

### Presentation 1 - 15 Minutes

#### UPG

#### Russell Box, UPG Senior Sales Consultant

The latest offerings from UPG/Trimble for the mining industry including the latest GNSS, Total Station, Data Recorders, Scanning, UAV, Monitoring and GIS Mapping products.

### Presentation 2 - 15 Minutes

#### Maptek

#### James Mackenzie, Maptek Senior Technical Solutions Specialist

The increase in the number of sensors used and amount of data gathered in mining is making it harder to use all the information collected in a meaningful way. Get a first look at new tools Maptek has been working on to automatically clean up underground point cloud data, create models and generate strings.

You will also learn about how Haul Road Conformance functionality, which uses integration between Vulcan and PointStudio, is helping sites ensure they meet formal standards for haul roads while minimising and improving productivity.

### Presentation 3 - 30 Minutes

#### University of NSW, School of Minerals and Energy Resources Engineering

#### Dr. Simit Raval, Program Director - Undergraduate Mining Engineering Degree, Co-Director - Laboratory for Imaging of the Mining Environment (LIME)

Creation of a digital twin of an underground mining landscapes such as roadway or tunnel is now increasingly becoming possible using 3D reconstruction techniques applied with static/mobile laser scanners.. However, absolute positioning of 3D scans remains a challenge in an underground environment, due to the absence of a global positioning framework, limitations of active wireless positioning sensors, and difficulty in transferring datum from an open environment to an underground environment on a routine basis. Moreover, the surveying process is often time-consuming, arduous, error-prone and exposes mine personnel to risks. Furthermore, in the post-processing stage, a surveyor is typically required to manually reference 3D point clouds using distinguishable surveyed markers or tie-points. Visual browsing of point cloud to identify such tie-points is tedious, introduces human bias and often causes unnecessary operational delays. This study presents intrinsically safe and passive tags, termed “three-dimensional unique identifiers” or 3DUID, for automated georeferencing and coregistration of multi-temporal 3D point clouds. Each tag consists of a unique identity analogous to commonly used QR codes, has features for simplifying a surveying exercise and is automatically recognisable in a 3D point cloud. The 3DUID tags are required to be surveyed only once post-installation, thereafter, the collected point clouds can be automatically aligned to the referenced spatial framework without requiring the manual tie-point marking. Spatially registered point clouds can then be used for automated change detection, deformation monitoring, localisation and object detection with minimised human input, thereby, making the process friction-free. Our initial investigation show the successful application of the proposed technology on a point cloud of 850 m length acquired from a mobile scanner in an underground coal mine. The automated registration using 3DUID assisted technique has achieved 1.76 m accuracy for georeferencing and 0.16 m accuracy for co-registration.