exyn technologies

CUSTOMER STORY | FEBRUARY 2020

# Pilot-free Aerial Cavity Monitoring, a real world solution for surveyors.

Dundee PRECIOUS METALS

Challenge

# How could DPM transform accuracy and safety?

*Watch the Customer Story Video*

Dundee Precious Metals Inc. (DPM) is a Canadian-based, international gold mining company engaged in the acquisition, exploration, development, mining, and processing of precious metals.

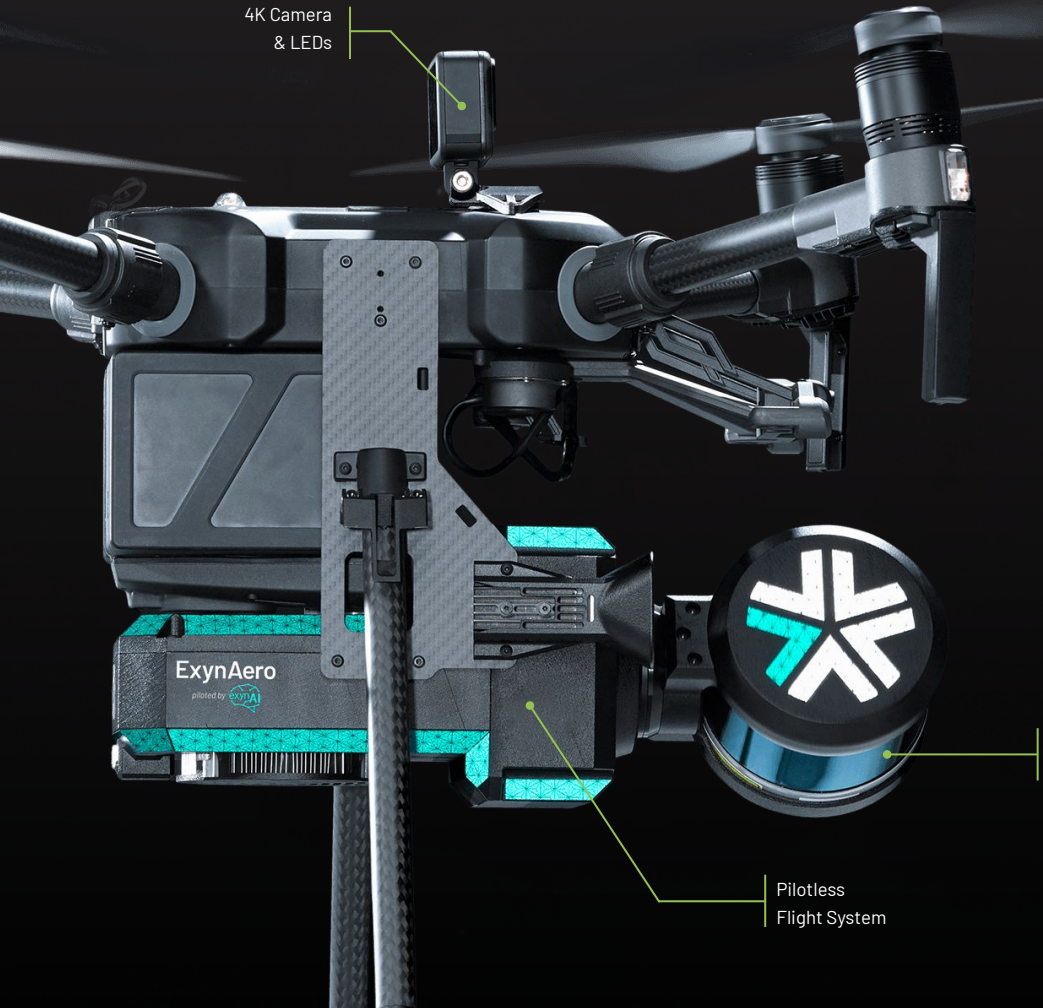
In 2003, after extensive due diligence, DPM acquired two gold mines in Bulgaria. To survey the multitude of mine stopes — which are open spaces, or cavities, in an underground mine — surveyors used a static cavity monitoring system (CMS), which is essentially a lidar scanner at the end of a very long pole. Surveyors would take the CMS very close to the edge of the brow, which is the lip next to the opening of a stope. Brows can be potentially unstable and unsafe for surveyors in close proximity.

The main limitations of CMS technology are that the scan is made from a single, static point and that it takes so long for surveyors to set up and tear down. The scan data can have hidden areas, called shadows in the industry. This missing data makes the models that are built from the data incomplete. These inaccuracies can accrue to make further calculations incorrect.

DPM is always looking to be innovators in the mining industry, both in safety – keeping surveyors away from the brow and other dangerous areas – and in efficiency – capturing a more complete picture of their cavity monitoring. DPM approached Exyn as a potential solution to both of these problems.

A surveyor setting up an Exyn beta system at DPM's Bulgarian mine in 2019.

exyn technologies




Products Used

# ExynAero™

The ExynAero is a fully autonomous cutting-edge system that maps entire stopes in minutes, keeping surveyors safe, and maximizing beyond-line-of-sight data collection.

(Latest version of the product shown here, the customer may have used an older version of the product, the A3R, in this case study.)

exyn technologies

Solution

# A Pilot-free Aerial Cavity Monitoring System


Manipulating 3D data collected from the stope in real-time, during the flight.

To help Dundee Precious Metals (DPM) address the challenges of safety and efficiency, Exyn flew a team to Bulgaria equipped with three Exyn A3R™ aerial robots. The A3R is Exyn's advanced autonomous aerial robot equipped with Velodyne Puck LITE lidar sensors. Exyn A3Rs are powered by ExynAI™, a proprietary autonomy software stack, and can be deployed anywhere within a mine without the need for a pilot or prior map.

The Exyn robot can be unpacked, deployed, packed up again and data downloaded in 15-20 minutes, compared to the 60+ minutes it would take with traditional CMS. And due to the robot's infrastructure-free design, surveyors can stand far away from open brows and deploy robots to fly beyond line-of-sight.

Surveyors can launch the robot with an easy-to-use, ruggedized tablet planning a mission in real-time. Once they launch the mission, the robot takes over and completes all computation onboard. The Exyn engineering team trained DPM surveyors over the course of a week so DPM could use the robots on their own in ongoing mining operations.

exyn technologies

Results

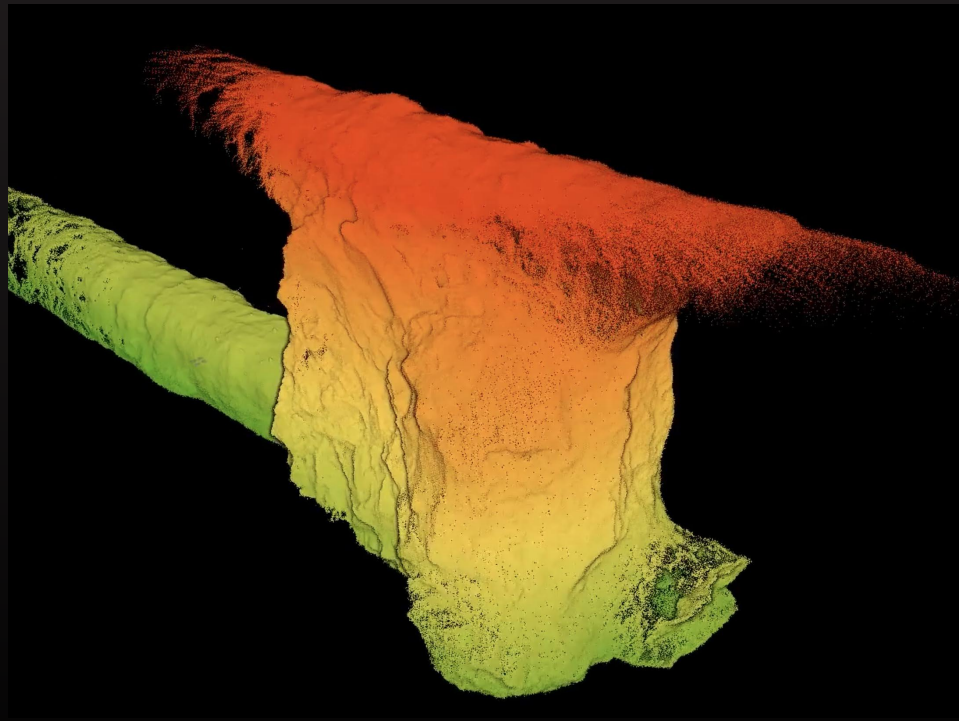
# Complete Stope Maps, Zero Shadow Areas

In total, Exyn performed 123 flights, scanning six stopes. Surveyors were able to scan stopes in two-to-three minutes and collect more than 20 million points of data in real-time, capturing a highly accurate view of the entire stope.

Exyn's autonomy enabled the robot to fly throughout the stope eliminating any hidden points or shadows. Comparing to the old technology used before on-site, the scan time was about three times less and the amount of data was millions of times more. The new stope scanning method also allowed surveyors to spend less time underground and farther away from dangerous brows.

**Key Details:**

- **6** Stopes Scanned
- **20+ million** Data Points Collected
- **3x** Scan Time Reduction
- **0** shadow areas



A point cloud collected at DPM's Bulgarian mine site during flight.

exyn technologies

"At Dundee Precious Metals, we assess new technologies based on their ability to increase safety, enhance operating performance and maximize efficiency. **Exyn's innovative autonomous drones provided a solution that not only improves the accuracy of our cavity monitoring but also significantly increases safety for our underground surveyors.**"

— David Rae, President & CEO
Dundee Precious Metals

exyn technologies

# Visit our website for more information, or to request a live virtual demo.

www.exyn.com







exyn
technologies