# Model and Monitor Track Geometry Resilience with MUD®
## (Mapped Underworld Dimension)

## Background

Railway operators across the globe face a broad array of significant technical challenges in predicting and monitoring track geometry across their networks. Railway track structures endure harsh conditions over their life cycle, which can last many decades.

Track geometry deterioration occurs as track structures unevenly settle and is typically measured by in-service vehicles that use on-board systems to detect deviations in the wear or movement in the track structure. What may not be captured in these measurement systems are the root causes of track geometry deterioration.

Root causes of track geometry deterioration conditions that specifically relate to impact on the track structure such as subsurface movement and deformation or insufficient drainage.

MUD®, like an X-ray of the Earth, penetrates and sees through dense vegetation, soil, water, ice, overburden and snow to see the subsurface. It models subsurface structures, geology, voids, disturbed earth, assets and infrastructure. MUD® makes it possible to detect and monitor subsurface conditions that impact track structure that can lead to track geometry failure.
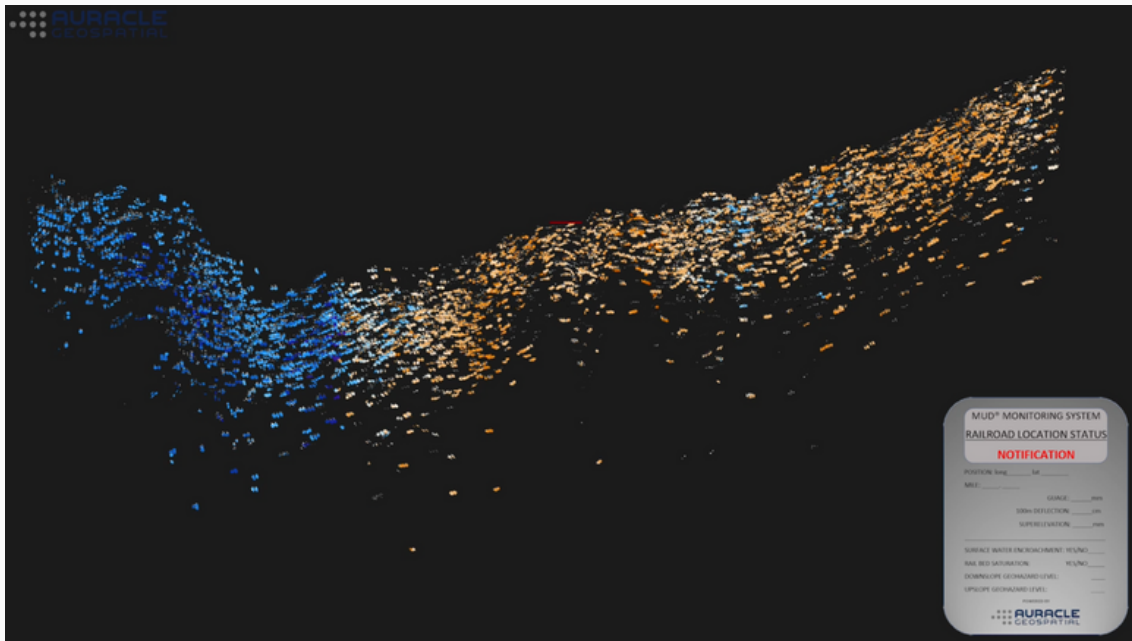
MUD® produced point clouds provide millions of location and condition data points that reveal subsurface intelligence including water encroachment and geohazards
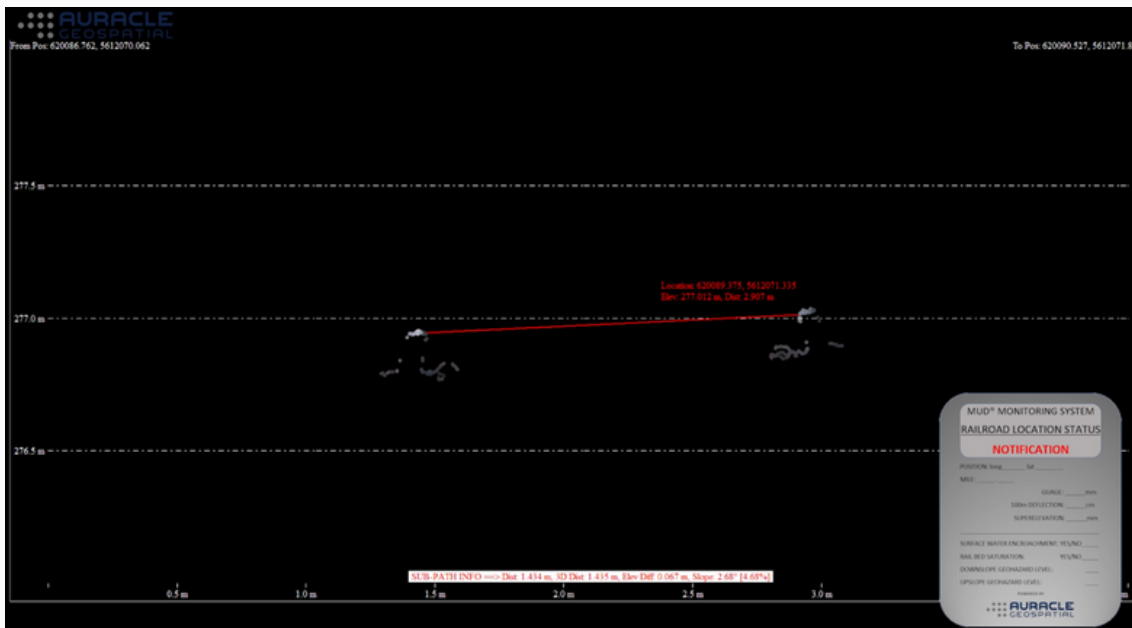


MUD®, coupled with client data, visualizes track geometry, with exact rail location, elevation and slope data, tracked over time to identify movement and deformation.

## Solutions

Applying MUD® algorithms to investigate subsurface conditions answers the need for information about what's happening under the earth and the impact on track structure resilience.

Subsurface intelligence is critical for early intervention, providing operators the capacity to predict and prevent track geometry faults.

Track structures deteriorate and require ongoing maintenance but not all track sections degrade at the same rate. MUD®, using satellite imagery, can monitor whole track sections and differentiate those sections that require immediate attention.

MUD® can align detected faults with interventions to measure the effectiveness of repairs, with no direct human interaction with the track.

MUD®'s 3D visualizations and advanced analytics facilitate standardized reporting so track geometry resilience targets can be monitored and achieved.

Get in touch with any questions you may have.

Auracle's MUD®
adds 3D visualization
of the subsurface
which can inform
network operators of
problems under the
track structure.

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