



# Handling an incipient or real fault on an Intercity passenger train

Demonstration Scenario 3a of the InteGRail project

Integration of information is key for further growth of railway transport volume. InteGRail has defined a standard approach for architecture and communication that allows easier information integration and sharing. Using this standard approach a number of example applications were developed. InteGRail has chosen three demonstration scenarios, where the developed functions get the chance to prove that they work, that the methodology proposed by InteGRail works, and that they are able to help improve the performance of some of the railway processes.



## Railway processes in Demonstration Scenario 3a: Handling an incipient or real fault on an Intercity passenger train

The demonstration scenario applies the InteGRail approach to Diagnostics, Maintenance and Traffic Management integrating their Information in the real operational environment of a train in passenger service in Italy:

- An advanced Diagnostics with incipient fault detection capabilities is built on 2 existing platforms (locomotives and coaches) showing the flexibility of the integration, that can be achieved at different levels, and feeding Information about the train criticalities to the complete system;
- A Condition Based Maintenance system, automatically planning maintenance activities on the basis of the real-time conditions of the vehicles, implements the complete maintenance process, till the preparation of the work orders;
- The InteGRail Operational Decisions Support System and Traffic Rescheduler support the Traffic Management allowing path rescheduling in real time when a train performance limitation occur.

## Which new information systems are demonstrated in demonstration scenario 3a?

The scenario deals with a new approach for Information sharing, focusing on integrating existing and new information systems adopting a common solution. Focusing on the second ones:

- On Board Monitoring and Diagnostics applications were developed in order to support the detection of incipient and active fault impacting on the train mission: the Symptom Agent and On Board Condition Analyzer;
- On Ground Diagnostics and Maintenance, dealing with the Condition Based Maintenance and allowing information dispatching within the maintenance specific process and the external ones, is implemented by a number of applications: On Ground Condition Analyzer, Unplanned Event Manager, Lean Maintenance Optimizer, Predictive Maintenance Server, Intelligent Depot Tool;
- Traffic Management is integrated in a common information system together with Operation and Maintenance, receiving from them information of interest for ODSS and Traffic Rescheduler.

Please refer to the specific Fact Sheet for more information about each specific application.

### Who can benefit and which benefit?

Diagnostics can achieve intelligent fault and critical conditions detection taking advantage of the state-of-the-art knowledge based technologies available as distributed reasoning services and as embedded solutions for hostile environment. The same approach applied on ground side implements extended and smart Information availability allowing the implementation of a real-time maintenance process and of a decision support for traffic management. Consequently, the impact of the benefits is on most of the railways stakeholders, starting from the operator and the maintainer to the infrastructure manager, allowing preservation of the train mission or effective just in time management of events mining it.

### Present status, availability and future possibilities

To be able to demonstrate the information integration capabilities of the InteGRail Information System, a prototype of it was developed integrating a Trenitalia Euro Star City train in passenger service in Italy. All mentioned applications are available online and running with real data in real time, showing the effective results of adopting the InteGRail solution.

#### Other results of InteGRail

Architecture definition of integrated information systems: IGRIS

Semantic data structure of the railway domain, the InteGRail ontology

Example user applications: ODSS for on-line operational decision support, IAC for on-line infrastructure availability, IDT for on-line vehicle maintenance information

Description of interdependence of performance of railway processes: the railway KPI tree, and a tool to assess and visualise performance

#### InteGRail - Facts and Figures

InteGRail started on 1/1/2005 and ends on 31/12/2008

Total project budget:  
20 million Euros

EC funding : 11 million Euros

Total effort over 125 person-years

39 partners from 11 countries

### Partners of InteGRail:

UNIFE • Alstom Transport • AnsaldoBreda • Bombardier Transportation • Siemens Mobility • UIC • Trenitalia • D'Appolonia • TSB-FAV • DeltaRail • ATSF • CAF • Nortel Networks • Laboratori Guglielmo Marconi • FAR Systems • MER MEC • Italcertifer • ATOC • České dráhy • MAV • UNICONTROLS • Strukton Railinfra • Deuta-Werke • Heriot-Watt University • IMEC • OFFIS • Televic • Seebyte • Kontron • University of Chile • INRETS • Wireless Future • University of Birmingham • ADiF • RFF • ARGE Corridor X • Network Rail • ProRail • SNCF

### More information:

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