



Maintenance

On Ground Condition Analyzer

Knowledge based Intelligent Fault Classification of railway vehicles

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 the enablers. Technology enabling universal access to existing information systems, being them 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 them is the On Ground Condition Analyzer, a ground software application that considers all symptoms and environmental data in order to identify and classify real or incipient faults on a single vehicle or across the fleet



What is the On Ground Condition Analyzer?

The On Ground Condition Analyzer is a software application that considers all symptoms and environmental data in order to identify and classify system faults according to their priority, and their nature (existing or incipient) for a single vehicle or across the fleet. Furthermore, the On Ground Condition Analyzer application is also able to infer information about the current condition (i.e. status) of the train and individual coaches with regard to its being available for operate, based on the fault and context information. The main advantage of this application is based on the representation of the structure of the vehicle, the operational context of the vehicle and the relationships between diagnostic information as an ontology model, which structures the heterogeneous knowledge related to the system and enables the common understanding between software applications.

The main sources of information are ground repository storing the diagnostic information corresponding to relevant process and event data. The On Ground Condition Analyzer is capable to work with standard legacy systems, such as relational databases or MS SQL server, as well as ontology based repositories.

Who can benefit?

The representation of all knowledge involved in the diagnostic of the system into an well understood ontology model may have an impact on most of the railway stakeholders, from the operator to the infrastructure manager. However, the On Ground Condition Analyzer has been designed to work in the maintenance environment, therefore the main benefits are for the maintenance engineers, who can properly analyze equipment failures and forecast the probability of the same equipment failing in the same vehicle or other units, or undertake processes, such as data collection, data clustering, testing, fault or defect diagnosis, planning spare parts, making recommendations, reporting major factors affecting a systems life, all in a technical and timely manner.

Which benefit?

A more efficient fault detection and classification could lead to the realization of predictive maintenance, which can easily be translated into longer time between failures and reduction of number of failure during services, and therefore increase of the reliability of the operational trains.

Present status, availability and future possibilities

To be able to demonstrate the advanced fault classification capabilities of the On Ground Condition Analyzer, a ES* inter-city train of Trenitalia in Italy and a double-decker train unit EMJ471 of Czech Railways in the Czech Republic are being watched, monitored and diagnosed by the On Ground Condition Analyzer from the ground. The On Ground Condition Analyzer is demonstrated in Demonstration Project 3 of the InteGRail project in Autumn 2008.

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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