

## European tendencies and co-operation in the field of ITS systems - national achievements and challenges in Hungary

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### Abstract

The article presents the role of intelligent transport systems/services related to the implementation of the essential European and Hungarian transport policy objectives. The 'ITS Directive' will provide a framework for the tasks/works to be performed in the forthcoming years within the priority areas of ITS. The European Commission published regulations / specifications for the priority actions in the form of delegated acts defining the tasks/responsibilities of Member States. Regional/European co-operation for Hungary started after the EU-accession of the country. Hungary was an active partner within the European CONNECT and EasyWay projects, currently Hungary is a member of the CROCODILE consortium.

**Key words:** National Transport Policy, ITS Directive, ITS strategy, specifications/regulations, regional/European co-operation

### 1 Introduction

Due to the increasing international characteristics of transport/traffic key words like interoperability, cross-border seamless ITS services, Pan-European services, the convergence of systems and services is becoming more and more important in Europe. The convergence of the currently operating and later implemented system/service forms is one of the most important preconditions of a comprehensive, new European ITS 'market'.

The European development of the forthcoming years in the scope of ITS is going to be determined by two strategic documents, the '*ITS Action Plan*' of the European Commission and the '*ITS Directive*' approved by the European Parliament and the Council of Europe.

There has been a great need on European level to change attitude because the traditional way of approach – building new infrastructure – cannot provide the expected results within the required time frame due to the magnitude of challenges.

Innovative solutions will be necessary to achieve the required fast development because of the urgent need to solve the problems.

## 2 The objectives of European Transport Policy for 2050

The common European goal is to create a more competitive and fully integrated transport network that connects different modes of transport and makes thorough changes in the fields of both passenger transport and freight transport.

The European Commission outlined an ambitious plan in March 2011 approving the new European ‘White Paper’ ‘*Transport Policy for 2050*’ document [1].

*It is essential for Europe to build up competitive transport systems to stay standing against other parts of the world and to grow economically to create new jobs and to improve the quality of living of its citizens.*

A comprehensive strategy emerged with this document in order to build up a *competitive European transport system* that enhances mobility, significantly reduces emission of transport and helps to achieve road transport with nearly zero fatality and eliminates barriers in key priority areas.

Implementation of intelligent transport systems / services can significantly contribute to achieve objectives therefore this strategic document aims to create the TEN-T basic network by 2030 which is multimodal, provides excellent quality information services and cooperates with urban and other road operators.

Continuing the objectives of the ‘White Paper’ of 2001 *in the field of road safety* [2] (whereby the number of fatalities on the road must be halved between 2001 and 2011) the number of fatalities on the road must be halved by 2020 and ‘zero vision’ must be aimed by 2050.

The objective on the field of pollutant emission by road transport is to reduce it by 60% by the middle of the century (eliminate cars run by conventional fuel from urban areas, 40% less use of fuel containing carbon-dioxide in aviation; redirection of mid-range interurban passenger and freight transport to railway and waterways).

## 3 National transport policy – National Transport Infrastructure Development Strategy

Industrial production and export have significant roles in Hungary’s economy therefore one of the conditions of economical growth is to improve the condition of transport network and the level of services. Transport contributes to the GDP of Hungary with 6.2% employing 260,000 people and indirectly influencing the living conditions of all the ten million inhabitants. According to the Industrial Policy Communication of EU2020 the competitiveness of industry is heavily relied on the quality and effectiveness of transport infrastructure network [3].

The preparation of national transport operational programmes within the 2014-2020 budget/planning period of the European Commission has been launched.

For dynamic use of free resources available from 2014 there is a need of operational programmes approved by the *Government and the EU Commission*; the condition of approval from the EU Commission’s side is the existence of a *comprehensive sector strategy / national transport plan* creating a base for operational programmes but also going beyond operational issues.

The '*National Transport Infrastructure Development Plan*' was completed in 2014.

The *key objective* is to create transport which is efficient from economical aspect, competitive, meets social needs, modern, safe, and means less environmental load. The key areas of the strategy are as follows [4]:

- It should be achieved that the transport system serves economic growth by permanent improvement of efficiency.
- Areas of improvement of transport serving economic growth both in mid- and long-term the best should be defined.
- Development policy supporting alignment should be implemented; equal opportunities and balanced basic services should be provided.
- The development of transport system should be implemented in the framework of a sustainability-oriented strategy both in economical and technological aspects; the indebtedness of public service operators should be stopped, national wealth should be saved.
- Environmental load and energy dependency of transport should be reduced.
- The number of fatalities of road crashes should be significantly reduced.
- The level of transport services should be improved by application of modern and cost-efficient IT tools.
- Interconnected and cooperative travelling and freight chains should be established.

Among *the tools to achieve these objectives* there is a high-level, predictable, safe and punctual service provision based on up-to-date technology; safe and effective use of existing transport networks and network elements and also development and preservation of them and implementation of high level expertise and *state-of-the-art technology*.

#### **4 The 'vision' of future intelligent transport systems – strategy of intelligent transport systems / services**

The intelligent transport systems / services significantly contribute to the implementation of basic objectives of transport policy.

The desired future state of road transport system and the harmonised applications of future are presented by the comprehensive '*ITS vision*' as follows:

'The sustainable transport system makes it possible for the stakeholders of European passenger and freight traffic to travel safely (no accidents), effectively (no delay) and cleanly (environmental friendly). The end users are always and everywhere supported by harmonised and seamless ITS services at all stages of travel (pre-trip, on-trip).'

The elements of the '*ITS vision*' described above are the vision of '*well-informed traveller*', (travel information services), the vision of '*well-operated road network*' (traffic management systems), and the visions of '*effective and safe freight transport*' and '*connected high quality infocommunications infrastructure*'.

The way to achieve the '*ITS vision*' is served by the *ITS strategy*, that has to contain those priority deployment areas which fit both to European tendencies and national requirements – considering the concept of road network development, the trend of traffic development, the basic objectives of transport policy and the needs of road users (drivers and other travellers).

In the field of application of intelligent transport systems and services in *national road transport* – connecting to other transport sub-sectors and modes of transport – there is the opportunity to ‘*break out*’ and it is *clearly supported* by the followings:

- Current European tendencies, the new European Transport Policy, the ‘White Paper’ [1]; the ‘*ITS Action Plan*’ of the EU Commission 2009 [5] and the ‘*ITS Directive*’ of the EU Commission 2010 [6] for faster dissemination of ITS systems – supporting the implementation of general transport policy objectives;
- Available grants of the EU Commission since 2014 in the field of intelligent transport systems and services, mainly by contribution to the regional ITS projects in the ‘temporary’ 2013-2015 period following the closure of EasyWay project; and by new ITS projects launched in the 2014-2020 period (within the framework of CEF projects allowing higher financial assistance);
- Increasing interest of private service providers besides governmental intention and the needs of network operators and road users towards a more extensive application of intelligent transport systems and services.

The planned ‘*ITS strategy*’ in Hungary should also reflect on the possibility of breaking out – fitting to the comprehensive document on ‘*National Transport Infrastructure Development Strategy*’. The comprehensive ‘*ITS strategy*’ has to have interfaces with other transport sub-sectors and also has to contain technological and non-technological tasks.

## 5 Tasks regarding the ITS Directive

### 5.1 The significance of Directive 2010/40/EU

The most important objective 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* (that is ‘ITS Directive’) is the acceleration of development and application of intelligent transport systems and services in the field of road transport (and also with respect of connecting road transport with other transport modes) [6].

This directive is creating a framework to support the cross-border, harmonised, and single use and construction of intelligent transport systems (ITS) and to define general conditions necessary for this purpose.

The directive should be applied for all ITS applications and services in the field of road transport and also for all interfaces of them without violating national security issues, defence interests or considerations necessary from the aspect of defence interests.

In article 2 and 3 of the ITS Directive the *priority areas and actions* connecting to the application of intelligent transport systems are defined. The Directive also decides on elaboration of regulations on actions regarding priority areas and on necessary standards if required.

Detailed information on application area of priority areas can be found in Annex I of the Directive 2010/40/EU. According to article 2 of Directive 2010/40/EU there are *four priority*

*areas* and according to article 3 of Directive 2010/40/EU there are *six priority actions* which can be summarised as follows [6,7]:

- I. Optimal use of road, traffic and travel data,
  - a. the provision of EU-wide multimodal travel information services;
  - b. the provision of EU-wide real-time traffic information services;
  - c. data and procedures for the provision, where possible, of road safety related minimum universal traffic information free of charge to users;
- II. Continuity of traffic and freight management ITS services,
- III. ITS road safety and security applications,
  - d. the harmonised provision for an interoperable EU-wide eCall;
  - e. the provision of information services for safe and secure parking places for trucks and commercial vehicles;
  - f. the provision of reservation services for safe and secure parking places for trucks and commercial vehicles;
- IV. Linking the vehicle with the transport infrastructure.

## 5.2 Rules and regulations relevant to the priority actions of the ITS Directive

Intelligent transport systems / services will be given a framework by the 'ITS Directive' in the next few years. The appearance of *rules / regulations* has significant importance as it will be compulsory for all member states to apply them in case they are intended to implement an ITS system / service considered relevant to the priority area given.

The most important provisions of the ITS Directive for *rules and regulations* are the followings:

According to article 4 the regulation is: a legally binding measure defining provisions including requirements, procedures, and other relevant rules.

Article 6 (1) calls the Commission to approve necessary standards and specifications regarding priority actions and with respect to development and application of ITS systems and services to ensure compatibility, interoperability and continuity.

According to article 6 (4) depending on the area covered by the specification the regulation should include one or more of the following types of provisions:

- a) *functional provisions* that describe the roles of the various stakeholders and the information flow between them;
- b) *technical provisions* that provide for the technical means to fulfil the functional provisions;
- c) *organisational provisions* that describe the procedural obligations of the various stakeholders;
- d) *service provisions* that describe the various levels of services and their content for ITS applications and services.

Prior to the approval of regulations the EU Commission performs an impact assessment including *cost-benefit* analysis.

Under article 7 (1) the EU Commission may adopt *delegated acts* for standards and specifications.

Delegated acts which have been completed and published are the followings:

Delegated regulation of the EU Commission 305/2013/EU priority action (d):

*Commission Delegated Regulation (EU) No 305/2013 of 26 November 2012 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the harmonised provision for an interoperable EU-wide eCall* was published 3 April 2013 in the Official Journal of the European Union (priority area III; *priority action d.*)) [8]. The regulation entered into force on the 20<sup>th</sup> day following that of its publication in the Official Journal of the European Union that is 23<sup>rd</sup> April 2013. It should apply to infrastructures deployed from the date of entry into force of this Regulation (that is 23<sup>rd</sup> April 2013). It should apply from 23<sup>rd</sup> April 2014 to infrastructures already deployed at the date of entry into force of this Regulation.

Delegated regulation of the EU Commission 885/2013/EU priority action (e):

*Commission Delegated Regulation (EU) No 885/2013 of 15 May 2013 supplementing ITS Directive 2010/40/EU of the European Parliament and of the Council with regard to the provision of information services for safe and secure parking places for trucks and commercial vehicles* was published 18 September 2013 in the Official Journal of the European Union (priority area III; *priority action e.*)) [9]. The regulation entered into force on the 20<sup>th</sup> day following that of its publication in the Official Journal of the European Union that is 8<sup>th</sup> October 2013. It should apply from 1 October 2015 to the provision of services already deployed from the date of entry into force of this Regulation. It should apply from 1 October 2013 to the provision of services to be deployed after the date of entry into force of this Regulation.

Delegated regulation of the EU Commission 886/2013/EU priority action (c):

*Commission Delegated Regulation (EU) No 886/2013 of 15 May 2013 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to data and procedures for the provision, where possible, of road safety-related minimum universal traffic information free of charge to users* was published 18 September 2013 in the Official Journal of the European Union (priority area I; *priority action c.*)) [9]. The regulation entered into force on the 20<sup>th</sup> day following that of its publication in the Official Journal of the European Union that is 8<sup>th</sup> October 2013. It should apply from 1 October 2013. With regard to the information service already deployed on the date of entry into force of this Regulation it should apply from 1 October 2015.

Delegated regulation of the EU Commission 962/2015/EU priority action (b):

*Commission Delegated Regulation (EU) 2015/962 of 18 December 2014 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the provision of EU-wide real-time traffic information services* was published 23 June 2015 in the Official Journal of the European Union (priority area I; *priority action b.*)) [9]. The regulation

entered into force on the 20<sup>th</sup> day following that of its publication in the Official Journal of the European Union that is 13 July 2015. This Regulation should be applied from 13 July 2017.

### **5.3 Fulfillment of obligations included in ‘ITS Directive’**

In accordance with reporting obligations specified by the ‘ITS Directive’ Directive 2010/40/EU of the EU Commission Hungary reported on national ITS actions of the next five-year-period in the ‘*National ITS report*’ 27 August 2012. According to the report the following projects are planned:

*Priority area I:* Optimal use of road, traffic and travel data – travel information systems (TIS):

- Establishing a transport database with data portal to set up travel/transport information services.
- Installation of travel time determines and display systems – M0 motorway and the motorway sections leading to Budapest (continue earlier developments, develop a system based on cooperation of operators and data source users in the area of Budapest).

*Priority area II:* Continuity of traffic and freight management services – traffic management services (TMS):

- Implementation of comprehensive traffic management/preparation of traffic management plan as regards to the whole motorway network (including cross-border traffic management solutions linked to urban traffic management) in order to operate motorways safely and efficiently.
- Establishing an open and harmonised database of public transport (urban areas, alongside main routes of the public network) in order to establish high quality passenger information services.

*Priority area III:* ITS road safety and security applications:

priority action d): The harmonised provision for an interoperable EU-wide eCall:

- National implementation of eCall.

priority action e): The provision of information services for safe and secure parking places for trucks and commercial vehicles:

- Full establishment of the parking management system of M1 motorway, creating pilot reservation systems.

The most important task of the next years are to build up systems / services in accordance with the delegated regulations published with respect to the priority areas of the ITS Directive.

## **6 European co-operation in the field of application and development of intelligent transport systems / services**

For Hungary – as an EU Member State – has had significant importance of the European co-finance since 2004. Developments within the European projects (CONNECT, EasyWay, CROCODILE) briefly introduced later are outstanding because they are the first ever developments that are comprehensive, widespread, and connected to a comprehensive strategy (earlier there were only isolated solutions in the framework of developments that were not compatible and they were implemented at different periods). Contributing in the projects meant implementations of such national developments – truly necessary on the road/motorway network – that made it possible to implement *interoperable services in European context*, providing achievement of higher service level on the road network [7].

It was an essential aspect that European co-operation made it possible for Hungarian experts to be informed on successful European best practice/implementation.

### Regional cooperation – CONNECT project

One of the key objectives of the European Union was to integrate the trans-European transport networks (TEN-T) providing equal technical and service level and appropriate capacity.

Between 2005 and 2009 the Euro-regional CONNECT project (Coordination and stimulation of innovative ITS activities in Central and eastern European Countries) provided a framework for national developments. The participants of the project were the new EU member states of Central and Eastern Europe (Poland, Czech Republic, Slovakia, and Hungary) and also Austria, Germany, Italy and road authorities, motorway operators and system service providers of these countries. Studies, feasibility studies were elaborated, pilot-projects and actual implementations were completed in the framework of CONNECT project [7,12,13].

High priority activities – completed projects:

- installation of traffic monitoring at the critical sections of the motorway network;
- installation of traffic control and information system on the motorway network;
- migration / development of traffic control centres;
- development of cooperation between motorway traffic control centre and Budapest traffic control centre (building up DATEX data exchange);
- installation of traffic / travelling information systems, installation of RDS-TMC, installation of multimodal information systems;
- initial cooperation with Austrian and Slovakian partners in the field of cross-border traffic management;
- a comprehensive ITS strategy for road transport was implemented as a horizontal activity and the establishment of national ITS ‘system configuration plan’ was launched.

### Broadening European cooperation – EasyWay projects

As the theme of intelligent transport systems remained a high priority for the EU Commission after the closure of Euro-regional projects the *EasyWay projects* between 2007-2012 (*Phase I: 2007-2009; Phase II: 2009-2012*) provided a platform for 27 European Member States to



cooperate in the field of *implementation of ITS services representing added values* in the TERN network [7,12,13].

In the *two phases of EasyWay project* national project partners continued their work started within CONNECT project and the following works were completed in the phases of the project:

*Completed high priority works in EasyWay Phase I:*

- the pilot project of 'data portal' was completed as a basis for future services;
- the basis of Budapest multimodal information system was established;
- the installation of traffic control and information systems of the motorway network (priority M0 motorway) was continued;
- the cooperation between the city and motorway traffic control centres was further developed;
- cross-border traffic management was continued (M1 motorway);
- parking information system for truck drivers was completed.

*Completed high priority works in EasyWay Phase II:*

- further installation of traffic control and information systems in the critical sections of the motorway network, and at its Budapest urban sections (by extension of measuring system, further installation of traffic control and information systems);
- continuing cooperation between Budapest and motorway traffic control centres;
- further installation of travelling information systems;
- continuing installation of freight transport information services, management of dangerous / overweight / oversize goods;
- further development of 'data portal' of public road data;
- involving a new partner (Hungarian Transport Administration – KKK) to develop a comprehensive, integrated public road data administration (KIRA).

European corridor projects – CROCODILE

Continuing the common European work had high priority therefore the planned CROCODILE project provided a framework for national ITS developments until the end of 2015. The EU Commission released its open call 11 December 2013 with *ITS systems / services* as one of the key priority areas. The member states of CONNECT region prepared an ITS project with the title of '*CROCODILE – Cooperation of Road Operators for COnsistent and Dynamic Information Levels*'.

Partners from Austria, Bulgaria, Czech Republic, Greece, Croatia, Poland, Hungary, Germany, Italy, Romania, Slovakia and Slovenia work together in the framework of the project in order to accomplish common objectives and to improve cross-border traffic flow. The beneficiary in Hungary is the Ministry of National Development and the implementers of the project are the Hungarian Road Management Company and Budapest Road Management Company.

In the focus of ITS activities of the CROCODILE project there are European dimension, interoperable services provided to road users / travellers in accordance with the ITS Directive – such as priority action c) for *road safety related minimum universal traffic information*; and priority action e) for *information services of safe and secure parking places for trucks*.

*The particular projects at particular priority actions were the followings:*

Cross-border coordination activities, cooperation agreements:

- review of completed traffic management plans, preparation of new plans working together with neighbouring countries.

Data collection, data process regarding priority areas c) and e) of the ITS Directive

- further development of existing data collection and data process infrastructure.
- development of data collection and monitoring network to transmit road safety related traffic information on the city road sections concerned by TEN-T corridors.

Data availability:

- establish a national DATEX II 'node'
- dynamic database of traffic steering and establish real-time database;
- establish the conditions of an open, standard data communication and provide data availability;

Provision of information services:

- provision of traffic information services, developing existing information channels (mobile side, -applications);
- extension of M1 parking control system;
- implementation of internet-based traffic information service.

## **7 Current tasks in the field of national implementation of intelligent transport systems / services**

Member states participating in the CROCODILE project – seeing the success and efficiency of the project – decided to continue the project therefore in spring 2015 they submitted a project proposal with the name CROCODILE 2 to the EU Commission which approved that.

The CROCODILE 2 provides cooperation between ministries, road administrations, and system providers of traffic information services as a logical continuation of the CROCODILE project. The project partners are going to work together from Austria, Cyprus, Czech Republic, Germany, Greece, Italy, Poland, Romania, Slovenia to improve cross-border traffic / transport, implementing harmonised and coordinated ITS applications on the main road networks of member states. *Hungary*, such as Bulgaria, Slovakia and Croatia participates *as an observer*. One of the key priority themes in CROCODILE 2 project is to establish National Access Points.

It is necessary to find other European financial resources in the future apart from TEN-T resources therefore the task of next years should be the optimised use of available EU sources (TEN-T and others) for the national implementation of '*ITS Action Plan*' [5] and the '*ITS Directive*' [6] considering the transport policy objectives of the '*National Transport Infrastructure Development Strategy*' [4].

There is a new opportunity for finance which is the CEF (Connecting Europe Facility) that released its first call in the second half of 2014 and the second on 5 November 2015 (deadline to submit project proposals is 16 February 2016). In the latter call there is the opportunity for so-called cohesion countries (Hungary belongs there) to implement their necessary projects in the field of ITS systems / services with higher rate of financial support.

The cohesion call of CEF promises 85% co-finance for the implementation of ITS projects and it would be essential to use this outstanding occasion continuing the ongoing and already completed work in the field of implementation of ITS systems / services.

## 8 Conclusion

The implementation of intelligent transport systems / services effectively contributes in European scale to the planned establishment by 2030 of a multimodal TEN-T core network also providing high quality information services and co-operating with other road operators and urban road network operators.

When solving problems of the present it is also essential to see far in the future because Europe has to give a common, coherent answer to the challenges we face. The common European objective of transport is to establish a more competitive and fully integrated transport network connecting different transport modes and making it possible to generate significant changes in the fields of passenger and freight transport.

Hungary needs further European / regional co-operation in the field of intelligent transport systems / services to fulfil the obligations under the ITS Directive. The co-finance of the EU Commission – mainly besides the higher support rate provided for the so-called cohesion countries including Hungary – still has a key role in making the motorway network truly effective, safe and operating it in an environmental friendly way.

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