Telematyka transportu w praktyce

Czech Republic

Roman Srp, Katowice, 28.9.2010

Contents

- About Intelligent Transport Systems - ITS
- About ITS&S
- Today’s objectives

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Transport telematics (ITS)

- Transport telematics (ITS, Intelligent Transport Systems) **integrates** electronic communication and information technologies (ICT) with transport engineering in order to optimize transport and forwarding processes.
- It is an instrument of a **sustainable transport** helping to better economy, ecology and safety.
- Telematic principles are applicable in all transportation modes and can be an inspiration also for other utilities (energy distribuition,e-health, e-government)

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ITS macro functions

- electronic tolling
- management of rescue services
- traffic management
- public transport management
- intelligent vehicle
- journey planning & information provision
- fleet and freight management
- enforcement systems

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Telematic community

- **Sensors & actors:** gate crossing signals, cameras, active and passive detectors, radar
- **Communications:** GSM-R, 3G, DSRC, M5, infrared RFID, WIMAX, CALM, RDSC
- **Positioning:** GPS, Glonas, Galileo, EGNOS, gantry systems
- **Data processing:** GIS, billing, management, expert systems
- **End user devices:** on-board units, chip-card readers, user terminals
- **Services:** **strategic planning, technical, financial consulting**

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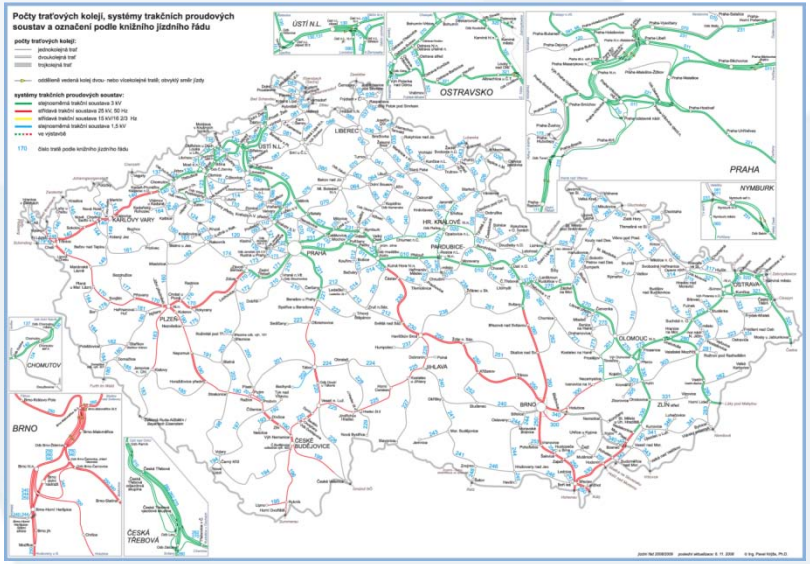
ITS potential



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Interoperability:

main issue of today over Europe

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ITS&S – Intelligent Transport systems & services

- ITS&S
  (Sdružení pro dopravní telematiku)
  is a **successful sector cluster of**
  in the area of transport telematics
  with a multiyear tradition
- Representing **Czech & Slovak**
  Transport Telematic Community

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ITS&S

- Founded 2000 as ITS&S Czech Republic
- Today **74 Czech and Slovak** companies & institutions on board. Fast growing membership base.
- Complying with the COMMUNICATION FROM THE COMMISSION, COM (2004) 353 final Brussels, 16. 6. 2004: Science and technology, the key to Europe‘s future – Guidelines for future European, Union policy to support research
- Member of the steering committee of the **Network of ITS National Associations**

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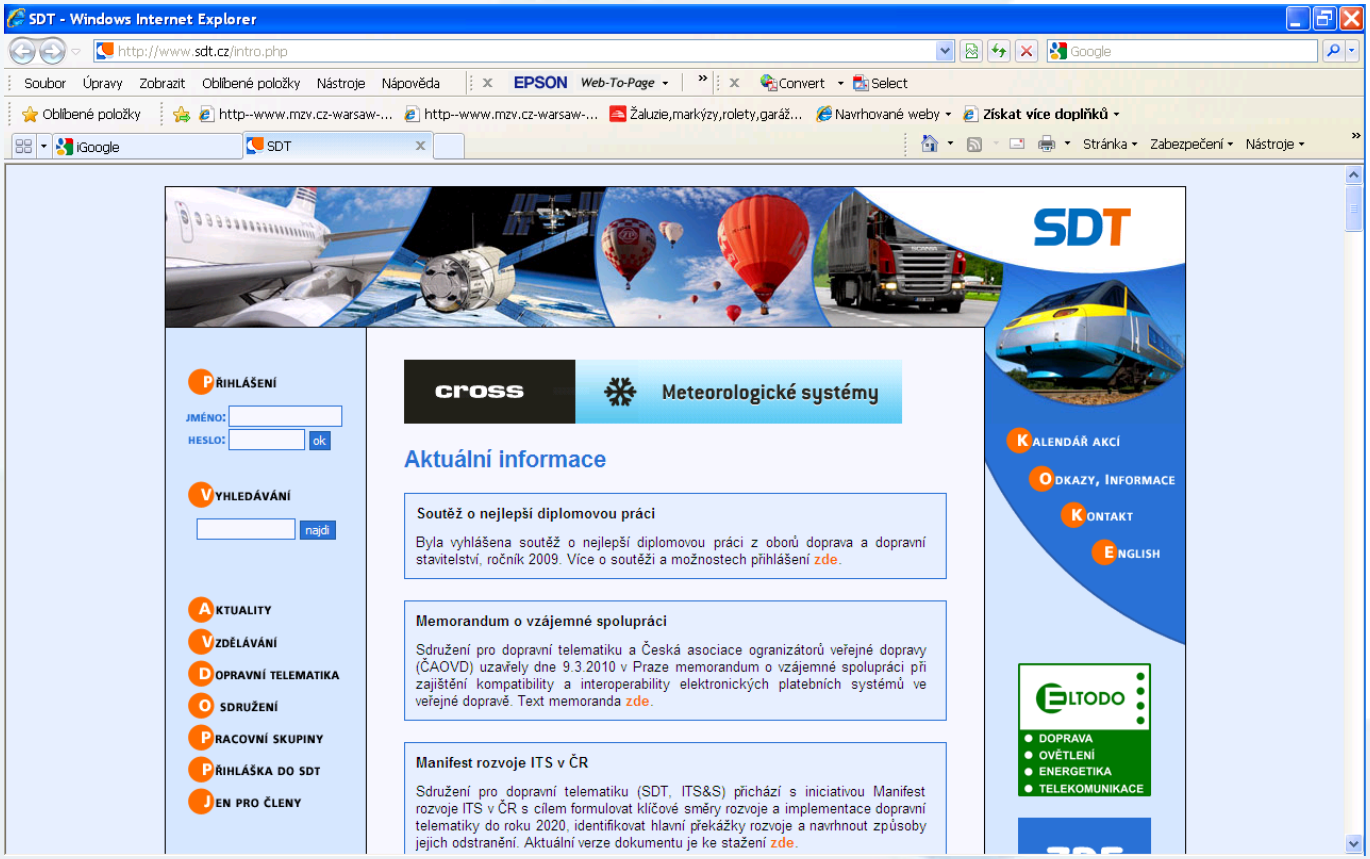
More about ITS&S?

www.sdt.cz , www.telematika.cz



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Let's co-operate together!

- Joint problems - > actions
- Financing
- Research & Development
- Mobility
- Economy, Ecology & Safety
- ITS planning
- ITS deployment

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Today's objectives

- Explain importance of ITS for future transport
- Inform about ITS development in the CZ and SK
- Discuss best practices across CZ, SK and Poland
- Highlight an urgent need of ITS vision, strategic planning, feasibility study projects

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ITS&S team in Katowice on28.9.2010

- ITS&S — Roman Srp
- University — prof. Alica Kalašová, TU Žilina
  prof. Ivo Vondrák, VŠB TU Ostrava
  prof. Josef Gnap, TU Žilina
  Tomáš Stárek, CTU Prague
- Users — Aleš Stejskal, Ostrava region
  Ivo Mokrý, Žilina region
- Industry — Karel Toman, Eltodo
  Petr Foltýn, Saab Czech
  Jiří Novobilský, CE-Traffic
  Jan Kotík, ČSAD SVT

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Looking forward to our co-operation!

Postal address:

Sdružení pro dopravní telematiku (ITS&S)
Roman Srp, vice-prezident, executive director
Bartolomějská 11 or Konviktská 24
110 00 Praha 1
Czech Republic
tel.: +420 226 207 111
fax: +420 226 207 110
e-mail: r.srp@sdt.cz

More: www.sdt.cz

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Main challenge of ITS in urban environment

= deal with the transport development

CZ, Prague example

- CZ road traffic = + 35 % since 2000
- Prague road traffic = + 36 % since 2000
- Prague car penetration = 1 car per 1,8 habitant
- Traffic in the city centre at the saturation level
- Further inner road infrastructure development limited
- Outer road ring – under construction
  (slow process of building permits)

Usual traffic problems in urban areas over Europe

- Insufficient capacity of road infrastructure
- Limited city infrastructure for further deployment (private estates)
- Rapid development of commercial centres, office buildings
- Diversion routes
- Pedestrian links
- Cycling
- Ecological impact
- Attractive public mass transport

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+ Capacity of the road
= > - injuries - costs

- Info status on communication infrastructure
- Travel times
- Parking information
- Information about public transportation mean departures

Telematic applications:

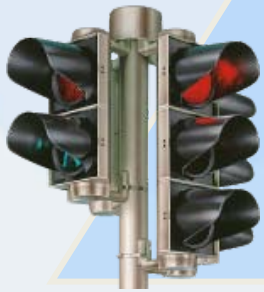
Thanks to on-line reaction of the management system on a real traffic situation they provide in-time information delivery & instruction to the road users.

ITS city architecture

- Management and co-ordination of traffic light crossings
- Monitoring
- Central optimization of traffic management

Level of area management
Sitraffic Scala

Level of the node area management



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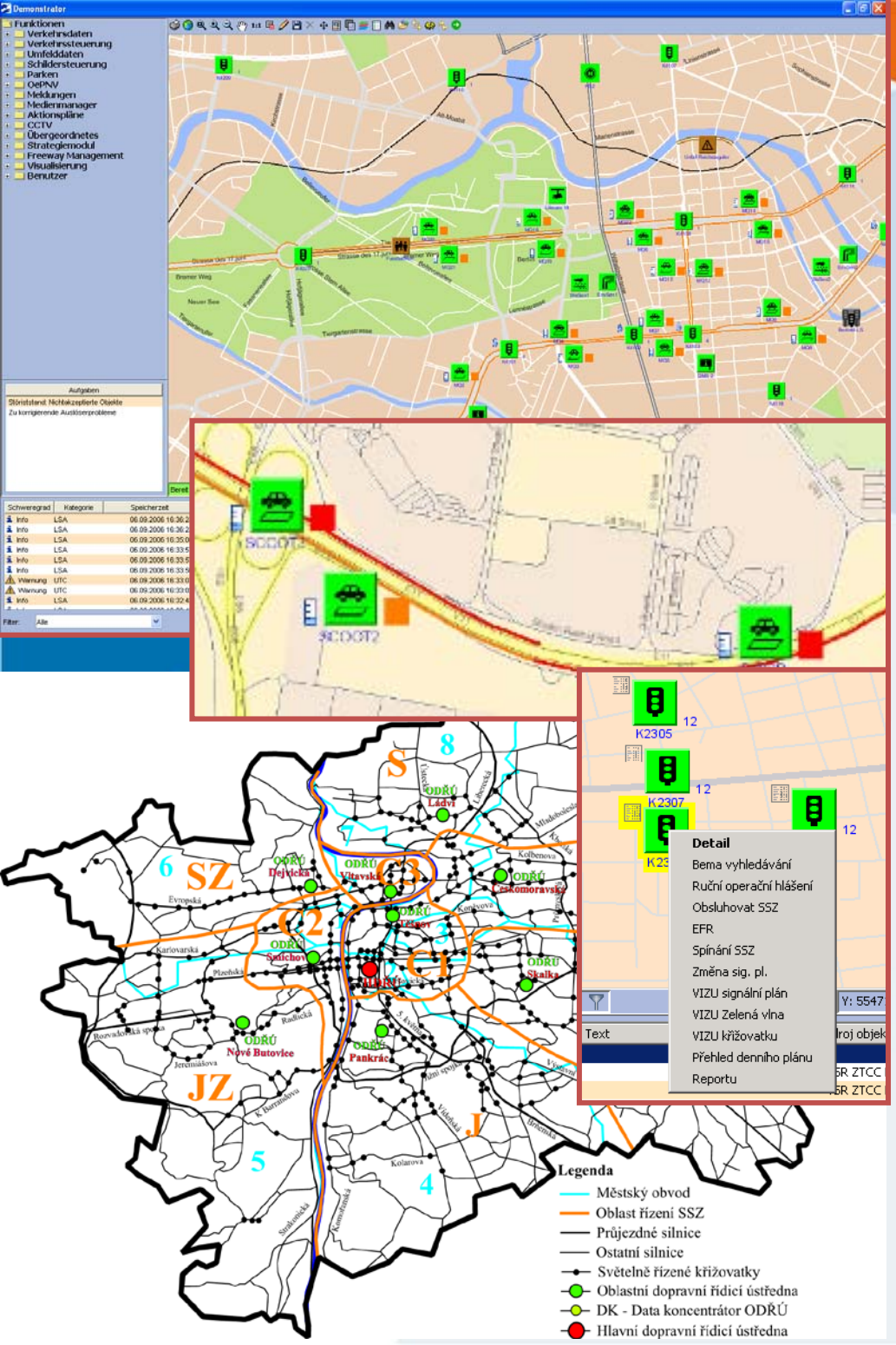
Traffic management centre

- Integration of transport management technologies
- Traffic data & information collection
- Traffic data & information provision
- Monitoring of technology components, system integrity
- Influence on real traffic
- Interconnection with integrated rescue system

Traffic Management

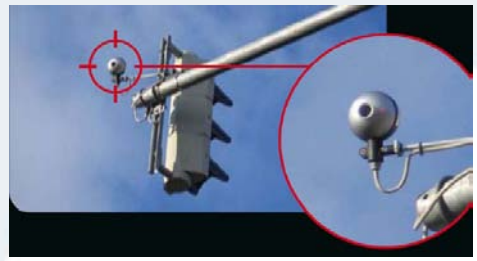
Prague



- 9 areas of management
- Data collection from all traffic lights (TL), interconnection of TL and tr. Exchange
- Variable message signs
- Visualization & monitoring
- Traffic light management
- Priority routes
- Traffic data collection
- Data processing and archive
- Alarm & outage reporting
- Open interfaces

Data
for traffic lights management

- Sensors / Detectors
  - At crossing
  - In profile
  - Strategic
- Alternative detectors
  - Floating car data
    (taxi, private fleets, public transport)
- Human via radio
  - Police, rescue, regular drivers



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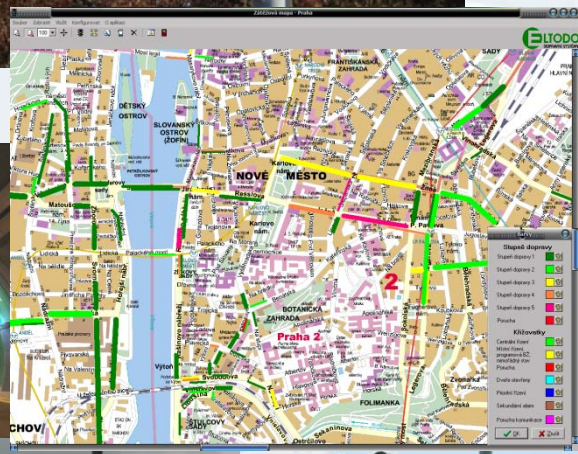
Applications

of telematic systems in the city

- Traffic management
- Safety and integrated rescue system
- Survey and alarm systems
- Travel information provision
- Maintenance of road infrastructure
- Parking systems
- Electronic payments
- Data collection and processing
- Speed limit regulation & entforcement
- Camera survey & videodetection



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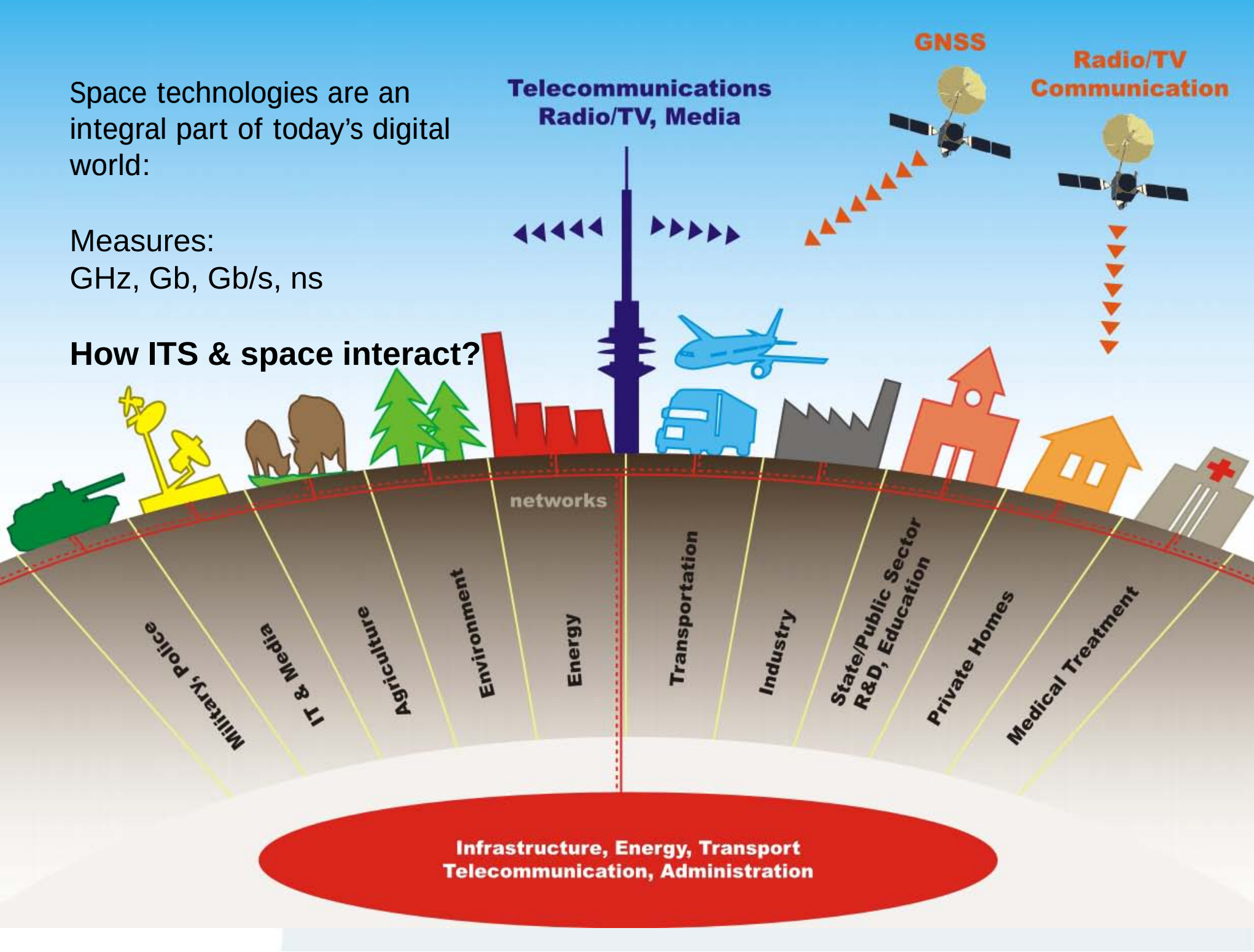
Space technologies are an integral part of today's digital world:

Measures:
GHz, Gb, Gb/s, ns

How ITS & space interact?



GNSS (today)
satellite „navigation“ systems

Global Navigation Satellite Systems

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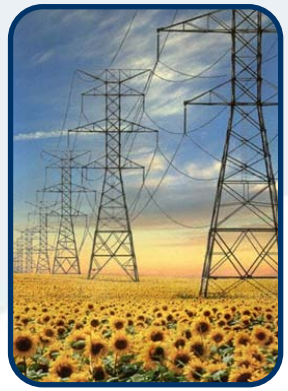
GNSS in economy



- **Time & frequency:**
  - Electronic communication networks
  - Production & distribution of electricity
  - Industry, production
  - Management & Regulation
- **Geodetic**
  - GIS, construction
- **Localization**
  - Transport, Freight
  - Military

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GNSS in transport: part of intelligent infrastructure

- **Intelligent services**
  - On-line management
  - Smart logistics
  - Travel assistance
  - Safety (E-Call)
  - Car Security
  - El. Payments
- **Intelligent infrastructure**
  - Sensors, actors
  - Vizualisation
  - Beasons & Portál
  - **GNSS infra structure**
  - Management Systems
- **Intelligent vehicles**
  - Advances in- car electronics
  - V2V, V2I on-board EQ
  - Eco-driving, trip planning
  - Security & Safety features
  - Traffic data generator

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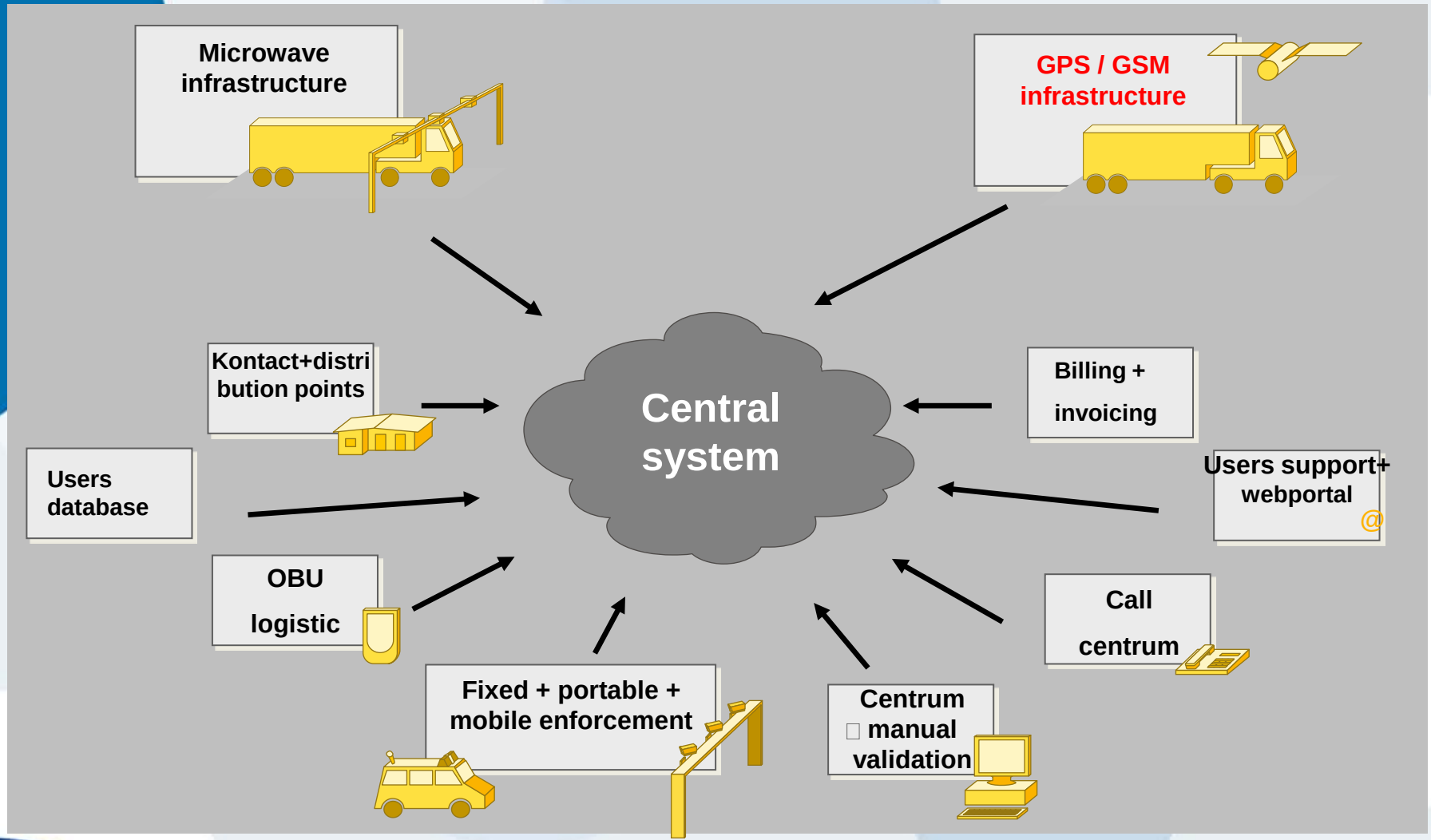
Pilot project:
GNSS subsystem for the CZ tolling



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Pilot project:
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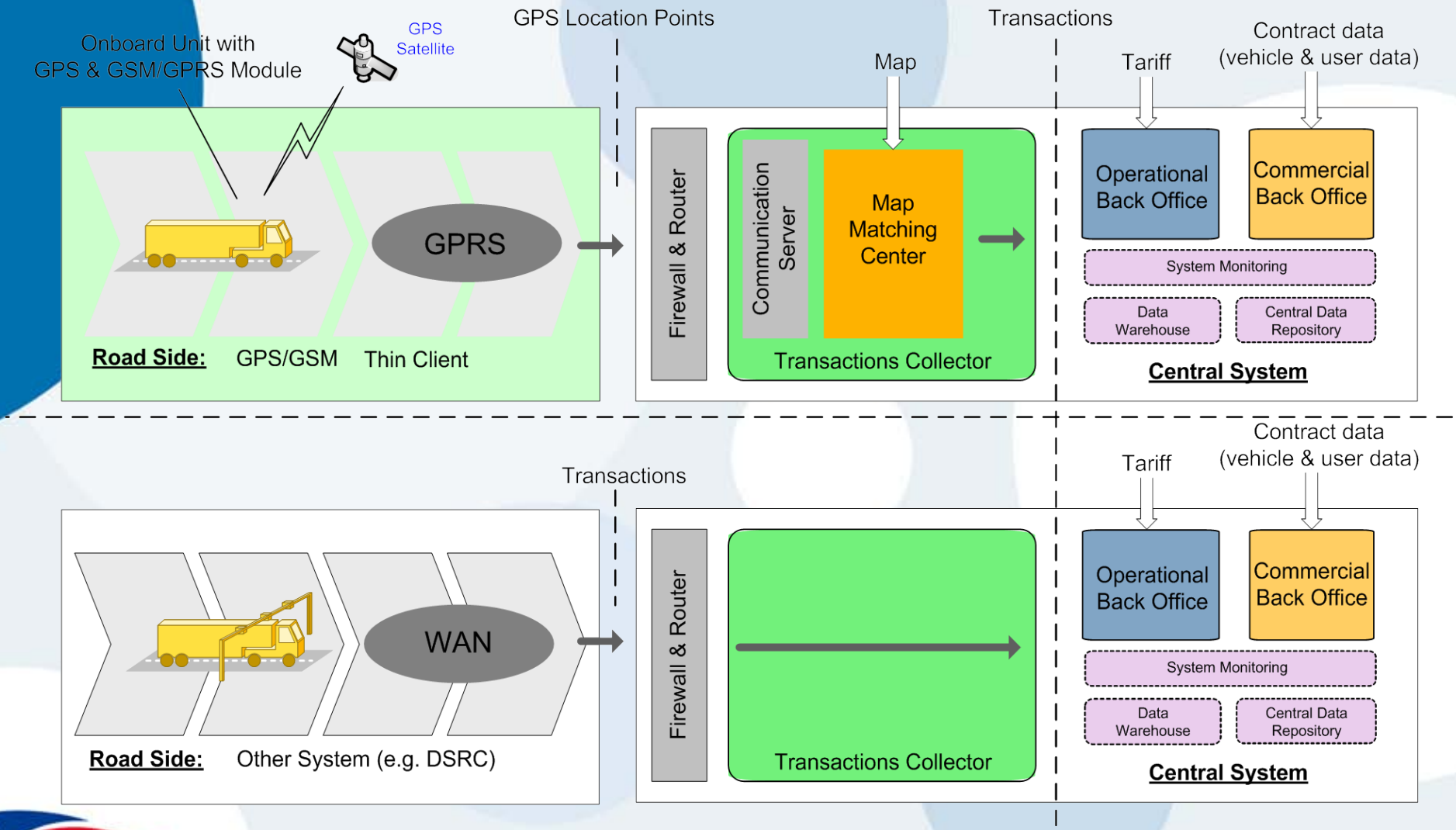

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ITS in public transport = IFM Fare Management Systems

- Application of „Electronic tolling“ macro function in public transport for the purpose of Fare Management
- Combine end user devices in vehicles with communications, IT, data processing and some overlay services incl. financial
- Main challenge for the future is to achieve regional, national and international interoperability in IFM
- Main players in the CZ: ASSECO, ČSAD SVT, ČSOB, EMTEST, Haguess, Mikroelekronika, XT-Card, all members of ITS&S's working special working group, ERIKA – SMS ticketing

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Electronic ticketing in PT in Czech Republic

	city	population	region	electronic fare system
1	Prague	1 285 995	Prague, the Capital City	City card
2	Brno	405 337	South Moravian	No Cards
3	Ostrava	314 666	Moravian-Silesian	Cards of PT supliers
4	Plzeň	173 932	Plzeň	City card
5	Liberec	105 240	Liberec	City card
6	Olomouc	102 112	Olomouc	No Cards
7	Ústí nad Labem	98 862	Ústí nad Labem	Cards of PT supliers
8	Hradec Králové	95 890	Hradec Králové	City transport card
9	České Budějovice	95 709	South Bohemian	Cards of PT supliers
10	Pardubice	90 765	Pardubice	City card
11	Havířov	83 180	Moravian-Silesian	Cards of PT supliers
12	Zlín	77 288	Zlín	Cards of PT supliers
13	Kladno	71 654	Central Bohemian	City transport card
14	Most	67 216	Ústí nad Labem	City transport card
15	Karviná	63 193	Moravian-Silesian	Cards of PT supliers
16	Frýdek-Místek	59 821	Moravian-Silesian	Cards of PT supliers
17	Opava	59 793	Moravian-Silesian	Cards of PT supliers
18	Karlovy Vary	53 691	Karlovy Vary	Cards of PT supliers
19	Teplice	53 193	Ústí nad Labem	City transport card
20	Děčín	52 589	Ústí nad Labem	City transport card

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Czech Republic total - 10 mil. residents

Esimated total number of emited Smart Cards in PT – cca 4 mil. cards

Electronic ticketing in PT in Czech Republic

E-ticketing:

České dráhy (Czech railways), 2005, MIFARE DESFire, 600 000 holders

Hradec Králové, 2006, MIFARE Classic 4K, 30 000 holders

Pardubice, 2007, MIFARE Classic 4K, 20 000 holders

Connex, 2003-2007, MIFARE Classic 1K, 10 000 holders

Citycards:

Prague, 2007, MIFARE DESFire, 500 000 holders

Plzeň, 2003, MIFARE Classic 1K, 140 000 holders

Liberec, 2004, MIFARE Classic 1K, 40 000 holders

SMS-ticketing:

Praha

Ostrava

Ústí nad Labem

České Budějovice

Liberec

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Improving the legal conditions for IFM

- Government Regulation laying down the requirements and procedures for ensuring the connectivity of electronic fare management systems.

- E-ticketing systems:
  - Responsibility for the operation of e-ticketing systems is on the Public transport Autorities
  - Procedures to ensure interoperability (Certification + Certification authority)

- The implementing legislation establishes requirements and procedures for providing technical and operational connectivity of electronic fare management systems:
  - requirements for e-ticketing media
  - requirements for acceptance equipment

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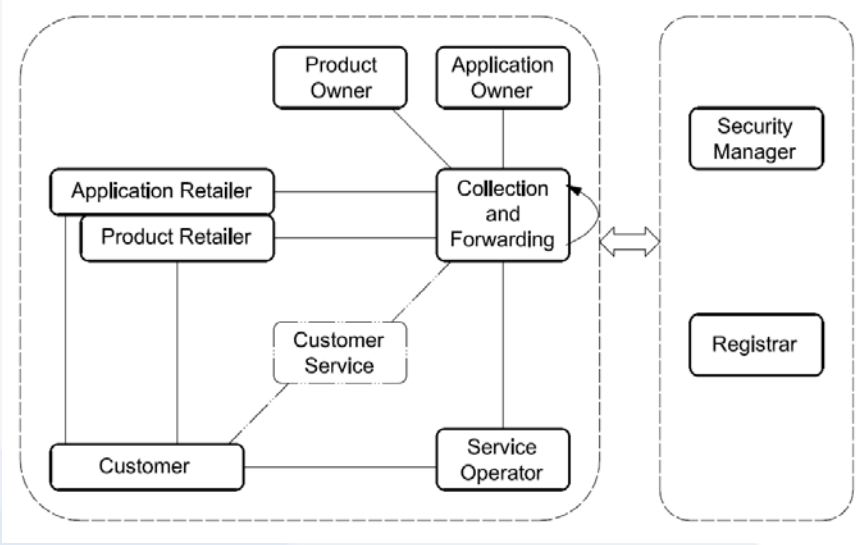
In line with European standards and norms

- In conformity with the standards (EN ISO 24014-1 IFMSA Architecture, etc.)
- consistent with precedents in another projects in EU



Helping in the Czech Republic to determine and enforce authorities:

- **Security manager (Certification)**
- **Registrar authority (Routine operation)**

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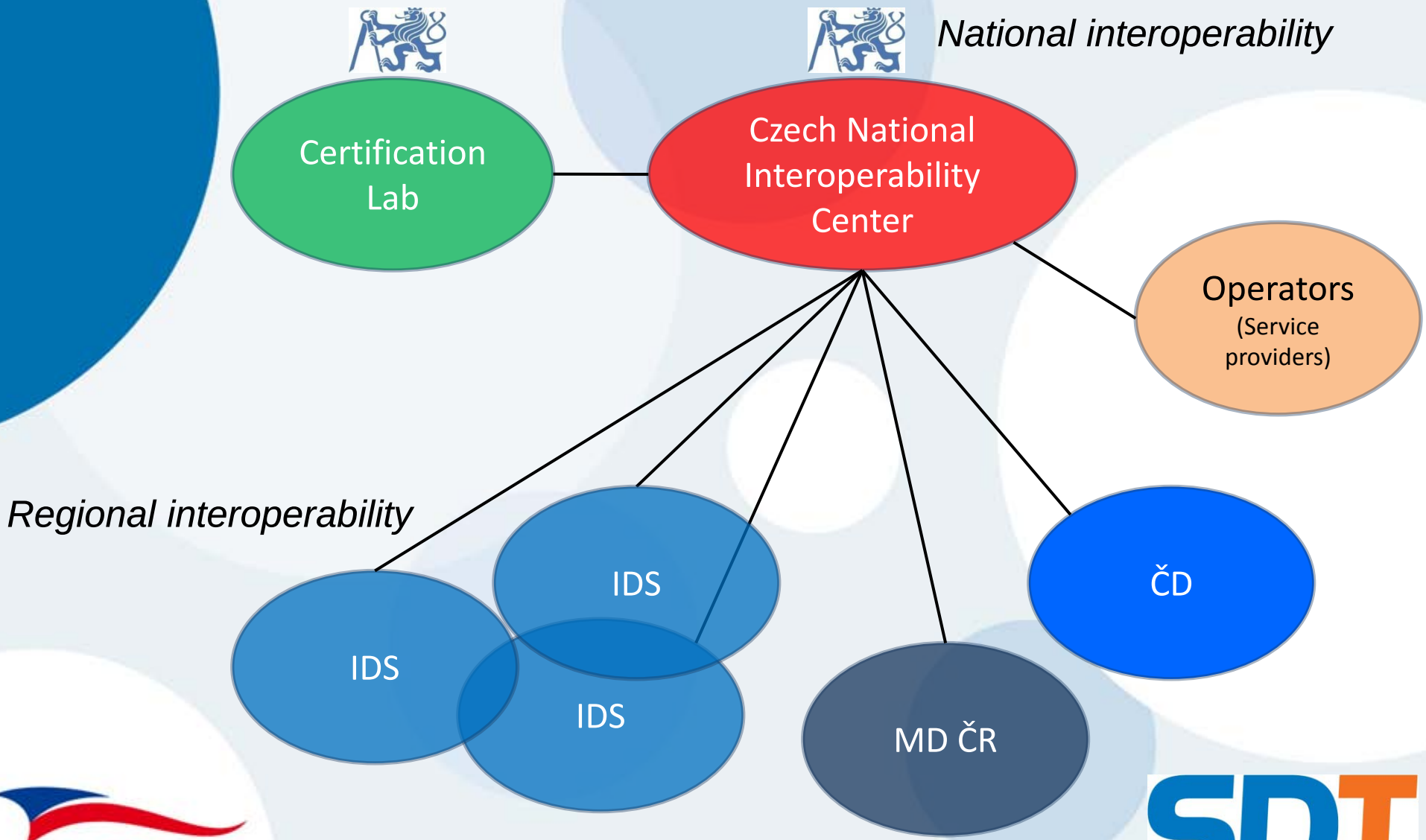
Interoperability system architecture



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