



## THE IMPORTANCE OF MODERN INTELLIGENT TRANSPORT SYSTEMS IN IMPROVING ROAD TRAFFIC SAFETY

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**Abstract.** This article discusses the importance of modern intelligent transport systems in improving road traffic safety. It explains the crucial role of intelligent systems not only in organizing efficient transportation of passengers and cargo but also in ensuring traffic safety on roads.

**Keywords:** driver, telematics, passenger, navigation systems, road traffic accident

In recent years, a number of laws and decrees have been adopted in our country aimed at ensuring road safety, preventing road traffic accidents, and reducing the number of fatalities and injuries. In particular, the Presidential Decree No. PQ-190 of April 4, 2022, "On measures to reliably ensure the safety of people on the roads and sharply reduce fatalities" was adopted.

Initial projects aimed at implementing driver support systems in various countries significantly reduce traffic accidents and at the same time increase the efficiency of transportation processes. One of the main such projects is the "Intelligent Highway." In this case, the infrastructure organized around the road mainly performs the task of delivering collected and processed information to the driver. In such a situation, there is no need to equip each vehicle with a complex technical system, but nevertheless, it is possible to provide at least one-way communication to the vehicle through the RDS-TMS system or information displays.

In such highways, a telecommunication environment is created that allows collecting meteorological, traffic, and other data from any part of the highway, processing them in a central system, and transmitting them to drivers in the form of current information or commands via traffic signs and information displays. The telecommunication environment can be wireless or formed through LAN and WAN networks.

Today, to implement the AHS (Automated Highway Systems) developing in world countries, it is necessary to first create the infrastructure, which requires the following measures:

1. Monitoring the condition of the road surface (physical conditions), traffic flow, and potential obstacles (traffic jams, road accidents).
2. Processing data at the traffic control center.
3. Delivering information to drivers: either to each driver or to the traffic flow.
4. Taking actions: through automatic systems in the vehicle (AHS-a) or via drivers (AHS-m).



During the driving process, information about non-standard situations is transmitted to the driver from the traffic control center. Information can be collected via measurements or video surveillance (intensity, speed, freezing, rain or snow). Verbal transmission of information to drivers is also becoming important, such as police announcements, emergency situations, service messages, and other notices



**Figure 1. AHS (Automated Highway Systems)**

After information is collected and processed at the traffic control center, it is transmitted to the driver via the vehicle's information system and other communication systems. Information boards and controlled traffic signs are used for the entire traffic flow.

Telematics not only helps organize the efficient transportation of passengers and cargo but also assists in solving traffic safety issues. The concept of safety is very broad. For example, in the urban public transport sector (GPOT), the monitoring system operates with video cameras installed in all vehicles and stops.

These systems allow drivers of passenger vehicles to avoid danger when a threat arises. "Intelligent" intersections warn the driver about dangerously moving vehicles even if they fail to stop at a red light. Well-designed systems are also used to ensure the safety of visually impaired pedestrians by establishing communication with public transport and traffic light control devices in various forms.

Systems that enhance human safety on the roads are based on intelligent sensors using situation analysis algorithms and reliable monitoring tools. One of the main parts of safety systems is communication devices.

Navigation systems based on satellites and radio communication tools are used to determine the location of tools used in eliminating the consequences of accidents or helping in dangerous situations. To reach the accident scene in a short time, the rescue team uses the optimal route. In many cases, it is possible to remotely monitor the condition of the injured person in the vehicle. The hospital doctor manages how to help the injured person from a distance and prepares all the necessary tools before they arrive at the hospital. The danger signal can be sent by the driver or automatically detected by a crash sensor or airbag. In public transport, an emergency alert button for assistants is located next to the driver. In addition, these buttons are installed at all public transport stops together with video cameras.

One of the simplest ways to ensure the safety of passengers in emergencies is to provide first aid to the injured person directly at the scene. Each driver should



carry a kit consisting of a mobile phone, a dual-band GPS-GSM antenna, and simple electronic devices.

In conclusion, it can be said that one of the means of protecting modern vehicles is an electronic road traffic accident registration device. This recorder not only helps determine the traffic accident but also allows for improving the vehicle's design. A modern vehicle is equipped with several sensors connected to recording devices. When a road accident occurs, the recorder saves 30 seconds before and 15 seconds after the incident.

The subsystems of Intelligent Transport Systems (ITS) operate to register and record vehicles that run red lights at intersections with high traffic flow, thereby enabling control and punishment systems.

With the help of these subsystems, all movement processes are registered: the vehicle's speed, direction, working hours, engine revolutions, and other indicators.

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