PROJECT

RM-HST GWR

CLIENT

Great Western Railway

Overview

Wabtec are providing a bespoke Remote Monitoring solution for the MK3 HST Trailer Car and Class 43 Power Car sub-systems. Wabtec have worked with Great Western Railway (GWR) as part of an R&D project to deliver a First in Class (FiC) full Remote Monitoring System on Trailer Cars and Power Cars.

Using the data collated and analysed through use of the RM equipment and the WabtecONE cloud hosted services, Wabtec will support GWR in optimising their vehicle operations and reduce maintenance activities.

The solution shall provide a rich source of data that is wholly relevant to the operation of the train fleet. This data is valuable in understanding the areas that can be improved upon and targeted in the future.

With this information at the disposal of GWR, the end user experience can be improved continuously, and money saved made through maintenance optimisation can be redeployed on other data driven targeted improvements.

Deliverables

Complete design, procurement, installation and commissioning of an end to end integrated remote data capture & information delivery system for a first in class HST.

The hardware will be installed into the existing Wi-Fi enclosures space envelopes and the Remote Monitoring Controllers will be connected to a dedicated train systems ethernet network.

The RCM equipment will provide access to near real-time monitored systems with on-train controllers, collecting, aggregating, compressing, encrypting and transmitting data to off train servers in WabtecONE cloud hosted servers for further analysis.

As well as the physical installation of the Remote Monitoring equipment, Wabtec are providing an informatics web interface and subscription service to monitor fleet system performance in near real time to increase train availability and to allow pre-emptive allocation of technical resource.

The WabtecONE platform will provide microservice based Rules Engines and Machine Learning pipeline capable of analysing inbound data to provide near real time alerting via the informatics UI dashboards and email notifications and Analytics for trending and Machine Learning.

Wabtec will use the information to validate the maintenance optimisation strategies.

Challenges

The MK3 HST fleet is an aging passenger favourite, with significant investment being made by train owners, operators and the government to ensure they can operate into the future.

Wabtec have been fortunate and privileged to be part of these iconic train's transformation into modern, compliant, comfortable rolling stock that have the capability to operate on the UK rail network for another 15 years, and possibly beyond.

This all being said, Wabtec recognise the trains are up to 45 years old, but the potential of these trains to compete with the most modern of rolling stock is untapped and our challenge is to prove how data can improve the assets.

Solutions

Wabtec carried out a detailed cost benefit analysis to ascertain the most valuable channels to monitor, considering historic performance issues and newly installed systems as part of the PRM-TSI modifications together with potential maintenance optimisation strategies and penalty reduction opportunities.

Utilising hardware that is modular and flexible by design to integrate various transmission hardware medium to connect Ethernet, Wi-Fi, Digital, Analogue, Serial and CAN devices and signals enables the benefits to be realised by providing a rich data set.

Taking the opportunity whilst trainsets are stood down for prolonged periods for complex modifications enabled additional interconnecting wiring to be installed at a reduced labour cost.

Wabtec utilised much of the existing vehicle design to install the additional remote monitoring equipment and capitalise on previous investments, housing the controllers within Wi-Fi cabinets and making use of the unused backbone to separate train systems and passenger systems.

Water Level Sensor

Passenger Comfort Sensors

DCU

PIS

RCM Equipment
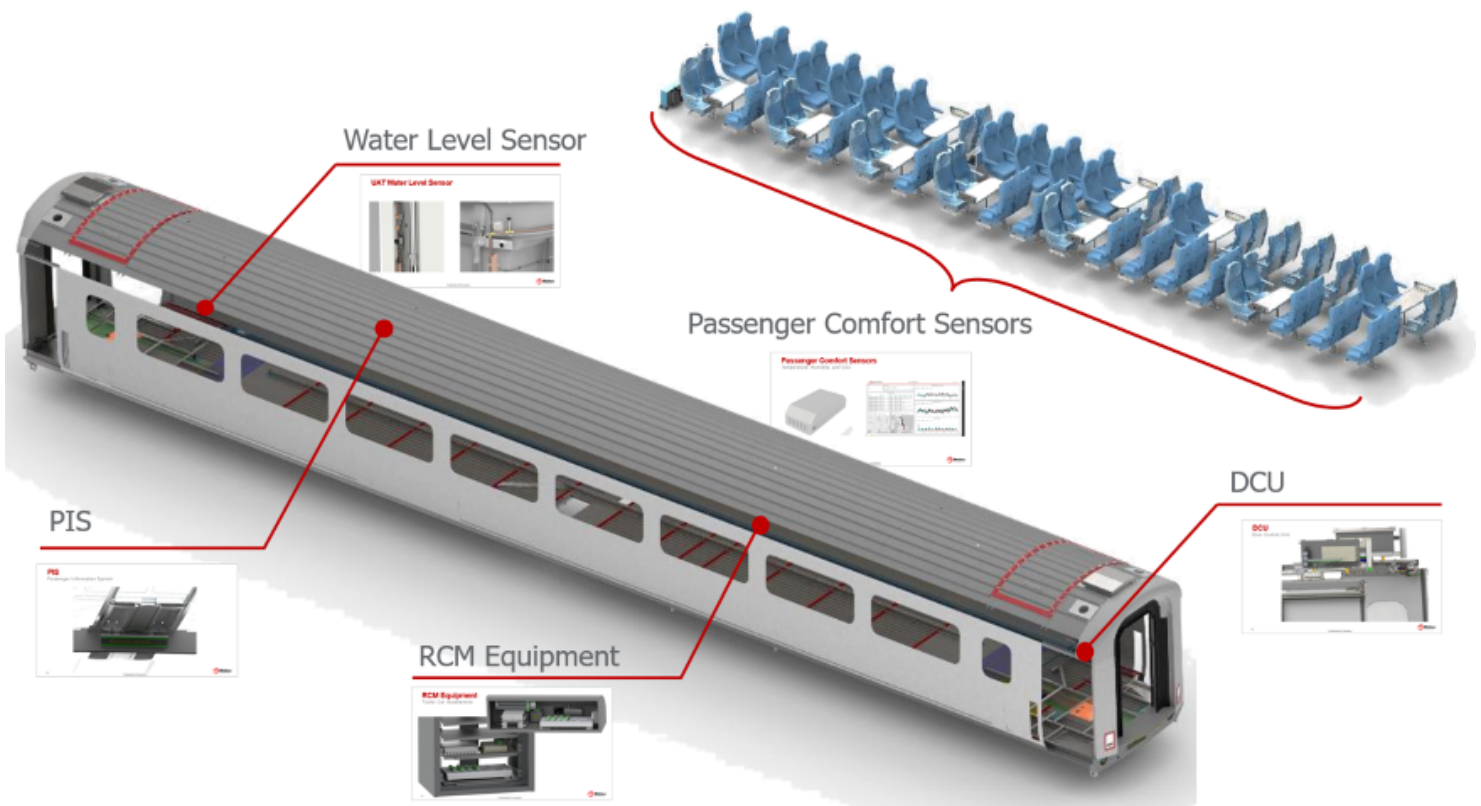
Benefits

- Increase in MTIN
- Reduced Delay Minutes
- Reduced Cancellations
- Optimise maintenance and improve life cycle costs
- Improve Passenger Experience

From sensors to ➔ Outcomes;

Environment sensors, At seat sockets, Toilet condition and PIS ➔ Improved passenger experience.

Toilet ➔ Timely replenishment of water, tank emptying and maintenance to improve system availability.

Engines, Braking systems, Battery volts, Train controls and Door Control Units ➔ Reduction in delays, cancellations and maintenance optimisation.

GPS and OTMR ➔ Geographical and operational context of faults enables enhanced understanding of cause and effect for diagnosis.

Improved Comfort and Value for Money

Fewer Delays and Cancellations

Targeted Maintenance