



## CERTIFICAT OF CONFORMITY

Public tender ID : [ocds-b3wdp1-MD-1648535285228](#)

Beneficiary: Î.S."Administrația de Stat a Drumurilor"

Company CROSS Zlín, a.s. as a traffic technology manufacturer and technology provider, the tender states that the "National Road Traffic Monitoring System (with installation)" complies with the technical requirements listed below.

At the same time, CROSS Zlín, a.s. states that this "VideoTrafficEmbedded" System also includes software for reading and calculating road traffic according to the specifications.

Technical specifications and requirements to be performed according to the specifications:

The project includes 15 video analysis units for monitoring objects (transport units) and evaluating their trajectories in real time using the RTSP camera stream, with H264 or H265 video encoding, together with software that allows remote control and configuration of the unit. The unit will be able to process two-way traffic using real-time camera flow. All calculations related to the extraction of traffic data from images and their interpretation will take place inside the unit (local); after connecting the camera, the unit operates as an independent system - a configurable traffic sensor.

Visual analysis requirements:

The detection and classification of objects in the image will be based on deep neural networks and will be in variants (front, back) at the position of the object relative to the camera on the horizontal axis. The minimum area of the object detected in the image will be 3000 pixels in HD resolution. Objects will be tracked as they pass through the area monitored by the single video source. The result of the visual analysis will include data for each object, such as:

- ID
- category of objects:  
bicycle, motorcycle;  
cars;  
trucks;  
articulated vehicles (semi-trailers, trailers);  
buses;  
vans.
- object color - basic classification (such as: black, gray, blue, brown, yellow, green, red, orange, white) during the day time.

• the trajectory of the movement of the object transposed on the road (during the current processing time).

This information will be provided continuously with a frequency of at least 1 Hz and a maximum processing delay of 3 seconds after receiving the camera stream.

Traffic Analysis Engine Requirements:

The analytical part of the system for evaluating the extracted trajectories will be programmable with the visual programming language, while the programmable interface will provide at least the following operators:

- Spatial filters - an area or gate with the ability to choose a direction and pass filter through an area or gate
- Motion filters - stationary time, duration of occurrence
- Attribute filters - object type, object color
- Other operators - level of service
- Set operators - union, intersection, complement



It should be possible to put operators together and connect and thus create more complex traffic analysis functions. The analytical traffic core will continuously evaluate the extracted trajectories with a frequency of at least 1 Hz.

#### Data view:

The system will allow the configuration of the visualization of the extracted information and the exit of the basic analytical function of the traffic using the so-called widgets. The system will support at least the following types of view widgets:

- Distribution view - histogram or pie chart
- Heatmap (thermographic map) with a grid view option - a form of graphical presentation of the trajectory.
- Visualization of trajectories in the visual source material
- Value display
- View the variable with basic statistical parameters such as minimum value, maximum value, median value, and average value
- Tabular display

The system will allow these widgets to be connected to the individual filter / operator outputs, if they are compatible with the data. The system will allow the name and location of the dashboard widget to be defined. The system will also allow data to be exported from these widgets in CSV or other appropriate widget format.

#### Data interface:

The unit will provide a data interface in REST API (HTTPS) format. The interface will allow access to the collected traffic data both in raw form (trajectories) and to the output of the configurable traffic analysis functions. The data interface will also allow access to the history of monitored traffic values for retrospective data retrieval (for example, in case of disconnection from the unit).

Data transfer from local video cameras (traffic meters) to the central server will take place via GSM data communication.

Video traffic devices will be integrated on the server of the State Highway Administration, with the following parameters:

#### VM1 - Server

- quad-core processor
- 16 GB RAM
- 256 GB HDD

#### VM2 - MongoDB server

- quad-core processor
- 16 GB RAM
- 1 TB HDD

#### VM3 - Public Portal Server

- quad-core processor
- 12 GB RAM
- 64 GB HDD

Measured by local stations traffic data to be collected and stored in the central integration platform database for further processing, analysis and presentation.

The data of the measured objects should include speed and time.

#### Other:

- The unit will allow remote updating.
- The unit will have a protection mechanism against the loss of traffic data collected and a setting for a power loss.
- PTZ camera support with ONVIF - option to set traffic analysis for separate camera positions.
- The unit will accept user profiles with access permissions and do so with a minimum split:
  - reader - can view traffic analysis results (traffic data)



- administrator - can view and change analysis settings and manage other accounts
- The unit will support the so-called interactive evaluation mode in which there are at least 1000 updated trajectories that can be used to re-evaluate the results of the analysis based on the new system configuration.

#### Hardware Requirements:

The hardware unit is suitable for outdoor installation. The planned installation is on a street light pole with a console.

- Interface: 2xPoE for connecting camera units that provide RTSP stream (H264 or H265 encoding), data connection: 1xETH, 1xLTE or 1xWiFi
- UPS with power up to 300W
- Up to 64 Gb Micro SD Memory Card
- Power supply: 220 / 230V AC, power consumption of the processing unit without camera maximum 50W
- Installation: plastic or metal housing (combination), IP66
- Operating temperature range: -20 to 50 degrees Celsius
- Storage temperature range: -30 to 60 degrees Celsius
- Size: 550x550x350 mm
- Weight: up to 15 Kg

#### Camera requirements:

Model included in the Hikvision DS-2CD2623G2-IZS

project • 1 / 2.8 "progressive scan CMOS

- 1920 × 1080 @ 30fps
- 2.8 to 12 mm varifocal lens
- Color: 0.01 Lux @ (F1.2, AGC ON), 0.018 Lux @ (F1.6, AGC ON), 0 Lux with IR
- H.265 +, H.265, H.264 +, H.264
- Three streams
- 120dB WDR
- BLC / 3D DNR / ROI
- IP67, IK10
- Built-in micro SD / SDHC / SDXC card slot up to 256 GB
- 3-axis adjustment • IR lighting type EXIR lighting up to 60 meters

The systems for monitoring the objects (transport units) will be installed according to the predetermined places, according to the table. The systems will be installed on the existing pillars, which are connected to the electricity source. Transportation, assembly work, machine testing and training of ASD personnel were taken into account when preparing the offer.

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