

WIRAILCOM - Wireless railway condition monitoring

In line with the pan-European policy to cut carbon emissions from road vehicles, the European rail network is targeting a considerable expansion with an increase of 43% in commercial passenger and 70% in freight by 2020. Achieving these targets requires increased reliability and availability of vehicles and track whilst maintaining the same level of safety.



Railway operators rely on remote condition monitoring of assets to enable continued safety and efficiency. Modern railway vehicles incorporate a significant level of built-in condition monitoring. The component condition monitoring systems can be interfaced to vehicle management units to allow an unprecedented level of fault detection and decision support for the vehicle operators and maintainers.

Such systems are made possible by the close incorporation of the component systems with the vehicle infrastructure including core data communication busses, train management units, and remote communications equipment. Retrofitting condition monitoring systems to existing rolling stock can bring a number of similar benefits, but the incorporation of the component condition monitoring systems with the existing train systems provides a significant challenge.

The aim of WIRAILCOM is to develop a standardised framework architecture supporting the implementation of networks of self-powered, wirelessly linked, sensor and processing nodes to be constructed and fitted to vehicles with minimal intrusion. The core of the system is based on an ad-hoc non-hierarchical wireless mesh network capable of undergoing dynamic network reconfiguration to

ensure a reliable communications path under varying conditions.

Project objective

The objectives achieved in WIRAILCOM will overcome one of the main limiting factors for the monitoring of railway assets which is the costly and technically prohibitive installation of cables to carry power and data signals from vehicle to vehicle and to the wider railway infrastructure. In particular, the target developments will not only provide direct return on investment within the project, but also support the development of standards for other assets which will bring further value for follow on applications.

The project will address four major technical challenges:

- Development of a flexible, short range wireless monitoring network and associated standards for operation in the railway domain.
- Investigation of the correlation between asset condition and non-destructive testing inspection and development of appropriate monitoring system.
- Analysis of sources of energy within the railway system to power the monitoring system.
- Creation of an energy harvesting system capable of generating appropriate power to drive the wireless monitoring system.

The project output will lead to the development of a supply chain based on the remote condition monitoring equipment, wireless equipment, energy harvesting equipment, condition monitoring software and hardware and systems integration with legacy railway systems.

For further information, please visit the project website at www.wirailcom.eu.

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