



## Joint Workshop of the GOFC-GOLD SCERIN and MedRIN Networks

CIHEAM conference center, Chania, Greece, July 16 – July 19, 2024

Land Cover Change (LCC) and Extreme Events in the Context of Climate Change

Mediterranean Agronomic Institute of Chania

Region of Crete

Eratosthenes Center of Excellence, Cyprus University of Technology

Aristotle University of Thessaloniki

NASA LCLUC Program

GOFC-GOLD and START, USA



# Enhancing Earth Observation capabilities of the ERATOSTHENES Centre of Excellence on Disaster Risk Reduction through Artificial Intelligence: Introducing the AI-OBSERVER project

Andreas Christofe<sup>a,d</sup>, Marios Tzouvaras<sup>a</sup>, Michalis Mavrovouniotis<sup>a</sup>, Renos Votsis<sup>a</sup>, Kyriaki Fotiou<sup>a</sup>, Eleftheria Kalogirou<sup>a</sup>, Thomaida Polydorou<sup>a</sup>, Gerd Reis<sup>b</sup>, Fabio Del Frate<sup>c</sup>, Lorenzo Giuliano Papale<sup>c</sup>, Giorgia Guerrisi<sup>c</sup> and Diofantos G. Hadjimitsis<sup>a,d</sup>

<sup>a</sup> ERATOSTHENES Centre of Excellence, Franklin Roosevelt 82, 3012 Limassol, Cyprus

<sup>b</sup> Deutsches Forschungszentrum für Künstliche Intelligenz, Trippstadter 122, 67663 Kaiserslautern, Germany

<sup>c</sup> Università degli Studi di Roma "Tor Vergata", Via del Politecnico, 1, 00133 Rome, Italy

<sup>d</sup> Department of Civil Engineering & Geomatics, Cyprus University of Technology, 3036, Limassol, Cyprus

\* [d.hadjimitsis@cut.ac.cy](mailto:d.hadjimitsis@cut.ac.cy)



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the European Union

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The ERATOSTHENES CoE consists of three Departments:

- Environment and Climate**

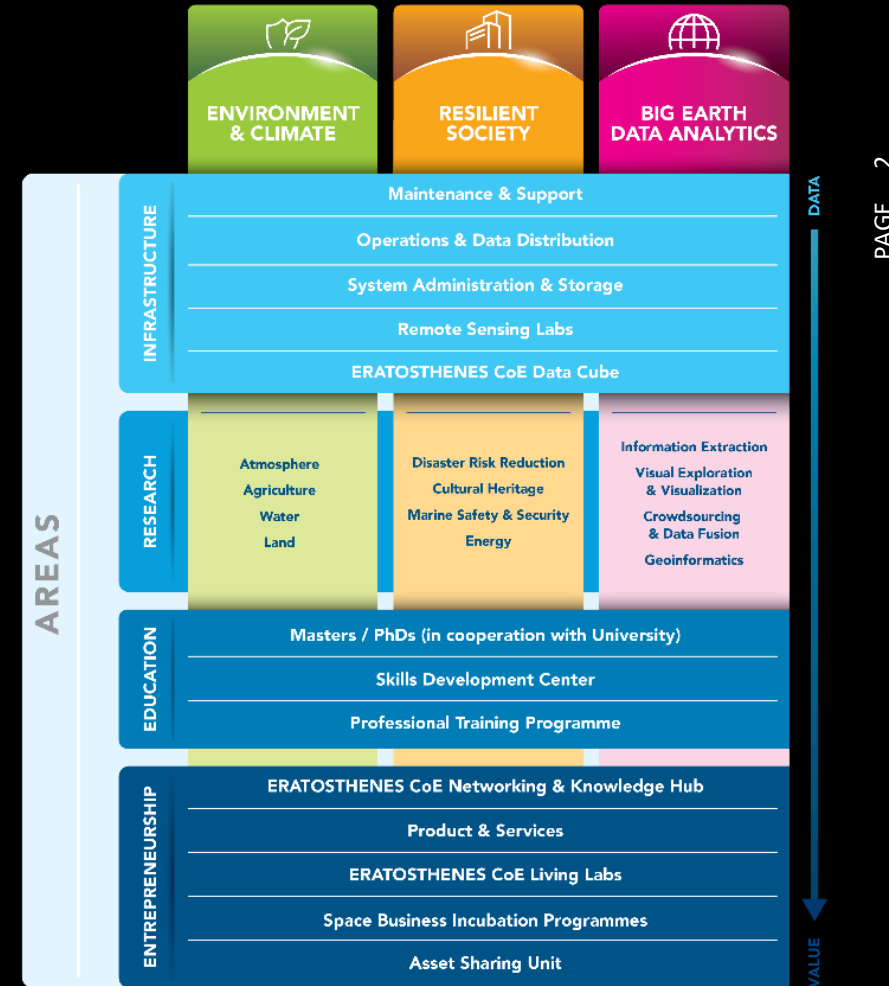
- Atmosphere
- Agriculture
- Water
- Land

- Resilient Society**

- Disaster Risk Reduction
- Cultural Heritage
- Marine Safety and Security
- Energy

- Big Earth Data Analytics**

- Information extraction
- Visual exploration & visualization
- Crowdsourcing & data fusion
- Geoinformatics



## Project details

- Call: HORIZON-WIDERA-2021-ACCESS-03 (Twinning)
- Type of Action: HORIZON-CSA
- Starting date: 1 October 2022 | End date: 30 September 2025
- Duration: 36 months
- Budget: €1,489,379



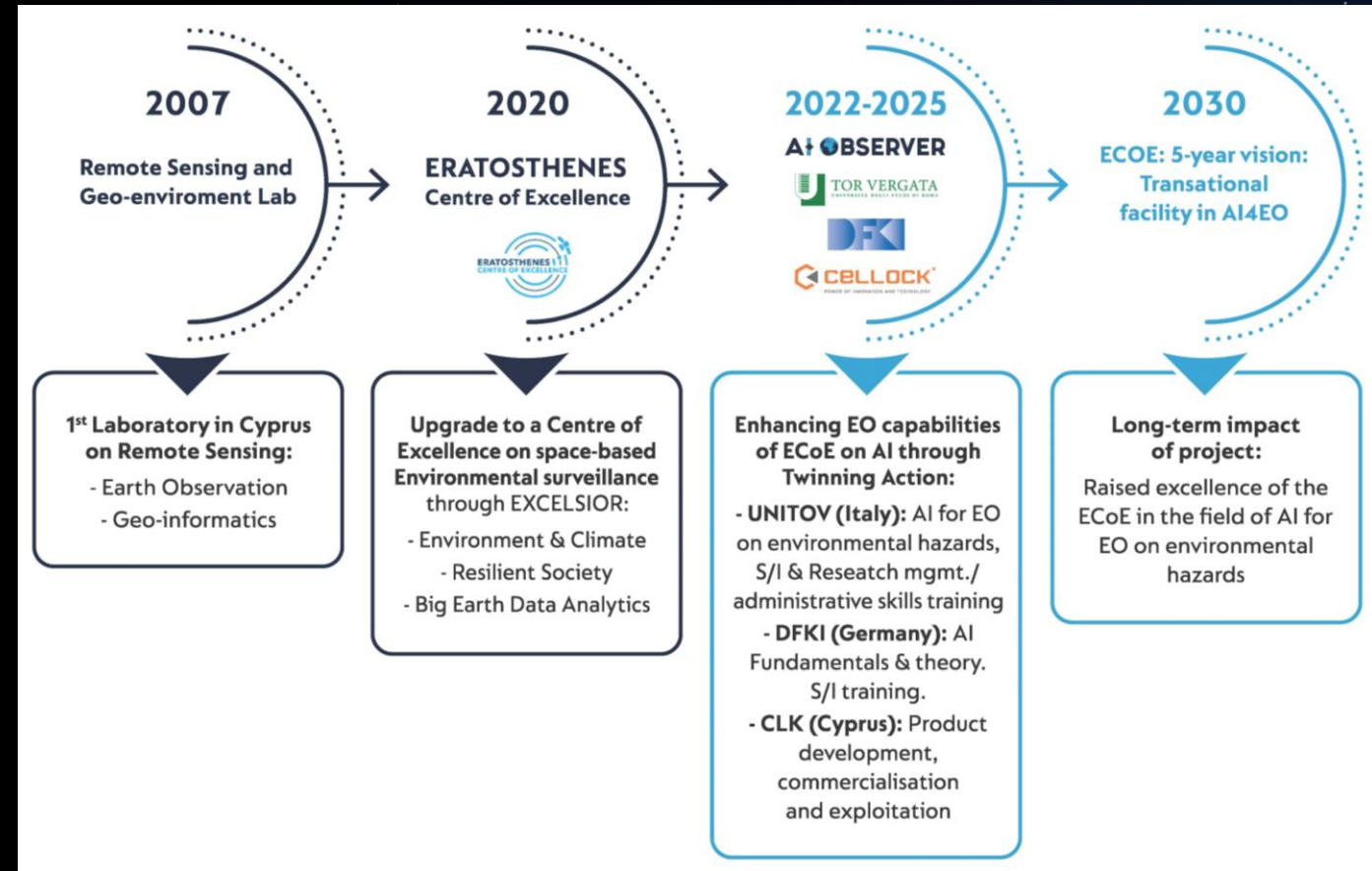
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## Project overview

- Collaboration of the ERATOSTHENES Centre of Excellence (Cyprus) with:
  - **two advanced partners:**
    - German Research Center for Artificial Intelligence (DFKI) from Germany.
    - University of Rome Tor Vergata (UNITOV) from Italy.
  - and the **industrial partner** CELLOCK Ltd. (CLK) from Cyprus.



## Project vision

- ERATOSTHENES Centre of Excellence is the only established research organization in Cyprus for space-based Earth Observation (EO), with a significant track record in participation and coordination of EO related research projects.
- By 2026, the ERATOSTHENES Centre of Excellence , through the EXCELSIOR project, will become a world-class Digital Innovation Hub (DIH) for EO and Geospatial Information, becoming a self-sustained Centre and the reference Centre in the Eastern Mediterranean, Middle East, and North Africa (EMMENA).
- The Centre will take advantage of its state-of-the-art infrastructure, such as the Earth Observation Satellite Data Acquisition Station Hosting (DAS) for Near-Real Time acquisition of satellite data, as well as their storage and processing infrastructure.

## Project vision

AI-OBSERVER aims to **significantly improve the scientific and innovation capacity of the ERATOSTHENES CoE on Artificial Intelligence for Earth Observation, and the research management/administrative skills**, through knowledge transfer activities by the advanced partners, the German Research Centre for Artificial Intelligence (DFKI) and the University of Rome Tor Vergata, **increase the mobility of researchers to and from the advanced partners**, and **exploit the market potential of its activities**, increasing the connectivity of the upgraded ECoE with the industry in Cyprus and the EMMENA region.



## Project objectives



### Upgrade and Modernisation

Upgrading and modernising the existing department of Resilient Society, as well as research management and administration departments of the ERATOSTHENES CoE.

## Project objectives

### Environmental Hazards

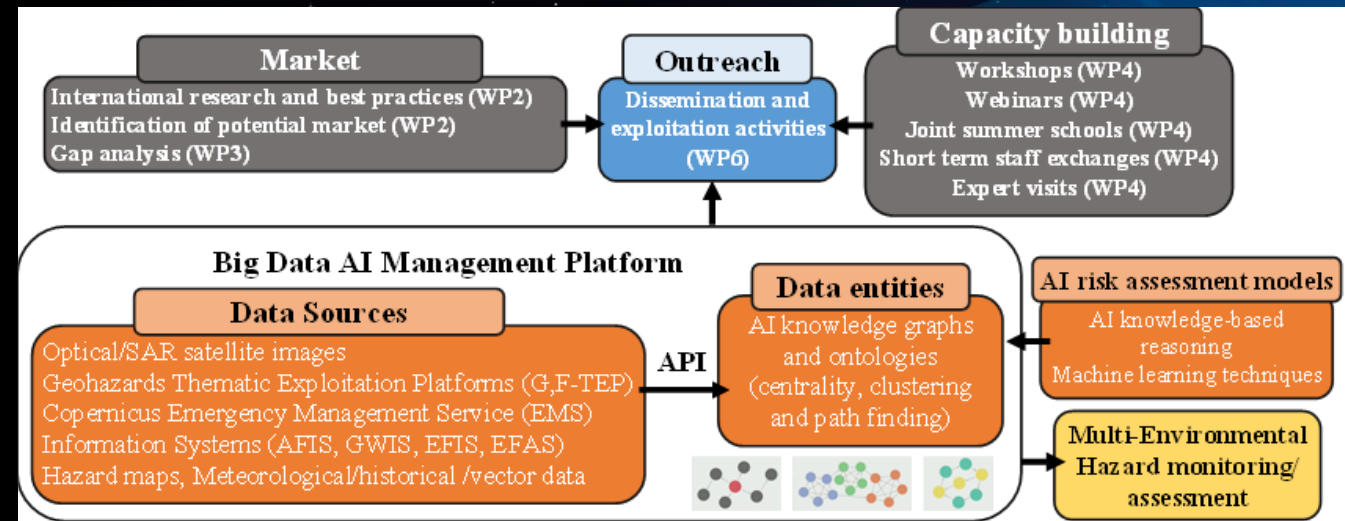
Assist the ERATOSTHENES CoE to reach its long-term objective of raised excellence on AI for EO on environmental hazards





## Methodology

1. Review of international research and best practices
2. Market analysis
3. Gap analysis
4. Capacity building
5. Exploratory research project
6. Development of the first AI-EO products by ERATOSTHENES CoE

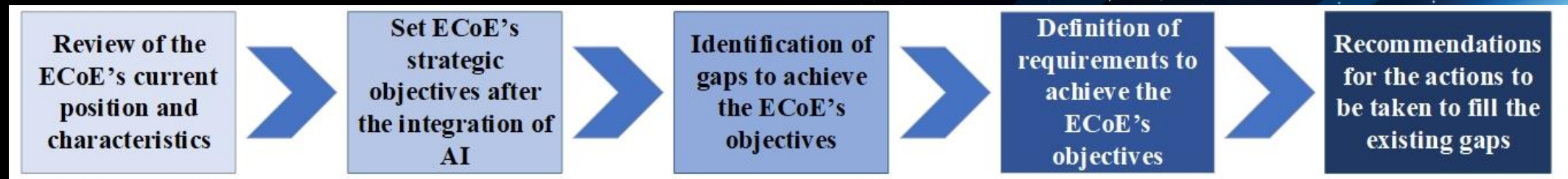


## Market analysis

- Following discussions with the advanced partners and local stakeholders, the Centre's Research Pillar of Disaster Risk Reduction was identified as the one that can provide significant added value to the Centre, increasing its market potential in local, regional, and international level.
- The application areas of the thematic area of disaster risk reduction were decided, thus identifying the main natural and anthropogenic (environmental) hazards in Cyprus.
- The application areas addressed throughout the project are:
  - Land movements (Earthquakes, Landslides, Soil erosion).
  - Forest fires.
  - Floods, Extreme meteorological events.
  - Marine Pollution (oil spills, illegal waste dumping, etc.).

## Gap analysis

- Determination of the ERATOSTHENES Centre of Excellence current position, in terms of scientific excellence, innovation capacity and infrastructure/resources, in the current market.
- Identification of the ERATOSTHENES Centre of Excellence staff needs and the activities necessary for capacity building after the integration of advanced AI technologies in their Disaster Risk Reduction related EO activities



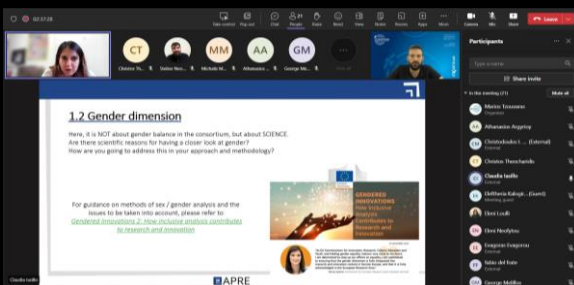
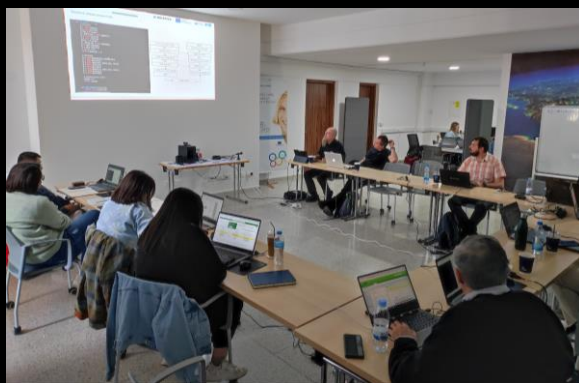
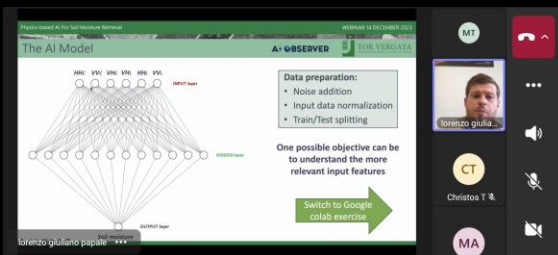


## Capacity Building activities

- A series of online seminars (webinars), hands-on workshops, expert visits, staff exchanges, and summer schools organized by the project's advanced partners.

Activities/Travel	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Meetings (M)	ALL					ALL						ALL						ALL
Workshops (WS)				AI						AI					AI			RMA
Webinars (WEB)		RMA				AI					RMA						AI	
Short-term staff exchange (SSE)									AI									
Expert Visits (EV)					RMA							AI						
Joint Summer School (JSS)								AI										
Activities/Travel	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Meetings (M)						ALL						ALL						ALL
Workshops (WS)				AI					AI					AI				
Webinars (WEB)	RMA				AI			RMA				AI						
Short-term staff exchange (SSE)			AI											AI				
Expert Visits (EV)																	AI	
Joint Summer School (JSS)		AI																
		DFKI				UNITOV				DFKI/UNITOV				ALL				EV

# Capacity Building activities





## Exploratory research project

- A joint exploratory research project will be carried out on the topic of EO on Disaster Risk Reduction – Environmental Hazards using AI.
- The knowledge gained through the capacity building activities, and the commercialisation, exploitation, and product development input from CLK will lead to the development of the first AI-EO product of the ERATOSTHENES CoE.



## Exploratory research project

Identification of user needs and data collection

- Meetings with local stakeholders
- User needs
- Concept design of the EO Big Data AI management platform
- Data collection

EO Big Data AI management platform

- Handle multi-source data EO inputs
- APIs
- Monitor and assess the data in real time, through visualizations and dashboards

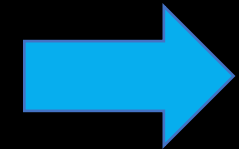
AI-EO risk assessment of environmental hazards in Cyprus

- Earthquakes, landslides, soil erosion, forest fires, floods, marine pollution
- AI-assisted data fusion techniques

Commercialisation of the exploratory project's outputs

- First combined AI-EO products
- AI-OBSERVER final workshop to stakeholders/public
- Roadmap towards commercialisation

# Exploitation and commercialisation



- User requirements
- Data provision

- AI-EO risk assessment models:**
- Earthquakes, landslides, soil erosion,
  - Forest fires,
  - Floods, extreme meteorological events
  - Marine pollution)



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# Thank you!!!



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