

# The European Rail Research Network of Excellence





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**EURNEX** 



#### Foreword

The European Rail Research Network of Excellence EURNEX has made a major step forward in overcoming fragmentation and achieving sustainability. The 10 poles of excellence, each involving the leading researchers for the particular thematic subjects, have concluded their inauguration phase. Beginning with the 2nd Integration Conference in March 2005, all poles have now defined their thematic scope and strategies for consolidating and further developing scientific excellence. Pole leaders and vice leaders were nominated by the pole members and approved by the EURNEX Council in July. Besides further integration within the poles, intensive cross-pole interaction will be the key to success

Based on the priorities of the European Rail Research Advisory Council (ERRAC), the EURNEX poles of excellence were defined through closely interacting with the customers. The EURNEX Advisory Board and the Scientific Board played a decisive and supportive role in drawing up the new structure of EURNEX, which is designed to cope with the challenges of the rail system of the future in Europe.

Over the summer, the EURNEX poles of excellence started to prepare the first raft of joint international projects, in a new European-wide spirit of collaboration. Developing a sound EURNEX business case based on new projects with the rail sector represents a major challenge for EURNEX on its way to becoming a durable organisation of excellent research. Defining and implementing the sustainable EURNEX business plan is and remains therefore the key issue for the NoE. The grant for integration provided by the EU is important of course, but for the longer term it is just the initial trigger to building a long lasting research network that is a major contributor to the competitive rail system of the future.

Undeniably, the European rail sector is ever more confronted with increasing competition from other regions, such as North America and East Asia. We therefore need to bundle our efforts. The development of EURNEX is one important contribution to maintaining and further strengthening Europe's position in the worldwide rail market. At this stage I would like to thank all colleagues in the network for their committed contributions to fostering EURNEX development. We have already made remarkable and solid progress and I'm sure that the EURNEX community will successfully grow into a sustainable and reliable network.

You should already get out your 2006 diaries and make a note of the InnoTrans 2006 rail fair in Berlin, 19 - 22 September 2006. At this - the leading event worldwide for the international railway community - EURNEX will be presenting the level of integration achieved thus far and the strategic way forward to become a world class player in rail research. My colleagues and myself look forward to seeing you there.





### UITP World Congress - Research Sessions



UITP held two research sessions during its 56th World Congress which was held in Rome in June of this year. The first was held on 7 June and dealt with European research needs and solutions for the EU urban, suburban and regional public transport sector. The second session was held on 8 June and was specifically devoted to EURNEX and ERRAC. Participants included representatives of the European Commission, public transport operators, industry, and specialised press. The presentations of EURNEX representatives Mr Wolfgang Steinicke (FAV) and Mr Manuel Pereira (IST Lisbon) held on 8 June were of great interest to the participants, who asked several questions concerning the Network and wished to be kept informed about future developments.

Mr Pereira speaking during the UITP session on 8 June 2005

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### Poles of Excellence • Objectives and Leadership

Poles of excellence have now defined their Action Plans and nominated pole leaders, who were subsequently approved by the Council. A summary of each pole is given below.

#### Pole 1: Strategy and Economics

Objective: to develop and support a business case for railways, which requires sound understanding of the three fundamental

- · The main drivers of demand and of costs of railways; including regulatory reform;
- The potential and limitations of service quality rendered by railways to the various market segments (compared with that of the best practices in other modes)
- · What desirable changes in railway operators' behaviour are being hindered by existing regulations and ways to amend this
- o Strategy systems knowledge, LCC
- o Scenario development and analysis towards roadmaps
- o Operations research capabilities
- · How regulators and infrastructure administrators could act to optimize the liberalisation process and the potential railways market. Best practices.
- The implications for OEMs and suppliers.

# Leaders: Wolfgang H.Steinicke, FAV; Chris Nash, University of Leeds & Jose Manuel Viegas, IST Lisbon

#### **Pole 2: Operation and System Performance**

Objective: to understand and to evaluate the complex nature of the railway system and to assist its operational management, with specific contents, in accordance with the Strategic Rail Research Agenda 2020 formulated by ERRAC, on:

- Stakeholders' requirements;
- · Interoperability and technical harmonisation;
- Functional analysis and designing of system architecture and components relationships;
- · Modelling and simulation;

#### Training to excellence: EURNEX launches its Short Training Courses (STCs) Programme

Whatever the competences acquired in the railway-applied research and academic sector, the opportunity for complementary learning and training initiatives is an ongoing need in order to constantly improve skills and continuously upgrade knowledge. Excellent training is not only the most effective way to ensure a continuously evolving approach to education and skills/capability development within the railway sector but also offers an opportunity to further knowledge-transfer among members of the rail research community and guarantee lifelong learning.

With 64 networked research institutions representing European Excellence in Railway Research, EURNEX stands out as the beacon providing expert solutions to training needs in the railway sector worldwide.

The EURNEX STCs Programme for the year 2006 includes 23 courses in different specific topics, ranging from single day to four-day courses, and including e-learning courses. Further information on EURNEX STCs, such as detailed course programmes, fees, background needed, lecturers, facilities, contacts, as well as the registration form and broader EURNEX training can be found on the EURNEX website (www.eurnex.net), following the STCs links.

You may also contact: Marco Giannettoni (ajannet-

You may also contact: Marco Giannettoni (giannet-toni@die.unige.it) or Marina Fracchia (marina@crt.unige.it)

- · Operation planning and management;
- · Capacity management and optimisation.

Leaders: Stefano Ricci, DITS Rome & Jürgen Siegmann, **TU Berlin** 

#### Pole 3: Rolling Stock

Objective: to develop innovative solutions to the challenges of tomorrow's rolling stock

- · Improve the performance and the attractiveness of passenger and freight vehicles:
- o Higher operational speeds, both for freight and passenger transport
- Enhanced passenger comfort: reduced noise and smoother ride
- Larger capacity and payload of freight wagons: high axle
- o More efficient railway systems: innovative traction technology, lighter and efficient ancillary equipment
- · Maintain and improve safety and reliability
- Provide the scientific and technical foundation for developing innovative solutions and supporting the creation of new standards.

Leaders: Francois Monnoyer, UVHC Valenciennes & Stefan Östlund, KTH Stockholm

#### **Pole 4: Product Qualification Methods**

Objective: to look at ways to improve the effectiveness of testing and modelling, and to work on developing product qualification methods for new techniques and technologies supporting the implementation of TSIs throughout an enlarged Europe. This includes in particular:

- · Scientific service for rail legislation and legal aspects
- · Assessment methods
- Test procedures and facilities
- · Acceptance process for railway products (e.g. cross acceptance procedures)

Leaders: Petr Moos, CVUT Prague & Witold Olpinski, **CNTK Warsaw** 

#### **Pole 5: Intelligent Mobility**

Objective: to promote sets of "intelligent" solutions in order to optimise the use of existing infrastructures for the rail domain, to enhance safety and security, to reduce operating and maintenance costs and to offer new services developing intermodal behaviour. "Intelligent mobility" relies on

- · New systems for communication, navigation (incl. Galileo applications) and surveillance (inside or outside the vehicle)
- Customer information systems
- · Web-based information systems
- E-ticketing, etc.

Leaders: Marion Berbineau, INRETS; Pekka Leviäkangas, VTT Finland & Francois Meers, Multitel (Belgium)

#### Pole 6: Safety and Security

Objectives: to monitor safety, develop new technology and promote safe and secure systems of operation that reduce risks whilst diminishing costs. The pole will cover:

- · Safety and security management including philosophy and culture
- Active safety (control/command, level crossings, etc.)



- Passive safety requirements and assessment
- · Incident/accident database and learning
- Risk analysis and assessment
- · Technical and operational safety
- · Occupational Health and Safety
- · Safety impact of maintenance
- New technologies for security
- · Psychological aspects of security
- · Prevention of terrorism

## Leaders: El Miloudi El Koursi, INRETS & Thomas Meissner, FAV

#### Pole 7: Environment and Energy Efficiency

Pole 7 is a transversal pole where the knowledge from infrastructure, rolling stock, signalling systems, operation and economy go into making an analysis of the environmental impact of the railway systems and how to reduce it, despite the target of doubling traffic by 2020.

Analysis of materials, recycling and waste management are not specific for railway systems but apply in general to any industrial systems and can be considered as low priority for innovative research. The objectives are the following environmental topics:

- Energy consumption and savings in electrified and diesel traction systems;
- Electromagnetic pollution
- Noise and vibration (on board and on land)
- Influence of weather conditions on railway operation
- Water and air pollution

Leaders: Marina Fracchia, NITEL; Christopher Baker, Univ. of Birmingham & Marek Sitarz, SUT Katowice

#### Pole 8: Infrastructure and Signalling

Objective: to contribute to optimising the cost, reliability and availability of the infrastructure.

- Track including sub-grade and rail / Line-side equipment
- Switches and crossings / Level crossings / Interlocking
- Wheel/rail interface (with pole 3)
- Signalling and control systems / Signalling compatibility
- Railway structures, cuttings and embankments
- Electrical power distribution / Catenary
- Remote condition monitoring / Maintenance procedure
- Life cycle cost (with pole 1)
- Noise, vibration and corrugation (with pole 7)

### Leaders: Anders Ekberg, Chalmers & Karsten Lemmer, $\mathsf{DLR}$

#### **Pole 9: Human Factors**

Objective: to understand the roles, capabilities and needs of all stakeholders in the rail system and use this understanding to make a key contribution to human-centred design and implementation of railway technical and organisational systems.

- Integrate of human factors within rail research and development
- Holistic approach embracing cognitive, physical and organisational human factors
- Promote systems ergonomics within a systems engineering philosophy
- Develop or adapt relevant human factors theories and models, methods and techniques
- Consider all stakeholders, staff and public and including accidental or non-users
- Integrate and develop new directions with almost all other poles

Leaders: John Wilson, University of Nottingham & Pedro Mondelo, UPC Barcelona

#### Pole 10: Training and Education

The main objectives and activities of this pole are (see also the boxes on this page) to:

- Create a pool of short training courses and to provide ongoing support for them
- Implement international PhD and Master programs
- Launch a European University of Railway (EURail) under the EURNEX brand
- Promote interdisciplinary contacts (cross-pole collaboration)
- Be a permanent forum for prospective studies
- Promote exchange of knowledge ([e]-learning material, publications, etc)
- Use research results in education programs and STC courses.

Leaders: Manuel Pereira, IST Lisbon & Ladislav Skyva, University of Zilina

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# European University of Railway - EURail in a changing railway sector

The development of the European railway sector needs well managed and collaborative research and targeted research-led education. By addressing the needs of the sector, the European University of Railway - EURail - will provide the conditions to develop high quality training and education activities for the railway community of tomorrow at European level within the framework of EURNEX. In line with the SRRA of ERAC, EURail is designed to promote interaction among its members and to define clear and realistic objectives with a view to the creation, dissemination and transfer of knowledge within the railway sector.

Based on the knowledge, experience and people from "real" universities in Europe, EURail, as a virtual association of leading European Universities in the railway field, aspires to foster excellence by gathering the relevant partners in an educational project tailored to the needs of the European Rail sector. A unique feature of EURail is this concentration of high-level knowledge and expertise in a single sector/problem-oriented institution. EURail is designed to grow into a dedicated community able to define lines of action and conduct sustainable business as a core part of the overall EURNEX business case.

EURail aims to disseminate the social and industrial benefits of training in the railway sector and to develop new and innovative forms of further cooperation with industry, bearing in mind that the railway sector requires advanced engineering training related to research and technological development. EURail is intended to provide access to a range of professional and academic groups in Europe active in railway-related research and education activities. Many of the participating institutions have unique expertise and sophisticated laboratory and testing facilities which can be used to enhance the quality and effectiveness of training and education in the railway sector. A networking process is crucial, and requires a detailed knowledge of industry needs to explore ways to satisfy them through the existing skills landscape across Europe.

For more information please contact:
Manuel Seabra Pereira (mpereira@dem.ist.utl.pt)

### **EURNEX KMS System**

The EURNEX Knowledge Management System (KMS) aims to become the main Knowledge Exchange platform dedicated to Rail Research Projects, to support the EURNEX Network of Excellence. The objectives of EURNEX KMS are to collect and categorise knowledge, provide knowledge to the members, provide information about knowledge to customers as an incentive system for further research contracts and provide collated rail knowledge to customers.

All EURNEX members can already gain free access to work under this system, via the following link: https://www.eurnex.com. If you are a EURNEX member and you wish to obtain your login and password, please contact Hugo Michel at UIC (hugo@uic.asso.fr).

As a further step, a public access system (subject to an access fee) will be developed by the EURNEX WP6 team.

The tools available to the users are:

- ==> Search engine to retrieve the information
- ==> Communication tools: mail, newsletter, notifications
  - => Collaborative tools to work together on documents

The databases provided in the system will cover the following categories: EURNEX poles of excellence, projects performed by EURNEX partners, information about research centres and individual researchers, as well as a calendar of meetings and events. The EURNEX KMS should evolve into a unique knowledge database for the railway sector.



For more information please contact: Marie-Hélène Bonneau (bonneau@uic.asso.fr)

#### **EURNEX** and FP7

The 7th RTD Framework Programme (FP7) will define the scope for research, technology and development of the European Union for the period from 2007 to 2013. FP7 can therefore be seen as the most important instrument to cope with the technological challenges of the future European rail system on the pre-competitive area. To support the preparation of the specific FP7 work programmes for the rail transport sector, the European Commission asked EURNEX to provide input on essential strategic topics for rail research in the coming years, as seen from the scientific point of view. This coincides perfectly with the request from the EURNEX Scientific Board for EURNEX to draft visions for the future rail system in order to attract the attention of decision makers and the public to this important transport mode.

At the end of May of this year, EURNEX representatives discussed the important topics for rail research in the coming FP7 with the relevant experts from the European Commission. Besides subjects of system optimisation, the discussion focused on visions for achieving a "quantum leap" in the competitiveness and attractiveness of railways. This covers both long distance passenger transport with the visionary concept "the 0.5 I/pax/100 km Intercity train" and seamless freight transport with the "efficient, low-cost and intermodal Mega Freight Liner". Making these visions a reality requires contributions from several thematic areas of the rail research domain. EURNEX is prepared to make available its scientific capabilities through targeted collaboration across the poles of excellence, and through trusted cooperation with the supply industry and operators.

EURNEX's ideas for FP7 are in line with the ERRAC priorities for the Rail Business Scenario 2020, but to some extent they look beyond the year 2020. Because of the close collaboration with the research customers, the EURNEX topics and visions for FP7 already include the industry position.

The FP7 will play an important role in the implementation of the sustainable EURNEX business case. Therefore, EURNEX is prepared to further support defining the rail related work programme by drafting in its concentrated scientific expertise. Provided rapid progress is made by the European Parliament and the Council in adapting the FP7, first call for proposals should be launched at the end of 2006.

For more information please contact: Thomas Meissner (tmeissner@fav.de)

#### **EURNEX Who's Who Booklet**

The success of EURNEX depends greatly on effective communication internally between EURNEX members and externally between EURNEX and the wider European railway community. EURNEX is tackling this issue in a number of ways; one is this newsletter, another is the EURNEX website. However, the sheer size of EURNEX in terms of the breadth of technical competencies and large number of researchers involved, means that senior railway managers can have difficulty making contact with the experts they need.

To help overcome this obstacle EURNEX is producing a 'Who's Who' booklet containing details of the principal researchers and the areas in which they are working. The booklet will contain details of the top three researchers from each EURNEX member institution, together with a brief summary of their main research areas and research efforts over the last five years, associated publications and contact details. The booklet is intended as a quick reference document to guide managers towards researchers whose competencies most closely match their problems.

EURNEX is aiming to publish the booklet before the end of 2005 for distribution to senior managers and decision makers. An electronic copy will also be available via the EURNEX web portal.

For more information please contact: Chris Bouch (c.bouch@bham.ac.uk)

#### **EURNEX Links**

- EURNEX http://www.eurnex.ne
- List of EURNEX Members http://www.eurnex.net/members.html
   EURNEX KMS - https://www.eurnex.com/

This newsletter was drawn up by UITP and FAV in October 2005.

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