

The background of the slide is the flag of the Czech Republic, featuring three horizontal stripes of white, red, and blue, with a white triangle at the top containing a red double-coiled snake. The flag is shown in a slightly blurred, draped manner.

Czech experience with supporting technologies for highways and tunnels

Libor Sušil, Sofia September 26th, 2017, by invitation of SYSCOM ENGINEERING

Czech motorways and 1st class roads

- **1223 km** of motorways– 17 sections
- **5663 km** of 1st class roads (incl. 90 km of express roads)
- **18 tunnels** on motorways (18 km) + **12** on 1st class roads (6 km)
- The longest tunnel – **2168 m**, AVG 1000 m
- **1603 bridges** on motorways (125 km)
- **6,380 thousands of vehicles**
 - Moto – 560 ths
 - Passenger – 5,110 ths
 - Heavy – 710 ths

Czech motorways and 1st class roads



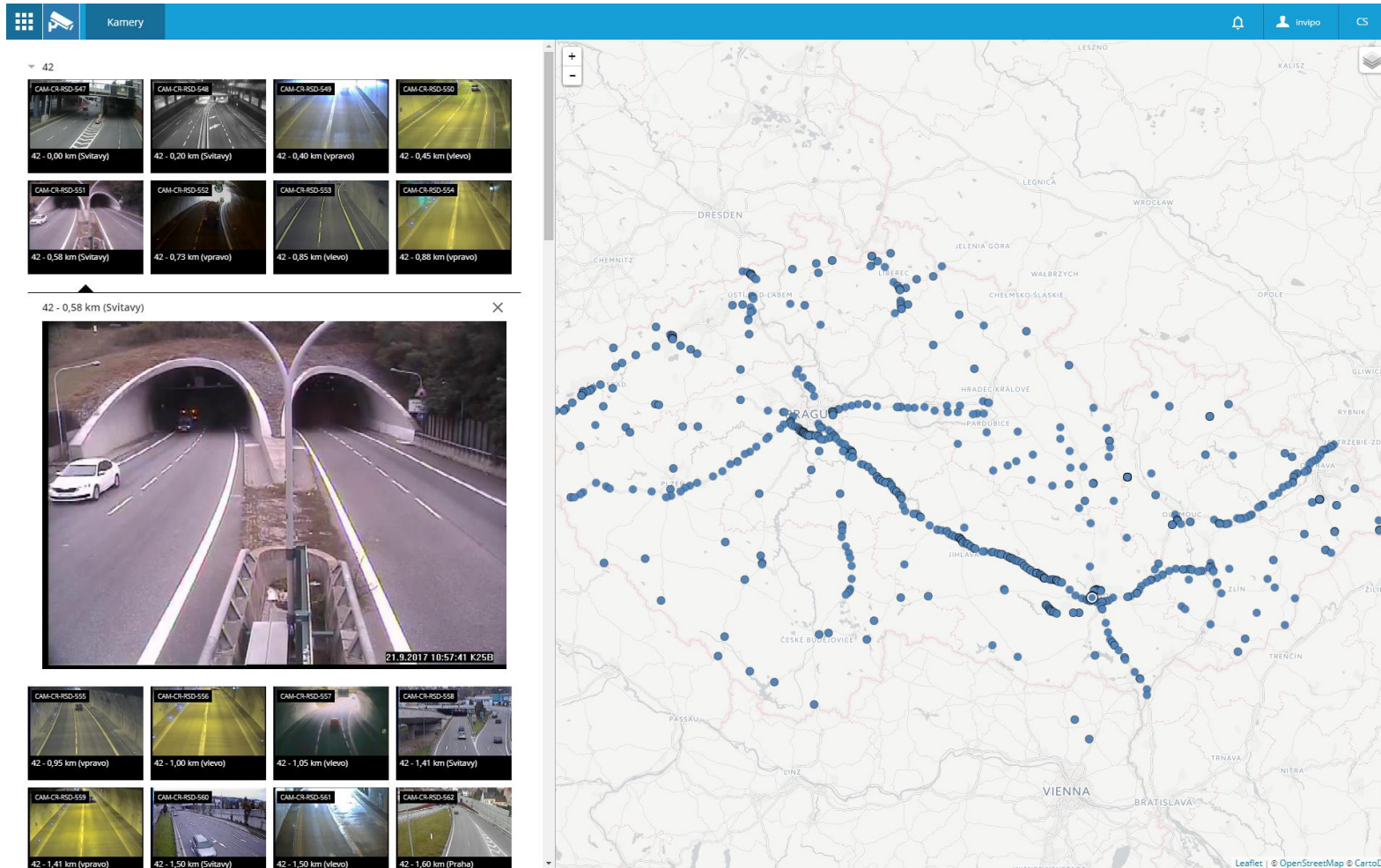
Czech experience with supporting technologies for highways and tunnels, by invitation of



Technologies, systems and telematics

- **600** cameras
- **300** traffic counting system and traffic flow monitoring
- **470** road weather station
- **270** gates for electronic toll system (1500 km)
- **40** station for travel-time measurement
- **20** weigh in motion stations (incl. direct enforcement)
- Traffic jam detection system
- Motion detection in the opposite direction
- Tunnel control systems
- Active traffic management system – VMS
- **110** info portals

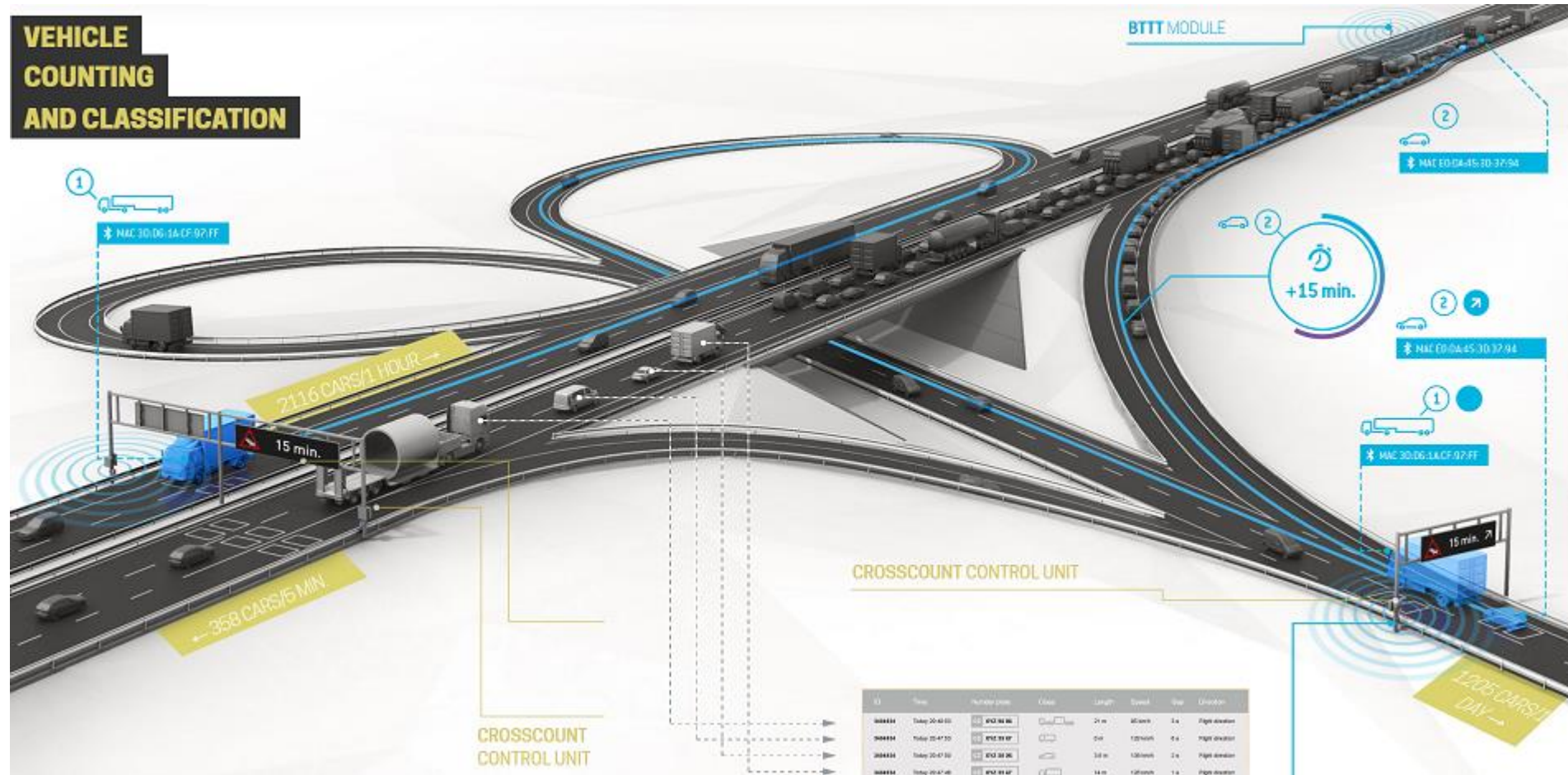
Cameras integrated by Invipo system



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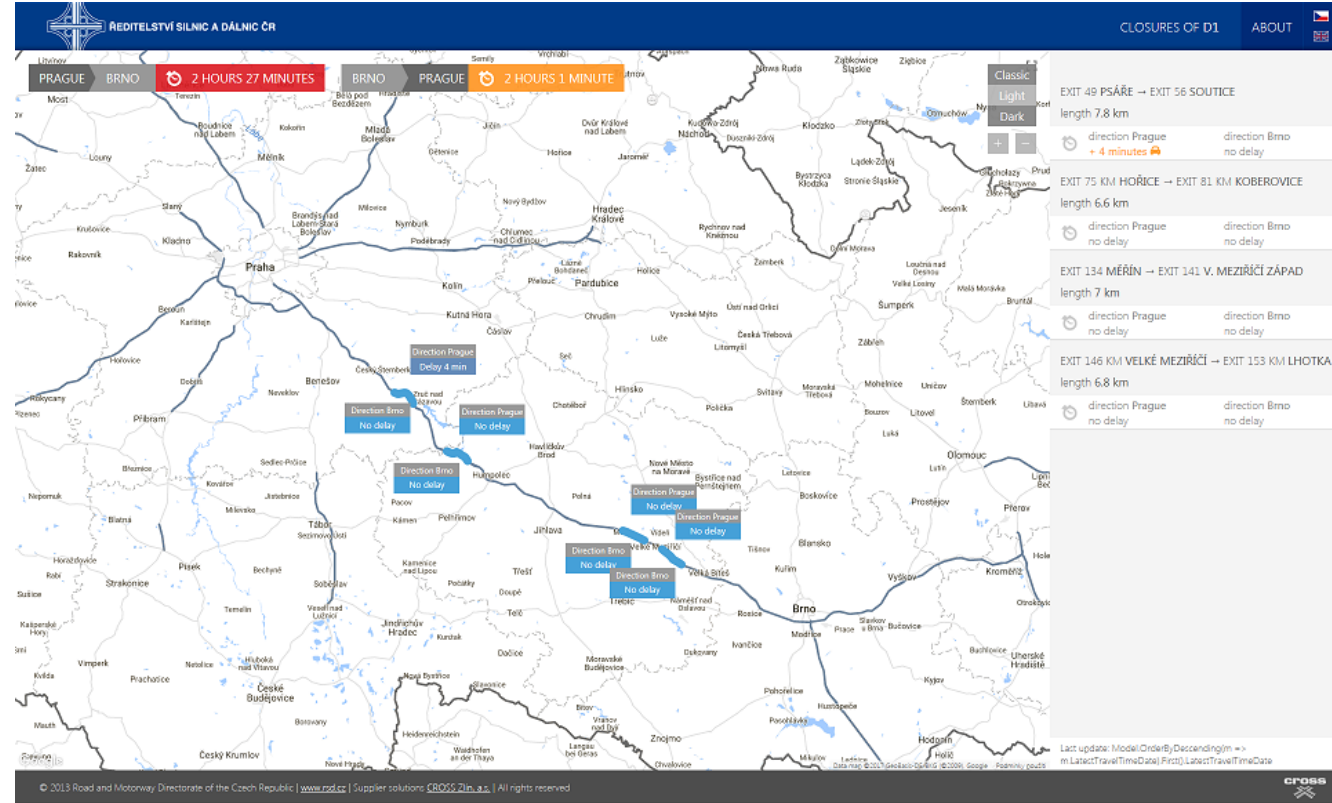
Traffic counting and classification, travel-time



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Traffic counting and classification, travel-time

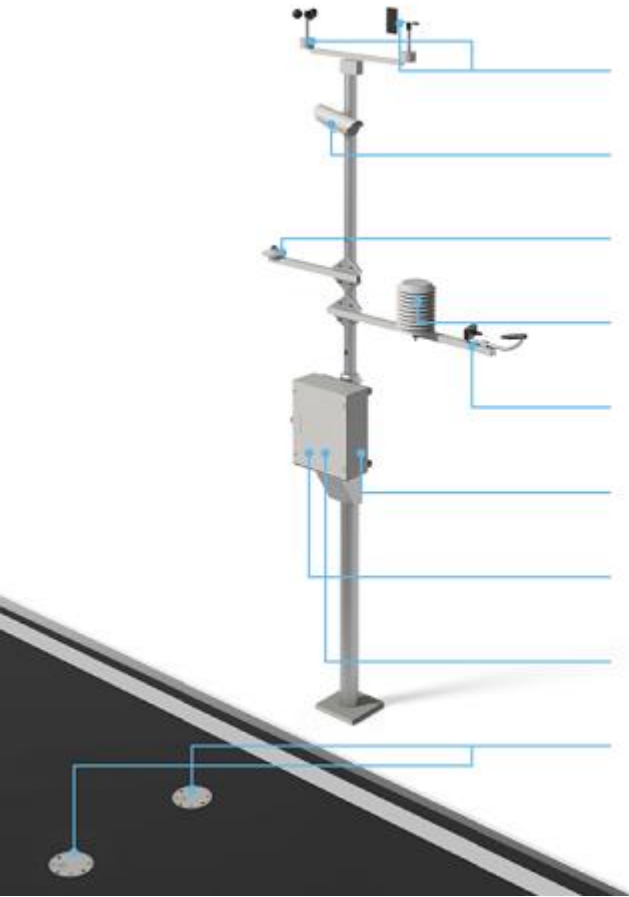


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Road weather system



WIND MEASUREMENT

OVERVIEW CAMERA

SUNSHINE – NET RADIATION

ATMOSPHERIC MEASUREMENTS

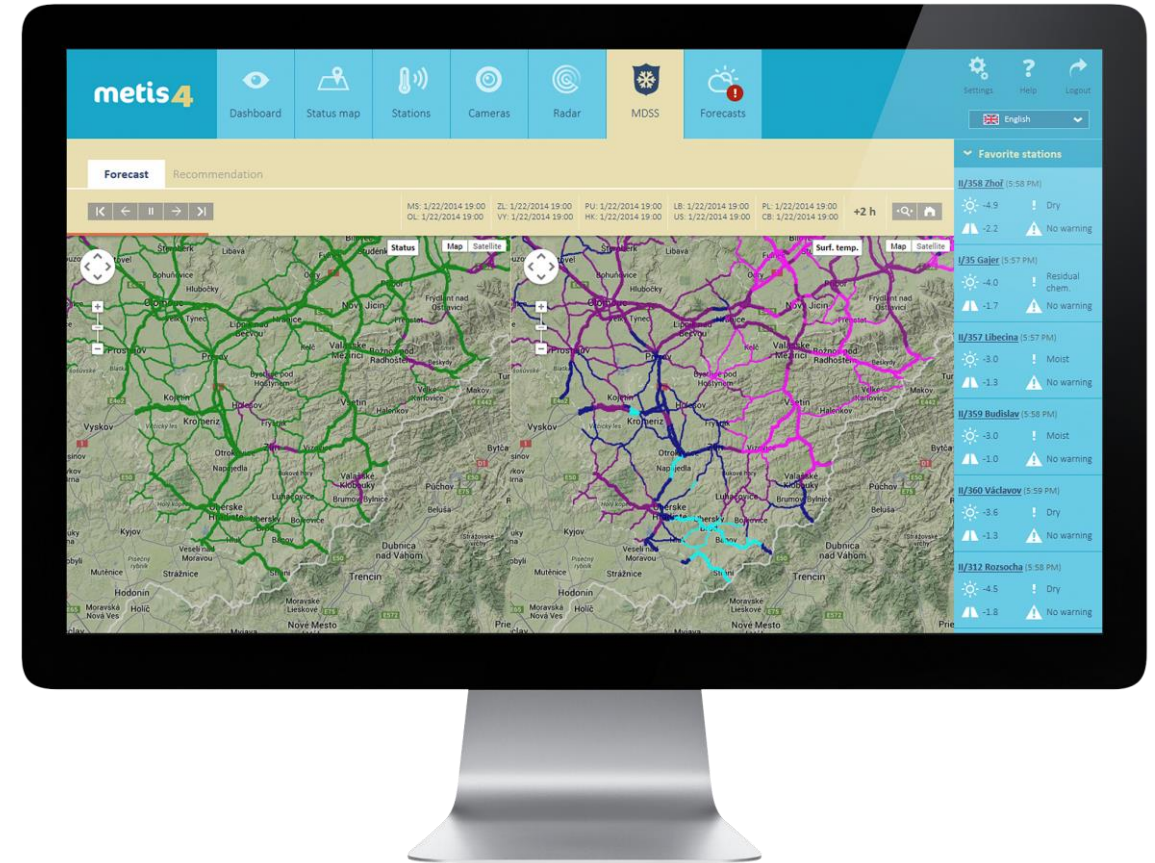
PRECIPITATION AND VISIBILITY

DATA TRANSMISSION

CONTROL UNIT AND DATALOGGER

CABINET AND POWER SUPPLY

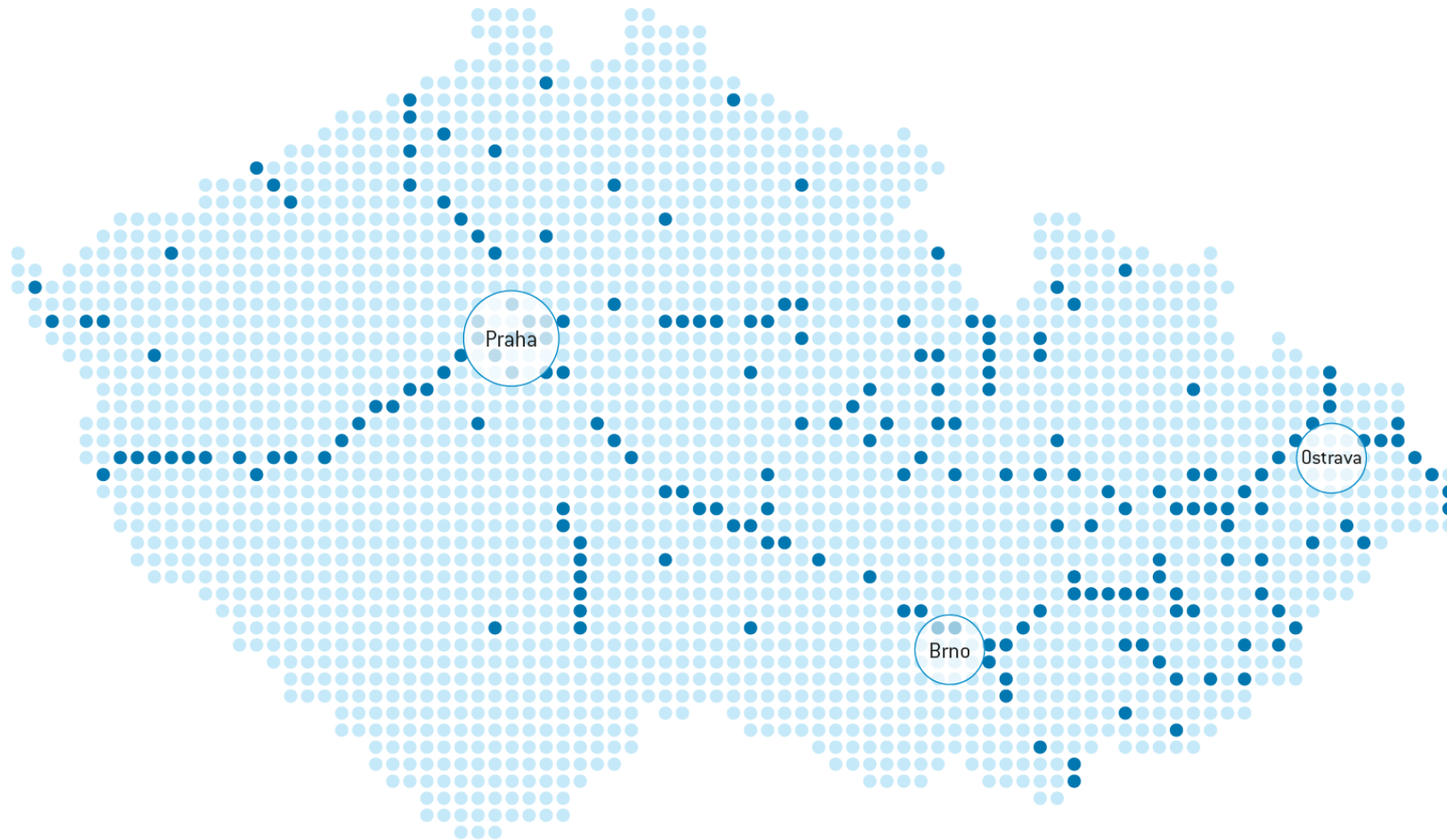
ROAD CONDITION MEASUREMENT



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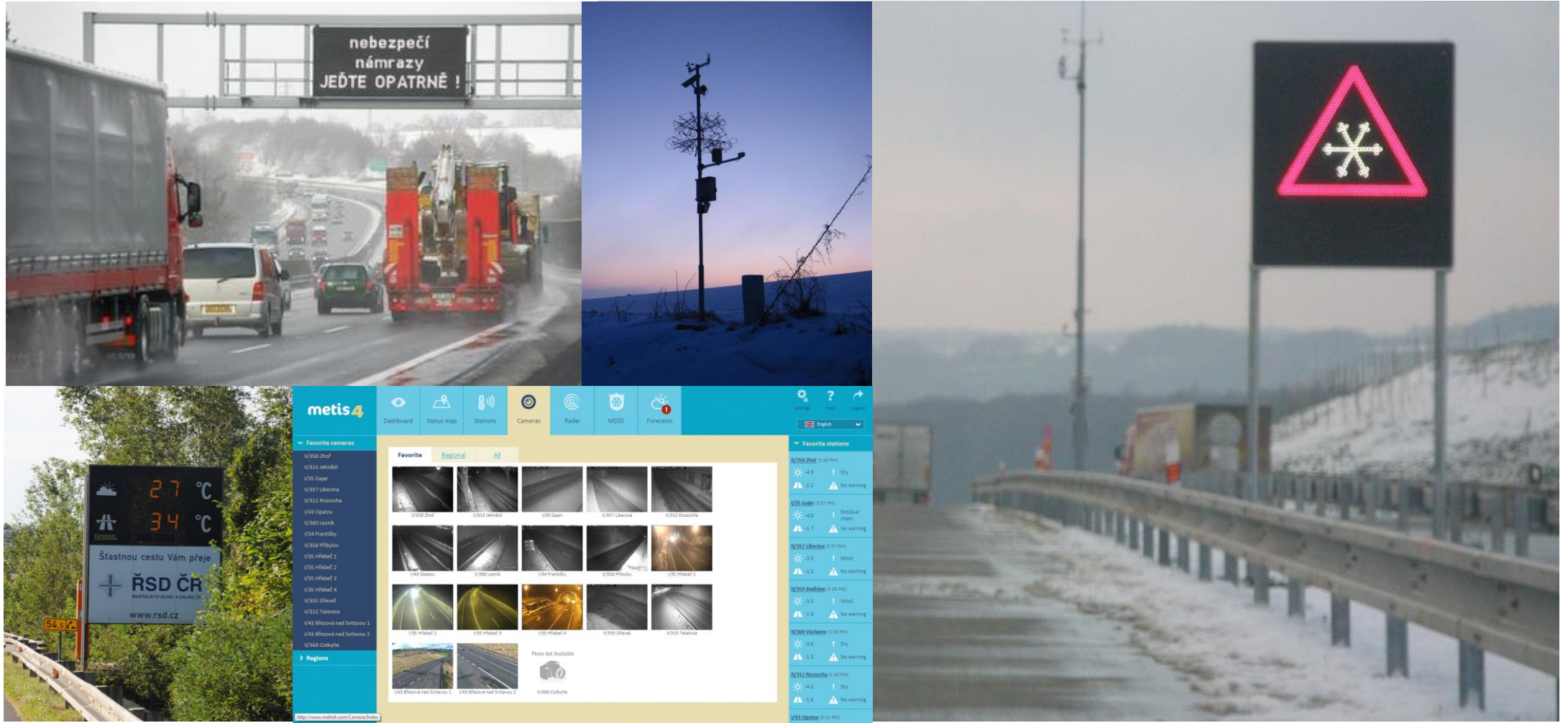
Road weather system



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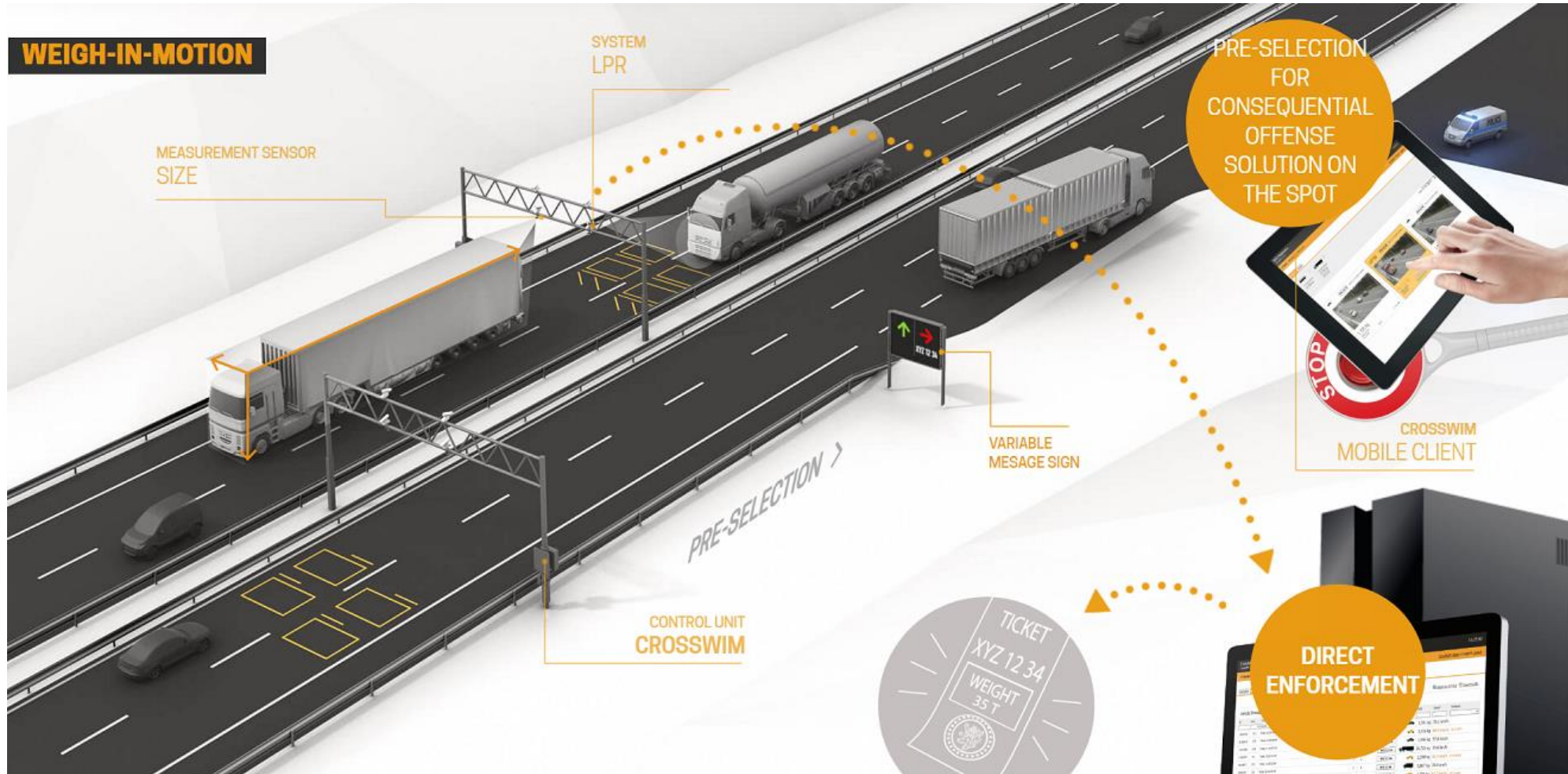
Road weather system



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Weigh in motion



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WIM – dimension measurement



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WIM – system recognition, VMS



Safety features in the tunnel



LIGHTING
Emergency exits and SOS niches are permanently lit

VIDEO SURVEILLANCE
Including speed measurement and adherence to minimum pitch between vehicles

EMERGENCY EXITS
Placed at regular distance

EMERGENCY LANES AND BAYS
To stop the vehicle

VMS
For active traffic control

AIR TECHNOLOGY
The ventilation system removes the smoke

SOS NICHE
Placed at regular distance:
- emergency telephone
- button to call for help
- fire alarm button
- portable fire extinguisher

Safety features in Czech tunnels

- **Video surveillance system** - CCTV, video detection, section speed measurement, ADR detection
- **Security system** - Emergency call SOS, alarm buttons
- **Traffic systems** – VMS, traffic light control, operating information equipment, vehicle height measurements, traffic data collection
- **Fire-fighting equipment** - automatic and push button fire detectors, hydrants, portable extinguishers, shutters and fire dampers
- **Evacuation equipment** - emergency escape light, safety markings
- **Communication equipment** - sound system, radio connection, mobile telephone network
- **Lighting**
- **Air control** - escape route ventilation, measurement of air flow and air condition
- **Electric power supply** including backup systems
- **Traffic monitoring and control systems**

Tunnels – Prague ring

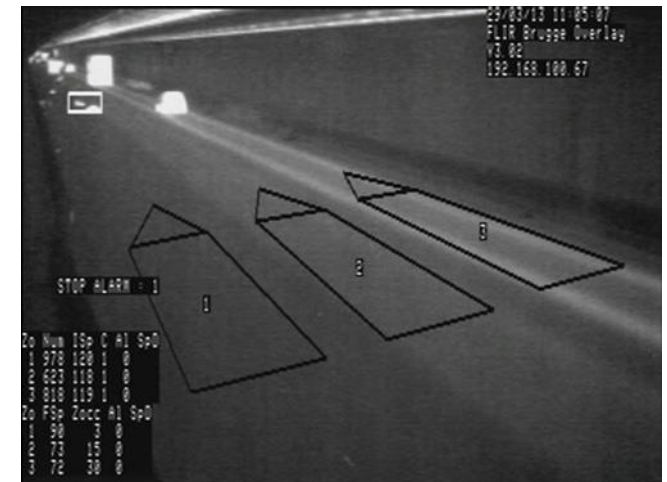


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Incident detection system in tunnels

- Automatic video incident detection – technology FLIR
- New version also with thermal cameras
- **Critical traffic information**
 - stopped vehicles (on the SOS niche, at the lane)
 - wrong-way drivers
 - pedestrians
 - lost cargo
 - early fire detection



Incident detection system in tunnels

- **TunnelCam Ultimo** – technology TKH Security
- Optical and thermal sensor
- High safety at low visibility
- Reliable detection of fire and heat outbreaks
- Automatic traffic incident detection
- Compact corrosion-free 316L stainless steel housing



Traffic control system in tunnels

Traffic management and tunnel technology is to be understood as part of a broader liner structure –motorway/road and tunnel - that ensures defined traffic control and technological equipment behavior in all tunnel conditions.

Input parameters are:

- Safety features (fire detection, security buttons, ...)
- Traffic parameters (traffic intensity, speed)
- Physical quantities (direction and speed of air, NOx concentration, ...)
- Technological variables (state of contactors, circuit breakers, input power)

Output:

- Traffic control, VMS, light signalization
- Control of technology elements – lights, ventilators, contactors, ...



NDIC - The National Traffic Information Centre

- The NDIC started operating on **November 1st, 2005**
- The new premises of the current station were open on **September 11th, 2008**



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