



KAVA UNDROMEDA

UNDERGROUND ROBOTIC SYSTEM FOR MONITORING, EVALUATION AND DETECTION APPLICATIONS

LAUFZEIT: 3,5 JAHRE



The number of underground mines is increasing worldwide. The hazardous environments in mines result in high risk for injuries and fatalities. The approximately 657 underground mines in the USA, alone, have an average of 20 fatalities and 1972 serious injuries per year, which are mostly caused by ceilings or walls collapsing. Therefore, the demand to explore unknown areas for operation and safety purposes in underground mines, but also in sewage tunnels and other underground areas, is very high today and will increase in the future.

The UNDROMEDA project aims to develop a robotic underground measurement system for autonomous 3D mapping and monitoring. The system is based on a mobile wheel-driven platform which additionally carries a flying drone to approach particularly unknown, difficult to access, or hazardous areas in underground mines and other underground environments. The autonomous platform and drone will significantly reduce the risk to underground personnel by replacing manual measurements. Automation will reduce time and costs for mapping and monitoring while advanced sensors and their integration will dramatically enhance the information density and quality.

PROJEKTLEITER

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Impact

Currently, there is no integrated and operationally available autonomous robot system for mapping and monitoring on the market. The key advantages over traditional surveying instruments are mainly the speed of surveying, usability in high risk areas, adaptability to multiple sensors, and the autonomy of the system, which requires far less personnel than competitors. The benefits offered by UNDROMEDA include:

- Lower personnel fatality/injury risk and costs through use of an autonomous system in both high-risk areas and in deformation monitoring of tunnels.

- Reduced time for mapping: Reduced personnel in planning and execution, rendering a faster process.
- Reduced time for tunnel and infrastructure monitoring.
- Potential to lower overall information effort: Through multi-sensor compatibility, the solution offers the customer a vehicle for measuring multiple information sources through the same platform (e.g. geological features and ore classification).

Work plan

The Technische Hochschule Nürnberg (THN) together with DMT and the Technische Universität Bergakademie Freiberg will form a central system architect group to control and coordinate all developments. Furthermore, the THN will be the lead partner in the autonomy software development, which entails algorithms as well as the user-carrier and carrier-drone collaboration.

The partners are:

- Boliden Mineral
- Caterpillar Global Mining Europe GmbH
- Commissariat à l'énergie atomique et aux énergies alternatives, CEA
- Deutsches Zentrum für Luft- und Raumfahrt e.V.
- DMT GmbH & Co. KG
- Indurad GmbH
- Inkonova AB
- LKAB Minerals AB
- Montanuniversität Leoben
- Rheinisch-Westfälische Technische Hochschule Aachen
- RISE Research Institutes of Sweden AB
- Technische Universität Bergakademie Freiberg