GLENCORE KIDD OPERATIONS STOPE MAPPING

How Emesent Hovermap technology is helping Glencore improve its understanding of stope conditions at the Kidd Operations mine site.

BACKGROUND

Owned by Anglo-Swiss mining giant Glencore, the Kidd Operations underground mine is situated outside Timmins, Ontario, Canada. The world's deepest base metal mine, it produces around 67,600 tons of zinc, 33,500 tons of copper, and 1.6 million ounces of silver each year.

CHALLENGE: **SCANNING BEYOND THE BROW**

Kidd Operations turns over around 55 stopes a year and has a shaft bottom of 3,015 meters (9,889 ft). Mining at this depth presents significant challenges: the high rock stress causes both deformation and extensive seismicity. Ground stresses may cause failures that impact the operation's mining rates or compromise access to future stopes. The seismicity is a constant issue for both production and inspections. Thus, geotechnical conditions, rather than equipment capacity, limit production.

The deformation and ground damage require frequent and detailed monitoring of stopes, drifts, and other voids, but seismicity restricts personnel access to these areas.
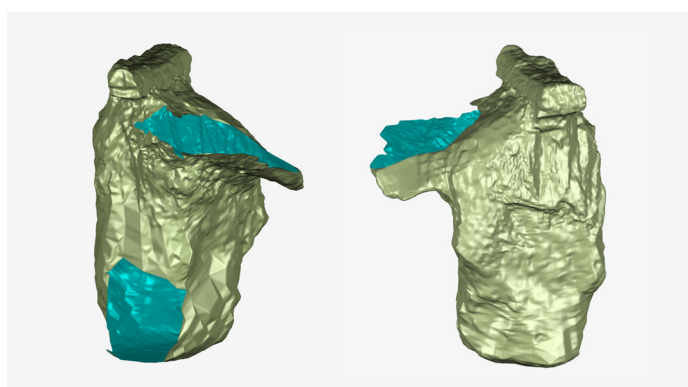
This stope CMS scan from an overcut produced a poor quality mesh with occluded areas.

Inspections were an ongoing challenge for the Kidd Operations survey team. CMS scanners mounted to ground robots, poles, or remote-controlled loaders were used to gather data. Coverage was limited and quality highly variable, given the scans needed line-of-sight and an empty stope.

Kidd Operations management sought a solution that could scan a partly-mined stope from an overcut, and capture data beyond blind corners and brows.

KEY ACHIEVEMENTS

- Improved safety for Glencore team
- Frequent collection of detailed data from previously inaccessible stopes
- Greater ability to discover and manage geotechnical hazards and deformation
- Optimized mine planning and production and extended mine life

SOLUTION: **SEND IN HOVERMAP**

In May 2018, Kidd Operations agreed to trial the Hovermap scanner at the site. Emesent partner Unmanned Aerial Services scanned a series of problematic stopes at 2,930 meters below the surface and captured high resolution point cloud data. In January 2020, Glencore purchased a Hovermap unit for use at Kidd Operations.

Surveyors use Hovermap at least four times a week to carry out stope scans. The Hovermap unit is also used by ground control personnel twice a week, on average, to detect and manage geotechnical hazards within stopes and improve their knowledge of the rock mass.

> "Kidd Operations is an enthusiastic adopter of new technologies like Hovermap, that improve safety and mining efficiency."

Matt Mackinnon, CEO, Unmanned Aerial Services

Remote inspections using Hovermap keep Kidd Operations personnel away from hazards.

DELIVERABLES: **HIGH RESOLUTION VISUALIZATION OF STOPES**

Point cloud data is exported to Glencore's bespoke database. Powered by artificial intelligence, it georeferences each scan and can align and compare data of the same stope or drift, making it easy to track geological structures and deformation over time.
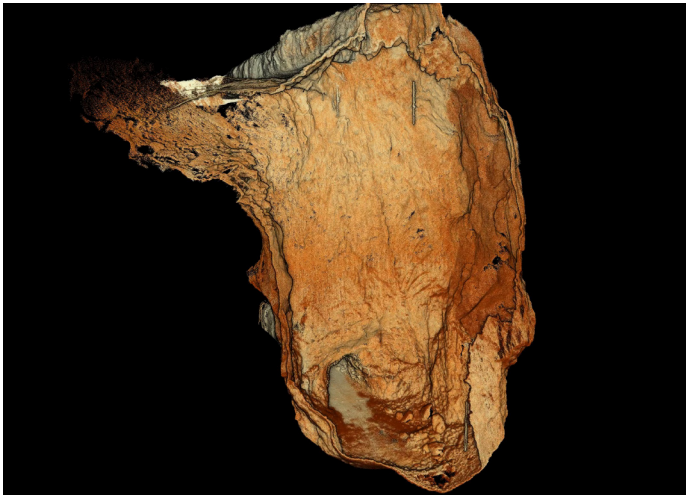
A Hovermap scan of a stope, fully captures geological features and areas of overbreak to produce an accurate shape and volume.

"The first time we flew Hovermap into one of our deepest and most inaccessible stopes, we got a complete picture with no shadows. The resultant point cloud data perfectly showed the areas we were concerned about. Hovermap is an excellent tool and it's become the go-to technology for our survey and geotechnical teams as we seek to safely maximize output and extend the mine life."

Iain McKillip, Manager Mine Technical Services, Kidd Operations

Emesent estimates the average value of a Kidd Operations stope to be more than US$8.8 million. Hovermap's ability to remotely capture detailed geotechnical data from within a stope enables mine engineers to optimize its design and respond to changes in rock mass behavior - potentially saving Kidd Operations millions of dollars.

"With Hovermap data we can develop alternative strategies to deal with problem stopes, rather than abandoning an area."

Sierra Mercer, Ground Control Engineer-in-Training, Kidd Operations

BENEFITS: **EXPANDED DATA-BASED DECISION MAKING**

» **Rapid access to data.** An engineering-driven mine, Kidd Operations is reliant on timely data acquisition. Hovermap enables the survey team to scan stopes at any time, from any access point, quickly and safely.

» **More informed decision-making.** Hovermap has expanded Kidd Operations' data-based decision making by providing high-quality data more efficiently than traditional methods.

» **Remote inspections.** The seismicity and ground stress at depth prohibit access to many areas. Expansion at Kidd Operations is increasingly reliant on remote inspection methods, such as Hovermap.

Hovermap transmits a 3D point cloud of the environment back to the operator in real-time, ensuring all areas of interest are captured in the stope.

» **Improved understanding of the rock mass.** High resolution point clouds of geotechnical features help ground control engineers implement effective measures to stabilize the environment and enable mine output to be maximized.

» **Collaboration and data sharing.** Hovermap's ease-of-use allows the survey and geotechnical teams to collaborate in data acquisition. Use of Hovermap has increased steadily over time and Glencore intends to purchase a second unit for the site.