Road Transport in the Area of New Technologies

European Parliament

ITS in Mobility Research Agenda

EWA ZOFKA

European Parliament

26, April 2016

Brussels

Instytut Badawczy Dróg i Mostów

Road and Bridge Research Institute

Instytut Badawczy Dróg i Mostów

Road and Bridge Research Institute

Who We Are

- IBDiM: the leading Polish research organization engaged in the area of transportation infrastructure, safety and planning
- STAFF: OVER 200 people, including about 50 scientific personnel
- 13 Approved Labs
- 9 R&D Divisions

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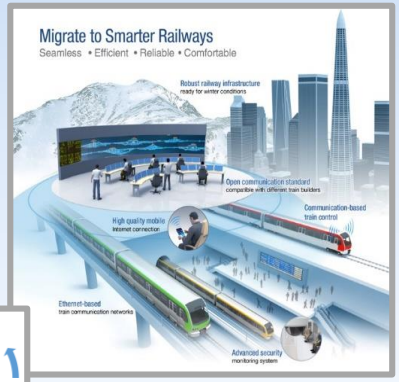
Research Areas

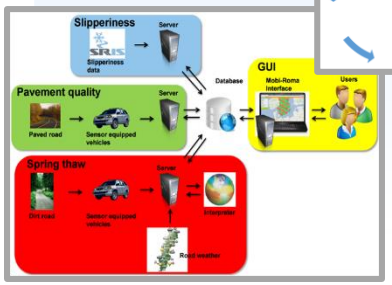
- R&D focused on innovative materials and technologies for new constructions, the modernization and repair of roads and bridges
- Systems of management and maintenance of the road network using modern diagnostic methods
- Innovative solutions improving the road safety
- Intelligent Transportation Systems

Selected ITS/ICT technologies for mobility

Integrated Transport infrastructure data/information systems

- Smart infrastructure across all modes
- Internet of Things (IoT): Big Data
- Crowdsourced user generated data: Floating vehicles data





Road | Rail | Water | Air

Internet of Things (IoT)

T

Internet of Things (IoT) represents the next step towards the digitisation of our society and economy, where objects and people are interconnected through communication networks and report about their status and/or the surrounding environment. IoT and Cloud combined ecosystem how user information can benefit from it.

I

The IoT encompasses sensor, actuators, electronic processing, microcontrollers, embedded software, communications services and information services associated with the things.

G

There is a need to consider the life-cycle process in which standardization is one activity. Significant attention is given to the “pre-selection” of standards through collaborative research, but focus should also be given to regulation, legislation, interoperability and certification as other activities in the same life-cycle.

C

End user, receiver of the user information: road, transit, rail, aviation users: passengers, road, rail water and aviation operators, infrastructure owners and operators, shipping and travel agents, logistic companies, airlines.

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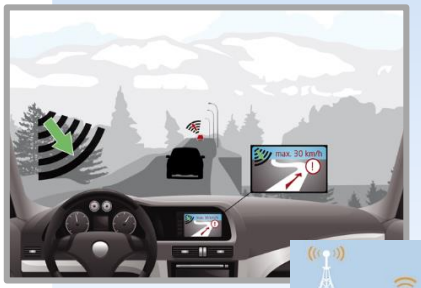
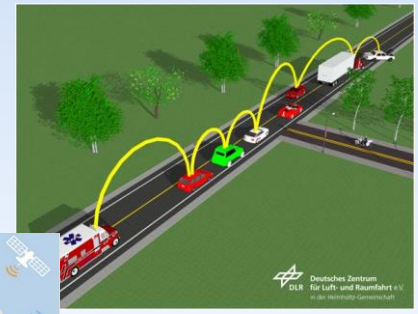
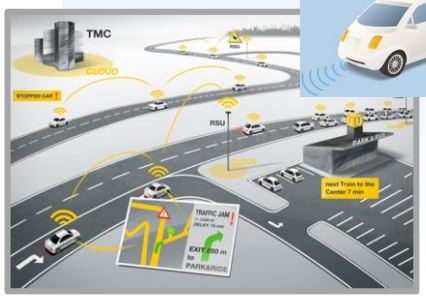
Selected ITS/ICT technologies for mobility

Automation

- Automated vehicles: autonomous vehicles, connected vehicles
- Vehicle to X Communications (V2X, including V2V and V2I)







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Automated vehicles

T Specific in vehicle technologies include: ADAS (Adaptive Driver Assistance Service), sensors, actuators, embedded laser scanners, cameras, road and weather condition sensors.The ERTRAC roadmap on automation is covering key enabling technologies for sensing, system integration and communication architecture, handling of human factors and functional safety.

I The European Smart Systems for Automated Driving roadmap is identifying necessary installations for communication at the roadside and to the data backbone. Even though creating of a dedicated vehicle communication infrastructure is not deemed necessary for AD, it can accelerate it, and it is also a prerequisite for application in urban areas. Future hybrid infrastructure needs to provide user information to automated vehicles as well as to conventional human driven vehicles.

G Communication standards for car to car and car to infrastructure communication are a prerequisite for AD at higher levels on the long therm. These have to be agreed on and harmonized at a European level.

C Vehicle users: drivers, transport system operators, vehicle manufacturers, airlines, airport operators, rail operators and rail passengers, water transport users and operators, logistics and hauling companies.

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ARE BIG DATA TRANSPORT'S "SILVER BULLETS"?

MOBILITY is recently on the edge of **FUNDAMENTAL CHANGES:** vehicles, travelers, and the transportation infrastructure are being connected and form a network of **MILLIONS OF SENSORS/DEVICES** that can communicate with each other.

Travelers are flooded with **REAL-TIME** information coming from overarching **COMMUNICATION NETWORKS.**

This will change today's intuition based **DECISION MAKING** to decision making **BASED ON KNOWLEDGE** of ambient conditions.

To enhance the decision making process, **WE DEVELOP SOLUTIONS,** which are built upon **BIG DATA,** using the information coming from the very **TECHNOLOGIES,** which are currently **CHANGING OUR WORLD.**

ROPDAS
ROZVOJ DOPRAVNÍCH SYSTÉMŮ

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BIG DATA FOR MOBILITY & TRAFFIC

"IF YOU CAN MEASURE IT, NEVER MODEL IT"

COMPLEX TRAFFIC MOBILITY LIVE MONITORING –
THE FIRST STEP TOWARDS ACTIVE SMART MOBILITY MANAGEMENT

MOBILITY MONITORING
Based on anonymized signaling data from mobile network

CELLULAR DATA USED

TRAFFIC MONITORING
Based on floating car data,detectors, toll data, meteo data

GPS DATA USED

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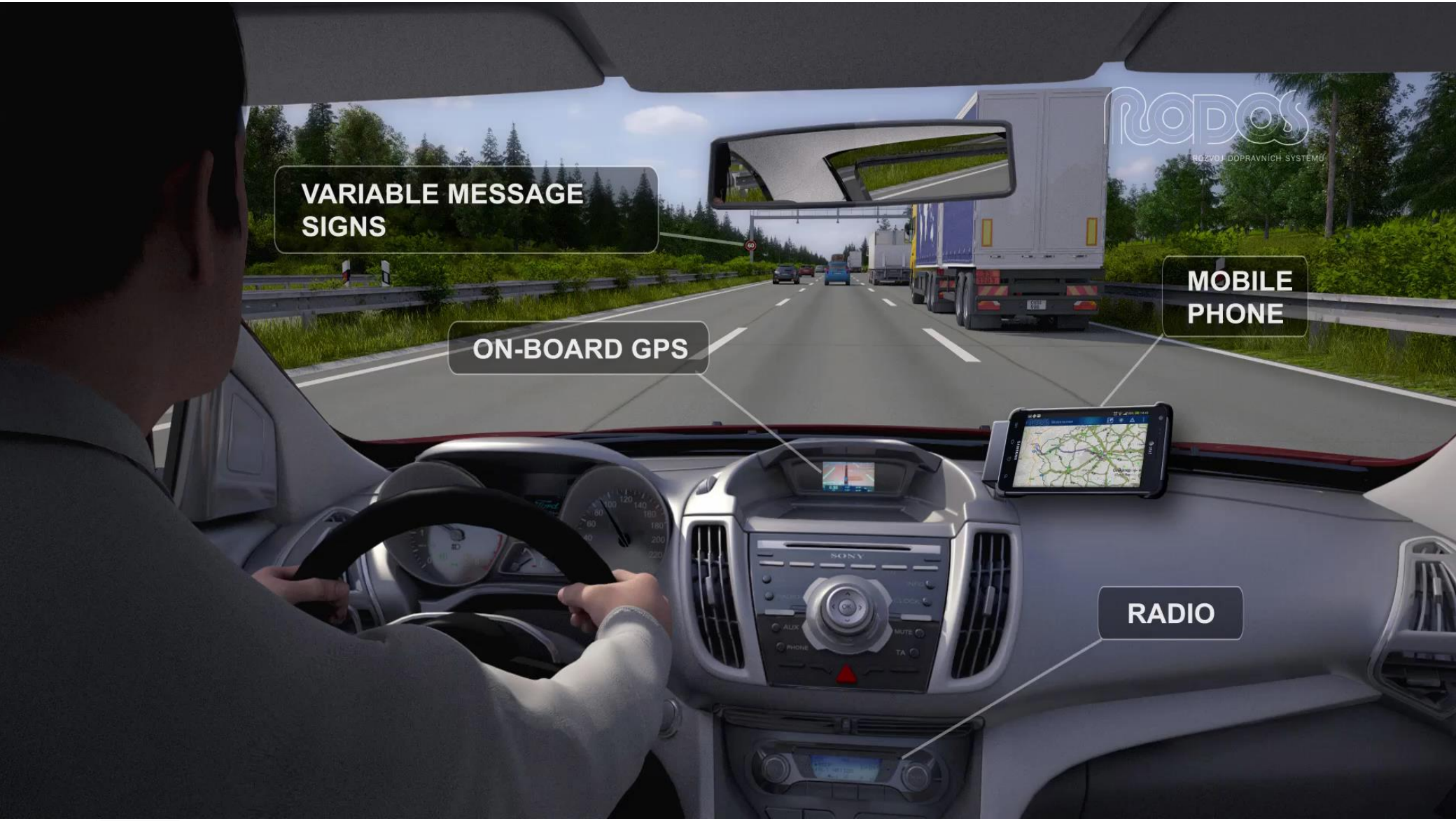

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NATIONAL MOBILITY ANALYSIS

CZECH REPUBLIC AGGREGATED ORIGIN-DESTINATION MATRIX

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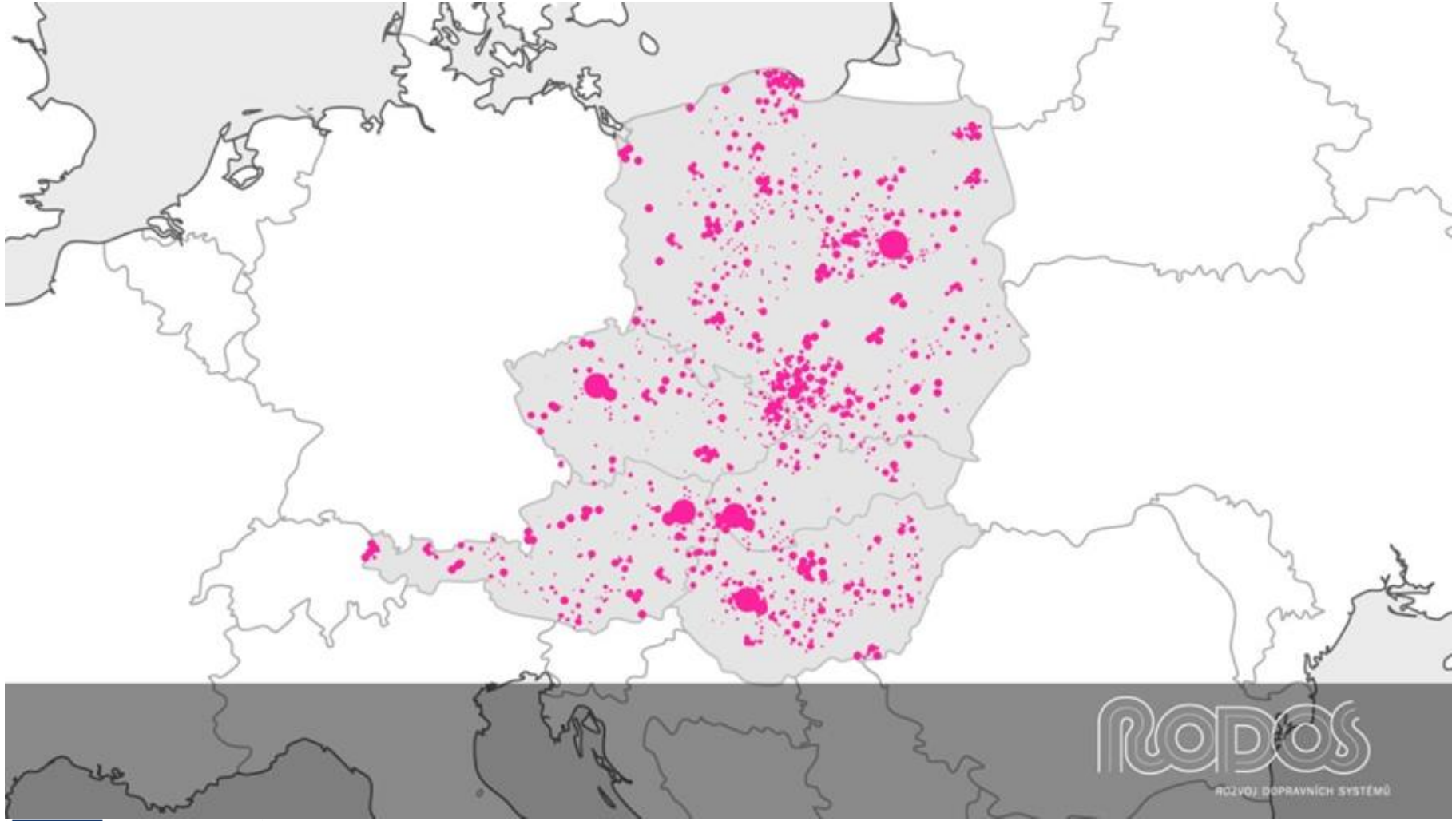
Central European Mobility Atlas CEMA



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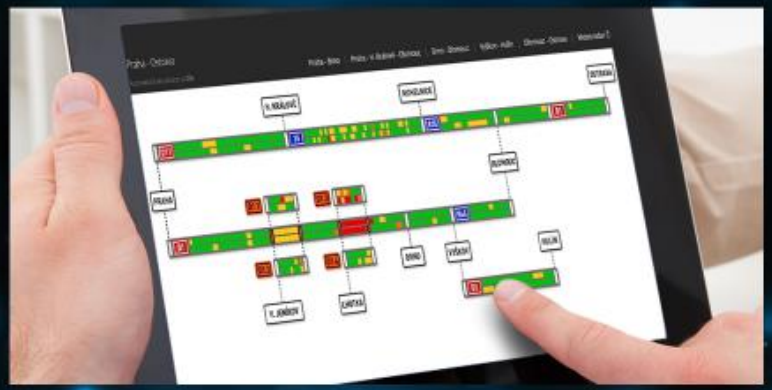
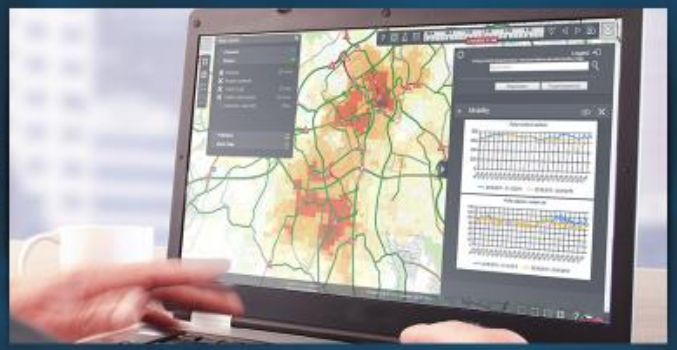
TRAFFIC MANAGEMENT VIA RODOS
NEW TYPE OF VISUALIZATION OF TRAFFIC INFORMATION

- The challenge is **HOW TO PRESENT TRAFFIC DATA IN A MODERN WAY WITH CURRENT WEB TECHNOLOGY**
- This application was designed in close cooperation with dispatchers from the **NATIONAL TRAFFIC INFORMATION CENTER IN CZ**



TRAFFIC AND CRISIS MANAGEMENT
ON-LINE APPLICATION FOR MANAGEMENT OF CRISIS



Showing traffic jams and number of people present per square in real time

TRAFFIC MANAGEMENT VIA RODOS
MAP & LINEAR VIEW FOR SLOVAK TRAFFIC MONITORING BASED ON GPS PROBING

TRAFFIC MANAGEMENT
SYSTEM OPEN FOR OTHER DATA SOURCES – WEATHER, CCTV, ...

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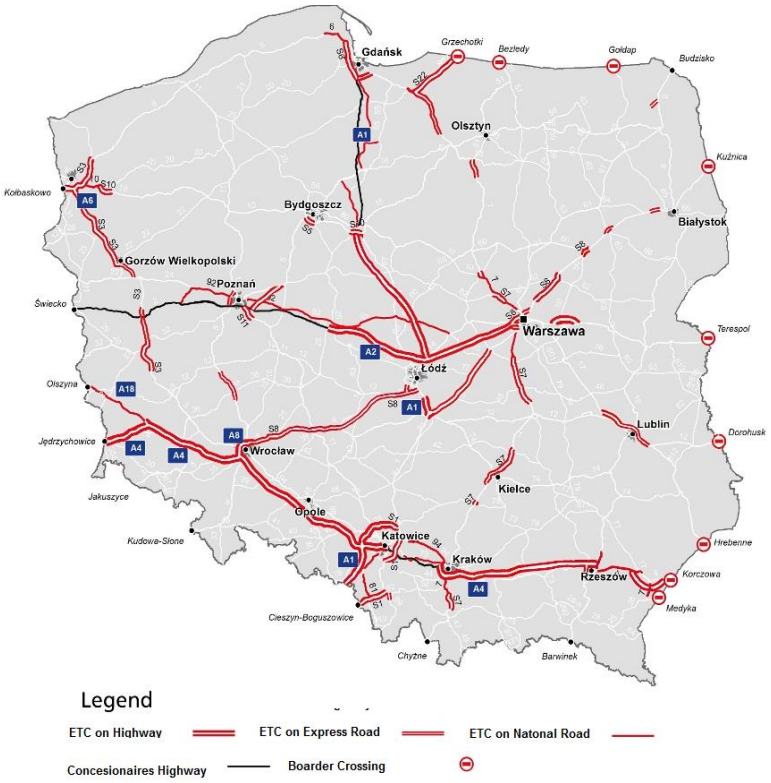
Electronic Toll Collection in Poland

- National Electronic Toll Collection System" **viaTOLL**" covers over 3150 km of roads in Poland (distance based toll system)
- Obligatory on toll roads for heavy vehicle – HV- (permissible gross weight >3,5T)
- Based on Direct Short Range Communication (**DSRC**) technology to secure top level quality of toll KPIs (99,97%)



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viaTOLL

kapsch

EETS – European Electronic Toll Service

USER'S POINT OF VIEW

- Free flow
- Single continuous service
- Single OBU
- Single contract

PROVIDER'S POINT OF VIEW

- Technical interoperability
- Procedural interoperability
- Service level agreements
- Data privacy and security

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viaTOLL

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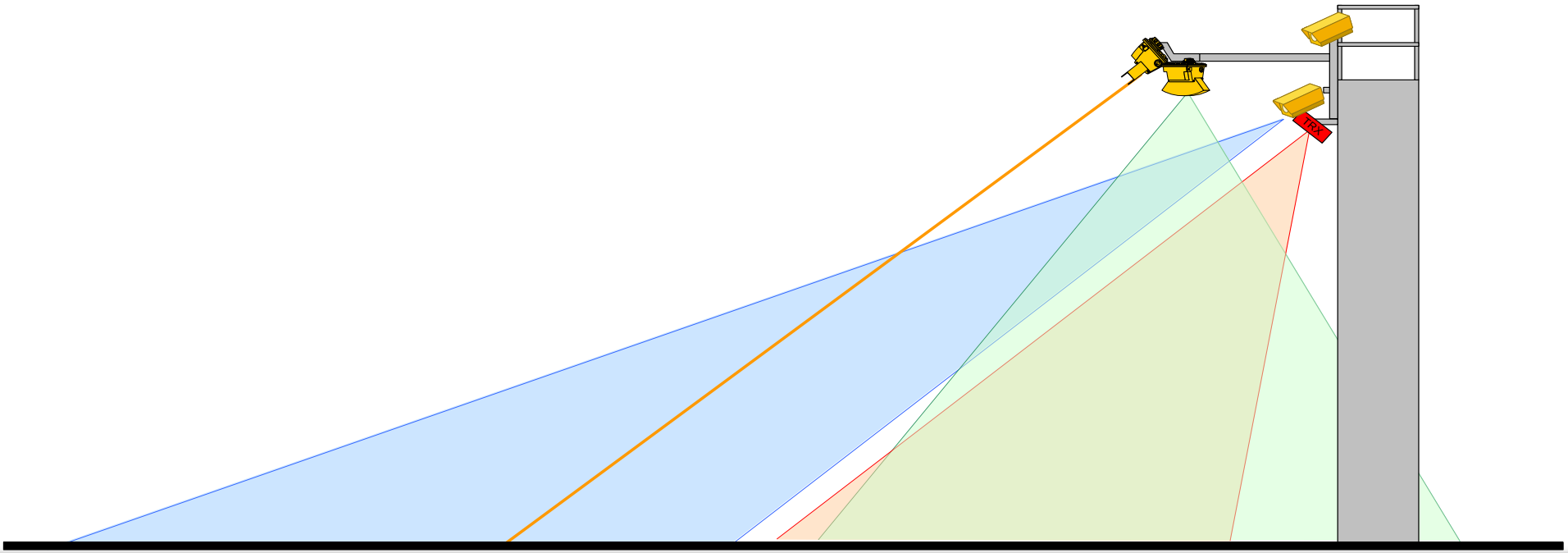
Enforcement and tolling process

Vehicle detection

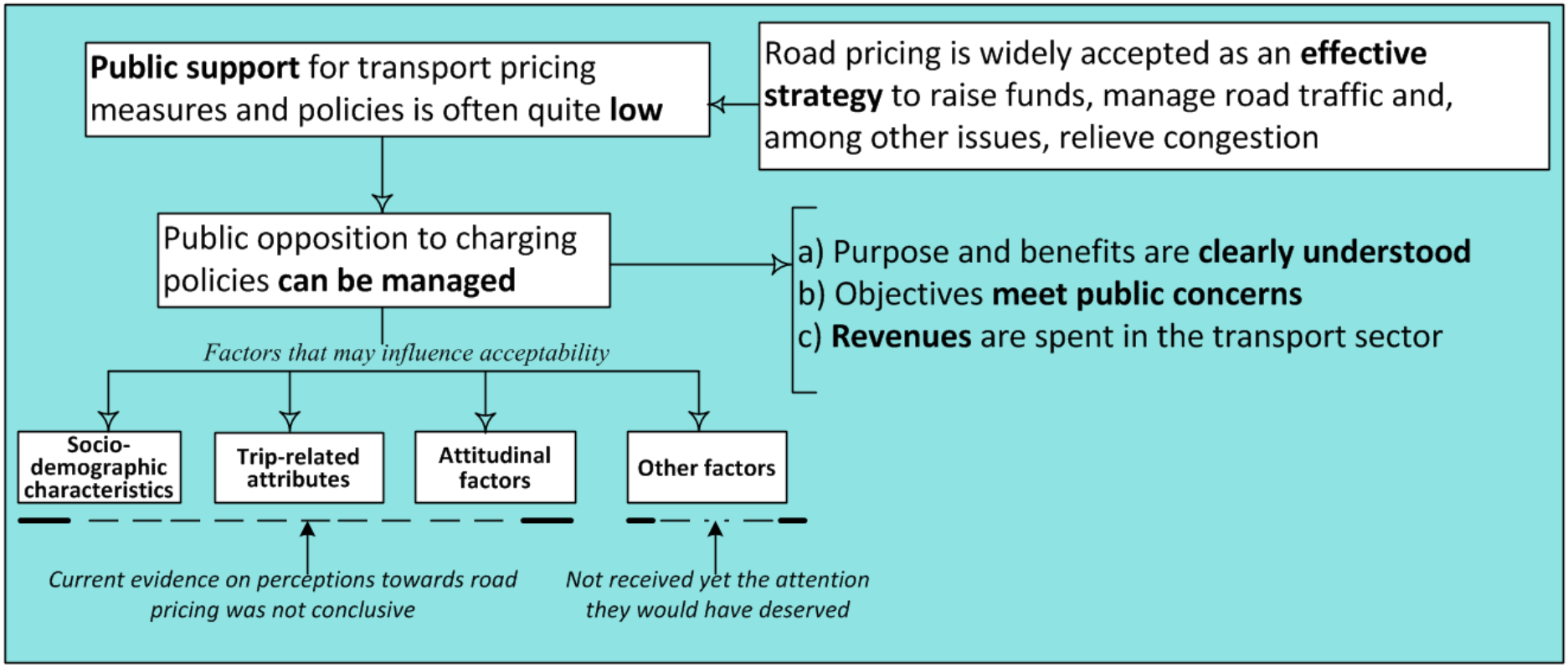
Image registration

DSRC toll transaction

Vehicle classification



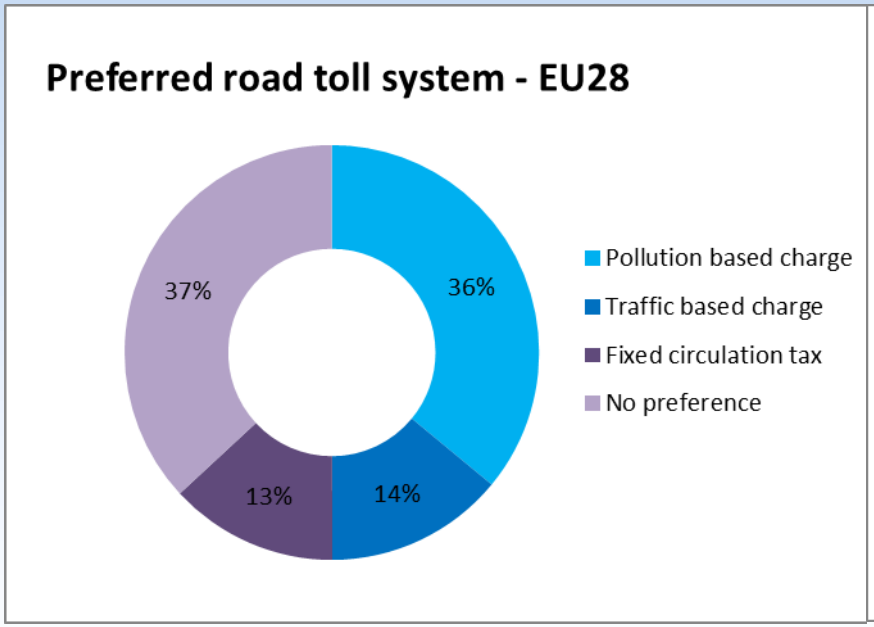
Congestion Pricing

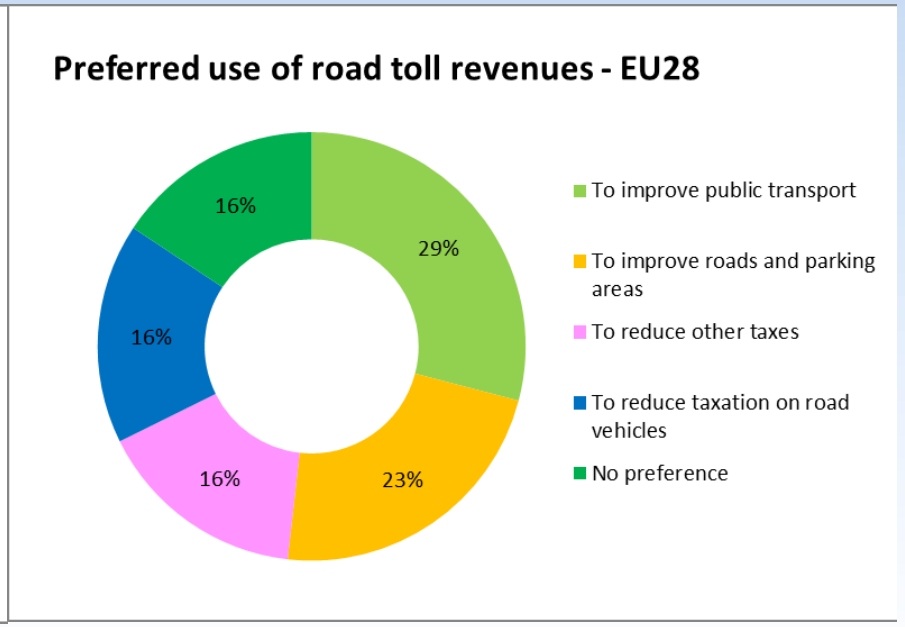


Congestion Pricing

- Some policy recommendations might be addressed to decision makers
- Consider the type of road pricing strategy to be implemented
- Understanding attitudes seems to be a crucial aspect for predicting social behavior and reactions towards new transport pricing schemes

Attitudes towards road charging

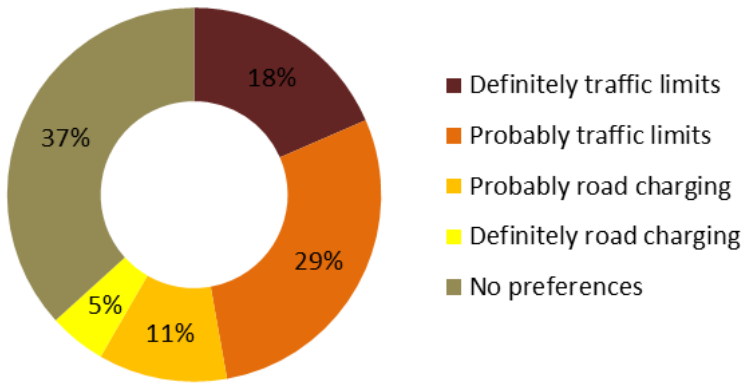




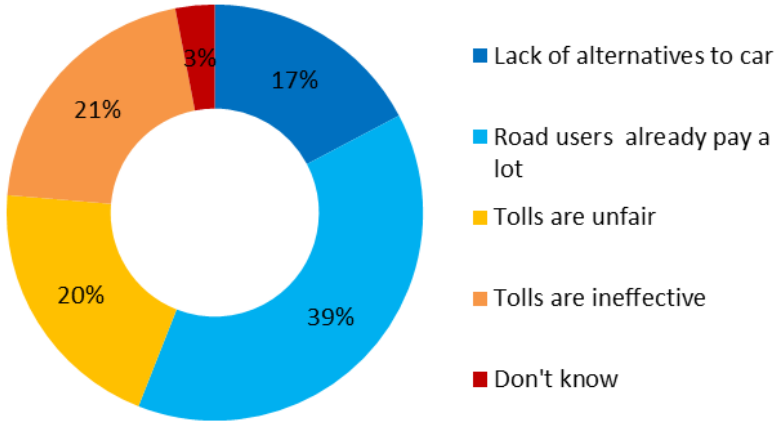
Source: CAWI Survey 2014, TRT Trasporti e Territorio; EC JRC IPTS Seville

Attitudes towards road charging

Preferred policy option to fight urban congestion and pollution - EU 28



Reasons for opposing tolls - EU28



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Thank You, Questions?

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