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TAIT CASE STUDY: ZINKGRUVAN MINING

Tait PTTToX solution unites DMR and LTE systems to deliver increased safety and operational efficiency at Swedish underground mine

When an underground mine in Sweden wanted to interconnect its two-way radio system with its 4G LTE system, Tait Communications supplied its PTTToX solution to interconnect the two networks.

The Background

Zinkgruvan Mining AB is an underground mine in south-central Sweden owned and operated by the Lundin Mining Corporation, a Canadian base metals mining company. It comprises of an underground mine, a processing plant and associated infrastructure. The mine produces zinc, lead and copper concentrates.

The mine is accessed principally via three shafts. The primary P2 shaft provides hoisting and man access to the 800m and 850m levels with the shaft bottom at 900m. A ramp system is used to access mine levels below the shaft with the deepest level now approximately 1,400m below the surface. A ramp connecting the underground workings with the surface provides direct vehicle access to the mine.

The Project

Zinkgruvan Mining has an existing Tait DMR Express 20 two-way radio system with 6 radio sites and approximately 750 users. It also has a separate broadband 4G LTE communications system in place. The company wanted to integrate the LTE-based voice communication system with the existing two-way radio system.

The main task involved creating a combined communications solution, which allows seamless voice calls to and from DMR radios and LTE devices. It was essential that the LTE devices are integrated into the existing two-way radio talk groups. The ability to support private calls from radios to LTE devices and vice versa was an absolute necessity.

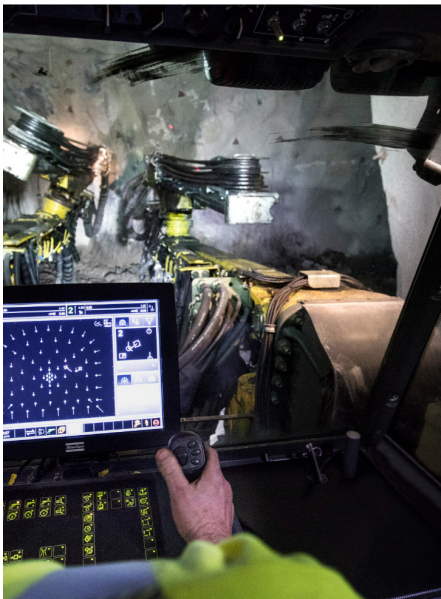
The Challenge

The main impetus behind the installation of a private LTE system is to create a platform for further digitalization, support autonomous vehicles and enhance automatization - all key drivers to make the mine more efficient, safer and less costly to operate.

LTE will provide the platform for improved tagging and a new means of voice communication. The existing DMR radio system covers all areas of the mine, while the LTE system only provides coverage in one third of the underground tunnels, typically those areas with active production.

The majority of the mine staff work in areas with LTE coverage, and were not keen on carrying two communications devices. The major requirement, therefore, was to integrate the existing DMR Tier 3 trunked radio system with an LTE-based PoC (Push-to-Talk over Cellular) system. This ensures all staff can communicate with each other at all times across the entire underground mine and surface areas.

Another key requirement was that all users have access to the same functions and features whether using a DMR radio or an LTE-based device.



The Solution

Tait proposed implementing its PTTToX system, which is designed to interconnect narrowband two-way radio and cellular LTE broadband systems. This enables LTE devices to operate as PTT (push-to-talk) devices, allowing them to intercommunicate with two-way radios.

As a trial, a PTTToX system was set up by Tait in the UK to demonstrate the effectiveness of the solution to the customer. Tait then installed a gateway locally at the Zinkgruvan site to connect the PTTToX platform, managed in the cloud from the UK, with the existing DMR Tier 3 system at the mine. The PTTToX application was then uploaded to the LTE devices.

The PTTToX system was configured to enable the ongoing use of the existing radio talk groups, thereby minimising any disruption and ensuring continuity. Each PTTToX device was given a 4-digit RadiolD in the DMR system enabling a radio user to directly dial an LTE-user and vice versa.

The Results

For easy operation, LTE users were included in the radio's address book and the radio numbers were included in the dial list in the LTE device.

There are no noticeable delays in communications between radios and LTE devices even though the PTTToX installation is located "off-site". A slight difference in voice characteristics was all that the users mentioned.

The call diversion feature is proving very handy, as calls to a radio user are forwarded to the LTE device when the radio is turned off. Calls to the LTE device are forwarded to the radio when the LTE-device is out of cellular coverage range.

The Tait EnableFleet application makes configuration changes and firmware upgrades as easy to carry out for PTTToX as for DMR radios. Changes are transferred instantly via over-the-air programming from a remote centralised location.

The Tait PTTToX solution enables Zinkgruvan Mining to continue to reap the benefits of its existing DMR Tier 3 system, while enabling DMR and LTE devices to intercommunicate with each other. This will enhance operational efficiency and safety, while providing a strong platform to support the introduction of further broadband-based applications such as increased automation, autonomous vehicles, sensor-based safety alerts and the like.

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