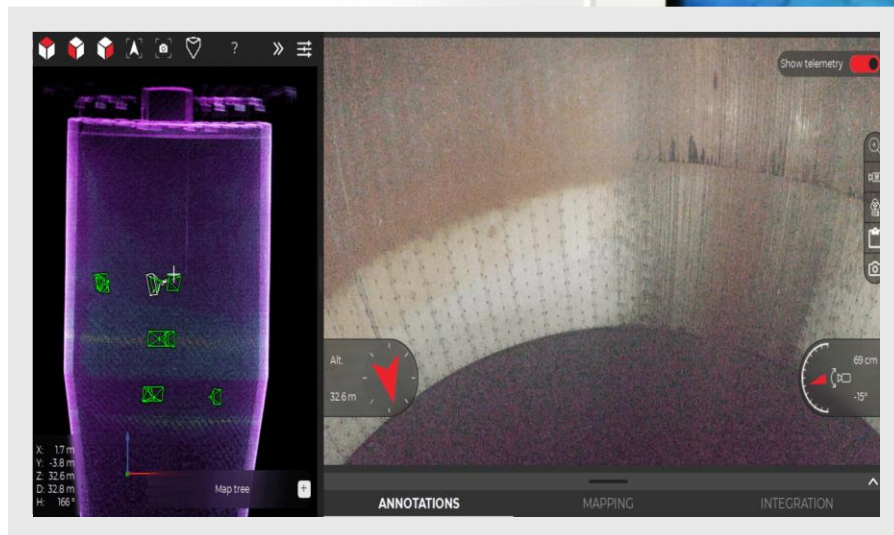


Drone Inspection in Mining



By Custom Wind Solution



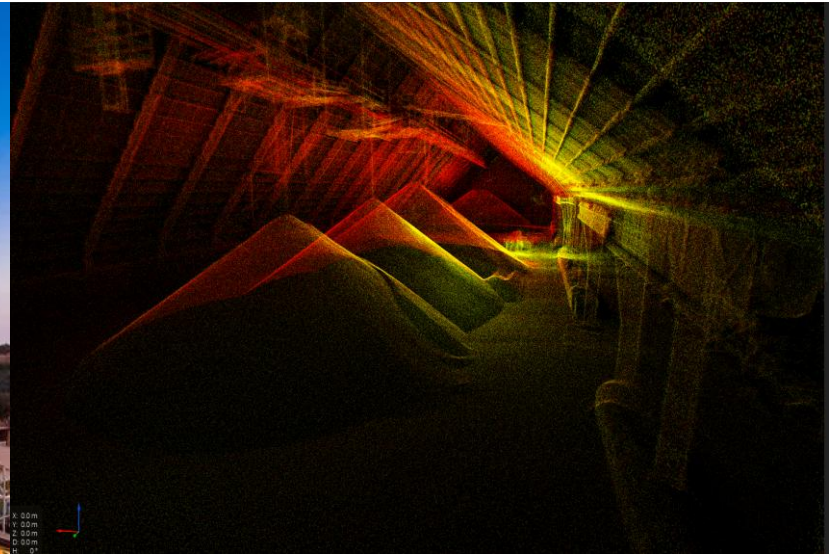
The 21st century is witnessing a global mining
boom



New technologies are driving demand for elements and rare minerals.

Underground mine surveying is required at almost every stage of a mine's life, from initial excavation to blast assessment, contingency response, and mine backfill planning. Accurate volume calculations and condition monitoring are essential to overall mine management, and careful data analysis enables smooth operations.

Two primary uses of drones in mining are surveying and inspection. For these tasks, drones can also be used inside mines to collect visual and LiDAR data within unstable areas of the mine, to investigate the cause of disruptions, and to generally improve understanding of various underground areas.



A mining drone is a drone specifically designed or engineered for mining applications, such as stock measurement, surveying, mapping, and inspection, including ultrasonic testing for thickness measurement.

Mine Monitoring and Planning

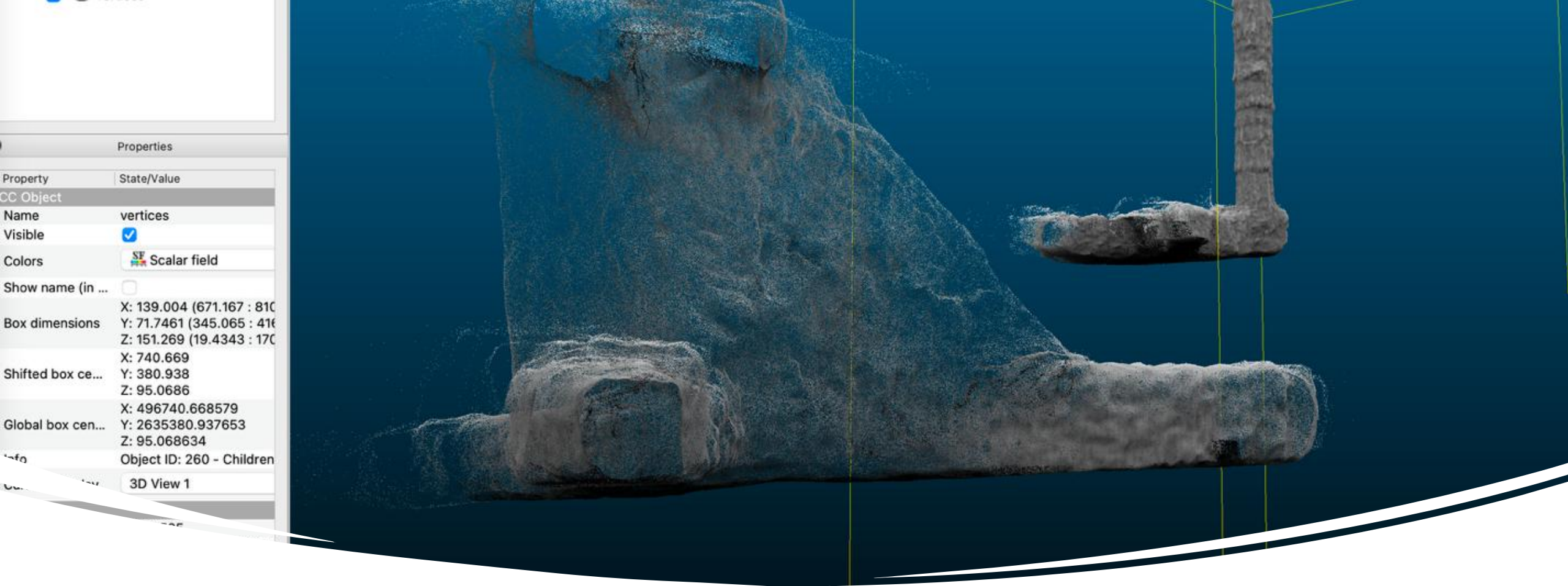
Development and Exploration

Processing Plant Inspections

Volumetric Monitoring

Identifying Hazards

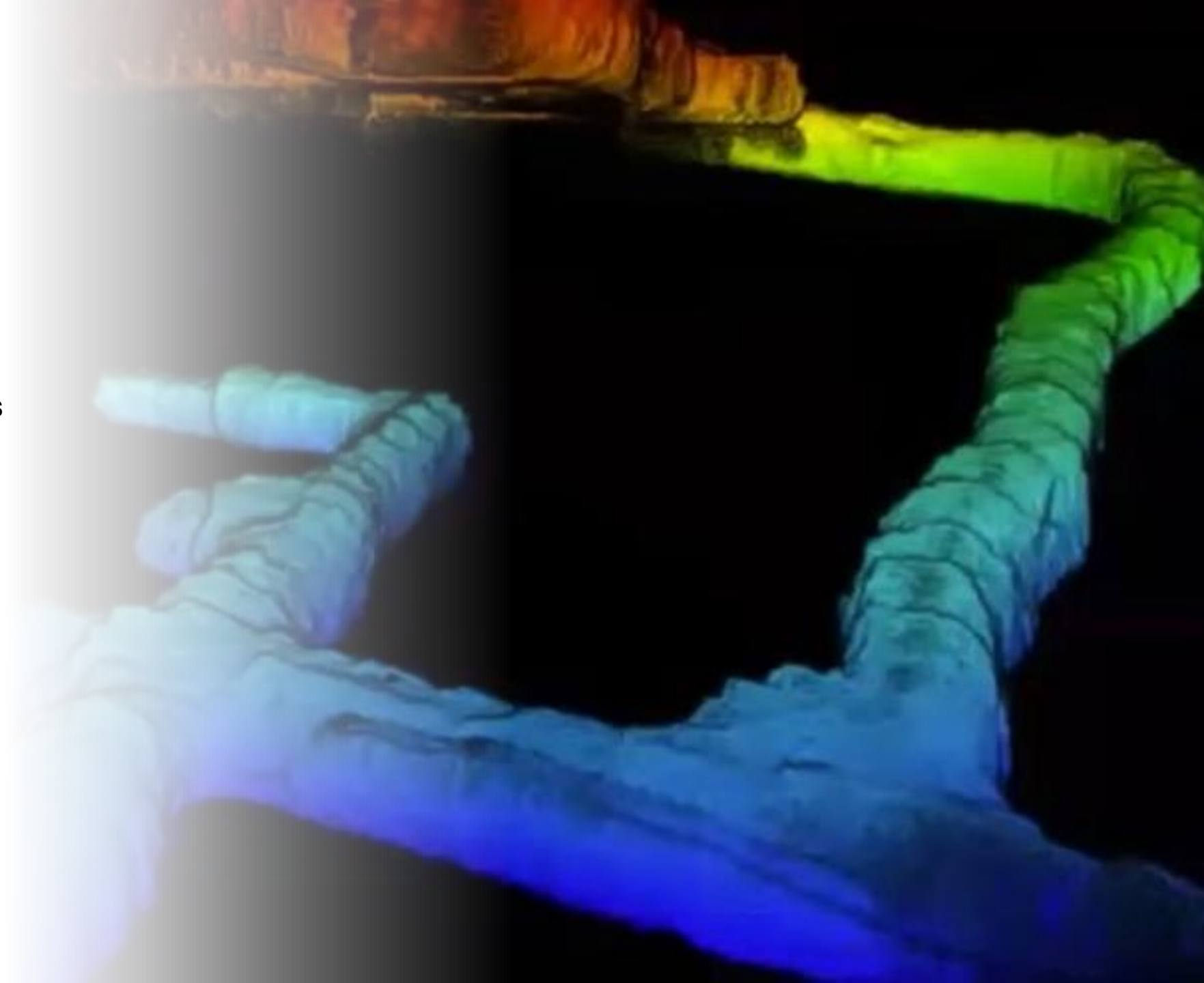
Drilling and Blasting Assessment



The benefits of using drones for inspections

- **Accessibility:** Perform survey tasks in areas that are unsafe or inaccessible to humans using traditional tools.
- **Efficiency:** Deliver centimeter-accurate data in minutes instead of hours and make informed decisions faster.
- **Safety:** Avoid hazardous work environments with remote monitoring, mapping, surveying, and inspection capabilities.

- Monitor shafts and ore passes
- Progress mapping
- Equipment inspection
- Map and survey hazardous areas
- Cut and fill volume calculation
- Crusher visual & UT inspection
- Stockpile volumetry
- Rock mass classification
- Pre-entry survey



Draw point inspection:

- Inspection from a safe distance and get 100% visibility from the inside
- Less time than to set up a traditional CMS
- 10 min to capture high resolution point cloud data
- Detailed 3D insights with 100% coverage

Stockpile volumetry:

- With the accurate LiDAR scanning, fully calculate your stockpile inventory and tighten up your forecasting
- No work at height. The data is collected from a safe distance
- 3D models provide accurate stockpile calculations

Hang-up localization:

- ~10 min to find the cause of an ore pass hang-up
- Geolocalize the hang-up in the ore and see exactly how the hang-up looks like
- Gather both visual and LiDAR data





Ore pass inspection:

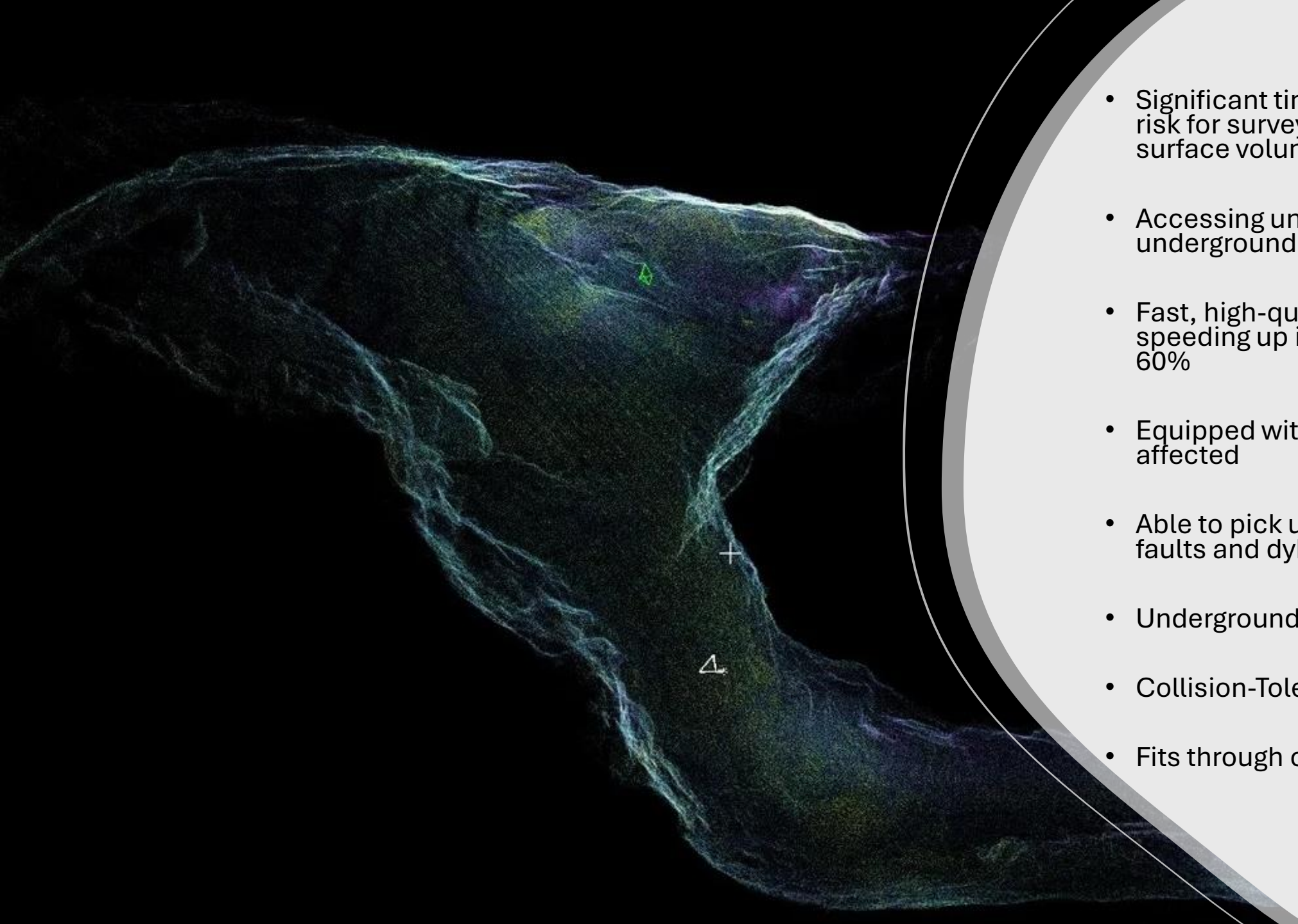
- ~8 min to inspect 2 Ore passes and a small stope
- 100% data coverage even in no-go zones
- No workers exposed to hazards

Equipment inspection & monitoring:

- Perform inspections without stopping the production with one pilot only vs. standard teams of 3-4 people
- No need for elaborated safety procedures and/or complex scaffolding

Inspect large excavations:

- Quickly map and inspect large excavations to ensure they are in a safe condition
- Get 100% data coverage—even in no-go zones

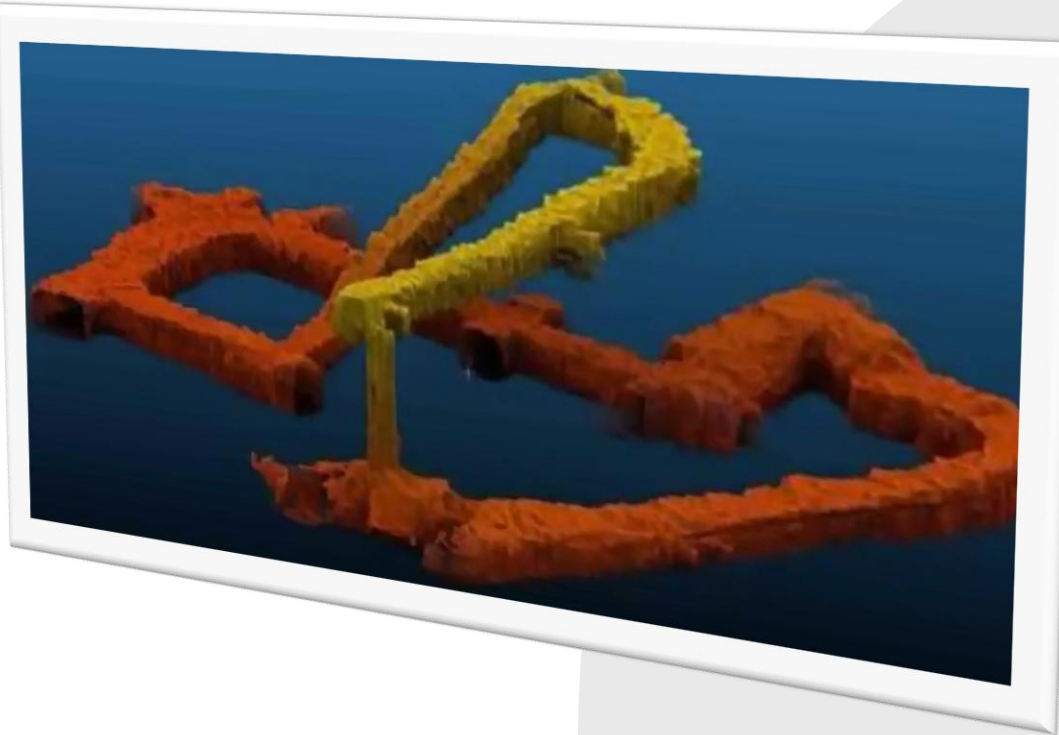


- Significant time savings and reduced risk for survey teams when measuring surface volumes
- Accessing unstable or difficult-to-reach underground areas
- Fast, high-quality data collection, speeding up inspection time by up to 60%
- Equipped with LiDAR, so visibility is not affected
- Able to pick up geological hazards, like faults and dykes
- Underground Volume Calculations
- Collision-Tolerant Design
- Fits through openings up to 50x50 cm

Drone data can also be exported to other mining software programmes, such as **Leica Cyclone** and **Maptek**.

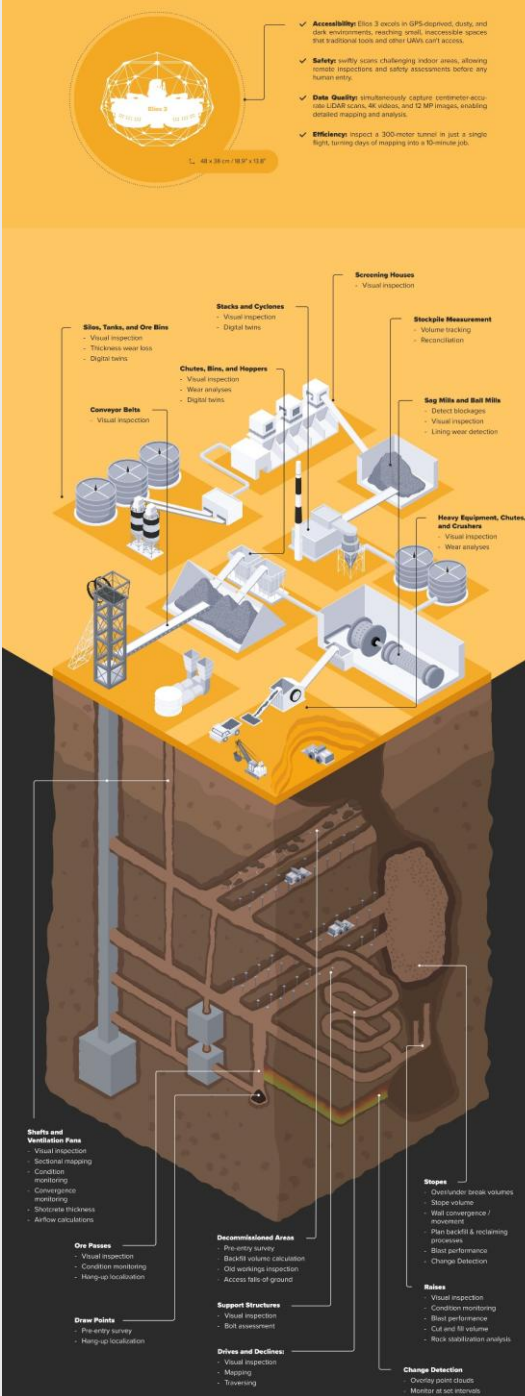
The data can be imported into the Leica Cyclone 3DR, where it can be analyzed in depth, including complex volume measurements.

GPS-Denied Drone



The LiDAR scanner, which is part of the survey payload, is an Ouster OS0-128 Rev 7 model. It can capture 1 million points per second and has a range of more than 100 meters.

At the end of a mission, the pilot has a digital twin of the mining environment along with points of interest captured by the camera, localized within the 3D model.



**Let's work together to make your mine operations
faster, cheaper and safer!**



**Custom Wind
Solution Plc.**



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