Traffic Information Systems for Smart Mobility as part of Smart Cities

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Wissen für Morgen

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Agenda

1. General Information
2. Smart Mobility System for Smart Cities
3. Use Cases – Traffic Information Systems
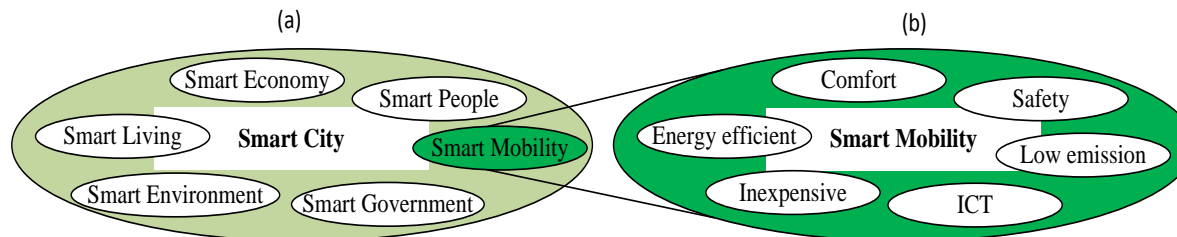4. Conclusion

Smart Mobility System for Smart City
General Information

Smart City

– "a city well performing in a forward-looking way in economy (competitiveness), people (social and human capital), governance (participation), mobility (transport and ICT), environment (natural resources preservation), and living (quality of life), build on the smart combination of activities of self-decisive, independent and ware citizens" [Giffinger at al.]

Smart Mobility

– as part of a Smart City is defined as an offer that allows an "energy efficient", "low emission", "safe", "comfortable" and "inexpensive" mobility and which is intelligent used by traffic participants. Smart Mobility focuses not on establishing new infrastructure, but instead to optimize the infrastructure through the use of information and communication technologies (ICT) in a smart way


(a) Smart City: Smart Economy, Smart People, Smart Living, Smart Mobility, Smart Environment, Smart Government

(b) Smart Mobility: Comfort, Safety, Energy efficient, Low emission, Inexpensive, ICT

Smart Mobility System for Smart City
An Architecture for Smart Mobility System

Part Components
- Transport Participants and Freight
- Means of Transport
- Transport Modes
- Traffic Information and Data Sources
- Environment Information
- Social Media Information
- Traffic Information Systems
- Traffic Management Systems
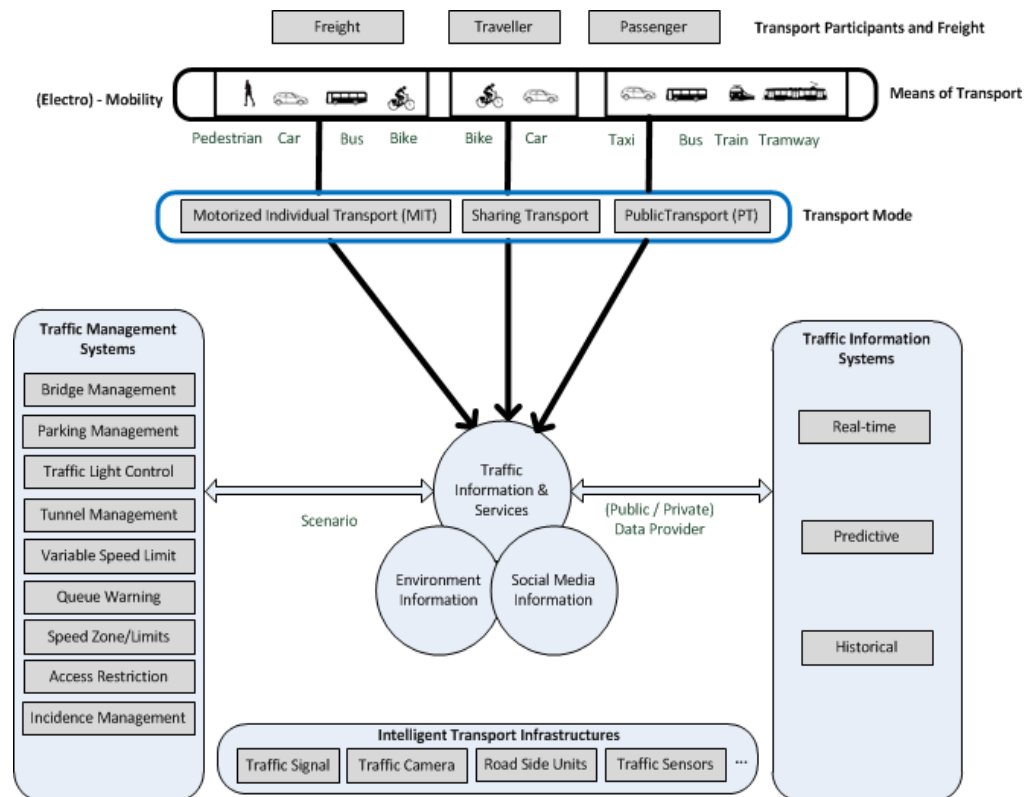
Smart Mobility System for Smart City

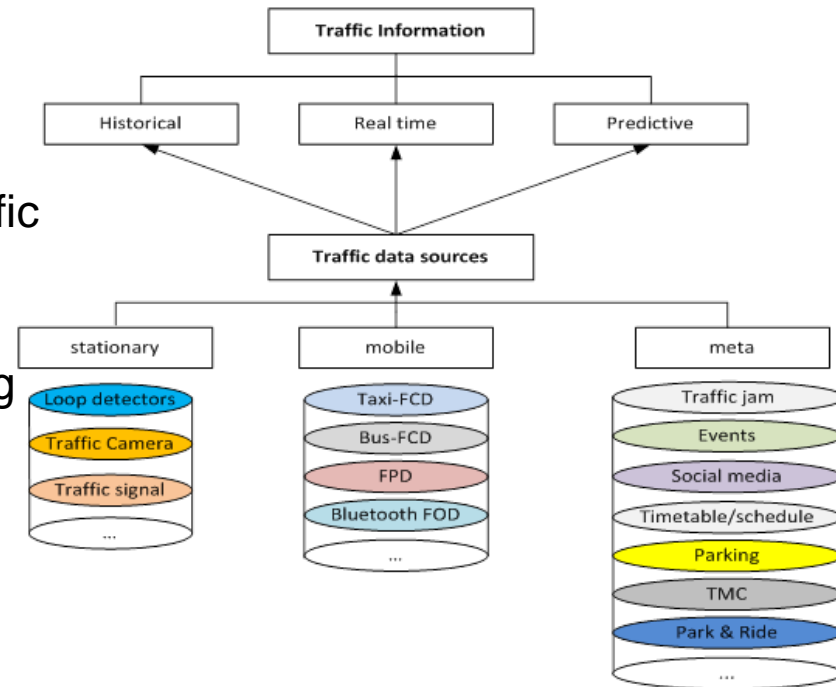# Smart Mobility System for Smart City
Traffic Information and Data Sources

Traffic Information

– Different categories of TI: real-time, historical and predictive data

– Provided by a various number of available traffic information systems (private & public)

– TI are required for the realization of intelligent transportations solutions and services (Routing service, traveler assistant) to support traffic participants and transport authorities

– Easy Access to TIs using ICT possible

– TI are obtained from different data sources
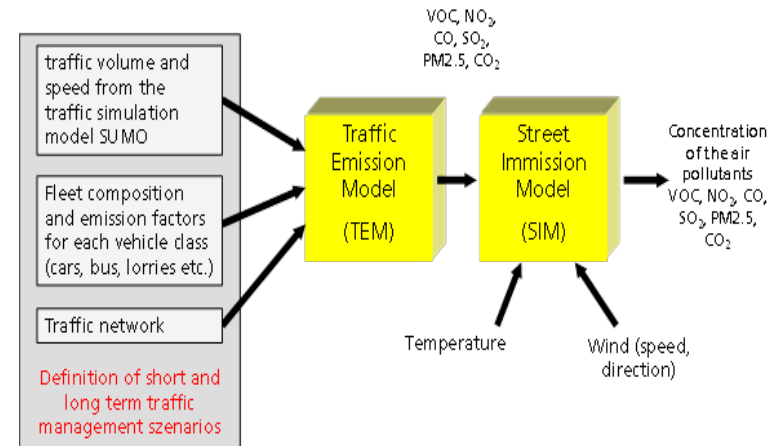
Traffic Data Sources

– Different data collection technologies are used (*Bluetooth*, induction, FOD, Video)

– Various data sources are available

Smart Mobility System for Smart City
## Environment / Social Media Information

Environment Information

– The reduction of air pollution in urban areas due to traffic is essential.

– *Environment Information Systems* are required to collect and provide environmental data in real time in Smart Cities (e.g. COX and NOx Pollution)

DLR Processing tool set of environmental data

Social Media Information

– Social Media (e.g. Twitter, Facebook) as new Traffic Data Source for Traffic Management in Smart Cities ("Social Media Harvesting")

– Big Data analytics/mining and processing to extract Traffic Information

– Possible Traffic relevant Information
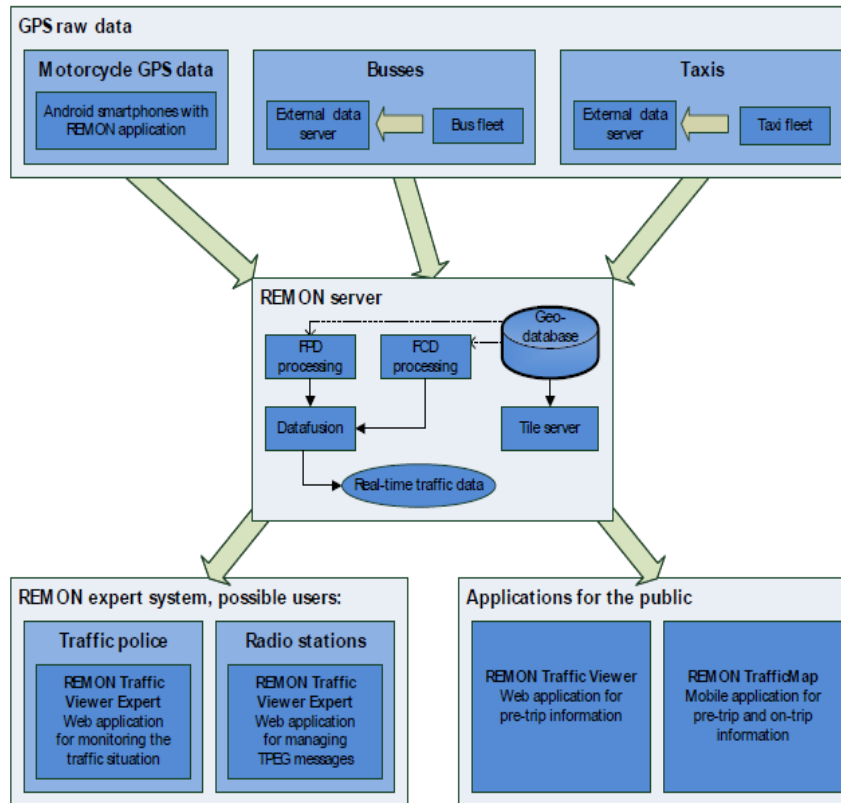 – Accidents, road blockade, road construction etc…
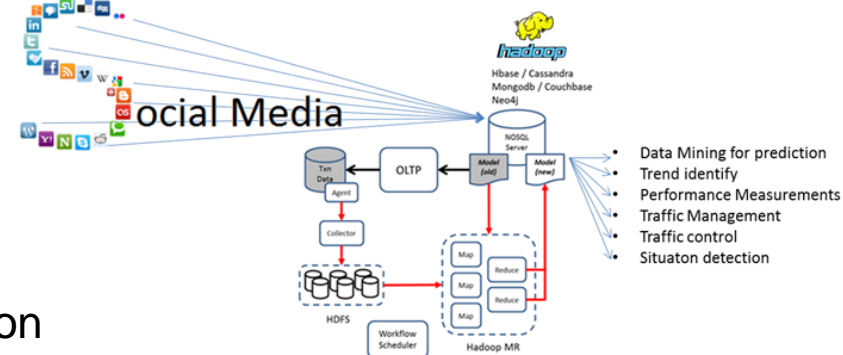
Infrastructure for processing of social media

Use Cases - Traffic Information Systems (1)
## TIS for Hanoi, Vietnam

- Architecture

- Benefits
  - Vietnamese-German Project REMON worked to improve the traffic situation in Hanoi
  - The REMON TIS delivers for the first time in Hanoi comprehensive traffic Information in real-time.
  - It consists of **Web and App tools** and **Hotspot monitoring** for long term traffic analysis
  - Data fusion of traffic data from different sources to enhance the quality of the TI
  - REMON TI is available for public authorities (e.g. police) and private traffic participants

Use Cases - Traffic Information Systems (2)
TIS for Hefei, China

• Architecture
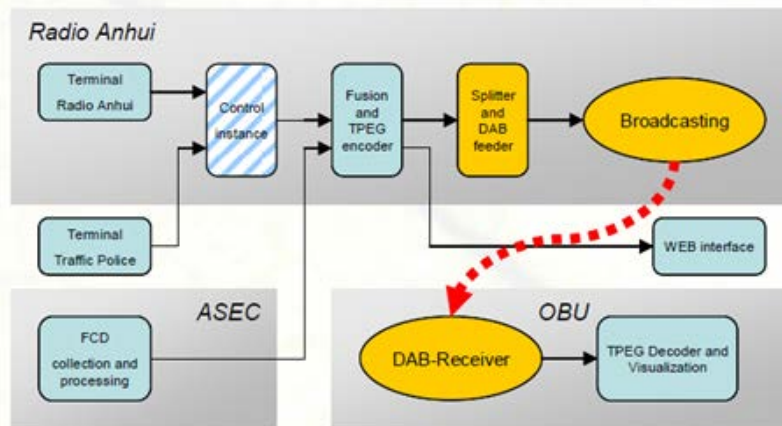
On-Board Unit with integrated Traffic Viewer showing Traffic Situation in Hefei city, China
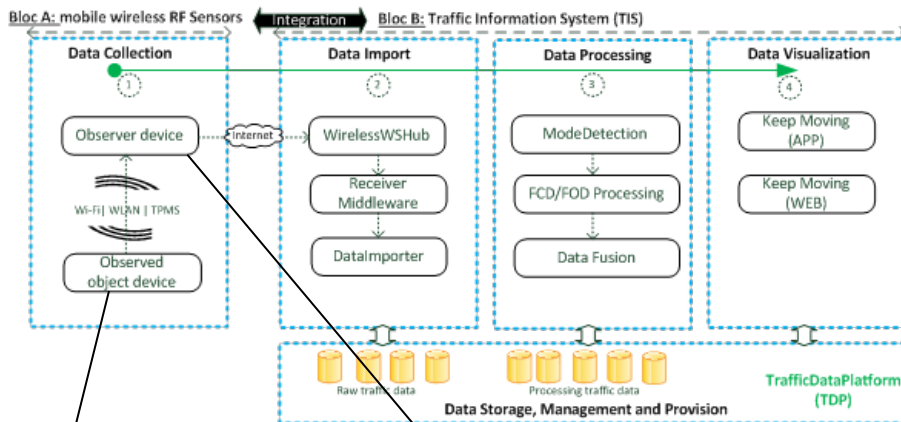

• Benefits
  – The Chinese-German project METRASYS worked on the new concept of sustainable mobility in mega cities.
  – The focus was on the *sustainable planning and dynamic data collection using FCD and traffic management*
  – Broad approach was implemented in close cooperation with the relevant Chinese parties
  – METRASYS gave means to decision-makers to implement and control sustainable transport in Hefei effectively.
  – The Chinese-German cooperation has provided valuable insights into the development process of Hefei and led to the integrated approach to transport and urban planning involving local decision-makers

Use Cases - Traffic Information Systems (3)
Bluetooth based Floating Car Observer System

- Architecture

Bluetooth/Wi-Fi enable observed Devices
Traffic object

Bluetooth/Wi-Fi enable observer Devices
Traffic observer devices

- Benefits
  - The German project I.MoVe worked on the research and prototype realization of an alternative dynamic indirection data collection system using short range radio communication technology like *Bluetooth/Wi-Fi*
  - DYNAMIC system allows for *local* and *wide* measurement of traffic data (e.g. travel time and speed, route path OD matrices)
  - DYNAMIC can be used for stationary and mobile data collection
  - DYNAMIC supports different transport modes (*bike, bus train, pedestrian etc…*)
  - Most of the existing Bluetooth/Wi-Fi enabled mobile devices can be observed as **traffic object**

Use Cases - Traffic Information Systems (4)
## KeepMoving - Mobile Intermodal Travel Assistant System

• Architecture
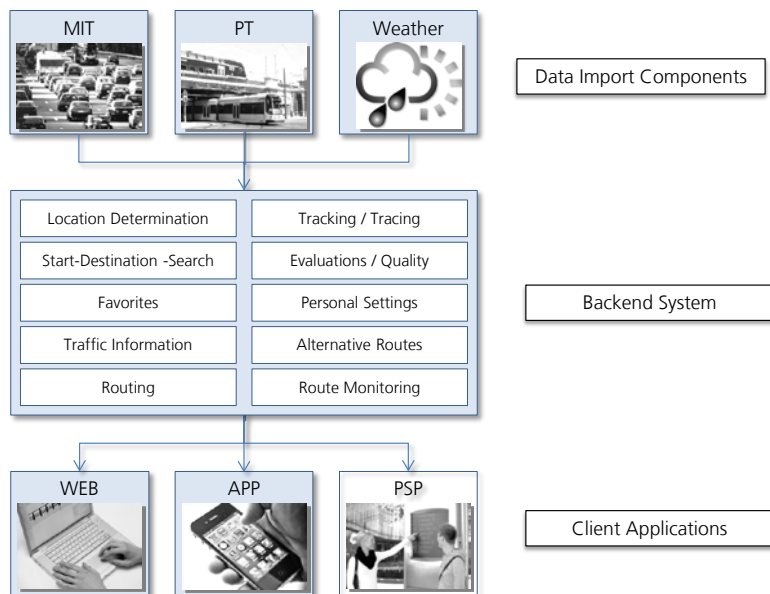
• Benefits
  – The German pilot project *MobiLind* funded by DLR had the purpose to enable a shift towards Smart Mobility for the 1000+ employees in the city of Cologne by various means
  – One brick of the solution is a mobile intermodal travel assistant (KeepMoving)
  – KeepMoving system provides various added ITS services for **smartphone, web and interactive touch screen** to support multimodal mobility of commuting and travelling employees before (pre-trip), during (on-trip) and after the trip (post-trip)
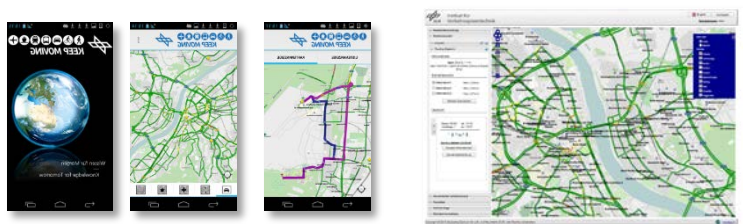
Conclusion and Outlook

- The development of a Smart City requires and provides intelligent transport infrastructures to support the mobility of people and goods in urban areas in a *sustainable*, *environmentally friendly, energy efficient and safe way*
- The problem generated by traffic and transportation like traffic congestion and transport-induced environmental pollution remains and needs to be solved.
- Intelligent transport systems and ITS services can help to make transport in cities more energy efficient and sustainable
- In this paper an architecture of an Intelligent Transport System to support the Smart Mobility for a Smart City was introduced
  - The focus was put on the traffic information and management systems
  - Environmental aspects as well as the social media like Facebook and Twitter as new data sources for the generation of traffic data were discussed
  - Some selected use cases for ITS as been presented to illustrated the benefits of Smart Mobility System
- There is not an ITS solution that fits for all cities.
- First, the characteristic of the traffic in the city must be analyzed with the local decision-makers to provide an individual integrated intelligent **smart mobility** solution customized for the selected **smart city**.
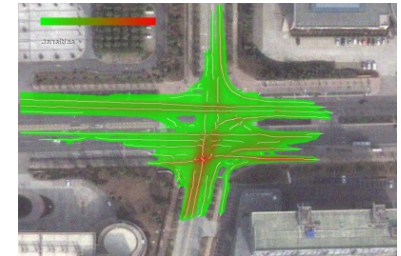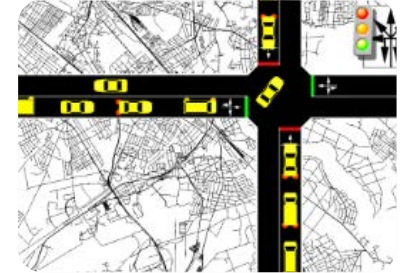
Thank you for your attention

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