EUROPEAN UNION
SATELLITE CENTRE

Analysis for decision making

The use of EO data for security and interconnected domains

Michele Lazzarini

RTDI Project Manager

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Outline

- SatCen and RTDI activities
- The security concept and the role of AI
- AI4Copernicus open calls for security
- SatCen bootstrapping services for open calls

SatCen

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SatCen and RTDI Activities

SatCen is the EU Agency supporting the EU CFSP by analyzing data from space-based assets

Within the Capability Development Division, the RTDI Unit works in new solutions along the whole EO data value chain, from the acquisition of data to the delivery of trustful information

Cooperation | EU Initiatives | Innovative Tech | EO Applications | New Security

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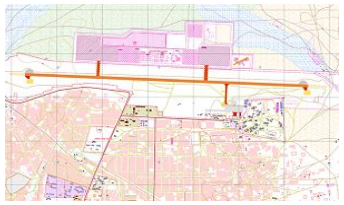
The Classic Security Concept

Geospatial services for Security are traditionally focused on analyzing isolated scenarios with potential risks for citizens' safety

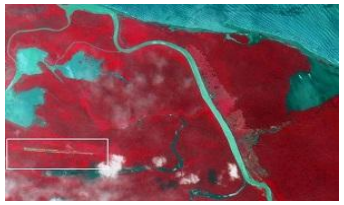
Humanitarian Aid

Border Surveillance

Critical Infrastructures



Contingency Planning



Security Surveillance

Disasters

The New Security Concept

The new security concept considers also the links of different domains with the security of citizens and societies

Climate Change
Changes in climate patterns can introduce major risks in some regions

Environmental Issues
Illegal activities can threat safety of population

Pandemics
Governments can be forced to take measures affecting daily life of citizens

Resource Scarcity
Water access or scarcity of food can lead to conflicts

Weather Events
Extreme climatic conditions can result in forced migration

Air Pollution
High level of contaminants in the atmosphere can create health issues

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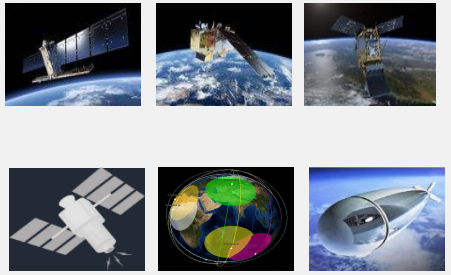
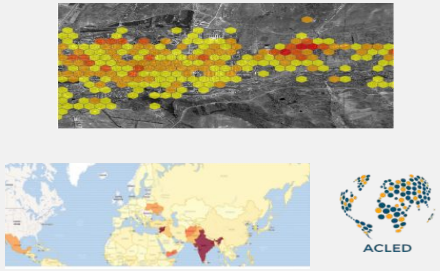
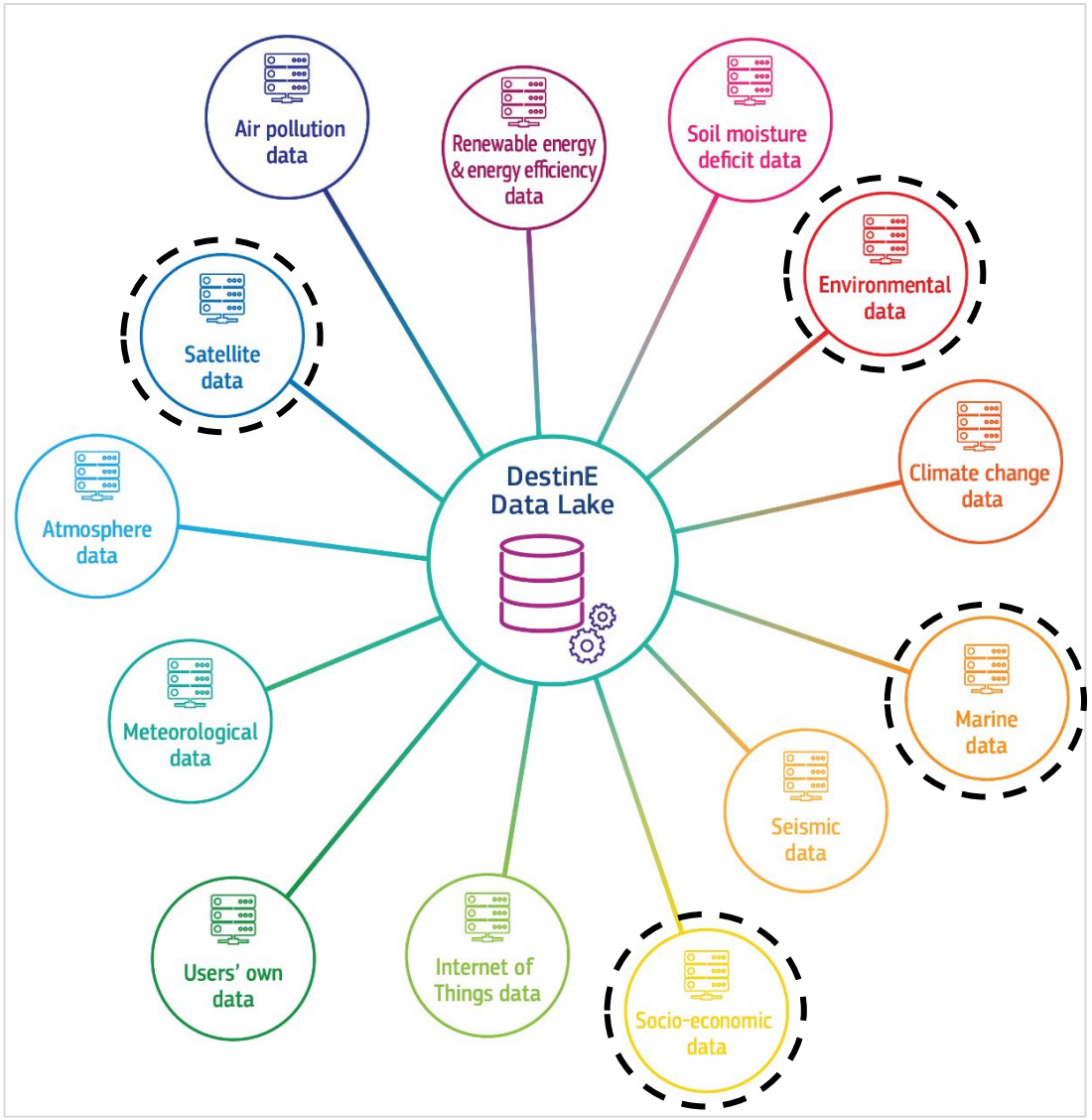
New Security and New Data towards a DTE model

EO imagery



Collateral sources





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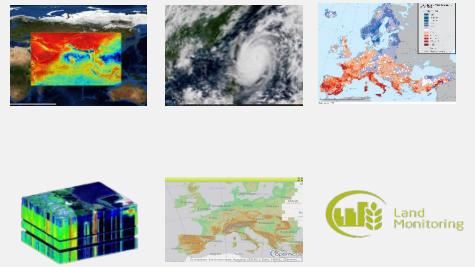
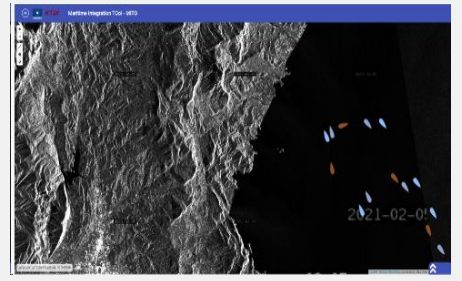
Other EO and derived data



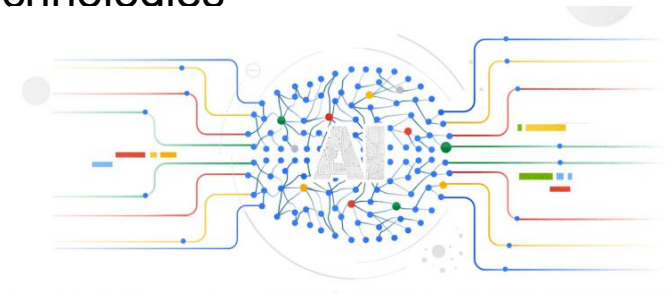
EO fusion with AIS signals



AI in the Space and Security Domain

Disruptive moment in time – new Space paradigm

- Explosion of availability of data, ICT infrastructure and new technologies

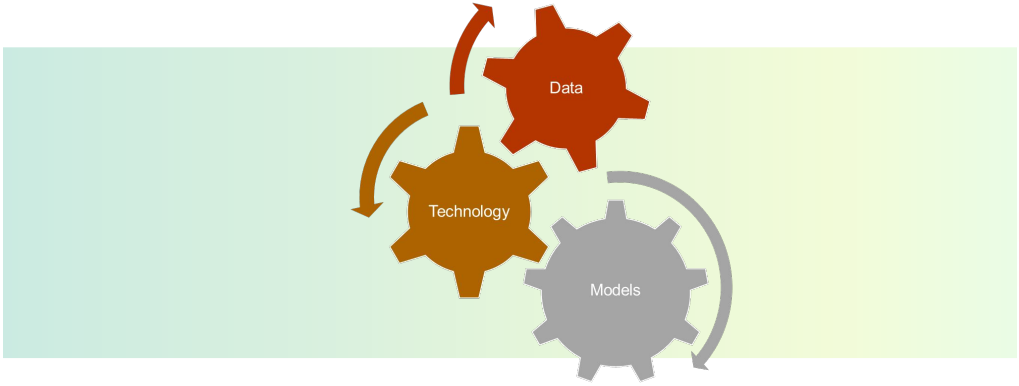


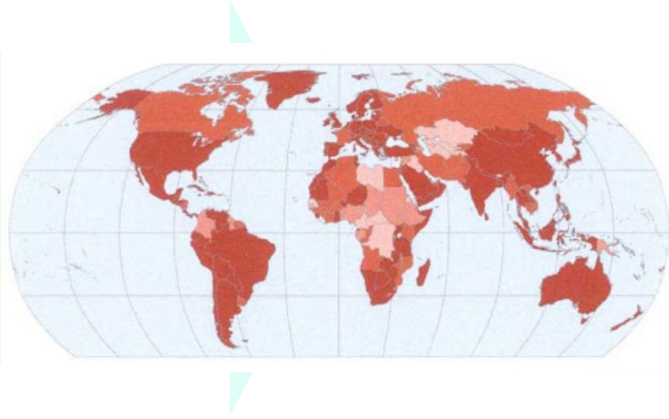
Production is more complex, demand is ever increasing

- There is a need to be faster, to be better

AI techniques are showcasing its impact across many industries

- Particularly repetitive jobs can be extremely benefited from AI techniques





SatCen is actively working in new methods, tools and algorithms to cope with the growing demand and to timely extract information from data

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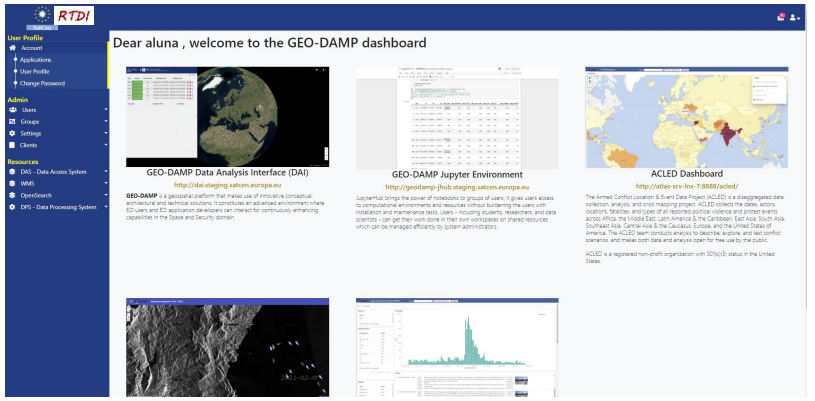
AI at SatCen

Horizon 2020 Projects
Participating to initiatives aimed at securing SatCen competitiveness

Cooperation with other organisations (e.g. ESA, GEO, OGC) and industry

Internal Activities through an interdivisional Working Group: IT, CapDev, Ops



New operational solutions
supporting the SatCen mission

2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023+

Activities driven by ad-hoc Operational needs

- Ai4SecureSocieties
- Road segmentation
- ESA LSP
- MATRIX
- ARCOS
- GEM
- PROMENADE
- AI4Copernicus
- CALLISTO

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AI4Copernicus

Reinforcing the AI4EU Platform by Advancing Earth Observation Intelligence, Innovation and Adoption

- ICT-49-2020
- Jan. 2021 – Dec. 2023
- https://ai4copernicus-project.eu/

Main activities:

- Reinforce the AI on-demand platform AI4EU with EO ecosystem
- Develop on-demand EO Artificial Intelligence (AI) solutions
- Provide an environment for open calls mechanism

SatCen role:

- Responsible for bootstrapping services
- Manage Security Open calls

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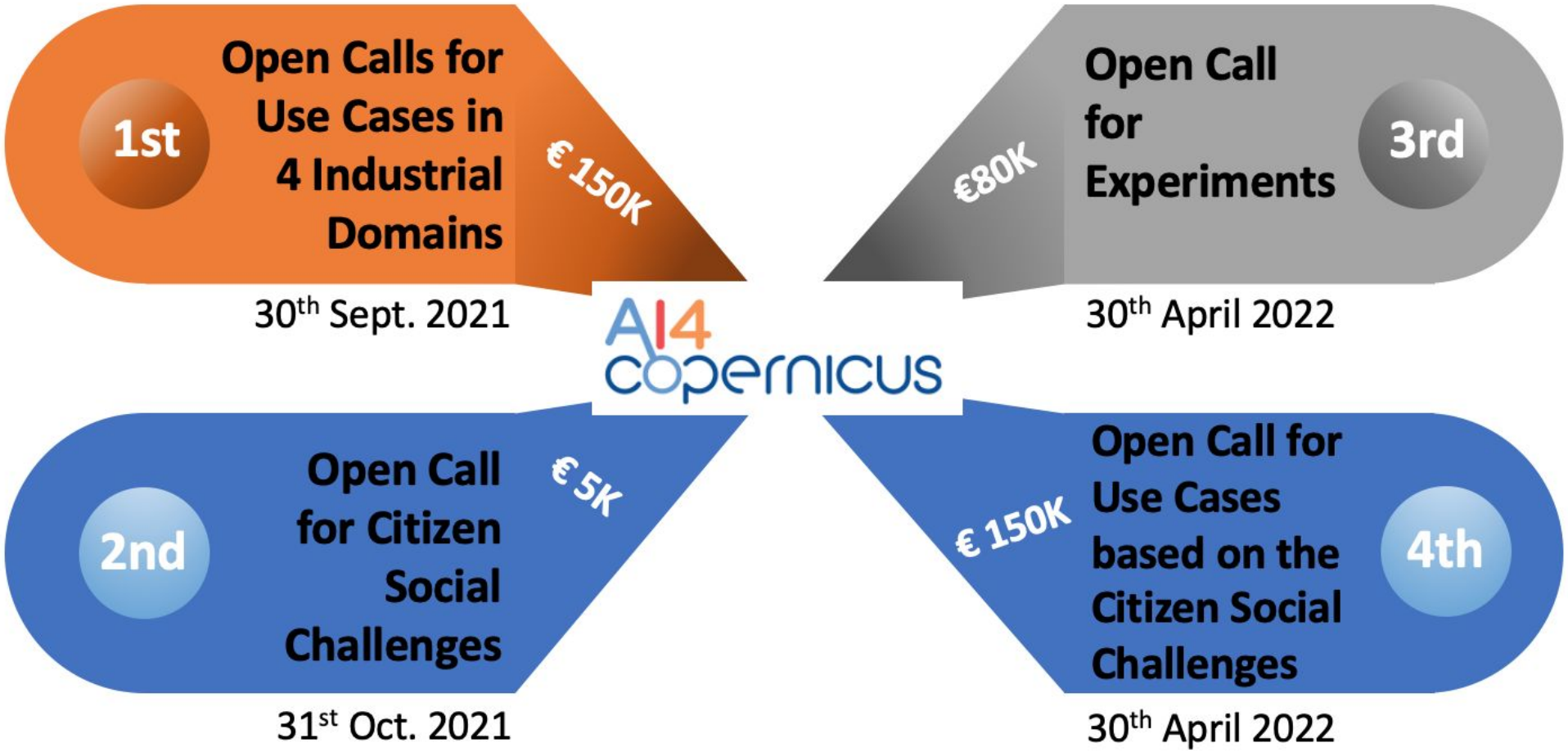
Open Calls Mechanisms



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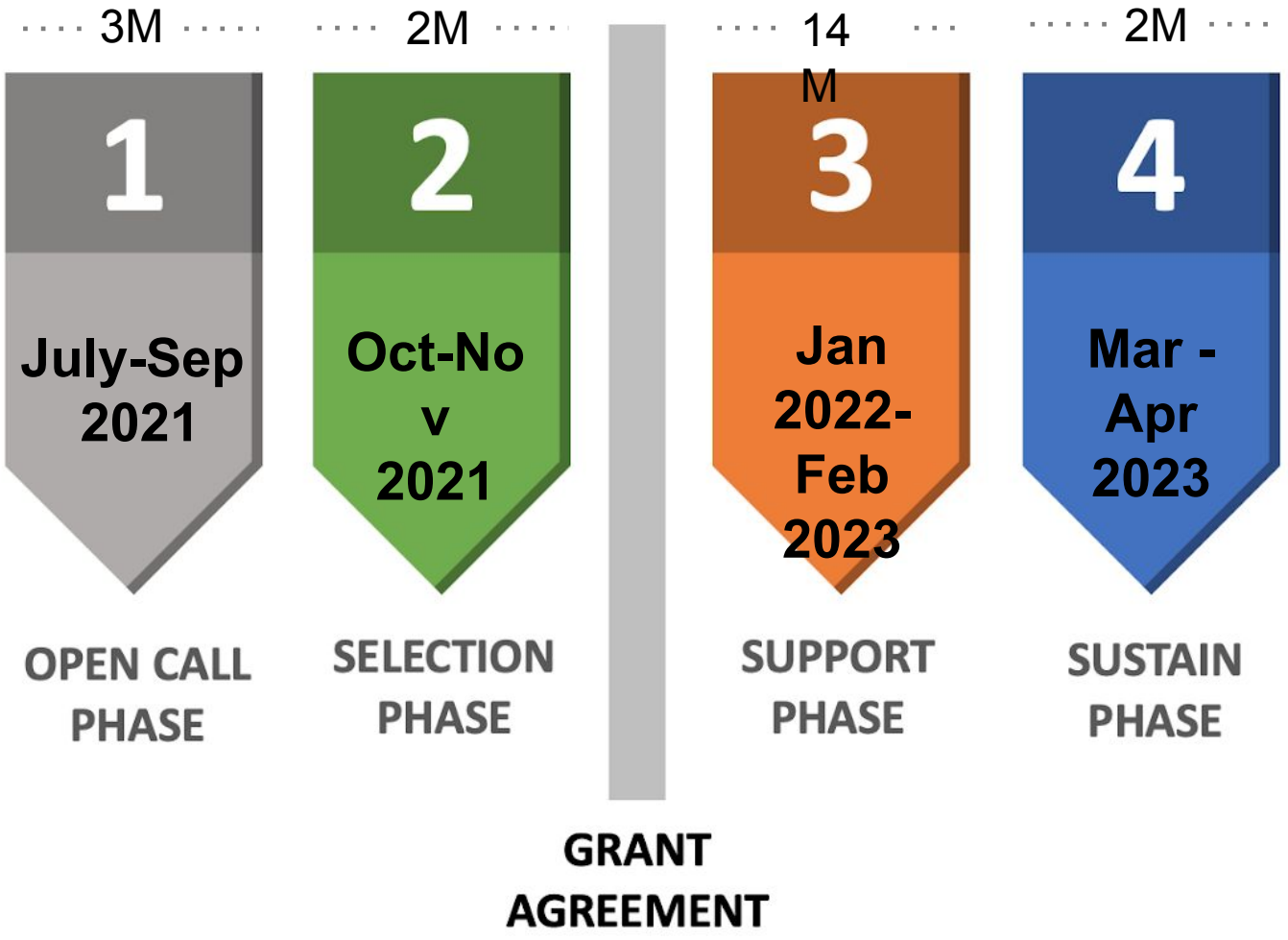
1st round of Open Calls



€ 150k per project

Types of Projects

SME Consortia with at least 1 low-tech SME
In 4 industrial domains

Results

6 AI-EO solutions to be published at AI4EU

Launch Date: 30th June 2021

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Security Scenarios for AI4Copernicus

Development of EO applications leveraging on AI algorithms to detect, identify and/or predict features and events in response to current Security challenges.

The applications are expected to exploit EO data, in conjunction with relevant collateral data sources as suitable (e.g. geolocation, AIS, statistical data, climate/weather, in-situ sensors…) with the use of the latest technologies, also contributing to shape the development of a Digital Twin Earth (DTE) for Security.

SatCen

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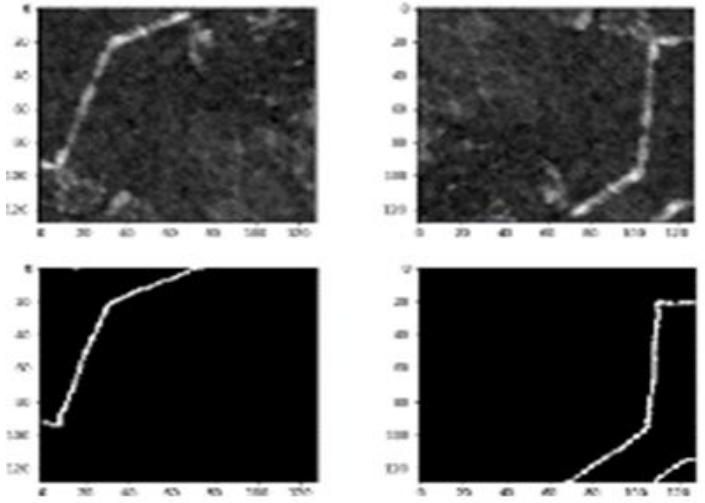
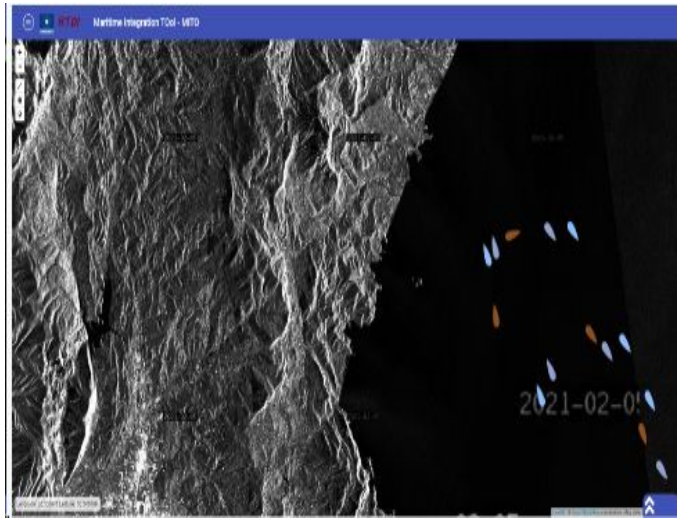
Security Scenarios description

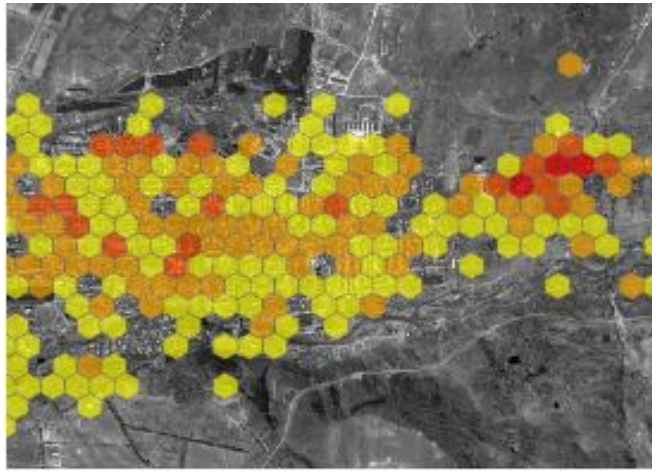
Critical infrastructures and anomaly detection



Maritime Situational Awareness



Synergy of EO and geolocation data



Climate Security

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Security Bootstrapping services

Resources	Scope	Pre-requisite
#1 Sentinel-1 and Sentinel-2 pre-processing pipelines	Pre-processing chains for Sentinel-1 and Sentinel-2 to ARD will be provided to support the development of AI applications	Sentinel-1 (Level-1 SLC and GRD), Sentinel-2 (Level2A) and SNAP software
#2 Sentinel-1 and Sentinel-2 pre-processing pipelines	Processing chains for Sentinel-1 and Sentinel-2 (e.g. change detection) will be provided to support the development of AI applications.	Sentinel-1 (Level-1 SLC and GRD), Sentinel-2 (Level2A) and SNAP software
#3 OSM-derived vector data	OSM-derived data (e.g. roads, buildings and other features of interest for the security domain)	OSM data and vector extraction tool

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Conclusions

1. The security concept is evolving towards a multidomain sector
2. SatCen has several initiatives to implement AI solutions for the security domain
3. AI4Copernicus gives an excellent chance to develop useful applications for the Space and Security domain
4. Open calls mechanism will foster EU market for the development of security applications with the support of bootstrapping services

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Thank you!

Michele Lazzarini

RTDI Project Manager

Michele.lazzarini@satcen.europa.eu

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