

Worldsensing contributes to European mining safety effort

IoT remote monitoring leader is part of an ambitious EC-funded research project improving health, safety and environmental performance

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[Worldsensing](#), the global leader for monitoring critical and civil infrastructure through wireless Internet of Things (IoT) technology, has joined mining peers in Leoben, Austria, to discuss the progress in illuMINEation, a major European Commission-funded research and innovation project.

The project recognizes Europe's valuable mineral deposits can only be exploited if very strict legal and environmental requirements are met and local communities do not perceive mining operations as a risk to their livelihood, but rather as a source of work, income and prosperity. For this reason, health, safety and environmental (HS&E) standards and performance are considered the most important core values applicable to the mining industry sector.

The implementation of technologies ensuring the highest possible performance levels of those values requires the combination of many cutting-edge approaches



illuMINEation group photo



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and disciplines and the collaboration of European experts from different fields of expertise. The illuMINEation consortium met in Leoben to discuss the progress of the research and innovation project and the results achieved since the start.

Combining data to minimize risks

The [illuMINEation project](#) uses various sensing technologies, comprising off-the-shelf, low-cost sensors combined with sensors serving specific needs, for integration into a digital mine management system. Information acquired by sensor networks is processed and analyzed via sophisticated data analytics, including machine learning algorithms, to:

- Support a comprehensive and real-time HS&E, risk and sustainability assessment.
- Provide a cost-effective way of ensuring that high HS&E standards are kept.
- Ensure, in the long run, sustainable and economically efficient extraction of raw minerals that are crucially needed by Europe's industry sectors.
- Facilitate a more transparent mining industry so that public acceptance, awareness and trust in mining activities can be increased.

IlluMINEation and the Internet of Things

The project is centered around the development of a reliable, large-scale, data-intensive and highly adaptable digital industrial Internet of Things platform, capable of processing data for various mining-related applications. Technologies deployed and investigated that are linked to the safe zone classification are:

- 'Intelligent rock bolts' that combine classical rock support methods with novel low-cost sensor solutions for rock mass stability monitoring, as well as sensors that continuously monitor atmospheric conditions in underground environments.
- Sensor suites to provide autonomous drones with accurate navigation and collision-free performance in GPS-denied environment, whilst at the same minimizing the drone's weight and maximizing flight time.
- Big data analytics combining seismic, hydrological, geological and structural sensor data of large-scale tailings dam monitoring networks, to prevent potential dam failure accidents.
- Sensor-based monitoring systems for mining machinery, using various data loggers mounted on machines and early warning systems to avoid collisions between equipment and underground personnel.

All real-time information on workplace conditions is directly made available to mining personnel via digital interfaces such as dashboards on tablets and mobile phones, or via augmented/virtual reality devices. According to the World Economic Forum, the use of digital mining technologies—as envisaged in the illuMINEation project—has the potential to save about 1,000 lives and prevent 44,000 accidents over the next 10 years.

First installation tests of the 'intelligent rock bolts'

Project partners have already conducted the first installation of sensor bolt heads developed in the illuMINEation project. The intelligent rock bolt heads consist of various sensors, a microprocessor, a rechargeable battery and a device for data transmission. This low-cost

intelligent rock bolt assembly allows near-real-time recording and visualization of geotechnical and environmental measurands on a large-scale basis—a milestone towards underground digitalization and safety.

Project partners

The high-quality and multidisciplinary project consortium consists of 19 partners from six European countries (Austria, Sweden, Poland, Germany, Spain, and Finland), constituting a well-balanced assembly of world-leading industrial and academic players from a multitude of technical fields and applications: Montanuniversitaet Leoben (AT; coordinator), Joanneum Research Forschungsgesellschaft MBH (AT), Epiroc Rock Drills AB (SE), ams AG (AT), KGHM Cuprum sp. z o.o. (PL), DMT GmbH & CO. KG (DE), GEOTEKO Serwis Sp. z o.o. (PL), Lulea Tekniska University (SE), Universidad Politécnica de Madrid (ES), KGHM Polska Miedz SA (PL), Minera de Orgiva SL (ES), RHI Magnesita GmbH (AT), DSI Underground Austria GmbH (AT), Retenua AB (SE), IMA Engineering Ltd Oy (FI), Fundacion Tecnalia Research & Innovation (ES), Worldsensing SL (ES), Instytut Chemii Bioorganicznej Polskiej Akademii Nauk (PL), Boliden Mineral AB (SE).

About Worldsensing

Worldsensing is a global IoT pioneer. Founded in 2008, the infrastructure monitoring expert serves customers in more than 70 countries, with a network of global partners to jointly drive safety in mining, construction, rail and structural health.

Worldsensing is headquartered in Barcelona and has a local presence in the UK, North and South America, Singapore, Australia and Poland. Investors include Cisco Systems, Mitsui & Co, McRock Capital, ETF, Kibo Ventures and JME Ventures.

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