High-resolution radar system for early warning and real-time stability monitoring in underground mines

IDS GeoRadar: Innovative Interferometric Radar for Mining, Environmental and Civil Engineering Applications

www.idsgeoradar.com
HYDRA-U

MONITORING IN UNDERGROUND RE-DEFINED
IDS GeoRadar, industry leader in radar technology for slope stability monitoring in mining, has brought its expertise to the underground mining industry.

HYDRA-U is a compact, high accuracy, high resolution monitoring system designed for early warning and real-time measurements of ground hazards in underground mines.

SAFETY MONITORING OF GROUND COLLAPSES
HYDRA-U is a remote sensing monitoring system able to provide real-time monitoring of surface deformations over large areas and trigger early-warning alerts in case of impending collapses to evacuate people and machinery at-risk. With a scan range of 200m, even non-accessible areas of underground openings can be safely monitored for elements at risk.

COMPACT SOLUTION
With a compact and lightweight design, HYDRA-U can fit narrow spaces typical of underground operations. The system consists of 3 rugged boxes less than 25 kg in weight for quick and easy deployment in critical areas by one person.

PERFORMANCE FOR CRITICAL DECISIONS
Ground collapses and rock bursts represent a serious issue for underground mining. HYDRA-U provides the high-accuracy (<0.1 mm) and resolution typical of radar technology to support geotechnical engineers. The aim is to guarantee a safe access to working places of the complete mine structure, protect the major service openings throughout their designed duty life, and assess the performance of ground supports.

INFORMATION AT A GLANCE
HYDRA-U exploits the IDS GeoRadar cutting-edge ArcSAR technology, providing a spatial resolution of centimetres with an updated displacement information every 30 seconds, automatically corrected for changes in environmental conditions (temperature, humidity). An optical and infrared camera provides real-time visual inspection of monitored area and radar data are draped on a 3D model of the scene created by the built-in laser.

ADVANCED SOFTWARE PLATFORM
The industry-leading IBIS Guardian software provides an easy-to-use and powerful tool to visualize and interpret radar data and perform analysis of displacement trends of ground movements. Alarms can be completely customized and set based on specific velocity thresholds, alerts activated via pop-up, email, text messages and audio-visual siren.

**MEASUREMENT ACCURACY AND RESOLUTION**
Hyper spatial resolution (0.2m x 0.8m @100m scan distance) able to detect even the smallest moving rock element with sub-millimetric accuracy.

**REAL TIME RESULTS AND ON-SITE ALERTS**
Results provided in real time with onsite processing. Alarms can be set based on specific velocity thresholds and alerts activated via pop-up, email, text messages and audio-visual siren.

**COMPACT AND PORTABLE SOLUTION**
Easily transportable from a location to another and installed by one single person. In transport mode, each box weights less than 25 kg and all transport cases are equipped with off-road wheels.

**DATA RATE**
Fast acquisition: 30 seconds for a full Resolution scan.

**3D DATA REPRESENTATION AND VISUAL IMAGING**
Radar heat-maps are overlaid on the 3D model created by the system by means of an integrated laser sensor. An IR camera improves data interpretation by providing a visual image of the monitored area.

**HIGH AVAILABILITY WITH LOW MAINTENANCE COSTS**
Minimal moving parts and low profile design to guarantee robustness and maximum availability in all mining conditions.
MODULAR COMPOSITION

FEATURES

- Spatial coverage: horizontal field of view of 100° and vertical of 30°
- Scan speed: a new acquisition is performed every 30 seconds
- Accuracy: line of sight displacement with an accuracy in of 0.1mm
- Survey: 3D surface model created by means of an integrated laser sensor with 10cm accuracy and 1 cm resolution
- Weight: less than 25kg per each box (3 boxes total)
- Internal rechargeable battery pack and line power connection
- Infrared HD camera operating under complete darkness
- Operates in all weather conditions and temperatures (-20°C to +50°C), IP65
- Alert generation with user-defined displacement, velocity and inverse velocity criteria
- Instant data processing and on-site alarm generation
- Built-in geotechnical analysis tools

Real-time deformation data and picture of monitored area