishing a subsystem for locating and tracking vehicles in real time* by installing terminals for GPS positioning in 40 vehicles (57% of the fleet) - GPS receivers, radio / GPRS / Wi-Fi transmitters of data, on-board computers;
  - *Establishing a subsystem for informing passengers* about and during the traveling: light and voice notification in 40 vehicles; light notification on 65 key stops (40% of total number of stops); and SMS notification for the other stops of the town's public transport;
  - *Provision of communication medium* for data transfer based on standard TCP/IP protocols (using as wire net- ADSL, SHDSL, Fiber Optical, so wireless net - radio, wireless, WiMax, GPRS, 3G, 4G), communication links (interfaces) between vehicles, network operators, dispatchers, transport operators and other dispatch centers (EMCC, traffic police, fire department) and channels for exchanging data and differentiation of communications regarding vehicles, stops and traffic lights control (to give priority to the public transport).
  
- **Establishment of a Center for management and control** of the public transport (CMC). CMC will be created within the newly created Municipal Enterprise "Center for Urban Mobility" and the activities will be managed by the control center with the following features:
  - *Collection of data* in real time, maintaining an integrated centralized database and archive for the objects and activities of vehicles;
  - *Processing of data*: primary processing of operational data (in real time and place) for the movement and operation of the vehicles and displaying current information about the observed parameters on electronic screen on the digital map of the town of Pleven; preparing daily and monthly reports and consolidated reports on the implementation of the transport tasks; generating information reports, statements and tables related to the control of the transport process, preparation of analysis and planning of follow-up activities;
  - *Monitoring and operational control* of the means of mass public transport vehicles regarding routes, schedules and adherence to the timetable of movement in real time;
  - *Implementation of operational cooperation with other institutions* and organizations in the implementation of the transport tasks by organizational, functional and information interoperability with other information systems (traffic management, ticketing system, traffic police, EEN112);
  - *Provision and dissemination of relevant information* about the passengers during the traveling and through internet portal;

- *Maintenance of ITS assets*, software and communication tools, security and compatibility of data to guarantee the security and system performance as well as its openness to expand to other ITS applications and services.
- **Development of an interactive portal and software for realization of web based information system for citizens.** The portal will enhance the possibilities of regular users, citizens, and guests to get online information on the travel by public transport in the town, including the provision of the following services:
  - Providing graphic and text information about routes and schedules of individual public transport lines;
  - Notification of delays and traffic jams by integrating information about the location and vehicles' movement in real time;
  - Information on changes of routes and schedules because of special events, emergency repairs, road accidents;
  - Display of a route scheme, estimated time and possibilities to move by public transport from one point to another within the town;
  - Display by e-card of the sites for purchasing transport documents (tickets and cards);
  - Graphic display of access and ways of non-motorized transportation to stops and places of transfer;
  - Provision of opportunity for feedback for signaling errors, problems, and irregularities in the transport service;

***Introduction of Intelligent Traffic Management System:***

**Value with VAT under contract with a Contractor: 884 400 BGN.**

**Time for execution: 11 months.**

The system is necessary to significantly improve the management of traffic in the town by providing priority to the vehicles of the public transport and improve the traffic management infrastructure. ITS will provide an opportunity to change the cycles of 13 key traffic lights controlled junctions depending on the daily fluctuation in the volume of traffic or according to their business based on the reporting of traffic through these intersections in real time.

The interventions are aimed at the realization of centralized ITS structure as the main activities include:

- Establishing a network of detectors to record the intensity of the real-time traffic and microprocessor controllers for automated traffic lights control of the selected intersections;
- Implementation of adaptive traffic control separately at each intersection;
- Establishment of Center for Traffic Management (CTM) and its integration with the Centre for Management and Control (CMC) of the public transport by organizing communication environment for feedback in real time;
- Development of a web-based solution for processing and analyzing the data generated by the detectors and the provision of recorded information on the movement of public transport in real time. The software solution will enable effective management of operating modes of traffic lights in real time in order to give priority to the movement of the public transport.

The system's implementation will help to optimize the traffic in the city by managing the traffic jams, reducing the public transport delays and timely response in case of road accidents. The expected benefits of ITS are improved mobility, safety and limitation of the adverse impacts on the environment.

**III. ITS in stage of testing and commissioning:**

The public operator “Trolley Transport”, Pleven, is in a process of renewal of the trolley fleet with 40 new trolleybuses. The delivery and commissioning of the new vehicles will be implemented by the end of September 2014. The activities are performed under project “Implementation of measures to improve the quality of life in Burgas, Varna, Stara Zagora and Pleven”, Contract for Grant Assistance (CGA) DIR-51315001-C004. The project is funded by the Operational Programme “Environment 2007-2013” under procedure for direct grant award BG161PO005/13/1.50/01/35 “Measures to improve air quality by providing environmentally friendly vehicles for public transport”, Priority axis 1.

The new low-floor trolleys have a contemporary design and technical features to ensure high availability, safety and travel comfort, low noise in movement and increased energy efficiency at high average speed and the possibility of an alternative movement in a power cut through autonomous auxiliary ICE.

Besides these advantages, the new vehicles have an open in-vehicle platform for provision of ITS services, applications, and standard interfaces for connecting to external systems. The architecture of the platform unites these ITS technologies:

- GPS system for locating and tracking the vehicle in real time;
- Information system for light and voice alerts to passengers during the traveling;
- System of voice control of the doors for safe getting off and on the vehicle;
- CCTV of the travelers’ cabin and the traffic;
- Application for manual emergency notification and personal security.

For the period of this report 26 trolleys were delivered, there have been positive tests of the vehicles and ITS functionality of the on-board systems and as a result the new trolleys have been integrated in transport system of Pleven and are already in regular operation on the lines of town public transport.

#### **IV. ITS in stage of feasibility studies:**

In process of realization is a feasibility study on the possibility of introducing a system for electronic fare collection from the passengers in the public transport of Pleven.

The aim of this study is to explore and offer modern technology based solution that will contribute to the creation of a single financial model in the public transport of Pleven and to achieve effective and sustainable improvement in the transport services quality for the passenger in the following aspects:

- Implementation of unified transport document (contactless smartcard) and electronic single trip ticket issuing;
- Implementation of modern technologies for charging and collection of objective and comprehensive real-time information for transported passengers, types of trips, and revenues and control of travel, minimizing losses from incorrect passengers;
- Use of information for planning the tariff policy of the public transport to achieve a fair price for travel, flexibility and combinability with other electronic services and maximum economic efficiency while preserving the social functions of public transport;
- Achieve better administration, coordination and control of the processes for issuing transport documents, the realization of revenue and their equitable distribution among the various transport operators.

The feasibility study is underway and will be finished by October 1st 2014. The implementation of the action is the responsibility of the Association “Euroregion Pleven-Olt” Pleven under project 1187R4 (RITS-Net) “Network of regions for intelligent transport solutions.” The project is financed by the “Operational Program for interregional cooperation INTERREG IVC” 2007-2013.

#### **V. Determination of an action plan for the deployment of ITS technologies.**

The area of action involves setting goals and priorities for the use of ITS in the context of the opportunities that the technology offers to solve real transport problems and challenges. Defining

the strategic role of ITS is the basis for the development of ITS Vision and action planning for its implementation for sustainable innovation development in public transport in the municipality of Pleven supporting the initiated reorganization and rationalization of the municipal transport policy according to the adopted “Integrated Plan for Public Transportation of Pleven, 2012-2020 (IPPT Pleven, 2020)”.

Pleven, on par with other major cities, is facing serious **challenges** arising from the need to build appropriate infrastructure/transport network, diversification of the possibilities for free movement, use of modern technology, implementation of complex security measures and safety, improvement of the culture of road users, efficient management of processes in the public transport system, environment protection and providing favorable conditions for the life and activities of citizens and businesses.

IPPT Pleven 2020 is aimed at the implementation of harmonic management decisions and taking solidarity action at all levels through the development and implementation of mechanisms for shared responsibility and actions for complex improvement of the main characteristics of transport and the environment, with **priority to the general urban public transport**.

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

***GENERAL PURPOSE: To improve municipal policies and practices in the field of public transport and traffic to achieve socially acceptable, cost-effective and sustainable management model that provides balanced territorial integrity and full connectivity with the European transport system***

***SPECIFIC OBJECTIVE: Development of modern and smart, highly competitive urban public transport, ensuring environment health and providing better quality of service, high level of awareness, mobility and accessibility, adequate to the needs of citizens and businesses.***

The integrated plan for public transport Pleven, 2012-2020, was the first ever strategic document which defines “Leading role of the intelligent transport systems” (Priority 4) and sets the first and urgent technological measures that are currently being implemented.

Although the purpose of this plan (as a separate document at a lower hierarchical level) is to achieve the objectives of the Municipal Development Plan 2007-2013, “Consult-DNM” finds it important to emphasize the need for the implementation of strategic sequence of the ITS actions to find continuity in the development and deepening of the strategic development complex of documents of Municipality Pleven for the new programming period 2014-2020.

In this regard, the objectives of the integrated plan for public transport can be transposed as a declaration of strategic vision for the deployment of ITS.

#### **VI. Results of the study status of ITS technology in Municipality Pleven:**

- The implemented systems are few, partially deployed or focused to solve specific problems of traffic and parking in the town and there is no organizational and operational integration among them;
- First integrated actions for the use of modern technology (road telematics and information communication technologies - Intelligent Transport Systems/ITS) in support of local policies for sustainable public transport safe transport networks and sustainable green urban environment have been taken with the realization of two key projects for the community in Pleven - project “Integrated Urban Transport of Pleven” (OP “Regional Development”) and the “Implementation of measures to improve the quality of life in Burgas, Varna, Stara Zagora and Pleven” (OP “Environment”):
  - ITS deployment is tactically justified as implementation of innovative measures (components 1 and 6) of project “Integrated Public Transport of Pleven”. The need of their introduction is based on a detailed analysis of the demand for public

transport and the use of well-calibrated model to predict the traffic and the problems of the mobility in Pleven. The developed transport model is based on the feasibility study, the rationale and selection of technical options for modernizing the public transport, reorganizing its management and streamlining the traffic management within this project. The engineering of the above ITS provides construction, subject to open common for Europe standards for interoperability that allows future upgrade with the missing ITS applications, implementation of new systems and the development of ITS services;

- Project “Integrated Public Transport of Pleven” necessitate subsequent maintenance of an efficient and sustainable public transport system, and planning and implementation of measures (component 12 “Program for Sustainable Development and implementation of innovative solutions”) to develop a comprehensive strategy for future development including:

- ✓ Developing a strategic framework for long-term planning and forecasting of the public transport;
- ✓ Creating a single financial model of public transport;
- ✓ Development of a unified policy and management model of transport and infrastructure;
- ✓ Preparation of Master Plan for traffic organization;
- ✓ Developing a strategy and plan for organization and control of parking;
- ✓ Acquisition of ITS assets (embedded ITS applications and systems) is also realized through the delivery of new trolleybuses under the above-mentioned second project. On one hand, this approach clearly highlights the benefits of combining the physical and technological renovation of public fleet to enhance the competitiveness of the public transport. On the other hand, it demonstrates effective combination of investments for the full public transport integration in the developing intelligent transport system of the town. Third, it sets strategic direction for the public transport development based entirely on electric vehicles (trolleybuses - along the lines of the existing and expanding contact network, and electric buses – along the other lines currently served by ICE buses).

- The RITS-Net study in this section shows that there is a substantial reserve for full absorption of ITS potential - the majority of studied ITS tools do not exist or the basic ITS infrastructure/network is underdeveloped for their deployment. The intentions to change this status quo regarding planning of response actions are limited by the lack of integrated and comprehensive vision for full use of ITS.

### **Stara Zagora Municipality**

Currently Stara Zagora Municipality is executing a project entitled “Modernization and development of sustainable urban transport in the city of Stara Zagora” under Operational Program “Regional Development”. One of the primary project activities is the implementation of an information system (telematics). The proposal is for partial implementation of telematics as part of an integrated Intelligent Transport System (ITS). The system will include installation of electronic notice boards displaying real time information on all stations of Urban Transport Stara Zagora (119 in total). The following functions are proposed:

- Exchange of real time information between the system’s control centers and the central database;
- Enabling of two-way communication between the vehicles and the control centers;



- Supply of electric power to “smart bus stops” in the most convenient way in view of the specific location of the individual bus stop ;
- Training of the municipality officials in charge and of the passenger carriers in the use and management of the information system.

The proposed system must include the following:

- Passenger information on the operations of Mass Urban Transport (MUT) which should include at the minimum arrival and departure times, as well as delays;
- Real-time updating of the arrival/departure information made available to the passengers at all stations on the urban transport system.

**More precisely its functions should include the following:**

- Exchange of real time information between the system’s control centers and the central database.
- Enabling of two-way communication between the vehicles and the control centers.
- Providing information to passengers on the timetables and operations of Mass Urban Transport.

The system needs to provide the option / be compatible with and open to expansion of its functions at a later stage through the addition of the following Applications:

- Option enabling the transmission of travel and traffic information using text messages sent to mobile devices (SMS).
- Information on urban transport provided by a client service center/website.
- Information on the nature and causes of delays, if any are to occur.
- Information on the passengers carried, broken down by destination, line and hour, as well as the option to present this information in reports and analyses.
- City TV or radio information channel operated by Mass Urban Transport.
- Wireless Internet access available in all vehicles that are part of the fleet operated by Mass Urban Transport.

The technical support for the system should include the possibility to upgrade the system products, to solve functional defects (viruses), to receive messages from the system users, etc.

### **Execution Stage**

Presently a contractor is to be chosen in compliance with the Public Procurement Act.

### **Technical Specification**

The general architecture of the proposed system must be part of the integrated Intelligent Transport System (ITS) for urban transport and traffic management in line with the current international practices. It must incorporate at the minimum the following management cores:

- Central management system: a fundamental element of ITS designed to monitor the connections between the individual elements. It includes all necessary technical and information subsystems;
- Center for bus station and vehicle management – it performs the management and control of buses and trolleybuses conducting real time observation of the operations. It enables: (a) direct two-way communication with each individual vehicle or group of vehicles selected by the operator based at the center, and (b) direct two-way data transfer in real time (online) from the vehicle (speed, information and computer sensors, as well as other factors considered important by the system operators);
- Monitoring center: a center where supervisors will be able to support, for instance, the Planning and Control Department (of the passenger carriers) by observing the

outcomes of the exploitation of the transport network, preparing reports, gathering statistical information, etc.

In terms of elements and characteristics, the system architecture must include as follows:

- Databases;
- Passenger information systems;
- Automatic vehicle location systems;
- Transmission channels allowing access to and use of the services;
- Security systems (computer security);
- Open architecture allowing the incorporation of additional systems (upgrading).

The equipment of the vehicle telematic terminal must be connected to the Automatic Fare Collection Systems (AFC) with the purpose of providing two-way data transfer, as AFC is to be implemented at a later stage.

The central and auxiliary system units must be capable of supporting at least 50 % more vehicles and bus stops than the ones in use as of the project date, in case more vehicles and/or bus stops are added to the network and become operational in the future.

**Table of deliverable elements and activities**

<b>Description</b>	<b>Number</b>
Onboard receivers – vehicles processor	90
Hardware package	1
Software package	1
Center: - office area - security systems - anti-theft systems - fire safety - power generator and others.	1
Telematics Installation: - at bus stops - MUT vehicles	119 90
Staff training	6
Display - 5 rows	30
Display - 3 rows	50
Display - 1 row	39

**Onboard computers** for vehicle application – connected to the main onboard system for detection of the accessible parameters of the motor vehicle

- GPS systems, GPS module connected to onboard computer;
- Wireless communication systems (two-way data transfer), wireless module connected to onboard computer;
- System providing the driver of the vehicle with access to the onboard computer (keyboard/display)
- Transfer of diagnostic data about the motor vehicle;

Option to activate the following functions:

- Video surveillance control inside and outside the vehicle;
- Wi-Fi for the passengers' mobile devices that can be used to transmit and receive traffic information and/or access the Internet.

**Visualization system** for passenger information at the urban transport **bus stops/stations**

- Wired and wireless communication systems (two-way data transfer)

- System for vehicle identification at bus stop
- Traffic information, timetables for other destinations of Mass Urban Transport, Railroad Transport and other types of public transport.

#### **Information system at the command center**

- Visualization (general / of a selected item / of an individual line)
- Visualization of problems on the city road network
- Visualization provided by surveillance cameras
- Wired and wireless communication (two-way data transfer) for connection with the onboard vehicle computers
- Database for event registration (expandable event structure) – starting list of events coordinated with the Principal;
- Archive database
- Mechanical project of the visualization system
- Interminable power supply to the server, communication modules and main displays – UPS power supply, autonomic power generators.

Additionally, a traffic light control system has been in use in Stara Zagora Municipality since 2007. It was introduced as a pilot project and is used to manage 18 traffic light systems. A GPRS modem enables communication with a server based at Stara Zagora Municipality whence the condition of the traffic light systems is monitored. Their mode of operation is monitored and the systems are checked for faults. The timers of the system controllers are synchronized to enable and manage the so-called “Green Wave” along Sveti Patriarh Evtimiy Blvd. The system was started as a pilot project with a view to possible upgrading and development which never took place. Presently the system remains operational, but it is outdated and new solutions will be sought that could provide a better picture, more accurate information and more functions for this type of system.

### **Priority Area III: ITS road safety and security applications**

#### **Project of Ministry of Interior**

##### **“eCall”**

The Ministry of Interior (MoI) participates, in accordance with the provisions of *Directive 2010/40/EU of the European parliament and of the Council of 7 July 2010 on the framework for the deployment of intelligent transport systems in the field of road transport and for interfaces with other modes of transport*, in priority area III. ITS road safety and security applications, priority action “d” – providing the necessary equipment in the emergency calls centers receiving the data transmitted by the vehicles for harmonized provision for an interoperable EU-wide eCall;

Bulgaria (with 6 other Member States) is chosen to participate in a pilot project for the extension of the HeERO project – HeERO 2. The project should be implemented in the time framework 1 January 2013 – 31 December 2015. The total value of the pilot project is 731 207.50 Euro, 50 % of them co-financing by Bulgaria.

A consortium of organizations is established for the implementation of the project. MoI is participating via Directorate National System 112 and the other participants are:

- Bulgarian Association Intelligent Transport Systems (BAITS) – pilot leader for Bulgaria;
- Mtel – mobile operator (up to this moment the eCall flag is implemented by the mobile operators Mtel and Vivacom, until the end of 2014 it will be introduced also in Globul);

- Producers of on-board devices – Technical University Sofia and ICOM Company;
- Enterprise Communication Group and MoI – Upgrade of the architecture of the Center in Sofia for acceptance of eCall calls.

Public procurement is carried out in 2013 and the equipment is delivered and installed for the upgrade of the eCall 112 Center in Sofia that will provide the service eCall.

In the end of April 2014 the second phase of implementation of the pilot project - integration of the eCall service software for case management using the flag eCall implemented by Mtel has been completed. Tests have been performed in a test environment within the Center of the National System 112.

- Successful tests were carried out on the interoperability of 112 eCall Center Sofia with Belgium, Croatia and Romania as well as tests in a vehicle equipped with on-board eCall device (IVS) with the Romanian side.
- A training for VIP operators of the National System 112 – Sofia at the training center of the National System 112 - Sofia has been organized for accepting of eCall test calls. Training materials for accepting and processing of eCall were elaborated;
- A motor vehicle of Center 112 – Sofia is equipped with produced in Bulgaria and within the Pilot project on-board device (IVS) for installation in retro cars. Performance of tests is forthcoming;
- As of January 1, 2015 the Center 112 – Sofia will be upgraded for acceptance of eCall, as specified in Commission Delegated Regulation № 305/2013 (EU).