



Predictive Maintenance Server

Intelligent Incipient Fault Diagnosis for Railway Rolling Stock

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 Predictive Maintenance Server, a ground software application that analyses all historical data in the fleet DB on ground in order to identify patterns which can bring to the occurrence of possible faults.



What is the Predictive Maintenance Server?

The Predictive Maintenance Server is a ground software application that analyses all historical data in the fleet DB on ground in order to identify patterns which can bring to the occurrence of possible faults. The analysis, related to several vehicles, trains and fleets, is focusing on inferring new knowledge on devices behaviour and fault possibility, and it could be triggered by an external event (symptom), by a maintenance operator (establishing some rules) or by routine procedure. The Predictive Maintenance Server is based on the modelling of the diagnostic rules well known among the maintenance engineers, with the goal to indicate the need to perform a maintenance action at a scheduled point in time when the maintenance activity is most cost effective and before the equipment fails. The main sources of information are ground repository storing the diagnostic information corresponding to relevant process and event data. The Predictive Maintenance Server 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?

With a strong cooperation with the Condition Analyzer application, the Predictive Maintenance Server will help maintenance engineers and operators to determine the condition of in-service equipment in order to predict when maintenance should be performed. Maintenance staff are able to edit and execute diagnostic rules that could be performance at certainpoint in time, or be triggered by component condition or behaviour.

Which benefit?

With the Predictive Maintenance Server, maintenance engineers are able, in a technical and timely manner, to analyze equipment failures and forecast the probability of the same equipment failing in the same vehicle or other units, and consequently report the need to schedule a maintenance action before the failing of the system.

Present status, availability and future possibilities

To be able to demonstrate the advanced incipient fault diagnosis of the Predictive Maintenance Server, 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 Predictive Maintenance Server from the ground. The Predictive Maintenance Server 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

More information:

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