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Intelligent Highways

Interactive Session

Chairman: Peter Maurer

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Aim of this session (1)

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Intelligent Highways - There are a lot of systems and technologies existing

(with a quite low penetration currently)

- Systems that already work
- Experimental systems that have only been tested on a small scale
- Systems that are being tested and the preliminary results suggest that they might work

But it is more or less for sure that in future will be high penetration of many ITS systems

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Aim of this session (2)

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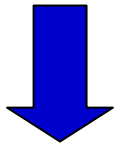
Intelligent Highways - Overall objectives

Applying and combining existing and newly developed systems as well as innovative technologies to support the evolution of current highways and vehicle systems towards smart and efficient transport solutions.



- Improved **road safety** and **capacity**
- Reduced negative impact on **environment**
- Reduced road and bridge **maintenance costs**

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Intelligent Highway Stakeholders

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Process Integration with

- Road Authorities
- Road and Bridge Operators
- Service Providers
- Road User
- Fleet Operator
- Vehicle Manufacturer
- Road Planning/ Engineering
- Transport/ Traffic Research
- etc.

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APPLICATIONS OF V2I TO…

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1. Safety Enhancement
2. Pavement Maintenance Management
3. Greening Management
4. Road Capacity Management

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Introduction of Expert-Forum

- Paul Kompfner (ERTICO)
- Stefan Deix (arsenal research)
- Bernard Jacob (LCPC)
- Steve Phillips (FEHRL)

Safety Enhancement

Safety Enhancement

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What we want (Abstract)

- Reduce number of fatalities and accidents (White Paper on Transport Policy)
- Support preventative and active vehicle safety systems (ADAS/…)
- (Develop) Optimize innovative safety technologies (ABS, ESP/DSC,..) utilising innovative vehicle to infrastructure and infrastructure to vehicle communication
- Road Diagnosis: Develop and identify road and highway inherent safety characteristics (surface, sensors, cameras, VMS,…)

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Safety Enhancement

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What we have

- Core technologies:
  - In-Vehicle (On-board) systems: ABS, ESP/DSC,…
  - Infrastructure (Road side): sensors, cameras, road properties (surface characteristics, design,…)
- (only) first experiences in V2I communication
- Projects:
  - SAFESPOT (EU), INTRO (EU), CVIS (EU), PReVENT (EU), SARI (F), DIVAS (F), Cooperative Systems (AUT), Highway³ (AUT),…

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Safety Enhancement

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What we need (examples)

- Intelligent safety systems based on both vehicle and infrastructure data
- Combined implementation strategies (infrastructure & vehicle) utilizing new communication technologies towards innovative vehicle safety applications
- Identifying the risk potentials and optimization potential of road infrastructure
- Strengthen the road system specific inherent safety attributes

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Safety Enhancement

Comments
Questions
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Pavement Maintenance Management

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What we want (Abstract)

- Development of services and proactive decision support systems to manage and maintain road infrastructure in cost-optimized way.
- Include all available data on road conditions to support condition based maintenance strategies
- Probe vehicles to identify weak spots and actual condition states
- Optimize life cycles and life cycle costs
- Reduce maintenance costs by utilization of new materials and design

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What we have

- Pavement management systems relying on (few) measurements with dedicated measurement devices and deterioration models
- Regional experiences with winter service information systems
- Projects: INTRO (EU), NR2C (EU), ARCHES (EU), SPENS (EU), COST 354, Cooperative systems (AUT), Intelligent sensor networks (AUT)

Pavement Maintenance Management

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What we need (examples)

- New multilayered models with many parameters
- Measurement data from various sources (sensors, probe vehicles, in situ measurements,…)
- Condition based maintenance
- Longer life cycles (materials, design)
- Calculate cost-benefit for new pavement management strategies

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Pavement Maintenance Management

Comments
Questions
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Greening management

Greening management

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What we want (Abstract)

- Energy efficient transport
- Low noise and vibration emission
- Advanced vehicle technologies to reduce fuel consumption (with special focus on HGV)
- Infrastructure to vehicle communication to incorporate road and traffic parameters in optimized powertrains and vehicle components

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Greening management

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What we have

- Traffic noise reduction strategies
- Hybrid solutions for cars
- Development of hybrid buses and two-wheelers
- Energy efficiency for HGVs (by route planning)

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Greening management

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What we need (examples)

- Implementing energy efficient drive technologies with utilization of eHorizon (infrastructure parameters)
- Cooperative systems providing eHorizon information
- Support and introduce “green” Highways by design parameters (noise, longitudinal slopes, evenness and rolling resistance) and infrastructure to vehicle communication facilities

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Greening management

Comments
Questions
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Road Capacity Management

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Road Capacity Management

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What we want (Abstract)

- Reduction of vehicle congestion and transportation times
- Optimization of travel times and traffic flow
- Improve efficiency of transport co-modality (for transport of goods and passengers)
- Supporting safety aspects and energy efficiency

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Road Capacity Management

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What we have

- Online traffic flow measurement
- Regional traffic information from fixed sensors and floating car data
- “Traffic Management Systems” using VMS

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Road Capacity Management

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What we need (examples)

- Combined PAN European approach
- Intelligent Routing (road side/vehicle side)
- Congestion forecasting and warning
- “The right information, at the right time, to the right user”
- Real time capacity management and services supporting Co-modality
- Mathematic modeling and simulation of traffic demands

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Road Capacity Management

Comments
Questions
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Thank you very much for your fruitful inputs