

Applications of LoRa Wireless Technology in Underground Mining

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ABSTRACT

In this presentation we will discuss the potential of an emerging wireless technology called LoRa (“long range”) for the mining industry. In particular we will discuss our work in developing proof-of-concept mining systems that make use of LoRa. LoRa is becoming a popular technology for sensor and actuator networks. LoRa is low cost, transmits in unlicensed spectrum, is energy efficient and transmits distances of several kilometres. It provides bit rates of up to 50 kbps which is sufficient for actuator and sensor networks and some low rate person-to-person communications. LoRa is usually implemented as a star network where multiple LoRa nodes communicate directly with a LoRa hub using a networking protocol called LoRaWAN. However, our interest in LoRa as a mining communications technology is to use LoRa as a relay network where a LoRa node receives a message and forwards it onto a destination via intermediate nodes called relays. We will describe our work in using this approach to LoRa networking in a number of areas including an emergency underground communication system, in situations where isolation from other networking infrastructure is desirable, and as an underground sensor network.