

***THE INTELLIGENT TRANSPORT SYSTEM IS A REALITY IN ROMANIA***

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**INTRODUCTION**

Using the systemic approach and the multi agent approach has been performed a detailed analysis of theoretical aspects concerning the Intelligent Transport Systems. The strategy for the Intelligent Transport Systems development in U.S., Europe and developed countries has been considered. Based on the obtained know how at national level has been launched the development of Intelligent Transport Systems. One of this systems dedicated to freight transport is presented below.

**THEORETICAL ASPECTS**

**1. Intelligent Transport System Definition**

Intelligent Transport Systems are the next step in the transport system evolution at national, European and international level [3].

Intelligent Transport Systems are a "marriage" of the information and communication Technologies with vehicles and transport network and create an intelligent movement of freight and persons because they provide a supplementary know-how for the travelers and operators [4].

The Intelligent Transport System is an assembly of subsystems based on advanced technologies from information, communication and electronics areas for transport processes management having as finality increasing of the transport efficiency and security.

## **2. Transport system components**

The principal elements of the transport systems are transport infrastructure, means of transport, means of transport drivers, transported objects (freight, persons), and transport logistics, agents involved in transport area, transport control centers, transit terminals, and transport documents.

The transport system can be structured in three types of systems with complementary objectives that are structural, functional and informational integrated. These systems are operational system, management system and information system.

The Intelligent Transport System can be structured taken into account the functional complexity and application area as advanced systems for traffic management, advanced systems for vehicle control, advanced systems for traveler information, advanced systems for public transport, systems for commercial vehicle operation, systems for emergency management, systems for electronic payment [12], [14], [16], [24], [26], [27].

## **3. Practical result**

„The integrated electronic system for e-business, transport optimization and vehicle monitoring in road transport area" - SOMCET-Net is an intelligent system developed in Romania

## **4. General Characteristics**

„The integrated electronic system for e-business, transport optimization and vehicle monitoring in road transport area" - SOMCET-Net is a modern, integrated, intelligent support for vehicle monitoring and route optimization and an interactive tool for electronic commercial transaction (demands and offers) administration.

The system allows transport demands and offers registration and searching, supports the negotiation process and transport contact set up between the business partners, performs route optimization with route visualization on the digital map, location and real time survey of vehicles and vehicle characteristics. The use of the digital map to represent the locations associated with characteristic descriptive information offers more visibility to the information.

## **5. Structure**

The system contains three integrated user oriented subsystems:

- The first subsystem is dedicated to economic transaction between the transport clients and the transport providers supporting the marketing, negotiation and contracting activities;
- The second subsystem performs route optimization being a support for negotiation and contracting activities;
- The third subsystem performs vehicle monitoring during road transport.

The system has also an "Administration" subsystem integrated with the others.

The classical communication means based on phone, mobile, fax or e-mail have been replaced with Internet communication and authorized access to the diversity of information managed by the SOMCET-Net information database and the geographical database.

SOMCET-Net system provides effective and efficient eServices that are available to support the development of a competitive knowledge-based economy in freight road transport area at European level and contributes directly to the enhancement of European job productivity and overall competitiveness in this area.

The particular focus is concentrated on eServices for freight transport. The eServices are first of all directed to businesses and could be dedicated also to citizens in moving by their own car and to government units from transport area in particular for dangerous freight transport monitoring.

## **6. Description**

The system provides eServices to support the principal activities specific to transport chain:

- **Marketing:** transport market investigation through transport demands and transport offers registration and search. The system can manage transport demands that contain one to n types of goods that have to be transported by specifying the start point and the end point, the loading date and place, the unloading date and place, good characteristics, required transport services.
- The system can administrate transport offers that contain one to n types of means of transport by specifying the start point and the end point, the loading date and place, the unloading date and place, (intermediary places between the start place and the end place), transport services and general characteristics of the goods that can be supported.
- **Negotiation and Contracting:** for the dialog between the partners the system offers an e-mail service provided by the system.
- **Route optimization:** in order to establish the route, that has to include the specified

places and have to be optimum taking into account some conditions, the system provides eServices accessible on Internet. There are offered three optimization models: "quick route", "short route", and "preferred route". The elements that have to be specified to all the models are: "route planer", 'driving speed', "fuel", "day driving planner".

- Vehicle transport survey in real time or from an indicated period of time or to a specified times can be performed using created mobile equipments installed on vehicle board used in freight road (international or national) transport.

The system uses open standards for positioning (GPS technology - Global Positioning System) based on satellite information communication, for geographical information management (GIS - Geographic Information System) and Europe digital map and for data communication (GSM - Global System for Mobile Communications) between the mobile equipment installed on vehicle board and the System Monitoring Centre. The created mobile equipment contains the following components:

- Positioning and Communication Device (DPPC);
- On board computer;
- Sensor GPS;
- Fuel sensors.

The mobile equipment ensures:

- Real time remote vehicle monitoring;
- Vehicle parameter acquisition;
- Message communication between vehicle driver and Management Center.

The monitored information consists of:

- GPS information: position (latitude, longitude), altitude, time (TIME GPS - hhmmss), number of visible satellites, number of tracked satellites, dilution and precision factor, heading north, speed;
- GSM modem status;
- Vehicle fuel level, temperature, alarm, information messages, monitoring messages.

All the messages can be point-to-point, point-to-multipoint to communication between mobile device and the Management Center and multipoint-to-multipoint between the transport providers and vehicle fleets.

The system is functional structured and modular developed in order to be open having a large flexibility.

The hardware and software components that have been developed implement effective,

efficient and innovative solutions to increase the efficiency of freight road transport and to support the integration in European Information Society.

## 7. User interfaces

The system supports European transport because the used map is a digital map that covers European regions.

The system user is the partnership created between transport clients and transport providers including also brokers.

The system has a strong impact on improvement the quality of life of drivers, business development and transport efficiency increase.

The SOMCET-Net system resources are administrated by "Administration" component. The system knowledge management is performed by search function based on dynamic criteria created by system users in conformance with access right.

In SOMCET-Net system operation can not appear major risk. If there are some problems the operator of the Monitoring Center will be informed by alarm messages in conformance with the situation type.

Some system interfaces are presented below.

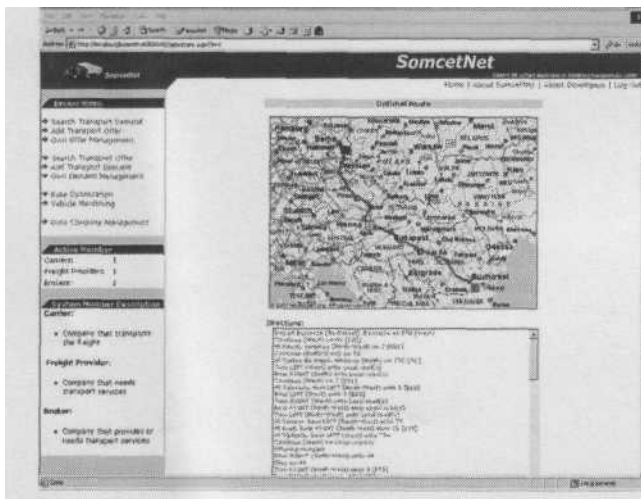


Figure 1 Route Optimization

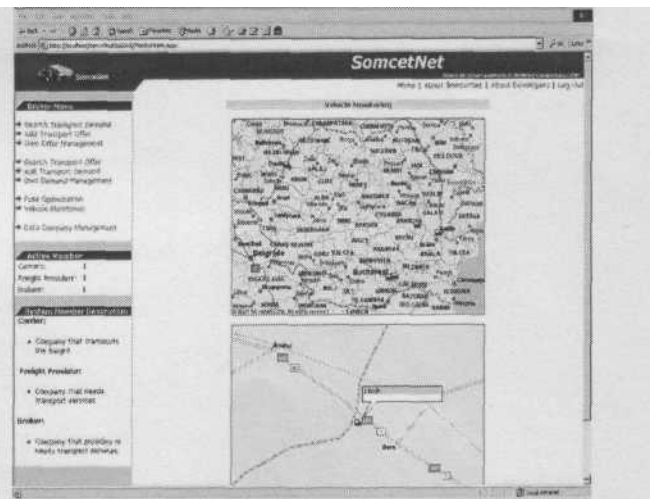


Figure 2 Vehicle monitoring

## 8. Conclusions

In conclusion the development of a complex system is difficult but with a coordinated management activity, with good experts, with person that like to learn new thinks and also like to finalize the tasks in conformance with the proposed objectives, at the end the results

will be in the conformance with the effort.

There are three major motivations for information society development in transport area based on intelligent transport systems.

The key motivation is political frame. The political factors have to ensure a balance between the requirements and capabilities.

The second motivation is an efficient exploitation of the technological infrastructure for a mobile business in which the computer and communication are available to the users anywhere and anywhen. The developed intelligent environment supports the political frame by providing information and determines new requirement identification.

The third motivation is a result of information society technologies development that acts in the direction of changing of the agents, citizen, commerce, industry, government and society needs.

## References

1. Banciu, Esanu, Hrin, Alexandrescu, Mihai, Anghel, 2003 „Sisteme inteligente de transport - Ghid pentru utilizatori si dezvoltatori" ISBN 973-31-2154-1 Editura Tehnica
2. White Book of European Community, ISBN 92-826 5911-9
3. US Department of Transportation - USDOT - Inteligente Transport Systems, 2001
4. <http://www.its.dot.gov/>
5. ERTICO - Working program for 2000,2001, <http://www.ertico.com>
6. ITS Network, 2001, <http://www.its-network.com/>
7. Kan, C, Miles, J.C., 2000, "ITS Handbook 2000, Recommendations from the World Road Associations (PIARC)", ISBN 1-58053-103-2
8. U.S. Organisation for Inteligent Transport, 2001, <http://www.itsa.org/>
9. Perrett, K.E., A. Stevens, 1996, "Review of the potential benefits of Road Transport Telematics", TRL Report 220
10. „Telematics Application Programs", 2002, Project results
11. SOMCET-Net, contract 1C01, program AMTRANS, 2001
12. Rumbaugh, J., Blaha, M., Premerlani, W., Eddy, F., Lorenson, W., 1991, "Object-Oriented Modeling and Design", Prentice Hall, Englewood Cliffs, NJ
13. Saito, T. et al., 1997, "Reduction of Traffic Accidents and Improvement of Road Traffic Produced by ITS Deployment", Proceedings of the 4th ITS World Congress
14. The people transportation software company, 2001, <http://www.trapsoft.com/index.html>
15. Steve Mortensen, Michael Harris, Corey Hill, 2002, "Mid-continent transportation symposium proceedings -Investigating ITS Concepts for the Dulles Corridor Rapid Transit Project"
16. Studiu de piata privind administrarea traficului, 2000-2001, <http://www.janes.com/>;
17. SVG On-line Information, 2002: <http://www.w3.org/Graphics/SVG>
18. Universal Traffic Management Society of Japan, 2001: "UTMS World 2000"
19. World Road Association (PIARC), 1999, "ITS Handbook '99"