C-ROADS CZECH REPUBLIC
MEMBER OF C-ROADS PLATFORM

Spolufinancováno Evropskou unií
Nástroj pro propojení Evropy

Cooperative Corridor First experience

TEM / HEEP Area V 2018 Annual Meeting

Prague, 28 May 2018

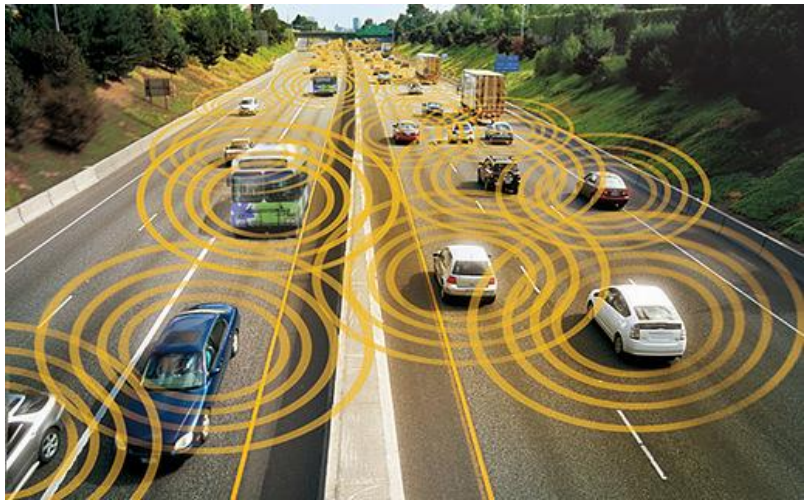
C-ROADS Europe

- platform of harmonized C-ITS (Cooperative Intelligent Traffic System) in Europe
- Goal: cross country seamless traffic information system
- 8 cooperative countries (GB,F,B,NL,D,CZ,A,SLO)
- Feb. 2016 – Dec. 2020
- Allocated total budget: 98 M € (CEF funding 55 M €)

C-ROADS

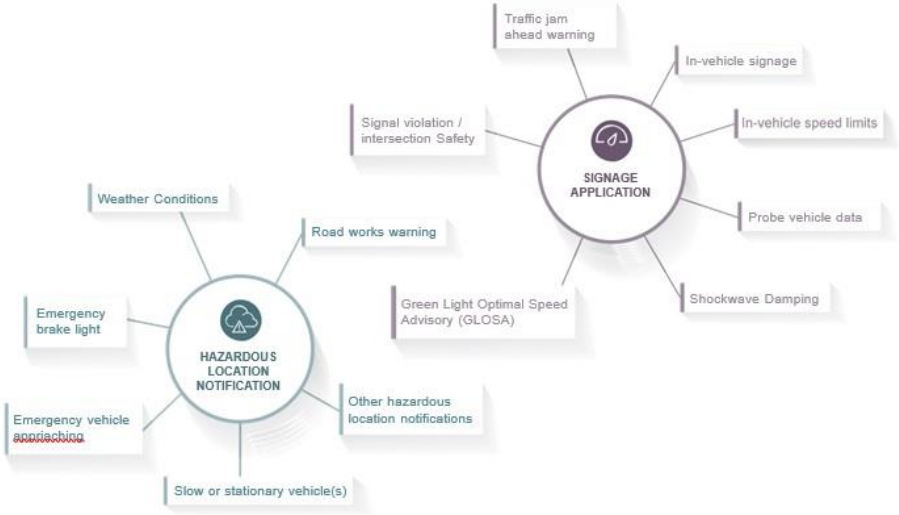
C-ROADS Europe

- based on wireless communication (C-ITS G5, Mobile 3G/4G/LTE, Wi-Fi and Bluetooth technology)
- between vehicles (V2V), vehicles and infrastructure (V2X)
- traffic information is generated from drivers behaviour and from infrastructure dependent of driving area and direction
- most frequent scenarios expected during traffic are precisely specified within so called Use Cases



C-ROADS Europe

- Use Cases are generated either automatically by sudden change of drivers behaviour or purposely from Traffic Centers along the motorways
- Use Cases are sorted by level of importance and urgency into Day 1 and Day 1,5 Services category
- Each Use case is gradually specified, tested and standardised for further implementation within other European member countries

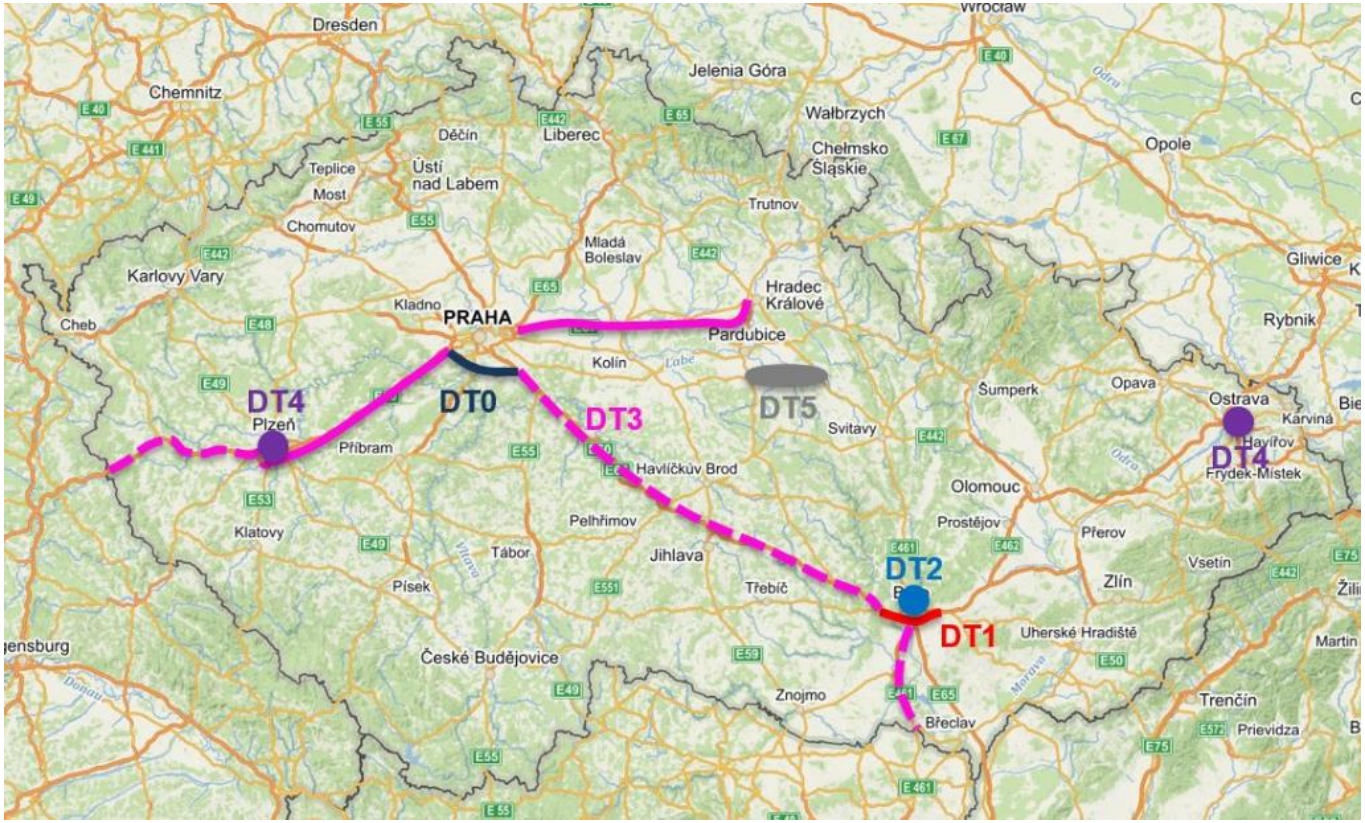


C-ROADS Czech Republic

- Basic Stone - Grant Agreement signed in November 2016
- Ministry of Transportation - Coordination Body
- Road and Motorway Directorate – Realisation Body
- 7 basic and 4 associated partners
- Deadline – December 2020
- Allocated total budget: 19 M € (CEF funding 16 M €)

C-ROADS Czech Republic

Deployment & Field Testing (DT) – Pilot Projects defined by Grant Agreement



C-ROADS Czech Republic

Deployment & Field Testing – DT „Zero“

- Location: South Prague bypass (46 km length)
- Not involved in C-Roads project yet but will become a full-fledged part in C-ITS
- New Use Cases implementation: Road Works Warning, Probe Vehicle Data, In-Vehicle Information

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Deployment & Field Testing – DT 1

- Location: Brno South D1 motorway part (23 km length)
- New Use Cases implementation: Slow and Stationary Vehicle, Emergency Vehicle Approaching

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Deployment & Field Testing – DT 2

- Location: Brno city
- New Use Cases implementation: Signal Violation, Weather Conditions

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Deployment & Field Testing – DT 3

- Location: Motorways D5 Prague-Plzen and D11 Prague – Hradec Kralove
- New Use Cases implementation: Traffic Jam Ahead Warning, Emergency Brake Light

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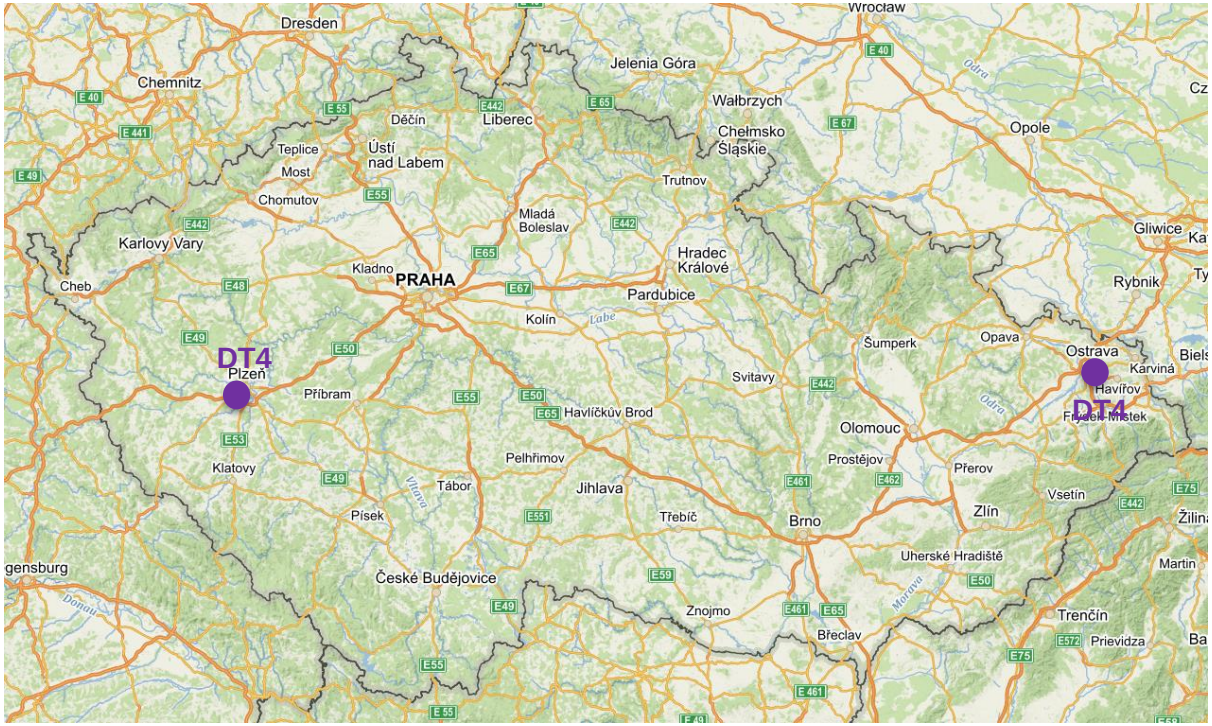
Deployment & Field Testing – DT 4

- Location: Plzen and Ostrava
- New Use Cases implementation: Public Transport Preference, PT Safety, Hazardous Location Notification



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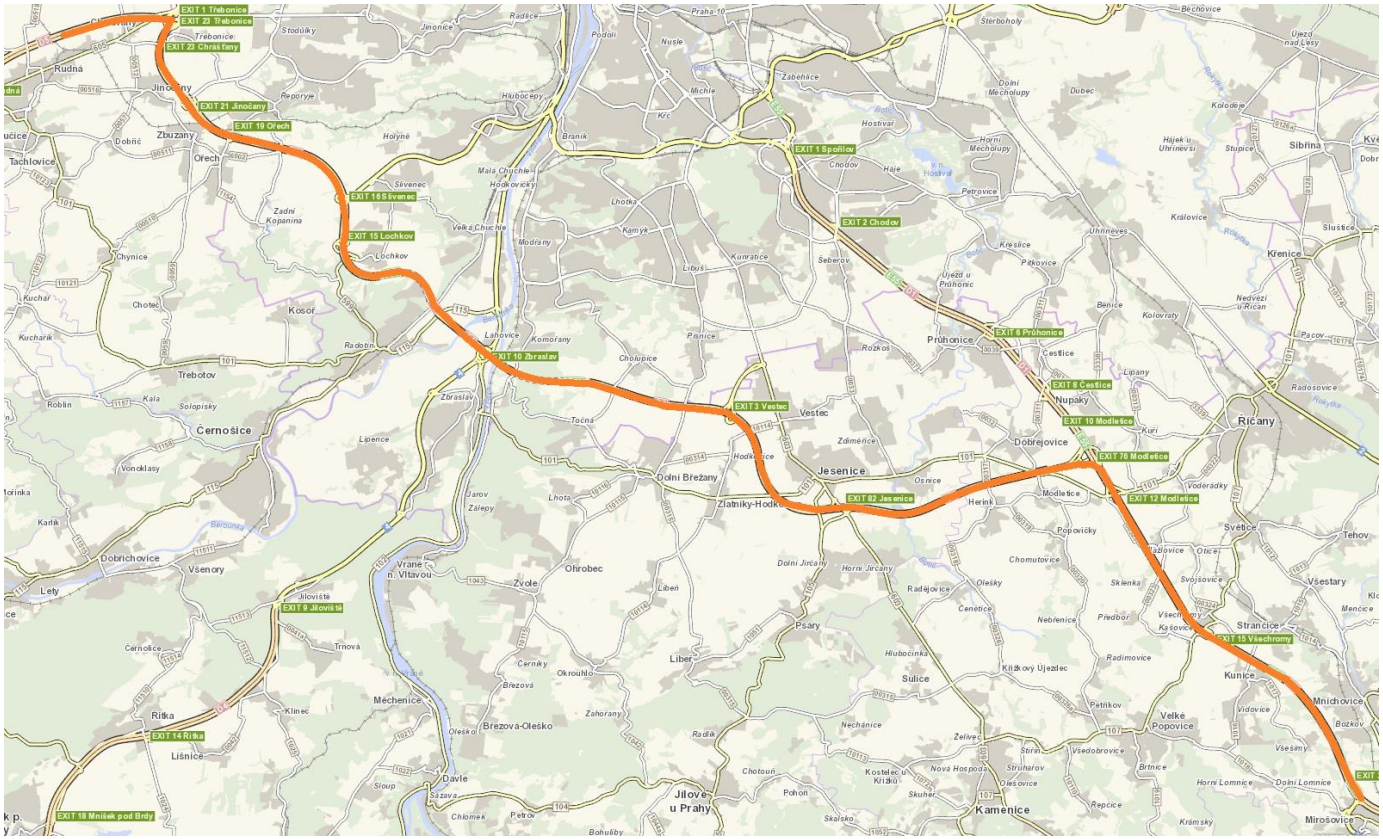
Deployment & Field Testing – DT 5

- Location: 2 Railway Crossing (W and W/O barrier) in Pardubice region
- New Use Cases implementation: Railway Level Crossing

Cooperative ITS Corridor Mirošovice – Rudná

- established in 2016 as an pilot cooperative system within Czech Republic
- 46 km stretch – D5 and D1 motorways parts and south Prague bypass D0 (R1)
- 2 tunnels (total of 3,6 km), 1 flyover (2,7 km)
- Busiest road in CZ

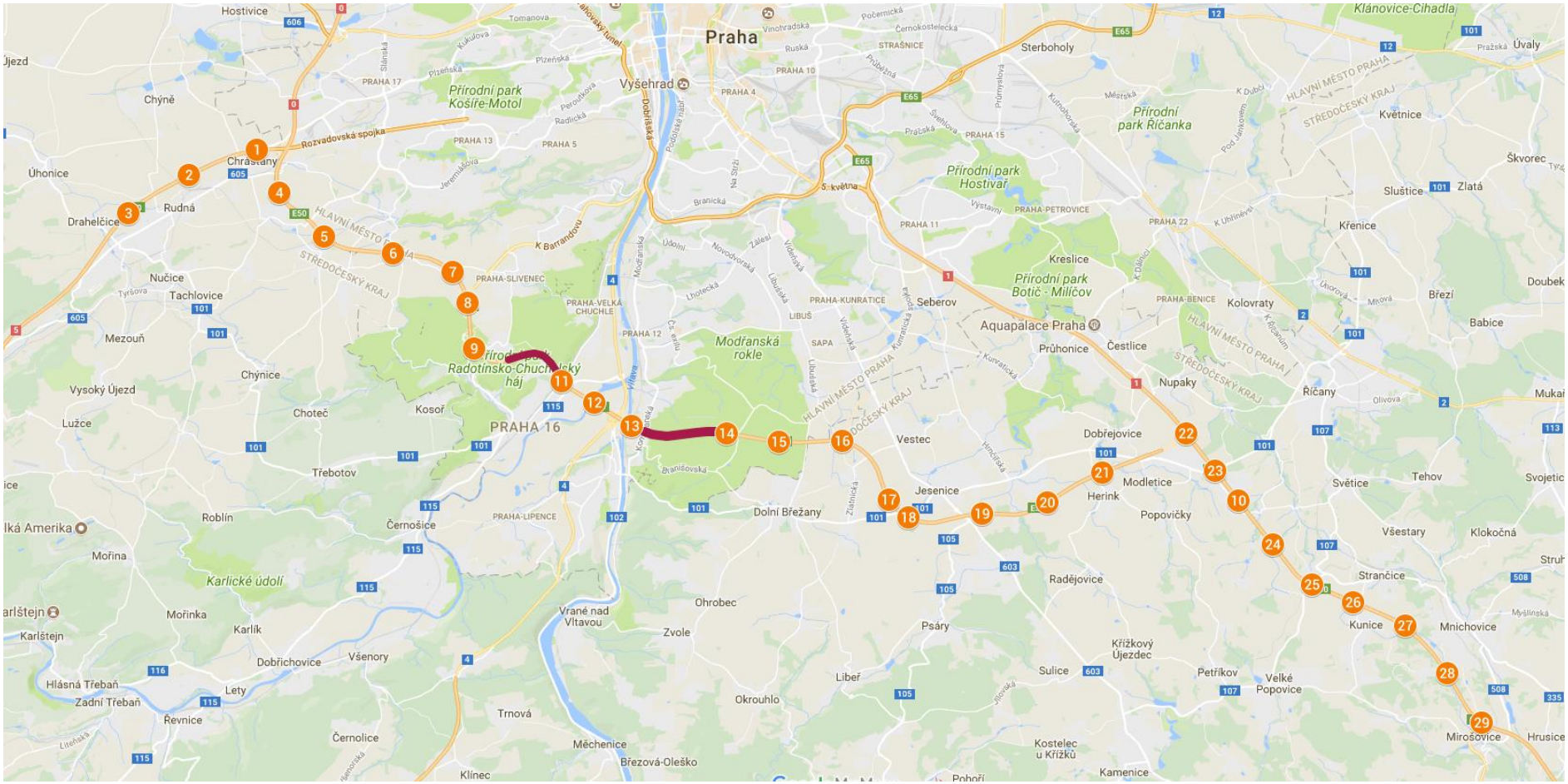


Cooperative ITS Corridor Mirošovice – Rudná

- Maintained by two highway maintenance centres – Mirošovice and Rudná
- Dedicated traffic management centre in Rudná (incl. management of tunnels)
- Dynamic Lane Management System
- Other ITS equipment (loops, CCTV cameras, tolling, height measurement…)
- total cost: 44 M CZK (1,8 M €)
- testing phase was finished in May 2018

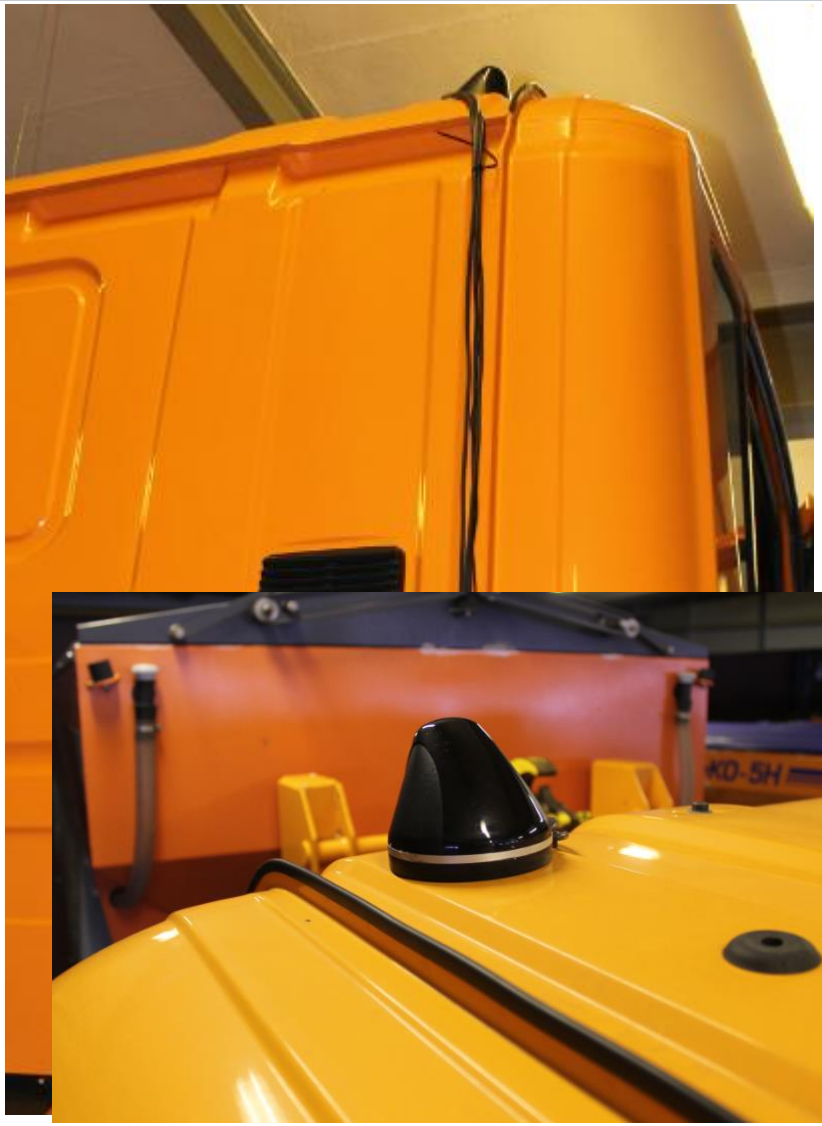
Cooperative ITS Corridor Mirošovice – Rudná

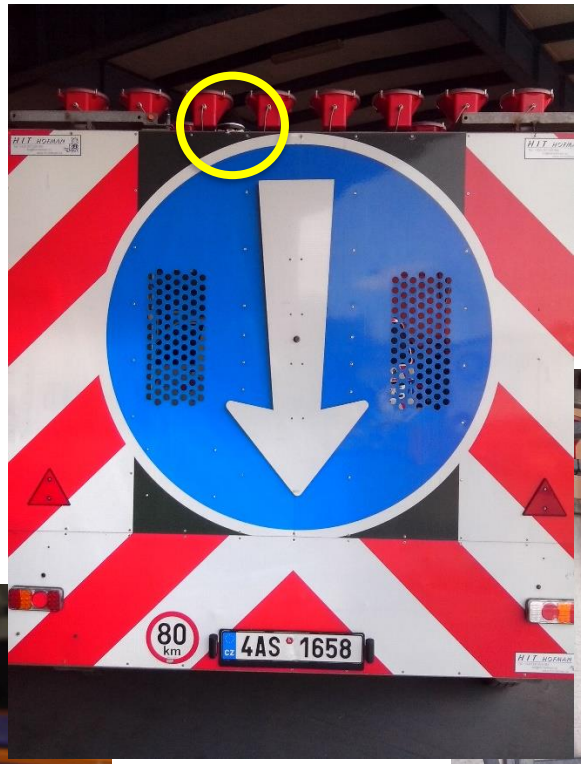
- 29 ITS G5 Roadside units including Bluetooth and Wi-Fi detection
- 5 On-board units (OBU) + 43 Road-vehicle units (RVU)
- Dedicated C-ITS back-office

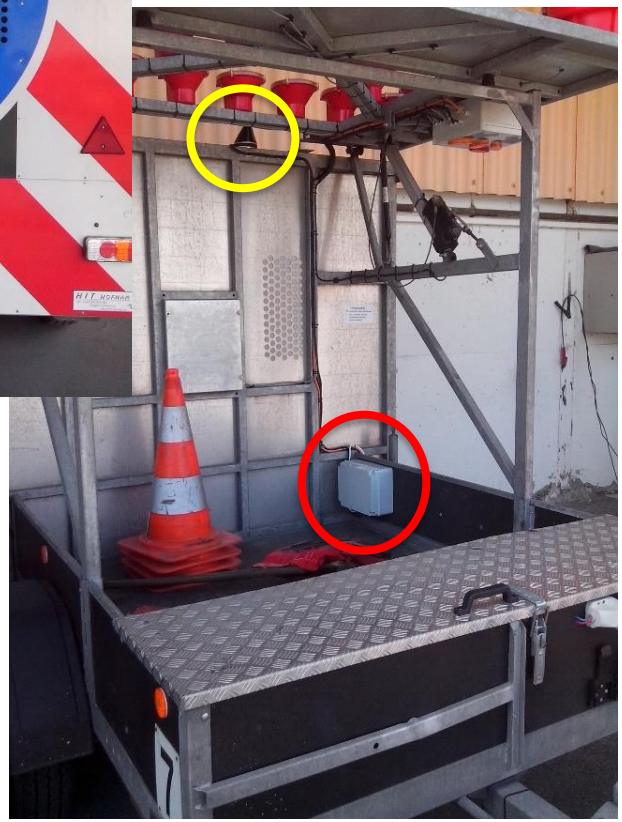


System technology

System technology

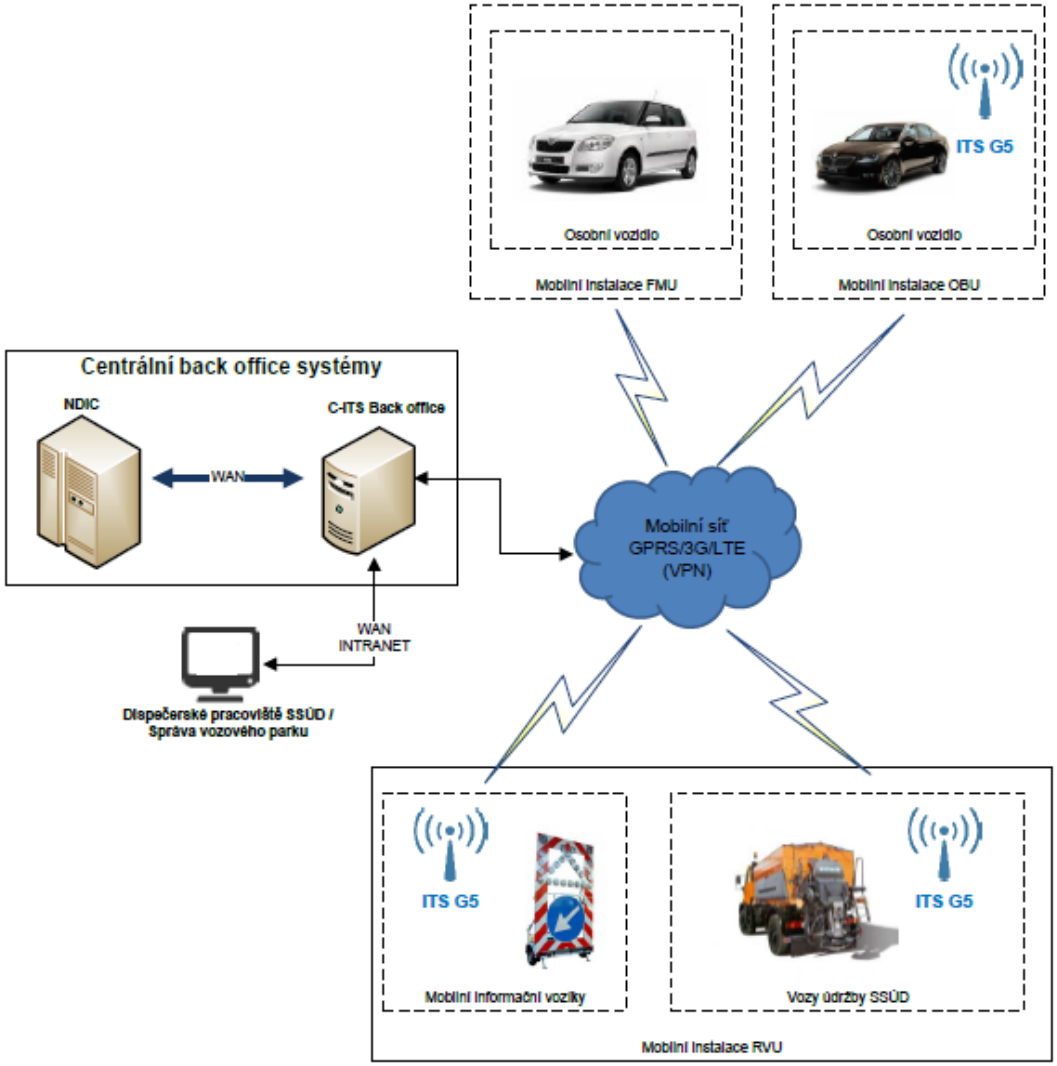






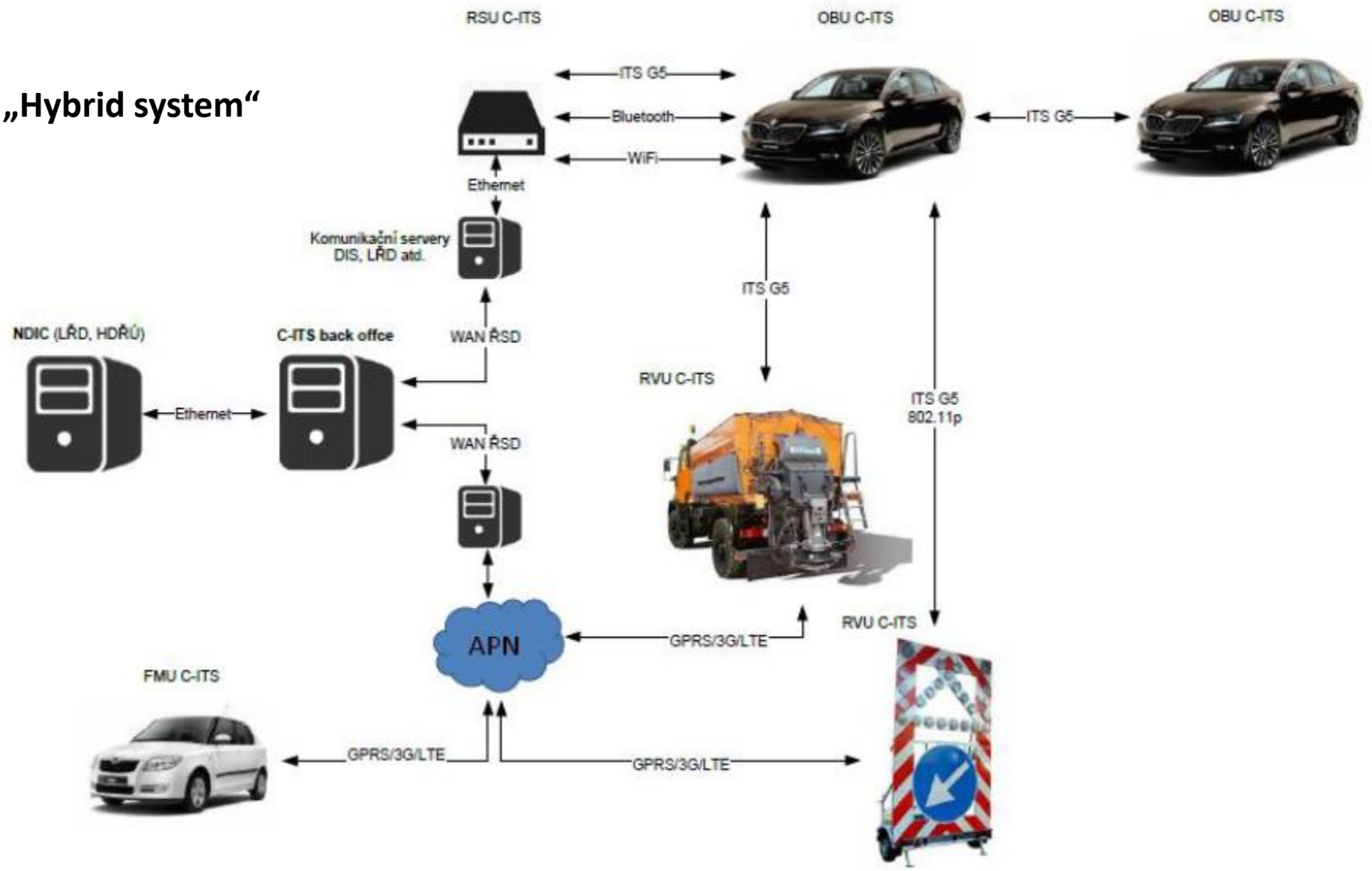
Basic Principle

V2X Communication



System architecture

„Hybrid system“



Deployed services

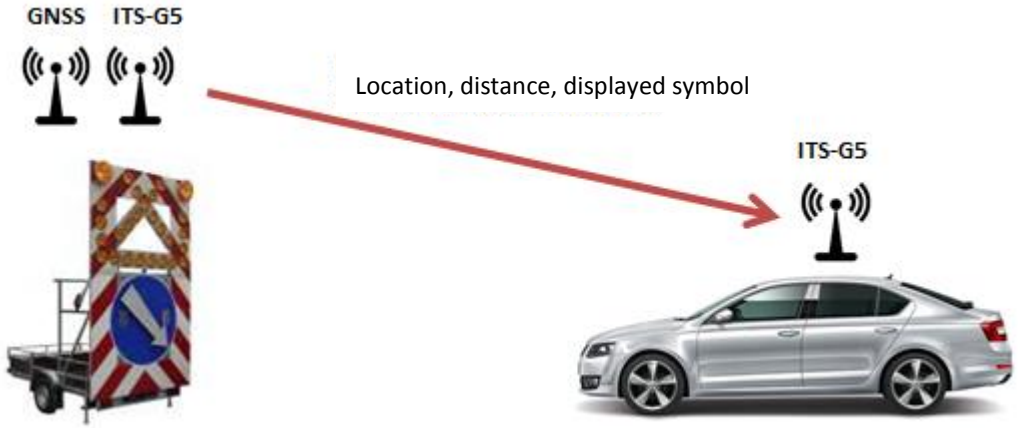
Road Works Warning – Message in advance with situation scheme as well as destination indication

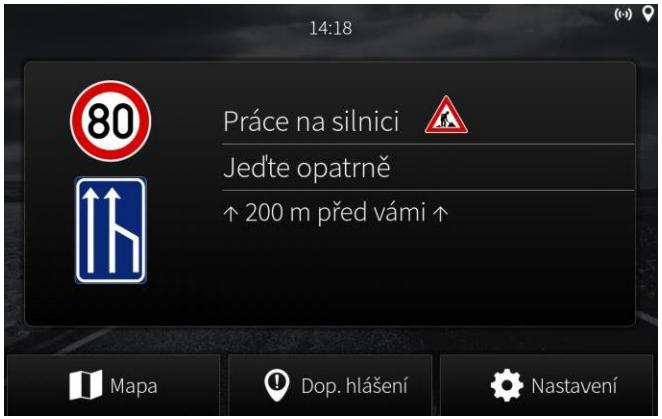
In-Vehicle Signage – All selected traffic information from infractructure to driver are proper sequenced and indicated in advance and displayed within appropriate area

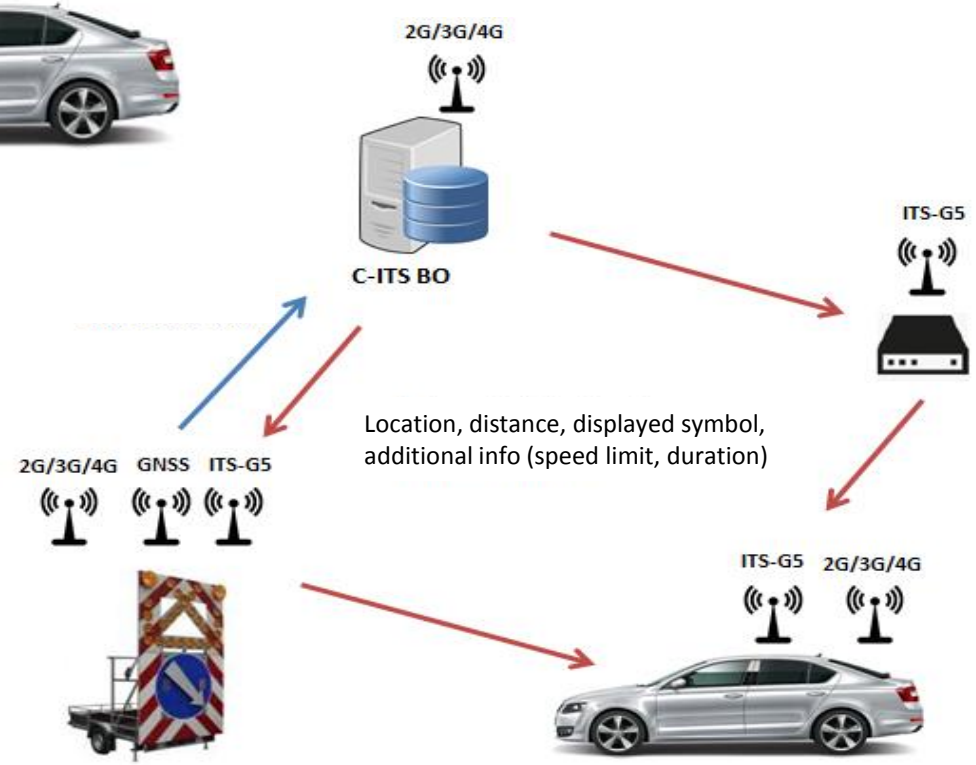
Probe Vehicle Data – Automatic Vehicle to Infrastructure (V2X) data collection using WiFi and BT technology to evaluate precise Commuting Times

Deployed services

Road Works Warning in „Standalone“ and „Connected“ mode

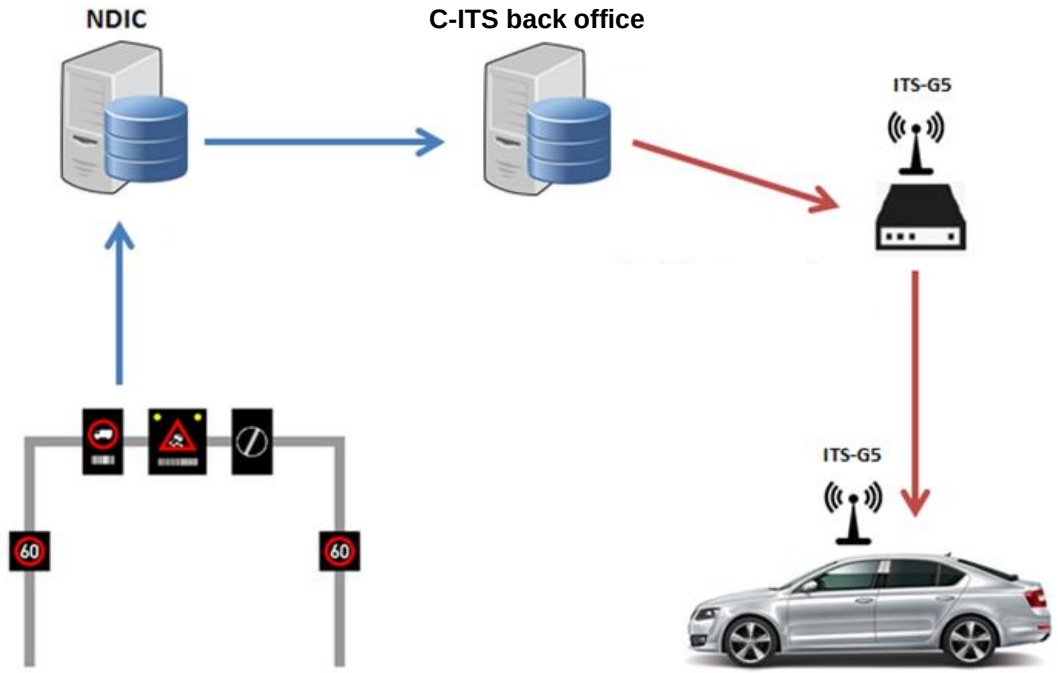


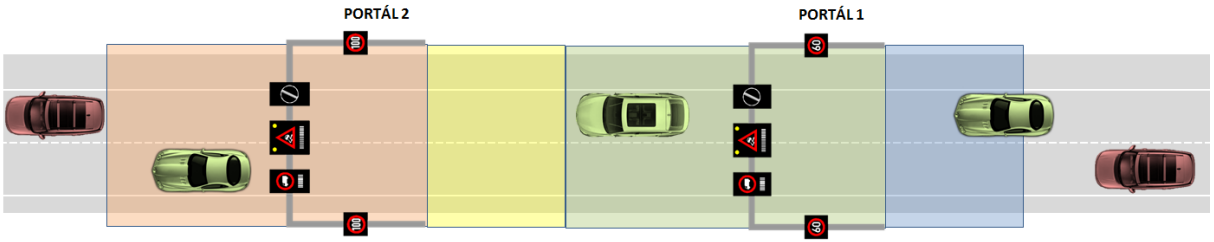




Deployed services

In-vehicle Signange



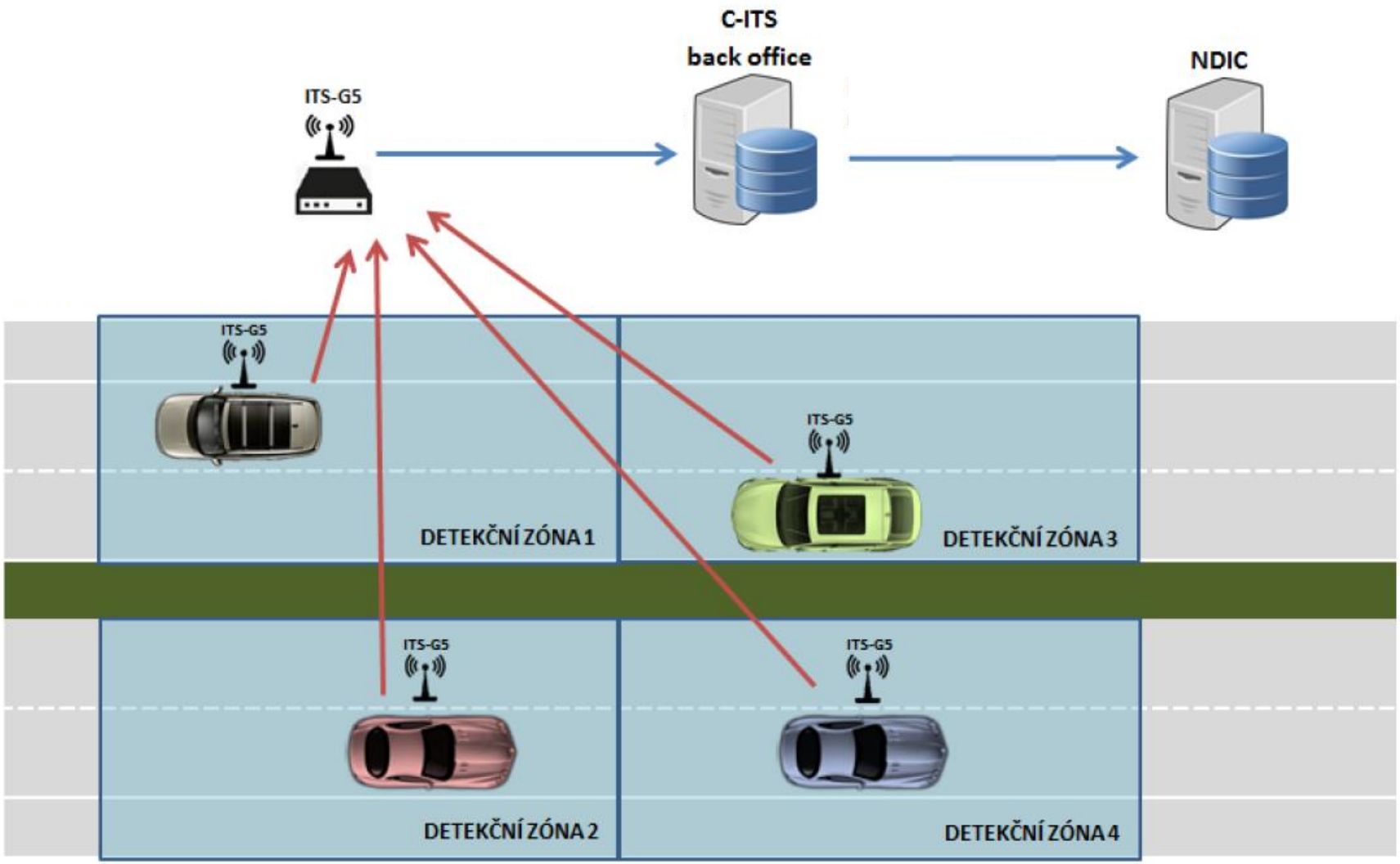


Informační oblast portálu 1 | Oblast platnosti portálu 1 | Informační oblast portálu 2 | Oblast platnosti portálu 2

IVI informace zobrazena řidiči | Mimo relevantní oblast služby IVI

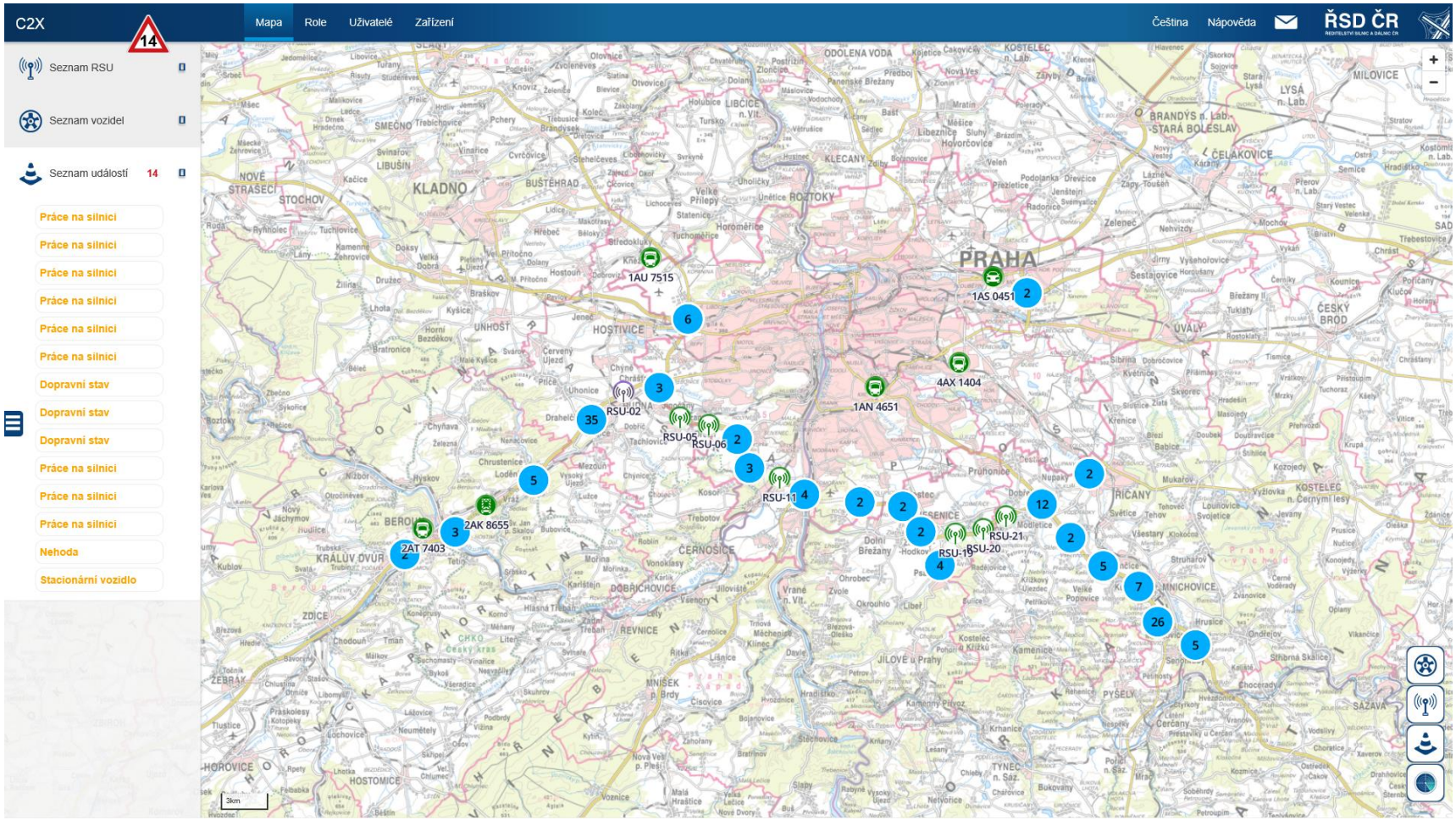
Deployed services

Probe Vehicle Data



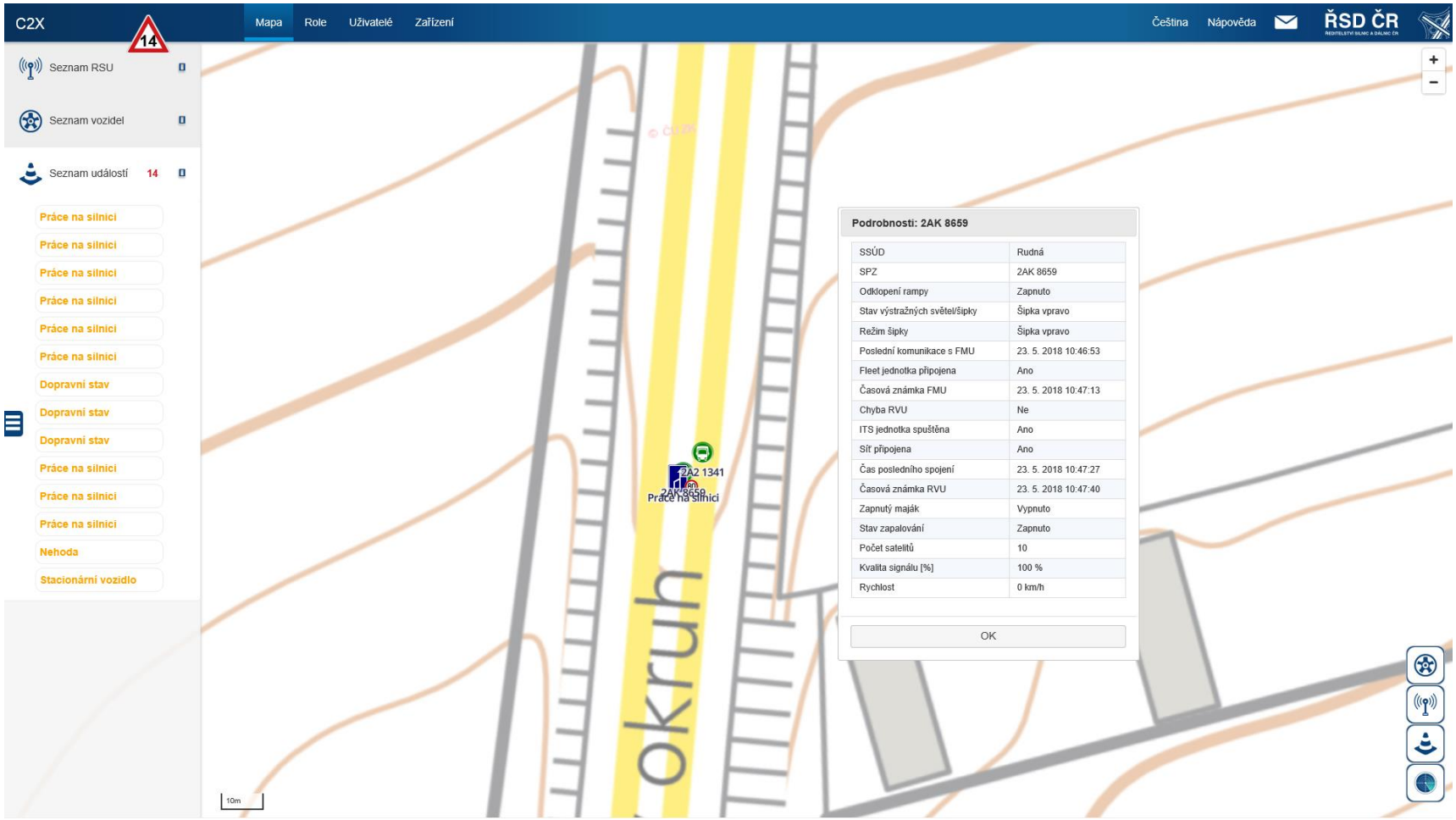
Administration

C2X Application – System Supervision



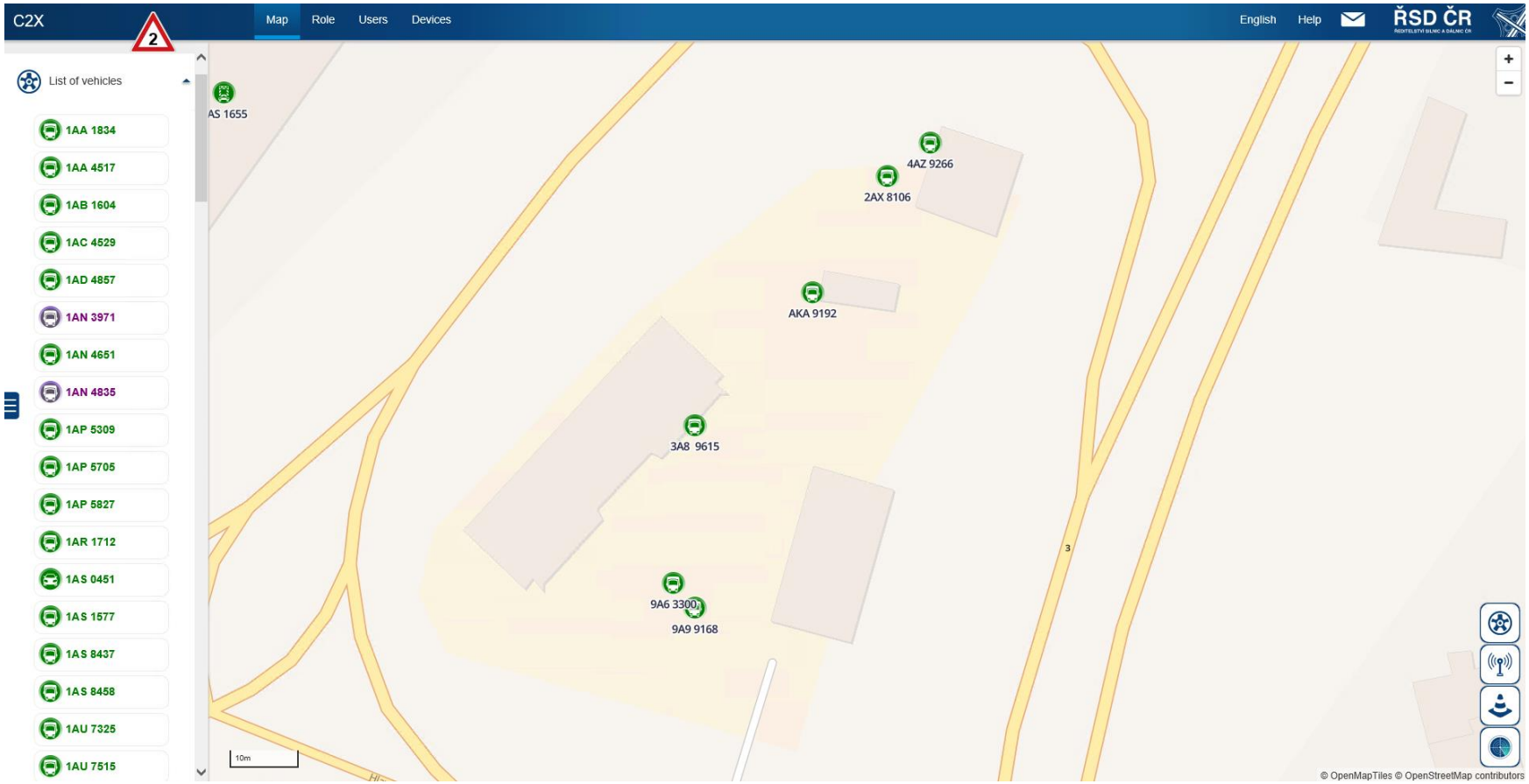
Administration

C2X Application – Road Works Management



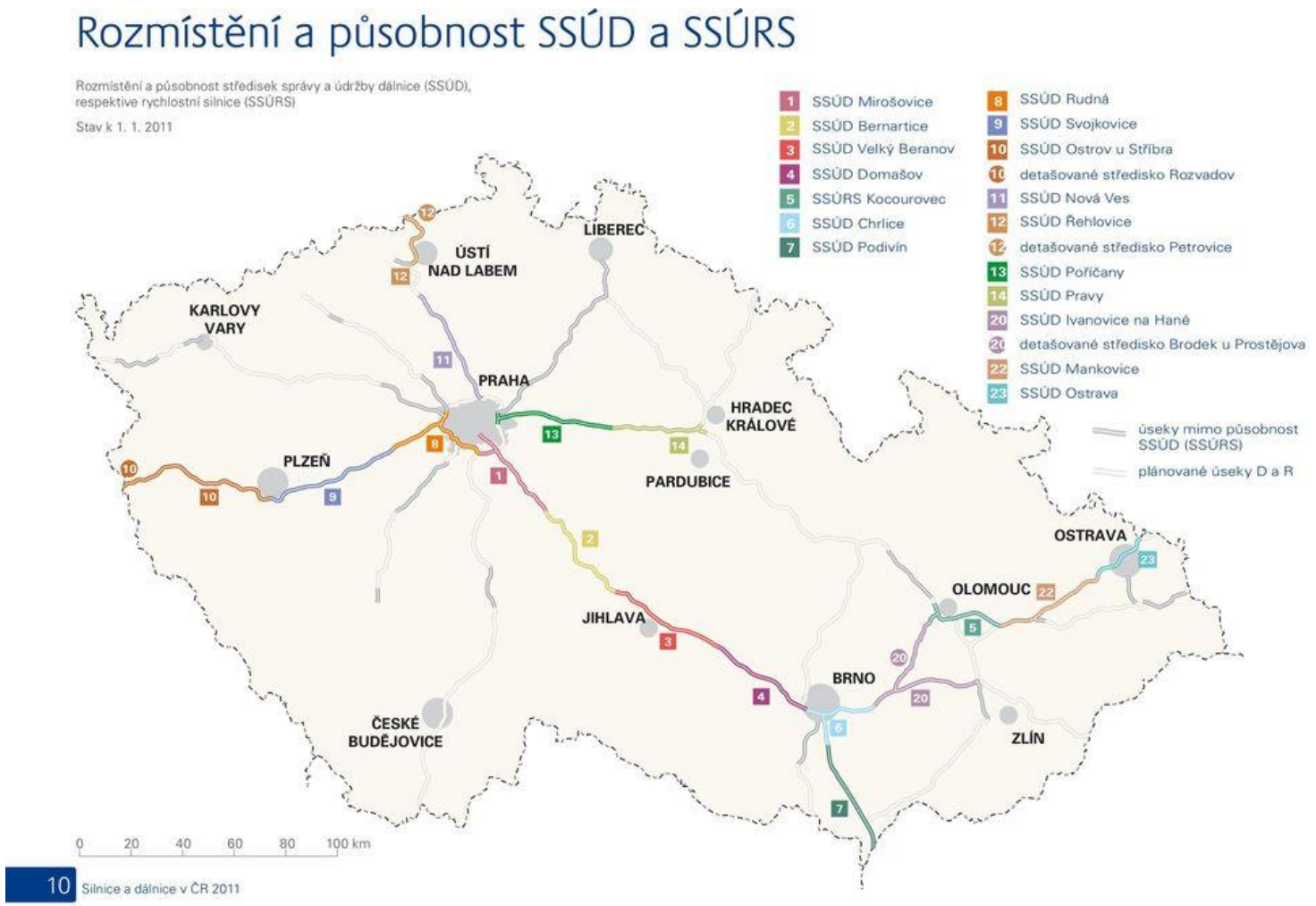
Administration

C2X Application - Fleet Management



Motorway Maintenance Centers - SSÚD

23 MMC locations and scope of their activities

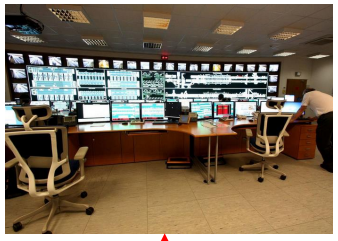


C-ITS Benefits

Centers / Road Workers / Drivers

DIS Network C-ITS Fleet Management Communication

Traffic MGMT & Traffic Police Center



Road Maintenance Operational Department

In Vehicle Information

C-ITS Benefits

Centers / Road Workers / Drivers

Actor	Advantage	Benefit
Traffic Management C. Traffic Police Center 	On line and enhanced C-ITS information Immediate response	Operative and effective management
Road Maintenance Operational Department 	On line information	Operative management
Road Workers 	„Visibility“	Life and health protection
Drivers 	Traffic information in advance	Accident prevention Continuous traffic Better route planning

Next steps

- Implementation of new Use Cases
- Testing field for external partners (ŠKODA AUTO)
- Further development of the system (back-office) to harmonize services with other C-ROADS member countries and cross – border testing
- Explore possibilities of using ITS G5 in tunnels – safety critical locations
- Deployment of next project phases – extending coverage
- New security standards and recommendations implementation

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Thank you for your attention

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