Surveying the scope

The business case for employing drones and UAVs has strengthened with the onset of COVID-19. Dan Gleeson looks into some of the latest applications for these autonomous and tele-remote robots

If a vehicle requires inspection and the situation is too dangerous to send a human engineer underground, drones and ground-based robots can carry out an autonomous video inspection to locate the problem (photo: Rajant)

The emergence of drones and unmanned autonomous vehicles (UAVs) in the mining space is part of a much broader movement to remove personnel from the most hazardous areas of operations.

Whether it is autonomous haulage, loading or refuelling, the ability for machines to carry out manual tasks without operator involvement is improving productivity, safety and – in many cases – profitability.

The fully autonomous mine of the future will require UAVs and ground-based drones to carry out all inspections currently conducted by operating personnel; for example, inspecting the stability of drives or troubleshooting faulty equipment.

The industry is already heading to this destination, but solid and stable networks will be required for a drone/UAV to carry out these tasks.

This is where **Rajant Corporation**'s Kinetic Mesh® could lend a hand.

Rajant Kinetic Mesh removes the problem of handoffs and communication gaps with inferior or access point-based networks, providing a level of flexibility and range that is "breathing life into robotics", enabling ground robots and aerial drones to take on the dirty, dull, and dangerous jobs that can make mining safer and more efficient, Chris Mason, Vice President of Sales for EMEA at Rajant, says.

This means it is no longer necessary for people to lead the way into a risky situation, Mason explains.

"For example, high-mobility robots can be used where the ground is unstable or has been without support for some time," he said. "They can carry sophisticated sensors, undertake laser surveys and send back real-time high-definition video following a seismic event or where gas is thought to be present. Personnel are thereby safeguarded to view and respond to this information remotely."

Wheeled autonomous vehicles are even becoming a basic part of a mechanic's toolkit alongside the spanner and the engine analyser, according to Mason.

If a vehicle requires inspection and the situation is too dangerous to send a human engineer underground, these vehicles can carry out an autonomous video inspection to locate the problem. The imagery can even be sent to remotely-located technicians, or to the machine manufacturers for expert assessment.

A basic network can enable such connected functionality when the problem is near the surface or there is a 'line of sight' to the area in question. When there is a need to delve deeper, travel further, circumvent an obstacle, or operate more than one autonomous system, a more sophisticated network is required, according to Mason.

"Operating even a single ground or airborne drone requires seamless connectivity. When a drone or UAV loses contact with the network, it stops operating and the critical data being transmitted ceases to flow," he explains.

Dynamic mesh networks create a situation where the vehicles effectively act as 'the network'. In its simplest form, when a drone sending back a feed of live video while carrying out a safety inspection reaches the end of its range, a second drone can be sent to join it. Because the two drones can connect to each other, the range of the search is effectively doubled.

With Rajant Kinetic Mesh, this is just the beginning of such network flexibility, according to Mason.

"Because each Rajant-enabled drone carries its own BreadCrumb® node, every additional drone you add to the inspection automatically and seamlessly becomes part of the network – sending and receiving information to and from other drones and back to the base station or control centre," Mason says. "The Kinetic Mesh architecture allows expansion and strengthening of the network without cumbersome infrastructure to deliver unfailing connectivity easily."

Mason concluded: "Autonomous and remote vehicles are transforming the mining sector, but they can only ever be as good as the network that connects them."