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FOREIGN EXPERIENCE IN THE FORMATION AND DEVELOPMENT OF INTELLIGENT TRANSPORT SYSTEMS

Abstract. This article gives the foreign experience of intelligent transport systems (ITS) and their formation and development stages. Also described and compared successful projects in the field of ITS.

Keywords: experience, ITS, projects, transport, integration

INTRODUCTION

One of the large European projects implemented for the management of a wide urban area was the Munich COMFORT project, which began in 1991. It was the first project to coordinate transport in the city center, taking into account the layout of the highway network around the city. Depending on the assessment of the state of traffic flows in the city, elements of the information and navigation systems in the vicinity of the city are activated. The control algorithms estimate the level of transport, optimize the work of the transport system, determine the forecast of the development of the traffic load, and direct the vehicles out of the congestion area when analyzing the project, it was stated that the initial investment paid off in 2 years only due to a decrease in the number of accidents.

RESEARCH

The number of collisions decreased by 35%, the number of road traffic accidents with injuries - by 30% and the number of fatalities decreased by 31%. Other well-known projects are projects implemented with the assistance of the European Union. These include, in particular, the following events.

1. **Analysis of transport networks.** For basic transport control, data from transport sensors at transport hubs may be sufficient. Despite this, an integrated telematics strategy for transport management in urban networks requires more detailed data on the network situation, which has been demonstrated in the QUARTET PLUS and EUROSCOPE projects. In the context of the widely accepted concept of "mobility management" and the close links between monitoring and transport management, these projects have practically tested new detector systems based on video detection, new algorithms for determining travel times, speed along lanes and in the network, and algorithms for determining points of departure and destinations (matrix OD: Origin-Destination). The latest data obtained is especially important for the transport information system. The prediction algorithms have been tried and tested. This applied to short-term (1–20 minutes), medium-term (11–12 hours) up to long-term forecasts (1–2 days). Both projects helped to understand what inaccuracies and what limitations are characteristic of the forecasts of the parameters of the transport network functioning. They also determined the directions for further development. One of these areas is the use of data obtained from a running laboratory moving in a traffic stream ("floating" car) - the CAPITALS project. The work within the VERA project also helped to understand the complex conditions in the network.

2. A private, but very important area of using the **results of data analysis** is the area of establishing (detecting) the places of occurrence of road traffic accidents (incident detection). Rapid detection of an incident can initiate the process of taking the necessary actions, including a traffic management strategy and informing drivers before starting and/or while driving, as well as a substantially quick response from rescue services. In addition to detecting accidents, the IN-RESPONSE project has also developed a model for predicting road accidents. Automatic detection of places of traffic accidents. Several European projects have also dealt with the problem of accident management. It

was about the modified projects of traffic management in cities UTC (Urban Traffic Control), which, with the help of special modules, ensured the detection of incidents and their impact on traffic flows. The IN-RESPONSE and IN-EMERGENCY projects demonstrated a variety of techniques, including high-speed warning systems for emergency responders and tools to support decision-making by emergency response operators.

3. **Information and navigation.** Driver information systems using on-board units or Controlled Traffic Signs and Displays (TFIS) along roads are increasingly important for traffic management on road networks. Awareness of potential problems significantly reduces congestion by allowing the driver to choose different paths or parking or parking. European projects are now more and more focused on TFIS systems since on-board units in vehicles are not yet very common and thus cannot have a significant impact on traffic flows. Projects in this area (AUSIAS, CAPITALS, CONCERT, CLEOPATRA, COSMOS, EUROSCOPE, TABASCO) were aimed at studying the behavior of the transport network and at determining optimal management strategies. The use of information and navigation systems in the framework of European projects can be shown on the example of the following cities:

- Bristol (CONCERT): TFIS for better use of the Park and Ride system;
- Brussels (CAPITALS): TFIS as part of the parent traffic management systems in tunnels on the inner ring of the city;
- London (CLEOPATRA): determining the impact of TFIS in identifying crash sites on the choice of drivers along the road network and the efficiency of transport in the network;
- Lyon (CLEOPATRA): information strategy for TFIS in automatic mode using data obtained from measurements carried out on the road network;
- Munich (TABASCO): TFIS for Park and Ride;
- Piraeus (COSMOS): a strategy for changing the direction of traffic flows in the seaport area;

- Southampton (EUROSCOPE): integrated crash site identification and parking management;
- Toulouse (CLEOPATRA): a general strategy for changing the direction of traffic flows;
- Turin (CLEOPATRA): TFIS strategy together with city traffic management strategy. Pre-trip information and information at GPOT stops have shown that they have a significant impact on the behavior of most passengers, because, in the end, they caused a small but noticeable increase in the number of passengers. The integration of urban transport management, GPT services and information systems in Turin has resulted in a 14% reduction in travel times for public urban passenger transport and 17% for passenger cars. This led to an increase in GAT by 3% and an overall improvement in traffic in the city. The investment in the crash site detection subsystem in the Southampton Transportation Management System has proven to be paid off within one year. However, the payback is highly dependent on the method and on the speed at which an accident is detected.

4. **Control at the entrance** to main roads was usually used in cities, where it was supposed to **prevent the formation of congestion**. However, congestion is very common on highways and on roads connecting urban areas. In this case, it is very important to integrate entrance control with the city-wide traffic control system. The TABASCO project demonstrated Ramp Metering, together with traffic information and navigation via TFIS, and traffic control via optical signaling in Glasgow. The Ramp Metering method has significantly increased the capacity of roads (5% highway, 13% urban network). In addition, the system has led to an improvement in driver behavior and, consequently, to a decrease in the number of accidents.

5. **Control depending on the load**. In urban environments, this type of control is of growing importance for maintaining satisfactory mobility, as it uses various telematics subsystems to manage traffic flows. The application of this

system contains, for example, control at the entrance to the central area of the city (the CAPITALS project) and artificial intelligence technology, combining control at the entrance and control using traffic lights with a system for providing information and assistance to drivers and with subsystems for providing transport and tourist information. This system will also make it possible to determine the time of movement and receive information about the availability of free parking spaces.

Conclusions

Foreign experience and formation of ITS is a way to development of transport safety in Uzbekistan. Increase of street throughput by 20–25%. Increase of road traffic safety (traffic accident reduction by 40–80%). Improvement of traveling comfort and traffic conditions for drivers, mass transit passengers and pedestrians.

REFERENCES

1. *Azamatovich, B. T. (2019). MARKETING RESEARCH OF THE TRANSPORT SERVICES MARKET. Экономика и Социум, 12.*
2. *Berdiyev, T. (2020, December). Metrobus in separated corridors as an optimal public transport system. In IOP Conference Series: Earth and Environmental Science (Vol. 614, No. 1, p. 012056). IOP Publishing.*
3. *Berdiyev, T. A. (2019). Issues of Foreign experience implementation in Transport Services. Indo-Asian Journal of Multidisciplinary. Research, 5(5), 1889.*
4. *Berdiyev, T. A. (2019). MARKETING IN TRANSPORT SERVICES. Экономика и социум, (12), 41-44.*
5. *Berdiyev, T. A., & Ortikov, Y. Y. (2016). The concept of work motivation. Young scientist,(7-2), 83.*

6. Erokhina, O. V., & Brega, A. V. (2020, March). *Intelligent transport technologies in "smart" cities. In 2020 Systems of Signals Generating and Processing in the Field of on Board Communications (pp. 1-5). IEEE.*
7. Janušová, L., & Čičmancová, S. (2016). *Improving safety of transportation by using intelligent transport systems. Procedia Engineering, 134, 14-22.*
8. Windelband, W. (1893). *A history of philosophy with especial reference to the formation and development of its problems and conceptions. Macmillan and Company.*