

T.E.A.M.



telematics
economy
architecture
management

SMART CITY - a big challenge

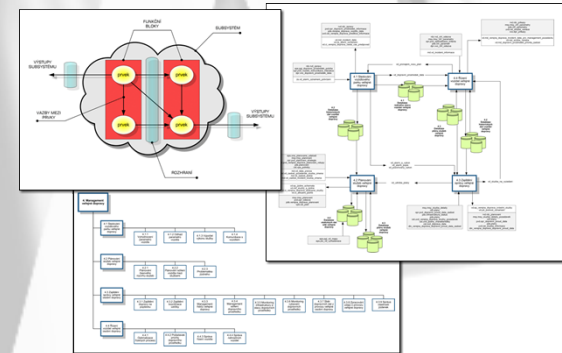
Prof. Dr. Ing. Miroslav Svítek, dr.h.c.
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Czech Technical University in
Prague
Konviktská 20,
110 00 Prague 1
svitek@fd.cvut.cz

Bridges in Prague – co-operation symbol



Content

- General Introduction
- Urbanization and Smart Cities
- Big Data and Smart Cities
- Integrated City Networks: Energy & Transportation
- Cyber Infrastructure for Smart Cities – Living Laboratory in Písek
- Conclusion



The background of the slide is a complex, abstract composition. It features several overlapping, semi-transparent geometric shapes, primarily triangles and polygons, in shades of white, light gray, and yellow. These shapes are layered over a background that appears to be a blurred, high-angle view of a city or urban landscape, with some blue and white tones suggesting sky or water. The overall effect is modern and technological.

General Introduction into Smart Cities and Communities

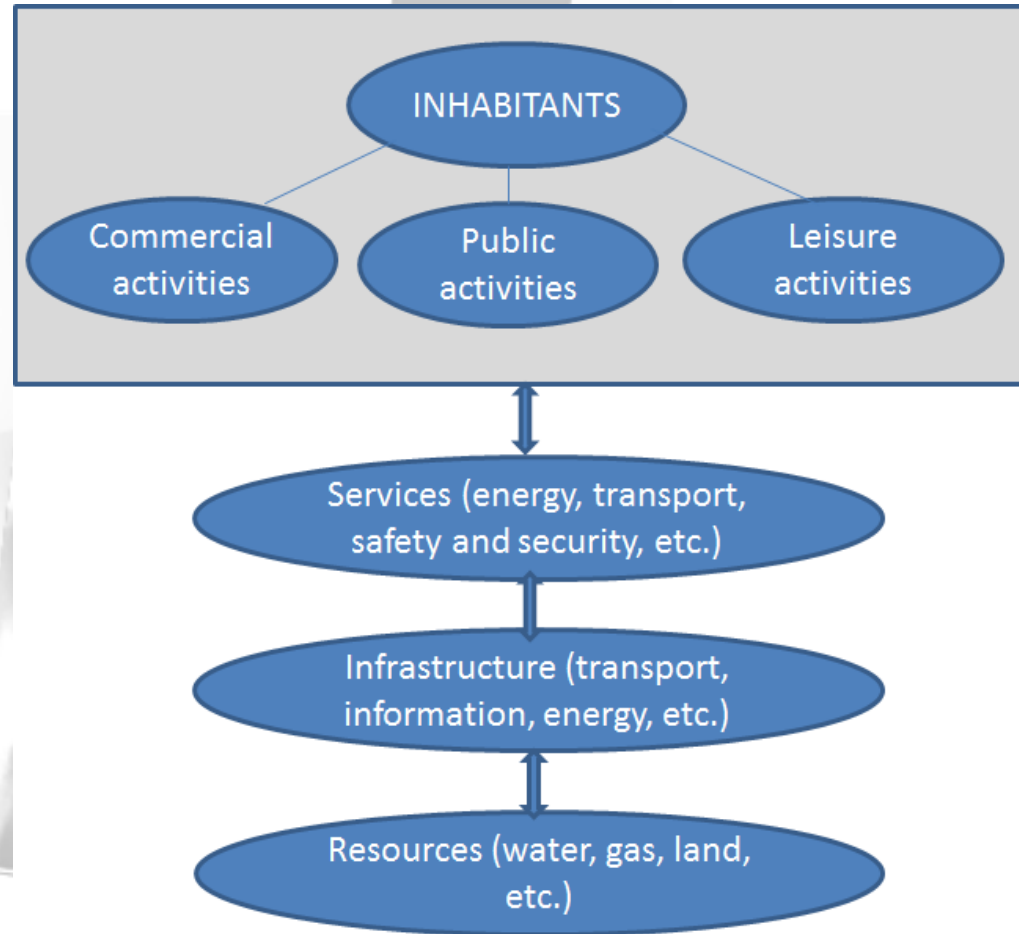
Definition of Smart cities

Sustainability - application of new technologies to keep city entropy under control (minimize loss of energy and time, improve inhabitants' satisfaction, etc.)

Smart city concept should support **services** making better:

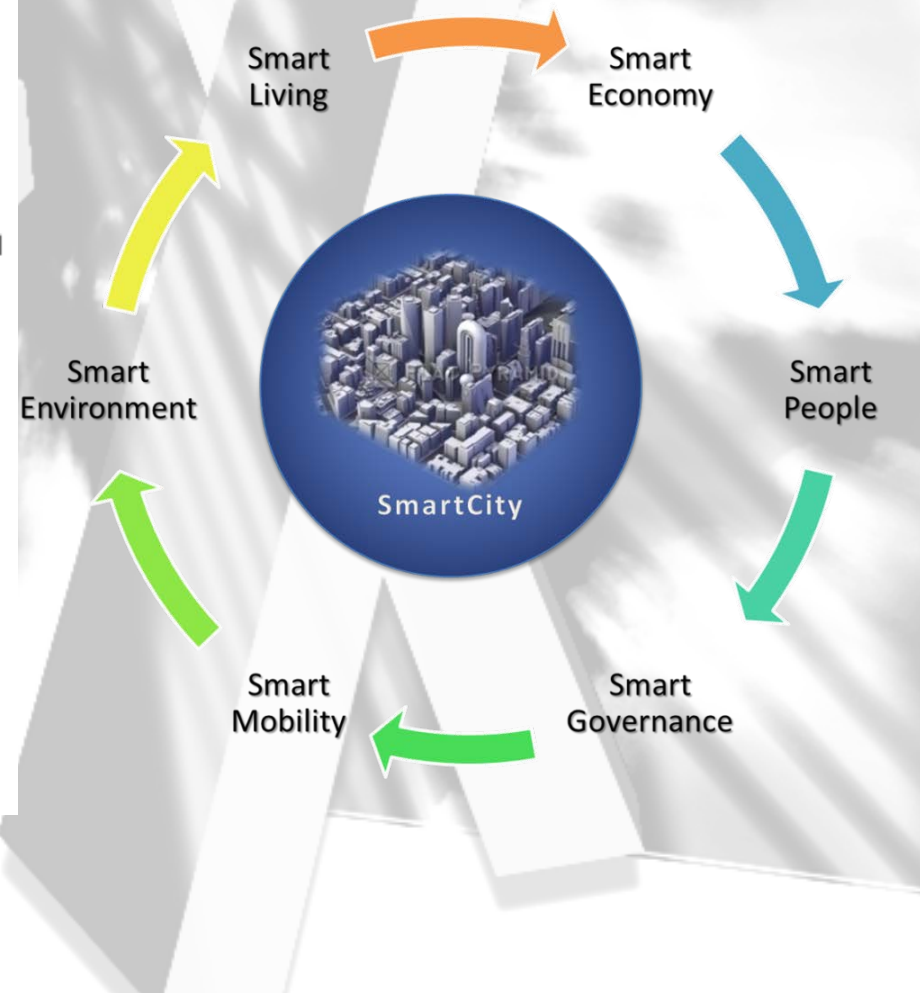
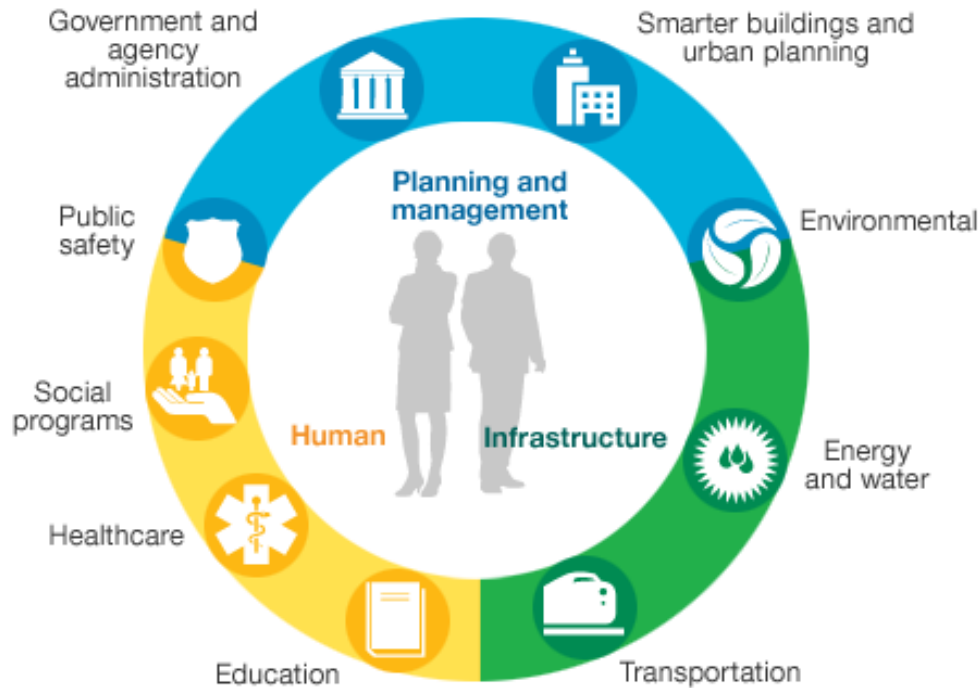
- commercial activities (employment),
- public activities (education, security, access to health care) and
- leisure activities (housing, culture, sport)

Each of the above mentioned services has requirements concerning **limited infrastructure** and **limited resources**.



General Approach (IBM, EU projects)

http://www.ibm.com/smarterplanet/us/en/smarter_cities/overview/



EU smart-cities project – example of city Plzeň

www.smart-cities.eu

Smart Economy

Smart People

Smart Governance

Smart Mobility

Smart Environment

Smart Living

Smart City

Characteristics

Factors

Indicators

6

31

74

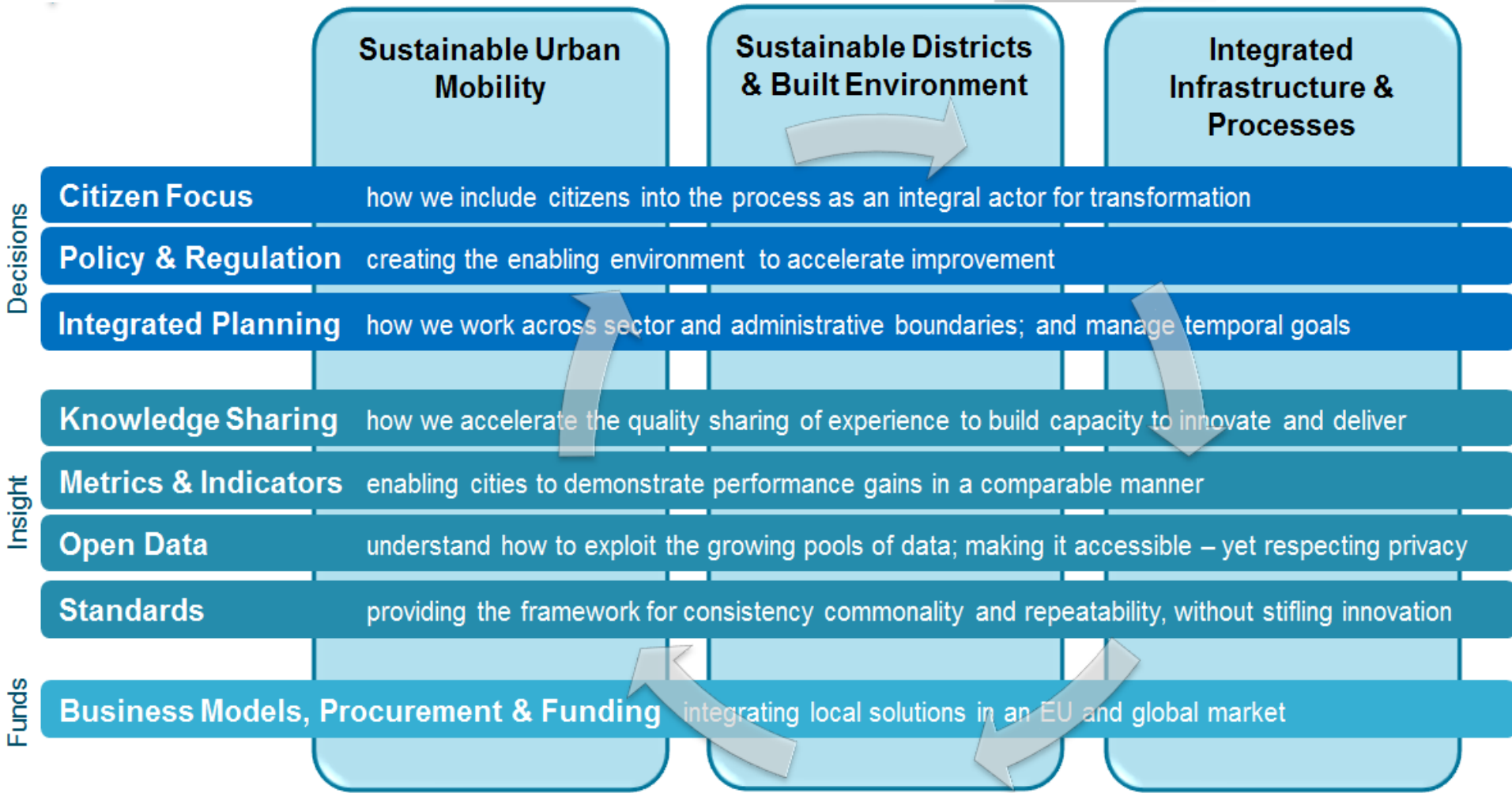


Summary of EU Approach

- **High level Group** for European Innovation Partnership on Smart Cities and Communities
- **Sherpa Group** for European Innovation Partnership on Smart Cities and Communities
- **Communication 4701 final** – Smart cities and communities – European innovation partnership - SCC EIP (2012)
- **Strategic Implementation Plan** – SIP (2013)
- **Operational Implementation Plan** - OIP (27.1. 2014)
- **Call for commitments** – Prague: “Door-to-door mobility center” (15. 6. 2015)



Operational Implementation Plan of European Union



Operational Implementation Plan of European Union

www.eu-smartcities.eu

Miroslav Svítek (svitek) | Smart Cities Stakeholder Platform - Mozilla Firefox


Soubor Úpravy Zobrazit Oblíbené položky Nástroje nápověda

Miroslav Svítek (svitek) | Smart Cities Sta... +

eu-smartcities.eu/users/miroslav-svitek-svitek

AVG Search... Safe Do Not Track Weather

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Smart Cities and Communities

Publications Groups


Join the Platform...
... to share your smart city solution proposals, best practices, project ideas and more!

Navigation: Home /

Miroslav Svítek (svitek)

View Edit

Dr Miroslav Svítek



Czech Technical University in Prague Faculty of Transportation Sciences
Dean of Faculty

Miroslav Svítek was born in Rakovník, Czech Republic, in 1969. He graduated in radioelectronics from Czech Technical University in Prague, in 1992. In 1996, he received the Ph.D. degree in radioelectronics at Faculty of Electrical Engineering, Czech Technical University in Prague. Since 2002, he has been associated professor in engineering informatics at Faculty of Transportation Sciences, Czech Technical University in Prague. Since 2005, he has been nominated as the extraordinary professor in applied informatics at Faculty of Natural Sciences, University of Matej Bel in Banská Bystrica, Slovak Republic. Since 2008, he has been full professor in engineering informatics at Faculty of Transportation Sciences, Czech Technical University in Prague. He is currently teaching courses and doing research in theoretical telematics, intelligent transport systems and smart cities. Miroslav Svítek is president of Association of transport telematics of the Czech and Slovak Republic (it covers more than 80 public and private

CS Čeština (Česká republika) České (QWERTY) nápověda

http://eu-smartcities.eu/solution_proposal_intro

Soubor Úpravy Zobrazit Oblíbené položky Nástroje nápověda

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Smart Cities and Communities

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Join the Platform...
... to share your smart city solution proposals, best practices, project ideas and more!

Navigation: Home /

Thank you for your interest in submitting a Solution Proposal.

Please find a description of the objective and the process of collecting Solution Proposals below.

Why collect Solution Proposals?

The Solution Proposals on this platform aim to provide a portfolio of innovative technologies or processes, that help cities improve their energy supply, building stock, or transport infrastructure. To be useful and attractive for cities visiting the platform, they should be clear, comprehensive, complete, practical and nicely presented.

Submitting a Solution Proposal

The link at the bottom of this page takes you to the Solution Proposal form. This asks for information about the technology or process, the benefits it can achieve, and the requirements for cities to implement them successfully. Please ensure that you complete the different sections of the form, so that cities can judge whether they are suitable for their circumstances. This enhances the chances of your Solution Proposal being taken up and implemented in European cities.

What happens next?

After a Solution Proposal has been submitted, the relevant Working Group chair reviews it for errors or gaps, after which it is published on the platform website. From this moment, cities visiting the platform can find it when looking for solutions.

During the year, the members of the Working Groups review the Solution Proposals submitted, to select the most promising and innovative suggestions. These reviews are based on clearly defined evaluation criteria for each working group topic:

- Energy Efficiency and Buildings
- Energy Supply & Networks
- Transport and Mobility

The next review date is 30 April 2013. Solution Proposals submitted up to and including this date will be considered in the subsequent review cycle.

The Solution Proposals selected are developed into Key Innovations. Apart from enhancing their profile, these provide input for the Smart City Toolkits, that explain in detail they can be applied and what financing tools are available. They are therefore more likely to attract the attention of cities and be realized.

Masculucia - Sicily Italy
Interesting!
Title: Houses for Smart Cities -

13:47 28.4.2014

Smart City Council – Advisor & Market Accelerator

www.smartcitiescouncil.com

The screenshot shows the Smart Cities Council website homepage. The browser address bar displays 'http://smartcitiescouncil.com/'. The website header features the 'SmartCitiesCouncil' logo with the tagline 'Livability | Workability | Sustainability'. Navigation links include HOME, OUR PARTNERS, CITY RESOURCES, PREMIUM RESOURCES*, GLOBAL ALLIANCES, JOIN SCC, ABOUT US, CONTACT US, and LOGIN. A search bar is also present.

The main content area includes a 'Follow us on' section with social media icons. A large featured article titled 'Real-time data helps cities avoid sending money down the drain' is displayed, accompanied by a photo of a panel discussion. Below this, there are three columns of content:

- Smart Cities Solutions:** Resources to solve common city pain points...
 - How can I accelerate economic development in my city?
 - How can I deliver enough clean water to my city?
 - How can I improve mobility in my city?
 - How can I reduce energy use in my city?
 - How can I make neighborhoods safer in my city?
- SCC Partner Spotlight:** IBM. With its Smarter Planet initiative, IBM is driving innovations that power public safety, transportation, water, building and social services around the world. It leverages insights from its 2,000+ projects to help cities of all sizes become smarter. [MORE](#)
- Upcoming Council Events:** Smart Cities Readiness Workshop Nov. 3-4 in South Africa

On the right side, there are three additional sections:

- SCW PHOTO GALLERY:** Check out the action at Smart Cities Week in D.C. via our Instagram feed.
- BE A SMART CITY INSIDER!** "The Smart Cities Council Readiness Guide offers us new ideas and has helped set the foundation for our 2030 planning. It is the tool that will help Hartford move forward." -- Hartford, CT Mayor Pedro E. Segarra. [LEARN MORE](#)
- LATEST NEWS AND TRENDS:**
 - Smart Cities Advisory Services [MORE](#)
 - Best city websites 2015: Take a tip from Independence, Missouri [MORE](#)
 - Rethinking water: lessons (and ambitions) from a city with plenty [MORE](#)

The Windows taskbar at the bottom shows the time as 15:57 on 20.9.2015.

The background of the slide is an abstract composition. It features several large, overlapping, semi-transparent geometric shapes in shades of gray and white, creating a sense of depth and movement. These shapes are layered over a background image that appears to be a cityscape or a landscape with a blue sky and white clouds. The overall aesthetic is modern and architectural.

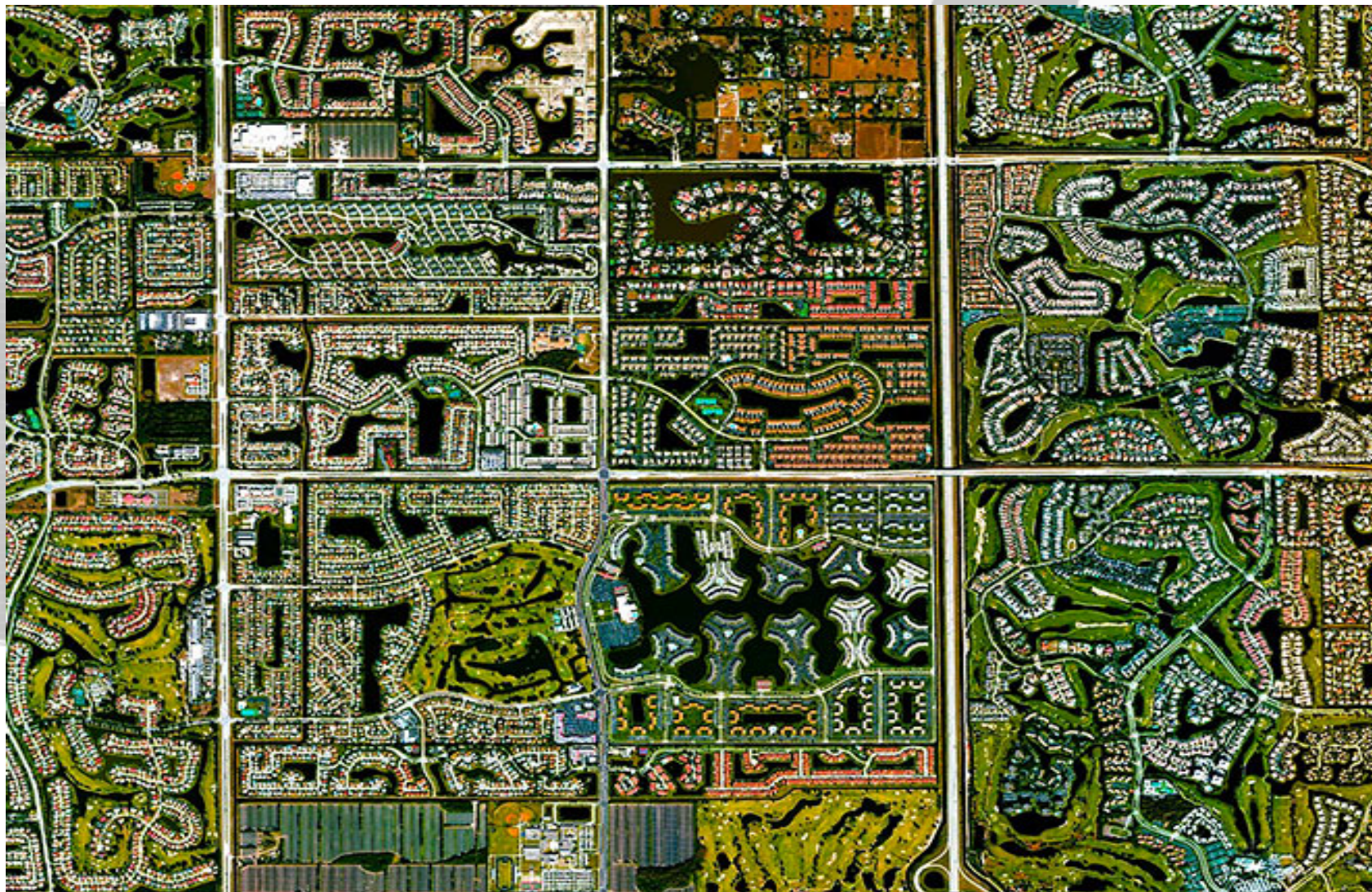
Urbanization and Smart Cities

Ing. Arch. Michal Postránecký

Horizontal Urbanization of Cities



Horizontal Urbanization of Cities



Vertical Urbanization of Cities



Vertical Urbanization of Cities



Combination of vertical and horizontal urbanization



New point of view on smart city urbanization

- Combination of vertical and horizontal dense urbanization will yield to „City megastructures“ (3D city)
- City megastructures will require new approach to city services (mobility, foods production, water purification, etc.)



Big Data and Smart City

Prof. Ing. Emil Pelikán, CSc.
Ing. Martin Hájek
Prof. Ing. Ivo Vondrák, CSc.
Doc. Ing. Pavel Hrubeš, PhD.

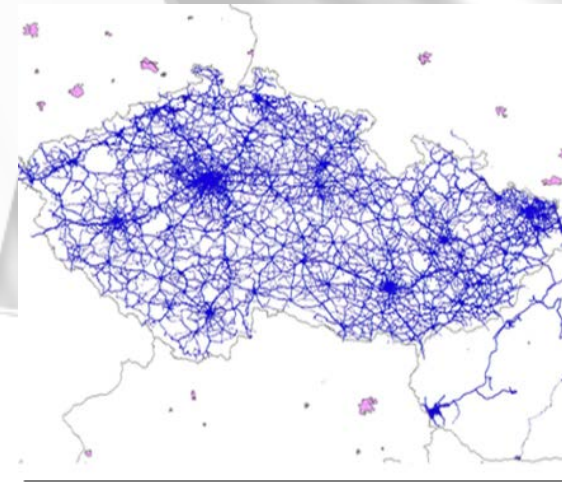
Czech RODOS project – mobility data processing

RODOS - center of competence aims at developing new methods of mobility monitoring, modeling and management (dynamic mobility model, innovative traffic control ...)

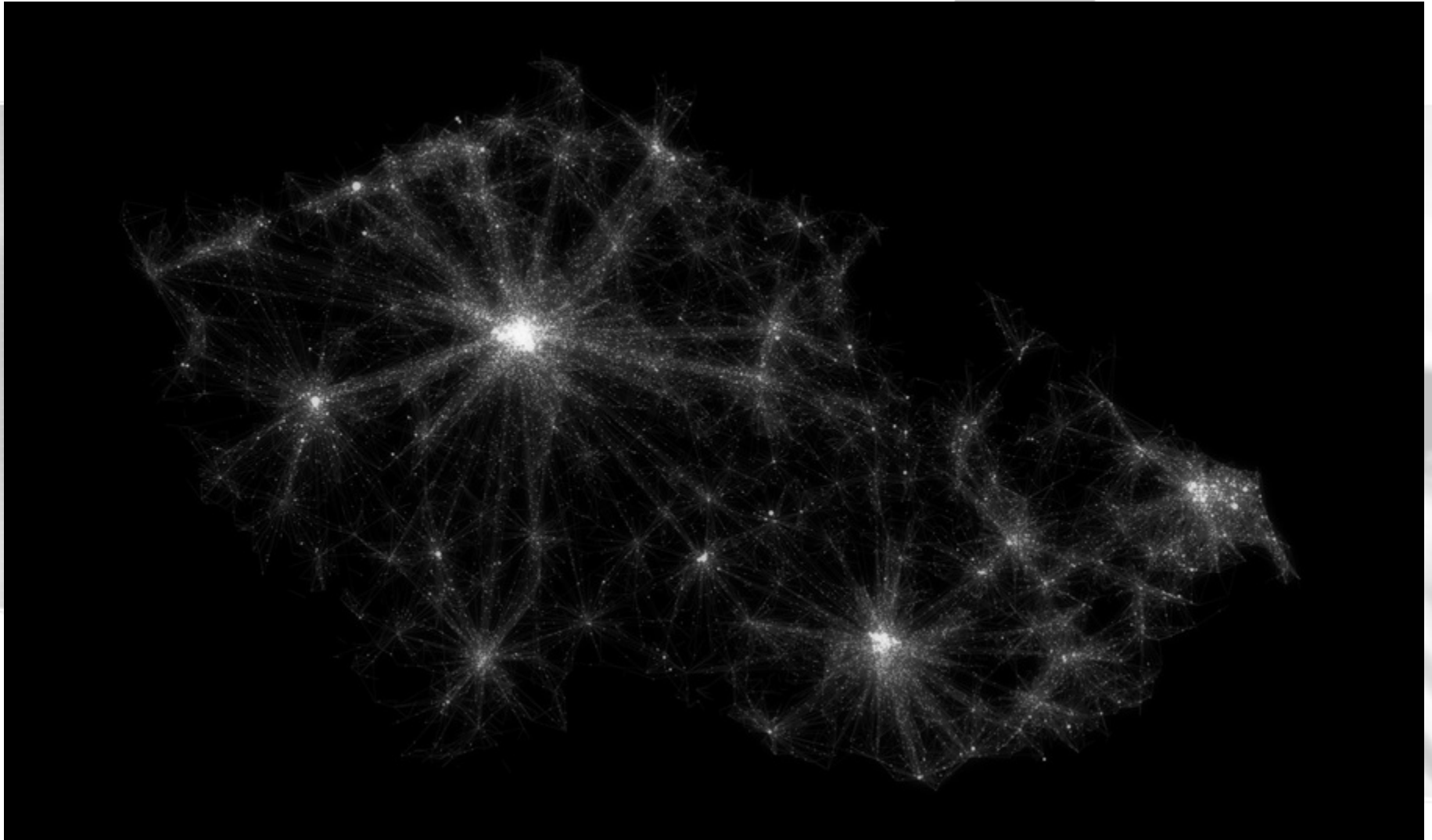
Floating Car Data (GPS/GPRS) - about 140 000 vehicles in CZ, coverage about 5% of traffic flow – every twentieth vehicle monitored

Electronic Toll Collection System - Transaction data of all (over) 3,5t vehicles integrated - 7,2 million of transaction data a day

Signaling data from GSM operator - Anonymous monitoring of distribution and mobility of population in time and space, monitoring of (about) 5 mil. users of GSM network



RODOS project – Czech Republic



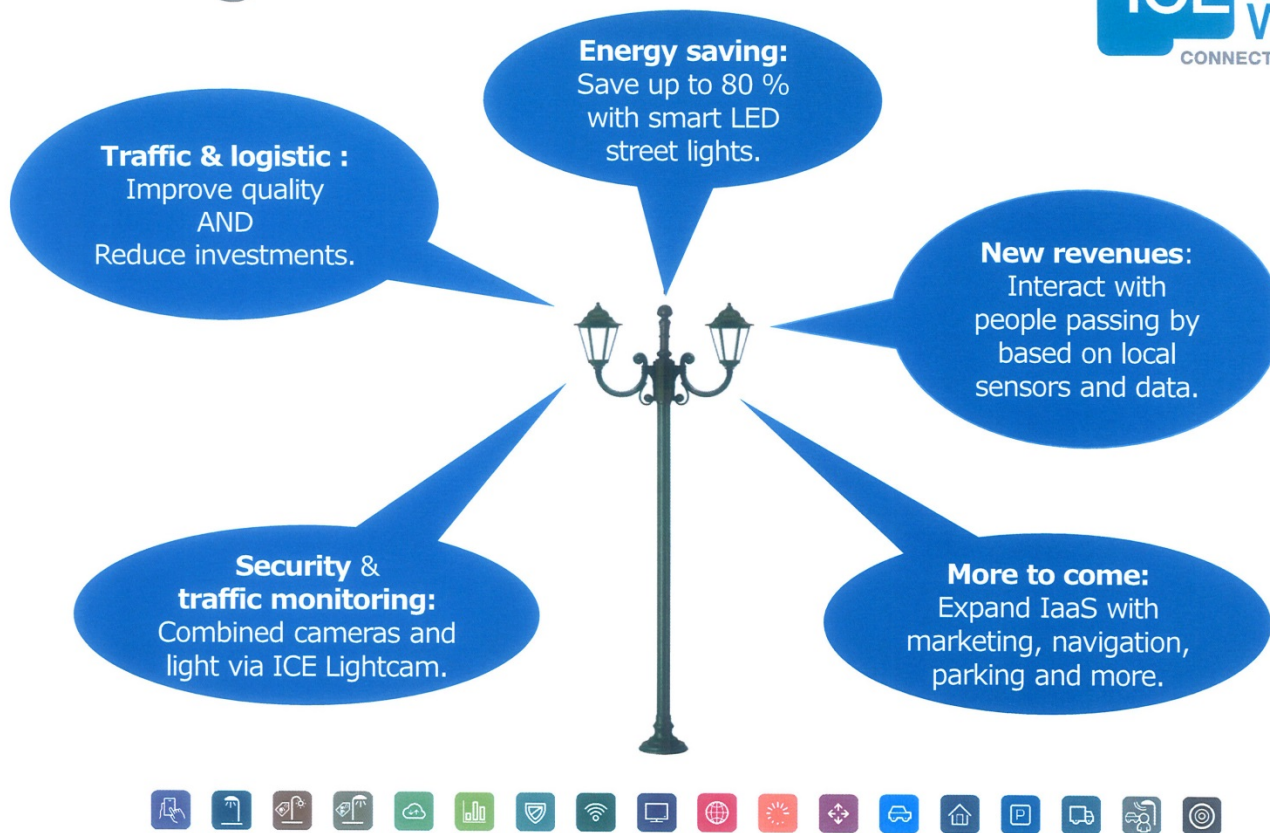
RODOS project – Ostrava



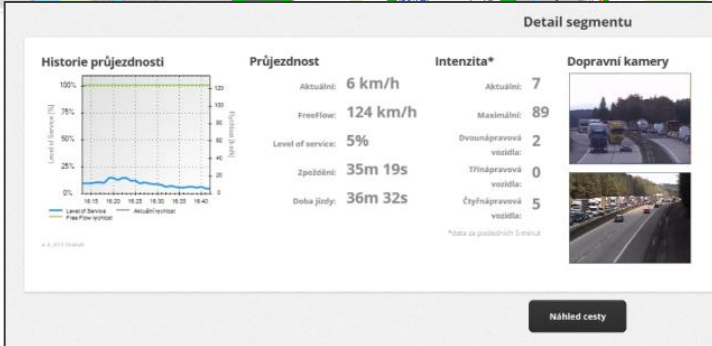
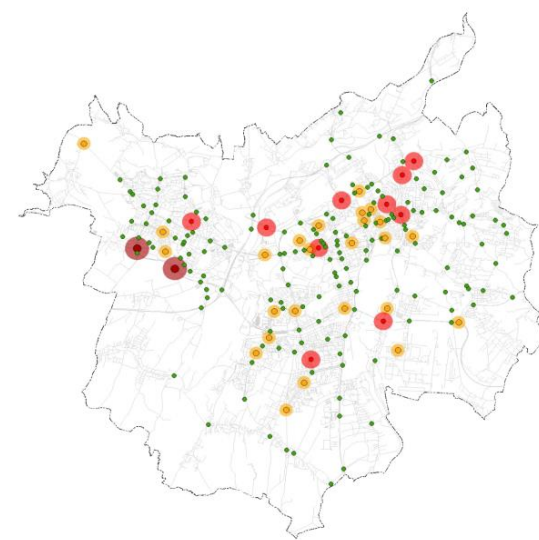
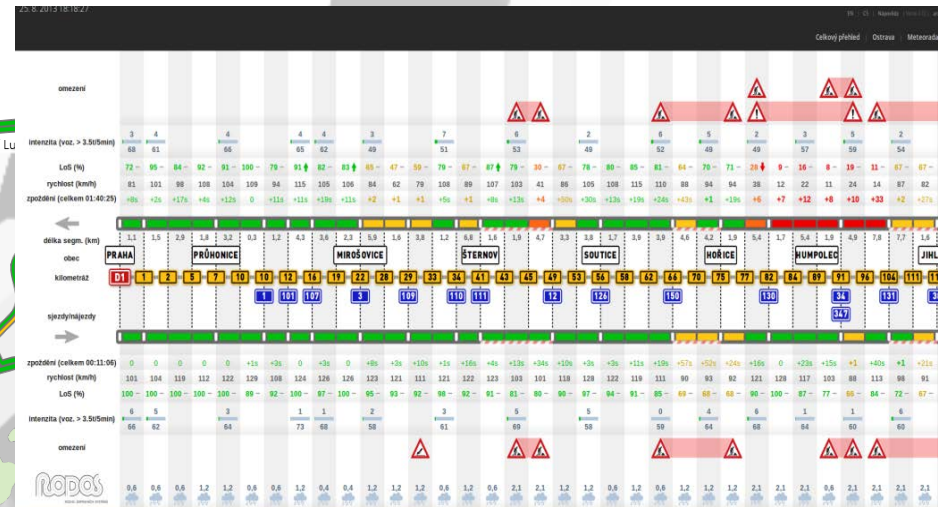
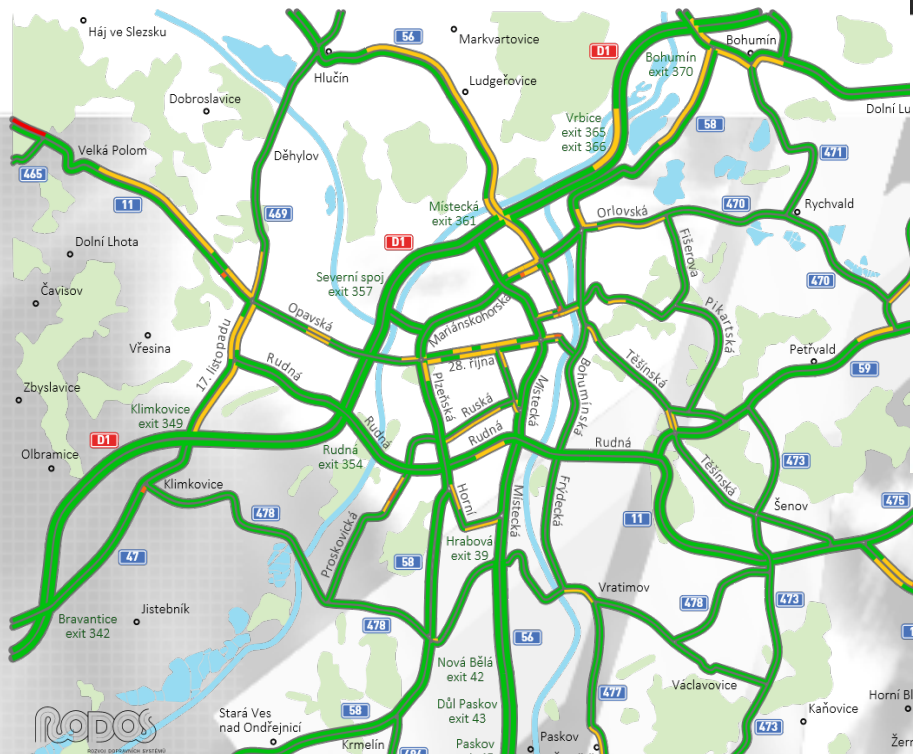
Infrastructure for city data collection

Example of City Cyber Infrastructure solution (HW and SW platform)

→ Lights as Cash cow



Mobility data visualization

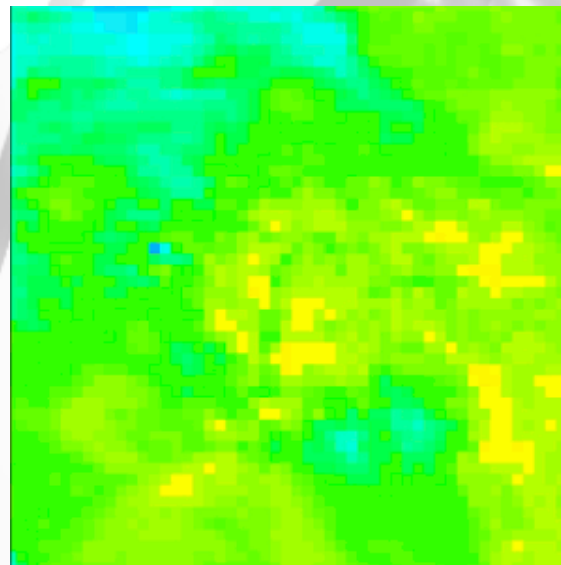
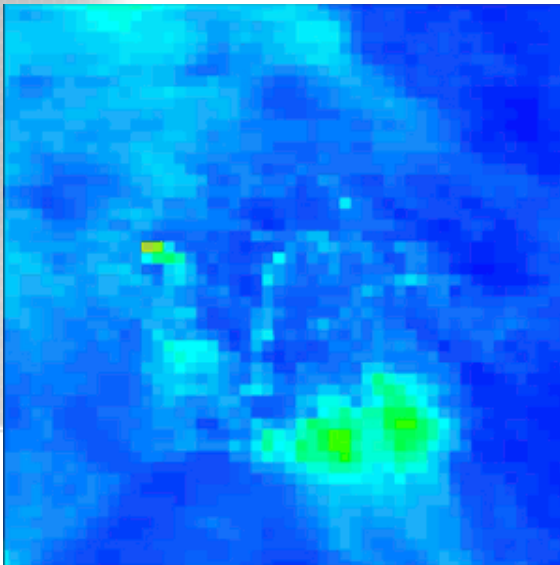


Whether data processing

Atmospheric modeling - Weather has an impact on the traffic density, supply/demand chain and transportation of the goods, and traffic safety.

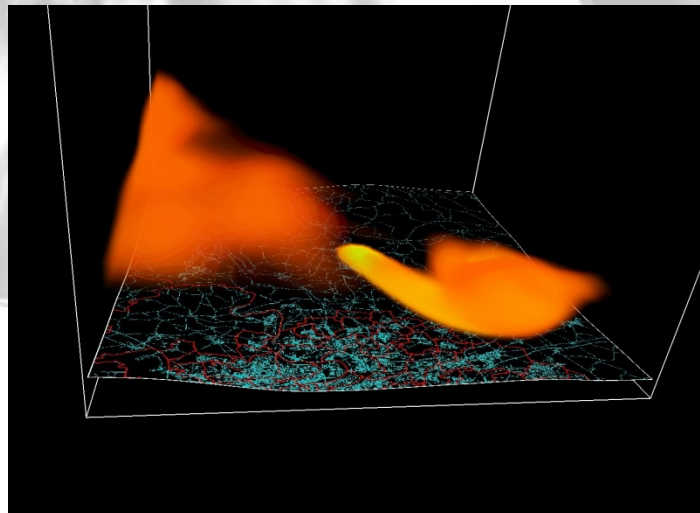
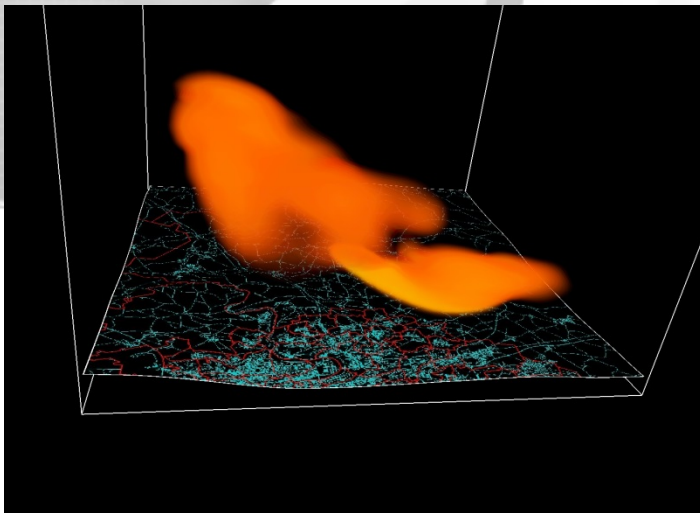
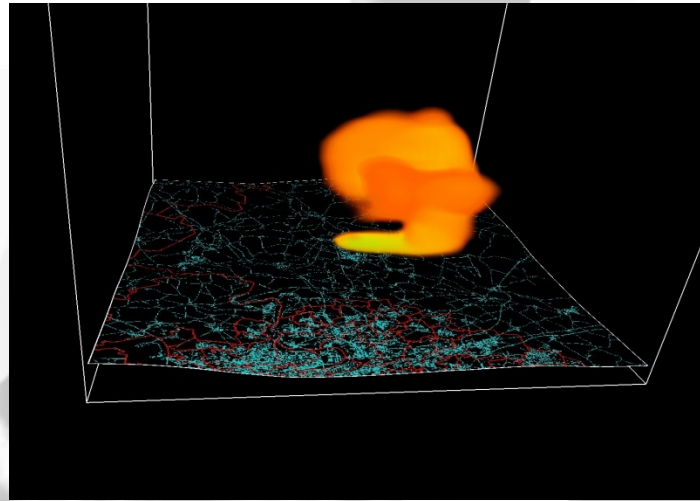
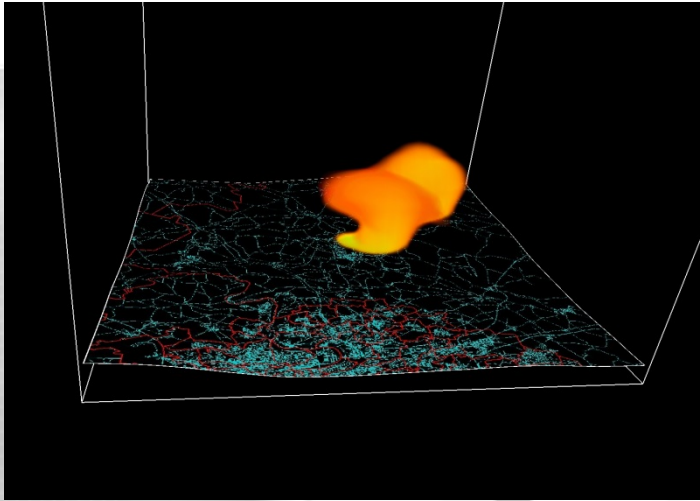
Concentrations of NO₂ (left), ozone (center) and ASO₄J (right)

Domain 52x52 km, horizontal resolution 1km



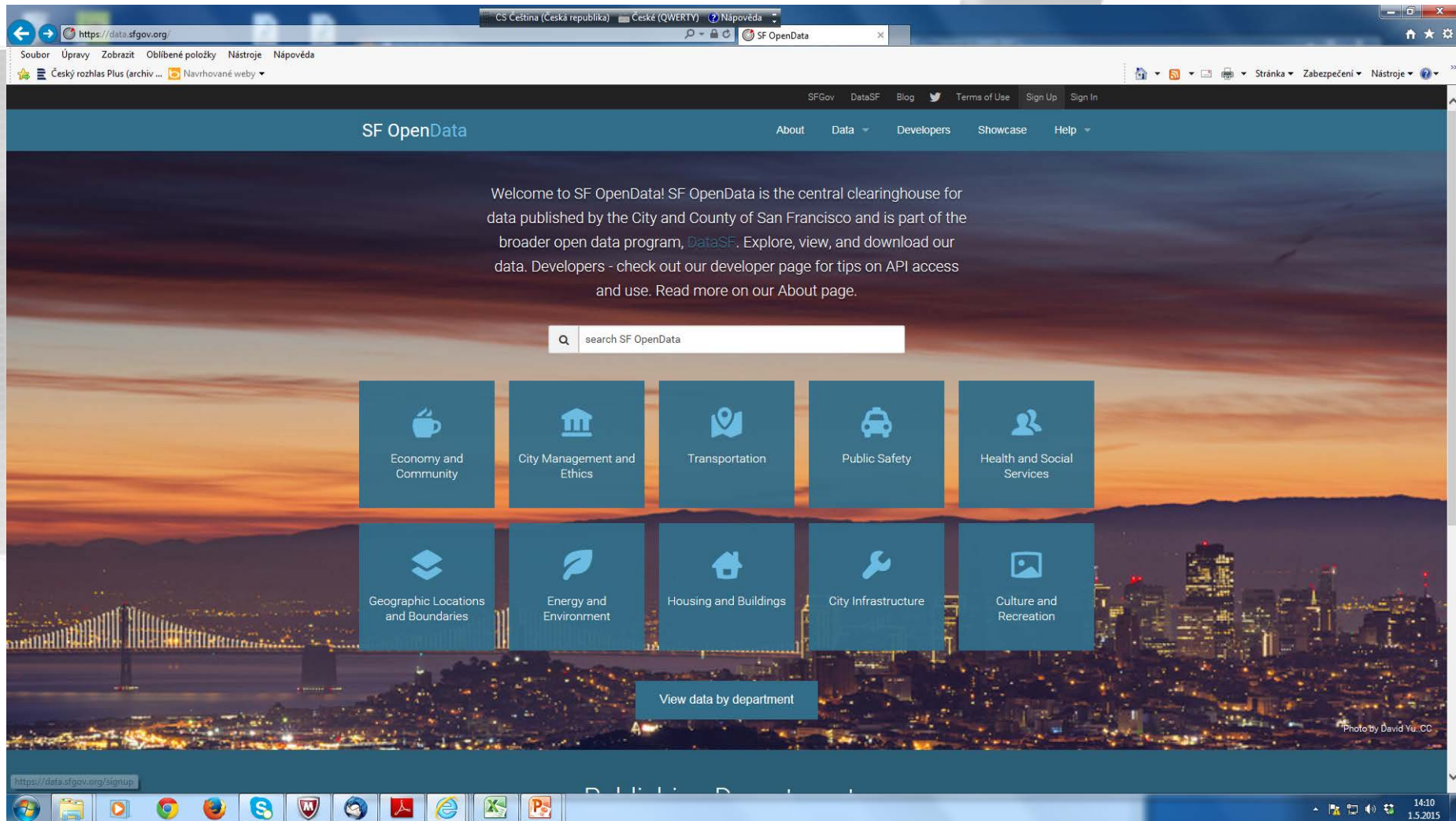
Emergency data processing

Spread of Pollution (ammoniac) in Prague



City Open Data Example – San Francisco (USA)

<https://data.sfgov.org/>



The background of the slide is an abstract composition. It features a large, light gray, three-dimensional geometric shape, possibly a stylized letter 'X' or a series of overlapping planes, that dominates the center. Behind this, there are blurred images of a city skyline and a sky with clouds. At the top, there are horizontal bands of yellow and blue. The overall aesthetic is modern and technological.

Integrated City Networks

Example: Energy & Transportation

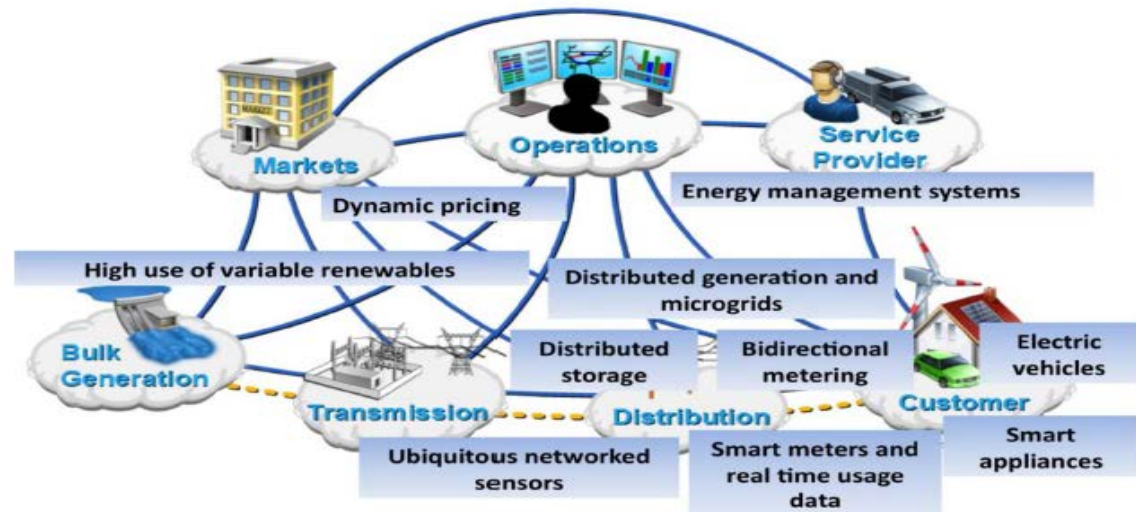
Prof. Ing. Zdeněk Votruba, CSc.
Prof. Ing. Mirko Novák, CSc.

Smart grids (SG) concept

THE CONCEPT OF SMART GRID IS GENERALLY DEFINED AS A FUSION OF:

- ENERGY AND
 - INFORMATICS COMPONENTS OF ELECTRIC ENERGY NETWORK
- IN WHICH ANY NODE OF THE GRID CAN ACT AS
- A SOURCE,
 - APPLIANCE / PROCESSOR,
 - STORAGE.

Features: Intelligence, omni-directional connectivity, flexibility, ability of re-structuralization, graceful degradation, self healing, clustering



Example of grid-node: electro-vehicle

- **Electro-mobility** is defined in a broad sense – i.e. including also trams, trolleybuses and fuel cell-powered vehicles (hydrogen and other)
- Electro-mobility emit only minimal local pollution - their motors do not emit nanoparticles, which have been proven to be very harmful to human health
- If batteries continue to become 5–7 % cheaper every year while their capacity increases by 5–7 % in the same period, the turning point will be reached in 2020
- Then electro-mobility will become an economically advantageous way of transportation



Smart transportation concept

- **Urban traffic management** will also increasingly depend on various sharing models for means of transport, such as bike-sharing, car-sharing taxi-sharing, sharing or maximizing the freight transport capacities in city logistics
- Future users will treat the urban transport system as a mobility service, which they will expect to deliver high-quality
- **Mobility Service Level Agreement (SLA)** should be guaranteed
- The **use of smartphones** for the optimization of individual routes, door-to-door navigation, or mobile payment for these services will help guarantee the quality parameters of mobility
- **Autonomous vehicles**, especially e-vehicles, will be operated automatically
(the high-profile development of the 'Google Car', for which Google has taken advantage of the large amount of high-quality mapping data it possesses to programme travel routes)

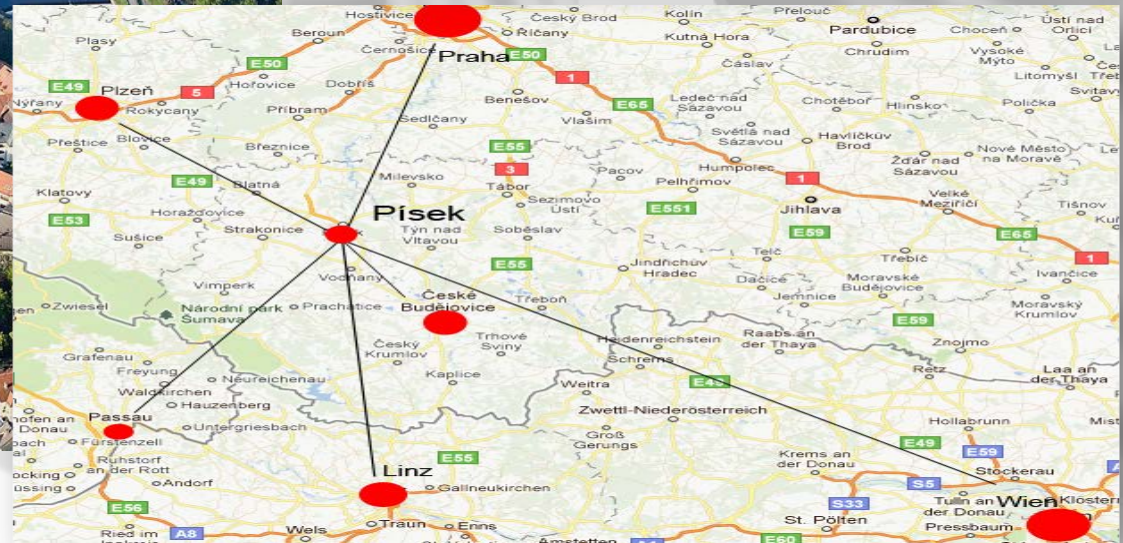


Cyber Infrastructure for Smart cities – Living Laboratory in city Písek

Ing. Vladimír Zadina
Ing. Jiří Šnajdar
Pavel Neoral
Jaromír Grégr

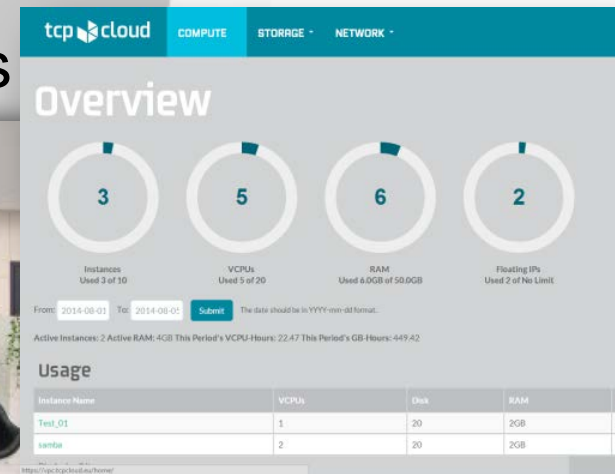
Písek – Living Laboratory for Smart city

- Historical city with 30 093 inhabitants



Písek – Technological Center (TCP)

- TCP – professional private cloud services



Cloud services

- **PaaS** (Platform as a Service)
- **SaaS** (Software as a Service)
- **IaaS** (Infrastructure as a Service)
- **NaaS** (Network as a Service)
- **STaaS** (Storage as a Service)
- **DaaS** (Data as a Service)
- **DBaaS** (Database as a Service)
- **TEaaS** (Test as a Service)
- **BaaS** (Backend as a Service)
- **XaaS** (Everything as a Service)



Intelligence – knowledge-based systems

- **Macro/micro simulation** (use real data, simulation of impacts of different strategies)



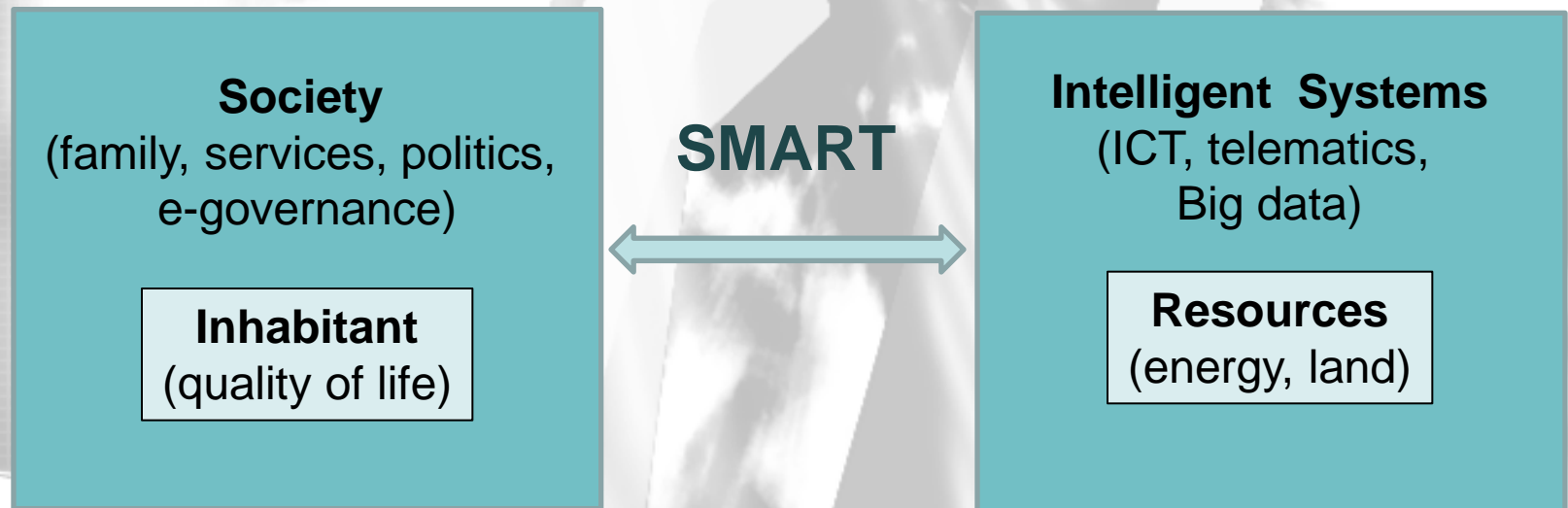
Intelligence – knowledge-based systems

- **Virtual city** (inspiration in Second life)



Final words to Smart cities concept

„Make the world more human, not high-tech“



Thank you for your attention

