



ROBOTICS & AUTOMATION

INNOVATION THROUGH AUTOMATION

EMBRACING AUTOMATION TO INCREASE QUALITY AND SAFETY

The future of rail; where robotics and automated inspections are becoming part of the industry's maintenance and operational norm. Through a transition to digitisation of repeatable and ergonomically challenging inspection tasks, rail maintainers can increase the quality and reliability of the inspection data they receive. Increasing maintenance capacity by running robots 24x7, freeing up time for the technicians and maintenance engineers to focus on higher value activities. Repetitive and time intensive inspection tasks can be performed safely, efficiently and with greater accuracy.

The **Robotics and Automation Module** adopts cutting-edge robots with advanced sensor technologies. The robot's operation is fully autonomous, working safely and around busy and active maintenance depots. Developed over years of experience and guided by Future Maintenance Technologies (FMT) scientific understanding in providing robotics and automated inspections. Downer's implementation services will prepare your organisation to adopt autonomous inspections and assist you with the transition.

BENEFITS

- Reduction in labor hours to complete repetitive maintenance tasks.
- Redeployment of maintenance staff to higher value activities.
- Reduction in maintenance staff working in unsafe environments and unergonomic conditions.
- Increase in accuracy and consistency of measurements avoiding unnecessary maintenance due to errors.
- Increased maintenance capacity due to 24x7 nature of the robots and ability to work autonomously while other activities are occurring in the maintenance depot.
- Increase in accuracy and detail of measurement to determine condition to avoid unnecessary replacement, lowering inventory costs.
- Restructuring of maintenance regimes to increase automated tasks and extend maintenance intervals, lowering total maintenance spend.
- Flexibility to add and change inspections in the maintenance depot without complex site designs typically required by gantry systems.
- Inspection data digitisation and integration into the asset management system to facilitate trending and increased CBM.

DATA INTEGRATION WITH YOUR ASSET MANAGEMENT SYSTEM

With over 15 years experience, Downer has been designing data models, integrating systems, using inspection data, as well as trends and business logic to support reporting needs and condition-based maintenance.



WHAT IS TrainDNA?

A cloud based, highly integrated suite of products designed to capture and analyse data for improved performance and enhanced passenger experience.

ACCESSING DATA TO BOOST EFFICIENCIES

Upgrade to next generation, asset management technology and provide the industry's most reliable, available and efficiently run trains. TrainDNA takes you on a transformational journey to a digitalised and improved asset management system. Co-ordinate maintenance and operations activities and benefit from accurate data driven insights.



“Payback in first two years derived from increased train availability, increased condition based maintenance and increased maintenance capacity.”

THE MODULES

Flexible, scalable and agile, TrainDNA is comprised of five standalone and inter-operable modules. Reap the benefits of one module, or add and combine multiple modules at any stage of operational maturity. The data, capability and knowledge of each module is proven to shape successful business decisions and improvements.



Maintenance Management

Asset management, maintenance activities and the related workforce planning.



Operational Intelligence

Real-time data, integrated from many sources (trains, maintenance facilities, operators).



Asset Intelligence and Analytics

The process of analysing data and producing in-sights and findings.



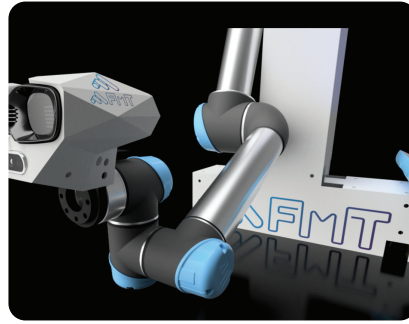
Robotics and Automation

Remove manual tasks that are prone to human error, difficult to perform and time consuming to complete.



Sustainability

Optimising real-time power consumption, work practices and track sustainability benefits.



GETTING STARTED

During a **Pilot Program**, we will introduce suitable robots (TRES and RFD) to your maintenance facility site. These autonomous machines, collect raw visuals, data models as well as algorithms to enable customers to establish with assurance a baseline against manual measurements. Outputs typically include a technical report and a business case to demonstrate the financial benefits.

TRAIN EXAMINATION SYSTEM (TRES)

The pioneering technology of TRES combines FMT's sensor technology and autonomous robotics platforms to conduct inspections of rail assets. It comes equipped with the latest Light Detection and Ranging (LiDAR) and state-of-the-art laser and optical technology to conduct highly accurate train inspections.

Some examples of common and pre-built inspections include:

- Rail wheel measurements (profile and diameter)
- Rail wheel surface defects (spalling and cracks)
- Torque mark identification
- Oil gauge level
- Brake pad and brake disc measurements.

RAIL FACILITY DRONES (RFD)

RFD is the result of combining drones with sensor technology, to conduct autonomous inspections of rail assets, facilities and infrastructure. Installed with Machine Learning and Computer Vision Analytics, RFD brings a selection of pre-built inspections:

- Overhead wires (connectors, insulators, tension and temperature)
- Facility (HVAC, solar, guttering and rust)
- Perimeter fence (damage and vegetation)
- High voltage asset condition
- People/intruder detection
- Rolling stock (graffiti, pantograph and roof).

ON-GOING MANAGED SERVICE

As part of the implementation, Downer's Managed service will ensure on-going operations and ability meet service levels and performance requirements.

This includes:

- Maintenance of the robots including parts replacement over its life.
- Support in the robot's day to day operation.
- Development and enhancements to existing inspection types.
- Ability to request new inspection types as required.

HOW DOES RFD WORK?

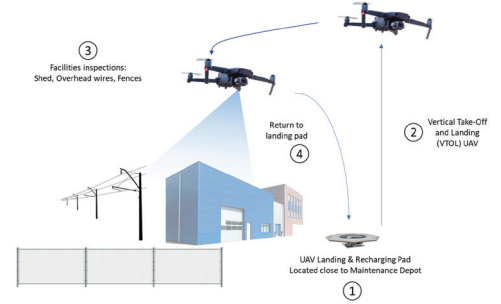


Figure (above): Rail Infrastructure Inspection captured in Pakenham, Melbourne, Australia in Dec 2021

Talk to one of our TrainDNA specialists and find out more about our modular approach.

Contact: TrainDNA@downergroup.com