

## **Enhancing Mine Safety and Accuracy Through Underground Ultra-Wideband Positioning System, Saskatchewan Polytechnic**

The use of GPS technology has become widespread with many benefits to society as well as industry and the economy. However, the necessary technologies required to duplicate accurate positioning in an underground mine have not yet been developed to the same level. This project aims to build a positioning system that will be able to position items in an underground situation to within 30cm of actual. The accrued benefits of this type of technology will touch on safety, process optimization and automation. This project will build a prototype mesh network of beacons that can automatically position themselves within the mesh. These beacons will be able to transmit both data and positioning information throughout areas of an underground mine. Mobile artifacts, such as mining equipment or personnel, will be trackable within this mesh by positioning beacons placed on the artifact. In the case of mining equipment such as a boring machine, this positioning data may be used to adjust and control its movement through the ore according to a surveyed mining plan. Greater accuracy of movement relative to the mine plan reduces waste material being acquired along with the desired ore as well as enhancing safety through accurate construction of a room providing stability. By using an automated locating system, the machine location can be determined without having to stop the machine.

Locating mobile artifacts within the mine environment on an ongoing real-time basis can improve safety by helping to avoid collisions between various equipment and/or personnel.