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Implementation of Intelligent Transport Systems

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Abstract: *In 2007, European statistics showed that more than 75% of the European population live in urban areas, which are essential for economic growth and employment (around 85% of the GDP of the European Union is achieved in cities). This agglomeration of population in relatively large areas requires a high degree of urban mobility. The need for citizens' mobility and the emergence of often unexplained the dependence of using the car, even on short distances that do not justify it, have led to overcrowding of transport infrastructure in major cities.*

Keywords*: Transport, investment, technology, transport systems, economy*

JEL Classification: *R40, R41*

Introduction

Although investment in new transport infrastructure has been massive over the last decades all over the world, the impact on mobility is still limited: in the last 10 years, the modal share of passenger cars in most of Europe's urban agglomerations declined slowly. The big cities are increasingly confronted with increasing atmospheric and noise pollution, but at the same time with an increase in traffic congestion. Taking into account the human error as well, all this leads to the imminent occurrence of accidents and traffic jams.

Today, urban areas face the challenge of transforming transport systems so that they become sustainable in environmentally terms (CO2 emissions, air and noise pollution) and in efficiency terms (traffic congestion), while responding to social issues.

In this respect, the objectives for urban transport are:

- Traffic flow in cities (ITM);
- Safe urban transport;
- Affordable and attractive urban public transport
- Smarter urban transport (BRT)

1. The European legal framework

The idea of a Single European Transport Area, promoted by the 2011 White Book on Transport, sets out the objectives to be achieved by 2050. Transport needs to become more competitive and more resource efficient over this time horizon.

The main responsibilities for urban mobility policies lie within local, regional and national authorities. However, decisions adopted within local level are not taken in isolation, but within national, regional and European policy and legislation. Achieving the goals set out in the White Book on Transport is unthinkable without the use of Intelligent Transport Systems (ITS). They can make a significant contribution to a cleaner, safer and more efficient transport system. A new legal framework (2010/40 / EU Directive) was adopted on 7th of July 2010 to accelerate the deployment of these innovative transport technologies across Europe. This Directive is an important tool for the coordinated implementation of ITS within Europe.

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The ITS Directive (2010/40 / EU) provides the legal framework to accelerate the coordinated implementation of innovative transport technologies in Europe. It seeks to establish the interoperability of ITS services, leaving the Member States free to decide on which specific systems to invest.

Two recent European Action Plans include complementary actions related to the STI issue for urban areas:

- The ITS Action Plan (2008) provides the establishment of a specific collaboration platform to promote ITS initiatives in the field of urban mobility.

- The Urban Mobility Action Plan (2009) provides for the assistance of the ITS applications for urban mobility to be provided by the European Commission, possibly in the form of a guidance document, in order to complete its action plan.

At European level, Intelligent Transport Systems (ITS) are considering six proactive actions, namely:

1. Multimodal travel information at European level
2. Real-time traffic information at European level
3. Traffic Safety Information
4. An interoperable eCall1 system at European level
5. Information services for parking lots reserved for trucks
6. Reservation services for parking spaces reserved for trucks

ITS is a global phenomenon to increase both the benefits of both the public transport and the private sector. Intelligent transport systems help to reduce travel time for both urban public transport users and drivers using personal cars. ITS also has a significant contribution in reducing pollution and helps to create comfortable travel conditions.

2. Intelligent Transport Systems

Intelligent Transport Systems (ITS) are an integral part of traffic management. Intelligent Transport Systems (ITS) refers to the effort to add information and communication technologies, transport infrastructure and cars in order to improve safety, reduce transport time, fuel consumption and congestion in traffic.

Intelligent Transport Systems (ITS) are designed to respond to the following important milestones in traffic management:

1. Comfort in traffic
2. Ad-hoc communication network between vehicles
3. Finding the optimal route

Using infrared or velocity cameras, inductive loops, congestion detectors, and other sensor systems embedded in asphalt, traffic lights and road signs, ITS systems can monitor traffic and make decisions to streamline it. Intelligent transport systems may also include other applications such as automated toll collection, automated license plate recognition or accident notification systems. Various communication technologies have been proposed for Intelligent Transport Systems. For short distances, (up to 500m), communication can be done using the IEEE 802.11 protocol.

In particular, the WAVE standard and the "Dedicated Short Range Communications" standard are promoted by the Intelligent Transportation Society of America and by the United States Department of Transportation. For large distances, WiMax-based infrastructures (IEEE802.16), Global System for Mobile Communications (GSM) and 3G have been suggested.

These communication protocols are well-established, unlike short-range ones, but implementation of such infrastructure is very expensive.

From an IT point of view, the progress made in car electronics, drives a movement towards less but more efficient processors. In 2000, a car had 20 to 100 interconnected microcontrollers. The current trend is to migrate to microprocessors with integrated memory management in hardware and real time operating systems. These integrated platforms allow the implementation of sophisticated software applications and artificial intelligence. The inductive loops are placed in the asphalt and detect the vehicles passing through by measuring their magnetic field. The simplest detectors count the vehicles that go into a unit of time (60 seconds), while more complex sensors estimate the speed, length, weight of the cars as well as the distance between them. Inductive loops can be placed on one or more bands and detect both stopped or slow moving vehicles as well as high-speed vehicles. Traffic measurements and automatic detection of accidents are done by using video cameras. Because they are not placed inside the streets, but on pillars or similar suspended structures, the system is called non-intrusive. Black and white or color video images are sent to a processor that can simultaneously analyze data from one to eight cameras. Frequently, such a detection system monitors the speed, the number of cars and the occupancy of the street strips. Other systems can detect stopped cars and measure the distance between moving vehicles.

CONCLUSION

First of all, in order to reach the maximum potential of a set of implemented ITS technologies; an advanced communication system is needed. The second place is occupied by an electronic toll system and the influence it will have on the operational system. Almost all BRT systems mention the use of electronic toll systems. The electronic toll system has the potential to reduce boarding time and provide benefits to passengers, drivers and operations. The third essential element is prioritization of vehicles for levels I, II and III of BRT systems. Since these systems interact directly with traffic and traffic signs, vehicle prioritization has the potential to offer significant travel time reductions. Lastly, there are the IVI technologies. At this time,

significant amounts of time and money are spent on researching and developing IVI technologies for bus transit. BRT vehicles are an ideal launch platform for IVI technologies and many BRT systems can benefit from them.

In conclusion, ITS technologies have the potential to provide a significant improvement in BRT system performance. It is clear that ITS are needed regardless of whether they operate on city streets or dedicated lanes. A BRT system of IV level is at almost maximum performance operating on dedicated bands. At a certain level of ITS technologies it is beneficial in operating a BRT system. However, ITS technologies do not fully define BRT systems. Firstly, BRT systems are defined by the operating environment.

BIBLIOGRAPHY:

Amar, G., 2004, *Mobilités urbaines, élonge de la diversité et devoir d' invention*, Paris Édition de l' Aube

Baumstark, L., et al., 2005, *Rapport PREDIT*, no. 03MT

Bavoux, J.J., *La nodalité: un concept fondamental de l' organisation de l' espace. Les Chaier Scientifiques du Transport*, no. 48, p. 5-14

Blow, C., 2005, *Transport Terminals and Modal Intercharges – Planning and Design*, Architectural Press/Elsevier

Bly, P.H., Webster, W., Pounds, S., 1980, *Effects of subsidies on urban public transport*, In: Transportation, 9, pp. 311-331

Bres, A., *De la voire à la rue: riverainеté et attrition. Des strategies d'inscription territoriale des mobilités périurbanes*, in: Flux no. 66-67 Octobre 2006- Mars 2007, p. 87-95

De Borger, B., Kerstens, K., Costa, A., 2002, *Public tranzit performance: what does one learn from frontier studies*, in: Transport Reviews, 22(1), pp. 1-38, 2002

Faivre d'ARCIER, B., 2010, *La situation financière des transports publics urbains est-elle « durable »*, in: Les Cahiers Scientifiques du Transport, no. 58, pp. 3-29

- Measures for traffic safety: Ministry of Transport and Infrastructure - National Company of Motorways and National Roads in Romania (CNADNR)– www.andnet.ro;

- Order of M. T. I. no. 9802011 for the approval of the Methodological Norms regarding the application of the provisions regarding the organization and performing of the road transports and related activities established by the Government Ordinance no. 27/2011 on road transport;

- Order no. 27 / 31.08.2011 on road transport;

- Road safety - an active factor of community security: www.scribd.ro;

- Safety at work for drivers in the road transport sector: European Agency for Safety and Health at Work –www.protecţiamuncii.ro;

- Dynamics of road accidents generated by the car - pedestrian impact: Dissertation, Jr. Elena Buştiuc, 2010,

- Preventive and ecological driving: Viorel Bleotu -www.scoaladesoferitimisoara.ro;

- Traffic security is life: www.examenauto.md;

- Organization and safety of road traffic: Prof. Eng. Russu Vasile –www.regielive.ro;

- Contributions to the fluidity of road traffic in Cluj-Napoca by using a modern traffic management system: PhD thesis, Eng. Voichiţa Angela Roib, 2010;

- GPS: www.foruminformaţiiauto.ro;

- GPS satellite radio-navigation system: Eng. Gheorghe Costa –www.electronica.ro;

- How to use the GPS system: www.scrigroup.com;

- O.U.G. 195/2002 on the public road traffic with modifications and additions;

- Implementing Regulations of O.U.G. 195/2002 approved by H.G.1391 / 2006;