CONDITION MONITORED MAINTENANCE OF BOGIES AND TRACK

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JUSTIN SOUTHCOMBE

ASSET MANAGEMENT RAIL SUMMIT

LONDON, 28 MARCH 2018

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A company built around excellence and value creation for rail

- World class knowledge in vibration engineering

  - Condition-monitored maintenance information for bogies – *focus on bespoke algorithm development*

  - Design & build of vibration energy harvesting sensors – *wireless maintenance free design*

- Spin out from the University of Southampton in 2004

- International order book and a global supply chain

- Dedicated to rail

- Maintenance
  - Resources
  - Wheel/rail
  - Skills

- Operations
  - Safety
  - Punctuality
  - Comfort

- New Build
  - Warranty
  - Differentiation
  - Development
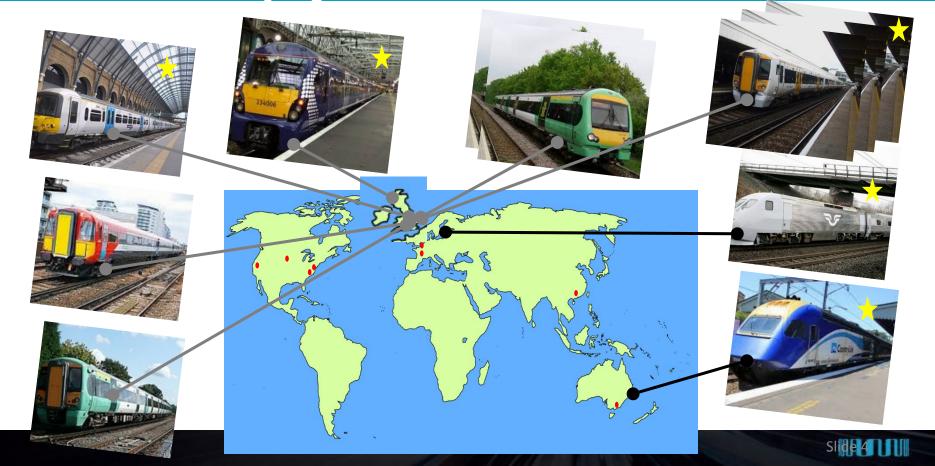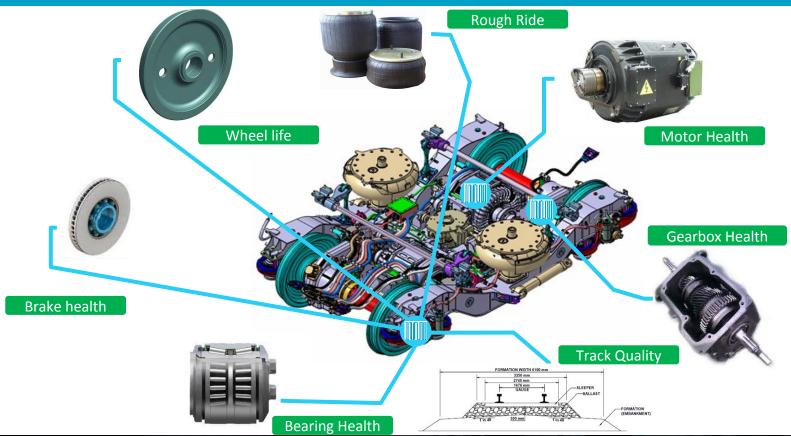
The intelligent, connected "IoT" bogie

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Rough Ride

Wheel life

Motor Health

Gearbox Health

Brake health

Track Quality

Bearing Health
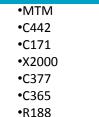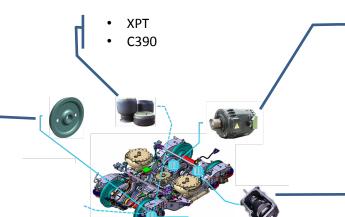
Deployment of the intelligent bogie

- C375
- C376
- C334
- MTM
- C442
- C171
- X2000
- C377
- C365
- R188
- LAmetro
- Wagon
- C465

- XPT
- C390

- B2007
- C465

- C377
- C465
- C365
- Loco

- C375
- C376
- C334
- MTM
- C442
- C171
- X2000
- C377
- C365
- R188
- LAmetro
- Wagon
- C465

- NR South East Route
- NR Scotland
- NSWT
- NR LNW(S)
- SPT Glasgow
- X2000 (Se)

>10 000 sensors globally
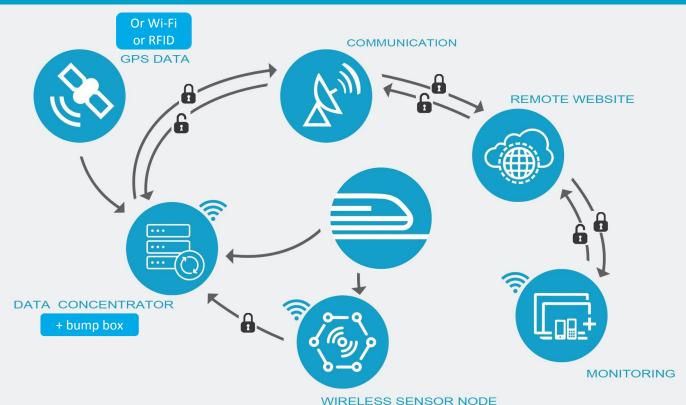
- Vision. *This project will research the feasibility of detecting axle cracks on trains through vibration measurement using on-board self-powered monitoring. The vision is to use continuous live monitoring of axles with low cost self-powered wireless systems that are easy to install and will* **replace expensive and disruptive NDT methods** *in maintenance sheds.*

- Concept*: Use acceleration to monitor stiffness*

- Funding programme: *RSSB Accelerating Innovation (UK)*

- Awarded: January 2018. Duration: 30 months

- Partners: Perpetuum, TWI, University of Southampton
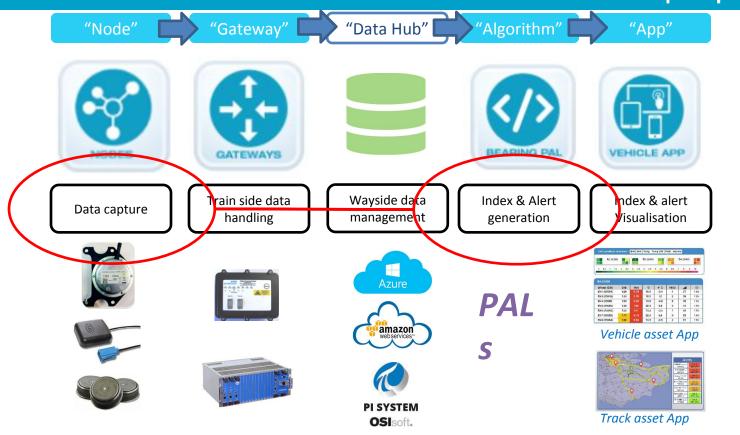
Condition Monitoring

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Or Wi-Fi
or RFID
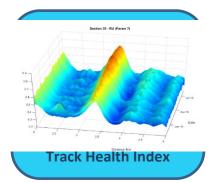
GPS DATA

COMMUNICATION

REMOTE WEBSITE

DATA CONCENTRATOR

+ bump box

MONITORING
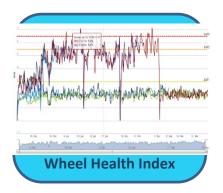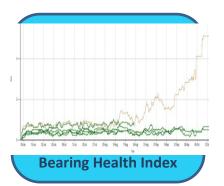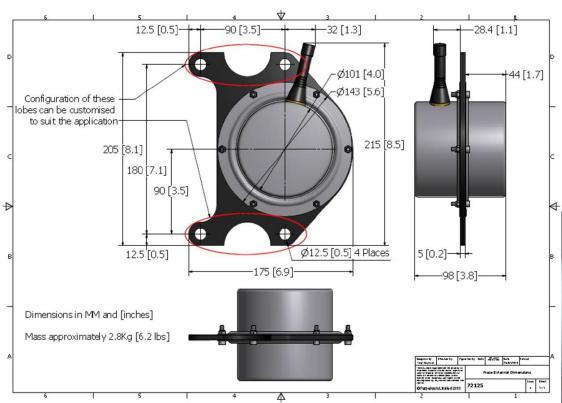
WIRELESS SENSOR NODE

CYBER
ESSENTIALS

Wheel Health Index

Bearing Health Index

Motor Health Index

Track Health Index

Gearbox Health Index

Ride Health Index
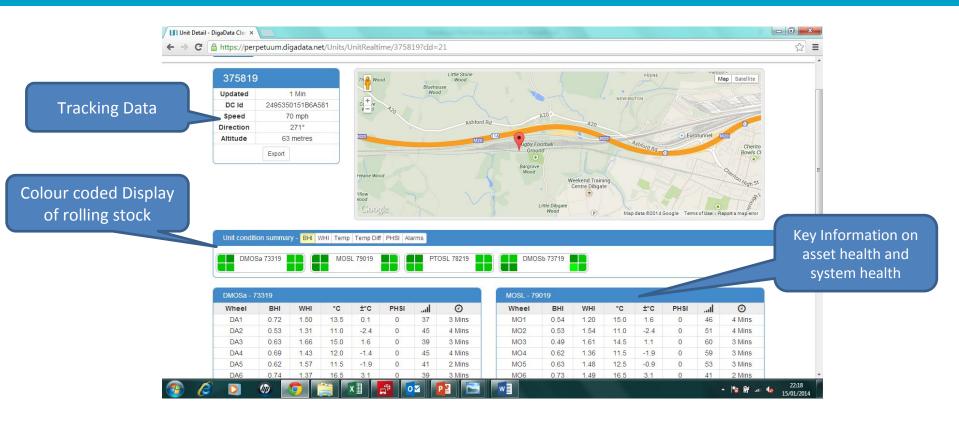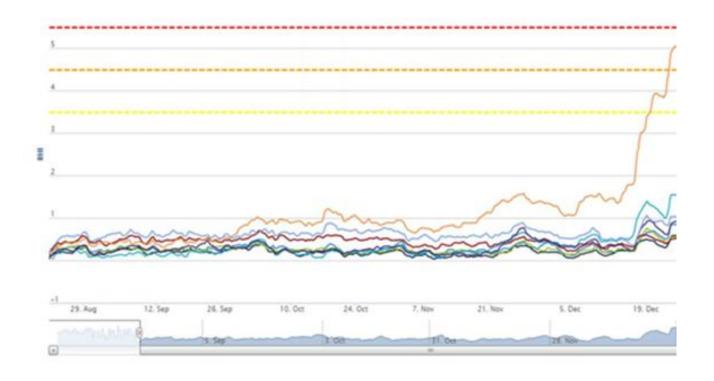
Easy, live asset health information

Tracking Data

Colour coded Display of rolling stock

Key Information on asset health and system health

Wheel Health Index

- 0 wheels have triggered a WILD alarm without a preceding WHI alert

- All L2 wheels have been corrected and reduced to L1 or less

- Wheel turning now based on WHI score as "inspection" is automated

- Flats, RCF, cavities, out of roundness … - all create a vibration signal

- Diagnostics - RCF diagnosed 2 months ahead

"IF THE RAILROADS WERE AUDITED TODAY AGAINST WORLD CLASS ASSET MANAGEMENT STANDARDS THEY WOULD <u>ALL</u> FAIL"

N. AMERICAN RESEARCH CENTRE – CAPE TOWN, 09/17

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Melbourne MTM deputy CEO maps out what a commitment to change should look like. Real actions, real conviction and real confidence in how knowlegable use of tech and data can change the status quo.
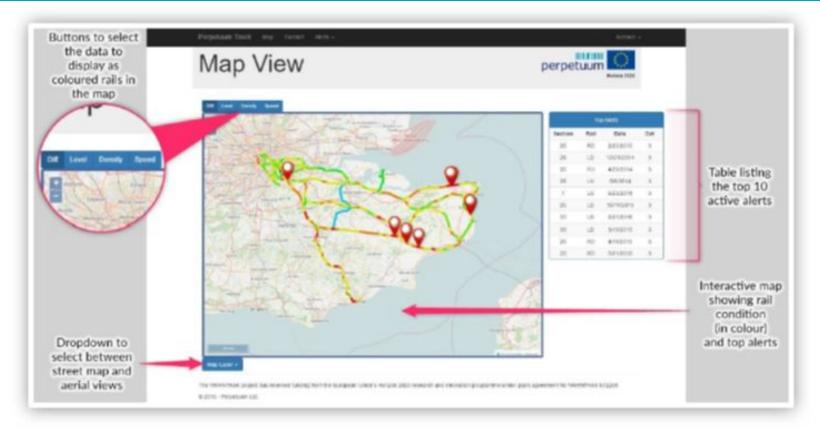
AusRAIL: Predictive onboard diagnostics to help Melbourne trains meet ...
railexpress.com.au

- Progressive adoption of asset management through the board, and the company

- 5 year development strategy for testing RCM technology

- Maintenance plan and component studies completed

- New franchise secured in 2017 through CBM savings supporting a competitive subsidy level

- Rapid mobilisation: Benefits in <3 years

Abellio Scotrail:

- Country: UK

- Business: Passenger Operator

Equipped Trainsets:

- 40 EMU (C334)

Ongoing Information Services

- Wheel Bearing health

- Wheel health

- Installation: 2017
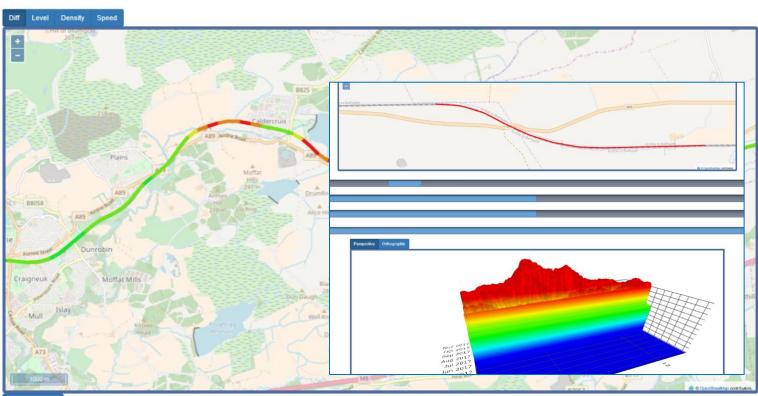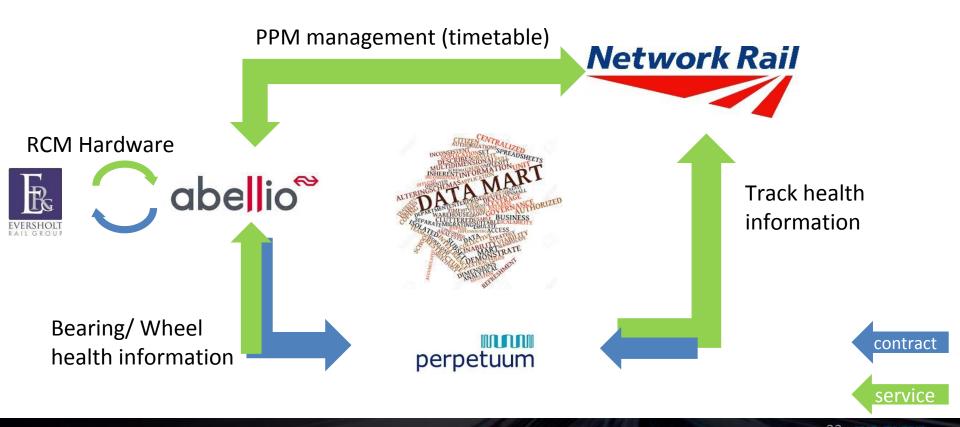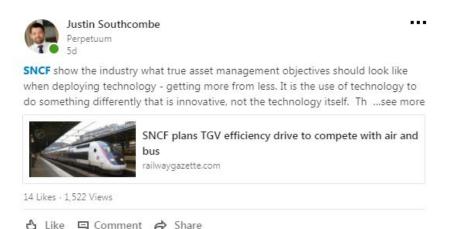
Commissioning is underway

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- Committed to a "more from less" strategy – Step change
    - €2.5bn savings by 2020

- 25% fewer assets for the same service level – 300 not 400 TGVs

- Maintenance plan and RCM tech studies completed upfront

- Rapid deployment: < 3 years

INNOVATION IS THE *APPLICATION* OF TECHNOLOGY TO IMPROVE THE STATUS QUO ...

IT IS NOT THE TECH ITSELF

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