



Maintenance

Unplanned Event Manager

Sharing of information between the railway actors to manage the effects of service disruption

Integration of information is key for further growth of railway transport volume. Decision makers will be able to make better decisions once they have the right information at hand about their own processes and about the processes of their partners in business. InteGRail is the project that developed an enabling technology to allow universal access to existing information systems, be it databases, monitoring systems or existing user applications. For this purpose InteGRail defined a standard approach for architecture and communication. Using this standard approach a number of example applications were developed. One of these applications is the Unplanned Event Manager (UEM). This application supports the operator, maintainer and traffic manager in managing unplanned events occurring on a train in service.



What is UEM?

UEM is an application which responds to changes in vehicle condition by notifying operator applications about needed maintenance activities and infrastructure manager applications about vehicle operating constraints. The UEM functionality is as follows:

1. Registration of queries from the Operational Decision Support System (ODSS) and Lean Maintenance Optimiser (LMO).
2. Mapping of queries about performance and maintenance to relevant queries about vehicle condition.
3. Registration of vehicle condition queries with the Condition Analyser (CA).
4. When there are changes in vehicle condition, evaluating the changes using a reasoner.
5. Replying to queries previously registered by the ODSS and LMO with performance and maintenance messages.

The architecture of the UEM is intended to decouple maintenance and operation activities from vehicle condition changes. This allows the addition of additional business process reasoning to incorporate additional knowledge into the decision chain. The addition of knowledge differentiates this application from previous systems.

Who can benefit?

Railway Undertakings will benefit from a reduction in train delays, through better management of the response to unplanned events. Maintainers will benefit from improvement in information used to trigger maintenance activities.

How is the benefit realised?

At present the traffic manager does not have access to information about vehicle state, and has to rely on human intervention to discover the current state of a vehicle of interest. The maintainer has a higher level of information available but may not be fully informed of the state of the vehicle and its environment.

Enabled by the InteGRail communications architecture, the Unplanned Event Manager connects a number of subsidiary systems, such as the ODSS and LMO. In principle the subsidiary systems can ask for information about any monitored system, but will normally only require a subset of information that is relevant to the domain.

By enabling better access to information and automating the process of notification the UEM presents timely and accurate knowledge to the right person, allowing decisions to be made with minimum delay. The decisions made can be more accurate as they are based on quantitative knowledge about the situation.

Present status, availability and future possibilities

A prototype of UEM has been implemented for InteGRail Demonstration Scenario 3 "Fault on a High-speed Train". In this application UEM has been interfaced with an Operational Decision Support system, Lean Maintenance Optimiser and Condition Analyser, developed by different partners in the InteGRail consortium. This demonstrates the integration of applications which can share data over a common communications system. The overall system can be accessed through the user interface of the Intelligent Depot Tool (IDT).

In the future a development of the UEM could be used to interface a number of dissimilar systems which need to exchange data and notify changes.

The Demonstration takes place in Autumn 2008 using a Euro*City train of Trenitalia running on the RFI network in Italy.

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

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