# The ESA Φ-lab Offices

## Φ-lab Explore Office

Explore the innovation universe
connecting EO sensor revolution
with the digital revolution
A Team of Technology Innovators
and an innovation seed funding (FutureEO)


## Φ-lab Invest Office

Stimulates competitiveness by fostering the growth of entrepreneurial initiatives through investment actions from ESA Member States and private investors
A team of business innovators and
a commercial co-funding programme (InCubed)

# Innovation Technologies axis and its Applications

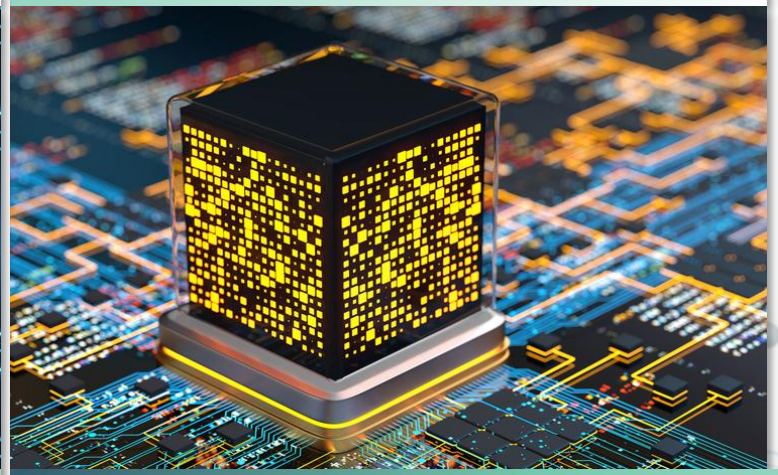
AXIS I

## Augmented Intelligence

Foundation Models
Digital Assistant and Twins
Generative AI
Decision Intelligence, Agentic AI
Explainability (xAI)
Physics-Informed ML
Virtual & Immersive Visualisation

AXIS II

## Innovative Computing Paradigms



Cognitive Space
On-Board AI
Quantum Computing
Hybrid HPC Computing
Neuromorphic
Biocomputing, Computational Imaging
and others

AXIS III

Other

## Transformative Innovations

Web 3.0, IOT
Distributed Ledgers/Blockchain
Metamaterials and Surfaces
and others …

Mistral AI

# Frontier AI.
# In your hands.

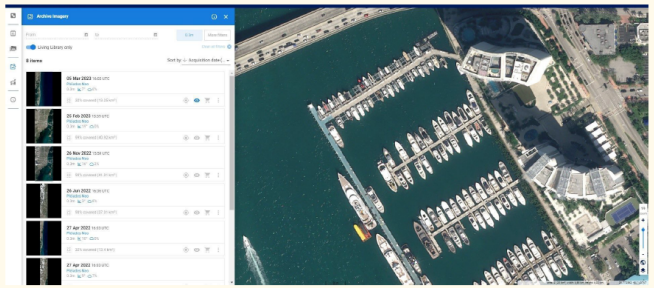
## Mistral AI for Geospatial imagery

April 2026

# LLMs redefine the satellite imagery value chain

## Multimodal understanding

LLMs unlock new user experiences through natural language interactions with geospatial data, transforming pixels into intelligence, and queries into decisions



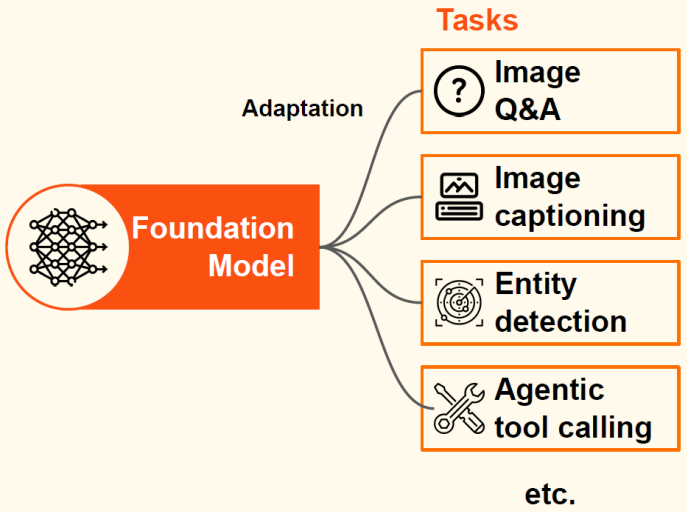
## Accelerated intelligence

**Edge AI** moves intelligence to the sensor, filtering out noise to deliver only the data that matters

**Agentic AI** orchestrates complex multi-satellite missions from simple commands.

## Lightweight specialization

Training large foundational models on extensive datasets streamlines the model lifecycle, enabling new tasks through minimal adjustments

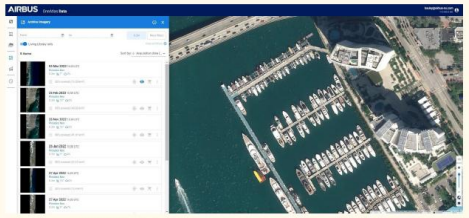


# Mistral LLMs are already powering next-gen geospatial applications

## General-purpose Mistral models already unlock new satellite imagery use-cases

- **Current Mistral VLMs** show strong image understanding for Earth observation and can power natural language interactions with GIS systems
- **Mistral Large** is designed to natively integrate grounding capabilities and enhanced Earth observation performance

**Image search**

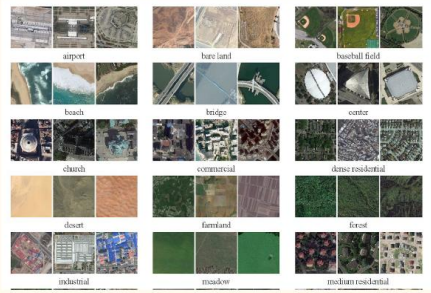


**GIS database queries**

## Fine-tune Mistral models for specialized models on mission-critical applications

**Model customization** further unlock precision, scalability, and real-world applicability by leveraging the unique characteristics of satellite imagery

**EVE model** we built with ESA (mistral small) gives 20% more accurate reply on Earth Observation specific data




**1.6x**

**improvement on classification accuracy**[1]

of baseline VLM by fine-tuning on satellite images

1. https://mistral.ai/news/unlocking-potential-vision-language-models-satellite-imagery-fine-tuning

# Visual grounding in satellite imagery: from detection to advanced reasoning

## Open vocabulary entity detection

By design, grounded models support zero-shot entity detection and can further be fine-tuned

**Locate residential buildings with solar panels in this image**

**They are located in <$R_1$>, <$R_2$>, <$R_3$> and <$R_4$>**

## Region description

Users ask targeted questions about specific image regions, while model considers the full image context

**Describe what happens in <$R_1$> and potential impact to local economy**

**A collapsed bridge has cut off a crucial transportation link, impacting both cargo and passenger transit**

## Visual reasoning and agentic planning

A reasoning grounded model brings planning for advanced image analysis: zooming-in/out critical regions, executing external tools & accessing data

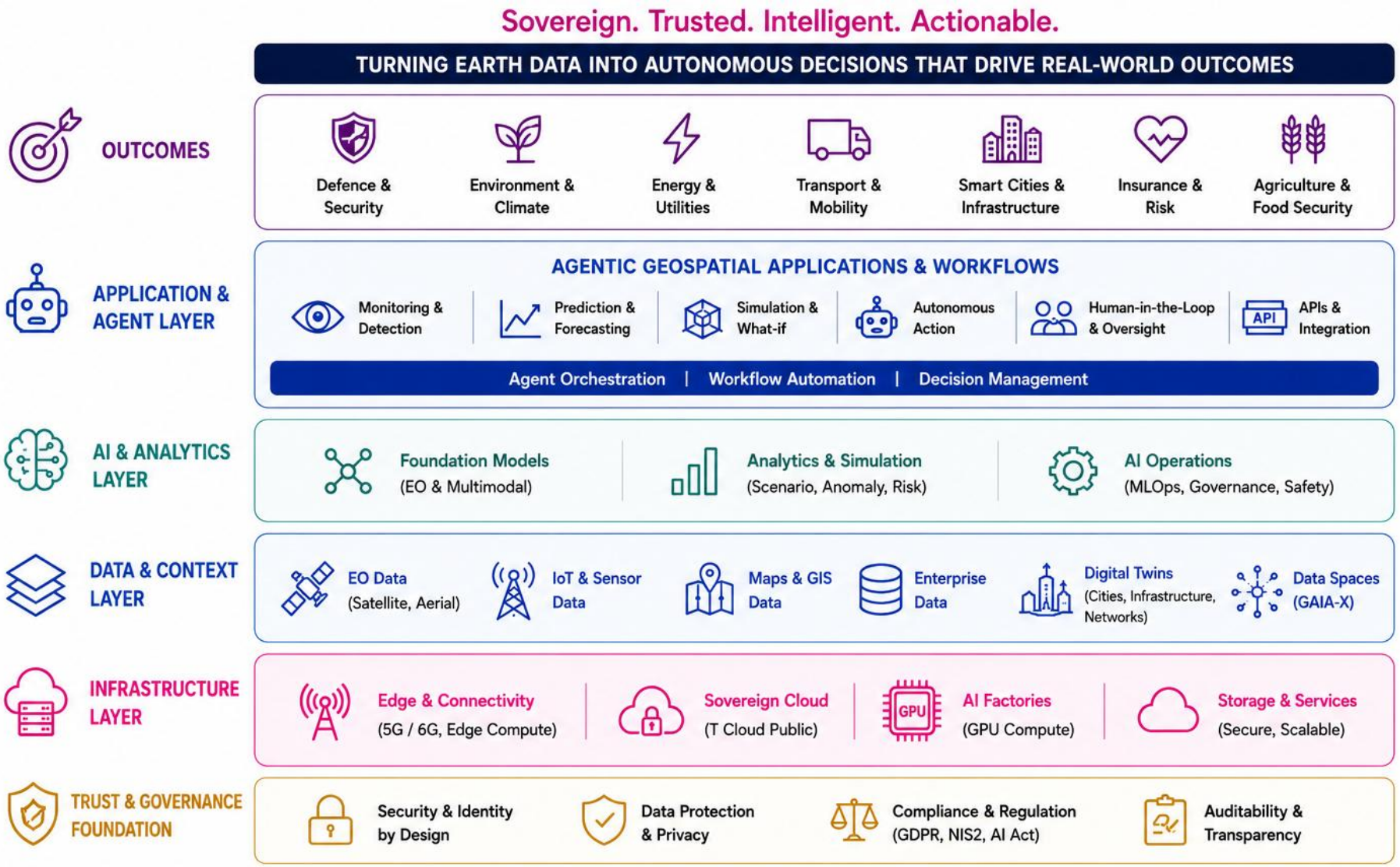
**What is the impact of flood on residential buildings?**

**1. Identify residential zones using GeoGIS metadata**
**2. Zoom in on <$R_1$> to detect flooded streets**
**3. Check for structural damage (collapsed roofs, debris)**
**4. Extract population density data from external sources for impacted zones**

# EO Commercialisation Forum

Session 2.2|Uwe Marquard|Sevilla|13.05.2026

# European Stack for Agentic Geospatial Intelligence Services



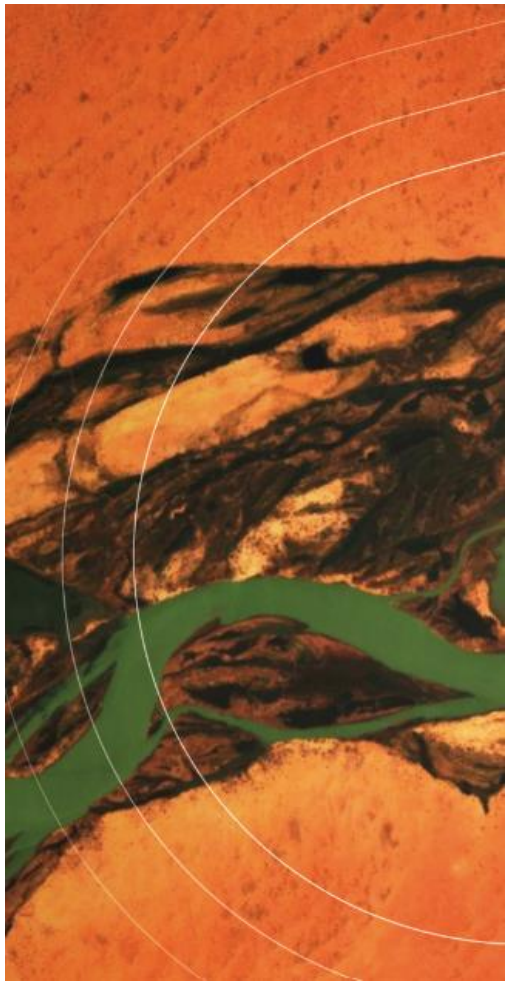
# Where are we today ?

Every layer of the proposed stack exists in European programmes, but:

- **distributed across multiple initiatives**
- **mainly research and development projects**
- **not yet unified into a single reference architecture**

Europe can succeed if:

- **Public policy creates sovereign demand**
- **Industry builds operational platforms**
- **Value is captured in trusted decision systems**

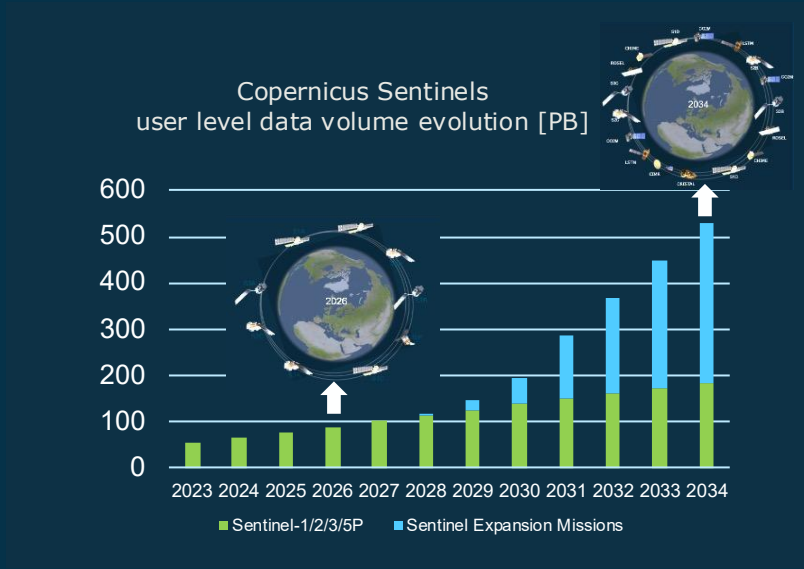


River Niger, 29 March 2026, Sentinel-2
Source: CDSE

# Challenges

Evolving EO Landscape

"Data Deluge" of EO data volumes




Exponential evolution of AI & technology capabilities

# The Actions

## Innovation

From traditional EO product access to efficient data analytics & modelling


## Market Strength

Relying European Industry & Sovereign cloud services

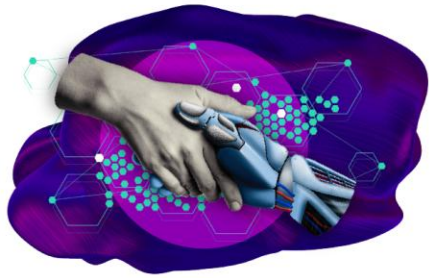

## Synergies & Federation

Unified solutions across ESA EO programmes …but not only

# The Future


ESA is committed to continue reinforcing the principles of innovation, resilience, environmental sustainability, efficiency and European collaboration

Enabling a best-in-class sovereign European ecosystem of innovative and competitive industrial services for EO data analytics



# The European AI Office

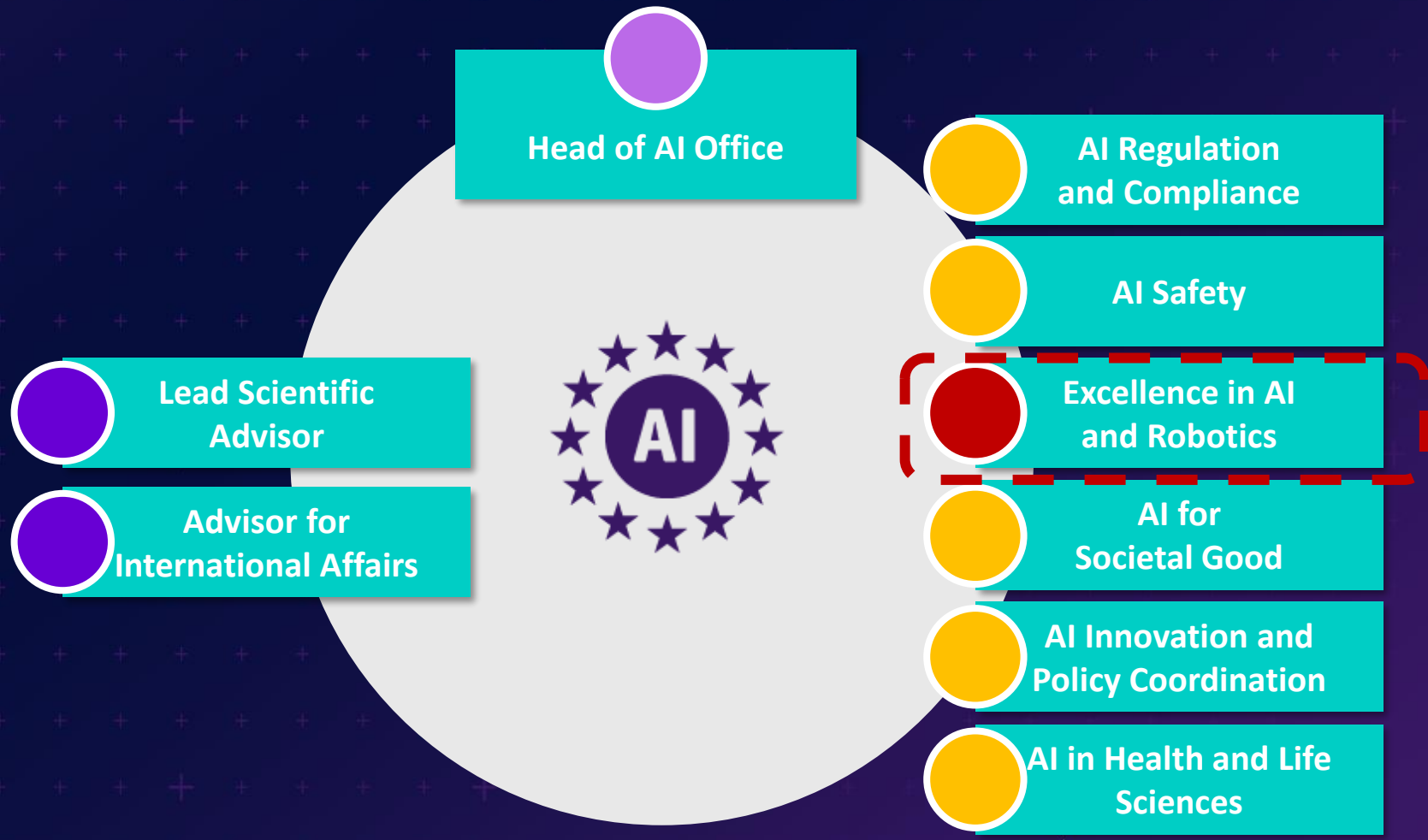
Supervision, Policy Coordination and Strategic Steering of Artificial Intelligence in Europe

EUROPEAN ARTIFICIAL INTELLIGENCE OFFICE

# Introducing the AI Office

## 360 degrees vision on AI

- key role in the implementation of the AI Act
- fosters research and innovation in trustworthy AI
- positions the EU as a leader in international discussions and contributor to AI for good




EUROPEAN ARTIFICIAL INTELLIGENCE OFFICE

# Horizon Europe & Digital Europe: 2021–2025 Funding & Impact Overview

## THE EVALUATION STAGE

**14** Calls for Proposals

**846** Eligible Proposals Received

Out of all submissions, **846** met the strict eligibility criteria to move forward into to the evaluation phase.

**859 M€**

### Initial Investment

The evaluation and early-stage management were backed by a substantial investment of 859 million euros.

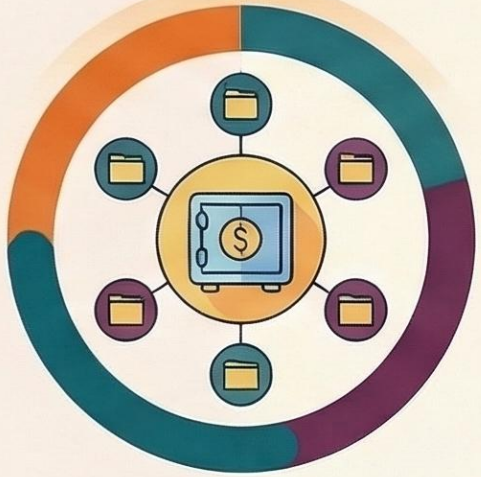
**604** Expert Evaluation Contracts

Over 600 external experts were contracted to ensure a fair and high-quality review of all eligible proposals.

## GRANTS & IMPLEMENTATION (2021–2025)

### Up to 144 Active Projects

The funding supports a diverse portfolio of up to 144 individual projects across the Horizon and Digital Europe frameworks.



**~1B€**

### Total Budget

The combined financial power of the grants for this period reaches an estimated 1 billion euros.

**2,142**

### Program Beneficiaries

A massive network of over 2,000 entities and individuals directly benefit from the distributed grant funding.

**1,016**

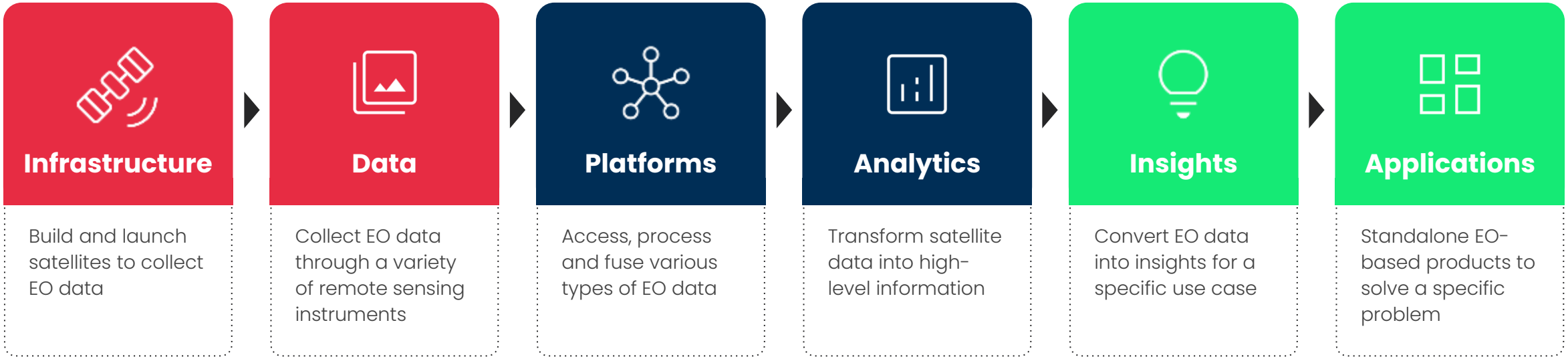
### Expert Monitoring Contracts

To maintain project quality and accountability, over 1,000 expert contracts have been issued specifically for project monitoring.


Science-to-technology partner
vito

# End-to-end Earth Observation value chain at VITO

140 In-house world-class experts




Remote Sensing technology & embedded solutions

EO Platforms & analytical capabilities

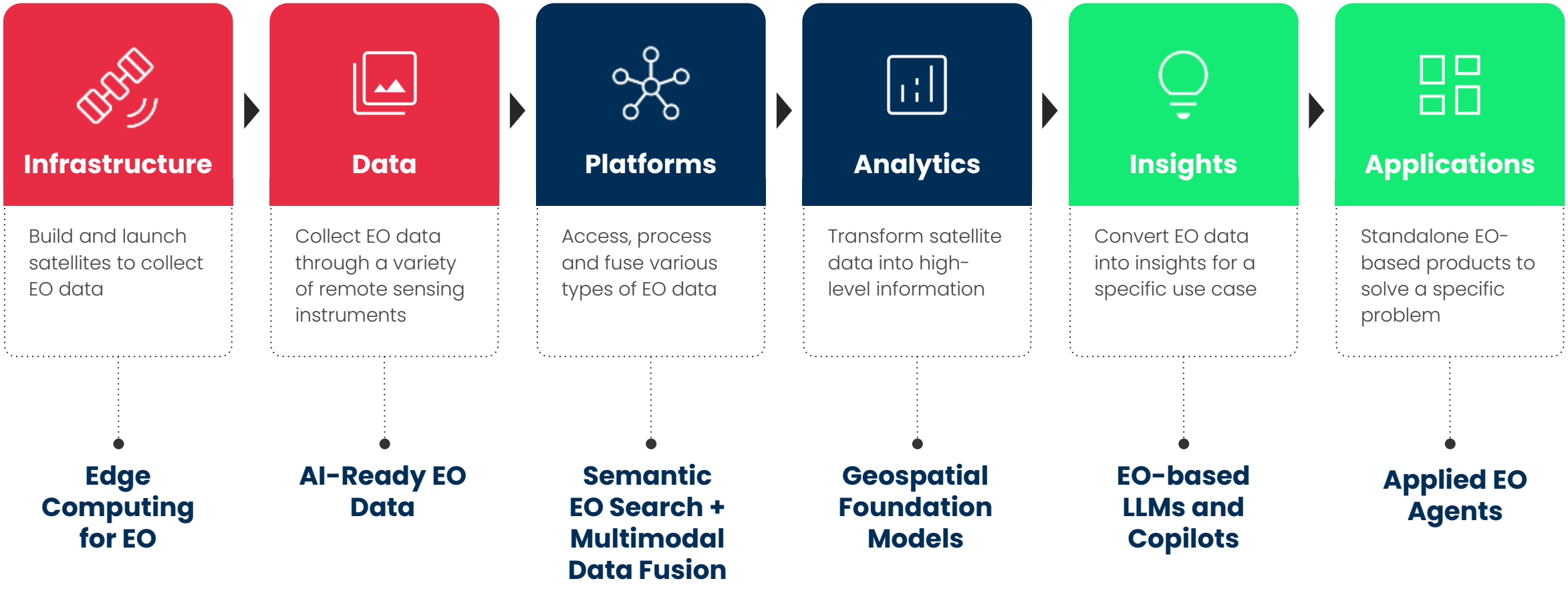
Downstream thematic insights: Vegetation, Land Use/Cover, Natural Capital Accounting Agriculture, Maritime, Security, Defense

vito

Credits: https://terrawatchspace.com/

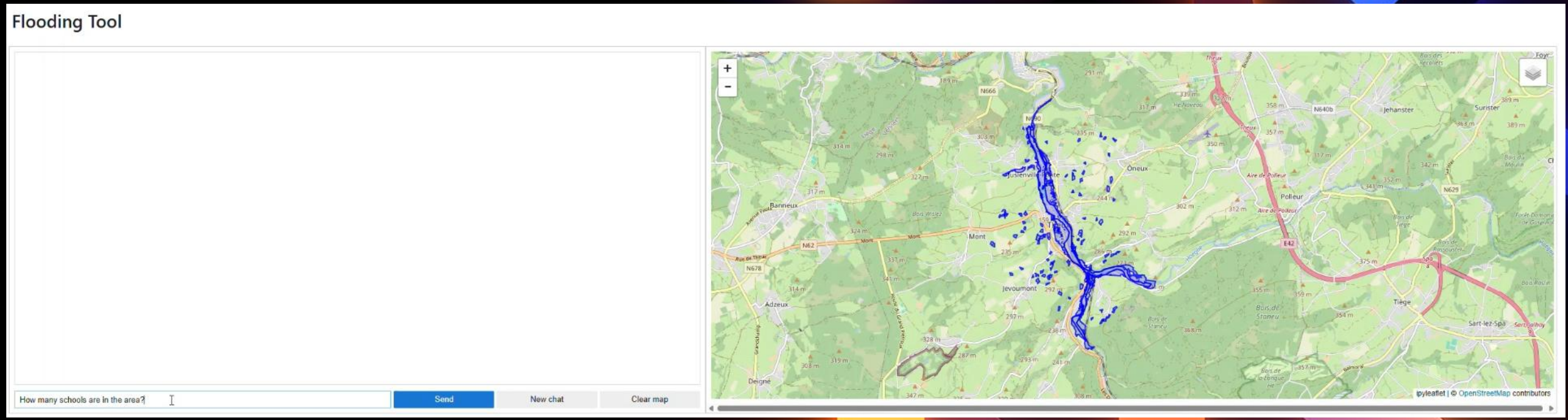
vito.be

# AI across the EO Value Chain




Credits: https://terrawatchspace.com/

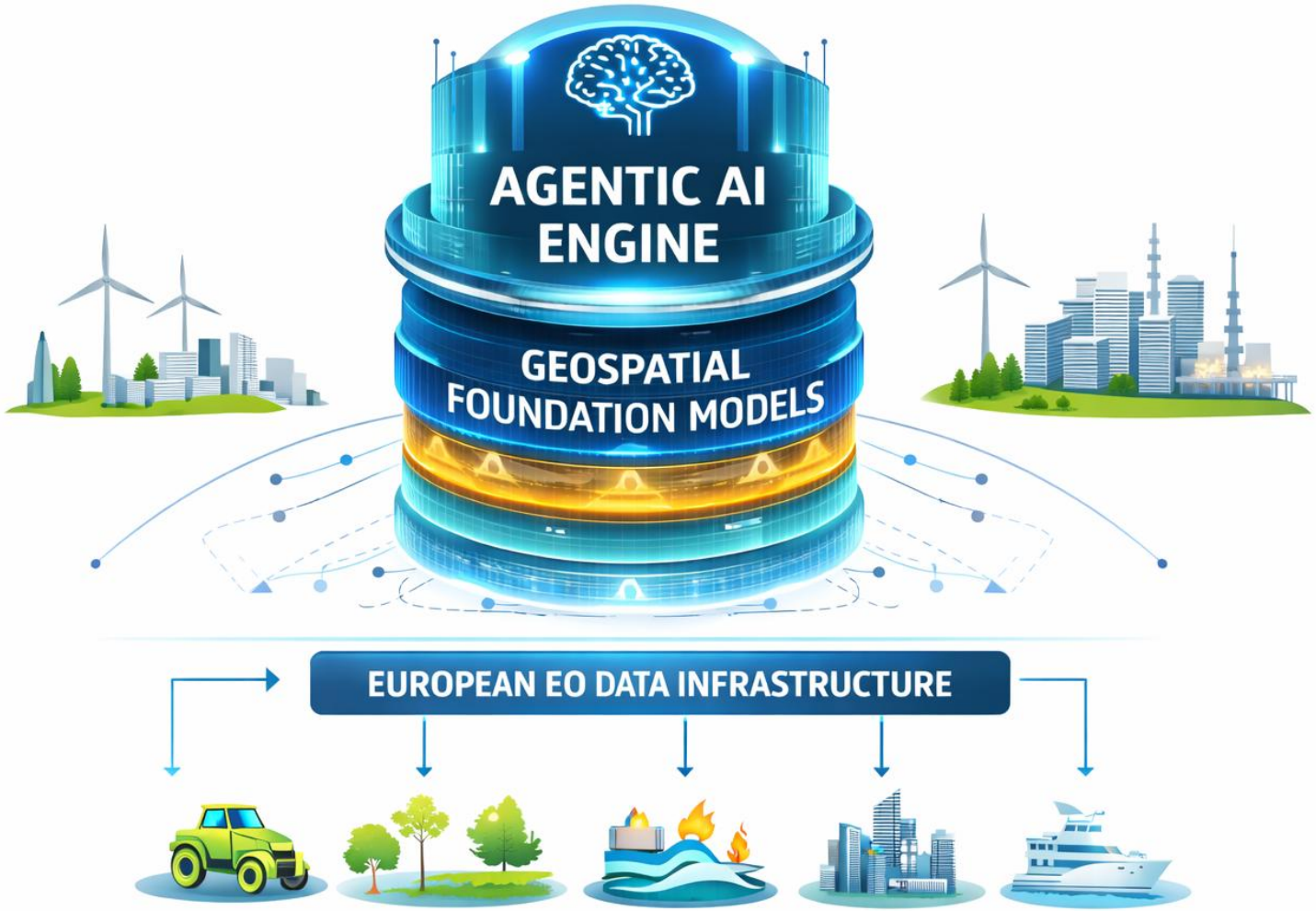
# DVPS – Advancing Multimodal Foundation Models




DVPS
Diversibus Viis Plurima Solvo

Funded by
the European Union

# World Agentic Engine




**Expected date** :
Q2 2026

**Duration** : 18 Months

**Budget** : 3 M€