New Satellite as a Service paradigm for Multi-node operations in Space

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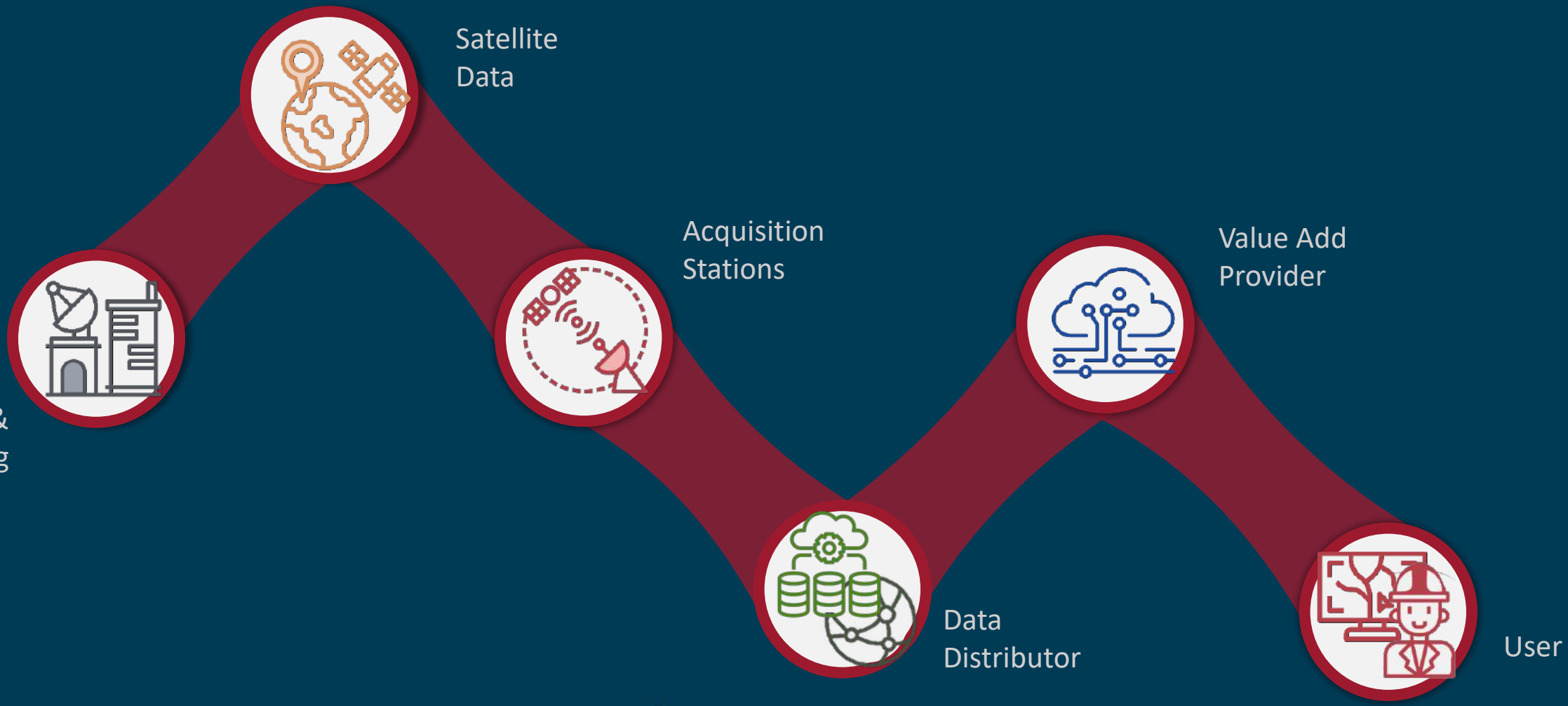
Earth Observation Value Chain



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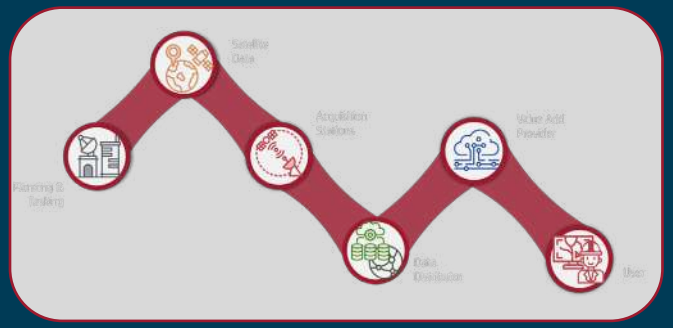
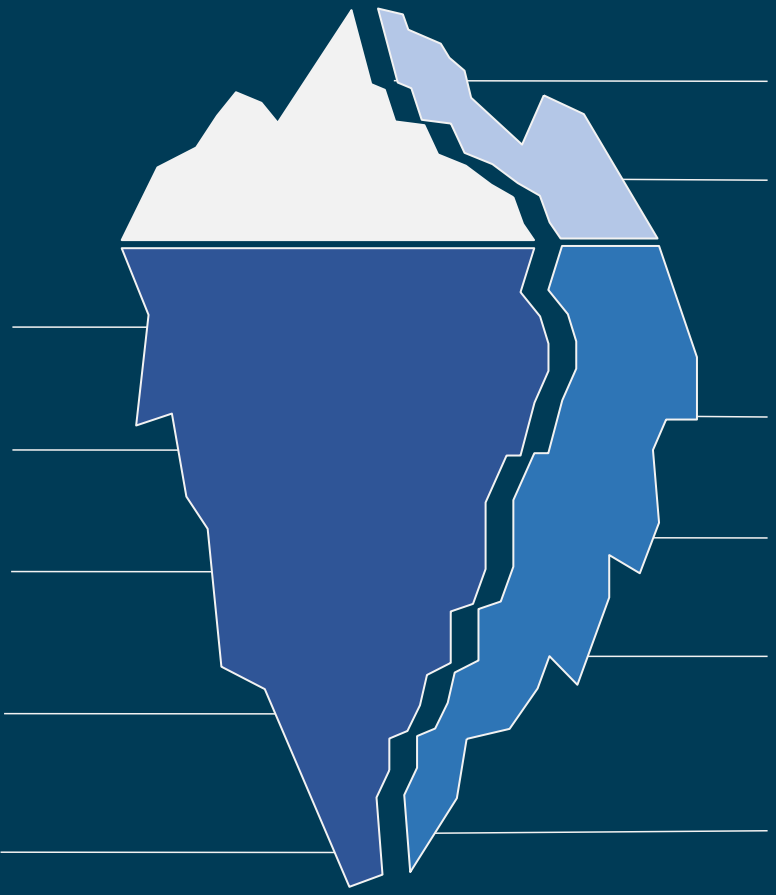
Reshaping the EO Value Chain





Limited Flexibility

Information Latency

Flat data downlink

Space assets as sylos

Increasing the Ground Stations is not sustainable

Space Access

Stream of Data

Limited Autonomy

Missed Observation

Poor quality or irrelevant downlinked data

Time to Launch

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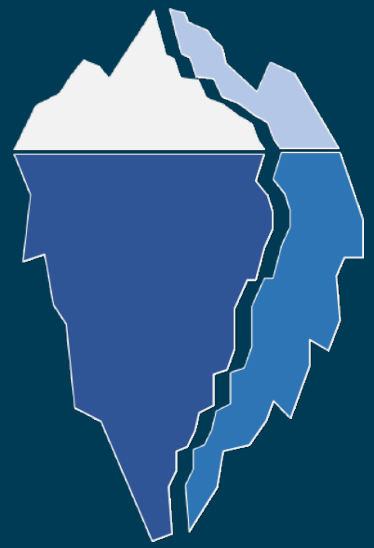
Processing data at the edge



- From data to actionable information
  - Optimization of the downlink channel usage
  - Wide area monitoring services
- Low latency alerting
- Information-driven autonomous workflows: NRT reaction to events or anomalies
  - sensors to sensor tasking
  - multi satellite coordinated acquisitions

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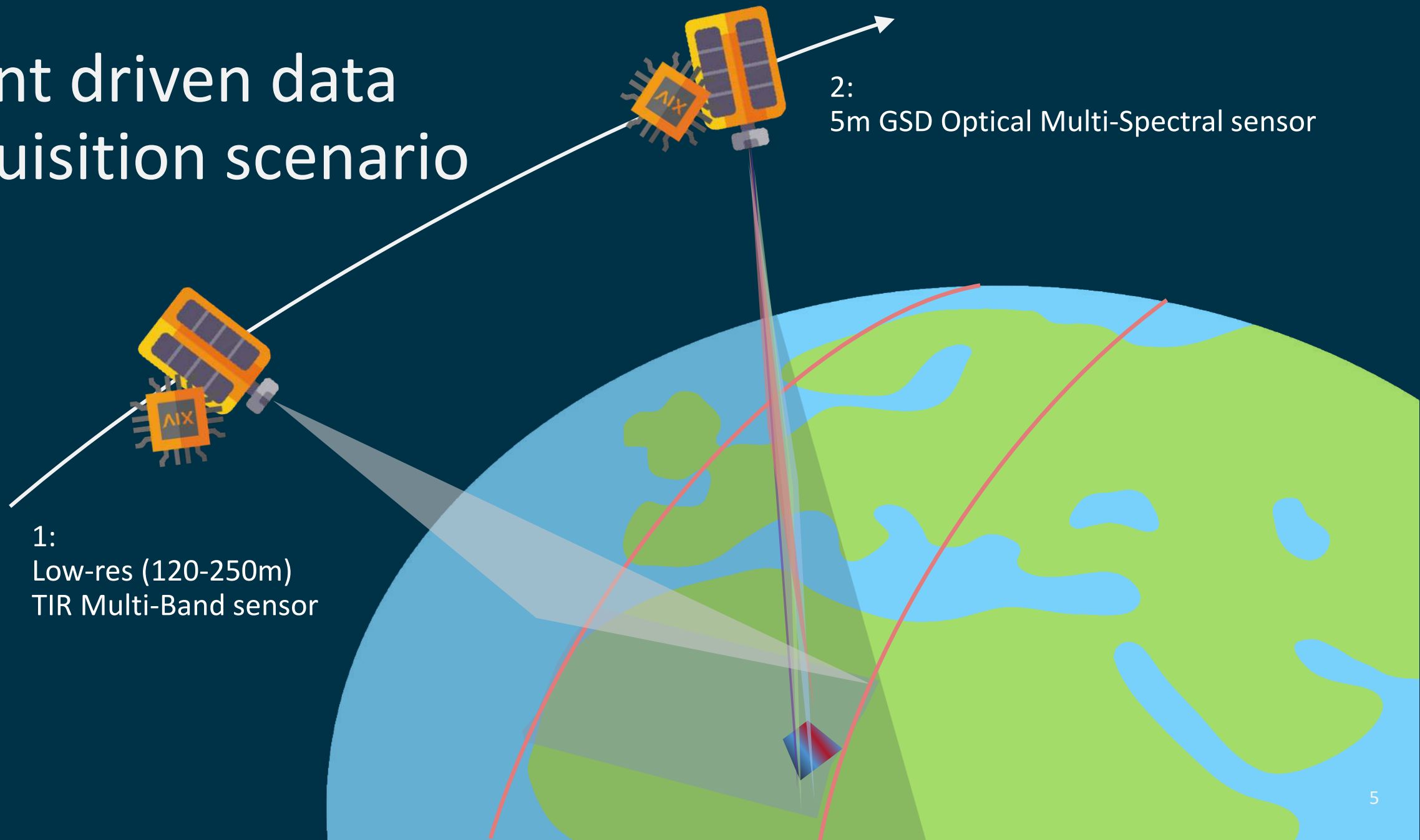
Event driven data acquisition scenario



Application examples

Alerting
Latency is the driver

Continuous monitoring is the driver

Market segments	Applications		
Agriculture	Yield Mapping	Nutrient Management	Irrigation Management
Forestry	Forest Health Management	Forest Fire Monitoring	Forest Land Mapping
Urban Monitoring	Cadastre & Land Mapping	Monitoring Urban heat	Critical Infrastructure Monitoring
Natural Disasters	Risk Forecasts for Hazards	Support early Warning and Response	Support to Insurance
Security/Defence	Border Surveillance Migrants-Refugees	Non-Collaborative Vessel Detection	Accidents Search & Rescue
Defence	Theatre Real Time Threats Detection	SIGINT/IMINT Situation Awareness	Anomaly Detection
Maritime & Coastal	Fishing Zone Surveillance	Oil Spill	Marine Litter
Oil&Gas	Onshore & Offshore Oil Field Monitoring	Pipeline Monitoring	Gas Station Positioning

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AIX
FUTURE EO
NOW

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A strategic & tactical asset

- Integrate AI^X on your satellite to become part of the ecosystem and of the federated constellation
- Embed your space technologies, sensors, memories, radios, on our AI^X Carrier(s), to be used by all the AI^X customers
- Exploit AI^X as a tactical asset to improve your workflows
  - Exploit capabilities and ready-made applications on-demand
  - Write a custom application for a specific Use Case (and your Payload onboard)
  - Use processed data and information from one of the flight-proven applications

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A Space ECOSYSTEM As-a-Service

AI^X on-board component loads the APP on the satellite(s) and manages all the Uberised HW resources

AI^X ground component defines a Space App-Store

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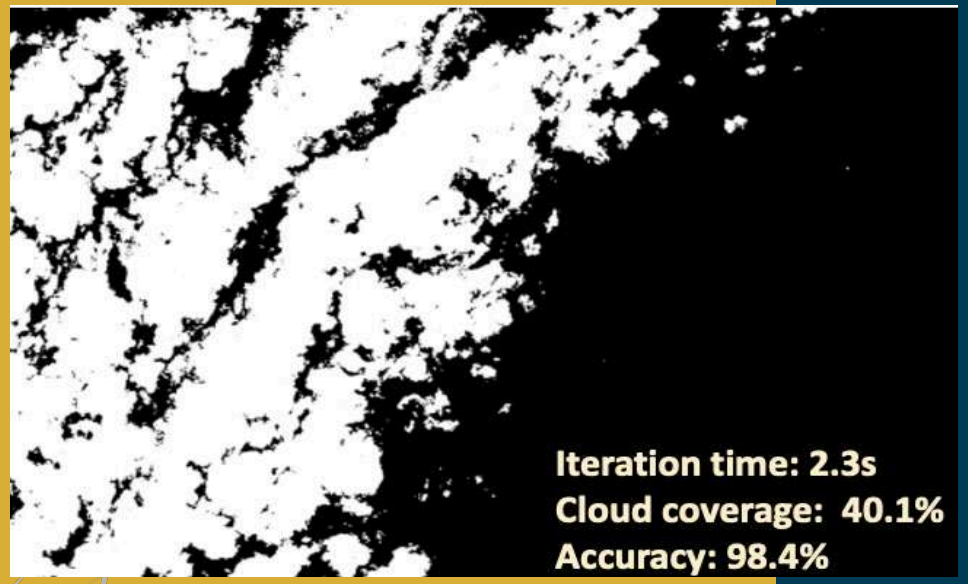
AI^X App: MiRAGE-Clarity

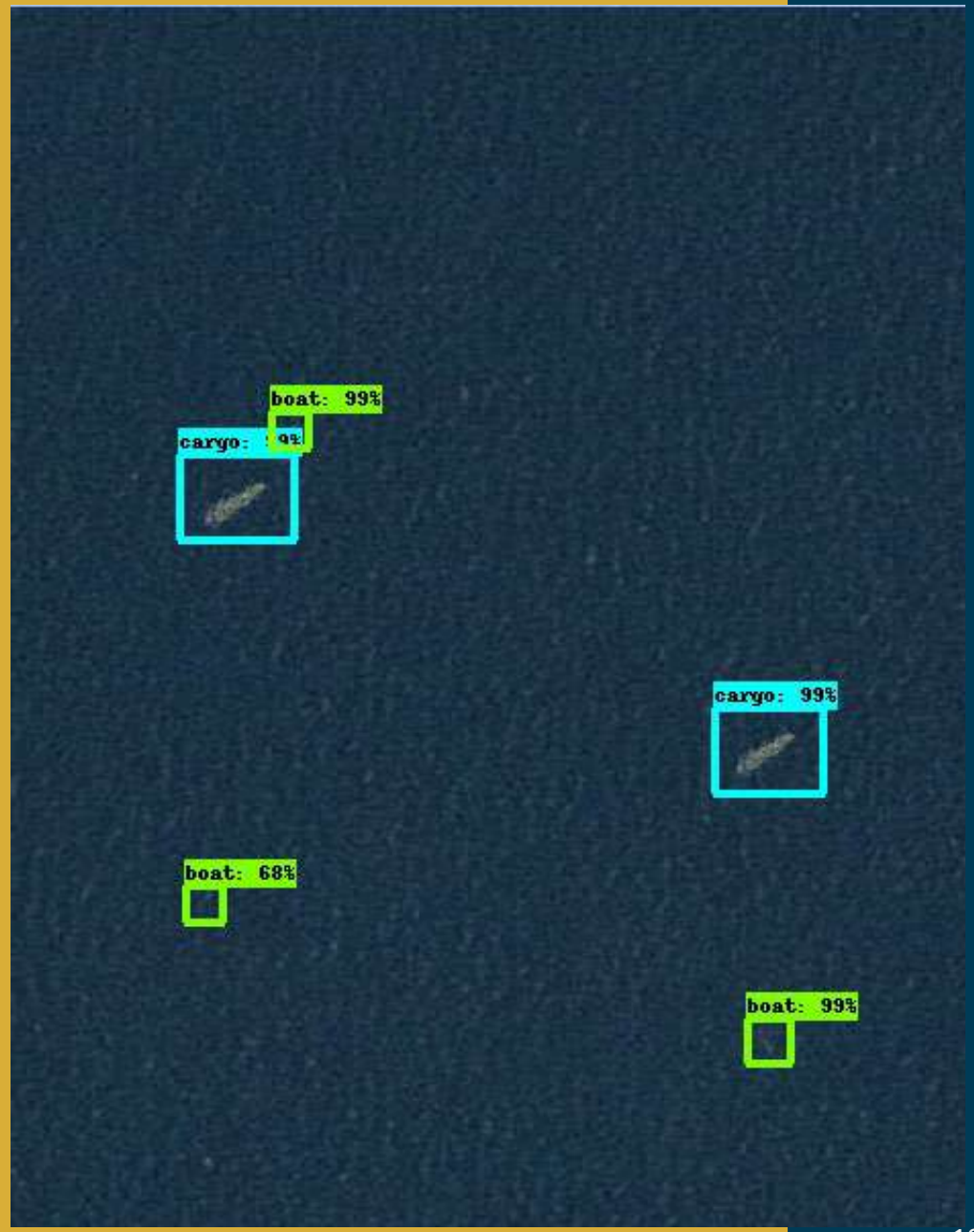
Clarity is a deep learning-based application that enables advanced EO payload data processing.

It has been designed to be compatible with the majority of on-board computing systems for Earth Observation missions, and is one of the AI^X applications' building blocks.



Application Use Case: ship detection

Ship detection from space has already been identified as a potentially interesting use case by several players in the European and US ecosystem and is envisaegd as one of AI^{X} applications.



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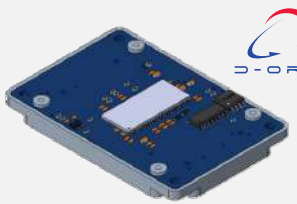
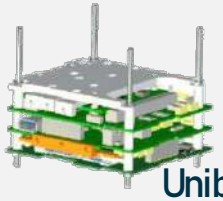
An open ecosystem

Hardware



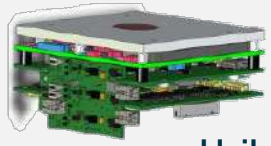
0.2-10 W

Embedded performance
Low electrical power



Unibap iX5

23W
10+ x performance



Unibap iX10

33W
50-100 x Performance of iX5
64x data centre - dedicated computing satellite

X

Customer / 3rd Party IOD

Software

AURORA Satellite Dashboard Control

ermes

AIX

AIX App Store & Services

MiRAGE AI

aws

IoT (Greengrass)
DevOps (Kubernetes)
AI/ML (Sagemaker)

SPACEDGE®

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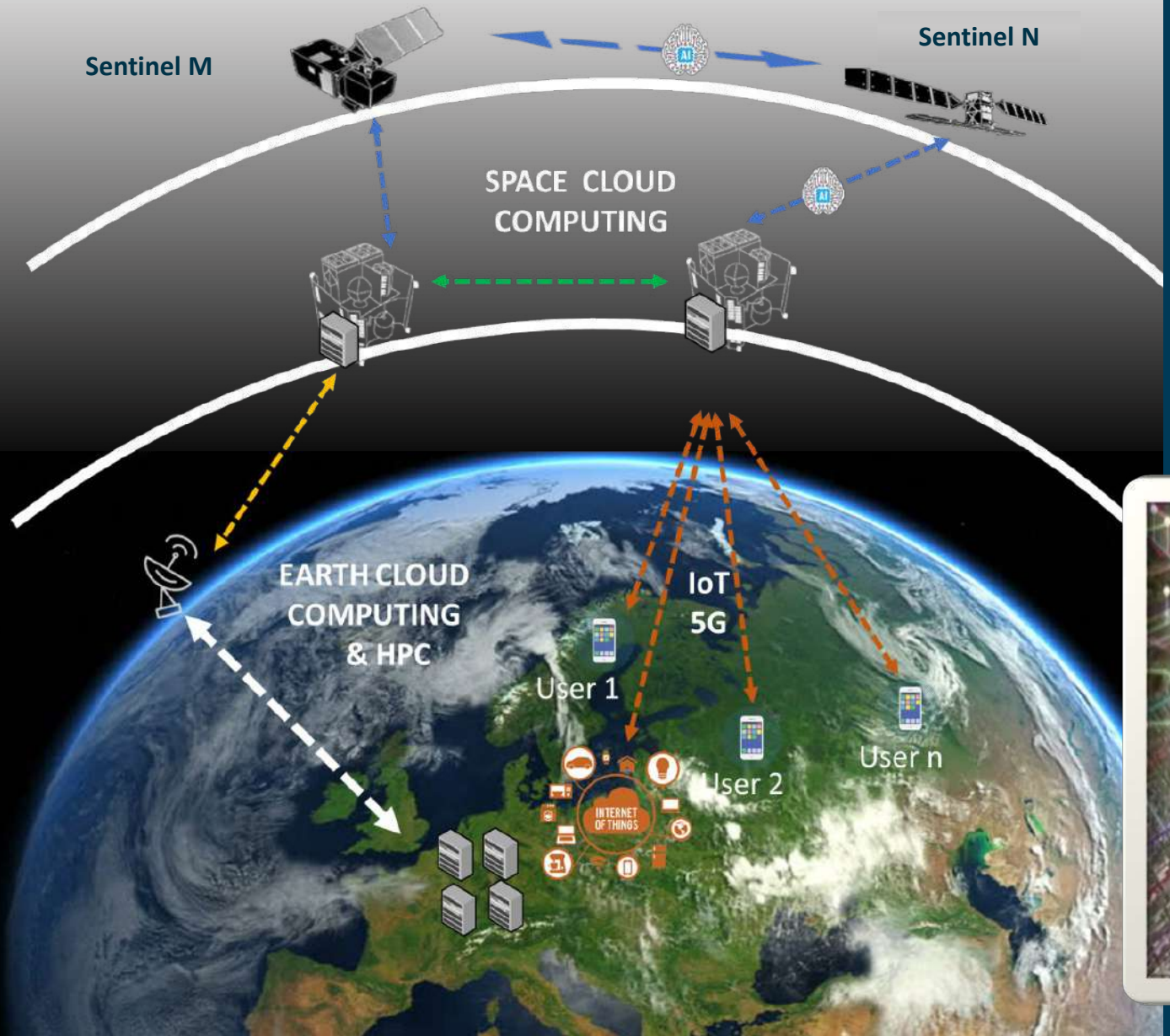
AI^{X} spacedge Cognitive Computing



AIX

SMART IN-ORBIT DATA PROCESSING

An esa InCubed Activity in³

Entering Flight preparation phase

First launch
First half of 2023

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How can we collaborate?

Opt#1. **Set and share your needs** (contributing to AI^X system consolidation) for:

- Discussing how to make feasible Space Services not sustainable today
- (EO) P/L selection & AppX
- Technologies & Protocols
- Implementation Priority

Opt#2. **Let's run your own technology in space and demonstrate your business case**

- Bring your P/L, your HPC computer, or in general your Space Component and let's use it in a AIX workflow
- Let's demonstrate your AI based algorithm in Space

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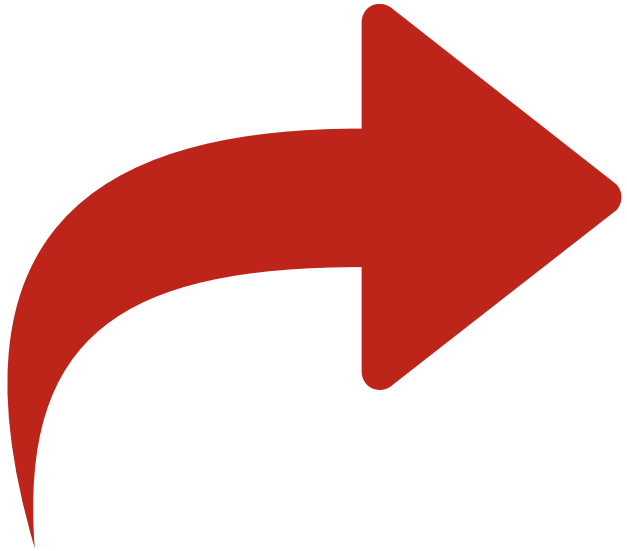
Let’s keep in touch



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