SOLUTIONS FOR MOBILITY OF 21ST CENTURY RESEARCH AGENDA

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TECHNICAL UNIVERSITY OF OSTRAVA
Jiří Novobilský, Director; CE-TRAFFIC
Our mission is to deliver scientifically excellent and industry relevant research in the fields of transport and mobility. We are providing **STATE-OF-THE-ART TECHNOLOGY AND SERVICES** and make it available for Czech and international teams from academia and industry.
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<th>TOPICS OF THE PRESENTATION</th>
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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.**
BIG DATA SOURCES
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

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

CELLULAR DATA USED

GPS DATA USED

"If you can measure it, never model it"
THE ViaRODOS SYSTEM
BIG DATA VALUE CHAIN

GENERATION OF ANONYMIZED DATA
Anonymized signaling data + cell map data
GPS data from large fleets and navigation communities

DATA PROCESSING, DATA ANALYSIS AND DATA INTERPRETATION
Linked with other data – digital maps, census data

TRAFFIC AND MOBILITY MEASURED BUSINESS INTELLIGENCE FOR EXTERNAL CUSTOMERS
Recomputing output for the entire population

OFF-LINE BUSINESS INTELLIGENCE
- # of people, socioeconomic data
- Typical (repetitive) / Atypical
- “Snapshot” / time series per location
- Relations (home-work), list of daily trips

ON-LINE BUSINESS INTELLIGENCE
ABOUT TRAFFIC JAMS
FROM ROBUST SOURCE DATA TO RESPONSIVE MONITORING SYSTEM

- AVERAGE DETECTION TIME 1 – 3 MIN – RED SEGMENTS
- AVERAGE DETECTION TIME 4 – 6 MIN – ORANGE SEGMENTS
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 MANAGEMENT
CZECH NATIONAL TRAFFIC INFORMATION CENTER
TRAFFIC MANAGEMENT
OPEN API ENABLING SHARING DATA WITH IN OTHER APPLICATIONS
- CZECH TV

Also: FCD traffic monitoring project for the City of Prague
TRAFFIC MANAGEMENT
OPEN API FOR INFIELD VISUALISATION
OFF LINE ANALYTICS

Mobility

20 June 2017
ABOUT CROWDS OF PEOPLE AND THEIR MOVEMENTS
THE GEODEMOGRAPHY DATA
FOR BUSINESS INTELLIGENCE

HOW MANY?

FROM WHERE?

WHEN?

CE-TRAFFIC

THE GEODEMOGRAPHY DATA

WE COMPUTE UNIQUE GEODEMOGRAPHIC STATISTICS OUT OF ANONYMOUS SIGNALING DATA FROM MOBILE NETWORK OPERATORS.
PEOPLE PRESENT IN REAL TIME
PEOPLE PRESENT IN REAL TIME

- Prague at noon on a working day
- Prague at midnight
NATIONAL MOBILITY ANALYSIS
CZECH REPUBLIC
AGGREGATED ORIGIN-DESTINATION MATRIX
ADVANCED MOBILITY ANALYTICS

CASE STUDIES
Visitors of MotoGP Brno

Origin destination matrix

Case: MotoGP Brno 2014
EVENT MOBILITY ANALYSIS
MOTO GP BRNO 2014

NUMBER OF VISITORS PER DAY OF THE EVENT

<table>
<thead>
<tr>
<th>Day</th>
<th>Visitors</th>
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</thead>
<tbody>
<tr>
<td>pátek</td>
<td>42144</td>
</tr>
<tr>
<td>sobota</td>
<td>60204</td>
</tr>
<tr>
<td>neděle</td>
<td>78432</td>
</tr>
</tbody>
</table>

NUMBER OF PEOPLE PRESENT AND “NEWCOMERS” DURING THE EVENT

<table>
<thead>
<tr>
<th>Day</th>
<th>People Present</th>
<th>Newcomers</th>
</tr>
</thead>
<tbody>
<tr>
<td>pátek</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>sobota</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>neděle</td>
<td>20</td>
<td>12</td>
</tr>
</tbody>
</table>
SPECIAL/TOURISM MOBILITY ANALYSIS
VISITORS OF MOUNTAIN RESORT SUMAVA/BÖHMERWALD (CZ)
STATISTICS ABOUT FOREIGN TOURISTS
MOBILITY ATLAS
TRAFFIC AND MOBILITY TOGETHER
DEUTSCHE TELEKOM – STRATEGIC PARTNER FOR MOBILITY ATLAS
ENABLER FOR DIGITALIZATION

INNOVATION POWER OF GLOBAL PLAYER
Digital Division bundles the innovation power of T-Systems, Deutsche Telekom and leading partners

STANDARDIZED, SCALABLE PLATFORMS
Digital Division offers standardized, scalable platform-based products combined with connectivity and footprint of a global ICT player and Deutsche Telekom

PARTNER ECO-SYSTEMS + OWN DIGITAL ASSETS
Digital Division combines standardized products from best of breed partners as well as own industry-focused digital platforms

TRUSTFUL BRAND: “T” FOR TRUST
Deutsche Telekom is the most trustful and valuable brand in Telecoms in Europe with strong investment in innovation, network quality and customer service

CLOUD & SECURITY MADE IN GERMANY
Cloud operated in Germany by Deutsche Telekom under German Law ensures privacy/security in line with highest data standards

BEST NETWORK IN EUROPE
Deutsche Telekom offers the most reliable network in Germany and is technology leader in CEE with PanNet and IP
## Mobility Atlas - Functions

<table>
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<th>Mobility Atlas</th>
<th>Functions</th>
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<tr>
<td>Big Data:</td>
<td>Real-time traffic (traffic jam detection) for traffic control centers</td>
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<tr>
<td>Computations,</td>
<td>Real-time population heatmaps for police and crisis management</td>
</tr>
<tr>
<td>Visualisations,</td>
<td>Origins-destination analytics, modal split, traffic volumes</td>
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<tr>
<td>And Analytics</td>
<td>Tourism statistics - foreigners in CZ, Czech abroad, domestic tourism, event analytics</td>
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<td></td>
<td>Tailored data and analytics for urban mobility plans and urban planning</td>
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THANK YOU!
CONTACTS

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