

FIRM

FEHRL INFRASTRUCTURE RESEARCH MAGAZINE



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Infraction 2014 - An ERA-NET PLUS
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**INNOVATION FOR TRANSPORT
INFRASTRUCTURE**

Transport infrastructure is the lifeblood of modern society, but often struggles to meet demands and expectations on reliability, availability, maintainability, safety, environment, health and cost. FEHRL's role is to provide solutions for the challenges now faced and anticipate the challenges to come. Through innovation, the operation of transport infrastructure can address society's needs.

FEHRL encourages collaborative research into topics such as mobility, transport and infrastructure, energy, environment and resources, safety and security as well as design and production.

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FEHRL behind FIRM13 and Expo; 2012 results profiled in Annual Report

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Infravation 2014 - An ERA-NET PLUS for Infrastructure Innovation



FOREVER OPEN ROAD

Redefining Road Transport for the 21st Century



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Towards an advanced, multi-modal transport infrastructure network for Europe

FEHRL ADDS NEW PROJECTS TO ITS PORTFOLIO

So far this year, FEHRL has added the following 13 new projects to its portfolio under the following Research Areas:

Design & Production Systems (DPS)

- **SAFELIFE X:** Safe life extension management of aged infrastructures networks and industrial plants (EC FP7 project)

Energy, Environment & Resources (EER)

- **LORRY:** Development of an innovative low rolling resistance truck tyre concept in combination with a full scale simulation tool box for tyre performance in function of material and road parameter (EC FP7 project)
- **FOREVER:** Future operational impacts of electric vehicles on European roads (CEDR project)
- **ALLBACK2PAVE:** Toward a sustainable 100% recycling of reclaimed asphalt in road pavements (CEDR project)
- **ECOLABEL:** Development of a novel eco-labeling EU-harmonised methodology for cost-effective, safer and greener road products and infrastructures (EC FP7 project)
- **ROSANNE:** Rolling resistance, skid resistance, and noise emission measurement standards for road surfaces (EC FP7 project)

Mobility, Transport & Infrastructure (MTI)

- **SOLUTIONS:** Sharing opportunities for low carbon urban transportation (EC FP7 project)
- **TRANSFORMERS:** Configurable and adaptable trucks and trailers for optimal transport efficiency (EC FP7 project)
- **3iBS:** Intelligent, innovative, integrated bus systems (EC FP7 project)

Safety and Security (S&S)

- **SAVeRS:** Selection of appropriate vehicle restraint systems (CEDR project)
- **ASAP:** Appropriate speed saves all people (CEDR project)

Horizontal

- **FOSTER-ROAD:** Future of surface road transport European research (EC FP7 project)
- **TRA-VISIONS:** TRA2014-VISIONS (EC FP7 project - see page 17)



- ▶ Contact Sylvie Proeschel, Acting Research Coordinator, at sylvie.proeschel@ifsttar.fr for more details.

EDITORIAL



Welcome to the second issue of FIRM, FEHRL's Infrastructure Research Magazine, which illustrates how FEHRL provides transport infrastructure solutions for the challenges now faced and anticipates those still to come. This work is carried out through FEHRL's fifth Strategic European Road Research Programme (SERRP V) and Forever Open Road programme, through projects within four Research Areas: Design & Production Systems (DPS), Energy, Environment & Resources (EER), Mobility, Transport & Infrastructure (MTI) and Safety and Security (S&S).

Much has already been achieved in SERRP V since it was published more than 18 months ago and the programme put together for the FEHRL Infrastructure Research Meeting 2013 (FIRM 13) on 4-6th June 2013 reflects vital components of this success. In this magazine, we focus on the highlights of this key event (see page 5), with most of the programmes and projects covered here featuring on the FIRM13 agenda.

This issue also has a particular focus on MTI projects with profiles of the OPTIMISM (Optimising Passenger Transport System) and RAIDER (Realising Advanced Incident Detection on European Roads) projects (on pages 14-15).

In addition, we feature the DPS POT-HOLE project (page 13), as well as the horizontal projects EUTRAIN (page 16) and TRA-VISIONS (page 17). Finally, we take the opportunity to include our 2012 Annual Report insert.

- ▶ Contact Steve Phillips, FEHRL Secretary General, at steve.phillips@fehl.org for more information and see www.fehl.org. FEHRL LinkedIn, Twitter and Facebook pages for FEHRL's latest news.



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twitter.com/FEHRL_SG



[on.fb.me/10xWsSh](https://www.facebook.com/fehl)

FEHRL INFRASTRUCTURE RESEARCH MEETING 2013



HIGH-LEVEL SPEAKERS AT FIRM13: EP, EC AND MEMBER STATE OFFICIALS

FIRM13 is being held on 4-6th June 2013 at the Diamant Centre in Brussels, Belgium for leading transport infrastructure innovation and research experts with the theme of **"Advanced and Innovative Construction and Maintenance"**. Here you can get an overview of the highlights of FIRM13, and on page 7 you can read more about the Infravation Expo being held in parallel.

FIRM13's main plenary session features high-level speakers from the National Road Administrations (NRAs) and the European institutions. FEHRL President, Joris Al of Rijkswaterstaat, will open the meeting. Speakers include Michael Trentacoste of the USA's, Federal Highway Administration (FHWA) and Manfred Bonn of the German Transport Ministry. And from the European institutions, Member of the European Parliament, Professor Boguslaw Liberadzki, will take the floor, as will two European Commission speakers - Dr. Rudolf W. Strohmeier of Directorate-General Research & Innovation (DG RTD) and Paul Verhoef of DG Mobility and Transport (MOVE).

FEHRL is a key engine for **infrastructure innovation and implementation**, the topic of one of the first parallel sessions of FIRM13. This session includes the Infravation **2014 ERA-NET PLUS** (see pages 6-7) and the **inter-European Technology Platform Task Force on Transport Infrastructure** that has made significant progress recently (see page 19).

Another parallel session on the **Greening of Road Infrastructure by Reducing Rolling Resistance**, an area of focus within our EER Research Area, features the MIRAVEC and MIRIAM II projects (see pages 10-11). **Adaptation to Climate Change**, also addressed by EER, includes FEHRL members presenting the work done within the Forever Open Road Resilient Element roadmap (see pages 8-9).

Other parallel sessions include **Infrastructure Maintenance and Innovation for Railway Infrastructure**, two of the key topics being addressed by FEHRL's

DPS Research Area and tackled, respectively, by the SMARTRAIL and TRIMM projects. While SMARTRAIL was profiled in the first issue of this magazine, you can read more about TRIMM on page 12. Also related to DPS, the progress within the Adaptable Element of the Forever Open Road programme is picked up in two sessions on the two new roadmaps for the **Asset Management Challenges for Road Networks and Transport Infrastructure Integrated with Land-Use Planning (TIILUP)** innovation themes (see pages 8-9).

Knowledge transfer of infrastructure research sits at the heart of FEHRL's work and at FIRM13, FEHRL members will present their achievements within the TEAM (see page 18), Pilot4Safety and INCRIS projects, as well as other national projects.



► For more information, contact Isabelle Lucchini, FEHRL Events Officer at isabelle.lucchini@fehrl.org or see www.fehrl.org/firm13

PARTNERING WITH GREEN WEEK AND WORLD HIGHWAYS

FIRM13 features as a satellite event for Green Week 2013 organised by the EC's DG Environment (see www.ec.europa.eu/environment/greenweek). And World Highways (www.worldhighways.com) is again our media partner for FIRM13.



INFRAVATION

infravation
An Infrastructure Innovation programme

As reported in the first issue of FIRM, FEHRL member Rijkswaterstaat is leading the initiative to create Infravation, an ERA-NET PLUS (EN+) action expected to be supported through the European Commission (EC) Framework Programme 7 (FP7) 2013 Work Programme. This call will address the needs of Member States for joint research on road infrastructure and bring together their efforts with the EC and industry. The call, to be issued in early 2014, is for the development of advanced market-ready products and services for road operations. Before the call, Member States will issue an invitation for a scoping study to sharpen the technical focus and priorities.

PHASE 1: INFRAVATION PROJECT PROPOSAL AND WEBSITE

FEHRL supported the drafting and submission to the EC of the project proposal for Infravation on behalf of the Member State representatives. This proposal, finalised in February 2013, set out Infravation's 2014 call for proposals and comprises a Consortium of 13 representative organisations of Member States, including FEHRL itself. A website has now been set up at www.infravation.net.

PHASE 2: INFRAVATION SCOPING STUDY (INCLUDING US SCANNING TOUR AND INFRAVATION EXPO)

To raise the profile of the EN+, help identify the key topics and further inform the development of the call for tenders and subsequent evaluation and negotiations, an Infravation scoping study will be completed before the end of 2013. This study, being coordinated by FEHRL, will involve international experts to determine the priority areas in advanced materials and systems and deliver a database on the Forever Open Road (www.foreveropenroad.eu) website on the topic. The project team, chaired by Finn Thøgersen of DRD with Dr. Johan Jonsson of the Swedish Road Administration (TRAFIKVERKET) as Secretary, will make up the Scientific Council that will advise on the Infravation programme from 2014 onwards.

As a contribution to the study, a US Scanning Tour was recently undertaken in cooperation with FHWA to provide an additional input to assist the Steering Group finalise their recommendations for the programme.

FEHRL May 2013 US Scanning Tour

Some 17 participants from ARRB, BAST, DRD, FEHRL, FHWA, IBDIM, IFSTTAR, NPRA, Rijkswaterstaat, SINTEF and VTI, as well as TRAFIKVERKET, joined the third US scanning tour from 4-11th May 2013. They visited:

1. FHWA's Turner-Fairbank Highway Research Center
2. Virginia Department of Transportation's Virginia Center for Transportation Innovation and Research
3. Virginia Tech Transportation Institute and
4. California Department of Transportation Division of Research and Innovation

The aims of the tour were to study the systems adopted for the development and management of projects for advanced and innovative construction and maintenance, understand the requirements for research to identify potential areas for cooperation, avoid duplication and reduce time to implement new products and services on both sides of the Atlantic.

To know more, **attend the US Scanning Tour presentation at the Infravation session on Infrastructure innovation at FIRM13 on the afternoon of Wednesday 5th June 2013** or contact Steve Phillips at steve.phillips@fehrl.org.



Scanning tour participants at FHWA

ROAD INFRASTRUCTURE INNOVATION EXPO



To help proposers prepare for the planned 2014 research call, Infravation is organising events to advise interested parties of the possibilities for participation and help develop successful partnerships. Innovative small and medium enterprises (SMEs) are encouraged to participate. The Road Infrastructure Innovation Expo, held in parallel with FIRM13 and organised by FEHRL, is the first

opportunity for innovative enterprises to showcase their latest research and innovation results.


The objective of this Expo is to raise awareness of Infravation, promote brokerage activities and contribute to the development of the final call. The topics being covered are:

1. Eco-design; resource and energy efficiency in road construction and maintenance
2. Virgin material reduction by substitution or recycling
3. Enhanced durability and life-time extension
4. Rapid and non-destructive methods for routine quality and performance checks of materials and construction
5. Keeping freight routes open through zero-intrusive maintenance
6. Ensuring infrastructure performance under all weather conditions
7. Advanced predictive infrastructure performance processes

**INFRAVATION
CONSORTIUM**




An exhibition space has been provided for the following SMEs who submitted a successful proposal:

 **Greenwood Engineering**
(www.greenwood.dk)

Continuous Pavement Deflection Measurements by use of Doppler Lasers.

 **Roadscanners Oy**
(www.roadscanners.com)


2D Laser Scanner based and 3D accelerometer based everyman's road survey system.

 **6D solutions**
(www.6dsolutions.com)


Measurements and prediction model of the fatigue behaviour of glass fibre reinforced bituminous mixture.

 **HiKoB** (www.hikob.com)


Wireless embedded measure technologies integrated with the latest generation of wireless multi-hops communication architectures.

 **3D TARGET** (www.3dtarget.it)

Detection of Geometrical and visual anomalies of bridges on the basis of the analysis of numerical images.

 **A.A.Z. Trade & NST**


New devices for traffic energy recovery (RDEG) and the next generation of road infrastructure.

 **Bagigi** (www.mobiphalt.com)


Three-stage process wherein the crumb rubber from tyres will first be treated to reduce fumes, then devulcanised/activated by ultrasound and reacted with molecule reactive with bitumen, different by applications like dry and wet mixing.

 **Most Monitoring & Structural Testings** (www.mostsr.eu)


System which allows the evaluation and monitoring of the residual pre-stressing stress acting on pre-stressed reinforced concrete beams of bridges.

 **BIM Systems**

(www.bimsystems.nl)
Real-time monitoring of constructions by OSMOS Group, on site monitoring with new wireless economic LIRIS sensor for ideal long term and the asset management of bridges.

 **3Radar** (www.3dradar.com)

3-Dimensional Ground Penetrating Radar.

 **Badennova**


(www.badennova.com)
New speed bump smart design for roads that ensures no damage to cars or disturbing.

 **Lightsout Computer Service**
(www.lightsout.co.uk)

Corona, a mobile real-time workflow management system created for highways maintenance and construction (see www.corona2012.co.uk).

 **Yotta DCL**
(www.yottadcl.com)

Horizons - a Visualised Asset Management System software (web-based combining the best elements of GIS Pavement Management and Asset Management).

 **Bio-Adhesive Alliance**

Bio-Adhesive Alliance, which produces adhesive (bitumen) from animal waste.

 **Kasi Infrared Corporation**
(www.kasiinfrared.com)

Hot in place infrared asphalt restoration for municipal and commercial applications.

 **Transtech Systems Inc.**

(www.transtechsys.com)
Non-Nuclear Asphalt and Soil Density Measurement

 **University of Nebraska**
(www.unl.edu)

Novel power electronic converter system, multi-objective system design framework for wind/solar hybrid power generation using roadway infrastructure, as well as novel renewable power generation roadway smart micro-grid.

FIVE ROADMAPS NOW AVAILABLE



'ASSET MANAGEMENT CHALLENGES FOR ROAD NETWORKS' AND 'TRANSPORT INFRASTRUCTURE INTEGRATED WITH LAND USE PLANNING' JOIN THE FAMILY

FEHRL's flagship Forever Open Road programme, originally conceived in 2009, has gained momentum ever since. During 2010, FEHRL members prepared a Research and Development plan outlining the technologies required to realise the concept with proposed demonstration projects. They followed this with roadmaps for each of the three key elements (Adaptable, Automated and Resilient), which form the core of FEHRL's fifth Strategic European Road Research Programme (SERRP V). And during 2012, these roadmaps were further refined with expert involvement and approved by FEHRL's General Assembly.

In parallel, two core groups led by FEHRL member Rijkswaterstaat have developed two supporting roadmaps entitled "Asset Management Challenges for Road Networks" and "Transport Infrastructure Integrated with Land Use Planning" (TIILUP). Both roadmaps represent innovation themes within the Adaptable Road element, although they have an over-arching focus that impacts the other two main elements.

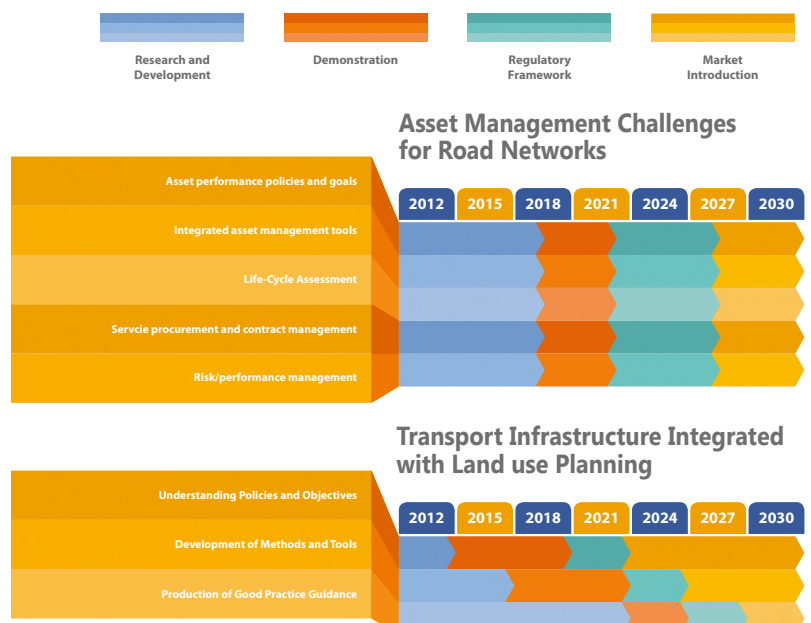
FEHRL has this year published all five roadmaps in both hard copy and electronic versions and we outline their highlights here.

ADAPTABLE, AUTOMATED AND RESILIENT ROAD - THREE KEY ELEMENTS

Each of the roadmaps starts by setting out the specific challenges it will need to address, such as an ageing road infrastructure or extreme weather events and the long term effects of climate change. They set out specific innovation themes and topics for future research actions up to 2030 that will address these challenges and outline the steps and predicted timelines required for Research and Develop-

ment, Demonstration, Regulatory Framework and Market Introduction. Two examples of these innovation themes are "Asset Management Challenges for Road Networks" and "Transport Infrastructure Integrated with Land Use Planning" (TIILUP).

Headline milestones are given for 2015, 2020 and 2025, which build up from proving single technologies, to the sub-system integration of several proven technologies by 2020 and full system integration in 2025, followed by large scale roll out.





ASSET MANAGEMENT CHALLENGES FOR ROAD NETWORKS

In order to meet challenges such as modal shift and co-modal transport and the increasing expectations of stakeholders with decreasing funds, the core group for Asset Management recommends in the roadmap the development of a flexible, transparent and integrated asset management framework to translate operation and maintenance activities and asset management through performance measures into economic added value, embrace innovation and adopt a willingness for change. They set out the following vision:

In 2025, we have a common understanding of an integrated and flexible approach towards asset management on a European level. Tools and flexible standards support an optimisation of performances, risks and cost of infrastructure within the modes, across the modes and between countries. Life cycle management of asset systems and assets is a common practice. Asset Management practices add a measurable value to different levels of economies, societies and environment. Best value is delivered to stakeholders.

The Asset Management roadmap defines 11 research needs and milestones, consolidated into three short term research statements on stakeholders' focused objectives, whole life and risk based approach and information management.

For more details, contact Jenne van der velde (jenne.vander.velde@rws.nl) or go to the FIRM13 session on Thursday 6th June).

TRANSPORT INFRASTRUCTURE INTEGRATED WITH LAND USE PLANNING (TIILUP)

TIILUP is an innovative approach that integrates Land Use Planning with Transport Infrastructure Planning. Cases in the Netherlands, Germany and Austria have shown that such an approach can lead to significant increases in cost efficiency in terms of investment costs, planning process and social/economic revenues, as well as the reliability of the transport system and liveability in the regions involved.

According to the TIILUP core group, the development of the TIILUP approach will be very practice driven. By analysing the best practices so far on their spatial, network, time, value, institutional and implementation dimensions, the key elements of the various approaches will be determined and consolidated in a suite of generic draft approaches

The outcome will be a practical toolbox which enables authorities to plan infrastructure more efficiently and meet policy objectives. The solutions in the toolbox are proven in practice and will be accompanied by common standards, guidelines and specifications as well as disseminated through a sound knowledge transfer process.

For more details, contact Jos Arts (jos.arts@rws.nl) or go to the FIRM13 session on Thursday 6th June).



NEXT STEPS

The roadmaps are being distributed to key stakeholders, which include the relevant European institutions and associations. More detailed work will be carried out to provide input to Horizon 2020, CEDR's trans-national programme, national and international programmes, as well as promote cooperation with other industry bodies. Longer term, implementation of these roadmaps will ultimately lead to a comprehensive portfolio of proven solutions that builds on state of the art practices. System trials will demonstrate the viability of the respective solutions.

TIILUP core group meetings



- ▶ Download the roadmaps and read more at www.foreveropenroad.eu
For more information, contact Bob Collis of TRL at bcollis@trl.co.uk



Four Research Areas - Mobility, Transport and Infrastructure (MTI), Safety and Security (S&S), Energy, Environment and Resources (EER) and Design and Production Systems (DPS) – within FEHRL are managed by Research Area Leaders. Each issue of FIRM features projects carried out within them, starting here with Energy, Environment & Resources (EER), which is led by Manfred Haider of AIT.

Within EER, FEHRL is currently involved in two projects – MIRIAM and MIRAVEC – which are looking at the greening of road infrastructure by reducing rolling resistance and both feature on the FIRM13 programme on the afternoon of Wednesday 5th June 2013.

PARTNERS



REDUCING GREENHOUSE GASES BY LOWERING ROLLING RESISTANCE WITH MIRIAM ...

MIRIAM



The Models for rolling resistance in Road Infrastructure Asset Management Systems (MIRIAM) project, formed by a consortium of 13 partners from Europe and the US, takes up the challenge of creating a new road infrastructure that reduces greenhouse gases (GHG) by lowering the rolling resistance from the road pavements. The first phase of the project investigated pavement characteristics, energy efficiency and modelling. A special test of the three available rolling resistance devices was conducted at the IFSTTAR facility in Nantes, France. This first phase also looked into how road management could consider the total energy used on roads when managing the road network, conducted by VTI in Sweden. The objective was to establish simple instruments for making decisions on maintenance treatments, including total energy use. The report focuses on how road management can reduce traffic energy by lowering rolling resistance of pavement surfaces by decreasing macro texture and increased evenness.

Phase one of MIRIAM also investigated pavement life cycle assessment (LCA). At UC Davis in California, a model was established to evaluate the total energy use and GHG emissions from pavement maintenance and rehabilitation strategies. This LCA model provides possibilities to analyse energy consumption and

GHG emissions associated with material production, construction and vehicle operation during pavement use, including pavement evenness and texture.

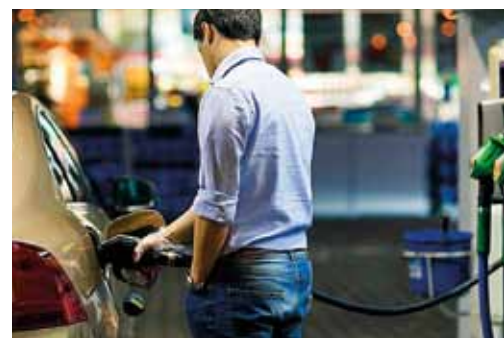
The second phase is now underway, focusing on developing and implementing CO₂ controlling models in road infrastructure asset management systems. The aim is to provide decision makers a strategic tool for reducing CO₂ emissions from the road infrastructure, hereby setting up and fulfilling emission goals in the transport sector. Specifically, the project will:

- Deliver representative and reproducible measurement method(s) for rolling resistance.
- Investigate and model all possible significant factors influencing rolling resistance
- Using the latter model, develop and validate one or more low rolling resistance road surfaces
- Evaluate and quantify positive and negative economic and environmental aspects of using pavement surfaces with low rolling resistance
- Provide methods, deterioration and optimisation models, for reducing CO₂ emission that can be implemented in existing road infrastructure construction, operation and management systems
- Implementation of models in asset management systems



► For more information contact Bjarne Schmidt of DRD at bjs@vd.dk or see www.miriam-co2.net.

... AND MODELLING INFRASTRUCTURE INFLUENCE ON ROAD VEHICLE ENERGY CONSUMPTION WITH MIRAVEC



CO₂ emissions from road transport represent an important part of the overall GHG. Efforts to reduce these emissions need to consider all influencing factors on the energy consumption of road vehicles. Besides the 'greening' of vehicle technologies, the improvement of road infrastructure characteristics related to fuel consumption can contribute to an overall CO₂ reduction in road transport. This requires both a thorough understanding of those interactions and the implementation of results in current pavement and asset management practice. In contributing to both objectives, MIRAVEC enables National Road Administrations (NRAs) to support the reduction of road transport GHG emissions.

The 24-month project, started in November 2011, falls within the scope of the ERA-NET Road "Sustainability and Energy Efficient Management of Roads" Joint Research Programme by

Germany, Denmark, Ireland, Netherlands, Norway, Sweden and United Kingdom represented by Austrian organisation FFG. It features five FEHRL institutes as well as FEHRL itself and will be finished in October 2013.

MIRAVEC activities have so far focused on identifying the most important effects contributing to road vehicle energy consumption which are governed by interaction with the infrastructure and their associated parameters, as opposed to those effects solely governed by vehicle or tyre type, vehicle and engine design or fuel type. The relevant effects have been categorised into the following five groups:

1. Effects of pavement surface characteristics
2. Effects of road design and layout
3. Traffic properties and interaction with the traffic flow
4. Vehicle and tyre characteristics including potential effects of current trends in vehicle and tyre development
5. Meteorological effects

For each of these groups, associated parameters are described and the effects which can be influenced by NRAs determined.

An analysis of existing modelling tools and evaluation of their capabilities with respect to the effects identified above has also been made. The objective here is to analyse factors of major importance, quantitatively or qualitatively depending on the information available and to describe methods for the estimation of uncertainties in models.

Work has also started on developing a simplified tool for estimating vehicle energy use as well as analysing the current and possible future role of road vehicle energy consumption and CO₂ emission in asset management.

The final output of MIRAVEC is a report comprising recommendations on the relevant effects and parameters, their importance in different contexts, the available modelling capabilities and their implementation on pavement and asset management.



► For more information, contact Manfred Haider of AIT at Manfred.Haider@ait.ac.at or see www.fehrl.org/miravec.

PARTNERS



TRIMM TACKLES TOMORROW'S ROAD INFRASTRUCTURE MONITORING AND MANAGEMENT ...

DESIGN & PRODUCTION SYSTEMS (DPS)

The Design and Production Systems (DPS) Research Area within FEHRL, jointly led by Alan O'Connor (TCD) and Jos Wessels (TNO), focuses on the methods and processes of infrastructure from a cost, efficiency and harmonisation perspective.

On this two-page spread, we profile two projects within this Research Area that are currently underway – TRIMM and POTHOLE. While TRIMM focuses on overall road infrastructure monitoring and management, POTHOLE is looking at the specific problem of pothole repairs on roads.



Effective, fair and sustainable road management requires the use of relevant and up-to-date information. TRIMM, a 36-month FP7 research project started on 1st December 2011, aims to exploit recent advances in sensing technologies and information processing to deliver more comprehensive information for road management, including bridges, pavements and specific equipment. Traditional monitoring techniques suffer, for example, from deficiencies in cost efficiency, reliability, time and spatial coverage.

TRIMM also focuses on the implementation of advanced monitoring data and use in road management. Interpretation of data is one of the barriers to implementation of advanced monitoring. The identified key technologies for monitoring pavements and bridges are investigated to improve data processing, interpretation, indicators and enable implementation in road management. Furthermore, the project is mapping the needs for monitoring data, as well as the means of assessing costs and benefit analysis of monitoring techniques and utilisation in asset management. Finally, aspects of implementation of indicators in road asset management are investigated to provide information on application areas, added values, and procedures.

To achieve its objectives, the project will

- Develop, test and validate advanced monitoring technologies in real world conditions based on an assembly of stakeholder needs regarding road and bridge condition
- Show how the advanced monitoring methods can be implemented on the European road network, and how any barriers to implementation can be overcome
- Develop relevant condition parameters and indicators to utilise both advanced monitoring data and data from traditional monitoring methods.
- Show how the advanced condition indicators would be implemented in asset management systems.



TRIMM is currently in an intense phase with data collection and analysis of the advanced measurements on bridges and pavements. With respect to their use in road asset management, several activities are underway, especially related to the needs of information and decision making, as well as practices in asset management. A key to success is to involve stakeholders in this process to ensure that TRIMM develops useful outputs. To this end, a session is being held at FIRM13 which aims to collect stakeholder views.

TRIMM PARTNERS

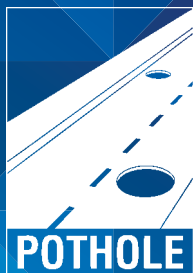


©VTI/Heijmansbilder



► For more information, go to the **TRIMM session on the morning of Thursday 6th June at FIRM13**, contact Robert Karlsson at robert.karlsson@vti.se or see www.trimm.fehrl.org.

... WHILE POTHOLE PROJECT ADDRESSES DURABLE POTHOLE REPAIRS



The 24-month POTHOLE European research project falls within the scope of the ERA-NET Road "Rapid and Durable Maintenance Methods and Techniques" Joint Research Programme by Belgium, Germany, Denmark, Finland, France, Netherlands, Norway, Sweden, Slovenia and United Kingdom represented by Austrian organisation FFG. It involves seven countries and will be finished in September 2013.

POTHOLE addresses the need of road agencies for durable construction and maintenance methods for the repair of damage occurring after hard winters due to repeated frost-thaw cycles. All European countries are faced with the problem of potholes and how to repair them. Many approaches just deal with repair methods which are durable only on a short-term basis and are therefore not cost-effective.

At the beginning of the project, stakeholders around Europe were asked to share in a questionnaire their experiences with different materials and procedures for pothole repairs. It became obvious that in a lot of cases, materials or procedures were being used that are not suitable for a durable pothole repair. This can be explained by the fact that no common regulations or requirements for materials exist in the different countries. Therefore, it is not just important to improve the methods and

techniques, but also to provide the road agencies with a tool that gives them the relevant information and helps them to make sound decisions.

In this project, both normal and new approaches which target the medium- or long-term repair of potholes have been studied. Tests, evaluation methods and experiences according to existing European Standards have been compiled in a catalogue to give road agencies an overview of the possibilities for the repair of potholes. Furthermore, the testing of techniques and the use of material types from already existing trial sites have been used to determine the properties of materials and their related laboratory testing, which can or should be used for the correct testing of materials for this purpose. A Life Cycle Cost Analysis (LCCA) will be carried out based on the results of the study of existing testing and evaluation methods, as well as the findings of the implemented laboratory tests.

The knowledge gained, including the overview of different European experiences, will be used to develop guidelines for road agencies to enhance their maintenance needs, allowing them to select a repair technique and/or material with a durability corresponding to the estimated lifetime of the existing pavement. First results have already been published on the POTHOLE website www.fehr.org/pothole (from the File Zone link at the bottom of the page).



PARTNERS



UNIVERSITY OF TWENTE.



► For more information, contact Dr.-Ing. Carsten Karcher at carsten.karcher@kit.edu. A POTHOLE LinkedIn group and POTHOLE Facebook page are also available for interested parties to join.



MODELLING THE IMPACT OF TRAVEL CHOICES, CO-MODALITY AND ICT WITH OPTIMISM ...



Fundamental shifts in the approach to road and traffic management are required to ensure Europe's roads can stay open for business. Research must be driven by the need to satisfy the predicted levels of personal mobility and freight transport. Additional benefits result from the fundamental redistribution and reshaping of the growth in demand for transport, and FEHRL's Mobility, Transport & Infrastructure (MTI) Research Area focuses on dealing with such changes in transport patterns that are likely to occur. FEHRL is involved in many projects within MTI, which is jointly led by Franziska Schmidt (IFSTTAR) and Åsa Aretun (VTI). Here we profile two current ones - OPTIMISM and RAIDER. While OPTIMISM deals with optimising passenger transport systems, RAIDER is all about realising advanced incident detection on European roads.



OPTIMISM TO CULMINATE WITH FINAL CONFERENCE ON 16TH SEPTEMBER 2013

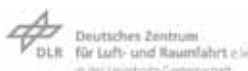
FEHRL is a key partner in the EC-funded OPTIMISM FP7 project that models the impact of travel choices, co-modality and ICT and produces insights into the future of sustainable travel. Coordinated by Coventry University Enterprises Limited in the UK, OPTIMISM brings together partners from Belgium, Germany, Ireland, Italy, the Netherlands, Poland, Portugal, Spain and Switzerland. The project started in October 2011 and is now in the final six months of a two-year work programme. Following a report on future transport and mobility scenarios, OPTIMISM will shortly produce recommendations on the harmonisation of travel statistics, best practices for decarbonisation and principles for sustainable mobility. In March 2013, the project staged a successful workshop examining the opportunities for harmonising travel data across Europe, with the active participation of EC Eurostat, Directorate-General for Mobility and Transport (DG MOVE), Research and Innovation (DG RTD) and Regional Policy (DG REGIO).

In addition, the OPTIMISM project is developing simulation models for future trends in mobility, examining best practice for encouraging a shift to low carbon transport and producing strategies for optimising passenger transport systems. OPTIMISM is expected to provide a more scientific and comprehensive set of tools to help decision-makers focus their policies on the measures that will have a greater impact, based on the changing patterns of mobility behaviour.

FEHRL (UCD) has led work to gather data on National Transport Surveys and analyse the gaps and commonalities between the differing national approaches. We have also been actively involved in identifying 'megatrends' influencing transportation systems and mobility behaviour. In addition, FEHRL is the lead partner for the dissemination and awareness raising activities, working with TML and SIGNOSIS.

SIGNOSIS is now organising the final event entitled "Towards sustainable mobility with OPTIMISM". This free of charge final conference, to be held on Monday 16th September 2013 at Universitaire Stichting in Brussels, is of interest to policy-makers at a national and European level, as well as public and private sector mobility providers and research organisations interested in the future of sustainable travel.

PARTNERS



Deutscher Forschungszentrum für integrierte Verkehrsplanung



▶ See www.optimismtransport.eu, the Linked In group and Twitter (twitter.com/OPTIMISMFP7) for more details or contact Sunil Maher at smaher@coventry.ac.uk.



... AND REALISING ADVANCED INCIDENT DETECTION ON EUROPEAN ROADS WITH RAIDER



RAIDER

RAIDER is an ERA-NET ROAD II project of the joint research programme "ENR2011 MOBILITY – Getting the most out of Intelligent Infrastructure". Incident detection is essential for Road Authorities to manage their road networks and adequately respond to incidents. Issues with the quality of detection, such as delays, inaccurate location of incidents, or high false alarm rates directly impact operations. Significant investment may be required to improve detection quality with additional roadside detection systems. New developments in nomadic devices, in-vehicle systems and third party services may provide solutions that both improve incident detection quality and reduce costs.

RAIDER aims to improve incident detection systems by integrating innovative technologies that are expected to be available by 2020. eCall can significantly improve the detection of severe accidents, while cooperative vehicle and road side systems can provide early detection and warning for a variety of hazards and (near) incidents. Nomadic devices will be ubiquitous and provide detailed traffic information through service providers, but may not be ade-

quate for detecting accidents reliably. Additionally, innovative roadside detectors may still be required at specific locations.

Experts from the National Road Authorities have been consulted early in the project to select their most pressing issues as reference cases for research, for example hard shoulder monitoring and the detection of accidents, stationary vehicles and traffic congestion. The detection quality of existing and new technologies is reviewed against the user needs and requirements. Quality is estimated in a generic way for the detection of specific incidents, i.e. using parameters like detection delay and rate, and the function of penetration rates of equipped vehicles, detector spacing and traffic volume. In a similar way, quality improvement can be estimated when an existing infrastructure is extended with a new detection technology. This methodology enables system concepts to be proposed to improve existing infrastructure for specific types of incidents.

Some of the most common road use cases are considered and alternative system concepts for incident detection explored. The feasibility, costs and ben-

efits of innovations in the near future in roadside sensors, nomadic devices, and in-vehicle devices are assessed. The project follows the following methodology:

- Generic specification of the innovative detection technologies, data fusion and incident detection algorithms, in function of the existing infrastructure, user needs and requirements on incident detection performance.
- Feasibility and cost assessment of innovative roadside sensors, nomadic devices and in-vehicle systems to improve incident detection.

These results can be applied by Road Authorities to assess the performance of their existing incident detection systems, identify necessary improvements, and define specifications for tendering. The specifications and feasibility assessment also provide the necessary input for cost benefit analyses of such improvements.

PARTNERS



► See www.fehrl.org/raider or contact Toon Beeks at toon.beeks@tno.nl for more information.



FEHRL also participates in projects that cover all four Research Areas and are aimed at the training and dissemination of high-quality information. On the next pages we bring you a selection of "horizontal" projects that aim at international cooperation (EUTRAIN), reaching out to young and senior researchers (TRA Visions) and the training of PhD students (TEAM).

INTERNATIONAL COOPERATION IN TRANSPORT RESEARCH

BUILDING A FRAMEWORK FOR INTERNATIONAL TRANSPORT RESEARCH COOPERATION WITH EUTRAIN

The EU and other major entities of "global" importance such as the US, Japan, Australia, South America, India, China and Russia are all buffeted by the same common transport related challenges. Due to the need for efficient transport and limited resources there is a need for common research. As the European Transport Research Area (ERA-T) takes shape, international transport research collaboration can both help its further strengthening and internal cohesion as well as boost Europe's competitiveness in the global economy. The 24-month FP7 EUTRAIN project, coordinated by ECTRI, puts forward a framework for international cooperation in transport research between the ERA-T and other regions. EUTRAIN, which runs until the end of November this year, builds upon the existing experience and know-how in this field - that has been gained through specific actions and projects such as DETRA (outlined in the first issue of FIRM magazine) - and goes one step further to make recommendations and policies that will be "ripe" for implementation.

FEHRL and its umbrella members have been involved in establishing potential fields of interest, as well as barriers/gaps/diversions for international cooperative research work for all modes of transport. To this end, in 2012 FEHRL arranged and held bilateral meetings in Ukraine, India

and Turkey and came up with recommendations on future cooperation with these countries.

FEHRL members VTI and BAST also led the work on Research Infrastructures (RIs) and their networking. This included building on the key findings in the DETRA project, developing a questionnaire and contacting important countries that had not been investigated so far in the project, synthesising and presenting the results of the main transport RIs and their networking that exist in the countries and regions examined (for example in the previously-mentioned bilateral meetings), as well as mapping some of the main data sources. The FEHRL team also led the work on developing models and tools for international cooperation in the field of RIs, including recommendations on information and data sharing issues.

EUTRAIN FINAL CONFERENCE AND RI WORKSHOP

The final EUTRAIN Conference is due on 9th October 2013 in Brussels and will be followed the next day by a workshop on RIs, co-sponsored by the European Transport Research Alliance (ETRA) (see www.etralliance.eu). The RI workshop, entitled "*Towards a more efficient use of transport research infrastructures*," aims at promoting a common approach to handling the issues of transport RIs in Europe and beyond. These issues include knowledge sharing on existing RIs, formulating an overview of existing world-class RIs in Europe, identification of missing RIs to address needs, etc.

PARTNERS



FEHRL UMBRELLA



► For more information, contact Adewole Adesiyun at adewole.adesiyun@fehrl.org or Ursula Blume at BlumeU@bast.de or see www.eutrain-project.eu.



TRA VISIONS: ORGANISING TRANSPORT RESEARCH AWARDS FOR THE TRA CONFERENCE

FEHRL is representing infrastructure in the newly started 18-month FP7 TRA Visions research project. This project is organising two competitions for transport research awards to be announced at the TRA conference on 15-18th April 2014 in Paris, France (see www.traconference.eu):

1. A research student competition for young researchers/students in sustainable surface transport.
2. A competition for senior researchers in the field of innovative surface transport concepts, based on results from EU-funded projects

Both will cover all surface transport modes (road, rail and waterborne), including Infrastructure and cross-cutting issues in line with the EC policy objectives for smart, green and integrated transport. The objectives of the student competition are to nurture the best transport researchers in Europe, promote the alignment of their interests with those of transport stakeholders, encourage them to participate in TRA 2014 and celebrate their achievements. Similarly, the senior researcher competition will promote and acknowledge the leaders in generating impactful research in transport in the EU.

The project features partners from all the relevant stakeholder organisations and will build on the success of the FP7-funded Young European Arena of Research (YEAR) competitions at TRA in 2008, 2010 and 2012, as well as the VISIONS (FP6) and VISIONS OLYMPICS (FP7) competitions. Together they captured the imagination of more than 1,500 students around Europe, and TRA Visions aim to develop this even further by including the new competition for senior researchers.

STUDENT COMPETITION

TRA Visions aims at university and technical institute students pursuing bachelor degrees and higher. Ini-

tially, participants will be invited in September 2013 to submit an abstract under one of the TRA 2014 conference topics: Environment and Energy, Industry Competitiveness, Logistics and Mobility Systems and Services, Safety and Security, Transport Infrastructures, Transport Policy Research/Socio-economic/Human sciences, Vehicles & Vessels Technologies.

The participants will then have a three-month period to further develop their proposal into a final project. This will be followed by an Evaluation of Ideas period, during which a judging panel will determine the top three ideas per mode (including cross-modality). The certificates and prizes will be awarded to the winners at TRA 2014.

SENIOR RESEARCHER COMPETITION

This **EU Champions of Transport Research Competition** will be an excellence award for leading surface transport researchers in European projects which have proven impacts in the field.

Candidates for this competition will apply in line with the rules outlined in the student competition, showing how their research has been scientifically and/or publicly impactful. The competition will be promoted through the stakeholders in the consortium (eg FEHRL for infrastructure), national contact points and targeted EU-funded transport projects. In the first stage, candidates will apply through the TRA Visions website. Entrants will be reviewed by the judging panel, which consists of transportation experts and stakeholders involved in TRA 2014. The judges will shortlist 10 entrants, who will be invited to present their entries at an event to select three winners for road, rail and maritime transport, with one overall winner to attend the TRA 2014 award ceremony.

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► For more information, contact George Smyrnakis, Secretary-General of WEGEMT, at george.smyrnakis@newcastle.ac.uk or see www.travisions.eu.



TRAINING AND REACHING OUT TO EARLY-STAGE RESEARCHERS WITH TEAM



Marie Curie Actions (www.ec.europa.eu/research/mariecurieactions) are European research grants available to researchers regardless of their nationality or field of research. In addition to research funding, scientists have the possibility to gain experience abroad and in the private sector, and to complete their training with competences or disciplines useful for their careers. One of these Actions, Initial Training Networks (ITN), offers early-stage researchers the opportunity to improve their research skills, join established research teams and enhance their career prospects.



TEAM (Training in European Asset Management) is a Marie Curie ITN that seeks to address the growing challenge associated with managing our existing transport infrastructure network. Society requires that our infrastructure network must adapt to support a continuing medium-term growth in demand, as this will underpin the future economic growth and integration of the European Union. However, transport growth using the technologies of today is unsustainable in terms of its impact on traffic

safety, climate change, land use, infrastructure life cycle costs and demand for non-renewable resources. New technologies and processes are needed which deliver economic, sustainable transport.

The TEAM ITN has been working to deliver these solutions and has received approximately €3.2 million in research funding; this is used to support a network of 14 PhD researchers working for seven partners in six countries. Through these clustered PhD research projects, the TEAM ITN has sought to exploit the benefits of new sensor and processing technologies, methodologies, models and algorithms to monitor the condition and safety of transport infrastructure. These have been used with new computer models and algorithms to enhance the value of the data and improve the accuracy of condition and safety assessments. These approaches have been tested on structures in-service and have been applied on pavements, road and railway bridges in Austria, Denmark, Germany, France, Ireland, Switzerland and the UK. By obtaining this deeper understanding of the way our structures are performing, the state of our transport infrastructure assets are more accurately assessed, leading to extended safe working lives and reduced costs.



The TEAM ITN consists of seven full partners, including three industry partners. Each of these are actively involved in research and host full-time PhD researchers. This strong industry voice has ensured that the research conducted has maintained a practical focus. There is also a strong FEHRL presence within the project with eight PhD researchers recruited at IFSTTAR, EPFL and UCD. This successful collaboration is producing experts with specialist skills in pavement damage modelling, structural assessment and traffic loading. The TEAM project will conclude in October 2013 and the researchers will be presenting the findings of their research at the TEAM final symposium; this will take place in **Brussels on the morning of June 6th 2013 as part of the FIRM 13 event.**



NETWORK PARTICIPANTS



► For more information on the TEAM project, visit www.ucd.ie/team or contact Project Coordinator Dr. Ciaran McNally at ciaran.mcnally@ucd.ie

JOINT ETP TASK FORCE ROADMAPS UP FOR ENDORSEMENT

As reported in the first issue of FIRM magazine, FEHRL has been coordinating efforts on behalf of ERTRAC to establish a transport-led, joint European Technology Platform (ETP) task force on transport infrastructure research and innovation for Horizon 2020. The task force, chaired by Ruud Smit from FEHRL member Rijkswaterstaat, consists of all four mode-specific ETPs (ERTRAC for road, ERRAC for rail, WATERBORNE for water, ACARE for aviation) as well as the construction industry ETP (ECTP).

This task force will deliver by mid-2013 a single roadmap on infrastructure research and innovation, synthesised from the various available strategic research agendas and roadmaps of the ETPs. This roadmap focuses specifically on cross-modal opportunities, which reinforces the position that Research and Innovation (R&I) needs to be done mode-specifically. FEHRL's Forever Open Road programme roadmaps (see pages 8-9) have fed into this process, which has run through the ERTRAC roadmap process.

The content of the roadmap was consolidated in two Brussels-based workshops - the first on 28th September 2012 and the second on 28th February 2013. Many experts from the five ETPs together with representatives of the EC services participated in these workshops, including several FEHRL members (since FEHRL is both a member of ERTRAC and ECTP).

Within the roadmap, the cross-modal R&I is structured into three domains

that need to be addressed together in order to achieve the infrastructure that Europe's citizens need in the 21st century. All five ETPs underline the relevance of the topics under the domains.

Following a formal endorsement by the ETPs by mid-June 2013, each ETP will then draw up their recommendations concerning infrastructure research and innovation for Horizon 2020 based on this roadmap, which reinforces their own mode-specific research agendas. Once each ETP has given this endorsement, the task force will meet in a final session to sign off the publishable version of the roadmap. It will be published (online) through each of the ETPs involved by the end of June.

The roadmap has already been presented to the EC's Transport Programme Committee on 23rd April and was well received. The presentation was preceded by presentations by the four ETPs, and each one referred in varying ways to the need for infrastructure innovation. The roadmap was also praised at a DG MOVE event entitled "Innovating for growth through our transport infrastructure" on 22nd March.

In summary, the joint ETP task force roadmap offers value added to the individual agenda's and roadmaps of the transport and construction ETPs as it reinforces what needs to be done mode-specifically by identifying opportunities for cross-modal cooperation in R&I and hence opportunities for efficiencies.

TOWARDS AN ADVANCED, MULTI-MODAL TRANSPORT INFRASTRUCTURE NETWORK FOR A SUSTAINABLE AND COMPETITIVE EUROPE

MEMBERS OF TASK FORCE



ACARE: Advisory Council for Aeronautics Research in Europe



ECTP: European Construction Technology Platform



ERRAC: European Rail Research Advisory Council



ERTRAC: European Road Transport Advisory Council



Waterborne: Waterborne Technology Platform



► For more information, contact Ruud Smit at ruud.smit@fehrl.org or see www.fehrl.org/jointetptaskforce

13-15TH NOVEMBER 2013

FEHRL INTERNATIONAL PROJECT MANAGEMENT TRAINING COURSE



Do you need to learn about the procedures and techniques needed to work effectively in EC and other multinational projects? If so, sign up now for the next **FEHRL International Project Management (IPM) training course** in Brussels on 13-15th November 2013.

This course will focus on building teamwork and cooperating with experts from the public and industrial sectors. Workshops will be performed in English by professional trainers, qualified project managers and EC officials.

- For more information, contact Isabelle.lucchini@fehrl.org.

14-17TH APRIL 2014

COME AND JOIN US AT TRA 2014



Transport Research Arena - Paris, April 2014

The 2014 FEHRL Infrastructure Research Meeting (FIRM14) will be held at TRA 2014 on 14-17th April 2014 in Paris, France so save the date now and come and meet us there!

- See www.traconference.eu for more details on TRA 2014.



FEHRL MEMBERS



FEHRL ASSOCIATES



FEHRL

