

Current Status of ITS Deployment in Greece

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Abstract—ITS is a powerful vehicle for gaining not only traffic and transport benefits, as for example less congestion and lower travel times, but also economic growth. Greece currently faces a strong financial crisis, and ITS can play a decisive role in adopting advanced technologies that can provide the anticipated transport gains with a more rational use of funding opportunities. This paper provides an overview of the ITS implementation and deployment in Greece, demonstrating its strengths and weaknesses, but also prospects.

Index Terms—Deployment status, intelligent transport systems, its directive.

I. INTRODUCTION

The term Intelligent Transport Systems (ITS) is used to define the applications of Information and Communication Technologies (ICT) in the field of transport, aiming to create real-time information and data flow, to enable a more “intelligent” utilization of transport infrastructures and vehicles and to enhance the management of traffic and mobility [1].

The present paper provides an overview of the current (2012) status of Intelligent Transportation Systems (ITS) implementation and deployment in Greece. The contents are based on desk research using official EU and national sources.

The paper follows the four Priority Areas of the ITS Directive 2010/40/EU [2], having thus a clear orientation towards road transport and its interfaces with other transport modes.

The paper includes also information about the status of ITS development in Greece, such as the main actors involved in ITS development, deployment and operations, the major obstacles towards ITS implementation, funding schemes, key strengths, and a short outline of the legislative framework.

II. NATIONAL AND EUROPEAN FUNDING SCHEMES USED IN THE AREA OF ITS IN GREECE

The main European funding mechanisms for ITS development in Greece are (or have been) the following:

- The 3rd Community Support Framework and, particularly for the ITS development, the Operational Program “Information Society”. The ITS implementation lies, specifically, upon measures 2.8 (“Intelligent Transport”) and 2.4 (“Regional Geographic Information Systems and Innovative Actions”) of the Information Society Program (2000-2006).
- The Cohesion Funds. The part-financed projects related to environment and trans-European transport infrastructures were funded under the INTERREGIII Community Initiative (2000-2006), which has been replaced by the South East Europe Program that covers 13 transnational cooperation programs (2007-2013).
- The National Strategic Reference Framework (NSRF) that constitutes the reference document for the programming of European Union Funds at national level (2007–2013).
- The 7th Framework Programme of the European Commission (2007-2013).
- The European Economic Area (EEA) Grants (2009-2014).
- The ICT Policy Support Programme (ICT PSP) of The Competitiveness and Innovation framework Programme (CIP) (2007-2013).
- The Intelligent Energy Europe programme (IEE) (2007-2013).

An important boost for the ITS development has been given through the integration of ITS projects into the Trans-European Transport Networks (TEN-T). The European Commission has established specific rules for the financial support for the implementation of TEN-T guidelines [3]. The TEN-T projects are financially supported by national government, European Community Funds (Cohesion Funds, TEN-T budget, European Regional Development Fund ERDF), loans from international financial institutions (i.e. the European Investment Bank) and private funding.

In the context of supporting the European transport corridors during the 2014-2020 horizon, the Commission adopted a plan which will fund €50 billion worth of investment to improve, inter alia, Europe's transport, networks. The Connecting Europe Facility (CEF) [4] is one of the key initiatives proposed by the Commission that will finance projects, which fill the missing links in Europe's energy, transport and digital backbone and remove bottlenecks. The Horizon 2020 (“EU Framework

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Programme for Research and Innovation”) is another financial instrument of the European Commission for the period 2014 to 2020 [5], [6]. Further to the abovementioned, Public Private Partnership (PPP) initiatives have offered new funding opportunities for major ITS related projects in Greece.

III. IMPLEMENTATION STATUS

A. Strengths and Weaknesses of the Greek ITS Environment

There are several factors that drive the ITS policy making and implementation in Greece. The geographical position and morphology, the current transport network (a relative sparse road and railway network, more than 140 passenger and freight ports, 45 airports), but also the deep economic recession that the country faces over the last years, create a rather complex context that influences ITS deployment. Greece has already implemented a number of large ITS projects, mainly in the field of road transport and in large cities (Athens and Thessaloniki). Greece’s main strengths regarding the ITS deployment lie upon its scientific human potential, its scientific experience and know-how coming from ITS related European projects (e.g. Intelligent Urban Mobility Management System of Thessaloniki, EASYTRIP, VIAJEO, SEE-ITS, COMPASS4D), but also from private initiatives that bestir themselves in the ITS research and development, as well as the active involvement of representatives of Greek ITS related bodies in European ITS organizations (i.e. ERTICO, ITS Nationals).

Nonetheless, the current ITS deployment in Greece is generally hindered by:

- restrictions on the financing;
- high investment costs that are demanded in combination with the uncertainty when the depreciation timeframe and the return on investment are concerned;
- existing weaknesses in the public administration structures;
- long time period from tendering to implementation;
- lack of a structured policy and national ITS priority framework that causes a fragmented and geographically limited ITS deployment.

Greece presents a number of large ITS projects that mainly focus on the major urban areas of Athens and Thessaloniki or major motorways, while a lack of such projects in other urban and rural areas is observed.

Therefore, as also highlighted in the ITS Action Plan for Intelligent Transport in Greece [7], the specific issues that need to be addressed for the deployment of ITS at national level include the following aspects:

- The need to support rural ITS deployment, since the majority of existing ITS applications and projects are concentrated on the two large urban agglomerations of Athens and Thessaloniki.
- The need to promote interoperability and coordination among implemented ITS systems.
- The promotion of the cooperation between public (central and regional authorities) and private bodies and

clearly define roles and responsibilities among the involved players.

- The improvement of the administrative structures and personnel in order to raise bureaucratic obstacles.
- The provision of incentives to the private sector aiming at investing more on ITS innovation.
- The better cooperation between the research community and the private initiatives.

B. Legislative Framework for the ITS Deployment in Greece

Greece has adopted the ITS Directive 2010/40/EU [2] into national law by the Presidential Decree PD50/2012 [8]. This Presidential Decree foresees the issuance of Ministerial Decrees or Common Ministerial Decrees, when necessary, for the approval of the ITS specifications that are going to be issued by the European Commission. Other Greek laws that refer to previous EC ITS directives are (Ministry of Development, ITS Action Plan for Intelligent Transport in Greece, 2012):

-PD 39/2001, referring to the EC Directive 98/34/EC, for the “Establishment of an information process in the field of technical standards and specifications and rules regarding Information Society services”.

-Law 2472/1997 (GG A’ 50), addressing the EC Directive 95/46, for the processing of personal data in the frame of the operation of the ITS applications and services.

-Law 3471/2006 (GG A’ 133), addressing the EC Directive 2002/58, for the protection of personal data in the field of electronic communications.

-Law 3917/2011 (GG A’ 22), addressing the EC Directive 2006/24, for the retention of data generated or processed in connection with the provision of publicly available electronic communications or public communication networks, use of surveillance systems with the audio or video recording in public places.

-Laws 3448/2006 (GG A’ 57) and 3613/2007 (article 11), addressing the EC Directive 2003/98, regarding the rules for the processing and use of data related to the road transport network and the road traffic.

-Law 3882/2010 (GG A’ 166), addressing the EC Directive 2007/2, for the creation of infrastructure for spatial data for the completion of the access to travel information.

-PD 177/2007 (GG A’ 216), addressing the EC Directive 2004/52, for the interoperability of toll systems.

An important Ministerial decision in Greece taken in 2005 is related to the availability of the data (both historical and real time) that are currently measured, processed and stored by the Athens Traffic Management Centre (ATMC). As per the decision GG 1252/B’/06-09-2005 “Traffic data provision from the Ministry of Environment, Physical Planning and Public Works to third parties”, ATMC data can be provided upon request and payment to any interested party. These data sets concern, at a primary level, the traffic flows, the average speed and the occupancy for 576 measurement locations of the Attica agglomeration road network and at a secondary level, traffic conditions and travel times at specific road segments of Attica. The data can be

provided via an XML protocol. Despite the aforementioned legislative actions, it is a general remark that Greece stands in a rather early stage of adopting a national regulatory framework for the deployment of ITS. This can be explained by the fact that the EC only recently (2010) set an ITS legislative framework that should be adopted by all member states in due time. Nonetheless, the rapid growth of the ITS technology, along with the role of the ITS in enabling a more intelligent use of infrastructures and vehicles and in enhancing the management of traffic and mobility, necessitates the creation of a robust legislative framework that will support an effective and holistic deployment of ITS in Greece.

C. Stakeholders Involved in the Development of ITS in Greece

The most important stakeholders involved in the ITS development in Greece are listed below:

- Relevant ministries, namely the Ministry of Development, Competitiveness, Infrastructure, Transport and Communications, the Ministry of Finance, the Ministry of Public Order and Citizen Protection and the Ministry of Mercantile Marine.

- ITS Hellas, the Hellenic Intelligent Transport Systems Association, which is a non-profit organization with members from the public sector (ministries, agencies, etc.), the private sector (companies, industries, services, media, etc.) and research organizations (research institutes, universities, etc.) dealing with the wider development, implementation, evaluation and promotion of Intelligent Transport Systems in Greece.

- Academia, namely universities and research institutes.

- Public Transport operators and organizations, such as the Athens Urban Transport Organization, the Urban Rail Transports SA and the Organization of Urban Transportation of Thessaloniki.

- Private operators and managers of highways.

- Regional and local governmental authorities.

- Federations of motorists.

- ITS related private companies and technology providers.

IV. PRIORITY AREA I: OPTIMAL USE OF ROAD, TRAFFIC AND TRAVEL DATA

The Priority Area is related to ITS applications, services or databases that provide real time and historical information to both travellers and transport and traffic operators, in order for them to:

- Optimize their route planning.

- Be informed on the public transport modes (itineraries, location of stops, estimated time of arrival, real time travel information).

- Be informed on road traffic conditions, such as traffic congestion, travel times and speeds.

- Be informed on the status and the operational conditions of the roads, i.e. road works, reports of congestions and incidents, status of tunnel lanes, etc.

- Obtain historical data that will allow the optimal design of the transport system.

This area includes, for example, various Traffic Management and Monitoring Centres, Information Portals and (multimodal) route planners and various databases that store and process traffic data, historical data on the roads’ operational characteristics, etc. The next two tables provide an overview of the most important finalized and on-going ITS activities in Priority Area I.

TABLE I. SUMMARY OF FINALIZED ACTIVITIES – PRIORITY AREA I

no.	Project - Action	Other relevant Priority Areas
1	MOBINET – Mobility Centre of the Kalamaria Municipality (Thessaloniki, Greece) and development of electronic services for travellers’ information through the Internet and through the Mobility Centre	II
2	H.I.T. PORTAL - An Online Portal for Integrated Transportation Data Management and Processing	
3	Telematics services of the Organization of Urban Transportation of Thessaloniki (OASTH)	II
4	Thessaloniki’s Ring Road Traveller Information System	II, III
5	Intelligent Urban Mobility Management System of Thessaloniki	II
6	Urban KTEL S.A.: Integrated Telematics System of Dynamic Passenger Information and Automatic Ticketing for Urban Bus Services	II
7	Consolidated combined transport system of Attica Region (Routing Portal)	II
8	e-Trikala ITS system	II
9	“Myroute” Portal	
10	“Geodata” Portal	
11	Athens Dynamic Traffic Map for multimodal travel information services	
12	Train-Taxi combined ticketing service	
13	Taxibeat taxi reservation smartphone application	II
14	“Parking Defenders” smartphone application for parking	II

TABLE II. SUMMARY OF ONGOING ACTIVITIES – PRIORITY AREA I

no.	Project - Action	Other relevant Priority Areas
1	Creation of an integrated Intelligent Transport System with telematics passenger information services in the island of Naxos	II
2	Integrated Information System for passengers on the municipal transport and for drivers on available parking places - Municipalities of Vironas, Ilioupolis and Pefki (Athens)	II
3	GEOPortal of Egnatia Motorway	
4	Park-n-Ride: An integrated system for driver’s information on available parking spaces and for passengers’ multichannel information.	II
5	Intelligent parking and transport services in the Municipality of Kropia	II
6	Integrated information system for Public Transport passengers multichannel information in the islands of Rhodes and Kos, the cities of Kalamata and Xanthi and the Municipality of Kordelio-Evosmos (city of Thessaloniki)	II

7	An integrated drivers' information system for free parking spaces within Municipality of Kalamaria (Thessaloniki)	
8	Digital Traffic Information Services in metropolitan Municipalities of the island of Crete	II
9	Park-n-Ride: An integrated system for driver's information on available parking spaces and for passengers' multichannel information in the Municipality of Corinth	II
10	EasyTrip: multimodal route planning application and advanced traveler information services for smartphones	II

V. PRIORITY AREA II: CONTINUITY OF TRAFFIC AND FREIGHT MANAGEMENT ITS SERVICES

Priority Area II refers to the dynamic traffic and transport management in passenger and freight transport services. Applications and projects under this Priority Area deal with: the operation of the Traffic Management and Monitoring Centres (also mentioned in Priority Area I); the use of telematics for traffic management in highways; the use of satellite positioning and mobile communication technologies for public fleet management; priority for public transport modes at intersections; single fare collection systems; intelligent lane control; en route information on the location and condition of transported goods. The next two tables provide an overview of the most important finalized and ongoing ITS activities in Priority Area II.

TABLE III. SUMMARY OF FINALIZED ACTIVITIES – PRIORITY AREA II

no.	Project - Action	Other relevant Priority Areas
1	Athens Traffic Management Centre (ATMC)	I, III
2	ITS services in Egnatia National Motorway	I, III
3	Intelligent Traffic Management System in the Prefecture of Chalkidiki (Greece)	I
4	Egnatia Motorway Observatory	I
5	Integrated Management Information System for Container Terminal in the Port of Thessaloniki (Greece)	
6	Telenavis NavFleet, Web Nav Fleet, Dispatcher and Traffic Information Services	I

TABLE IV. SUMMARY OF ONGOING ACTIVITIES – PRIORITY AREA II

no.	Project - Action	Other relevant Priority Areas
1	Study, Financing, Development, Operational Support, Maintenance and Technical Management of an Integrated Fleet Management and Passenger Information System for the Road Urban Public Transport of Athens	I
2	A Unified Automatic Fare Collection System for the Athens Urban Transport Organization	I
3	System for the electronic control of the parking places availability and the automatic information of the drivers in the Municipality of Megara	I

4	Integrated platform for traffic management and monitoring aiming at informing citizens about traffic conditions through multiple communication channels in the cities of Ioannina and Kavala	I
5	Intelligent Transport Systems and parking services in the Municipality of Vrilissia (Athens)	I, III

VI. PRIORITY AREA III: ITS ROAD SAFETY AND SECURITY APPLICATIONS

This priority area is related to ITS-based road safety and security applications that provided services and information, which could help drivers avoid an accident or mitigate the consequences of an accident. The next two tables provide an overview of the most important finalized and ongoing ITS activities in Priority Area III.

TABLE V. SUMMARY OF FINALIZED ACTIVITIES – PRIORITY AREA III

no.	Project - Action	Other relevant Priority Areas
1	ITS services and systems of Attica Tollway	I, II, IV

TABLE VI. SUMMARY OF ONGOING ACTIVITIES – PRIORITY AREA III

no.	Project - Action	Other relevant Priority Areas
1	Geographical Information System of the North Aegean Region	I
2	Innovative drivers' information system for emergency road incidents and free parking places in the Municipality of Nestos	I
3	Harmonized e-Call European Pilot	
4	An Integrated Multichannel System for the Management and Monitoring of the Conditions in the Road Networks of the Municipalities of Lamia, Domokos, Makrakomi and Stilida	I, II

VII. PRIORITY AREA IV: LINKING THE VEHICLE WITH THE TRANSPORT INFRASTRUCTURE

This area includes ITS applications that stimulate the interoperability/interconnection between the vehicle and the road infrastructure. The next two tables provide an overview of the most important finalized and ongoing ITS activities in Priority Area IV.

TABLE VII. SUMMARY OF FINALIZED ACTIVITIES – PRIORITY AREA IV

no.	Project - Action	Other relevant Priority Areas
1	Priority of Athens tramway to road intersections	II

TABLE VIII. SUMMARY OF ONGOING ACTIVITIES – PRIORITY AREA IV

no.	Project - Action	Other relevant Priority Areas
1	Cooperative mobility systems pilot in Thessaloniki (COMPASS4D)	III, I, V, VI

VIII. CONCLUSIONS

Greece has already implemented ITS applications to a satisfactory degree, mainly in the large urban areas of Athens and Thessaloniki. The integration of many regional ITS projects in funding mechanisms indicates that there is a large potential for deploying ITS applications at a wider regional level, by exploiting various funding opportunities. Therefore, one issue that remains crucial for Greece is to explore and report these opportunities, but at the same time to formulate a national strategic plan for the wider promotion of ITS deployment in the country, which currently does not exist. It is also crucial that such a strategic plan combines legislative interventions and the monitoring of the compliance to the legislation [7], as well as the development and adoption of existing standards for interoperability of the ITS systems and mechanisms for the durability of such systems [9].

It is also evident that emphasis has been placed on the Priority Areas I and II. Although, scientific expertise exists also on the areas of safety, security, V2V and V2I communication, only few ITS initiatives have been taken and only at research or pilot level.

One issue that remains for many years unsolved in Greece is the participation of the private sector in the development of ITS projects. Moreover, the majority of industries in Greece lack R&D departments that would boost the country's research and innovation. Nevertheless, the new initiatives taken recently at a legislative level, the new ITS projects already launched, and the large concession projects that are underway, provide optimistic prospects for ITS deployment in Greece.

Greece's participation in numerous ITS research projects indicates the country's high scientific expertise and the interest for the market of ITS. Research institutes and the academia, the Greek companies that provide ITS solutions and technology providers, the Public Transport Operators and the national highway operators, as major clients of ITS products and services, but also the relevant public authorities and ministries, constitute the critical mass for the wide deployment of ITS in Greece, as well as the players for a Europe-wide and international cooperation in exchange of ITS experience and expertise.

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