

REPUBLIC OF CROATIA

MINISTRY OF MARITIME AFFAIRS, TRANSPORT AND INFRASTRUCTURE

NATIONAL PROGRAMME

**FOR THE DEVELOPMENT AND DEPLOYMENT OF INTELLIGENT TRANSPORT
SYSTEMS IN ROAD TRANSPORT FOR THE 2014-2018 PERIOD**

INITIAL REPORT FOR EUROPEAN COMMISSION

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Abstract

This report is made according to article 17. item 1. Directive 2010/40/EU (hereinafter referred to as: „initial report”). Initial report gives insight into present state of national activities and ITS projects.

Initial report contains Introduction in which the goals of this project are described and which gives content overview of the document. The following describes the current state of development of ITS in Croatia through general overview of national activities and projects. Lack of systematic deployment of ITS in Republic of Croatia in previous period results in the absence of the unique database of previous projects and other activities. So this review is made only at limited information and at the level of general conclusions. For that reason the majority of numerical data is missing. This deficiency will be corrected in the coming period. For better understanding of the current state, appropriate SWOT analysis was made, shown in fourth part of this initial report.

1. Introduction

The basic objective of this document is to show the present state of development of intelligent transport systems (ITS) in Croatia. In second chapter the present state of ITS development in Croatia is described through general overview of national activities and some individual projects. The particular attention is given for legal framework, Croatian economic interests, research and development (R&D) activities and standardisation activities. The third chapter shows the overview of key stakeholders in area of ITS development and deployment in Croatia with descriptions of their activities, and attached contact information of associated web addresses. For the need of understanding the current state appropriate SWOT analysis was made, shown in fourth chapter of this initial report. In final fifth chapter are given some concluding remarks.

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2. ITS Development In The Republic Of Croatia

In 1980s and 1990s, the field of road telematics was well established. In late 1990s, a group of scientists from the field of transport sciences recognised the importance of ITS and established a Research centre at the Faculty of Transport and Traffic Sciences as an ITS precursor of the ITS Department at the Faculty, and initiated a series of expert scientific projects in this field. As a consequence of growing interest for ITS, in year 2005. an expert association called ITS Croatia was established, and accreditation was given to a special academic study: Intelligent Transport Systems and Logistics. In recent years, as a result of these activities, the Republic of Croatia has participated in some European research and development projects.

In recent period, motorway construction programme was especially significant for the development and implementation of ITS in the Republic of Croatia. Croatian motorways are among the most modern and safest in Europe, as a result of applied ITS technologies, especially in traffic management and tunnel incident management systems. These systems acquired several awards, including the one from EuroTAP. The motorways are equipped with up-to-date information and communication systems for exchange information in the form data, speech and image. Centres for traffic maintenance and control have systems for central traffic management consisting of several sub-systems: traffic control centre, traffic control workstation, road weather information system, video surveillance sub-system, etc. In case of tunnels on a surveyed section, the following sub-systems are added: sub-system for remote operation and control of power facilities, ventilation operation sub-system, as well as control and management of other systems built in the tunnel. However, one must recognize a certain lack of systematic approach at the state level (lack of legislative framework, lack of appropriate guidelines, failure to use appropriate cost/benefit analysis and other „tools“) causing reduced system interoperability (Electronic Toll Collection), increased maintenance costs (surveillance), poor coordination on the entire road network in Croatia and coordination towards neighbouring countries (the absence of a national centre for traffic management), lack of intermodal solutions , etc. Unfortunately, the situation is much worse on level of state and other roads, as well as on urban traffic.

There were significant changes in ITS development after the accession of the Republic of Croatia to the European Union, as a result of mandatory harmonization of Croatian legislation with that of the EU. Introduction of ITS in the Roads Act and especially the foundation of the National Council for development and implementation of ITS in the Republic of Croatia established for the first time the real "infrastructural organisational basis" for efficient development of all ITS aspects. Recognition of interests of Croatian economy, particularly of corresponding industries, is certainly of special importance. ITS development fits very well into a recently popular syntagm of "reindustrialization of Croatia". The domain of ITS offers a possibility of involvement of Croatian industry providing products and services of high added value.

2.1. Legal framework

As of 1 July 2013, the Republic of Croatia became a member of the European Union. During the process of negotiation for the accession, the Republic of Croatia harmonised its legislation with that of the European Union and started with deployment of corresponding systems. The most significant step in the field of ITS legislation was made in the new version of the Act on the Amendments to the Roads Act, which was adopted by Croatian Parliament on its session on 19 April 2013. This refers primarily to implementation of the Directive 2010/40/EU of the European Parliament and Council from 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 accordance with Article 72.b of the same Act, the Government of the Republic of Croatia, at the proposal of the Ministry of Maritime Affairs, Transport and Infrastructure on 2nd. of July 2014. brought the National Programme for the development and deployment of ITS in road traffic on priority areas for 2014.-2018. time period, for planning of activities and projects and determining measures for implementation of the programme. Holder of activities for preparation and drafting of National programme was newly established National Council for the development and deployment of ITS in the Republic of Croatia.

2.2. Croatian economic interests

The latest breakthroughs in building and modernisation of motorways and other segments of transport infrastructure put the Republic of Croatia at the top position in the region in terms of traffic management systems on high-speed and other roads, safety systems and protection on roads and road structures (especially tunnels), etc. Modern ICT technologies implemented on all Croatian motorways and some more important high-speed roads (Rijeka and Split region) enable further progress towards integration of road infrastructure as a significant step in development of harmonised traffic management in the country, region and wider. Given that the implemented technology is to a large extent a product of domestic industry, ones of the effects of building and modernisation of motorways and other transport infrastructure is a respectable increase of small and medium enterprises in terms of road telematics equipment, through the following: research and development, design, production, installation, and maintenance of telematics systems of different functionalities. Certain Croatian companies have specialised in delivery of fully integrated technological solutions for advanced traffic management on motorways, in tunnels and in cities. Numerous projects were successfully completed in Croatia, but also in more than 30 countries in the region and worldwide (Austria, Russia, Ukraine, USA, etc.).

Special attention should be brought to the fact that such approach to implementation of ITS technologies has had very positive effects on current and future development of Croatian tourism, as one of the most successful segments of Croatian economy. Specifically, all up-to-date impact analyses of motorway development (including corresponding ITS infrastructure) in the Republic of Croatia indicate that it can be perceived as a direct investment in the economic sector of tourism, through an increased level of traffic services and safety.

In close future, it is necessary to develop a concept of a public-private partnership through joint, co-operative activities of public and private sectors in development and implementation of different systems, as well as in provision of various services in the field of Intelligent transport systems. The result of a public private partnership in this area should be a faster, more economical and more effective application of ITS and its services in the Republic of Croatia. In doing so, it is especially important to establish a system of traffic data management (primarily real-time data), in order to enable particular providers of traffic and transport information exchange services the development of their services and applications in this area.

2.3. Research and development activities

The most significant part of research activities in the last period was financed within the programme of the Ministry of Science, Education and Sports - MSES (former Ministry of Science and Technology - MST). Some of those projects are:

- General ITS models and their modal mapping (MST, 1998-2002)
- Methods of development of integrated Intelligent transport systems (MST, 2002-2005)
- Methodology for development of integrated adaptive transportation logistics systems (MSES, 2006-2013)

In recent years, as a result of previous research activities, the Republic of Croatia has been participating in several European R&D programmes, projects and activities. Some of those projects are:

- Intelligent Cooperative Sensing for Improved traffic efficiency – ICSI (FP7 - Framework Programme 7; 2012-2015)
- Intelligent Transport Systems in South East Europe - SEE-ITS (South East Europe Transnational Cooperation Programme - SEE TCP; 2012-2014)
- Computer Vision Innovations for Safe Traffic - VISTA (European Regional Development Fund, IPA- ERDF; 2012-2014)
- TU1102 Towards Autonomic Road Transport Support Systems, (COST Programme actions, 2011-2015)

Although the present situation of research and educational capacities is satisfactory, the biggest problem is insufficient connection of research capacities and economy. This elementary problem in the Republic of Croatia is being solved through several programmes on institutional and the project basis. The Croatian Agency for SMEs and Investment - HAMAG-BICRO - was established by the Government with the purpose of implementation of the Government's technological development support programmes. Its basic task is successful and effective support to technological development and commercialization of research results by connecting the economy with science and by creation of financial, material and other preconditions for successful innovation development. HAMAG-BICRO has recognised the importance and the role of Intelligent transport systems through repeatedly support to such projects.

2.4. Standardisation activities

In the Republic of Croatia, the Croatian Standards Institute Technical Committee - HZN/TO 524 (Road transport and transport telematics) is responsible for standardisation in the field of road telematics, information, communication and control in urban and rural road transport, and for setting standards in the field of Intelligent transport systems. The Committee was established on 17 May 2001 and functions under the auspices of the Croatian Standards Institute. It also monitors the activities of the International Committee ISO TC 204 (Intelligent transport systems) and the European Committee CEN/TC 278 (Intelligent transport systems). Work of the Committee includes especially intermodal and multimodal aspects, passenger information, traffic management, public transport, commercial transport, emergency services and commercial services in the field of transport information and control systems. So far, the Committee has adopted a large number of documents from this area of standardisation, which provide basic information for the road sector and economy from this area.

3. Key stakeholders in development and deployment of ITS in the Republic of Croatia

The Ministry of Maritime Affairs, Transport and Infrastructure (www.mppi.hr)

The Ministry of Maritime Affairs, Transport and Infrastructure performs, among other things, administrative, expert and other activities which refer to:

- organizing preparation of strategic infrastructure projects and investment programmes for all aspects of transport of particular importance for the Republic of Croatia, and preparing proposals for the Government of the Republic of Croatia for their approval and implementation,
- organizing appropriate large infrastructure investment projects in construction of transport infrastructure facilities and devices, except their reconstruction and maintenance, as well as other corresponding large infrastructure projects important for sustainable development of the Republic of Croatia, which are fully or mostly financed from state budget funds, and coordinating activities of other entities in construction of such facilities, as well as monitoring and controlling those investments,
- performing expertise in connection with starting, coordinating and monitoring of activities through specific acts and legislation regulating the overall development of transport.

Ministry of Regional Development and EU Funds (www.mrrfeu.hr)

The Ministry of Regional Development and EU Funds performs, among other things, administrative and other activities which refer to:

- planning and implementing regional development policy and establishing comprehensive system of planning, programming, managing and financing of regional development,
- coordination and management of all interdepartmental working groups concerning regional development and coordination of all activities related to adjustment with the European Union in the area of regional policies and management of structural instruments,
- preparation of strategic documents regulating national development goals and priorities for use of instruments from EU funds, as well as monitoring the implementation of measures and activities established by such strategic documents; coordination of activities concerning management of EU programmes in the Republic of Croatia, and cooperation with institutions and bodies of the European Union and Member States.

The Ministry of Science, Education and Sports (www.mzos.hr)

The Ministry performs, among other things, administrative and other activities which refer to: development of scientific and technological activities; development of scientific and other legal persons; development of science and application of scientific accomplishments in particular areas; harmonisation of financing programmes and research activity projects; industrial and intellectual property; planning and adjustment of technological development in the Republic of Croatia; keeping a registry of scientists and scientific organisations; monitoring, recording and achieving scientific, technical and technological cooperation with foreign countries and international organizations in accordance with international agreements; sending Croatian experts abroad and including foreign experts in the Republic of Croatia; performance of activities regarding scholarship grants, specialisation and practical training of domestic and foreign experts based on international, transnational, business and other agreements, and administrative supervision of scientific organisations.

Ministry of the Interior (www.mup.hr)

Among other things, the Ministry of the Interior performs activities which refer to the following:

- security and protection of persons, facilities and areas,
- road traffic safety activities,
- state border control,
- driver's licences issuing and motor vehicle registration,
- fire protection supervision activities.

Ministry of Construction and Physical Planning (www.mgipu.hr)

The Ministry of Construction and Physical Planning is, among other things, competent for the issuing of technical regulations applied to road structures. The Ministry is also competent for the issuing of location, construction and operating permits for particular road structures.

Ministry of Entrepreneurship and Crafts (www.minpo.hr)

Among other things, the Ministry of Entrepreneurship and Crafts performs activities promoting the use of innovations and new technologies.

National Protection and Rescue Directorate (www.duzs.hr)

The National Protection and Rescue Directorate is an independent, professional and administrative organisation in the Republic of Croatia which prepares, plans and manages the activities of the operational forces and coordinates the activities of all participants of protection and rescue operations. The primary goals of the National Protection and Rescue Directorate are, among other things, the following:

- integration of the protection and rescue systems,
- unification of the preparation, planning, procedures, equipment and training,
- uniform coordination of the activities of the protection and rescue systems,
- effectiveness and rationalisation of the use of resources,
- shortening the reaction time,
- efficient control of preparedness.

County roads administrations

According to the Roads Act, county roads administrations are institutions charged with the management, building, reconstruction and maintenance of the county and local roads.

ITS Croatia (www.its-croatia.hr)

The scientific and professional association of ITS Croatia has been established with the aim of promoting and achieving harmonized development of Intelligent transport systems. By joining ITS Croatia, individuals, companies, institutions and other interested parties will be able to act more efficiently in promoting ITS solutions through the realization of synergy at the national and international levels. The association has the following objectives:

- stimulation and promotion of cooperation among members in the development of the national architecture of Intelligent transport systems,
- enhancing the efficiency and safety of the transport and traffic systems,
- support to harmonized development of Intelligent transport systems in the Republic of Croatia,
- formation of public scientific and professional opinion about Intelligent transport systems,
- influence on the development and progress of environmental protection,
- cooperation with ITS associations in Europe and around the world.

Croatian Agency for Small Business, Innovations and Investments - HAMAG-BICRO (www.hamaginvest.hr)

Activities of the Croatian Agency for Small Business, Innovations and Investments - HAMAG-BICRO include the following:

- management of activities the Agency has been entrusted with by state administration bodies concerning technology transfer and the stimulation of research, development and innovation in the private and public sectors,
- management of support programmes and the provision of support for research, development and innovation in the private and public sectors,
- provision of incentives for the establishment and financing of the construction, equipment and the covering of operating expenses of different legal entities which form the technological infrastructure for technology transfer and/or support to small and medium-sized trading companies with the potential of fast growth (for example, risk capital, conditional loans, interest-free loans),
- establishing cooperation with international and foreign financial institutions for the stimulation of technological entrepreneurship,
- participation in international research and development cooperation programmes.

Croatian Association of Toll Motorways Concessionaires – HUKA (www.huka.hr)

The Croatian Association of Toll Motorways Concessionaires – HUKA has been established for the purpose of protection and promotion of interests of its members - companies managing motorways based on the concessions granted to them for the construction and management and maintenance of motorways or concessions including only the management and maintenance of motorways in the Republic of Croatia. The Association finances its activities from the annual member fees. HUKA works on the improvement of cooperation among its members through experience exchange, knowledge sharing and discussion on issues which are encountered by its members individually, but which can be solved more easily by joint action. The Association cooperates with domestic and

international associations and organisations dealing with the issues concerning concession motorways. HUKA members manage the motorway and semi-motorway network in the overall length of 1,250.7 km.

Motorway concessionaires in the Republic of Croatia

The existing motorway concessionaires in the Republic of Croatia are the following: Hrvatske autoceste d.o.o. – HAC, Autocesta Rijeka-Zagreb d.d. - ARZ, Autocesta Zagreb-Macelj d.o.o. – AZM and Bina-Istra d.d. At this moment, the concessionaires Hrvatske autoceste d.o.o. – HAC and Autocesta Rijeka-Zagreb d.o.o. – ARZ are in the middle of an intense restructuring process, which in a way represents the current aggravating circumstance for more dynamic implementation of new ITS services.

Hrvatske ceste d.o.o. (www.hrvatske-ceste.hr)

Hrvatske ceste d.o.o. is a limited liability company managing, building and maintaining the system of state roads. The company is registered for the performance of the following activities:

- building state roads, including the acquisition of land and facilities, project design and appraisal, award of works, building control and supervision, organisation of technical inspection and state road delivery and acceptance,
- maintenance of state roads, including maintenance planning and protection measures, award of regular and emergency maintenance works, professional supervision and control of works,
- patrol and other state road management activities, including system informatisation, informing the public on the current traffic flow, deciding on the use of road land, management of public roads databank,
- organising the financing and financing state road construction, property transactions, leasing out properties.

City of Zagreb, City of Split, City of Rijeka and City of Osijek

Local self-government units in the RoC are expected to intensify, in the near future, their activities regarding the introduction of advanced ITS solutions for the purpose of increasing the safety and flow of the urban transport system. Intensified cooperation with respectable domestic and international ITS institutions and companies is suggested accordingly. Based on the evaluation of the received ITS projects as potentially the most distinguished are cities Zagreb and Zadar.

The Croatian Standards Institute (www.hzn.hr)

Croatian Standards Institute is an independent and non-profit public institution established as the national standardisation body of the Republic of Croatia. Basic activities of the Croatian Standards Institute are:

- preparation, adoption, regulation and publication of Croatian standards,
- promotion of use of Croatian standards,
- establishment and coordination of advisory and technical bodies,
- support to technical legislation implementation,
- information on national, European and international standards,
- informative WTO/TBT headquarters and Codex Alimentarius contact point,
- establishment, development and maintenance of Croatian technical terminology,

- education in the field of standardisation and related activities.

The Faculty of Transport and Traffic Sciences at the University of Zagreb (www.fpz.hr)

The Faculty of Transport and Traffic Sciences at the University of Zagreb is a higher education institution in the field of technical sciences, traffic and transport technology. Courses are held at undergraduate, diploma and postgraduate level. For performing the faculty activities, there are three courses of study: Traffic, Intelligent Transport Systems and Logistics, and Aeronautics, which incorporate classes in corresponding programmes. Department for Intelligent transport systems is a scientific curricular research and development organizational unit of the Faculty of Transport and Traffic Sciences, which creates, transfers and applies knowledge in the field of Intelligent transport systems and corresponding technologies.

The Croatian Chamber of Engineers of the Transport Technology (www.hkitpt.hr)

The Croatian Chamber of Engineers of the Transport Technology is an autonomous and independent professional organisation with legal person status and public authorities, with mandatory membership for traffic and transport engineers performing professional activities in the fields of road transport, railway transport, maritime transport, inland waterway transport, air transport, postal telecommunications transport, pipeline transport, Intelligent transport systems and logistics.

The Croatian Automobile Association (www.hak.hr)

The Croatian Automobile Association is a national association of drivers and vehicle owners and automobile associations. The mission of the Croatian Automobile Association as a single national association is protection of interests and fulfilment of requirements of its members and all service users, drivers in general, but also all participants in the road traffic. Some of strategic goals of the Croatian Automobile Association are:

- care for safety of all participants in the road traffic,
- informing the public about traffic conditions and mobility guarantee,
- development of business activities,
- development of international relations in the field of activity.

Associations of Croatian Road Hauliers

Associations of Croatian Road Hauliers are interest-based and professional economic associations which:

- improve and promote transport activities,
- encourage professional trainings of their members,
- protect interests of their members in economic, political and state bodies responsible for transport activities,
- inform their members about important matters from the scope of their activity
- provide assistance in solving different professional problems related to transport activities,
- make connections with similar international associations in Europe and worldwide.

4. SWOT analysis

Taking into consideration current situation of ITS development in the European Union and the Republic of Croatia, SWOT analysis was performed, and its results presented in Table 1.

Table 1. SWOT analysis

Strengths	Weaknesses
<ul style="list-style-type: none"> - the Republic of Croatia has the ability to develop new ITS applications and services, - transport telematics industry in the Republic of Croatia has good experience in technology and equipment development, - leading road infrastructure operators have very good experience in this area, - there is a high level of education in the field of ITS. 	<ul style="list-style-type: none"> - in the previous period there were no clearly defined politics and strategies in ITS development and deployment, - insufficient coordination of different bodies in charge of transport, - ITS development has been aimed at fragmentary low level applications, which resulted in the lack of effective integration between the systems, - the existing approach resulted in high equipment maintenance costs, - the former approach to design of these systems did not take ITS features into consideration, - small number of domestic research and development projects, especially the ones stimulated by the economy and infrastructure owners.
Opportunities	Threats
<ul style="list-style-type: none"> - Croatia lies on very important South-East Europe traffic corridors, - reduction of traffic jams and delays, improvement of traffic flows through integration of traffic management and passenger information exchange systems, - domestic ITS scientists and experts have better understanding of local traffic problems, limitations and behaviours, - possibility of providing advanced ITS services for incident management on motorways, - ITS has potential for improvement of road safety through better utilization of different technologies of legislation implementation (detecting of offences), - ITS has significant potential for roads safety improvement (especially significant for improving the country image from the tourist aspect, since tourism is one of the most significant economic sectors), - ITS provides solutions for small towns on the Adriatic coast with pronounced traffic problems during the tourist season, - ITS as an export industry. 	<ul style="list-style-type: none"> - financial crisis and problems of domestic economy and industry, - restructuring of the largest motorway concession holders (monetization project), where all consequences for the development and the deployment of ITS cannot be predicted, - ministries, government agencies and concession holders are interested only in goals of their own organisations, and not in interagency coordination and resource distribution, - the existing Public Procurement Act is not suitable for ITS projects because it is based more on technological specifications than on functional requirements, - ITS develops quickly in Europe, and Croatia has difficulties in adjusting to technological changes.

5. Conclusion

Intelligent Transport Systems have entered very early into consideration in Croatia, primarily in scientific and high-school field. The development of the Croatian motorway program at the beginning of the new millennium initiated very intensive implementation of specific applications and services. The lack of a systematic approach at the national level in the implementation of projects has caused reduced interoperability of systems, increased maintenance costs, poor coordination on the entire road network of Croatia and coordination with neighbouring countries, etc. With Croatian accession to the European Union certain preconditions were met for future systematic approach primarily through the improvement of the legislative framework, the adoption of planning guidelines for implementation, etc. Although the current state of R&D capacity and high school programmes are satisfactory, the biggest problem is represented by still their insufficient connection with the economy. Step forward has been made with the establishment of the National Council for the development and deployment of ITS in Croatia, as holder of the future activities of the systematic development and deployment in the Republic of Croatia.