INTRODUCTION

Intelligent Transport Systems (ITS) represents a holistic, management and information-communication upgrade to the classical traffic system and transport, which significantly improves performance, traffic flow, more efficient transport of goods and passengers, safer transportation of the same, and environmental pollution reduction. Intelligent approach actually means the ability to adapt to changing conditions and situations where it is necessary to process data in real-time. That does not mean that there was no traffic intelligence (at least for drivers) before ITS, but that through real-time data collection and processing, and network distribution of information, there is a significant reduction in congestion, waiting, traffic accidents, transport inefficiency, environmental pollution, etc. The concept of Intelligent Information Systems (IIS) is close to computing as well as various advanced technologies that are common to IIS and ITS. Concepts and Artificial Intelligence Techniques (Form Recognition, Machine Learning, Intelligent Computation, etc.) are used in the design, development and implementation of various ITS applications. ITS uses a whole range of ‘intelligent’ services that contribute to the goals of more efficient and safer transportation. It can be said that ITS represents advanced concepts of problem-solving, scientific discipline, a set of technologies and new technological movements. That is demonstrated by the ITS programs and projects in all developed countries, establishing ITS as academic discipline and study program at universities, and successful engagement in a number of national and international ITS associations. Unlike isolated technical solutions (green waves, variable signs, telematic devices in vehicles), the term ITS represents "Systems’ system", as explained in the Highway Capacity Manual, Intelligent Transport Primer. The basis of ITS are transport services and transportation, self-government, freight transport, public city transport, emergency services, electronic payments in transport, the safety of persons in transportation, national security and protection, response to incident situations. ITS solutions include redesigning the traffic infrastructure with new traffic management solutions to the organization and running of the streams, intelligent route guidance with reduced loads, information on free parking spaces, remote monitoring of cargo and vehicles, telematic land bills, incident traffic management etc. Within each domain i.e. functional area, there are mutually connected services.
In the area of traveler information, static and dynamic information on the transport network, incoming and outgoing information services, and support services for collecting, storing and managing information for planning transport activities are covered. Pre-trip information enables users to get useful information about available modules, time or travel rates from their home, or from their workplace or other public locations. The emphasis is on multimodal and intermodal information. Travel information includes real-time travel information, travel time estimation depending on existing conditions, availability of parking spaces, traffic accidents, etc. Information is provided through the terminal at bus and train stations, squares, transit points, screens in a vehicle or portable personal terminals. Routing and navigation services may relate to information about the optimal route or route to the designated destination. Choosing the best route is based on traffic and public transport information and includes multimodal options with solutions such as Park & Ride and others.

Trip Planning Support provides data on traffic flows and transport demand for transport planning purposes. These are current and historical data from traffic control and information systems, as well as vehicle data. Traffic Management refers to traffic flow management, both in the network of city roads and outside cities (on motorways and elsewhere). Monitoring and Remediation of Incident Management (Incident Related Incident Management) include detecting, responding, and clearing incidents on or near roads. Only a minor number of the total number of incidents relates to traffic accidents involving vehicles and there are injuries or deaths. Except for posterior action, detection and cleansing, prediction and accident prevention are performed. Particularly important is the prevention of post-incident management. The focus is on traffic accidents, although the system includes responses to other causes of small accidents (tire failure, vehicle fading, etc.) and major accidents and catastrophes (earthquakes, landslides, large fires and so on). Demand management is a set of services that affect demand levels at different times of the day and change in modes.

Management of Transport Infrastructure Maintenance is a group of services based on the ITS technology application in road maintenance traffic management, i.e. the related communication and information infrastructure. Traffic Pest Control (Policing / Enforcement) includes auto detecting vehicle type, registration plate, speed overtaking, and the like. In the field of freight transport, there are unified functions / services relating to the...
administration of commercial vehicles, multimodal logistics and the coordination of carriers and other participants involved in the cargo transport process. In the area of emergency services, there are functional processes that enable rapid and efficient interventions of emergency, firefighters, police and other emergency services. The service domain is increasingly integrating with incident management and becoming part of an integrated traffic management system.

In short, ITS is a modern, efficient, efficient, secure and intelligent transport system that with the least utilized resources meets the needs and requirements of today’s road users. The aim of this paper is to demonstrate the efficiency and usefulness of ITS application in all aspects, especially the transport sector, using modern, intelligent technologies. Safety, quality, cost-effectiveness and efficiency of transportation are the main drivers for the introduction of such technologies. It is considered that full introduction will contribute to reducing the number of traffic jams and queues, and more importantly, reducing the number of traffic accidents and injuries. By using intelligent traffic management, much less traffic accidents can be achieved, and if so, their impact on traffic flow and speeding up emergency response can be reduced. Different systems of intelligent traffic management achieve significant performance by using the same or less amount of resources of either financial, power or road capacity. "Intelligent" systems that react when a traffic accident occurs by automatically establishing a dialogue with the relevant services (emergency services, police, fire brigades) and giving them accurate information on the number of injured, the degree of injury and the resulting damage. Such systems automatically send information to the central control units to indicate the urgency of the approach to a semaphored intersection. Demand for the roadway capacity would be smaller in a way that passengers would be encouraged to use alternative modes of transport. Namely, “Park and Ride” systems are based on the promotion of the public transport and consist of a large area used as a parking lot in the peripheral part of the city where passengers traveling to the city center would leave their means of transport for cars, motorcycles and the like) and public city transport or other alternative transportation modules transported to the center with significantly less traffic capacity, reducing the negative impact on the environment, reducing the time needed to reach the center (without the time needed to locate the parking lot), all for the price of a single ticket including parking funds and transportation to the center.
Traffic incident management is a priority traffic management function when a system response is needed to correct it. Different systems are used in or out of the vehicle, and are manifested by the rapid reaction of emergency services and the prioritization of urgent services at intersections. Demand management for part of the roadway combines different traffic lanes, changing light plans for certain vehicles to reduce waiting at tails at crossings. For example, if there are no vehicles waiting in the free-wheel track on a trailer, the system automatically checks the presence of the vehicle in the other signal group and, if necessary, allows the passage of that vehicle group. Providing environmental information is reduced to road information about the road traffic situation, possible crowds, weather conditions, roadworks, and the like. In case of information disadvantageous for passengers, systems provide information on possible alternative routes. Road maintenance management is a functional area responsible for maintaining systems used in intelligent management or maintenance of road equipment (traffic signs, traffic lights and the like).

REFERENCES