

Current Research Projects

Here you will find an overview of our current publicly funded research projects, grouped according to the Smart Services corresponding to the data information value chain, which you can find in the overview of our research focus areas. In addition, the AMT implements projects on a private contract basis together with industrial companies, which, however, cannot be listed here for reasons of confidentiality of the research subject.

AKUSTAHL

The aim of the AKUSTAHL project is to develop a monitoring system using acoustic emission analysis (AE analysis) for the micro and initial crack prediction of steel structures subject to fatigue loading, such as bridges, cranes, offshore or industrial structures. Existing systems for acoustic emission analysis are thus to be expanded to include the measurement and detection of microcracks for the earliest possible detection of damage events.

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AREA.AI

The AREA.AI project explores opportunities to enhance the safety and sustainability of resource extraction through the development of a robust, low-emission, and autonomous transport system. The AMT focuses on ensuring safety in both autonomous operations and mixed traffic scenarios by investigating regulatory and operational requirements. It researches and develops necessary collision

avoidance systems and Human-Machine Interfaces to ensure operational safety. Additionally, it evaluates communication technologies in mining, including optimizing wireless networks and developing simulation approaches. Furthermore, the AMT conducts an ecological analysis to assess the CO2 reduction potential of electrified mining machinery and to develop implementation scenarios for these technologies.

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ELMAR

The objective of the ELMAR (Integration and Demonstration of the Use of Electric Heavy-Duty Transport Machines in the Raw Materials production) project is to investigate the fundamental effects of the use of electric automated transport vehicles in the raw materials production on the entire operation.

Furthermore, technologies and solutions for the utilization of electric mobile machines will be developed and their integration into existing and planned operational environments will be developed and tested in real-world mining environments.

The overall objective of the contribution AMT is making to the project is to investigate the electrification of raw materials extraction in order to generate a detailed understanding of the upcoming transformation of mine operations. For this purpose, a mine plan for optimized energy deployment, a holistic concept of energy design for raw material operations, and an IIoT gateway for decentralized machine communication will be developed within this project.

To achieve these respective goals, model-based applications for mapping raw materials extractions will be (further) developed and transferred into methods and procedures that enable optimized long-term and short-term planning and control of operational processes with respect to energy and resource use.

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HEET II

The HEET II project aims to develop the innovative high efficiency power system for machines and devices, increasing the level of work safety in underground mining, in potentially explosive conditions such as coal mines. The system will consist of four critical subsystems:

- transmission of electricity with single-wire technology,
- transmission of electricity with wireless technology,
- integration of the rail of the suspension monorail and
- monitoring and control system of the power supply network.

The AMT will implement a platform to monitor the parameters of the system and the environment and send them to the surface of the mine. These subsystems will be developed and implemented by a collaboration with an interdisciplinary consortium from Germany, Poland and Romania.

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