

**Europtirails (formerly OPTIRAILS II)**

**European online optimisation of international traffic through rail management system**

**Funding:** European (5th RTD Framework Programme)

**Duration:** Jan 2006 - Sep 2007

**Status:** Complete with results

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**Background & policy context:**

Freight and Passenger need for mobility and flexibility across Europe is increasing. The ever more frequent train services in the future must be handled, while at the same time maintaining punctuality. In order to guarantee trouble-free operation, information on thousands of trains and millions of data movement data per day have to be collected and dispatched to all involved European Infrastructure Managers and to Train Operating Companies via different channels, such as Extranet or Internet - in real-time.

The creation of trans-European traffic management facilities is a crucial element towards the achievement of a real integrated rail network within the Community - a much needed stepping stone for the implementation of competitive international rail services.

Therefore, the development and field validation of a monitoring and supervisory facility aiming at the management of railway traffic along major European rail corridors (e.g. a freight freeway) was included as one of the three mainstream activities of the ERTMS programme.

The EUROPTIRAILS concept addresses the extension of the current ERTMS developments, centred on the command /control (ERTMS/ETCS) and telecommunication (GSM-R) systems, towards the higher-level traffic management layer (ETML).

In this setting, EUROPTIRAILS enables real time, online supervision of European rail traffic. EUROPTIRAILS covers a given corridor of railway lines running between Rotterdam and Milan and assists national railway operators in the Netherlands, Germany, Austria, Switzerland, France and Italy.

**Objectives:**

Cross-border supervision of rail traffic is of critical importance to the European Union. A unique and harmonised information and supervision system is therefore needed to establish an integrated European rail network. Real time, cross-border information would enable operators to ensure connections run smoothly and bring long-lasting improvement to traffic flow along the European north-south axis. EUROPTIRAILS operates existing national platforms and manages their integration into the system using only the latest in railway security techniques.

The intention was to develop a facility which evolves around the concept of a One-Stop-Shop (OSS), providing a surveillance and communication platform with a two-fold objective:

i) Decision support to the different national and regional traffic management centres (TMC) for a more efficient and cost-effective management of international rail services; and

ii) Seamless exchange of operational and commercial information that can uphold the implementation of wider trans-European customer-oriented business strategies.

From a functional point of view the system was not aimed at replacing the national traffic management facilities but rather at creating an “information highway” layered on the existing systems, linking them and enabling the transformation of the national facilities into a network of collaborating agents. This allowed reaching the key goals stated above without entailing any major disruption to the existing legacy systems.
In this context, EUROPTIRAILS’ goals were to:

1. Check in real conditions the system functionality based on the OPTIRAILS concepts developed in former rail research projects under the EU RTD FP.
2. Perform on site measurement of the added-value of an OPTIRAILS system for real time traffic management.
3. Define possible institutional system/service governance structures.
4. Assess the results of full-fledged system operation.
5. Provide information to decision makers in terms of best practice for the implementation of traffic management facilities on other European rail corridors.

Methodology:

EUROPTIRAILS’ goals are to operate existing national platforms and manage their integration into one system using the latest in railway security techniques.

The new system’s first priority was the real time management (Information Model) of railway traffic inside and outside the borders of the participating countries. It was able to alert operating authorities of certain events, delays for example, at any given moment. Furthermore, all the data was recorded and accessible for analysis at any time (Monitoring Model). Such analyses provided accurate information about the critical points of the railway network, which were then drawn on to design train timetables. The national railway companies involved with the project were to define a set of shared procedures, referring in particular to response times and emergency measures (Path Assembly Model). In this setting, EUROPTIRAILS’ methodology was built around a three-pronged modelling

1. Information Model: Real Time information

The Europtirails Consortium developed a comprehensive rail transportation solution which included:

- Collection and exchange of railway traffic data from/with the European railway regulation systems
- Real time train traffic data - such as contracted timetable, forecast, running advice, delays - via Internet
- Customisable filtering functions
- Delivering freight and passenger train information
- Supporting the standard UIC data exchange

2. Monitoring Model

The Monitoring Model of Europtirails aimed mainly:

- To provide recording data about the running of Trans-European passenger and freight trains.
- To provide detailed information concerning EUROPTIRAILS trains on the whole network.
- To measure and analyse, with generated reports, the quality of services in order to improve it and to determine responsibilities of the operations processes

3. Path Assembly Model

The Path Assembly Model helps the European Infrastructure Managers to re-schedule a route by:

- Considering the available line capacity.
- Considering the trains currently running.
- Proposing a new path, if a deviation is necessary.

Parent Programmes:
FP5-GROWTH KA2 - Sustainable Mobility and Intermodality

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Austria:
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France:
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Germany:
DB Netz
Italy:
Rete Ferroviaria Italiana (RFI)

Switzerland:
SBB/CFF/FFS (Swiss Federal Railways)

The Netherlands:
Pro Rail

**Organisation:** SYSTRA  
**Address:** 5 avenue du Coq  
**Zipcode:** 75009  
**City:** Paris  
**Contact country:** France  
**Telephone:** (+33) 1 40 16 61 00  
**Fax Number:** (+33) 1 40 16 61 04

**Key Results:**
EUROPTIRAILS’ general achievements included:

1. The development of the first application of international traffic management in real-time on the Rotterdam-Milan corridor.

2. An industrial quality prototype.

3. The improvement of traffic conditions on international corridors including several « border effects » thanks to a marked reduction of delays. In particular, the system reduced border crossing times, reduced train delays, increased the operational capacity of corridors.

4. Full application scope (passenger and freight transport) for international traffic -- albeit its primary design was as a tool for international rail freight traffic.

5. Integration within the research agenda made up of other international purposed tools such as “Path Finder” (international timetables) and EICIS (European Infrastructure Charging Information System (cost of international paths).

These general achievements, resulting in an updated knowledge of internation trains, enabled:

- Information anticipation by Infrastructure Managers, in order to manage disruption consequences in advance.
- Railway Undertakings to view the running of their trains along the whole international route and to have a prediction of the arrival date at the final destination (vital piece of information for a RU).

**Technical Implications**
EUROPTIRAILS’ major technical implications were threefold:

1. A centralised real-time traffic data bank

Using its « Information » model, the system receives information pertaining to train traffic from the national control rooms thanks to the UIC standardised interchange protocol. This may imply:

- Contracted Timetables have been negotiated at national level between Infrastructure Managers (IMs) and Railway Undertakings (RUs). The EUROPTIRAILS core system registers and merges the received domestic timetables to a unique so called “EUROPTIRAILS contracted time table”.
- Scheduled passing dates of trains at existing noticeable wayside data collection points (stations average spacing lies between 20 and 30 km open track beacons).
- The actual passing dates of international trains at those points or Operational data related to incidents (location, time table deviation, delay causes).
- Technical characteristics of trains.

2. Available statistics of the follow-up of international trains.

Thanks to its "Monitoring" model, the system makes it possible to edit periodic reports pertaining to the traffic of international trains, and to release numerous statistics related to the origin-destination journeys, and no longer to the territory of an IM as it was formerly the case.
As an example, the system generates periodic reports related to:

- the punctuality of a train or train group from the origin to the final destination,
- the reasons and responsibilities related to the train delays,
- the performance of the various corridor segments and the view of potential bottlenecks.
- the reasons of train cancellations and the corrective actions that may be considered in the future.

3. A future replanning tool for international rail traffic

With its "Path Assembly" model, the system, in case of major disruption of international trains (crossing one border at least), will make it possible to rebuild international paths in real-time, by means of diverted routes if necessary.

In case of very significant disruption, (large train delay, cut off route, etc...), the involved IM will warn his partners concerned by the issue and a "pilot" IM will be designated by agreement to co-ordinate the "Path Assembly" process.

On the basis of IMs proposals and with the system's aid, a new path, involving a new timetable, will be elaborated by the pilot IM.

This "Path Assembly"

**Policy implications**

EUROPTIRAILS is destined to be diffused on the whole of the European area, even if it has been engaged first by a limited number of Infrastructure Managers. Indeed, experience shows that a cumulative effect is at work, regarding infrastructure management. The application of this principle for EUROPTIRAILS also entails geographical coherence.

Moreover, EUROPTIRAILS is just one of the many items composing the set of information systems developed by the European Infrastructure Managers: in 2004, Pathfinder has been made operational by Rail Net Europe and it is in favour of the “tracking” of the international paths; EICIS tomorrow will bring the information regarding the price of the international paths. So, by successive projects, and without massive investment, the basis of improved efficiency of international traffic is now well under way.

**STRIA Roadmaps:** Network and traffic management systems

**Transport mode:** Rail transport

**Transport sectors:** Passenger transport, Freight transport

**Geo-spatial type:** Other