



Conference under the  
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National Contact Point for  
Research Programmes  
of the EU



**Let's Construct Europe's Future  
With Innovative Buildings and Infrastructures  
*Construction and Societal Challenges***

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## Review of some road research projects

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# FEHRL's main objectives

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Through the specification and delivery of research, FEHRL's main objectives are to:

- Provide scientific input to European and national government policy on road engineering and road transport matters.
- Create and maintain an efficient and safe road network in Europe.
- Increase innovation in European road construction and road-using industries.
- Improve the energy efficiency of road engineering and operations.
- Protect the environment and improve quality of life.

# Members and Associates of FEHRL

		<b>AIT</b> with TUW			<b>ICERA</b>			<b>ZAG</b>
		<b>BRRRC</b>			<b>NRA</b> with UCD & TCD			<b>CEDEX</b>
		<b>CIRTNENS</b>			<b>ANAS</b> with UNIFI			<b>VTI</b>
		<b>IGH</b>			<b>LVCELI</b>			<b>LAVOC</b>
		<b>CDV</b>			<b>NPRA</b>			<b>Derzhdor</b>
		<b>DRI</b>			<b>RWS-DVS</b> with TNO & TUD			<b>TRL</b>
		<b>TECER</b>			<b>IBDIM</b>			<b>INRC</b>
		<b>IFSTTAR</b>			<b>LNEC</b>			<b>CSIR</b>
		<b>BAST</b>			<b>CESTRIN</b>			<b>FHWA</b>
		<b>KEDE</b> with NTUA			<b>IP</b>			
		<b>KTI</b>			<b>VUD</b> with U. Zilinia			

# Setting the Road Research programme 1991-2011

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- In 1991, FEHRL published its first document describing a Strategic European Road Research Programme (SERRP).
- In 1996, SERRP II was published as the research agenda for 1999-2004.
- Published in 2001 and 2006, III and IV both followed extensive consultation with Road Directors and Industry
- Common elements in all four documents included research and standardisation in design, construction, operation, safety and environment
- Latest edition in series is recently published SERRP V



## Context:

- European commitment into Environment-friendly and sustainable development of industrial products and processes
- A high contribution of road infrastructures to waste production
- Nowadays different practices between European countries to recycle road and road-related wastes (tyres, ...) as new road materials
- National experience almost never benefits to other European countries and especially not to new member states

## Objectives:

To share national knowledge and practice regarding dismantling and recycling of road and road-related materials back into roads

# **DIRECT-MAT** Dismantling and RECYcling Techniques for road MATerials

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## **Product:**

- an European data base online on Internet and guides for good practices,
  - Large access to national data (15 European countries).

## **Benefits & Users:**

- Standardization, European integration of road materials research,
- Practitioners, stakeholders.

## **Expected impacts:**

- Valuation and promotion of enterprises know how,
- Decision aid tool for ordering parties and practioners.



**INSAFETY:** *"A self-explaining road (SER) is a road designed and built in such a way as to induce adequate behaviour and thereby avoid driving error."*

- The SER concept is of a traffic environment that elicits safe driving behaviour simply by its design.
- It aims to do this by informing the driver what to expect and how to behave accordingly which may include:
  - ✓ choice of speed,
  - ✓ choice of lateral position,
  - ✓ expectation of the presence of other types of road user,
  - ✓ expectation of the behaviour of other road users,
  - ✓ expectation of changes in the road environment ahead.

**SPACE** is particularly interested in identifying measures that lead to the adaption of speeds that are safe and appropriate to the conditions.



## **Objective:**

to identify best practices in road assessment.

- look at data collection, assessment and reporting regimes,
- new challenges (low volume roads, road management, climate change, traffic configuration, new materials, road users expectations),
- identify the key technical components of assessment regimes,
- determine whether they are best practice or not,
- identify indicators at different assessment levels (road operators, decision makers and public),

## **Result:**

pick out the key good parts and provide advice to the customer on how they could use them leading to a better understanding of a holistic road performance assessment



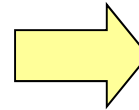
# TYROSAFE European Harmonisation of Skidding Resistance



- European countries have developed a wide variety of measures for characterising road surface skidding resistance.

different ...

Skid resistance	(safety)
Rolling resistance	(energy)
Noise emission	(health)



- measuring policies
- measuring methods
- measured parameters

- Tyrosafe aimed to harmonise the measurement of skidding resistance across Europe.

## Benefits:

- Provide basis for common skidding resistance policy
- Support the introduction of performance based specifications
- Generate European market for higher friction surfacings

**Aims:** To reduce the use of new materials and to limit energy consumption while building new roads.

- reducing the consumption of new materials (binders and aggregates),
- recycling 99% of old roads for building new roads,
- limiting the « down-grading »,
- managing polluted materials (e.g. materials with cold tar and asbestos)



Global approach integrating economic and environmental aspects ...

# SMART Rail Smart Maintenance and Analysis of Transport Infrastructure

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## Background:



# SMART Rail

Smart Maintenance and Analysis of Transport Infrastructure

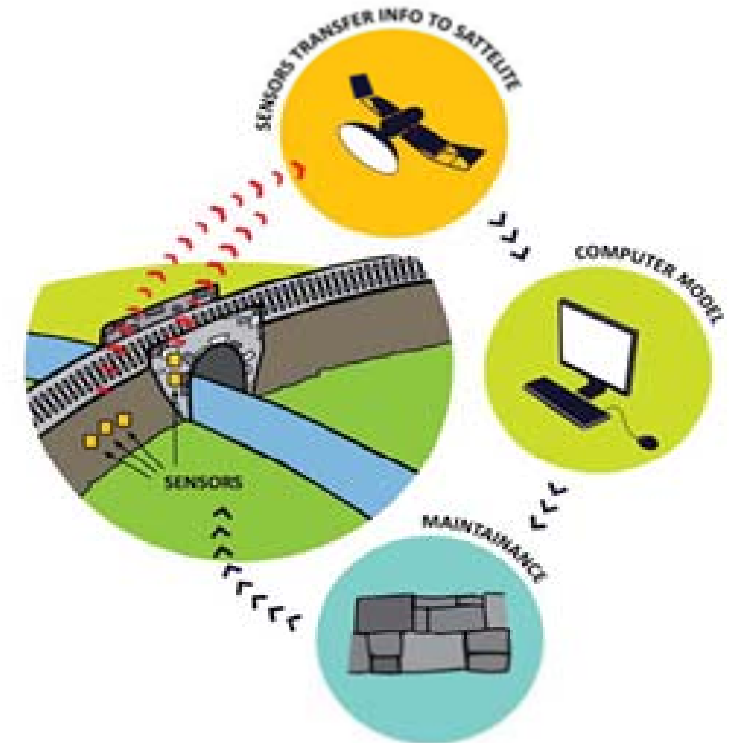
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In order to achieve the SMART Rail concept, we require the following critical and interdependent elements:

- an embedded sensor network,
- state of the art Structural Health Monitoring (SHM),
- suite of low-cost remediation measures that are region-specific.

## Technical Perspective:

- monitoring establishes current condition
- SHM defines reliability/safety,
- remediation required?
- Life Cycle Analysis quantifies cost and benefit.





# Highlights of SERRP V

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- Updated 'Vision 2025' on key stakeholder concerns and needs
  - ✓ 2009-2013 Strategy of CEDR (European Road Directors),
  - ✓ Recent European Commission (EC) Transport White Paper.
- Programming and instruments for delivery
  - ✓ Continues with effective current instruments,
  - ✓ Adds approaches, such as:
    - o FEHRL's role in road operations research programming,
    - o PPPs between European Technology Platforms (ETPs) and EC,
  - ✓ Implementation, international cooperation and multi-modality,
- The Forever Open Road concept as the core of the strategy.

# Forever Open Road

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- A combination of national and multi-national activities to be implemented as of 2011
- Involving a wide range of partners from public and private sectors
- Will be the fifth generation road for the 21<sup>st</sup> century at an affordable price
- A new concept for intelligent roads that are **adaptable, automated and climate change resilient**

**FOREVER OPEN ROAD**  
Redefining Road Transport for the 21<sup>st</sup> Century



FEHRL's Flagship Programme





# The Adaptable Road

Porous, low noise surfacing, light reflecting for night time driving.

Adaptable to freight transport communications, location and monitoring requirements.

Flexible, durable surface, self repairing/self-cleaning and instant crack repair.

In-built sensors for traffic monitoring/control and condition monitoring.

In-built lane control/vehicle guidance.

In-built power system for electric vehicles.

Removable/self-cleaning drainage reservoirs feeding carbon capture planting.

Adaptable/removable communication/power channels for lane control, traffic monitoring, driver information and condition monitoring.

Pre-fabricated inter-locking, sub-base with integrated drainage, services and communications channels.

Low carbon sub-base and pavement.

Energy harvesting grid and storage/use of solar energy to power lighting, signs and sensors.

In-built system for replacing and adding lanes/infrastructure, eg barriers, signs and sensors.





## The Adaptable Road

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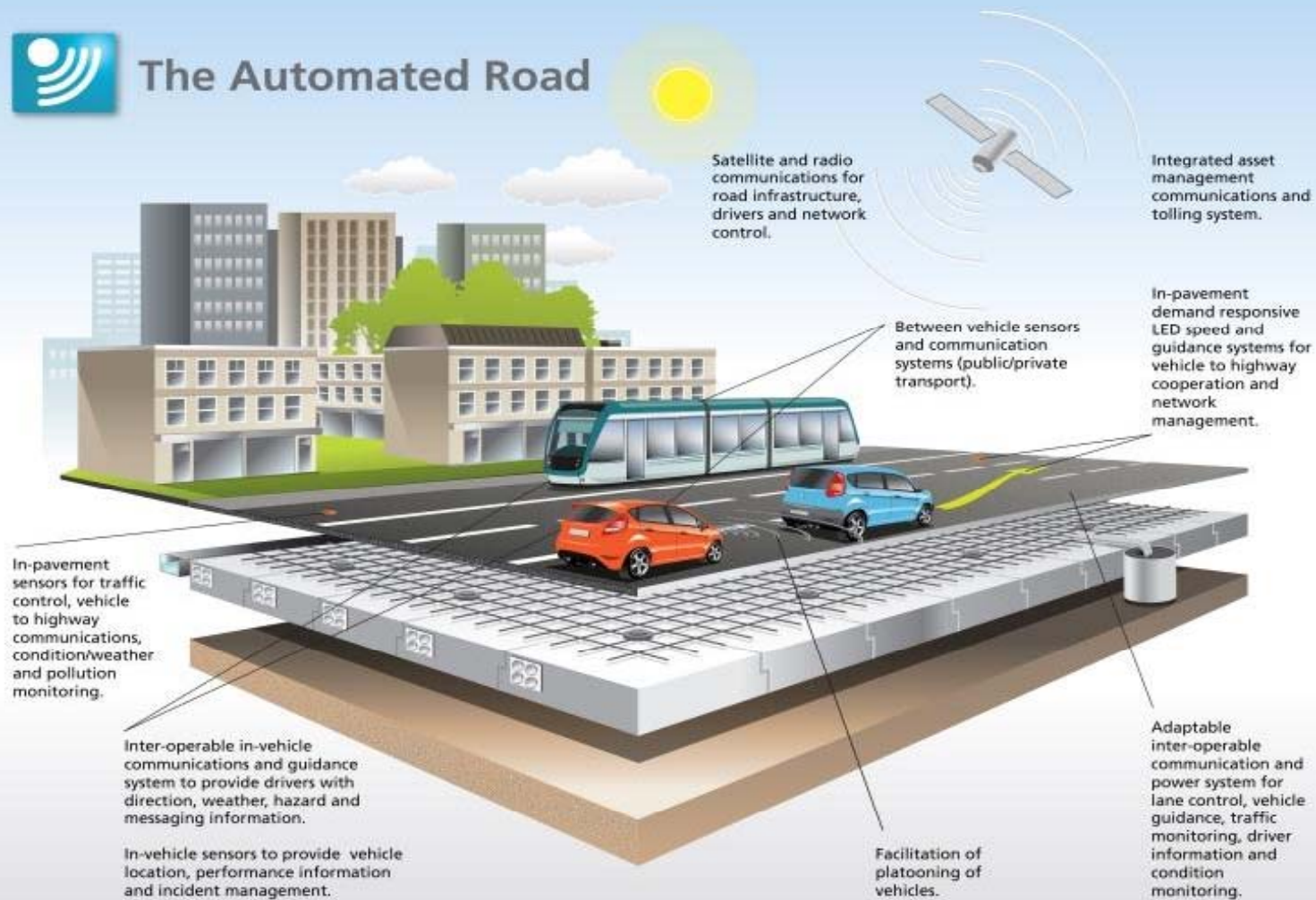
- Fully adaptable to changes in demand
- Based on a pre-fabricated/modular system that can gradually be implemented across Europe's motorway, rural and urban road networks.
- It will adapt to increasing travel volumes and to changes in demand for public transport, cycling and walking.
- It will power vehicles, harvest solar energy, measure its own performance and even repair itself.







# The Automated Road





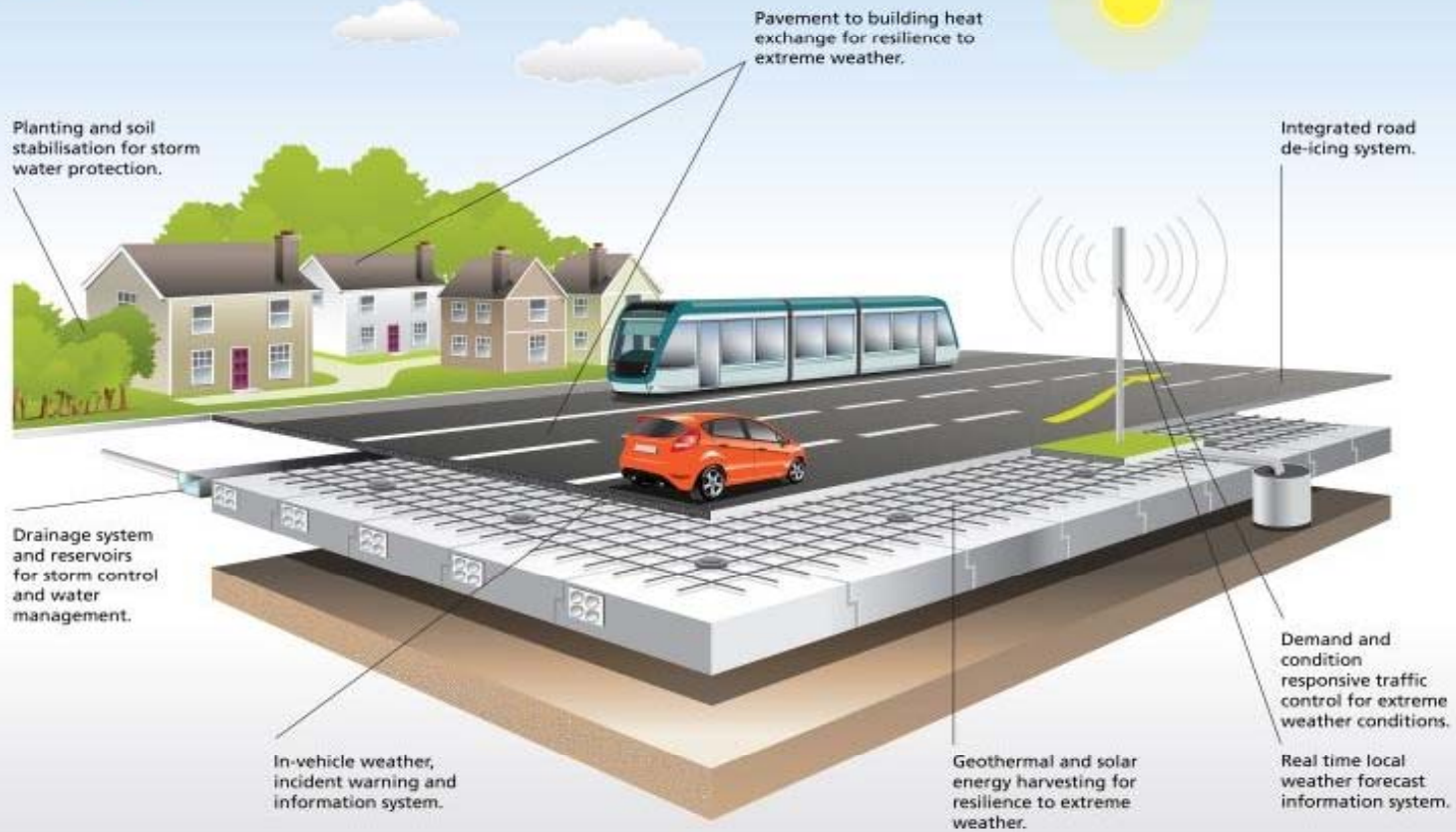
## The Automated Road

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- Fully integrated with the user, vehicle and operations
- Will incorporate a fully integrated information, monitoring and control system;
- Will support a co-cooperative vehicle-highway system that will manage travel demand and traffic movements.
- Will measure, report and respond to its own condition, providing instant information on weather, incidents and travel information.



## The Resilient Road





## The Resilient Road

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- Fully adaptable to extreme weather conditions
- Will adapt itself to the impacts of extreme weather conditions and climate change.
- Will monitor flooding, snow, ice, wind and temperature change, and mitigate their impacts through integrated storm drainage, automatic heating and cooling,
- Will be linked to the integrated information system for travellers and operators.

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Thank you for your attention

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