



MINE.THE.GAP

OPEN CALL #2

OUTCOMES



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 873149

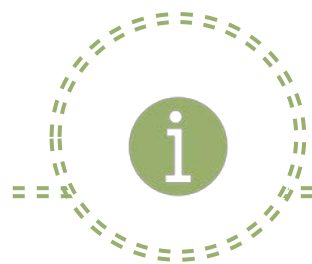
Topic: H2020-INNOSUP-01-2018-2020

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1. ABOUT MINE.THE.GAP AND THE 2nd OPEN CALL

MINE.THE.GAP is an innovation project funded by the European Commission as part of the INNOSUP programme. The project initiative is to fund in two open calls with Vouchers to reinforce synergies between raw materials mining SMEs and providers from the existing fields of ICT, Circular Economy, Resources Efficiency and Advanced Manufacturing.

In order to provide the direct financial support to SMEs through innovation vouchers, the **second open call** opened on 10th January 2022, and closed on 14th March, 17:00 CEST with two different direct funding schemes available: MINE-PoC (TRL6-7 and maximum 9-months duration) and MINE-Demo (TRL7-8 and maximum 12-month duration). Applications were submitted digitally using the platform MINE.THE.GAP (<https://h2020-minethegap.eu>)

After the second open call closure, the submitted proposals passed an eligibility check and then were evaluated by a highly qualified panel of external experts. The outcome was a ranking by score, from which the best-rated projects were selected. Rules and maximum funding per SME and per proposal detailed in MINE.THE.GAP first open call guidelines were applied to the selected companies (beneficiaries) and their projects.

Each beneficiary signed a separate funding contract, called “Third Party Voucher Grant Agreement” with MINE.THE.GAP, where selected SMEs become indirect beneficiaries of European Commission funding. MINE.THE.GAP consortium will monitor the proper execution of the funded projects and ensure that the recipients comply with obligations under H2020 specific requirements. This contract sets the start date of all projects on 1 June 2022.

The current document contains the outcomes of the first MINE.THE.GAP open competitive call: description of the third-party actions (projects), duration, and SMEs participants information.





2. PROJECTS FUNDED UNDER THE 2nd OPEN CALL

This section aims to provide a description of the projects, the starting dates of the different awards, their duration, and the legal name and country of the involved SMEs. Table 1 shows the general overview of the funded projects.

TABLE 1- FUNDED PROJECTS OVERVIEW UNDER THE 2ND OPEN CALL

Code	Acronym	Scheme	Start date	Duration
MTG025	MK	MINE-Demo	01/06/2022	52 weeks
MTG026	PUMPLOGGER	MINE-Demo	01/06/2022	52 weeks
MTG028	BIM-Fingerprint4.0	MINE-Demo	01/06/2022	52 weeks
MTG030	VALOMINE	MINE-Demo	01/06/2022	36 weeks
MTG032	A4C	MINE-Demo	01/06/2022	52 weeks
MTG037	CMW	MINE-Demo	01/06/2022	52 weeks
MTG043	ECODRONE	MINE-Demo	01/06/2022	52 weeks
MTG045	SMARTMINING	MINE-Demo	01/06/2022	52 weeks
MTG048	CONNECTING STONE	MINE-Demo	01/06/2022	52 weeks
MTG051	MWT	MINE-Demo	01/06/2022	36 weeks
MTG027	3DMAInt	MINE-Poc	01/06/2022	36 weeks
MTG042	GRYSOLSIGMASSES	MINE-Poc	01/06/2022	48 weeks
MORE THAN 1,4.M€ FUNDED FOR THE SECOND OPEN CALL PROJECTS				

Moreover, the funded projects EU distribution is shown in Figure 1.



12 PROJECTS APPROVED INVOLVING 32 SMES FROM 8 COUNTRIES



FIGURE 1-SECOND OPEN CALL FUNDED PROJECTS EU DISTRIBUTION



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MTG025-MK DEM

Title:	MinesKeeper		
Scheme	MINE-Demo		
Vertical sectors addressed	Information/Technology		
Challenges tackled by SMEs	<ul style="list-style-type: none"> - Health and Safety - New innovation technologies 		
Start date	01/06/2022	Duration	52 weeks
Project partners	Ewala IT Services, S.L., Leader, Provider, Spain, Information/Technology		
	HIoTee S.A.S, Provider, France, Information/Technology		
	Técnica Minera Aplicada, S.L. Adopter, Spain, Project Execution, Health and Safety, in Mines and Quarries		

Abstract

The MinesKeeper project is a collaboration between Ewala IT Services SL (here in after Ewala or SME1), HIoTee (here in after HIoTee or SM2) and Tecmina Minera Aplicada SL (here in after Tecmina or SM3). Participants Ewala and HIoTee are ITC providers and Tecmina is the adopter. The main objective for developing MinesKeeper is to create and integrate several technological tools to centrally and continuously monitor the health safety indicators of workers in mines or open pit mines. For this purpose, it is proposed to use environmental sensors and biosensors incorporated in the workers' clothing. IT architecture and all devices will be designed and developed under a cybersecurity framework to reduce potential exposure from technology risks. The cybersecure architecture will also protect the sensitive personal data of the workers. All the data generated by the sensors will be analysed and visually represented in a supervision console in the cloud. This will allow a multitenant use and access. Finally, the ultimate goal consists of deploying the technological tool in a cybersecure manner in order to detect warnings in real time, as well as to prevent potential risk situations which could endanger the safety and health of mining operators. In the present project, Ewala and HIoTee will participate in the design and development of MinesKeeper while Tecmina, as an adopter, will provide its knowledge of the sector and will test the product in a real environment.

MTG026- PUMPLOGGER

Title:	DIGITAL REMOTE SYSTEM FOR DATA MONITORING AND LOGGING AT RESIN INJECTION OPERATIONS IN UNDERGROUND MINING		
Scheme	MINE-Demo		
Vertical sectors addressed	ICT		
Challenges tackled by SMEs	<ul style="list-style-type: none"> - Digital monitoring - Data logging 		
Start date	01/06/2022	Duration	52 weeks
Project partners	GLOBAL DE ASESORAMIENTO Y APLICACION TECNICA S.L, Leader, Adopter, Spain, Mining and raw materials		
	NLS NEW LINK SOLUTIONS -CONSULTORIA E ENGENHARIA S.A, Provider, Portugal, Information and Communication Technology (ICT)		

Abstract

Tunnel construction for underground mining operations usually faces structural problems such as massive water infiltrations, ground instability, cracks or subsidence. Nowadays, injection of two component expansive resins is the mainstream solution for this kind of issues. Pumping equipment used for these works is operated in a strictly manual way, with a very low electrification level and there is not digital technology available for monitoring the operation. The present project proposes the development and testing of a digital remote system for data monitoring and logging at two component resin injection operations at underground mining environments. The system will allow monitoring the whole process and controlling its main parameters from a safe distance with a high level of accuracy and detail at the measurements, keeping automatized digital records for all the operations performed. The project requires selection and implementation of an appropriate sensor system for measuring the main parameters associated with the operation, the development of a hydraulic system and a data logger for screening and recording data captured and solutions for data storage and access. All the equipment has to be integrated in a proper solution for a portable remote data monitoring and logging station. Developed prototypes must be tested with two component resins to verify and improve the system capacity to provide the most accurate process parameters measurements.



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MTG028- BIM-Fingerprint4.0

Title:	Fingerprint 4.0 -a cyber-physical-system on Natural Stone		
Scheme	MINE-DEMO		
Vertical sectors addressed	Mining Process Engineering & Equipment Manufacturer		
Challenges tackled by SMEs	<ul style="list-style-type: none"> - Digital technology - Industry 4.0 		
Start date	01/06/2022	Duration	52 weeks
Project partners	CEI, Leader, Provider, Portugal, Advanced manufacturing technologies		
	Segura, Adopter, Spain, Stone extraction and processing		

Abstract

The scope of BIM-Fingerprint4.0 Project is the adoption and implementation of innovative digital technologies, oriented to improve productivity, skills, energy, and the efficient use of natural stone. Starting from the state of the art, the BIM-Fingerprint4.0 Project aims the implementation, test, and validation in industrial environment, of a cyber-Physical-System composed by different and complementary modules. It is an incremental innovation with a strong radical (collaborative) component because with the BIM-Fingerprint4.0 technologies, it is intended to digitally connect the natural stone factories to the marketplace (BIM platforms). In other words, the natural stone factories through the BIM-Fingerprint4.0 project will operate in Industry 4.0 mode" as the client will become co-creative collaborator and part of the process. Once the specific objectives have been achieved, the BIM-Fingerprint project will have an impact on the efficiency, sustainability, worker safety and attractiveness of qualified human resources in European natural stone companies.

MTG030- VALOMINE

Title:	Valorization of mine wastes for the development of building materials		
Scheme	MINE-Demo		
Vertical sectors addressed	Mining and Raw Materials		
Challenges tackled by SMEs	<ul style="list-style-type: none"> - Mine waste - Geopolymerization 		
Start date	01/06/2022	Duration	52 weeks
Project partners	MNLТ INNOVATIONS IKE, Leader, Provider, Greece, Raw Materials		
	LeonOreDevelopment SL, Provider, Spain, Mining & Metallurgy		
	Gevora Construcciones SA, Adopter, Spain, Advanced Manufacturing		

Abstract

The VALOMINE project aims to (a) the transformation of mining waste of the partner Leon Ore, through geopolymerization, into geopolymer components for the construction sector and mainly as a fire-resistant material, (b) the pilot production of the materials with precast conventional method by MNLТ. The produced materials will be applied as fire resistant tiles in the area of the company Gevora Construcciones, while at the same time will have at least 30% lower cost and 20% less CO₂ emissions comparing to conventional cement-based materials. The last comes in full alignment with EU 2020 agenda which boosts the transition to a resource efficient, sustainable society. The VALOMINE project addresses the needs of the Mining and Construction sector since both sectors will take advantage of the outcomes. Concerning the mining sector, more than 100 million tonnes are produced annually, while after decades of industrial activities, a huge amount of stored industrial wastes ends in landfills (which is not the most environmentally sustainable solution) and untapped side-streams have been accumulated in Europe, constituting an enormous wealth that waits to be unlocked and valorised. In addition, the commercial fire-resistant materials have a very high price rendering their application unaffordable. As a result, the VALOMINE project will tackle both barriers to produce an innovative low-cost fire-resistant material valorizing mine tailings as a primary raw material.



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MTG032- A4C

Title:	Anhydrite for coatings		
Scheme	MINE-Demo		
Vertical sectors addressed	Mining Process Engineering & Equipment Manufacturer		
Challenges tackled by SMEs	<ul style="list-style-type: none"> - New value chain - Sustainable sourcing and circular economy 		
Start date	01/06/2022	Duration	52 weeks
Project partners	Toro Gips SL, Leader, Provider, Spain, Advanced manufacturing		
	Yesos Alabastrinos, Adopter, Spain, Mining and raw materials		
	TI Chem Consulting, Provider, Poland, Resource efficiency		

Abstract

Since it's necessary to obtain square shape stones from irregular boulders, alabaster mining and sawing industry can only use about 3-5% total product extracted from mines. The rest of the product (97%) has to be sent back to mine as mining residues. Toro Gips has been developed a transformation process to revalorize this product (Calcium sulphate dihydrate) as TiO₂ extender for coatings and paints. Mining residue needs to be purified to 99% CaSO₄ purity product as raw material for processing industry. Process consists of dehydrate alabaster to obtain Anhydrite II and micronize it in accordance with destiny industry. After processing, a white colourant must be obtained with such optimal characteristics that it could substitute or extend TiO₂. Excellence: Transform mining residues into fine raw material for industry. Produce a greener TiO₂ substitute for paints and coatings. Impact: Decrease CO₂ footprint in alabaster mine. Reduce mining residues by revalue them into raw materials. Develop and obtain a safer alternative for TiO₂. Reduce CO₂ footprint in coatings and colourants production. Develop an environmentally friendly and biodegradable filler and colourant. Quality and efficiency of the implementation: The mining company provides necessary raw material, from their mining and processing residues. Processing company brings in the necessary know-how on the transformation from residues into final product. Consumer company gives sense to the project by develop a final commercial application.

MTG037- CMW

Title:	CircMineWater		
Scheme	MINE-Demo		
Vertical sectors addressed	Circular Economy, ICT		
Challenges tackled by SMEs	<ul style="list-style-type: none"> - Digitalization - Sustainable sourcing and circular economy 		
Start date	01/06/2022	Duration	52 weeks
Project partners	Ow atec Group, Leader, Adopter, Finland, Circularity		
	Sensmet, Provider, Finland, ICT		
	Mitta AB, Adopter, Sweden, ICT		

Abstract

Owatec's solution is a wastewater and sludge treatment process. Waste waters from mining contain valuable components which potentially can be recovered from the waste stream. The water treatment allows real-time water chemicalization and purification. After chemicalization the treated water goes through a froth flotation or sedimentation unit process to separate solid from water. The separated precipitate is pumped into a sludge treatment unit and the treated water is either recycled or taken into the wastewater stream. The treatment process is upgraded by combining Sensmet's online water analyser Sensmet μ DOES®+ to monitor water quality in real time at minute level. The solution allows for optimisation of key mining processes such as the froth flotation to increase the annual yield up to 3-6%. The analyser can simultaneously monitor up to 50 water quality parameters in real-time, including 30 metals and key water quality parameters such as turbidity, COD/BOD/DOC/TOC and total hydrocarbons. The data measured by μ DOES®+ is connected to EHP Data Service provided by Mitta AB. The data is analysed, visualised and fed to process control to optimise the wastewater treatment. There will be 2 demos. The first demo in Finland is a full-scale treatment process coordinated by Owatec. The second demo in Sweden is a tailings water application where Sensmet provides online metal analysis, Owatec performs laboratory reference analyses and Mitta AB coordinates the demo.



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MTG043- ECODRONE

Title:	Hazardous Gas monitoring with IoT enabled Drone in Underground Tunnels and Cavities		
Scheme	MINE-Demo		
Vertical sectors addressed	ICT		
Challenges tackled by SMEs	<ul style="list-style-type: none"> - Health and safety - New innovation technologies - IoT 		
Start date	01/06/2022	Duration	52 weeks
Project partners	VERTLINER P.C., Leader, Provider, Greece, ICT		
	FERON TECHNOLOGIES P.C., Provider, Greece, ICT		
	PERFORACIONES NOROESTE S.A, Adopter, Spain, MINING & RAW MATERIALS		

Abstract

The proposed MINE-Demo project is an ambitious cross-regional and cross-sectorial collaboration which aims to create a new innovative solution for the mining sector, ensuring occupational health & safety in underground working environments in an accurate and cost-effective way. Underground mines and tunnels are characterized by tough working and hazardous environmental conditions. In such environments serious accidents may occur due to a sudden rise in toxic gasses, dust, dangerously flammable gasses or low-oxygen conditions. To this end, novel robotic and IoT technologies are integrated into a tailor-made UAV embedding an IoT-based multi-gas sensor platform, for automating hazardous gasses concentration measurement in hard-to-reach places. The solution will be co-developed by two Greek ICT technology companies, VERTLINER and FERON TECHNOLOGIES and will be adopted by the Spanish mining/drilling company PERFORACIONES NOROESTE. A system prototype will be demonstrated in an underground tunnel facility. Through the involvement in the project, the adopter will leverage the developed solution for improving the currently used approach on gas monitoring activities, whereas the technology providers will have the opportunity to enter a new market with strong exploitation potential. The project primarily addresses the "Health & Safety" MINE.THE.GAP challenge, but also contributes to the "New Innovation Technologies", "Towards the Digital World", and "Environmental Footprint" needs.

MTG045- SMARTMINING

Title:	Smart raw materials exploration and operational monitoring for mining optimization		
Scheme	MINE-Demo		
Vertical sectors addressed	ICT		
Challenges tackled by SMEs	<ul style="list-style-type: none"> - Digitalization - Sustainable sourcing 		
Start date	01/06/2022	Duration	52 weeks
Project partners	TerraDat Geophysics S.L., Leader, Provider, Spain, Resources efficiency		
	Abaut GmbH, Provider, Germany, ICT		
	Cantera Lacilla S.L., Adopter, Spain, Mining		

Abstract

Business consultants raise awareness of the risks mining companies face by overlooking to include a better geology and digitalization in their core enterprise strategy, not only for the physical core processes, but also for the non-physical ones, which involve the collection, processing and analysis of data, as they are the means to unlocking the potential of knowledge and to creating a competitive advantage. SMARTMINING will demonstrate that a better geological, petrophysical and geophysical knowledge will focus the exploitation works in high-grade mineralization areas, reducing the environmental footprint. It also will increase the performance of critical works, like the drilling and blasting activities, by decreasing the amount of explosives needed through a better rock characterization. In addition to that, AI-ML analytics will improve the performance of the mobile fleet. Together, Abaut, TerraDat and Canteras Lacilla will collaborate for performing the different tasks and activities that provide intelligent mining performance analytics, by further developing the geological model and near-real time KPI's for the mobile mining fleet. The project will trigger the application and usage of these tools at Canteras Lacilla, demonstrating the competitive advantage of such tools for the small and medium EU mining companies.



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MTG048- CONNECTING STONE

Title:	CONNECTING STONE		
Scheme	MINE-Demo		
Vertical sectors addressed	ICT		
Challenges tackled by SMEs	<ul style="list-style-type: none"> - Digitalization - Sustainable sourcing and circular economy 		
Start date	01/06/2022	Duration	52 weeks
Project partners	Mottus Automation & Robotics SL, Leader, Provider, Spain, Automation and Industrial Robotics		
	Mármoles Bolmax SL, Adopter, Spain, Natural Stone (quarry exploration)		
	Several Ways Engenharia de Sistemas de Informação, Lda, Provider, Portugal, ICT (computer engineering)		

Abstract

Currently we are witnessing a shift in industrial paradigm supported by National and European guidelines, where Industry 4.0 is materialized by the integration of digital technologies (such as advanced robotics, artificial intelligence, cloud computing, IoT, among others). Within this scope, the Natural Stone (NS) Sector should also keep up and create innovation to address the market and answer to the global sustainability challenges. CONNECTING STONE appears as a pilot of a solution with a high TRL 7-8 idealized for the NS industry, to be tested in a real production quarry environment, consisting of an IIoT flexible high-quality image capturing system with immediate management and data availability in a cloud system. Designed for the primary product of NS quarries-blocks-the project is keystone for implementing a global vision for innovative digitized and "intelligent" quarries. The ability to collect images from blocks in real time with immediate user availability, is advantageous for the quarrying company itself (management and quarrying optimization and waste minimization) and allows the creation of databases and inventories of existing raw materials, contributing directly to its global valorisation. Therefore, CONNECTING STONE is a system for the digitization of raw materials allowing the access to the global market, increasing the possibility of industrial technology absorption with a critical role on waste minimization towards circular economy goals.

MTG051- MWT

Title:	Magos Workers Training		
Scheme	MINE-Demo		
Vertical sectors addressed	ICT		
Challenges tackled by SMEs	<ul style="list-style-type: none"> - IOT - Digital twin 		
Start date	01/06/2022	Duration	52 weeks
Project partners	Quanta & Qualia (doing business as Magos), Leader, Provider, Greece, Human Machine Interface		
	Breakpoint One GmbH, Provider, Germany, Software and Extended Reality development		
	Inwesta, Adopter, Poland, resources/waste management and recycling		

Abstract

The dangers of mining operations are well known. Inadequate training is often a root cause for mining fatalities. Hands-on training in an actual mining environment provides only limited real-life opportunities, however Virtual Reality(VR)-based training can expose the workers to real-world working conditions without the associated risks. There is a strong demand for VR in the mining industry, increasing productivity and reducing costs. A VR training application along with a solution that enables freedom of fingers' movement has an important role to play. It is an essential aid for virtual simulations and training applications which prepare individuals to work and perform high dexterous tasks in highly demanding and stressful environments. Imagine a worker who could interact naturally using their fingers instead of holding a pair of touch controllers and having awkward feedback. Wouldn't that change the whole experience? It would move training from an unrealistic or even negative event to a real experience with the exact feelings and conditions of the most demanding use cases. The experience of a trainee would never be the same again, providing a fully immersive experience where the hands and fingers enable "life-like" interaction within the VR environment. Mago's Workers Training(MWT) is also working towards this direction, offering a VR Training application for equipment in the mining sector (digger, mining heading, overhead loader, conveyor), exploiting Magos technology.



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MTG027-3DMAInt

Title:	Interactive 3D Mine Mapping Artificial Intelligence: from pit-to-market decision support instrument		
Scheme	MINE-Poc		
Vertical sectors addressed	ICT		
Challenges tackled by SMEs	<ul style="list-style-type: none"> - Waste optimisation - Towards the digital world 		
Start date	01/06/2022	Duration	36 weeks
Project partners	In.mat-lab, Leader, Adopter, Greece, raw materials efficiency		
	ENVISOL, Provider, France, ICT, software development		

Abstract

The digital solution proposed will provide a 3D interactive imaging for smart exploration and exploitation of an industrial minerals deposit according to its final uses (e.g. insulation, construction, agriculture, filtration, etc.). This innovation will allow users to define their own scenarios regarding final applications for the deposit and retrieve a 3D bloc model of the corresponding market value. The solution will advocate a better use of mineral resources and will democratize best practices. It will be a powerful leverage in raising awareness regarding resource optimisation. This solution also incites small-scale mining and end-use monitored excavations in a global economic context. Adopter and lead of the project is in.mat-lab. Founded in 2016 it covers a set of innovative services in the neuralgic sector of industrial minerals and their applications worldwide. With results verified on industrial scale by its clients, the company offers critical information for smart exploration & sustainable mining based on end-uses and markets, resources and wastes minimization. The purpose of the project is to bring this expertise in the next level through the digitalisation and the development of an online tool for in.mat-lab and its clients. In collaboration for this solution, Envisol is a consultancy company with a branch specialized in geostatistics and the development of artificial intelligence applications and is therefore a provider (ICT) of its expertise in digitalisation.

MTG042- GRYSOLSIGMASES

Title:	Smart Electrical Surveillance for Grysol Crushing & Screening Plant		
Scheme	MINE-Poc		
Vertical sectors addressed	ICT		
Challenges tackled by SMEs	<ul style="list-style-type: none"> - New innovation technologies - Towards the digital world 		
Start date	01/06/2022	Duration	36 weeks
Project partners	SIGMA INDUSTRIAL PRECISION SL Leader, Provider, Spain, ICT		
	GRYSOL, Adopter, Poland, Mining		

Abstract

Maintaining efficiency and health in key mine machinery is a must. Inefficient operation or unexpected breakdown can be critic for operation's profitability. To avoid such problems are necessary new solutions: flexible, to be integrated in the major part of key assets, easy to implement to reduce complexity, and affordable to make its implementation massive. This project proves how automated electrical analysis responds to these requirements. With the installation of high-tech electrical sensors in the electrical cabinets that powers the main components of Grysol's crushing and screening machine, and trough the automated electrical analysis performed from the collected data, Sigma shows a solution that ensures efficiency by continuously surveilling the process electrical behaviour, reduces maintenance costs by minimising the number of sensors and their required installation, and increases safety avoiding human continuous surveillance of machine's health and status. All from a cloud-based solution empowered with smart algorithms that simplifies its use and operation. With the integration of 9 electrical sensors, Sigma will have a complete overview of machine operation, identify electrical problems, dangerous for the machine and people, but also mechanical problems trough sophisticated algorithms based on Motor Current Signal Analysis. All with continuous data registration to track the behaviour and machines development life with energy and predictive analytics.



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