EXPONENT
TECHNOLOGY SERVICES

CASE STUDY 2

RAILROAD INFRASTRUCTURE INSPECTIONS

THE CHALLENGE

To provide cost and time-effective inspection solutions for the railroad sector.

The railroad industry has found the use of concrete railroad ties challenging. Heavy loads can cause structural problems with concrete ties, such as cracking and breaking which increase maintenance cost as well as creating a higher probability of derailment.

To solve these structural issues, Quality Control has to closely monitor the ties to ensure design specifications are being met. The ability to locate an individual tie amongst the millions that have been deployed across a rail network is daunting.

THE SOLUTION

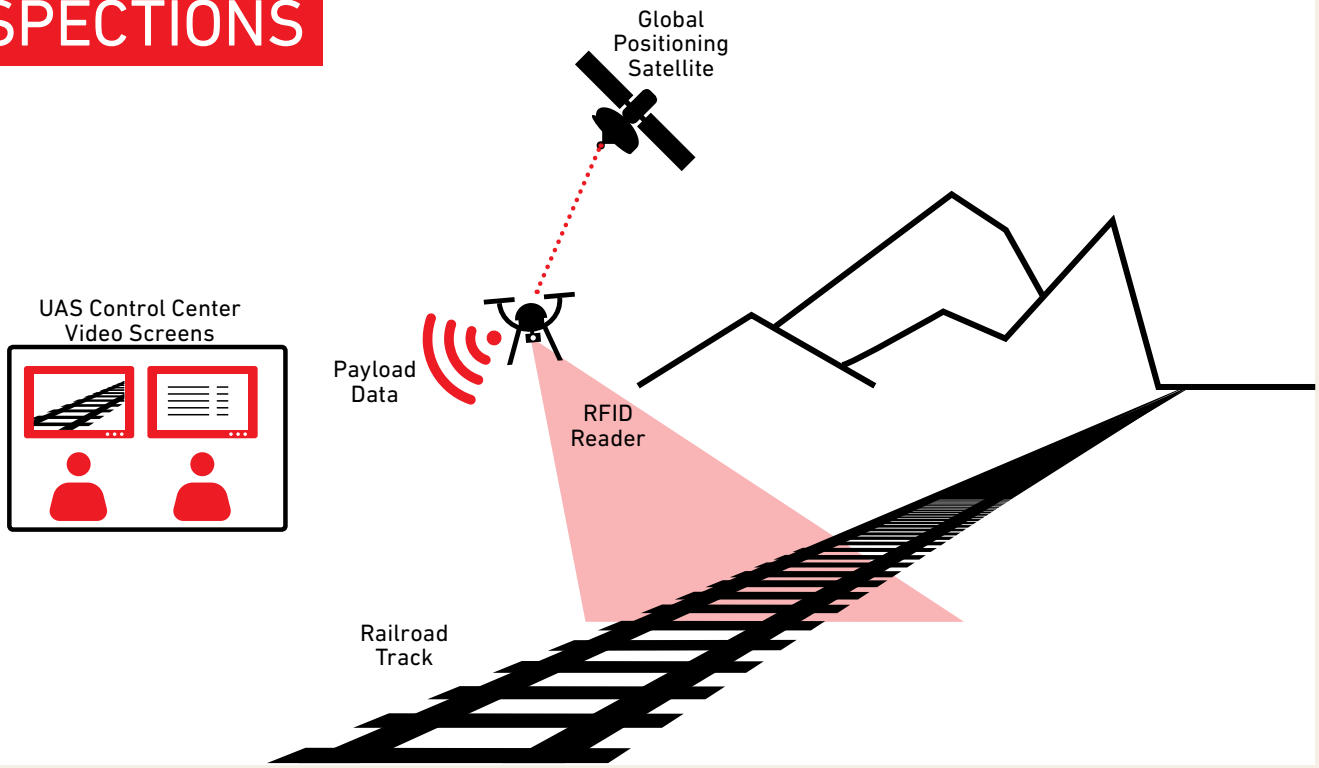
Using UAS-based solutions to facilitate remote maintenance inspection.

By embedding a RFID tag in each tie and then recording the manufacturing data against each tie, a true item level Quality Control tracking system can be implemented.

This allowed for detailed forensics to be done on failed ties, but more important the locating of defective ties within the track system.

A Unmanned Aerial Vehicle (UAV) equiped with an RFID reader/antenna can read the embedded tag and record the GPS coordinates. This would replace the need to outfit an inspection truck which is expensive and is not the inspection truck's primary mission.

RAILROAD INFRASTRUCTURE INSPECTIONS



IMMEDIATE IMPROVEMENTS

- **Greater Accuracy in reading tie RFID data and correlation with manufacturing Data**
- **Faster reading and location of ties - saving time on the inspection process**
- **Cradle to Grave" tracking capability of railroad ties**

THE TECHNOLOGY

UAS FUNCTIONALITY

UTILITY SPECIFICATIONS

UAS deployed with a passive RFID antenna.

SCOPE

EXTENDED RANGE

Fixed Base and Mobile Command Vehicle for extended range deployments available.

CLARITY

OPTIONAL ENHANCEMENTS TO SUIT CONDITIONS

Mounted HD and Infra red camerazoom capability allows capture of secondary inspection data for post flight analysis simultaneously.

TRACKING

MANAGED CENTRALLY

Back end integration with manufacturing and inventory systems to allow for rapid item level identification.

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