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CASE STUDY

Implementation of Intelligent Transport Systems

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PLANETSOFT

By implementing the Via Planet ITS system, we enabled our operators to manage and control traffic from a single central location. The system has enabled timely and quick detection of incidents, just like the reaction of our operators in real time, which has contributed to greater safety for all participants in traffic.

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Implementation of intelligent transport systems

Pursuant to the Law on Public Roads ("Official Gazette of RS", no. 3/04), the **Public Enterprise "Putevi Republike Srpske" d.o.o.,** is responsible for the maintenance, protection, reconstruction and construction of main and regional roads and road facilities, as well as for taking measures and activities to improve the safety of road traffic.

In accordance with the defined object of their business operations, and with a view to improving road traffic safety, and, in particular, increasing the safety of traffic participants, the Public Enterprise Putevi Republike Srpske started implementing the **"Pilot project for the establishment of intelligent transport systems (ITS)"** in January 2020, which included the implementation of advanced traffic monitoring, control and management systems in the Dragoraj Tunnel.
After the successful completion of the first phase, the second phase of the project was launched in 2021!

After a detailed analysis of all the tunnels that were built on regional and main road routes, and taking into account their importance, the traffic load and their significance in terms of the economic and business development of the Republic of Srpska, the below-listed tunnels have been selected for the implementation of the **ITS system** in the II phase of the Project:

Ugar Tunnel
L 270m

Čeljigovići Tunnel
L 580m

Kalovita Brda Tunnel
L 200m

Stambolčić Tunnel
L 980m

Čemerno Tunnel
L 2100m

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Implementation of intelligent transport systems

With a view to mitigating the problems caused by the increased traffic load, and to improving the performance of traffic management, the Client defined the goals of the **"Intelligent Transport Systems - ITS"** implementation project:

- Increasing the level of safety of traffic participants;
- Effective management and control of traffic in tunnels from a remote location through a single integrated platform.
- Constant improvement of traffic management business processes (easy setup and modification of standard incident response plans, easy integration of new equipment, system scalability, etc.)
- Two-way communication with traffic participants

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Solution

The Public Enterprise Putevi Republike Srpske selected the **Planet Soft** company to implement a software solution for traffic management and control in two phases, which, also, included equipping of a control center as the central location and system access point.

We developed and implemented **the Via Planet ITS software solution** as an advanced system aimed at providing traffic management services, enabling users and traffic participants to be better informed, with a positive impact on increasing the level of traffic safety.
The ViaPlanet ITS is a software solution that controls and manages traffic through installed field equipment. The system is designed to collect data about traffic, traffic accidents and other incident situations using data acquisition equipment (cameras, sensors, etc.). The collected data is sent to the traffic control center using the communication infrastructure and active/passive network equipment.
Operators in the control center carry out traffic management activities by applying the defined scenarios in the **Via Planet ITS** system.

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Project details

The Public Enterprise Putevi Republike Srpske manages the network of regional and main roads in the territory of the Republic of Srpska, which constitute an integral part of the European **"Trans-European Network (TEN)"** infrastructure. The total length of the road network is about 4,000 kilometers, with two or three traffic lanes, and a series of tunnels and other facilities.

Integration of different systems

- System of variable message signs
- Tunnel ventilation system
- Tunnel fire alarm system
- SOS call system
- Adaptation lighting for tunnels
- System of weather and road conditions
- Video surveillance system
- Automatic incident detection system
- Traffic counting and classification system
- Video wall system

More than 190 integrated I/O points

- 5 PLC controllers
- 85 AID Camera
- 12 PTZ cameras
- 3 systems of adaptation lighting for tunnels
- 60 variable message sign elements
- 18 SOS terminals
- 8 weather stations and non-invasive road sensors
- 1 video wall system with 9 monitors

The starting point of the Project

Before the implementation of a unique traffic management and control system, the existing topology of the implemented tunnel systems and subsystems was modest and was not mutually integrated, with minimal local management functionalities. None of the said systems and subsystems was aware of the existence of the other, while some tunnels did not have any management systems implemented, making it practically impossible for the operators to adequately manage the traffic. None of the advanced detection, control and management systems were implemented in the tunnels either.

In order to eliminate the resulting problems and increase the safety of traffic, **the Client placed the goals of modernizing the traffic infrastructure high on the priority scale.**

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System solution - integration through the unique Via Planet ITS platform

At **Planet Soft,** we analyzed the clients' needs, which has resulted in an implementation plan divided into several phases.

Phase A: Construction and electrical preparation works

Phase B: Installation of equipment in the tunnels

Phase C: Development and implementation of an integrated system for traffic management and control

Phase D: Engineering and integration of equipment into a unique integrated system for traffic management and control

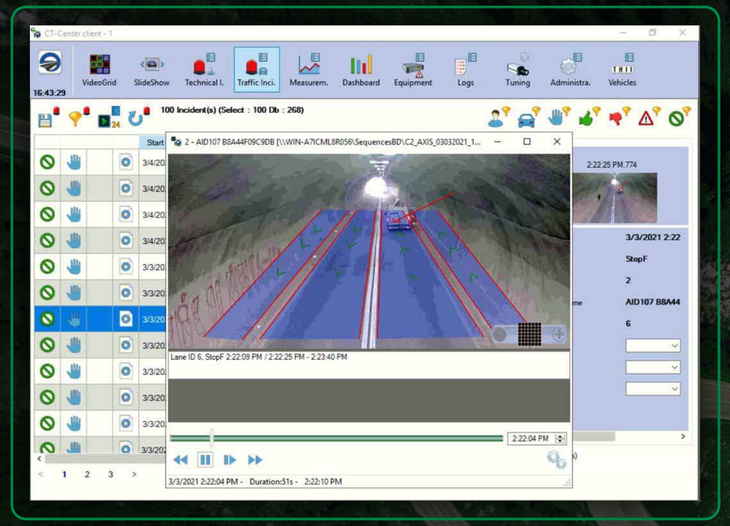
Phase E: Integration of the existing subsystems into a unique integrated system for traffic management and control

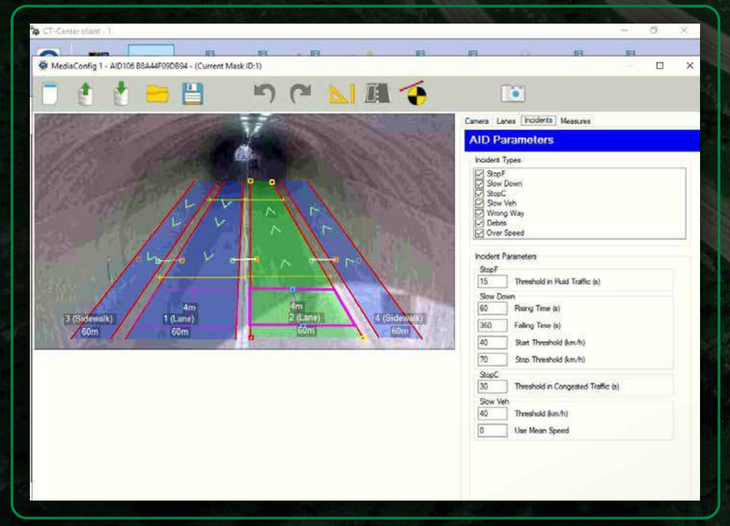
Phase F: Establishment of the central access point (the control center) of the traffic management and control system

The mentioned phases represent a prerequisite for the final phase, which is the moment when the client's desired solution is reached. **It is important to note that the system was constantly available and operational throughout the implementation period.**

Installation of equipment

The project involved a large variety of equipment and subsystems. Experienced members of the Planet Soft team tackled this challenge. The initial implementation of **the VPT ITS platform** integrated the tunnel traffic equipment enabling the operators to monitor and control traffic flow in tunnels through a single user interface. As the integration progressed, new tunnels in the system and supporting equipment were added without any disruption to the operators' daily work. In this way, the platform grew progressively. As for the existing subsystems that are implemented in some other projects, the Planet Soft team contributed to the clients' efforts to unify all systems and subsystems and quickly and a unique system of traffic control and management was implemented through quick and effective integration.





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Increasing the level of safety of traffic participants

The implementation of **the Via Planet ITS** system has increased the level of safety of all traffic participants:

- Operators of the Public Enterprise Putevi Republic of Srpska can now predict and detect dangerous weather and road conditions and adjust the flow of traffic in the tunnel accordingly;
- Detection of incident situations is available through the system for automatic incident detection;
- The system enables LOS (Level of Service) calculation in real time;
- Support for traffic management - the operators' decisions are monitored in the context of the incident location and type, and the system, thus, proposes, over time, the strategy that has proven to be most successful in the past.

Reduction of operator errors

Operator errors are reduced by applying artificial intelligence and machine learning algorithms. The system suggests the best strategy based on the defined procedures, traffic situation in real time and previous decisions. The operator is expected to perform only high-level tasks using fully his/her expertise. The system makes full use of the integrated equipment by collecting information in the context of incident detection and resolution. After an incident is activated, the system proposes a predefined scenario.

Constant improvement of work processes (easy setup and modification of standard incident response plans, easy integration of the system with new equipment, plug&play functionality, adding of new facilities to the system – new tunnel, opened section, bridge...)
During the incident resolution, the system monitors the operator's decisions and allows changing the scenario for a certain type of incident, learning and deviating from the default scenario in an efficient manner.

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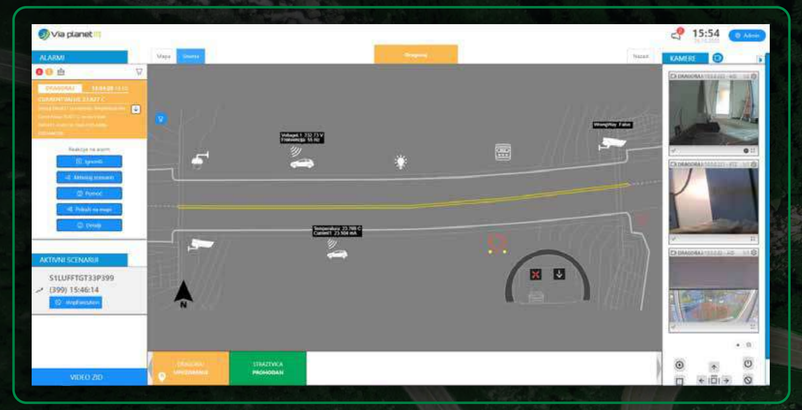
One of the potential scenarios that illustrates the operation of the system:

The AID camera detects a pedestrian in the tunnel or a load that was dropped during transport, alerts the operator in the control centre who, based on the detected incident, undertakes actions that, for example, reduce the speed of vehicles in the tunnel, using variable message signs. If necessary, he/she closes one or more traffic lanes, informing, by means of the information LED display in front of the tunnel, traffic participants about the current situation and the measures that have been taken.



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