# RAW MATERIALS

#SITE SELECTION, PLANNING, AND MONITORING #ILLEGAL MINING DETECTION #ENVIRONMENTAL IMPACT ASSESSMENT #SUPPLY CHAIN INSIGHTS

> "As the world is aiming for net zero, the demand for critical raw materials is set to soar."



#### WHERE ARE WE NOW?

The current state-of-play in the sector. Maturity of EO and its contribution to addressing the challenges of the sector.



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- A global race is on-going for the supply and recycling of critical raw materials
- The EU has a focus on building a resilient supply chain, supporting projects from mining to refining, processing and recycling

Main relevant policies and initiatives:

- 🗧 Raw Materials Act
- Action Plan for Critical Raw Materials



- Clobally, the revenues from
  EO data and services are expected
  to double in the next decade
- Earth observation (EO) applications for raw materials are well-proven across the mine life cycle
- It remains a highly specialised niche market, with limited number of internationally established players



- e Use of hyperspectral data foreseen to make a big impact
- Integration of ancillary data: integrating sources of information such as geophysical, UAV (hyperspectral, LiDAR) and geo-localisation data
- Data fusion / interoperability: ways to combine radar and optical data from the Copernicus portfolio and (e.g., hyperspectral) missions

#### WHERE DO WE WANT TO BE?

Guiding aims and priorities for the future as defined through the FIRE consultation process with sectoral users and EO professionals.

#### ADOPTION OF QUICK-WIN EO APPLICATIONS

- Earge-scale geological mapping to explore and select potential extraction sites
- Monitoring of the environmental impact of mining activities
- Monitoring and detection of geological and hydrological changes to reduce safety risks

#### EO TO HELP ADHERE TO STANDARDS AND REGULATIONS

- Regulations and standards drive the uptake of EO-data
- powered services and solutions
- EO applications can help miners adhere to regulations and standards related to air, soil, water, safety, etc.

#### INCREASE AVAILABILITY OF HIGH-RESOLUTION HYPERSPECTRAL DATA

Hyperspectral data
 enhances various EO
 applications, including
 in the reconnaissance
 and prospecting stages
 and for the assessment
 of environmental impact

#### INCREASED CAPACITY FOR MINERS TO ADOPT EO SOLUTIONS

 Specific capacity building programmes may be organised to boost the extractive companies' EO expertise to help implement EO solutions more easily into their day-to-day operations

Selected actions to be taken by the community of practitioners (both EO and non-EO) to achieve the envisaged future.

### **PROMOTE EASY-WIN APPLICATIONS FOR MINING**

Various EO-powered solutions are currently successfully offered to the mining industry, proven to work in many parts of the world. Yet, service providers continue to struggle with market adoption. Promotion of easy-win applications can boost uptake.

- Increased availability of EO-powered solutions provided by
- ¥HW mining technology companies

them to expand their service

offering with proven

EO-powered products.

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- Increased uptake of EO-powered solutions by mining companies

Leveraging of existing sales channels and tight-knit relationships which mining tech companies enjoy, as well as 'speaking the same

Demonstrating use cases and financial successes of EO-powered solutions

SHORT-TERM

1-2 years

IMPACT

HIGH

HIGH

LOW

LOW

in the mining industry.

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#### 04 SUPPORT MINERS WITH

DATA/SERVICES



**PROMOTE EASY-WIN** 

HELP MINING COMPANIES

ADHERE TO STANDARDS/

ACCELERATE DEVELOPMENT

REGULATION WITH EO

OF HYPERSPECTRAL

**APPLICATIONS FOR MINING** 

01

MONITOR RELEVANT NEW

Target mining technology companies and incentivise

language', accelerating acceptance.

EO service providers





End users

**Multipliers** 

EO service providers

Governance actors

End users

Selected actions to be taken by the community of practitioners (both EO and non-EO) to achieve the envisaged future.

#### 02 HELP MINING COMPANIES ADHERE TO STANDARDS/REGULATION WITH EO

MID-TERM

2-5 years

IMPACT

HIGH

HIGH

MEDIUM

LOW

End users

**Multipliers** 

EO service providers

Governance actors

Environmental and safety standards/regulations are continuously evolving and are becoming more stringent. **EO-powered solutions that help miners adhere to regulations and standards** are thus an 'easier sell', and these applications should be prioritised in promotional efforts.

– Increased uptake of EO-powered solutions by mining companies

that will help the adherence to regulations and standards

— More transparent supply chain (in relation to emissions, waste, etc.)



01

02

03

PROMOTE EASY-WIN APPLICATIONS FOR MINING

**HELP MINING COMPANIES** 

ADHERE TO STANDARDS/

ACCELERATE DEVELOPMENT

**REGULATION WITH EO** 

OF HYPERSPECTRAL

DATA/SERVICES

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IMPLEMENTATION OF SPECIFIC APPLICATIONS ¥HW

MONITOR RELEVANT NEW

Selected actions to be taken by the community of practitioners (both EO and non-EO) to achieve the envisaged future.

#### OB ACCELERATE DEVELOPMENT OF HYPERSPECTRAL DATA/SERVICES

EO service providers

The new technology trend of **hyperspectral instruments** (HSI) provides **significant potential for mining applications**. Supporting this specific technology development and downstream applications can accelerate the use of EO in various stages of the mine life cycle.

– Increased hyperspectral capabilities in orbit and downstream

to enhance EO-powered solutions for mineral exploration

— Further boost the currently largest application of EO in mining (raw materials site selection, planning)

A first call may be issued to accelerate the hardware developments/demonstrations of HSI technology. Such a call can be targeted by HSI instrument developers with proven flight-heritage.

**EU** institutions

A second call may be issued to develop, or further refine, EO-powered mining applications which leverage the data coming down from existing (and upcoming) hyperspectral missions.

End users

Multipliers

EO service providers

Governance actors

**MID-TERM** 

2-5 years

IMPACT

HIGH

HIGH

LOW

LOW

End users

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03

04

PROMOTE EASY-WIN APPLICATIONS FOR MINING

HELP MINING COMPANIES

ADHERE TO STANDARDS/

**REGULATION WITH EO** 

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ACCELERATE DEVELOPMENT OF HYPERSPECTRAL DATA/SERVICES

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**WHO** 

SUPPORT MINERS WITH IMPLEMENTATION OF SPECIFIC APPLICATIONS

-05

MONITOR RELEVANT NEW (EO) TECHNOLOGIES

Selected actions to be taken by the community of practitioners (both EO and non-EO) to achieve the envisaged future.

## O4 SUPPORT MINERS WITH IMPLEMENTATION OF SPECIFIC APPLICATIONS

The adoption of EO-powered solutions by miners is hindered by a lack of understanding, both in terms of potential safety improvements and/or cost effectiveness of operations, as well how such applications should be implemented in existing workflows. Capacity building efforts for miners can improve these understandings.

- Increased capacity of the mining industry to adopt and embrace γHγ

EO-powered solutions in their mining operations workflows

Coordination with	The capacity	Application-specific results should be	
existing initiatives to build	building approach	promoted through statements such as:	
EO capacities for mining	should be adapted,	'by the end of this course: guaranteed pit mine	
companies, such	and serve as	slope monitoring solution to be implemented	
as RawMatCop.	implementation support.	in your mining operations workflow'	
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**EU** institutions

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**WHO** 

EO service providers

End users

Researchers, academia

SHORT-TERM

1-2 years

IMPACT

HIGH

HIGH

LOW

LOW

End users

Multipliers

EO service providers

Governance actors

PROMOTE EASY-WIN APPLICATIONS FOR MINING

HELP MINING COMPANIES

ADHERE TO STANDARDS/

REGULATION WITH EO

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ACCELERATE DEVELOPMENT OF HYPERSPECTRAL DATA/SERVICES

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**SUPPORT MINERS WITH** IMPLEMENTATION **OF SPECIFIC APPLICATIONS** 

04

MONITOR RELEVANT NEW

Selected actions to be taken by the community of practitioners (both EO and non-EO) to achieve the envisaged future.

#### 05 MONITOR RELEVANT NEW (EO) TECHNOLOGIES

Various technology trends in EO have a direct impact on the suitability of EO-powered solutions to address the needs of the raw materials segment. This action aims to accelerate the availability and understanding of new technologies and data sources relevant to the mining industry (and its service providers) by continuous monitoring and reporting on trends.

- Accelerated uptake of new technologies by EO service providers
  Expanding portfolio of EO-powered applications provided
- to the raw materials industry

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Recent and upcoming emerging technologies should be monitored and their relevance to specific applications in the mining life cycle should be assessed.







#### MID-TERM 2-5 years IMPACT End users MEDIUM EO service providers HIGH Multipliers Low Governance actors Low

Produce (half) yearly insights (report) on operational new technologies with a showcase of successes (prototypes, operational implementation, etc.)

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PROMOTE EASY-WIN APPLICATIONS FOR MINING

HELP MINING COMPANIES

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ADHERE TO STANDARDS/ REGULATION WITH EO

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ACCELERATE DEVELOPMENT OF HYPERSPECTRAL DATA/SERVICES

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SUPPORT MINERS WITH IMPLEMENTATION OF SPECIFIC APPLICATIONS

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#### MONITOR RELEVANT NEW (EO) TECHNOLOGIES

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