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Goldeneye Project: Earth observation and Earth GNSS data acquisition and processing platform for safe, sustainable and cost-efficient mining operations

Проект Goldeneye: глобална сателитна навигационна система (GNSS) за наблюдение на Земята и платформа за получаване и обработка на данни за безопасни, устойчиви и рентабилни минни дейности

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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 machine learning algorithms. The project brings together 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) and 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 life-cycle by supporting the development of operational applications targeting mineral detection, operational efficiency, safety and environmental monitoring. The project will develop remote sensing tools for quasi-real-time mineral recognition during exploration, operational tools to measure slopes, gradients and terrain elevation changes. We will check sites against design and safety requirements and operational tools to track mining equipment and for accurately measuring waste disposal and environmental risks. In addition, the project creates data fusion and

data processing algorithms to support early warning and smart decision making of mines. 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) and validates the technologies in 5 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, 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 centers and 5 end-users, supported by a strong advisory board of experts in geosciences.