EMT ATLAS

Points Run Through – Realtime Alerting

Background / Scope

Engineering work on the railway network often requires access to the track, which usually occurs under a 'possession', where a section of the railway is closed to passenger and freight trains whilst the maintenance work takes place. During possession work, trains and rail-road vehicles (RRVs) operate on controlled parts of the network. In these locations the points are controlled manually, before being handed back to the network at the end of the possession. Passing over points in the wrong direction can force the points open which can damage the turnout or associated equipment. Passing over points in the wrong configuration can also cause derailment of the rail vehicle. Damaged points can be extremely expensive to repair, but also have a knock on effect in that the railway cannot be handed back after a possession, resulting in delays and cost.

Points configuration A

Points configuration B

Safely pass over points

Derailment / points damage risk

ENABLE
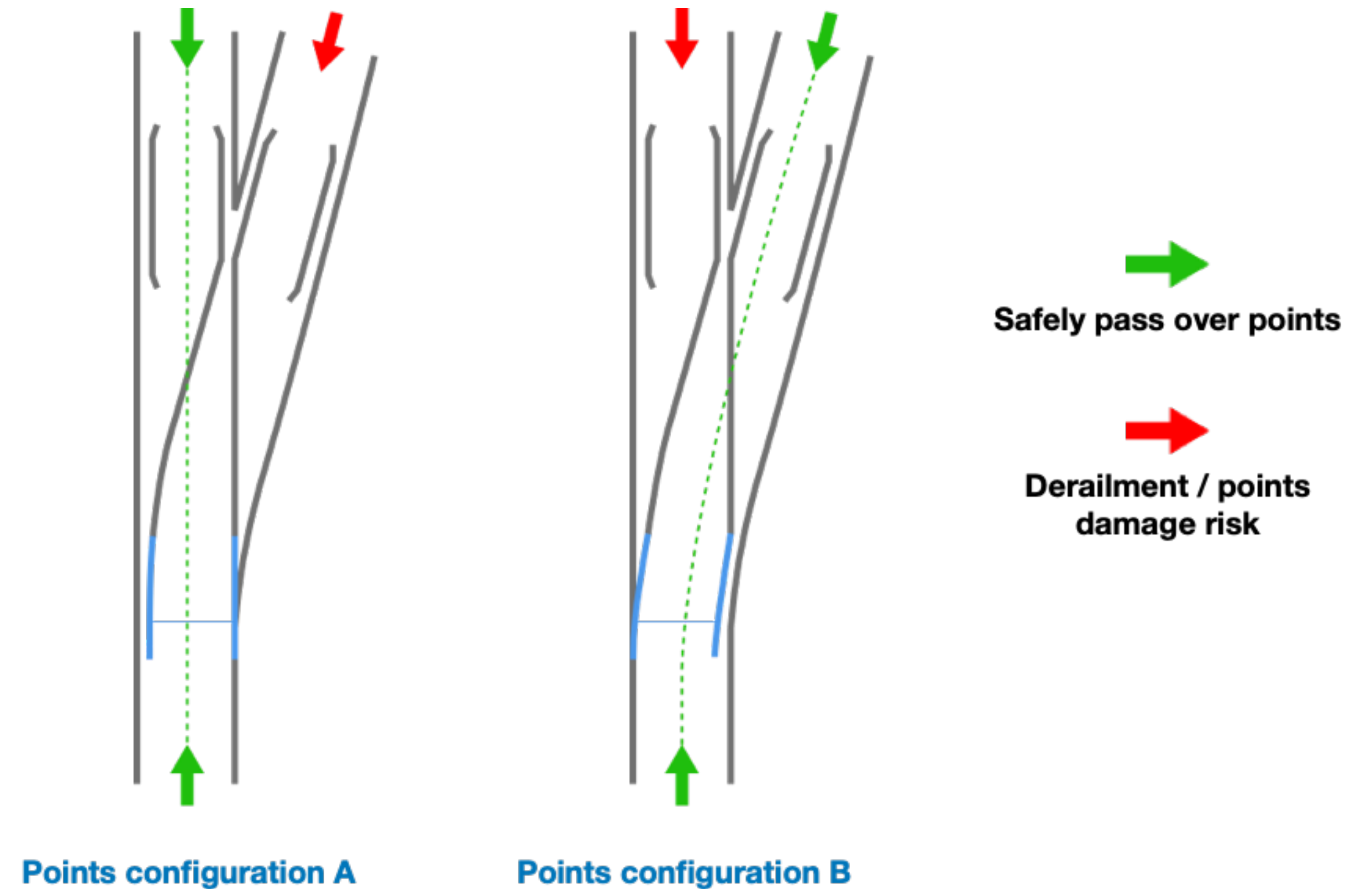
Solution

ATLAS Lens was used with a thermal camera, with edge based machine learning (ML) / computer vision to recognise whether a set of points are opened or closed from a front facing video. Depending on the direction of the train approaching the points will either mark the points as safe or dangerous. Dangerous points are flagged and an alarm triggered to alert the driver in real-time, allowing them to stop before running over the points.
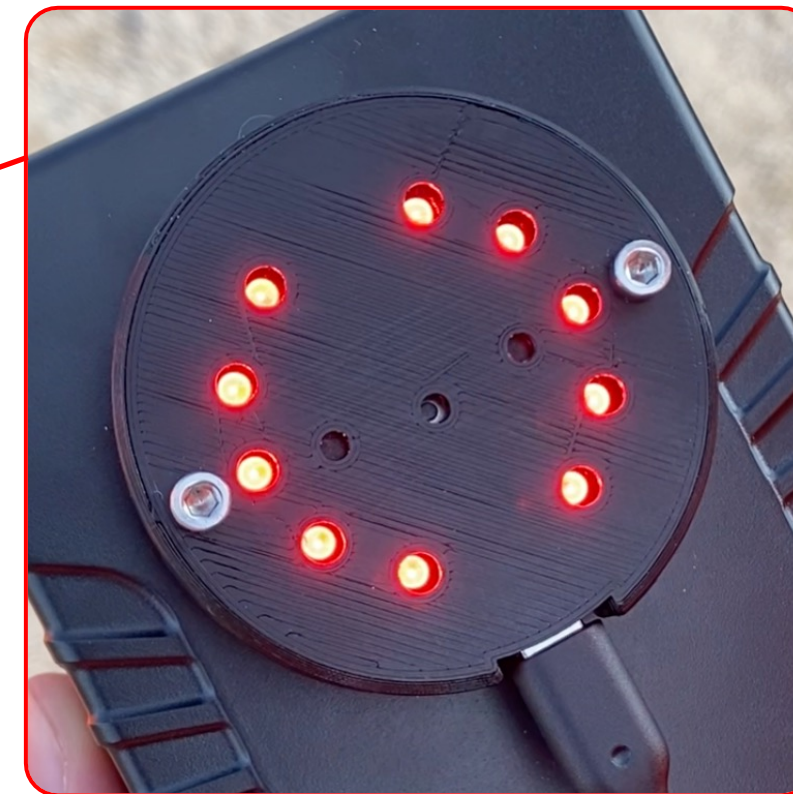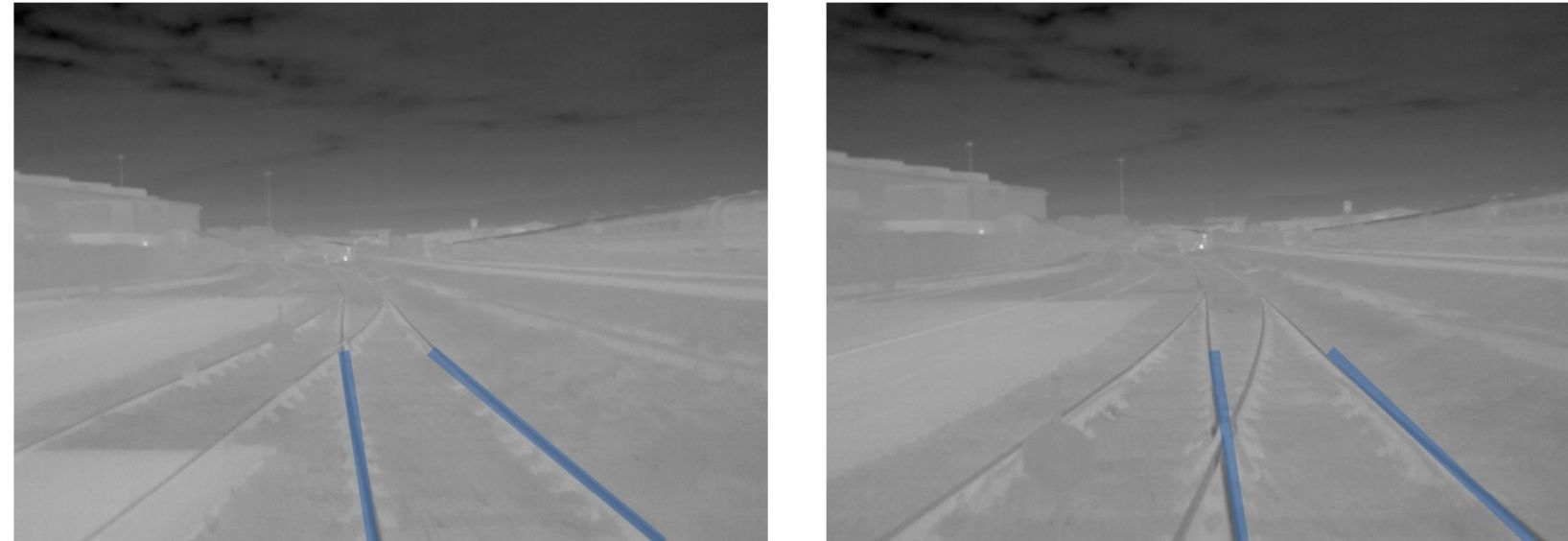
Hardware – ATLAS Lens
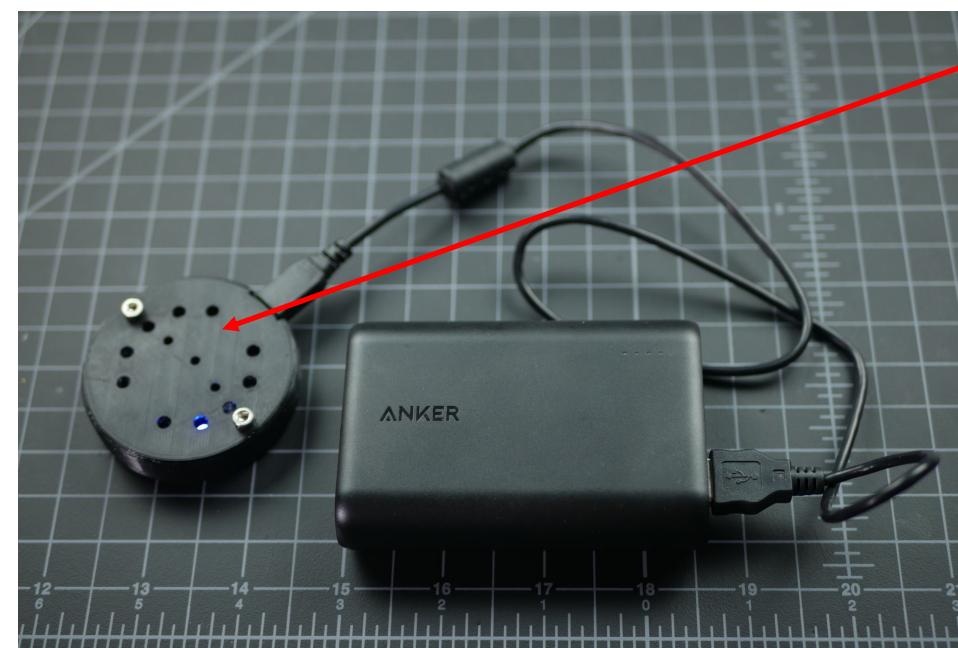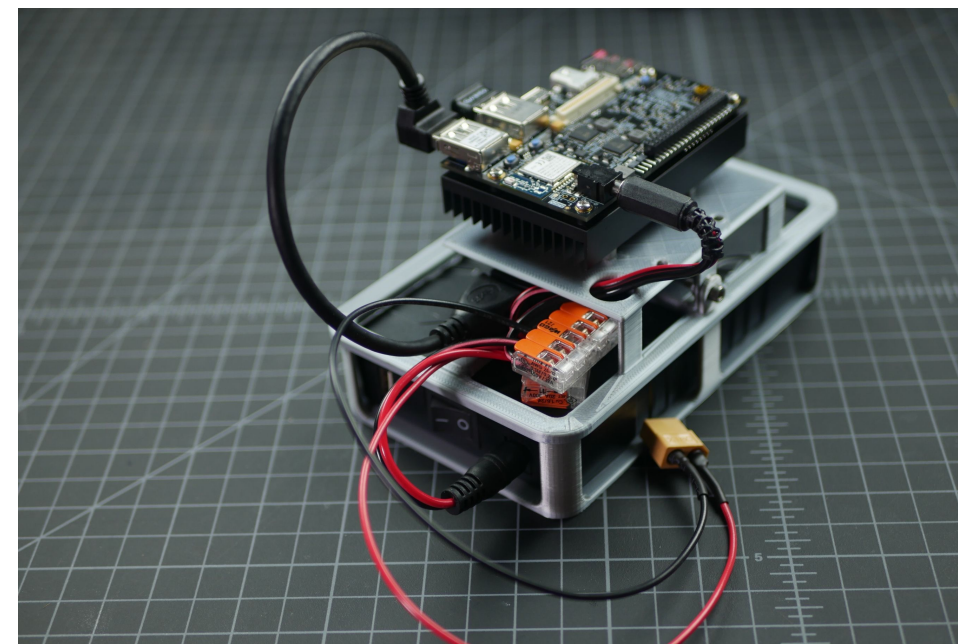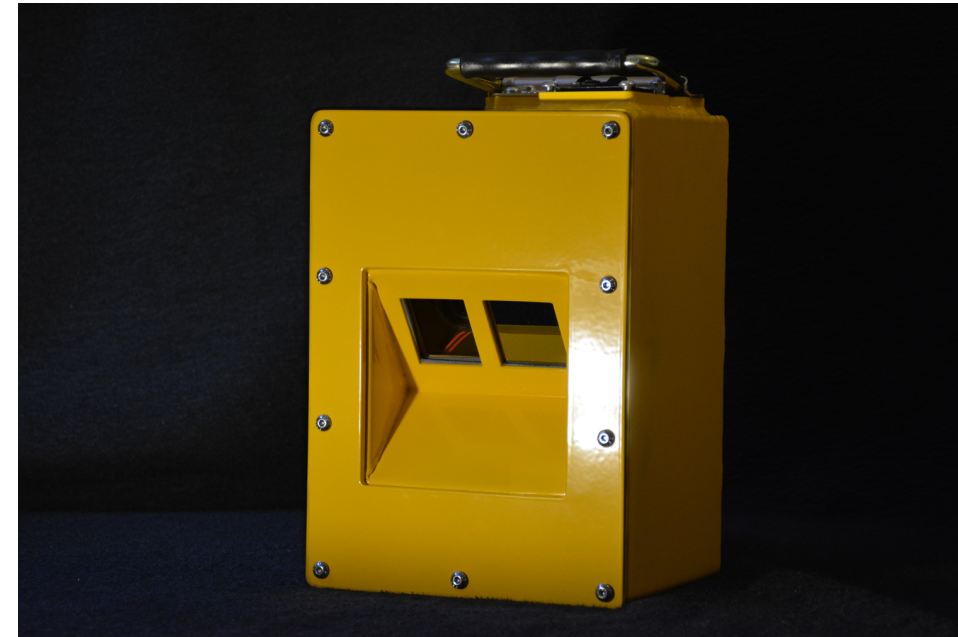
- Existing ATLAS Lens (TLC) enclosure – Approved and used on the railway
- Thermal camera
- ATLAS Lens board (for real-time data processing and transfer)
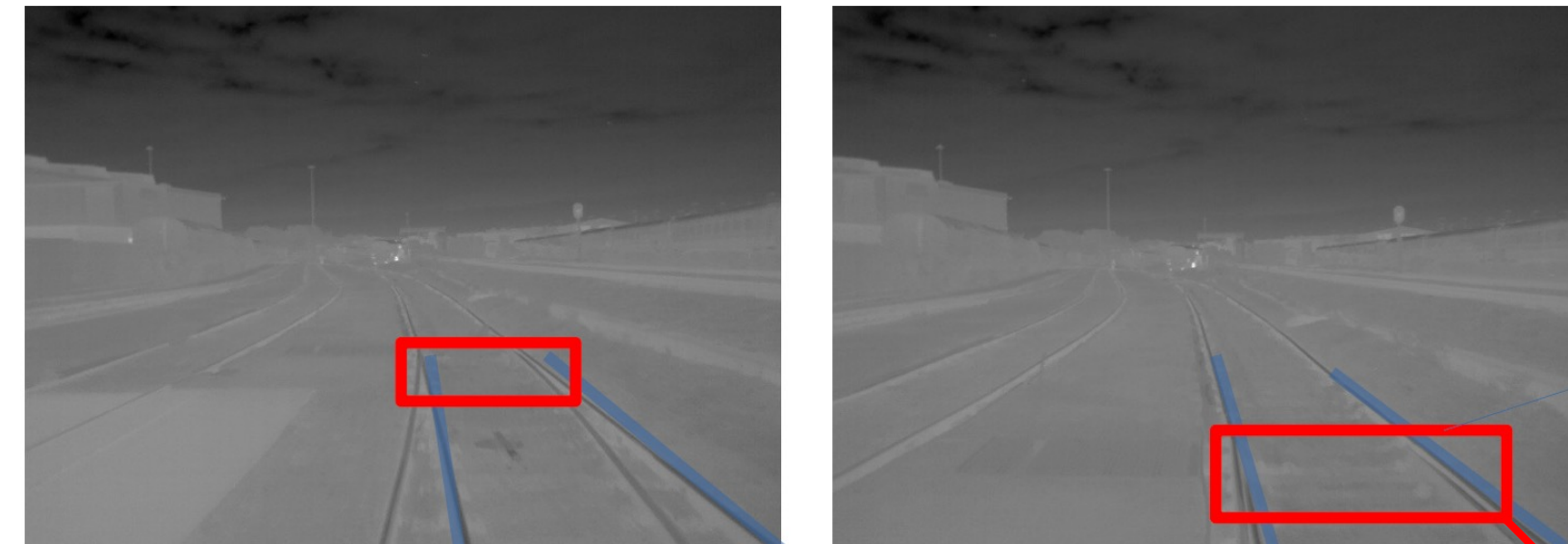- Driver alert beacon & battery pack
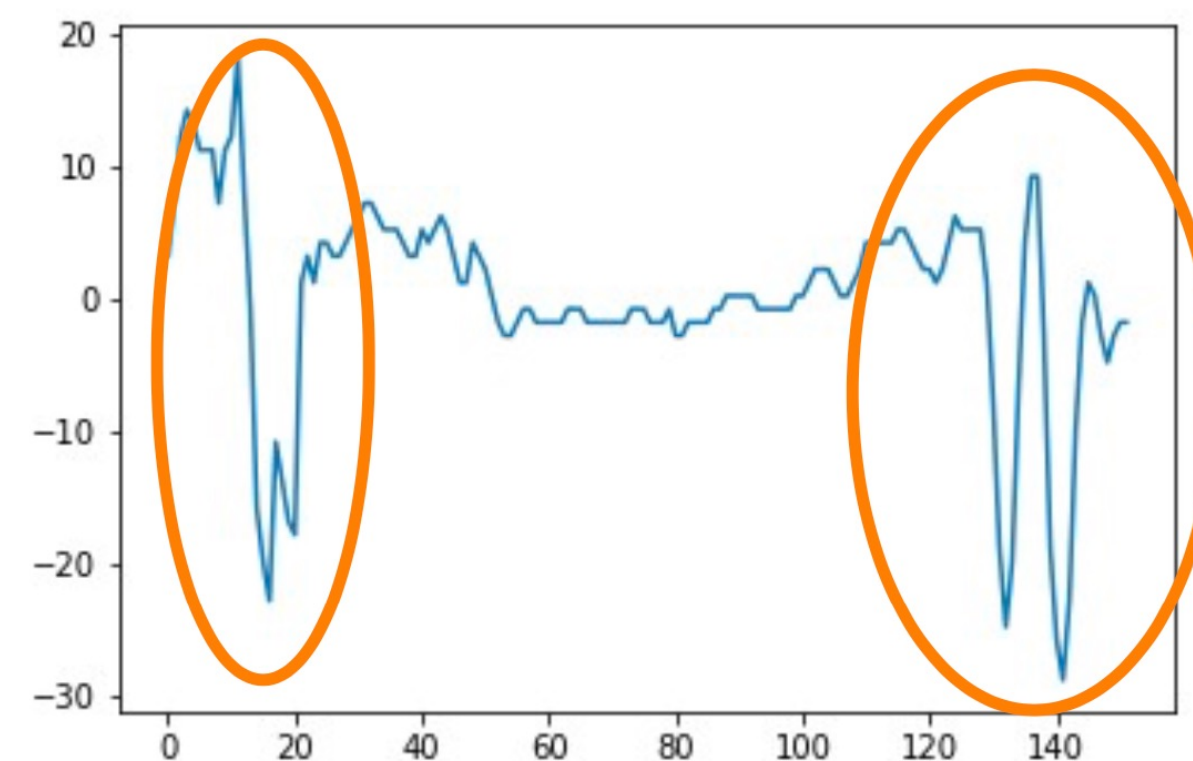
AI Model & Tracking Algorithm

1) Train track detection

2) Switch detection

3) Switch configuration

Right switch !

4) Decision based on switch configuration and current rail track

AI Model & Tracking Algorithm

- AI model to detect open / closed points

- Apply AI model to ATLAS Lens board for real-time processing

- Algorithm to track direction of travel and whether the detected points are incorrect

- Send signal to driver alert when approaching an incorrect set of points