

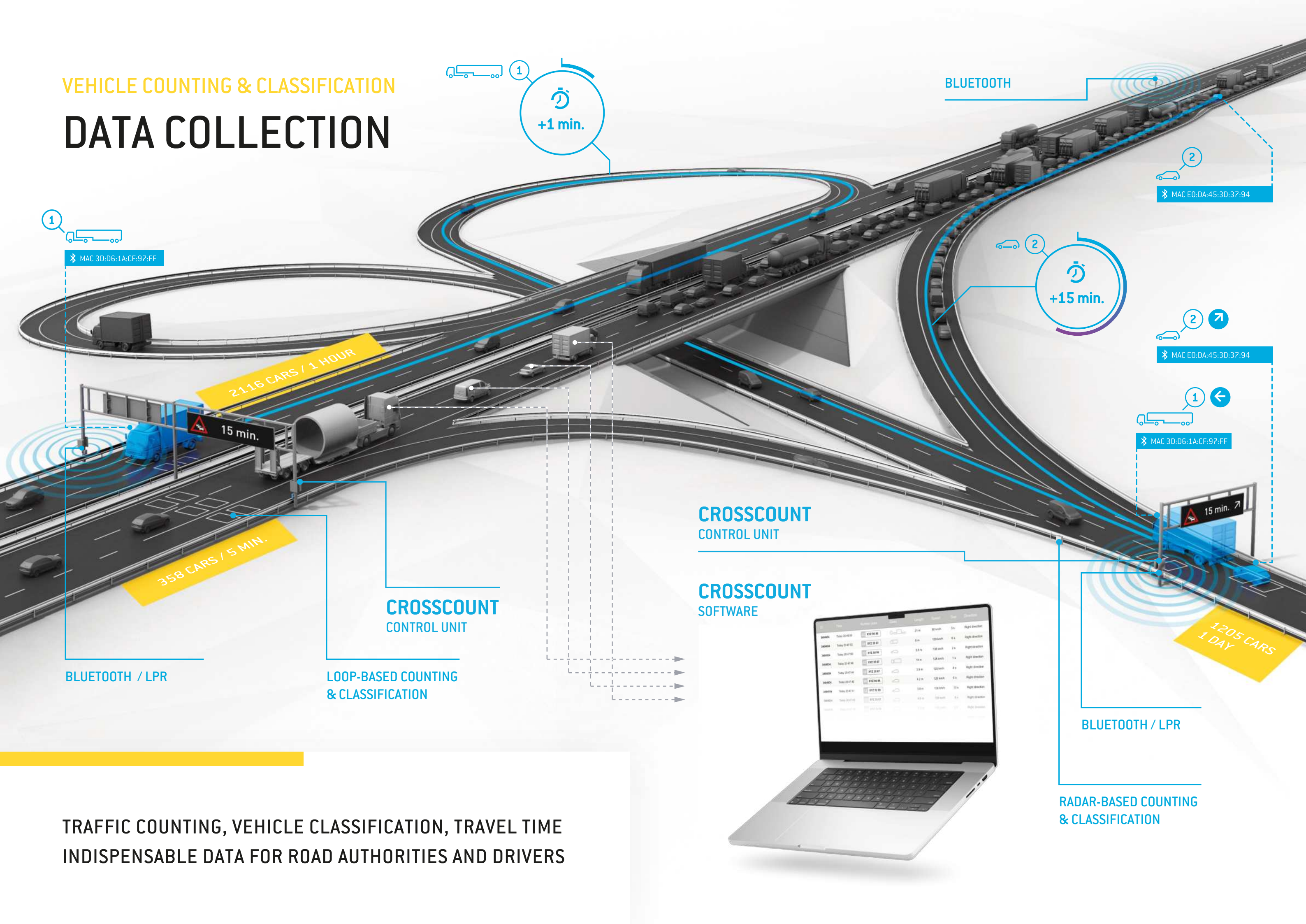


DATA COLLECTION



ALL-PURPOSE
TRAFFIC DATA

VEHICLE COUNTING & CLASSIFICATION DATA COLLECTION



BLUETOOTH / LPR

LOOP-BASED COUNTING & CLASSIFICATION

CROSSCOUNT CONTROL UNIT

CROSSCOUNT CONTROL UNIT

CROSSCOUNT SOFTWARE

BLUETOOTH / LPR

RADAR-BASED COUNTING & CLASSIFICATION

TRAFFIC COUNTING, VEHICLE CLASSIFICATION, TRAVEL TIME
INDISPENSABLE DATA FOR ROAD AUTHORITIES AND DRIVERS

| Time | Vehicle Count | Vehicle Type | Speed | Direction |
|---------------------|---------------|--------------|---------|-----------------|
| 2023-10-27 10:00:00 | 152 | 100 | 25 km/h | Right direction |
| 2023-10-27 10:01:00 | 153 | 100 | 25 km/h | Right direction |
| 2023-10-27 10:02:00 | 154 | 100 | 25 km/h | Right direction |
| 2023-10-27 10:03:00 | 155 | 100 | 25 km/h | Right direction |
| 2023-10-27 10:04:00 | 156 | 100 | 25 km/h | Right direction |
| 2023-10-27 10:05:00 | 157 | 100 | 25 km/h | Right direction |
| 2023-10-27 10:06:00 | 158 | 100 | 25 km/h | Right direction |
| 2023-10-27 10:07:00 | 159 | 100 | 25 km/h | Right direction |
| 2023-10-27 10:08:00 | 160 | 100 | 25 km/h | Right direction |
| 2023-10-27 10:09:00 | 161 | 100 | 25 km/h | Right direction |
| 2023-10-27 10:10:00 | 162 | 100 | 25 km/h | Right direction |

ALL PURPOSE TRAFFIC DATA

DATA COLLECTION

Keep drivers informed of their expected time of arrival or road hazards. Gather accurate data on rush hour, the volume of traffic and heavily used routes.



Detailed overview of road utilization

Obtain accurate, up-to-date information on the quantity and types of vehicles passing along a road, when peak times occur and the most frequently used routes. Learn which spots experience congestion, where capacity is inadequate and identify potential sites for new roads. CROSS systems facilitate effective administration and oversight of road networks.



Early warnings and display of travel times

Gather data, use and share it. Administrators of road networks can apply the data our systems collect on traffic to help regulate its flow, for example, by digital signage. Drivers will be informed as to restrictions, hold-ups and how long it takes to get to specific locations.



Make transport plans in accordance with specific data

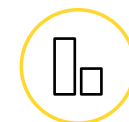
Reap the rewards of a focused traffic management solution for cities. Such road networks present particular challenges as they are often constrained and difficult to extend. CROSS excels at implementing effective systems based on precise analysis of traffic flow in city streets.

TRAFFIC FLOW MONITORING TECHNOLOGY

CrossCount



A reliable and flexible tool for counting and classifying traffic. The CrossCount unit uses the technology of induction loops or their combination with weighing sensors, or radar technology, and thus achieves very accurate measurement results. It is designed for one or even more lanes and has additional expansion functions thanks to sophisticated algorithms. The CrossCount unit can be configured according to local traffic conditions or national standards.



Accurate data



Precise overview

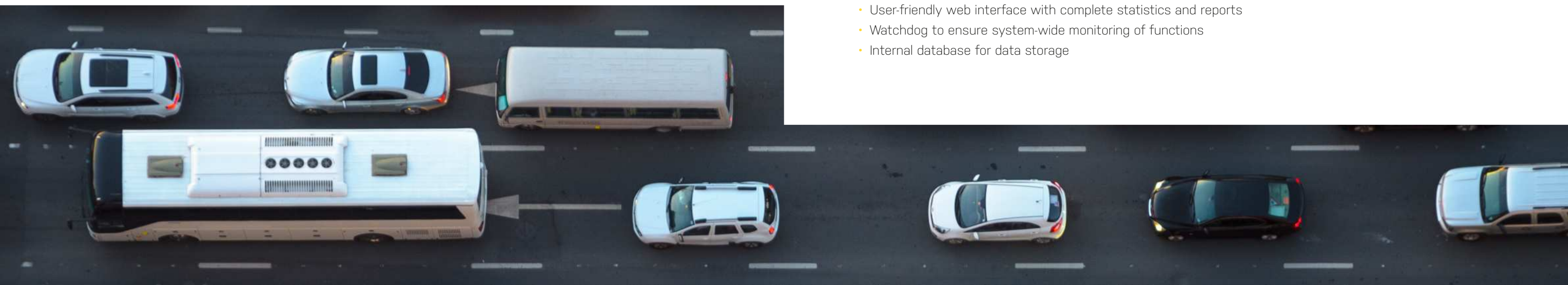


Available as OEM

Low energy concept

KEY FEATURES

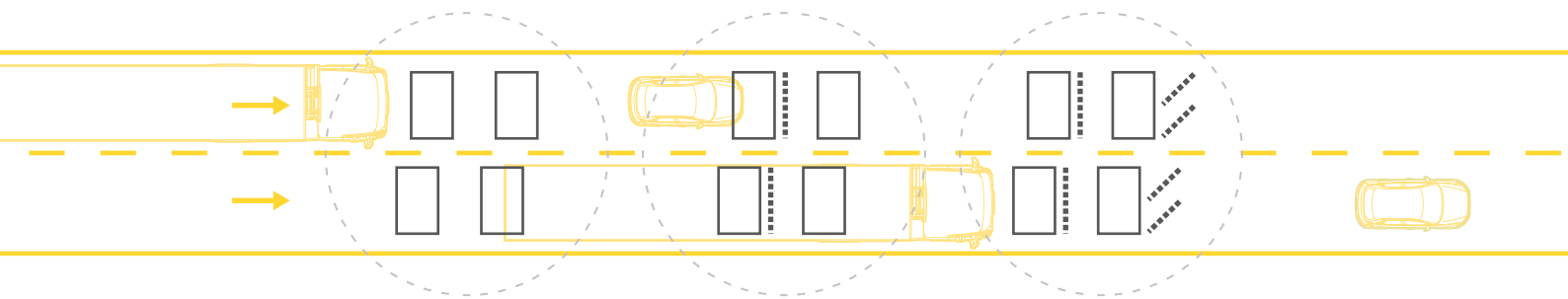
- Internal battery for short-term backup
- High accuracy based on compensation for unusual activity, thereby eliminating external effects
- One module covers up to 10 lanes
- Adjustable to match various dispositions of loops and sensor placement
- Sophisticated classification based on the magnetic signatures of vehicles
- Communication via GSM/GPRS, 4G, 5G, LTE, TCP/IP, emergency/SOS system data line or radio
- Option to export data to other IT systems
- User-friendly web interface with complete statistics and reports
- Watchdog to ensure system-wide monitoring of functions
- Internal database for data storage



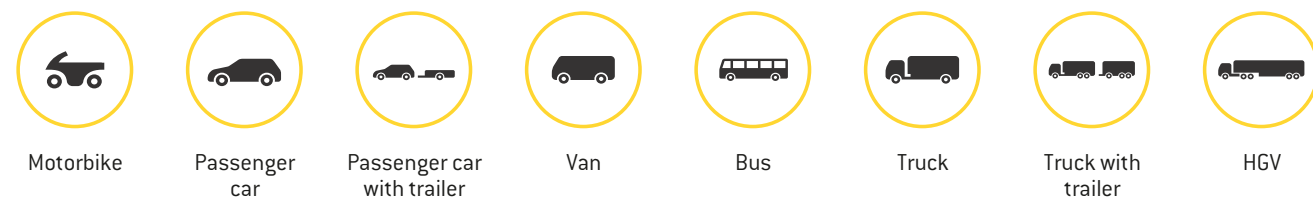
TRAFFIC COUNTING & CLASSIFICATION

| | | |
|---|---|---|
| <p>CLASSIFICATION BY MAGNETIC SIGNATURE</p> <ul style="list-style-type: none"> Based on inductive loops only Classification by the magnetic signature and length of a vehicle <p>BASIC CLASSIFICATION EN 8 + 1 or 8 + 0</p> | <p>PRECISE CLASSIFICATION BY PIEZO SENSOR</p> <ul style="list-style-type: none"> Based on inductive loops and a Piezo sensor Classification by the magnetic signature and length of vehicle, the number of axles, wheelbases and overhangs <p>CUSTOMER DEFINED CLASSIFICATION *</p> | <p>ABSOLUTE CLASSIFICATION BY THREE PIEZO SENSORS</p> <ul style="list-style-type: none"> Inductive loops combined with three Piezo sensors This version allows for clear extension of vehicle categories by detecting dual sets of tyres <p>CUSTOMER DEFINED CLASSIFICATION *</p> |
|---|---|---|

* Advanced classification enables precise determination of the class of vehicles if requested by users. This is typically based on the standards and conventions of the given country.



LOOP-BASED CLASSIFICATION EN 8 + 1 or 8 + 0

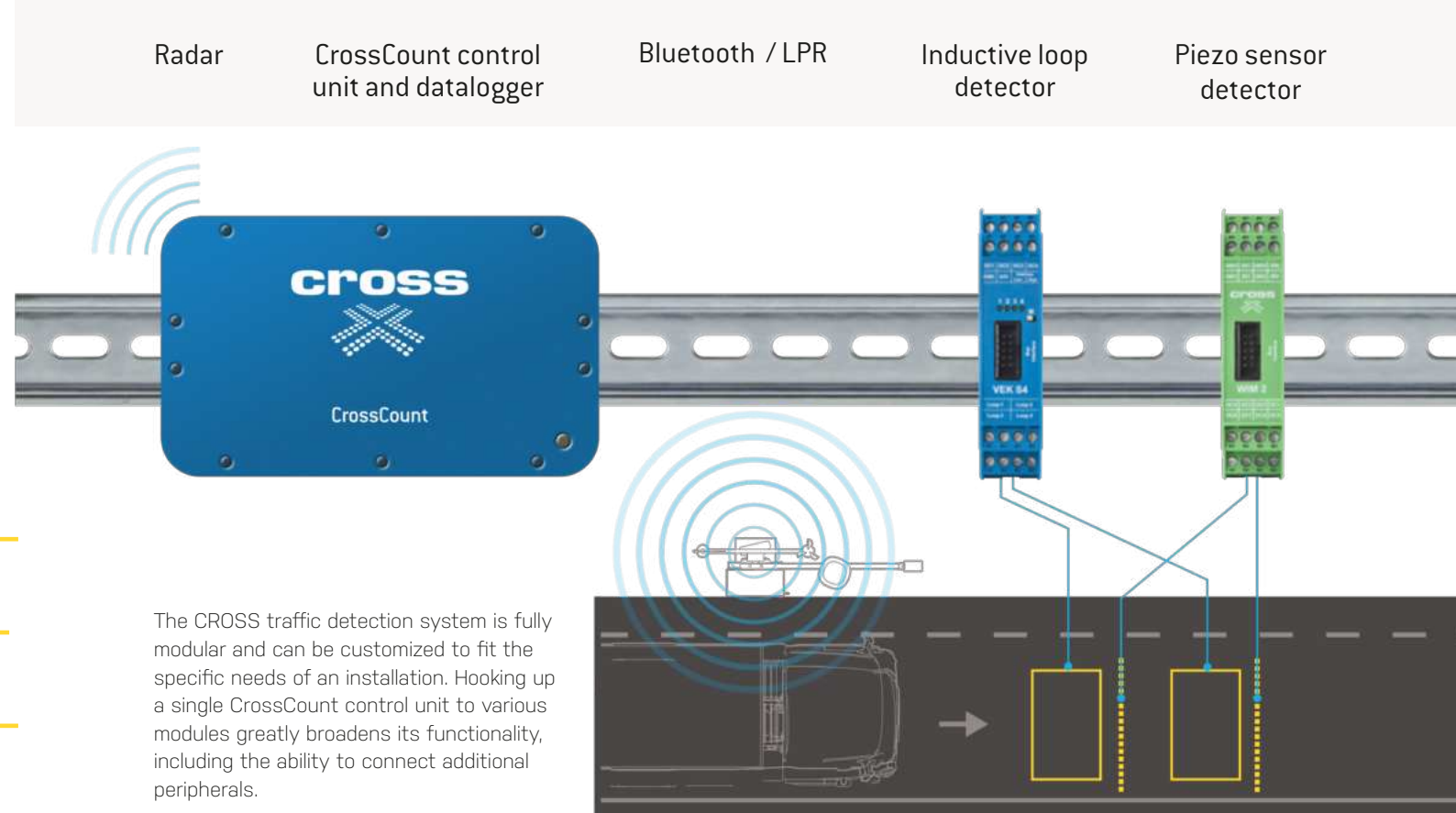


TRAFFIC FUNCTIONS

- Classification of vehicles into defined classes
- Total vehicle count for a user-defined cycle / interval (available per class of vehicle)
- Measures average speed for a user-defined cycle / interval (available per class of vehicle)
- Measures time gaps between vehicles
- Identifies the direction of traffic



MODULAR SYSTEM



The CROSS traffic detection system is fully modular and can be customized to fit the specific needs of an installation. Hooking up a single CrossCount control unit to various modules greatly broadens its functionality, including the ability to connect additional peripherals.

Configuration of CROSS traffic detection system

| | modules | | | | features | | | | | | | optional | | | | | |
|----------------------------------|---------------------------|-----------------------|---------------------|------------------|------------------|--------------------------------|-----------------------|----------------------|-------------------------|-----------------------|---------------------------------|-------------------|--------------------------|-------------|-----------------|-------------------------|------------|
| | control unit & datalogger | induction loop module | piezo sensor module | bluetooth module | traffic counting | classification EN 8+1 standard | classification EN 8+0 | basic classification | classification COST 323 | classification EUR 13 | customer-defined classification | traffic intensity | multi lane free-flow (1) | travel time | queue detection | traffic-flow monitoring | LPR system |
| CrossCount Loop-based | • | • | | | • | • | • | • | | | * | | • | | • | | • |
| CrossCount Precise | • | • | • | | • | • | • | • | • | • | * | | • | | • | | • |
| CrossCount Radar | • | | | | • | | | • | | | * | | • | | • | | |
| Travel Time | • | | | • | | | | | | | | • | | • | | • | |
| CrossCount & Travel Time | • | • | | • | • | • | • | | | | * | • | • | • | • | • | • |
| CrossCount Precise & Travel Time | • | • | • | • | • | • | • | • | • | • | * | • | • | • | • | • | • |

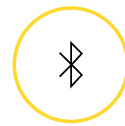
* consultation with a CROSS representative needed
 (1) including detection of vehicles changing lanes, or driving between lanes

MOVEMENT ON THE ROAD NETWORK

TRAFFIC FLOW DETECTION



Our Traffic Detection system anonymously monitors and collects the unique MAC* addresses of Bluetooth devices inside vehicles that pass through a monitored section. It is also tasked with evaluating exceptional circumstances, such as when traffic builds up or cars come to a halt on a road. Additionally, it provides information on expected travel times and the overall volume of vehicles in real time, as well as accurate data for analysis of traffic flow and surveying the origins and destinations of automobiles.



Bluetooth



Recognition of licence plates

** Note: The anonymity of the detected MAC address outside the system is preserved.*

TRAVEL TIME

Are we there yet? The Travel Time Invipo ITS System module has an answer to this age old question, gauging the time it currently takes to reach a point. It assesses the present situation on the roads, gives feedback as to any delays en route and recommends alternative routes to avoid traffic jams.

- Live and exact times for travel to selected points
- Calculates average speed
- Recommends alternative routes
- Utilizes past data to predict travel times

TRAFFIC FLOW & ORIGIN-DESTINATION SURVEYS

Find out which roads are continuously overloaded, where to expect traffic congestion during the day and which are the most frequented and busiest transit routes. Such traffic-flow data promote the efficient operation of networks and prove invaluable in the planning and construction of new roads.

- Monitors time-dependent traffic flow and its direction
- Accurate and valuable data for traffic engineers
- Statistics, reports and analyses
- Dynamic or adaptive control of traffic

SOFTWARE FOR DATA COLLECTION AND EVALUATION

CROSSCOUNT SOFTWARE



The CrossCount software, or Travel Times, collects and processes traffic data from one measuring station and stores it in an internal database. This data can be presented in the form of tables and graphs, or reports, or exported to other analytical programs for more detailed analysis.



Web API for data integration



API



WEB Services



Database



Fully customizable



UPGRADING THE D1 MOTORWAY

CASE STUDY



The aim of this project is to keep the general public informed of delays occurring as a result of overhauling a 200-km stretch of the D1 – the most important motorway in the Czech Republic. Commencing in 2013, this immense task has been carried out in stages.

Our Travel Time module monitors travel times in and around the parts under repair. The data gathered is presented on the Internet, detailing

where congestion has occurred at specific locations. It has proven possible to gather information from about 35,000 vehicles each day by leveraging Bluetooth technology.

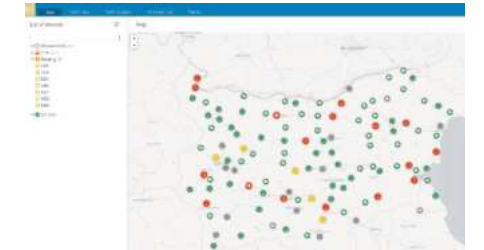


REFERENCES

Other references



Bulgaria, motorway network



Motorway and superior road network
6 + 1 Vehicle classification



Hungary, motorway network



Classification of vehicles in line with local regulations



Izmir, Turkey



Travel time, traffic level



Czech Republic, motorway & superior road network

Monitoring of traffic levels and travel time, data connection with web portal



Zlín, Czech Republic

Monitoring travel times in the city via Bluetooth technology



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EUROPEAN UNION
European Regional Development Fund
Operational Programme Enterprise
and Innovations for Competitiveness

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