AURACLE GEOSPATIAL

Remote Satellite Flood Defense System Using MUD®
(Mapped Underworld Dimension)

Background

Flooding is one of the most costly and dangerous global natural disasters, with negative impact on public safety, property, infrastructure and the environment. The frequency and severity of flooding continues to climb due to extreme weather events, structural failures, natural processes like landslides and human activity.

To solve challenges this big, an innovative technology is needed to provide an early warning system that addresses flooding issues before a crisis occurs. Valuable remediation time is lost when monitoring systems rely on observation of surface water pooling and flooding.

Flooding is a significant threat to the safety and performance of a rail network, with typical failures such as wet beds resulting in track geometry faults, landslips and track circuit failures. Any of these events may mean that trains aren't permitted to run.

An engineering firm in the UK needed an early warning system to detect soil saturation in an area where the rail lay along flat, low-lying land, with limited drainage that was quickly overwhelmed by heavy rain. Significant flooding had caused extensive damage to the rail network which resulted in delays and interrupted service, costing millions of dollars in lost service and repairs.

Solutions

Auracle's MUD® system, with its machine learning capacity located and monitored underground water systems along a railway, from space, with no environmental impact.

MUD® provided a detailed analysis of soil and water interaction. It classified and measured soil water retention by percentage, which was then monitored for changes to saturation levels, over time, in consideration of any seasonal effects. No expensive probes or sensors were used and the investigation didn't rely on the inspection of maintenance teams.

Water saturation changes were also spatially correlated to the patterns of subsurface displacement in the entire area, which added a second set of criteria in the geohazard monitoring program.

Auracle's MUD® satellite deep penetrating radar technology uncovered soil saturation levels as potential hazards to help operators make informed decisions, based on what was actually beneath the Earth's surface.

Proactive detection of subsurface soil saturation along the rail identifies the root cause so operators can fix the problem, rather than treating the symptom in the embankment, drainage and track components of the rail system.

Auracle's MUD® technology was used to determine the magnitude of water saturation and patterns of change in the surface and subsurface of the railbed and in the surrounding area.

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