



Performance

# Key Performance Indicator Trees

How to define and measure the performance of Railway Systems

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 intends to help railways in increasing their performance level in all areas. The first step in order to achieve such a goal is to specify how railway performance can be defined and measured. This means to identify the Key Performance Indicators (KPI) which can clearly express the railway performance, linking them to all Indicators which can influence their value. The result is a specific KPI Tree for each of the areas railways are composed of: rolling stock, infrastructure, operations and traffic management.



## What is a Key Performance Indicator Tree?

Railways need to evaluate their performance and have established systems to do it. Such systems are of course proprietary and different from one to another. This hinders possibilities like, for example, comparison of results between railways, calculation of predicted impact on performance of possible investments already done in another railways, performance definition in an international context (corridors), development of standard tools for performance measurement and assessment.

Performance is quantitatively defined by means of KPIs (Key Performance Indicators), which depend on other Performance Indicators and parameters, at lower levels, thus creating a tree of KPIs. These KPI trees relate each KPI to the parameters that have an influence on it.

## Who can benefit?

All railway stakeholders (railway undertakings, infrastructure managers, maintainers, policy makers, etc.) who need a reference in order to evaluate the performance level of a railway system in a standard way and predict the impact of future decisions at strategic level.

### How is the benefit realised?

KPI Trees will contribute to the definition of the new strategies of railways for the future, enabling better cooperation, information exchange about performance and evaluation of achieved results.

To achieve this, a reference standard to define and measure railway performance is needed.

The resulting standard will improve the possibility for European railways to cooperate according to a common strategy.

### Present status, availability and future possibilities

InteGRail defined a number of KPI trees, addressing the four main areas of the railways (rolling stock, infrastructure, operations and traffic management). However choosing the parameters and the links between them is not enough; in order to completely express them, a way to mathematically calculate such relation is needed as well. In this way, measuring same basic parameters in the railway system, it is possible to calculate the KPI linked to them and go up, along the tree, up to the top KPIs. The formulas and quantitative weights associated to each link in the tree have not been finally defined, as it will require a huge work of discussion, agreements and consensus between all railway operators (RUs and IMs, but also Maintenance Operators, Train Owners, Energy Managers, etc.). InteGRail produced not only the Trees, but also a specific Tool (see related Fact Sheet) and a working example where the tool was populated with formulas in accord to the Demonstration Scenarios (the Default Tree).

Starting from InteGRail results, complete standard KPI trees can be defined, which can be accepted by all railway administrations as a common standard. Some flexibility will be needed in order to accommodate current practices and smoothen incompatibilities.

The KPI Assessment Tool, also developed within InteGRail, can help in testing the KPI model and check its consistency.

#### Other results of InteGRail

The KPI Assessment Tool

Architecture definition of integrated information systems: IGRIS

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

#### 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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