Project Name: LIDAR-based Platform Clearance Measurement

1. INTRODUCTION

With safety at the core, the Executive challenged staff to evaluate the feasibility and introduce the use of LiDAR technology as a way of minimising staff exposure to the rail corridor danger zone. A cross-functional team was established and within six months, LiDAR technology was being used replacing over 300 manual platform measurement inspections a year.

Key Individuals

- Michael Briggs – Project Manager
- Kamran Kermanshahi – Sponsors delegate
- John McLeod – Professional Head of Track
- Alex Burridge – Principal Surveyor
- Graeme Gaggin – Subject Matter Expert
- Roy Matthews – System Engineering
- Vin Palihakkara – Business Analysis

2. A DESCRIPTION OF THE ENTRY

The project involves the use of LiDAR to measure rail platform clearances. LiDAR is a technology that shoots rapid pulses of laser light at an object or surface, and then a sensor measures the amount of time it takes for each pulse to bounce (or reflect) back. Using LiDAR as opposed to manual measurements reduces staff exposure to the rail corridor danger zone. The application of LiDAR for platform clearance measurements was a first in the Australian Rail Industry.

3.1 Difficulties Overcome

The project was executed quickly whilst complying with the required Sydney Trains and industry policies and standards. The team had to ensure compliance with:

- Procurement of a new technology with a new vendor to Sydney Trains
- Safety assurance required for first use of LiDAR in Sydney Trains
- Engineering assurance of measuring process and that results met Sydney Trains engineering standards
- Execution of Sydney Trains Project Methodology

In addition:

- 300 Platforms were surveyed to identify LIDAR recognisable features to ensure measurement accuracy to standards
- Planning and scheduling of Platform measurements had to be integrated to the schedule of the Mechanised Track Patrol Vehicle on which the LiDAR was mounted. (Appendix 2)
- Business processes and data management processes had to be developed and implemented.

3.2 Contribution / Impact to Rail

- Removes maintenance and engineering workers from the rail corridor danger zone (Red Zone Program)
- Improves inspections through technology and consistency
- Enabler for additional benefits - other danger zone inspection types.

3.3 Technical Input

Technical input was obtained from cross-functional representatives including:

- Network operations staff
- Engineering Assurance
- Project Management
- Surveying staff
- Vendor staff
- Safety assurance

3.4 Degree of Innovation in Rail Aspects

- First platform clearance using LiDAR in Australia
- Implemented LiDAR as a new technology to Sydney Trains
- Created Sydney Trains first Digital Twin 3D representation of the railway (refer to Appendix 1)
- Developed new methodology to identify LIDAR identifiable features

3.5 Contribution to Safety

The project has reduced the need for maintenance and engineering workers to enter the rail corridor RedZone for Platform Clearance measurement activities.

3.6 Systems Assurance

The team adopted a Systems Engineering approach that included the following processes and controls:

- Installation Plan
- Engineering Assurance Plan
- Test strategy
- Test Report
- Safety Assurance Statement
- System Engineering Management Plan
- Safety Change Assessment Reporting Determination
- Change Card
- Network Configuration Assurance the Sydney Trains Configuration Control Board
- Installation Readiness Check

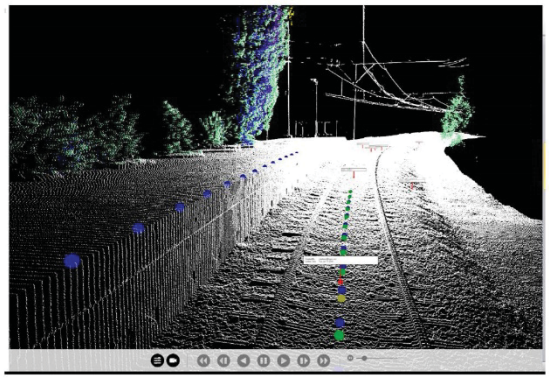
3.7 Commercial Benefits

The project has saved nearly 1000 maintenance and engineering worker hours per year.

LiDAR for platform clearance measurements can be leveraged for other manual inspections including:

- Track Centres
- Track Alignment
- Clearance (Tunnels etc)
- Line of Sight analysis
- Validation of Asset Location
- Engineering Site Surveys

Appendix



Glenbrook Station
LiDAR cloud points

Appendix 1 – LIDAR image of track and platform

Appendix 2 – LIDAR fitted in Mechanised Track Patrol Vehicle