Goldeneye Project "Earth observation and Earth GNSS data acquisition and processing platform for safe, sustainable and cost-efficient mining operations" 2020-2023.

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Summary

The Goldeneye project will implement a unique combination of remote sensing and positioning technologies, exploiting Earth observation and Earth GNSS data, together with data fusion and processing powered by data analytics and machinelearning algorithms: satellite sensor data (e.g. SAR data to detect surface subsidence in mining areas), drone sensor aerial data (e.g. high-resolution imagery to detect geomorphic changes , monitor equipment or track stockpiles / waste dumps), ground sensor data (e.g. Raman spectrometer data, Active Hyperspectral spectrometer, IoT sensors), GNSS data (e.g. GNSS simulator to provide indoor positioning capabilities in underground mines)

These innovations will enable the optimization of specific processes at all phases of the mining lifecycle, by supporting the development of operational applications targeting mineral detection, operational efficiency, safety and environmental monitoring:
- remote sensing tools for quasi-real-time mineral recognition during exploration
- operational tools to measure slopes, gradients (e.g. landslide risks in open pit mining) and terrain elevation changes (e.g. subsidence in underground mining) and check sites against design and safety requirements
- operational tools to track mining equipment and utilization
- operational tools for accurately measuring waste disposal and environmental risks
- data fusion and data processing tools support early warning and smart decision making

The Goldeneye project will use Copernicus (and contribution missions) space assets such as Sentinel 1 C-band IWS SLC Level 1, Sentinel 2 MSI, Terra-SAR X-band Strip-Mode SLC Level 1, EGNOS & Galileo as well as High resolution Digital Elevation Maps (DEM) and Surface Elevation Maps (SEM). The project will validate the technology in 6 field trials where the system will run for at least 12 months. The pilot evaluations will include full lifecycle analysis, socio-economic impact, business planning and health & safety analysis.

The platform will allow satellites, drones and in-situ sensors to collect high-resolution data of the entire mine, which can be processed and converted into actionable intelligence for safety, environmental monitoring and overall productivity, allowing more efficient exploration, extraction and closure. These tools will be demonstrated in field trials in Germany, ,Bulgaria, Romania,Ukraine, Kosovo and Finland, creating a compelling value proposition for implementation across the mining industry value chain. The project has a duration of 3 years with EC funding of €8.36M. The consortium includes 2 large industrial partners, 7 SMEs, 3 academic/research centres and 5 end-users, supported by a strong advisory board of experts in geosciences.

Goldeneye project consortium include:

- VTT TECHNICAL RESEARCH CENTRE OF FINLAND LTD, the Coordinator (FI)
- SANDVIK MINING AND CONSTRUCTION OY (FI)
- TIMEGATE INSTRUMENTS OY (FI)
- SITEMARK (DRONEGRID) (BE)
- SINERGISE LABORATORIJ ZA GEOGRAFSKE INFORMACIJSKE SISTEME D.O.O. (SL)
- OPT/NET BV (NL)
- DARES TECHNOLOGY SL (ES)
- RADAI OY (FI)
- GALILEO SATELLITE NAVIGATION LTD (IL)
- SOFIA UNIVERSITY (BG)
- BEAK CONSULTANTS GMBH (DE)
- CUPRUMIN S.A. ABRUD (RO)
- FOREIGN COMPANY EOS UKRAINE (UA)
- AKG SH.P.K. (XK)
- TECHNICAL UNIVERSITY OF CLUJ-NAPOCA (RO)
- UNIVERSITY OF OULU (FI)