Tibor SCHLOSSER[1]

EXPERIENCES ON ITS APPLICATIONS IN SLOVAKIA

The paper is dealing with the situation of Intelligent Transportation Systems in Slovakia spotted on the new up-graded ITS application of Motorway Information and Control System in Bratislava. The paper is dealing with the specific steps on the field of ITS deployment in Slovakia. The goals of ITS Slovakia is defined and constitute the role of the ITS Strategic National Plan. This is done by creating the System and Organisational Architecture of national ITS. The possible way is to show through the possibility of public private partnership. The general need of traffic information and its situation in Slovakia is described. A possible way of the ITS Slovakia Association as a partner between public and private sectors on the field of ITS activities in Slovakia is shown.

DOŚWIADCZENIA Z ZASTOSOWAŃ INTELIGENTNYCH SYSTEMÓW TRANSPORTOWYCH (ITS) NA SŁOWACJI

Ten referat powiązany ze stosowaniem Inteligentnego Systemu Transportowego na Słowacji oparty jest na unowocześnionej aplikacji IST - System Informacji i Sterowania Autostrady w Bratysławie. Referat dotyczy określonych kroków na polu zastosowania inteligentnych systemów transportowych (ITS) na Słowacji. Celem słowackiego ITS jest zdefiniowanie i ustanowienie jego roli w Strategicznym Planie Narodowym. W ramach utworzonego systemu organizacyjnego możliwym staje się powołanie spółki z kapitałem prywatnym i publicznym.

1. INTRODUCTION

At the beginning of the new century, which is characterised by shifting of the policy of information society the Central and Eastern Europe Countries (CEEC) have no other possibility to join to this phenomenon. Transport and traffic is a good example to create a space for this. The general aim is: to compare the effort of transport systems development in Central Europe Countries together with the problem of EU integration. Therefore our advantage of CEEC region should be essential the declaration of uniform access to the solving of IS/IT for the ITS applications. The area of Central Europe is so small, that in the case of different ITS architecture in transition countries it would be get to negation of the base advantage of information society [5].

The base thought of information society is to be connected, and we know that the information like uniformity. Only in this case we can be informed during the motion and we can be profitable from the information society spatially in transport needs. The definition of potential problems rising from that base axiom are [7].

[1] ITS Slovakia Association, Pri šajbách 3, 831 06 Bratislava 35, Slovakia, schlosser@dopravoprojekt.sk

- In the economic environment a lot of small transition countries,
- Different access to the transport policy of each country and large asymmetry of priority allocation in transport,
- Soft and too unequal economic background of information technology in transportation,
- Absence of sufficient accumulation of population on the forwarded start of ITS implementation,
- Specific environment for the development of information structure, which can help to transport telematics,
- Disability of the realisation of public private partnership, which is done by legislation,
- Abstentions in human sources in administration,
- Undesirable shifted lobbing in commercial policy in transport branch.

2. ITS NEED AND FUNCTIONALITY IN SLOVAKIA

The mission of Information Technology Services is to reliably connect people, processes, and content through the effective use of reliable information, computing, and telecommunications technologies and services. With another words we have to define how to achieve and to deliver the needed data together with their added value - content - capacity. We could abstractly say that this is also a commission of IS/IT for transport. How to receive and transfer the information in movement? In order to move forward there is necessary to make following new accesses in the work of [5.]:

- Administration,
- Design and consultancy,
- Implementation control,
- Operation.

In Slovakia we started an official co-operation between public sector represented by Ministry of Transport, Post and Telecommunication and private sector covered by ITS Slovakia Association as a representative of private sector. The result [8.] is a first document of Slovak ITS needs defined together with Ministry of Transport SR as a public deputy and private sector. The general rules are coming form the KAREN architecture [9.].

In the frame of base economic category demand and offer we can stat that the realisation of road infrastructure (in which the ITS is most profitable) together with added value of information traffic services of passengers (not only drivers!) is the right the group of activities supported by EU.

Transport Telematics and their services are directly bound with the advanced traffic management systems and these are strongly tied on the base transport infrastructure construction. In present time the EU slowly does not differentiate, or better to say **does not "recommend" to segregate the creation of transport infrastructure without its „added value" - transport service**. The transport service automatically covers the part of information society. Otherwise telematic services by oneself do not have substation. We can define this by other words: **the route or transport way, its network without the added work - it means high performance transport service does not have complex and society wide benefit**.

As usually in Slovakia we have overrun the standard methods and conditions for functionality of ITS applications used in the world. We started with the realisation of ITS application instead of institutionalisation and standardisation. Comparing the development

and realisation of ITS applications we cannot report, that our way is the bad one because we are speaking about the up-grade of one large ITS application on Slovak motorways. On the example of the functionality of Motorway Information and Control System (MICROS) [1.] have been shown that:

- In our condition does not exist the technical or technological problem by solving of the new traffic control applications,
- There is no problem to provide organisationally the co-operation of various activities,
- There is no problem to adjust the requirements and to create the partnership between public and private sector.

In Slovak condition there is a large problem - to operate an ITS application. This is the result of missing institutional rules in our country. There are some problems or limitations, which have to be clearly declared, what does mean who, what, why, where and how to do if something goes wrong. Therefore the accomplishment of project realisation has any disproportion according to the following reasons [3.]:

1. Implementation of IS/IT technology in road administration is only a part of the delivery of road construction companies. The road construction companies do not have any interest in knowing the functionality and occasions what and why behind is with in relations. The delivery of technology is only the matter of profit of these companies. The problem is the rules of the state investors.
2. The state administration responsible by law for the maintenance and administration of the road network does not know how to define its requirements, it does not have particular solutions and methods how to go on, it does not know to create adequate space on physical and material side.

3. MOTORWAY INFORMATION AND CONTROL SYSTEM

Motorway Information and Control System (MICroS) [1.] is an integrated tool for the acquisition, processing, distribution and archive of all monitored data and information on the Motorway Network. MICroS enable the active input to the controlling of traffic situation with the aim of the traffic condition optimisation. MICroS is currently open in its system architecture for cooperation with other control and/or information systems in the field of transport or commercial data changes and to provide standard electronic and communication services.

The controlled part of MICroS is called the Operative Supervisor Control System (OSCS). This enables to the motorway operator on the each control level to acquire the view about the all traffic and weather situation, equipment conditions on the referred motorway section and to enter actively into the traffic process. The OSCS is composed by:

- Heterogeneous facilities for data acquisition, information processing and presentation
- Composite framework of telecommunication devices
- Software.

3.1. TECHNOLOGY DEVICES

From the technological point of view the core of problem is the question of information transmission from different sources with different communication facilities, information processing and quick response on burden or running situation on the motorway. The base goal of control system is to connect the human doings at the beginning and in the end of the process. The road traffic is the object of our case. At the beginning there is the man - road traffic user (driver, passenger) - who creates the data and/or information - and in the end is found the man - administrator, dispatcher, operator who transfers backward adapted information to the user. Between these two bodies is an active loop.

Roadside equipments are based on microelectronics, which absorb and reflect different physical features on impulses and signals. Herewith methods they retain and survey the actions on motorway. The general equipments are: traffic counters, meteorological devices, variable message signs, equipment for weighing in motion, CCTV and incident detection, emergency SOS cabs, water pumps, etc. In the complicated engineering works like tunnels on motorways other devices are included: traffic lights, overhight vehicle detection, opacity measuring and air-quality equipments, lighting, ventilation, fire protection equipments, inside radio and mobile links, etc. Usually any of above-mentioned equipments are from different producer offering his own controlling system. The goal of the MICroS is exactly integrate the control components that neither the operator nor the user need to know the background of the complicated provided and presented information.

The telecommunication technology is covered by all-accessible sources on the motorway. These are: classical metallic cables, fibre optics, radio transmission, video signal, telephone lines, as well as GSM, GPS a DSRC. The problem of the system architecture is the consolidation and unification of the communication tools so that they will be used effectively to the expenditures. The efficiency takes the certain *line transmission speed* from one to other system points and *information capacity* in the cross-section of communication media. Needful rules for data transmission - *protocols and interfaces* are defined. From the operation point of view it reflects the qualitative and comfortable work condition.
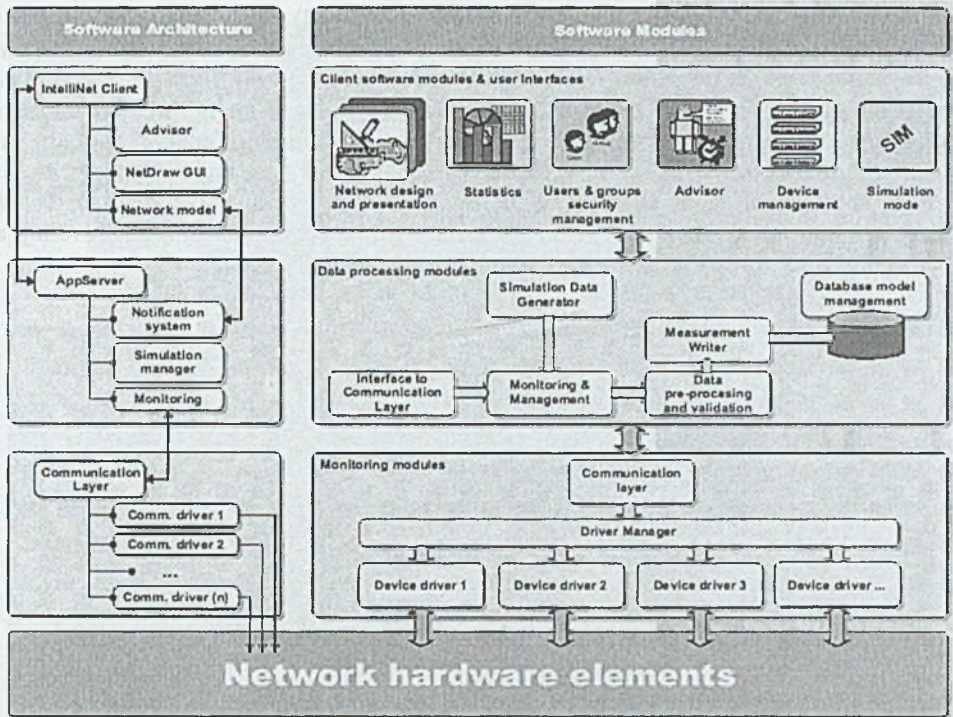
Fig.1. Architecture of the MICroS application software

3.2. CONTROL ROOM

The MICroS will have an associated Central Motorway Control Room. The project in Bratislava forms a completely new construction. Essentially, the new motorway section (fig. 2.) connects motorway routes from the Austrian and Hungarian borders to the D-1 motorway that links Bratislava in the west with Ladce to the north. Slovak Road Administration had commissioned ITS motorway Command Centre features control room designed to international standards (fig. 3.). There are designed on high levels of ergonomic styling, the modular and, therefore, is specially designed for technology - intensive environments providing superb levels of operator comfort. The consoles are configured as two desks each for four operators and a separate two-person desk. Video screen wall due to the modular design display walls and rear projection system is realized of size 3x4 55" displays.

The 6.5km D1 Mierova - Senecka motorway (see fig. 2) newly opened in the end of August 2002 had created a possibility to up-grade the existing Motorway information and Control System, which is operating on 65 km motorway section from Horna Streda to Ladce (operated by Local dispatcher room in Trencin) from 1998. New Central Motorway Control Room where it houses the screens and equipment necessary for it to function, initially, as a local dispatcher room for the some 46 km of motorway in the Bratislava area together with the new motorway city tunnel which will be 1.1 km long. However, over the course of the next two-to-three years, the same Command Centre will become fully utilised, covering all sections of the MICroS system fitted with the ITS technology.

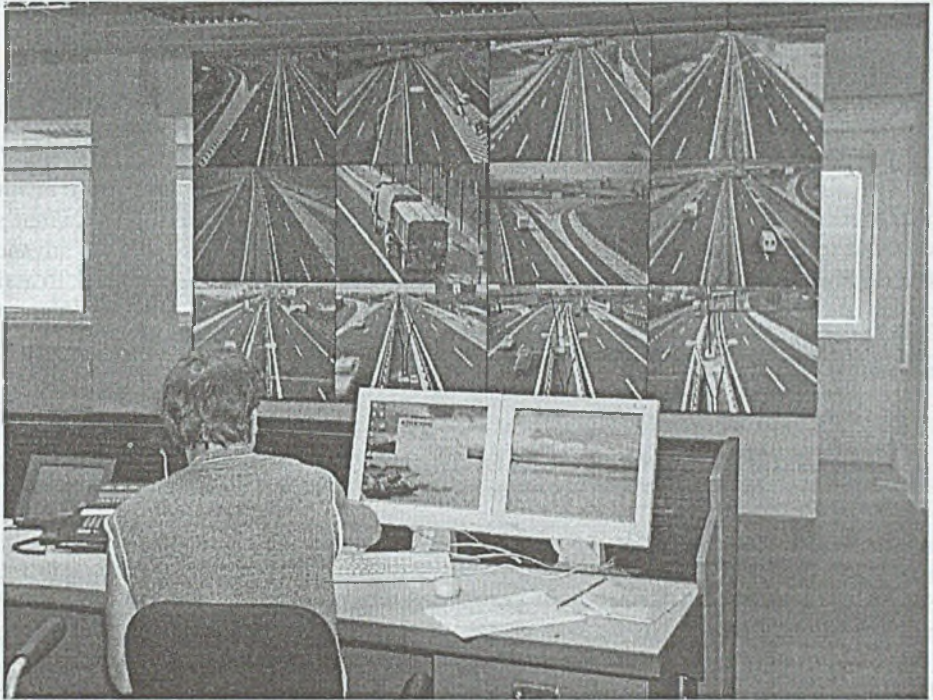Fig.2. Motorway sections in Bratislava

Fig.3. Central Control Room in Bratislava

When we would like to follow the ITS deployment in Bratislava there is an institutional problem how to cooperate between the levels of public sector. It is up to the discussion between the administration of the Capital Bratislava and Ministry of Transport how will look the Integrated Traffic Management System in the Bratislava Region.

4. THERE IS A NEED TO SOLVE THE PROBLEM OF TRAFFIC DATA

To be useful on the field of ITS in own country we know that we should have a perfect working environment with traffic engineers, electronic and informatics engineers together with systems' integrators on one side, what is natural according to the sophisticated technology. On the other side we need to have a cooperative and open environment on the side of public sector. The object of the ITS is the information. How looks like the operative schedule of common and general traffic data in our countries? In our conditions for ITS is absolutely imperative the base rules for transmitting, processing, distribution and providing of transport/traffic and with them related data.

Over the world the traffic information services are commonly accessible and they purvey the dynamic information in real time. These services are provided by private sector. We know that for this kind of service we need a sufficient database of historical data with reliable values. From this activity follows up the **function of mobility information for the**

public, used the transport infrastructure. The role of public sector for the commission of these kinds of services is:

- to define the rules of data collection and communication,
- to work out the instructions for assembling and operation of facilities and equipments,
- to declare the legal system of using and exploitation of transport/traffic data,
- to provide the safety, enforcement, responsibility and determination of user fees.

The first principle is the **legal form of these service provisions in transport infrastructure, which should be integrated on the whole country area.** We cannot say how it will look the concession and licence policy in transport services. Using the advanced traffic management systems is necessary, on the technological and information level, to assign the rules and responsibility on services performance. In any case it does not tread about the classification of artefacts but **determine the hierarchy of levels of content, objective and function.**

5. INFORMATION SERVICES OF TRANSPORT INFRASTRUCTURE IN URBAN AREAS

The suggestion for this discussion we can start with the question: can we achieve to create an environment for formation of desired authorisation and to confirm the permitted extent and using of traffic data for user charges in transport electronic services? This should be the goal not only to construct the hardware of transport infrastructure - the road (way)!. The strategy should be defined in the State Transport Policy, and so it should open the space for implementation of executive standards, instructions and rules of traffic/transport services. This is a general lack of the transition countries. This state causes another questions:

- How clearly and functionally declare the base legal principles for multimedia services, which far away exceed the transport sphere?
- How will be created the environment of telecommunication services in transport and its related activities?
- How the link of data security will work in transmission and processing of information?
- How the administrative operational connections will look for providing the administrative misdemeanour, enforcement, legal code and copyright?
- How the functional root of control traffic systems operation will be designed - with clear responsibilities and institutional not complicated forms of connection: administrator - operator - police together on real time link up of transport logistics and evidence of goods and passengers?

Transport is a dynamic tool of the society and make up the information society. **The quality of transport, expressed by mobility in agglomerations and whatever in territory, does not represent only the quality of movability but the capability of human being to have benefit from transport system as well.** Therefore the transport service oriented complex has to give us an answer: how will be secure the object of transport/traffic process – it means manly human being - passenger. In order to create this kind of structure on qualitative high level transport services we have to do the base items and principles. These are:

- Security of traffic / transport data,
- Processing principles of personal data,
- Duty of transport service providers,

- Providers and user rights of transport services to the data and supervision of data security.

The rules and legislation should be clear for the domain of telematics (technology background) and in public sector (state – region – city) as well. Thereafter it is possible to solve the user problems in ITS applications, which are:

- Traffic and travel information,
- Multimodal route planning,
- Traffic/transport networks control,
- Transport logistics of goods and fleet management,
- Telematics for vehicle control.

From Slovakia point of view it should declare the following steps:

- to create the uniform ITS architecture for all kind of transport and services. Slovakia is a very small region for experiments and to co-ordinate the effort with neighbouring countries,
- to segregate completely the implementation of technology from the "road construction" of the public acquisition,
- to initiate the possibility of private sector accession to the operation of transport control systems by licensing.

Therefore in Slovakia we need to create the National Strategic ITS Plan for the standardisation of the environment and rules of transport informatics. There are questions and controversy of possible new administration barrier. This will be the step for the next year as a result of public – private partnership. We cannot to use the same base rules, which are common in "normal" economic countries. The base problem is the legislation. The administration is really not in enviable position. We have to be conscious that on the side of the administration there is going on the definition of two base attributes:

1. ITS must be include in to state transport policy – in present time unambiguously absent,
2. Transition of the public administration in Slovakia together with the budget flow can destruct the effort about the uniform transport IT system architecture in our country.

The managers in road administration and traffic engineering companies are in the position where they can to influence how to deep should be the implementation of advance transport control systems inside of the transport policy document. The strategy of ITS implementation we could see only in the development materials and they are outside of the transition process. Even though, in our conditions - in Slovakia, we changed little bit the standard practise on the implementation of ITS application. Other words, our aim of the strategic National plan is to involve the people both sides.

6. CONCLUSION - ITS SLOVAKIA

Slovakia established in 2001 the ITS Slovakia Association. The ITS Association in Slovakia has a complex goal on the level of planning, design, implementation and operation of advanced transport/traffic ITS applications. This goal is given by the reason of absolute market, which is in function and it has a negative impact on the base rules of ITS. The Association has been given to consolidate the most of the private companies and the academics under one umbrella. The Association has not only the goal to be an advisor at the public-private partnership framework activities but to be directly in the centre of ITS movement.

The strategy places considerable emphasis on developing capabilities beyond existing or specifically targeted transitional objectives. And, since our strategic plan is people / resource centric not the technology and the system only, we believed it must also address how we interact, what we stand for and what we value in our work.

Assertion of correct relations between the public and private sector is necessary for the institutional tasks. The experts must know how to coordinate the different kinds of the transport. The problems of road infrastructure are not the problem of money but first of all to understand its role - the service. Finally the travellers are not to interest in which kind of transport will they use but important is how to reach form origin to destination in time and comfortable.

BIBLIOGRAPHY

[1] SCHLOSSER T., Motorway Control Information System - Starting with ITS in Slovakia, 7th World Congress on ITS, Torino, ERTICO – Brussel 2000
[2] SCHLOSSER T., Electronic Toll Collection - Mode of User Charging on Slovak Motorways; In: Economic Objectives of Introducing Tolls on Intercity Road Infrastructure, ECMT Round Table 118, Paris 2000
[3] SCHLOSSER T., Intelligent Transport Systems Their Role in Road Administration - A Look on Central and Eastern Europe; 7th International Conference Mobilita, Bratislava 2001
[4] SCHLOSSER T., Traffic Control Systems in Road Infrastructure and Their Role in Transport Policy; 3rd International Conference Transport in Urban Agglomerations, Zilina 2001
[5] SCHLOSSER T., Intelligent Transportation Systems in Slovakia; ICS Workshop on Intelligent Transportation Systems: from Physical to Virtual Transport Systems; Universita Cattolica del Sacro Cuore, Piacenza, International Centre for Science and High Technology, ICS-UNIDO, Trieste 2001
[6] Premietnutie dopravnej politiky do aplikácií dopravných služieb (Implementation of Transport Policy to the Applications of Transport Services); In: Horizonty dopravy 3/2002, Transport Resaerch institute, Zilina 2002
[7] PŘIBYL P., SCHLOSSER T., Network Operations and Telematics in Central and Eastern Europe, prepared In: Routes/Roads, AIPCR/PIARC, Paris 2002
[8] SCHLOSSER T. et all, Systémová a organizačná architektúra Inteligentých dopravných systémov (ITS System and Organisational Architecture), ITS Slovakia Association, Bratislava 2002
[9] CONVERGE-System Architecture: Guidelines for the Development and Assessment of Intelligent Transport System Architectures, Atkins Wootton Jeffreys (co-ordinator), Brussel 1998

Reviewer: Ph. D. Kornel B. Wydro