Detect Subsurface Geohazards to Monitor Landslides with MUD®

(Mapped Underworld Dimension)

Background

Landslides, when masses of soil, rock and debris slide down a slope, can occur anywhere in the world. Heavy rainfall, geological factors, poor soil structures and human activities can lead to landslides.

Exposing the underlying causes of landslides is critical in characterizing slope movement and developing effective prevention and mitigation strategies. But monitoring what is happening beneath the earth can be a challenging and expensive task that requires specialized monitoring expertise.

Like an X-ray of the Earth, MUD® detects potential risks that traditional methods often miss. An advanced satellite deep-penetrating radar technology, MUD® uncovers and monitors potential hazards based on what lies beneath the Earth's surface.

MUD® penetrates layers including deep vegetation, snow, ice, overburden and even water, to reveal underlying surfaces, structures, and textures. This subsurface intelligence allows decision-makers to identify and monitor, over time, specific risk zones that exist at surface, underground and underwater.

The Ripley Slide is one of 9 slides that have occurred within an 8 kilometer section of the Thompson River Valley, south of Ashcroft, BC. The Ripley Slide has been characterized as a post-glacial, slow-moving slide, within a narrow transportation and infrastructure corridor. A major river, a highway, an interprovincial pipeline, a high-tension electrical powerline and two railroads all lie within the slide zone.

The Ripley Slide has been studied extensively. Using archived GPR, drill logs, corner reflector placement data and newly collected SAR data, MUD® was used to validate the historic findings and to add critical, new layers of information from the surface, subsurface and underwater, over the entire landslide zone.

The study demonstrated spatial correlation between the historical data collected and tested at the site and the new layers of subsurface and underwater intelligence added by MUD®

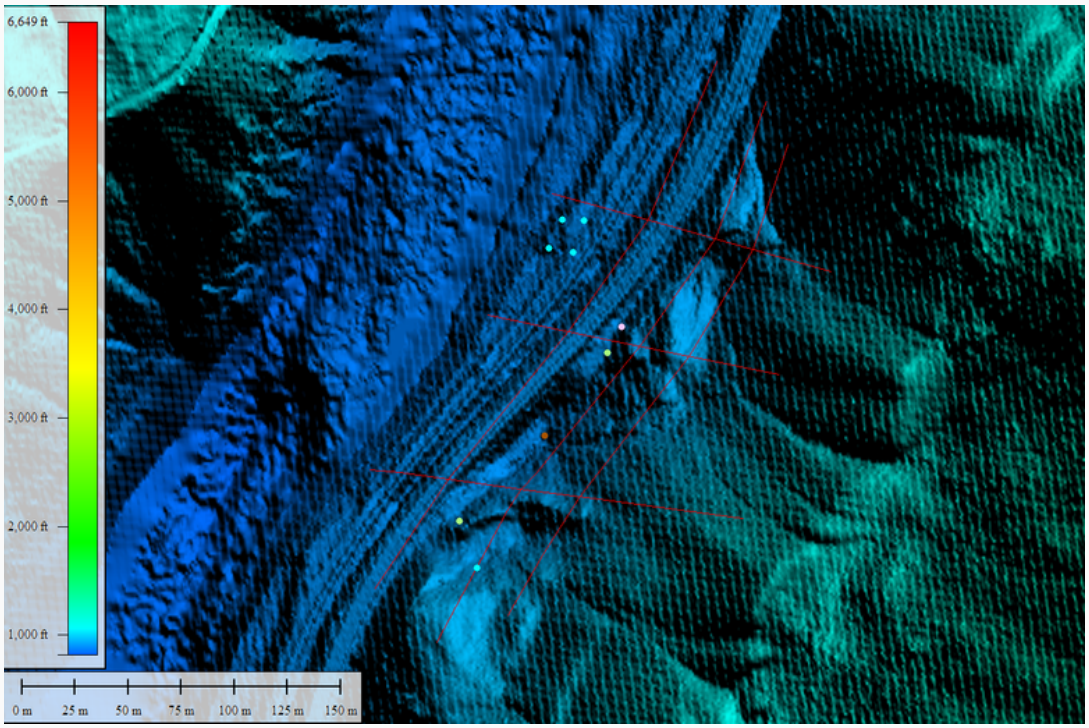
This study highlighted MUD®'s deep subsurface and underwater penetrating capacity, overcoming issues typically associated with traditional surveys and monitoring methods.

MUD® was not impeded by the complexity of surface obstructions within the survey area, which included roads, parking lots, buildings, and rail systems.

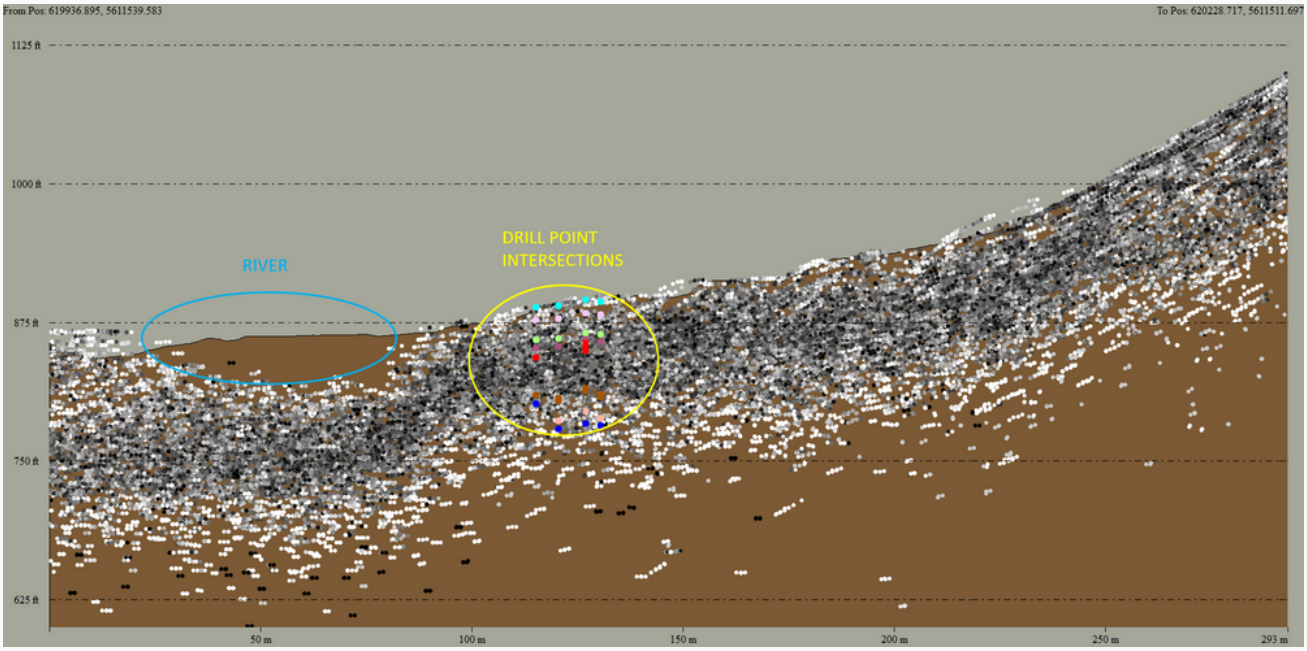
As an event agnostic, wide-area, analytics tool, MUD® detected subsurface geological structures not identified in earlier studies, which provided new insights into the actual structure of the Ripley Slide. Root causes, even those distant from previously identified risk zones, were detected as potential risks of land and slope instability, erosion and subsidence.

The MUD® system produced a base model which precisely duplicated position, altitude and timing for ongoing change detection within the entire landslide zone.

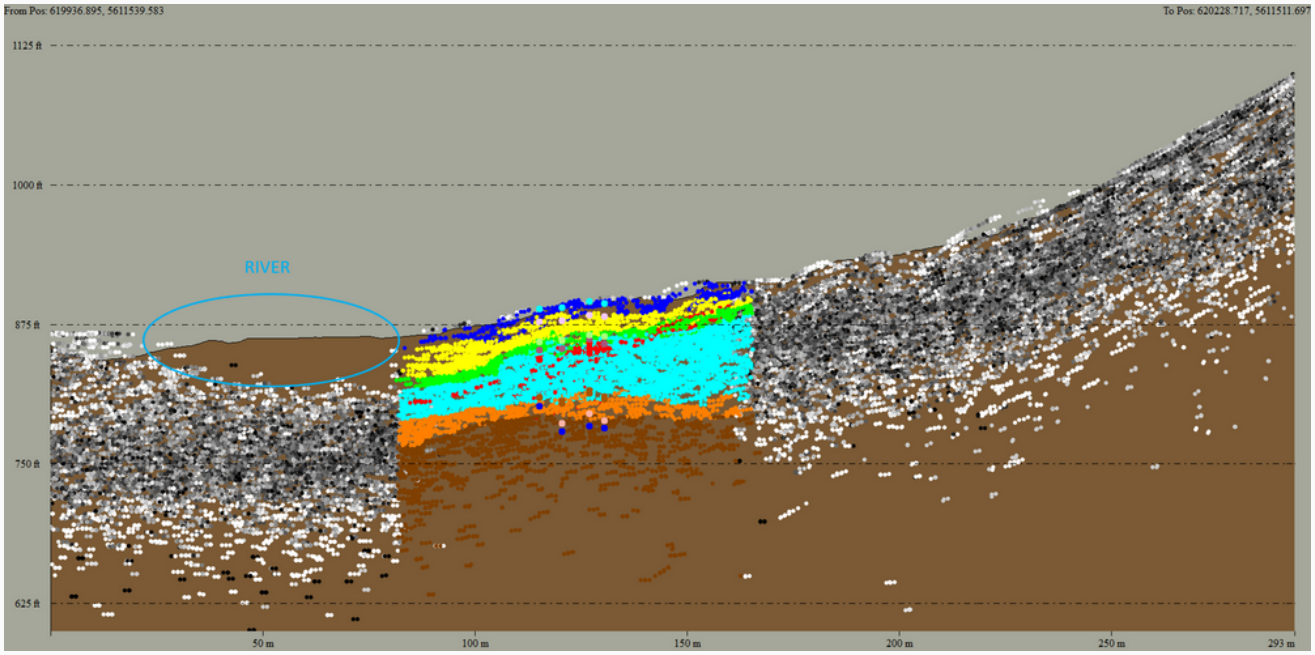
This optical satellite image displays the surface of the Ripley Slide, in the Thompson River Valley.



This MUD® elevation product displays both land and river-bottom elevations.



A MUD® 3D Point Cloud acts as a digital twin to visualize the shape, size, position and direction of elements within the subsurface. MUD® classified a river and the precise locations of each historic drill hole intersection.



MUD®, with its AI component, further classified, as separate colors, the structural boundaries and composition of the underlying layers, without the need of probes, sensors or any direct human contact.

Solutions

MUD® can integrate various data sources like topography, rainfall patterns, land cover, and geological information to create predictive models and identify high-risk landslide areas.

MUD® does not require permits or social license and is a confidential and discrete form of modelling, mapping, and monitoring.

MUD® does not impact the environment and is scalable to large areas.

Results are visual, easily interpreted for collaboration between departments and as evidence of compliance.

Do more than fix the surface symptoms. Go deep to understand and then act to remediate the root, subsurface causes linked to movement characteristics, soil properties and the regional geology.

MUD® makes subsurface interferometric observation possible, providing a viable, inexpensive tool for monitoring geological hazards.

Get in touch with any questions you may have.

A MUD® Point Cloud acts as a digital twin that visualizes the shape, size, position and direction of potential geohazards within the subsurface.