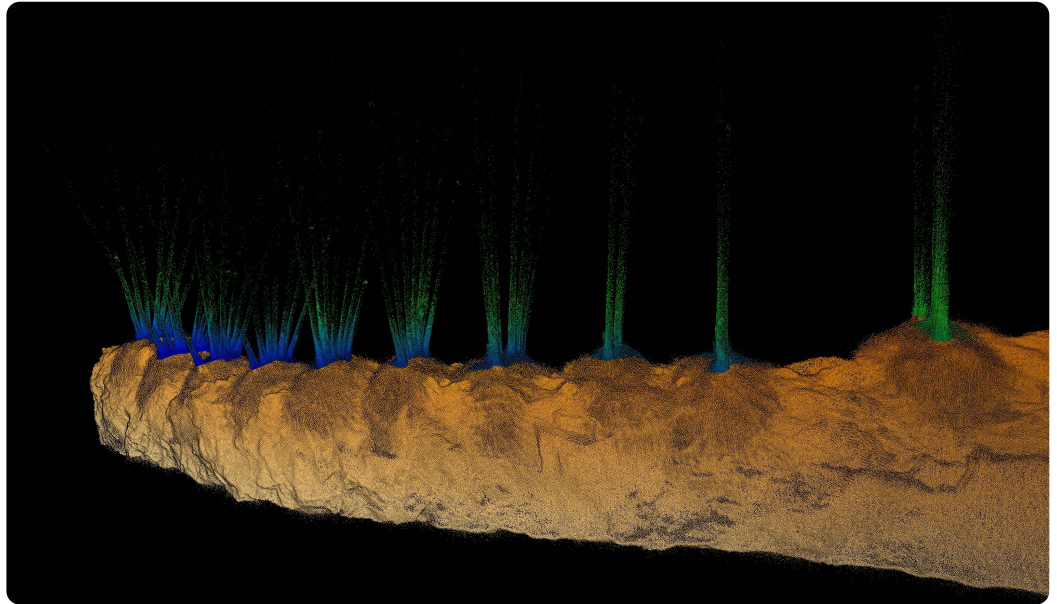# Case Study

Project

Systematic, efficient monitoring of drill and blast operations

Emesent Partner

α safety

A sub level caving gold mine in southern Kazakhstan was looking to employ a more efficient and systematic approach to monitor and analyze daily drill and blast operations, while meeting regulatory requirements.

The challenge

It was crucial to accurately determine the position and orientation of the drill hole collars to identify any deviation from plan, particularly given the necessity for the blast holes to align between two excavations.

The traditional method for taking these measurements was time consuming, leading to delays in the blasting process and impacting overall productivity. Surveyors had been using a downhole survey system which would need to be inserted and then removed from each drill hole, while a total station was used to survey the location of each hole.

The approach

To overcome this challenge, mining engineering company, Alpha Safety, used Emesent's Hovermap to map the drill holes in 3D. Hovermap is a versatile SLAM based LiDAR mapping solution that can be used for handheld mapping or mounted to a drone, vehicle, backpack or pole to access other areas.

The mine surveyor used Hovermap to survey 154 drill holes over a 32 meter area in just 7 minutes.

To provide better access to holes that were elevated on the backs, Hovermap was attached to Emesent's telescopic pole accessory which extends to 2.1m. This allowed the surveyor to simply walk to each drill hole and position Hovermap near the collar, ensuring a vantage point which captured lidar points inside the drill hole to a depth of at least 4 meters (sufficient for measuring hole orientation). Other areas were scanned using Hovermap in handheld mode.

The data captured was then processed in Emesent's Aura processing application, delivering a high accuracy point cloud ready for analysis.

To ensure the holes were correctly georeferenced in the mine's coordinate frame, Emesent's automated georeferencing workflow was used. Reflective survey targets were placed in the environment and surveyed using a total station. The targets were scanned during the 7 minute hole scan and automatically detected in Aura processing and used to georeference the point cloud.

> **"By allowing data capture 9 times faster than traditional methods, Hovermap proved transformative in an environment where improving operational efficiency and minimizing production downtime are paramount."**
>
> **Dmitriy Naumenko**
>
> **Team Lead, Alpha Safety**

Results

The client was able to scan the blast holes 9 times faster than traditional methods. This minimized operational delays and allowed them to easily compare the actual survey data against design, facilitating the implementation of a systematic system to monitor the effectiveness of drill and blast operations.
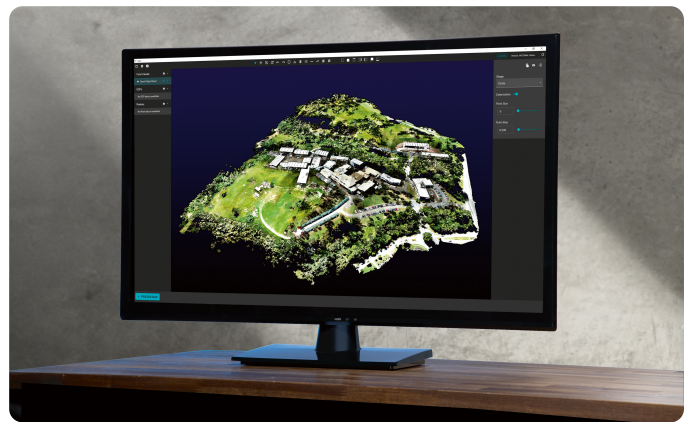
Solutions used

Hovermap ST

Designed for fast and easy data capture, Hovermap ST sets the standard in survey grade autonomous LiDAR mapping. From harsh GPS denied environments and previously inaccessible areas to surveys or inspections, ST's powerful combination of precision engineering, world-leading SLAM algorithms, and robust drone autonomy provide accurate LiDAR mapping anywhere. Equally capable above and below ground, indoors or out, with unrivaled versatility and deployment options.

Emesent Aura

Emesent Aura allows the processing and visualization of scans in one intuitive platform, streamlining the way Hovermap users process, view, and analyze point clouds for faster insights and improved decision-making. A range of automated georeferencing, filtering and point cloud enhancement features combine with reliable, high quality processing to deliver accurate, rapid results. Aura software comes bundled with all Hovermaps.

Mapping

The Hovermap Mapping solution enables your Hovermap to deliver rapid, accurate, and high quality mobile scanning for environments where autonomy is not required. Hovermap can be used as a handheld scanner, mounted to a backpack, drone, vehicle or ground robot, lowered in a cage, or attached to a pole. Real-time visualization of the point cloud is provided as you scan via the next generation Commander app. Hovermap gives you the flexibility to easily upgrade your plan remotely to an autonomy solution if your needs extend.

safety