



EO PLATFORM SUPPORTING CRITICAL RAW
MATERIALS INDUSTRY IN EUROPE

Deutsches Geoforum, 2025

Marko Paavola, VTT Technical Research Centre of Finland

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GoldenRAM - Project facts in a nutshell

SAVANNAH **BOLIDEN**

A State-of-the-Art Earth Observation Platform for Raw Materials

Number of Partners 13

Duration 36 months (started January 2024
– now M23)

Budget 6.7M€

Consortium expertise: large-scale ICT platforms, geologic and remote-sensing know-how, benchmarking, market analysis, business modelling and result dissemination

4 end-users, 4 academic/research centres, 5 SMEs



GoldenRAM Project

A State-of-the-Art Earth Observation Platform for Raw Materials



GoldenRAM supports the European mining industry and their challenges

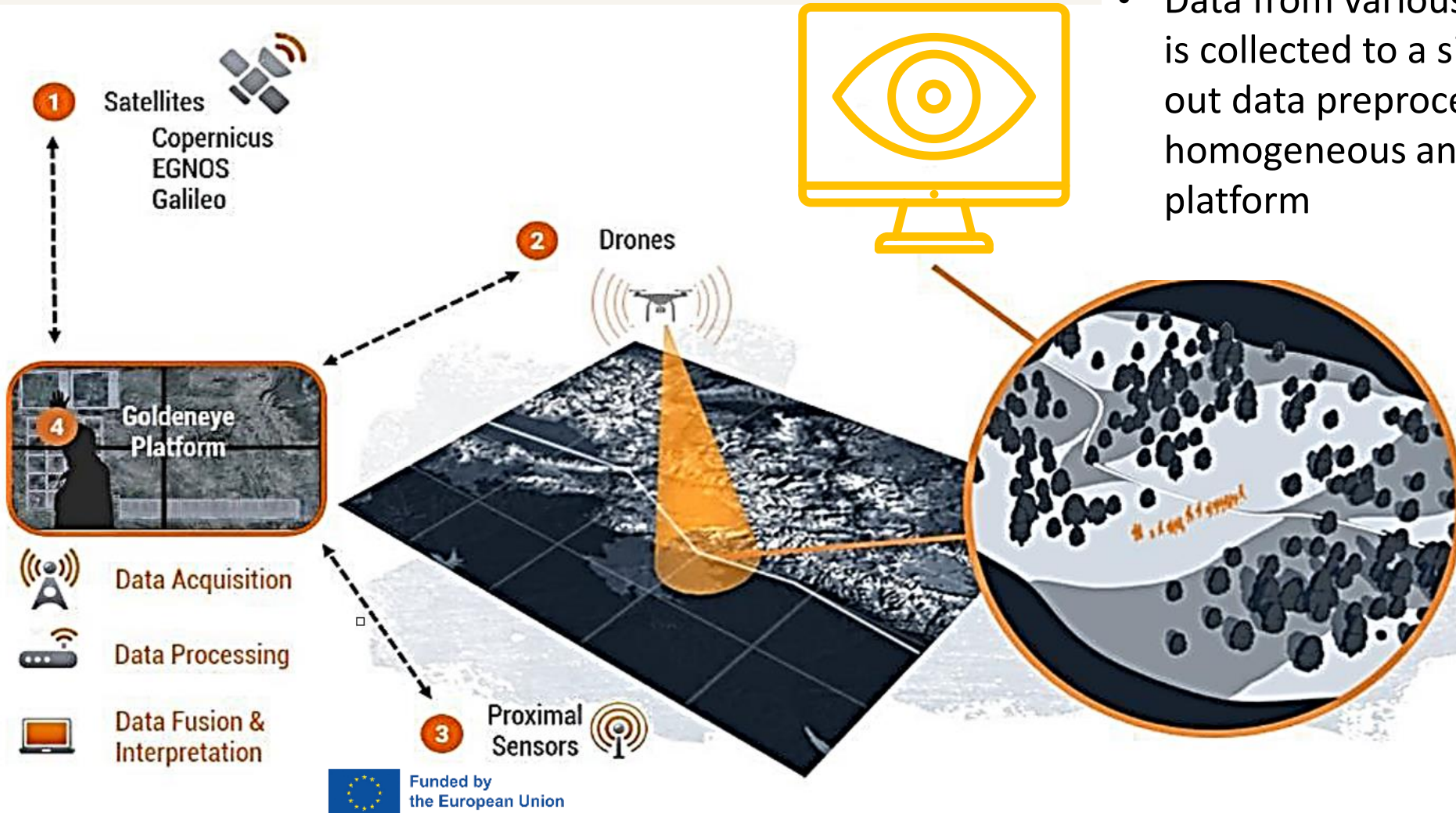
The developed EO platform aims to provide tools for

- mining efficiency, sustainability and safety as well as
- improving responsible and sustainable supply of CRMs to Europe
- increase the raw material investment potential for Ukraine by promoting exploitation prospects via the G-RAM platform



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the European Union

What is an earth observation (EO) platform?



- Data from various sensors + legacy systems is collected to a single platform that carries out data preprocessing making it homogeneous and accessible via single platform

Overview of application areas

A variety of applications are addressed by GoldenRAM



Exploration



- EO Mineral mapping,
- Mineral prospectivity mapping,
- Mapping of secondary CRM deposits



Operations & safety



- Open pit monitoring
- Tailings storage facility (TSF) monitoring



Environment



- Environmental impact
- Groundwater level and discharge



Prospecting & Exploitation



- Access to the databases and electronic maps of critical minerals' occurrence with detailed characteristics and geospatial information about areas of mining activity in Ukraine

Technologies

Deploying the latest advances in IT and AI



AI Natural Language Processing



- Ease of use
- Simplify workflows



Satellite Sensing



- Multispectral, hyperspectral, SAR and other



Aerial Sensing



- RGB, hyperspectral, imaging, TIR...



Proximal Sensing



- Existing data sets,
- microXRF, XRD, Raman
- ...

6 European Field Trials

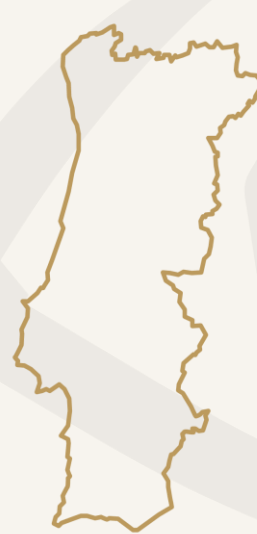
The team will demonstrate the value of the platform in various stages of the raw materials value chain, from exploration to site closure.



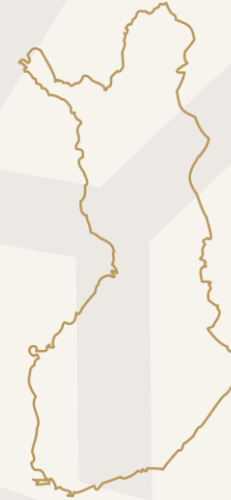
ABRUD
Romania



AITIK
Sweden



BARROSO
Portugal



SOKLI &
KEVITSA
Finland



UKRANIAN
SHIELD
Ukraine

Some Recent News – More on the Website

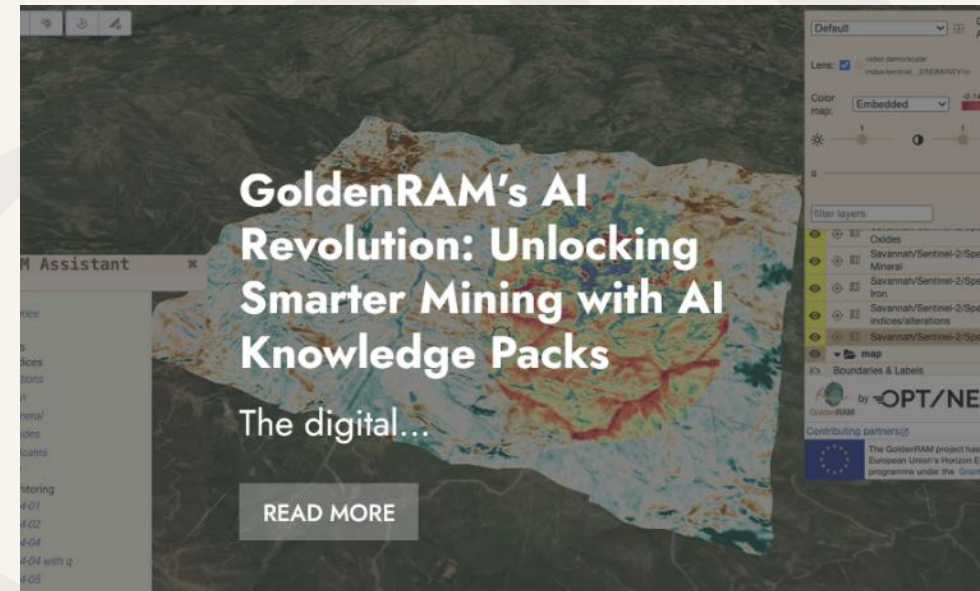


- Field work campaigns (phosphorous ore deposit, multi-metal mine)
- In-situ data used to calibrate satellite measurements
- Monitor ecological changes over time: chlorophyll concentration, turbidity, potential contamination



- Europe's largest resource of hard rock spodumene lithium
- Test and advance mineral mapping technologies to identify and monitor lithium-bearing minerals directly at the mining face
- Combination of airborne, terrestrial, and ground-based instruments

Some Recent News – More on the Website



- In CUPRU MIN, Romania, GoldenRAM showed geotechnical risk monitoring in open-pit mining.
- Large-scale modelling is helping to better understand slope behavior and prevent costly failures and improve safety.

- GoldenRAM is pioneered a new GIS application development approach which is based on the AI Knowledge Packs (AIKPs).
- This novel modular methodology aligns with GEO Knowledge Hub approach for creation and retention of the 'know-how' that simplifies creation of the complex computational workflows and brings actionable intelligence to the application's users.

A Message From a GoldenRAM Mining Partner

Using GoldenRAM platform to communicate with the stakeholders



John Morris Pereira
Exploration Manager
Savannah

"GoldenRAM platform may be a very useful tool to help Industrial Partners communicate with communities, local and national administrations, and technical entities."

"One possible way if for the Industrial Partners to set up accessible data from the environmental monitoring to share with the stakeholders, in a visual format and at the same time multiple levels of numeric information."

"The landowner can now in real time what is the water quality, the municipality can monitor the forest health and soil contamination, and the Mining Agency can monitor mining volumes and compare them against the approved plans."



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CONCLUSIONS

- An earth observation platform with artificial intelligence tools can boost mining activities in many ways
 - Reduced environmental impact, operations efficiency, safety, more efficient exploration...
- Building a multidisciplinary platform requires collaboration
 - Industry and academia have slightly different goals
 - Different domains - language
 - Legal issues when going to market
 - BUT the rewards could be huge (possible to serve both communities)
- The EO platform helps the public to accept mining in Europe
 - Responsible production
 - Reduces dependency on imported raw materials
 - New technologies attract new talents to the mining industry
 - Improved communications: local stakeholders, authorities...
- Commercial adoption of new technologies: ensuring life of the project after research phase, how to increase TRL?

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GoldenRAM

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