METS Ignited CEO Adrian Beer. Image: Letitia Dick

MX3 project manager Ting Ting Lee.

Newcrest Mining geotechnical engineer Courtney Christensen. Image: Leticia Dick.

The key drivers of the project were improving the safety and health of underground miners, in particular the removal of diesel particulate matter, whilst concurrently providing a robust demonstration of battery electric vehicle reliability.

The Bortana EV (utility vehicle) and the Batt Mobile Equipment's TRITEV (loader/integrated tool-carrier) were installed with 3ME Technology's smart high-performance batteries.

The vehicles have superior power and torque and an on-board 1000VAC input charger.

Other important benefits include low heat generation, low maintenance costs, high operational time and enhanced functional safety.

Originally designed for military operations, the all-terrain Agrale Marrua was selected as the base for the Bortana EV, with every panel galvanised and the chassis fully sealed.

The vehicle is reducing energy costs by up to 75% underground by preventing the need to dispel noxious gases, pollution and heat generated by diesel machinery—ultimately reducing ventilation requirements.

Automating Mining

Automation was another hot topic at the conference with Auto-mate offering options for haulage and convoys, dust suppression, stockpile management, berm clearance and automated drilling.

Auto-mate marketing and communications manager Pips Woodhouse said the company's technology did not need a network to operate and would keep running even if the site communications go down because it works on a "mission basis".

"The smart vehicles essentially think for themselves with a clever brain placed on each vehicle," she said.

They operate individually so if one has to stop to avoid a hazard, the others can keep operating without disruption.

Ms Woodhouse said mobile equipment could be automated to create a safer environment for workers.

For example, driving a dozer to the edge of berm to remove rock debris to clear a path for vehicles can be dangerous for operators.

Automation allows the removal of the operator from the danger zone and can also help protect equipment through geofences and automated alerts.

Ms Woodhouse said repetitive and boring tasks could also be avoided, removing the risk of operators' losing concentration and allowing better use of their time.

3D Visualisation

Imagine going underground and exploring mine caverns with amazing detail from the comfort of an air-conditioned boardroom.

Australian software company Euclideon has pioneered udStream, which uses cutting edge technology to bring assets—or entire mine sites—into a 3D digital format to enhance decision making, operational efficiency and safety.

The company has been working with the University of Queensland's Sustainable Minerals Institute and the Geological Survey of Queensland to archive the state's geological data, bringing together data collected over more than a 100 years into one platform for the first time.

This will allow everyone from technical experts to the general public to visualise the state's geological data in a way never achieved before to uncover new knowledge that ultimately leads to new discoveries.

Steve Amor from Euclideon showed AMR how the technology could be used to see the geological formation at Mount Isa Mines in astounding detail.

He said the platform created endless opportunities for mining companies including planning future exploration, carrying out audits, detecting wall movements to predict failure and checking whether work has been done—all without having to visit site.

LiDAR and SONAR scanners are used to capture an unlimited geographical sized environment before data sets are geolocated onto world maps and built by adding annotations, measurements, live feeds, filters and imagery.

The data can be shared with all stakeholders with a secure link and interactivity can be added with the geolocation of AR, AI, IoT, live camera feeds, images and other documents.

Health Analytics

Mine sites have long used urine testing to gauge how hydrated workers are but this is not always practical and is becoming less ideal with a growing female workforce.

MX3 Diagnostics has developed a much more user-friendly system—a handheld saliva swab which provides an instant result as to how hydrated the worker is.

The MX3 Hydration Testing system takes lab-grade measurements in seconds and delivers a full report via an easy-to-use app. MX3 project manager Ting Lee said dehydration leads to lost productivity and downtime.

"If someone collapses, that will result in lost time but what a lot of people don't realise is how dehydration leads to poor decision making and mistakes can be expensive," Dr Lee said.

"It also leads to tiredness which will slow the worker down.

"Urine collection is also time consuming.

"The feedback we have received is the MX3 test is much quicker and less invasive."

The device was rolled out at Newcrest's Telfer mine in 2020 as a trial and has since being picked up by other companies through word of mouth. ***AMR***

Austmine 2021 Awards Winners

Craig Senger Excellence in Export Award, Sponsored by Austrade

Winner: Gekko Systems

Austmine Innovation for Miners Award, Sponsored by Komatsu

Winner: BHP Dash Maintainer Tools

Austmine Innovation for METS Award

Winner: Emesent

Austmine Champion of Innovation Award

Winner: Dr Bob Johnson, Maptek

Gekko Systems Sales and Operations Manager Tim Bell with Australian Trade and Investment Commission (Austrade) WA state director Jane Caforio.