PROJECT

RAILCOM

Electromagnetic Compatibility between Rolling Stock and Rail-infrastructure Encouraging European Interoperability

Funding: European (6th RTD Framework Programme)
Duration: Dec 2005 - May 2009
Status: Complete with results
Total project cost: €3,637,580
EU contribution: €2,396,403

Call for proposal: FP6-2003-TRANSPORT-3
CORDIS RCN : 78720

Background & policy context:

Although RAILCOM research focused on practical problems regarding the vehicle/infrastructure interface on the TEN-T railway network, it used the results and information collected during previous EC co-funded research projects in the specific field of rail EMC carried out in the Fourth and Fifth Framework Programmes. In comparison with all these projects, RAILCOM aimed at achieving harmonisation of interference limits necessary for a sustainable improvement of production techniques for electrical installations of railway vehicles.

One important part of this work will also be to fill the gap that exists between the expertise available in other transport areas (aeronautics, automotive) and the knowledge and best practise applied to rail systems.

One major distinctive difference between railways and other transport/industrial systems is that the whole power involved in railways has the potential for EMC disturbance and the extension of the system favours the propagation of disturbances in the environment. Moreover, the interaction between the disturbance sources and the system can amplify the interference, as a function of the specific operating conditions.

Objectives:

The objectives of the RAILCOM project were:

- to harmonise the interference limits for train detection systems on the TEN-T railway network;
- to characterise the railway electromagnetic (EM) environment for communication systems, with correlation between EM emission and operating conditions of the system;
- proposals for the ongoing standardisation process within CENELEC, the European Committee for Electrotechnical Standardisation.

It was envisaged to carry out work in the following areas:

- Compatibility between vehicles and train detection systems. The main objective of this work is to provide a set of fully validated characteristics and technically sound testing methods and approaches to achieve and demonstrate electromagnetic compatibility between vehicles and track circuits for future interoperable lines. The specification, models and methods shall aim to become generally accepted and recommended tools for the design and acceptance processes defined in the relevant European Standards and TSIs.
- High frequency interference of the whole railway (especially of communication systems between trains and infrastructure). This work aims to improve the capacity of the whole railway, especially that of communication systems and the safety of the message transmissions between train and infrastructure using new telecommunication technologies. The work will consist of developing experimental and numerical characterisation methods to determine EMC specifications, to protect the safety of the message transmissions and improve the capacity of the communication systems...
Methodology:

The RAILCOM project carried out research, testing, modelling and validation activities dedicated to identify access and specify limit values, assessment and verification methods for the electromagnetic interference between the railway vehicles, electric traction power supply and the principal train detection and radio-communication systems.

The research activity, including modelling and measurements, will be focused on train detection and communication systems. Harmonised calculation methods will be identified and validated through appropriate test campaigns. Strong efforts will be made to favour harmonisation of interference limits and methods to determine the limits of train detection systems, overcoming the barriers imposed by national regulations and practice. The EM of the railway systems will be related to their operating conditions, in order to facilitate the forecasting of electromagnetic emissions based on the systems' characteristics and to assess interference with the communication systems.

Parent Programmes:
FP6-SUSTDEV-2 - Sustainable Surface Transport

Institute type: Public institution
Institute name: European Commission
Funding type: Public (EU)

Lead Organisation:

Movares Nederland B.v.
Address: Daalseplein 101
2855 UTRECHT
Netherlands

Organisation Website: http://www.movares.nl
EU Contribution: €0

Partner Organisations:

Consortzio Nazionale Interuniversitario Per I Trasporti E La Logistica
Address: Via All' Opera Pia 11A
16145 Genova
Italy

Organisation Website: http://www.nitel.it
EU Contribution: €0

Ansaldo Trasporti - Sistemi Ferroviari S.p.a.
Address: Via Argine, 425
80100 NAPOLI
Italy

Organisation Website: http://www.atsf.it
EU Contribution: €0
<table>
<thead>
<tr>
<th>Organisation Name</th>
<th>Address</th>
<th>EU Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Union International Des Chemins De Fer</td>
<td>16 rue Jean Rey 75015 PARIS France</td>
<td>€0</td>
</tr>
<tr>
<td>Alstom Transport Sa</td>
<td>3 Avenue André Malraux 92300 LAVALLOIS-PERRET France</td>
<td>€0</td>
</tr>
<tr>
<td>Vyzkumneho Ustavu Zeleznicniho Praha</td>
<td>Novodvorska 1698 14201 PRAHA 4-BRANIK Czech Republic</td>
<td>€0</td>
</tr>
<tr>
<td>Technische Universitat Kaiserlautern</td>
<td>Gottlieb-Daimler-Strasse 3049 KAIERSLAUTERN Germany</td>
<td>€0</td>
</tr>
<tr>
<td>Institut National De La Recherche Sur Les Transports Et Leur Securite</td>
<td>2 Avenue du General Malleret Joinville 94114 ARCUEIL France</td>
<td>€0</td>
</tr>
<tr>
<td>Siemens Ag</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organisation Name</td>
<td>Address</td>
<td>Organisation Website</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>----------------------------------------------</td>
<td>-------------------------------------------</td>
</tr>
<tr>
<td>Wittelsbacherplatz 2</td>
<td>Wittelsbacherplatz 2 80333 MUENCHEN Germany</td>
<td><a href="http://www.siemens.com">http://www.siemens.com</a></td>
</tr>
<tr>
<td>European Union Road Federation</td>
<td>Avenue Louise 106 1050 BRUXELLES Belgium</td>
<td><a href="http://www.unife.org">http://www.unife.org</a></td>
</tr>
<tr>
<td>Schweizerische Bundesbahnen Sbb</td>
<td>Hochschulstrasse 6 3000 3000 BERN 65 Switzerland</td>
<td><a href="http://www.sbb.ch">http://www.sbb.ch</a></td>
</tr>
<tr>
<td>Centrum Naukowo - Techniczne Kolejnictwa</td>
<td>Chlopickiego 50 WARSZAWA Poland</td>
<td><a href="http://www.cntk.pl">http://www.cntk.pl</a></td>
</tr>
<tr>
<td>Reseau Ferre De France</td>
<td>92 avenue de France PARIS France</td>
<td><a href="http://www.rff.fr">http://www.rff.fr</a></td>
</tr>
<tr>
<td>Bombardier Transportation Sweden Ab</td>
<td>OSTRA RINGVAGEN 2 721 73 VASTERAS Sweden</td>
<td></td>
</tr>
</tbody>
</table>
Deutsche Bahn Ag

Address:
Postdamer Platz 2
10785 BERLIN
Germany

Organisation Website:
http://www.deutschebahn.com

EU Contribution: €0

Société Nationale Des Chemins De Fer

Address:
34 rue du Commandant Mouchotte
PARIS
France

Organisation Website:
http://www.sncf.com

EU Contribution: €0

Ceske Drahy, A.s. (Czech Railways, Joint Stock Company)

Address:
nabrezi Ludvika Svobody 1222/12
11015 PRAHA 1
Czech Republic

Organisation Website:
http://www.cd.cz

EU Contribution: €0

Technologies:

- Rail operations
- Common and interoperable train-to-ground communication system

Development phase: Research/Invention

Key Results:

The project implementation contributed to:

- Interoperability (TSI) and CEN, CENELEC standards by defining EMC limiting values;
- Increase capacity and availability of TEN through early detection of EMC incompliance;
- Safety and reliability of the new rolling stock by improving on-board detection systems;
- Productivity in design and manufacturing of rolling stock components by standardising the assessment procedures and thus reducing time to acceptance of new rolling stock.

The expected benefits from project results are:

- Reduction of time and resources required to demonstrate EMC compliance of rolling stock for pan-European operation by up to 90%;
- Increase in communication system capacity and availability by up to 10% through the elimination of repeated messages due to corruption by electromagnetic interference;
- 5-10% increase in track capacity/occupancy and traction power through refinement of worst-case scenarios and assumptions currently employed in EMC assessment of rolling stock and train detection systems.
Documents:
- Final Reporting Interactive Conference.pdf (Project presentation)
- Final Report Summary - RAILCOM (Electromagnetic compatibility between rolling stock and rail-infrastructure encouraging European interoperability)

**STRIA Roadmaps:** Vehicle design and manufacturing, Network and traffic management systems
**Transport mode:** Rail transport
**Transport sectors:** Passenger transport, Freight transport
**Transport policies:** Digitalisation
**Geo-spatial type:** Network corridors