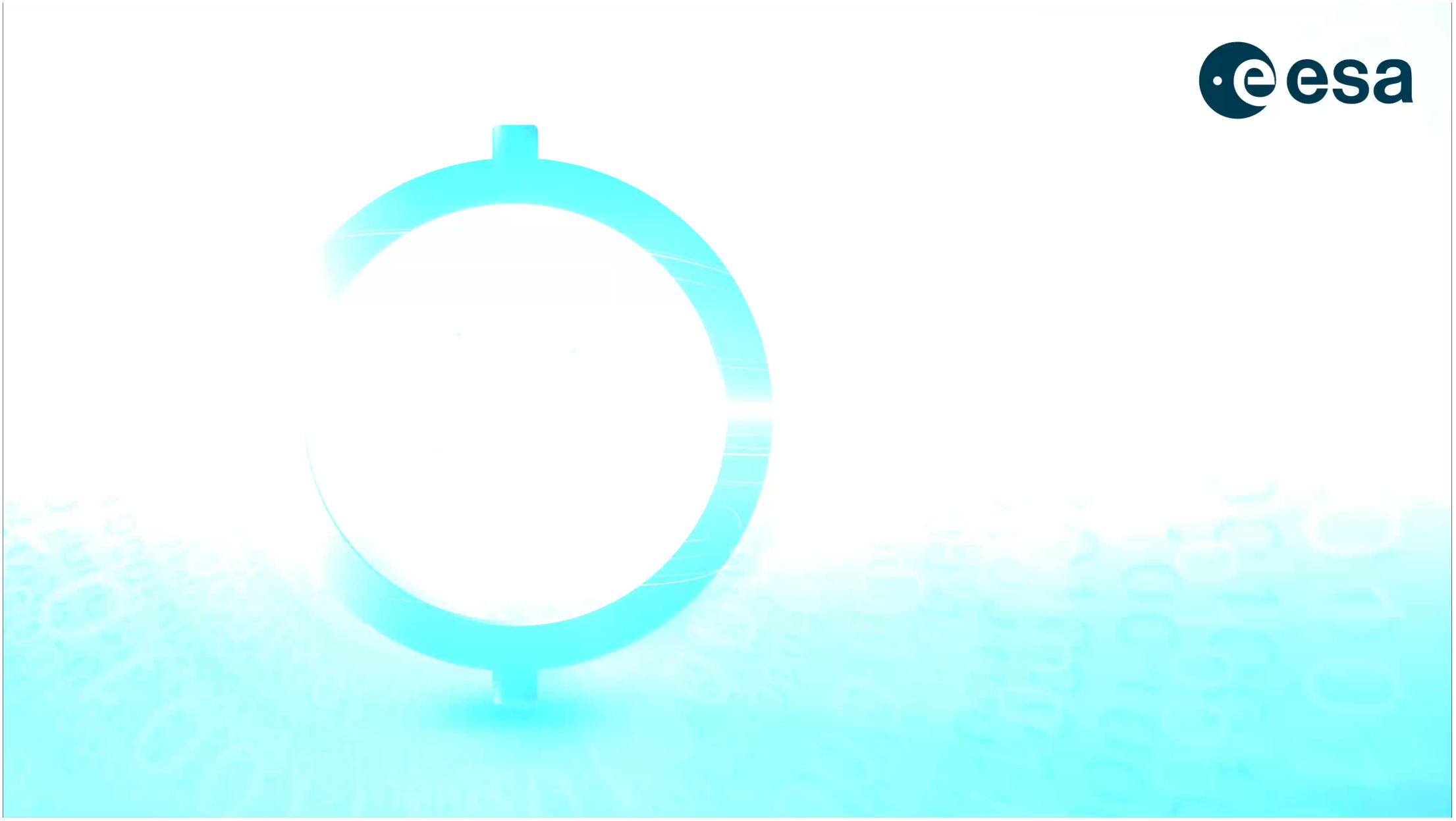
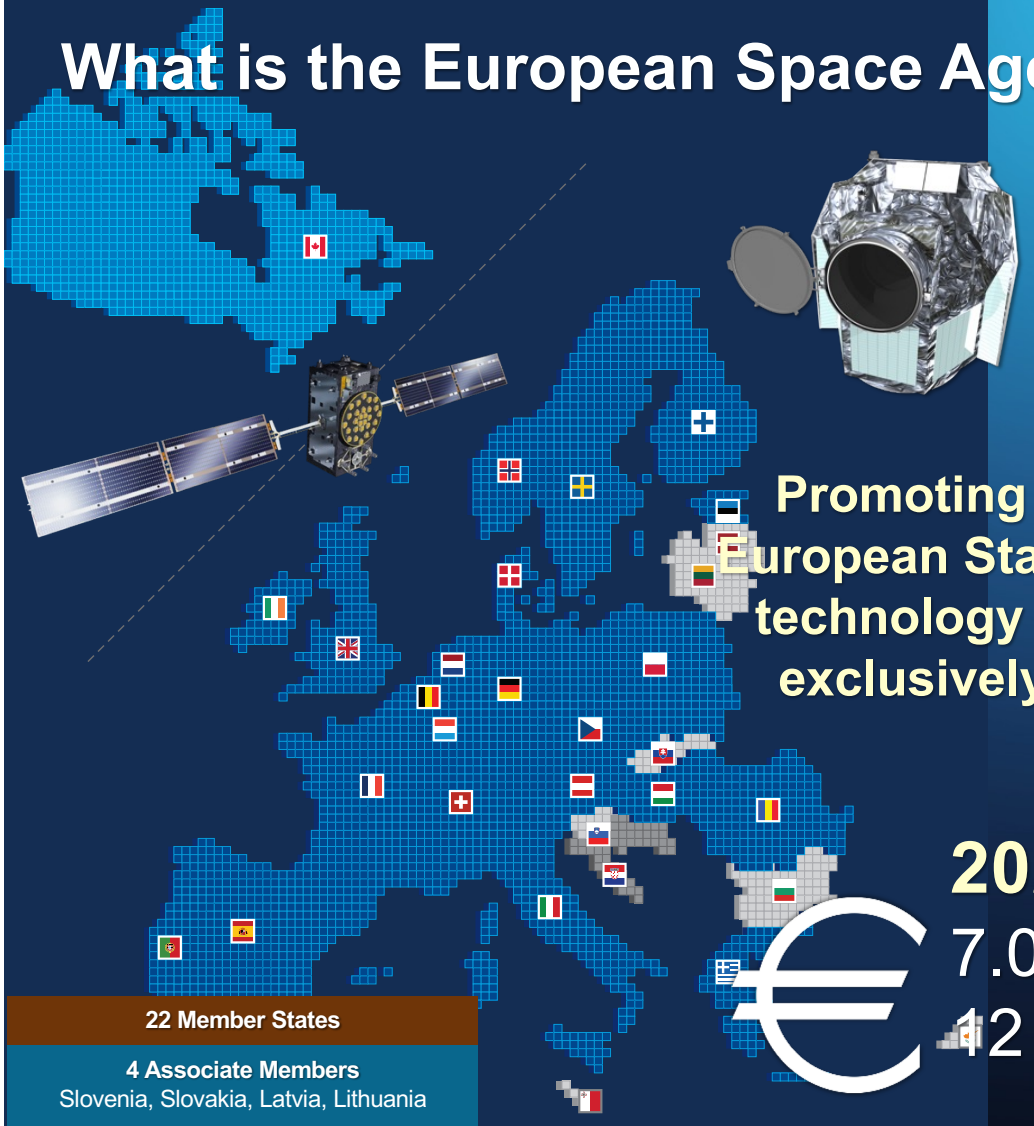



esa
Φ-lab
The ESA Φ-lab
Climate Action, Sustainability and Science Department
Directorate of Earth Observation Programmes
We strongly believe in
truly transformative ideas and
in the power of compelling partnerships
to accelerate the Earth Observation future
Giuseppe.Borghi@esa.int
May 2024
→ THE EUROPEAN SPACE AGENCY

What is the European Space Agency?

esa

Make Space for Europe



Promoting cooperation among European States in space research, technology and applications, for exclusively peaceful purposes

2023 Budget

7.08 billion

42 per European

5,500+

ESA Workforce

22 Member States

4 Associate Members
Slovenia, Slovakia, Latvia, Lithuania

Cooperation Agreements
6 other European States + Canada

ESA Membership

22 Member States

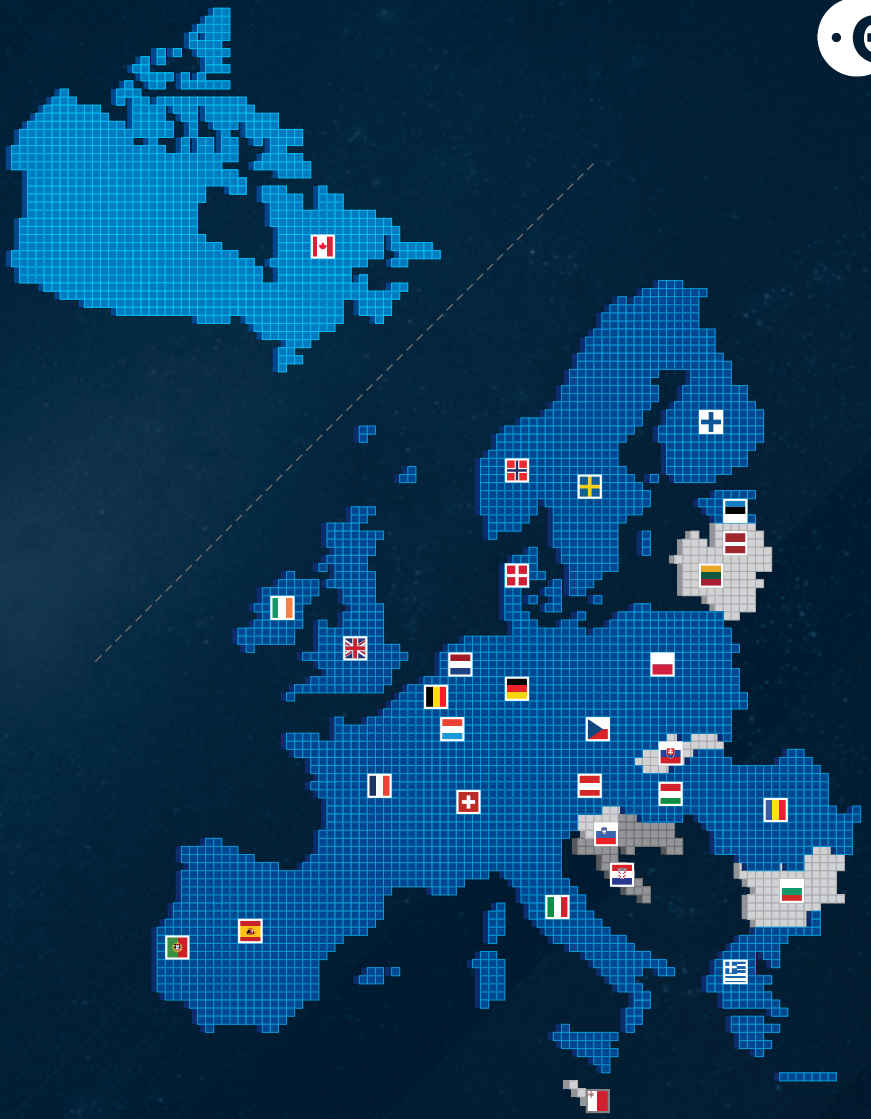
Austria
Belgium
Czech Republic
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Ireland
Italy
Luxembourg
Netherlands
Norway
Poland
Portugal
Romania
Spain
Sweden
Switzerland
United Kingdom

3 Associate Members

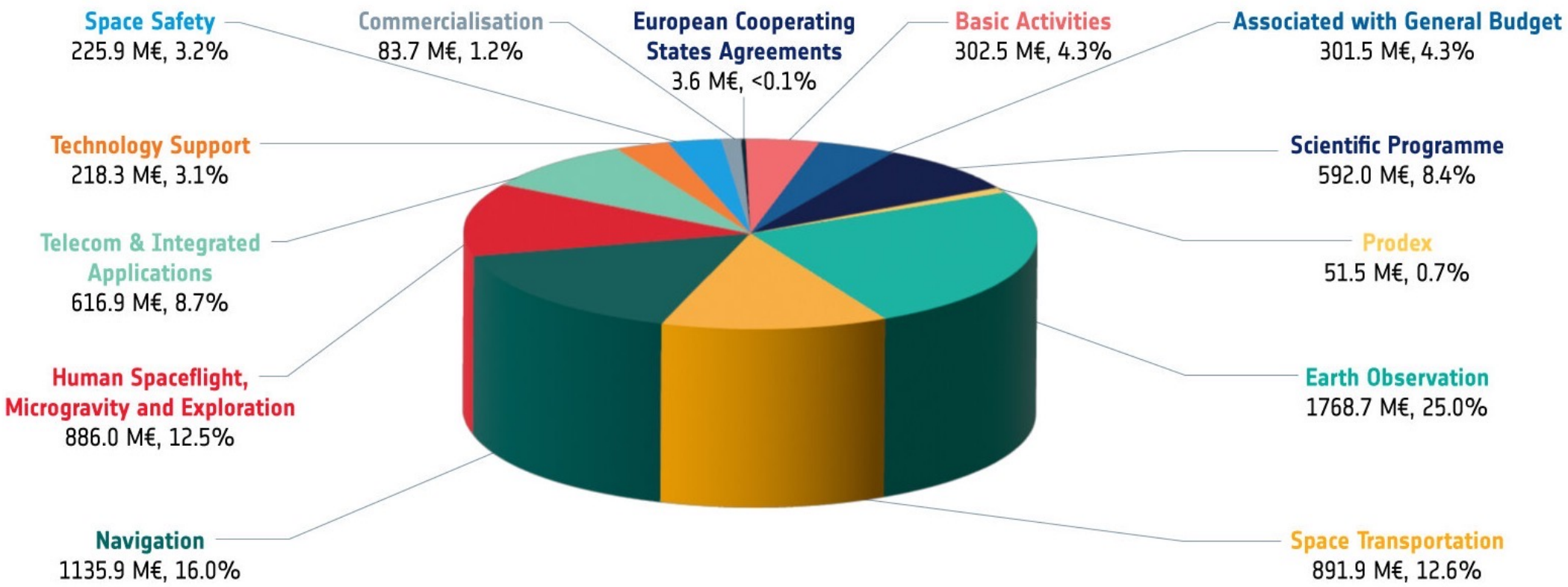
Slovenia, Latvia, Lithuania

Cooperation Agreements

6 other European States + Canada



ESA Budget by Domain for 2023: 7.08 B€*



*Includes activities implemented for other institutional partners

ESA’s Earth Observation vision

Take the pulse of our Planet

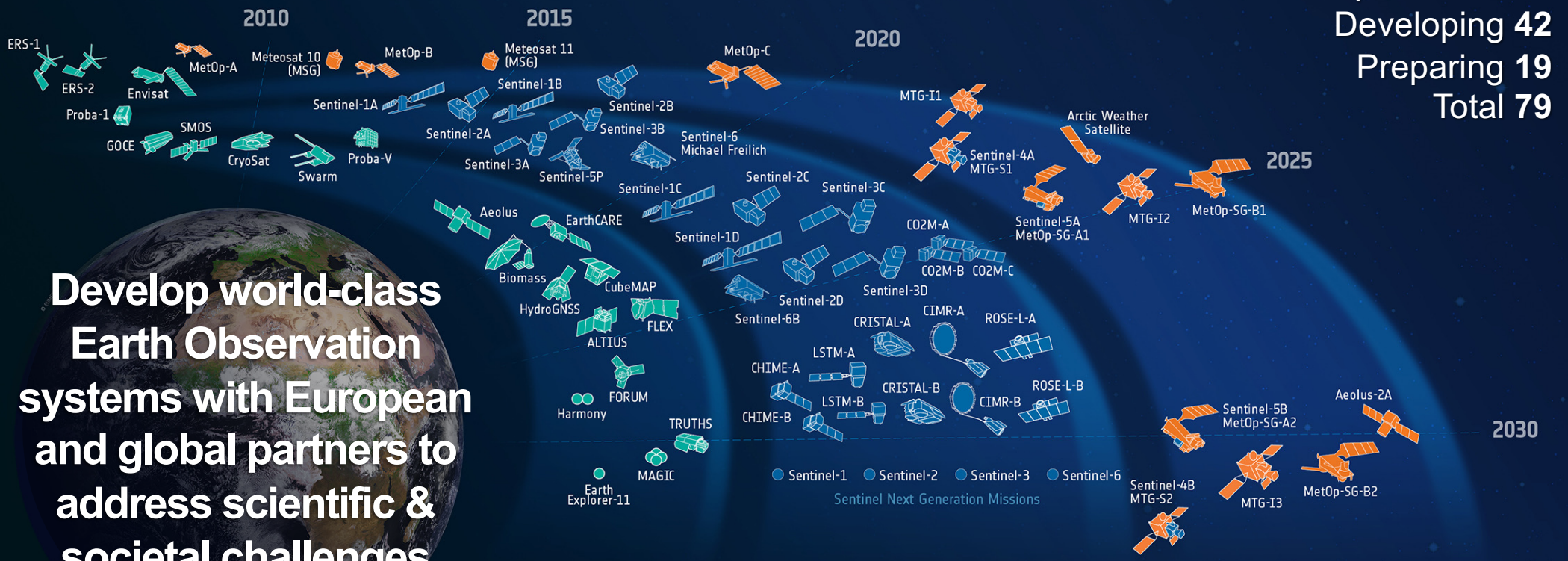
THE EUROPEAN SPACE AGENCY


AFP
TV
“There is no Planet B”
Emmanuel Macron, USA Congress
25 April 2018

ESA's Earth Observation Mission

Satellites

Heritage **04**
Operational **14**
Developing **42**
Preparing **19**
Total **79**



Develop world-class Earth Observation systems with European and global partners to address scientific & societal challenges

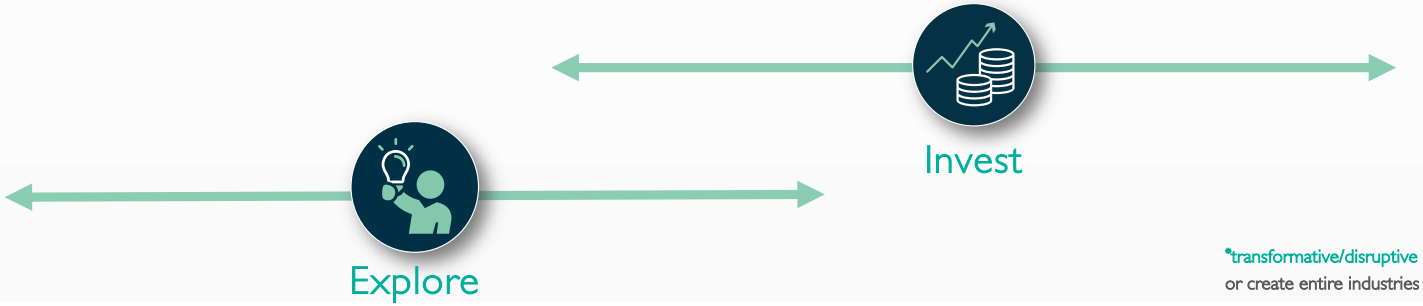
Science esa Copernicus European Union Meteorology EUMETSAT

→ THE EUROPEAN SPACE AGENCY

The ESA Φ-lab – What ?

Accelerate the future of Earth Observation
via transformative innovation* and commercialisation actions
strengthening Europe's world-leading competitiveness

Uniquely in ESA
Φ-lab innovate and apply
under-one-roof



*transformative/disruptive innovation: with the ability to completely transform or create entire industries via new methodologies or technologies

The ESA Φ-lab – What ?

Accelerate the future of Earth Observation
via transformative innovation* and commercialisation actions
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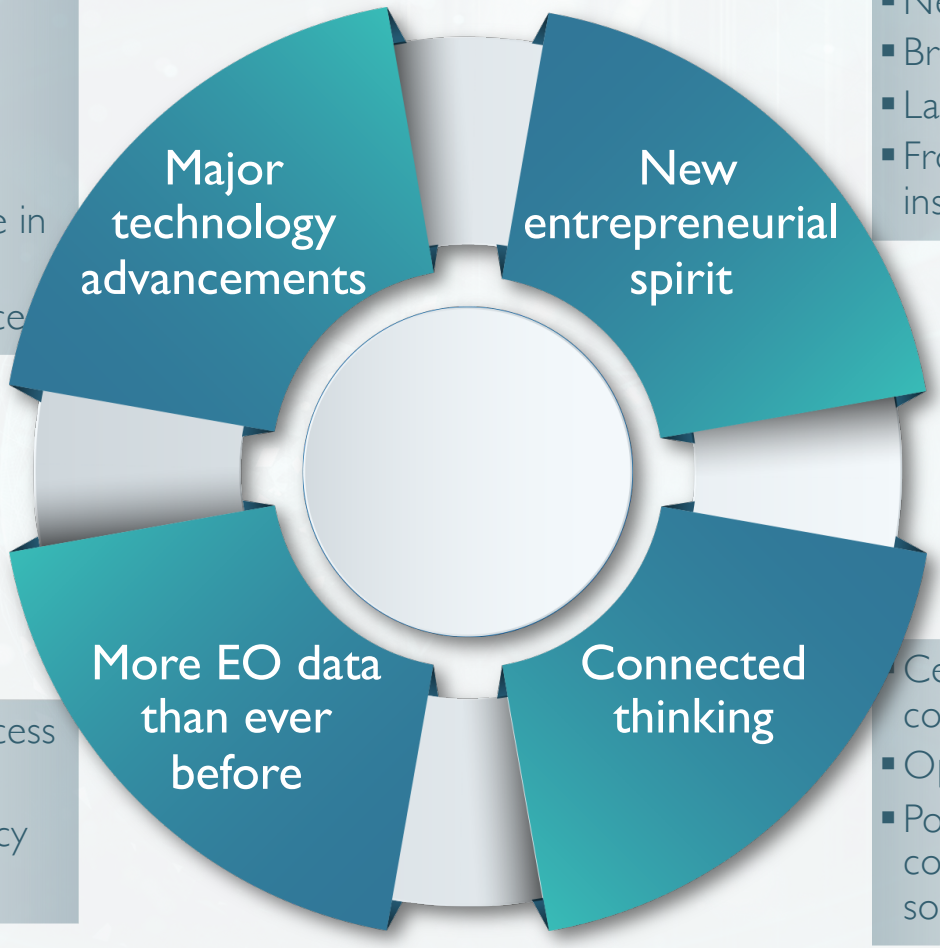
Uniquely in ESA
Φ-lab innovate and apply
under-one-roof

*transformational innovation: with the ability to completely transform or create entire industries via new technologies

The Earth Observation perfect storm

- Lower access to space costs
- Smart sensors, better performance, lower SWaP-C
- Commercial constellations
- Cloud computing
- Huge computational power available in space
- Artificial Intelligence and IOT in space

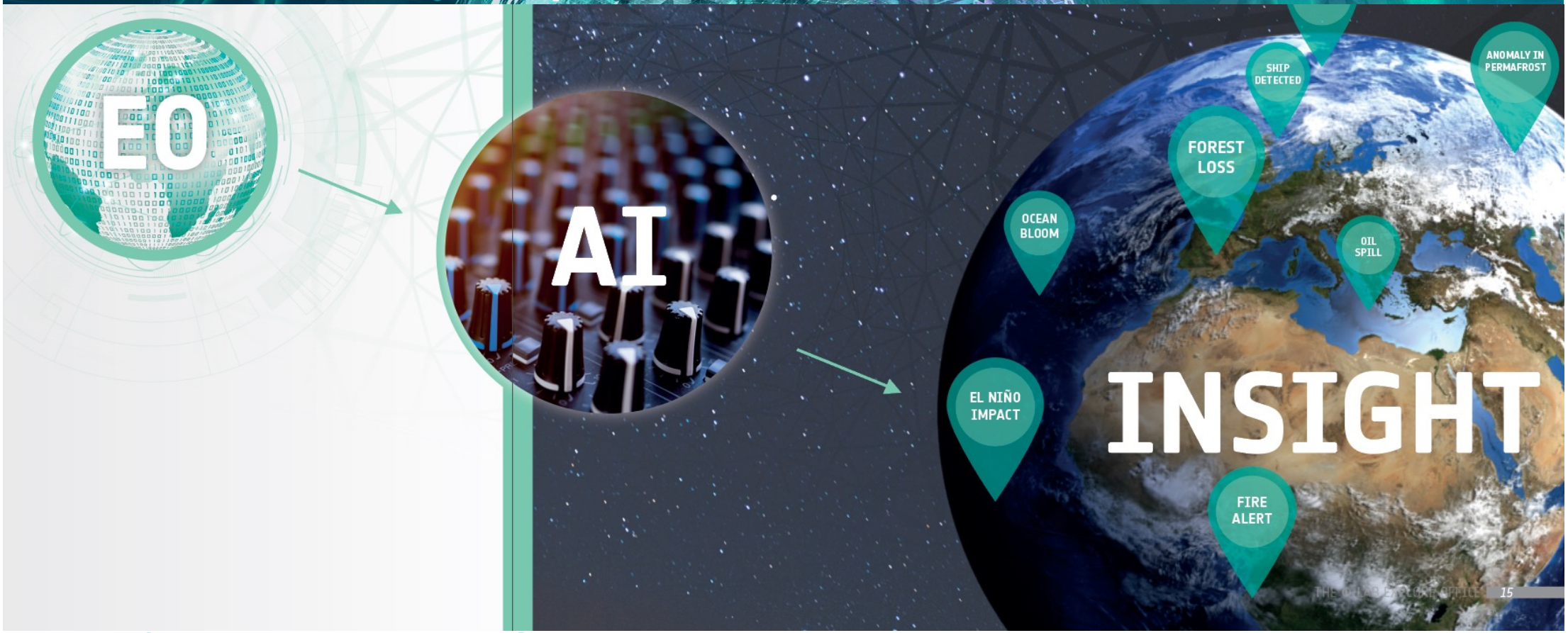


- New Space players
- Broaden customer base
- Large risk capital investments
- From data services to actionable insight and information

- Huge data availability and easiest access
- Constellations with richer sensors
- Copernicus free and open data policy
- IoT in space is coming

- Centralised vs distributed and connected thinking
- Openness toward risky innovation
- Policy makers more open to commercial space vs institutional space solutions

The ESA Φ-lab – Why?

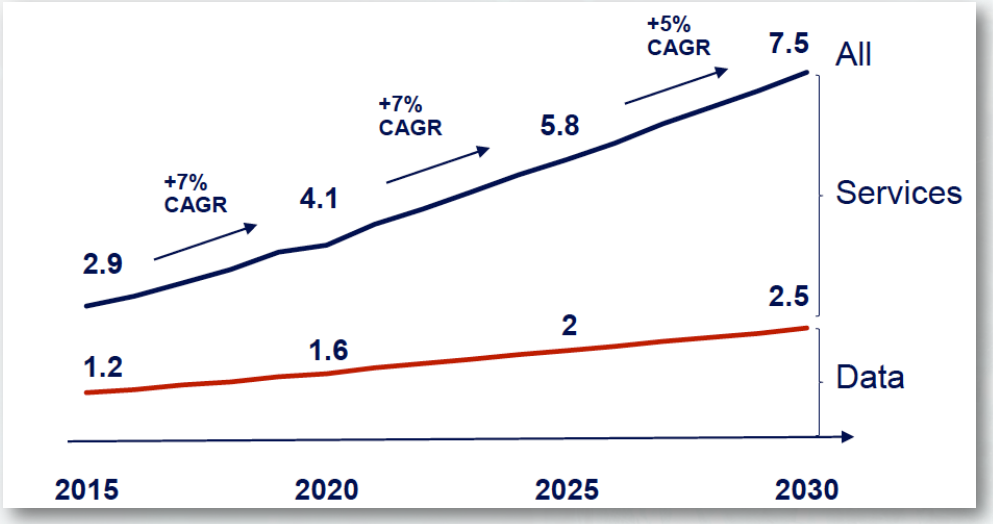


from Earth Observation to Earth Action

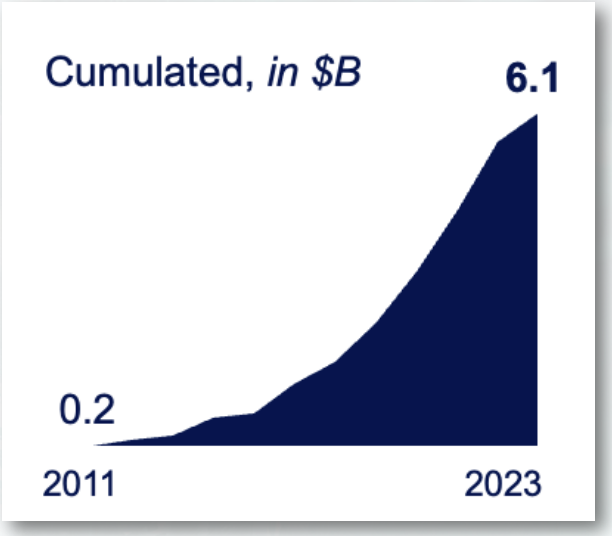
From data to actionable information

The ESA Φ-lab – Why?

EO Growth data and VAS



EO private investments



European EO service market

€1.79b revenues (EARSC Industry Survey 2023)

772
EO Companies
Up from 746 (+3.5%) year on year

13796
Employees
Up from 12085 (+14.2%) year on year

€ 1.79b
Revenues
Up from €1.6b (+10.9%) year on year

7.5%
Growth rate
over the last 5 years

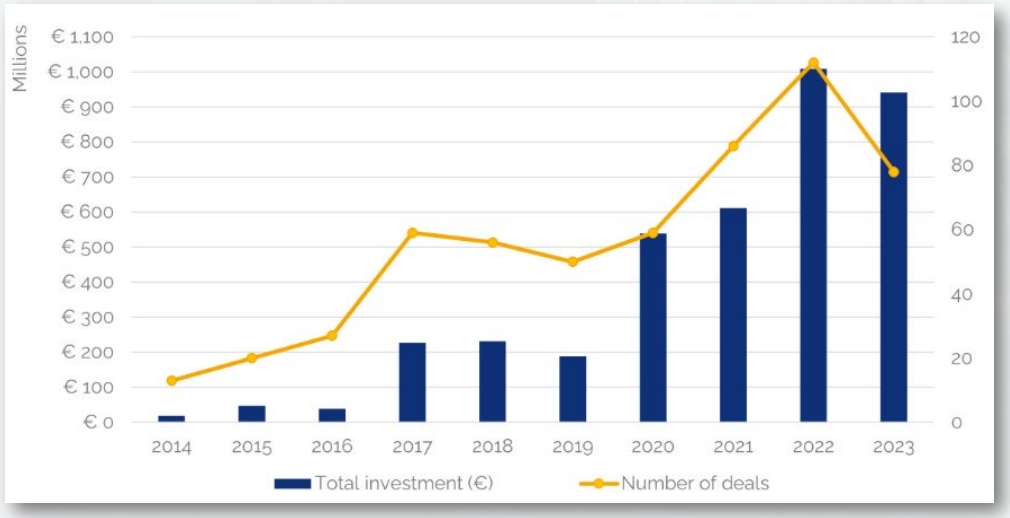
- Take advantage of the EO perfect storm
- Boost European competitiveness
- Develop and mature the EO market

Source : European Commission, Euroconsult and EARSC

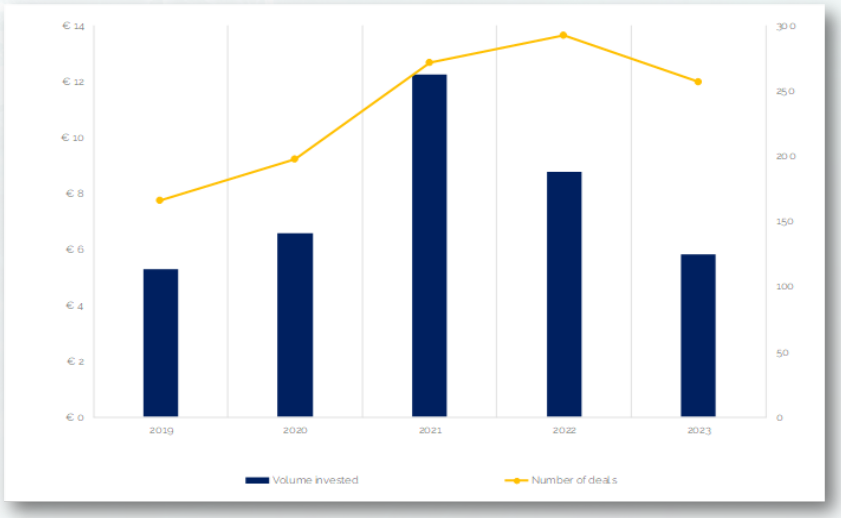
European and Global Funding Dynamics – Looking Forward

- €950M 2023 investments in Europe(-7% YoY, -35% globally)
- Investment in Europe was highly concentrated (43% for Top 5)
- Acquisitions second type of investment, narrowly surpassing debt finance
- Globally, space startups raised €5.8B. €12.3B 2021, a drop of 53%

European

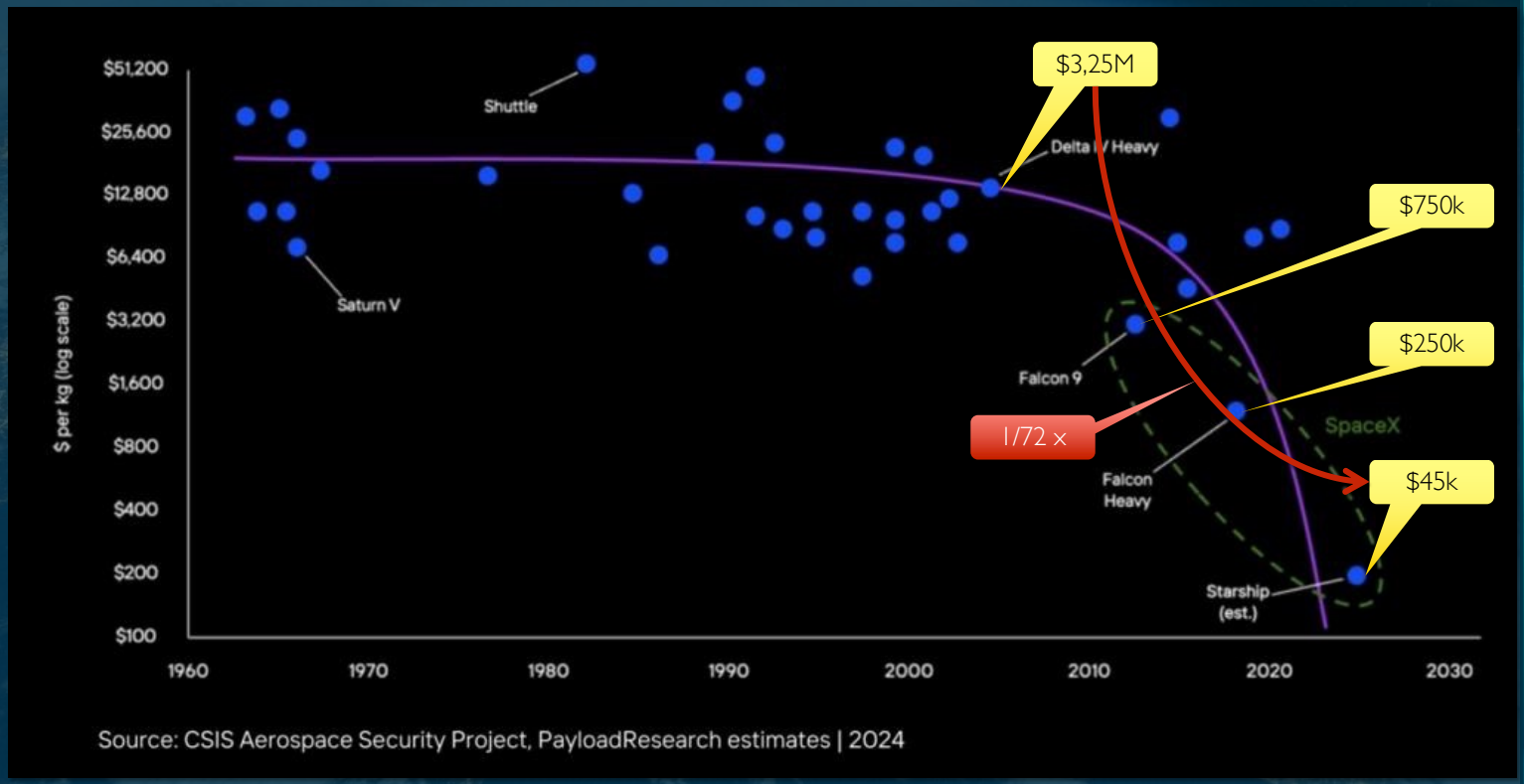


Global



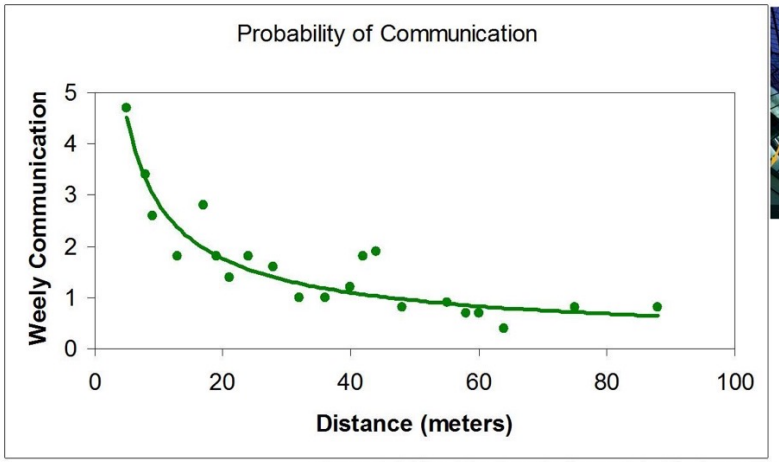
Falling Launch Cost to Orbit: 250 kg sat example

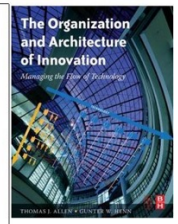
Through advancements in launcher technology cost of access to space is at an inflection point



Why an Open lab in the ICT revolution era ?

Innovation is at its fastest when
we glue knowledge with emotion





Source: TJ Allen, The Organization and Architecture of Innovation, 2007

nature

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nature › news › article

NEWS | 29 November 2023 | Correction 05 December 2023

'Disruptive' science: in-person teams make more breakthroughs than remote groups

Analysis of millions of papers shows that farflung collaborators produce fewer foundational discoveries than groups working together in person.

Observation:

# of invention disclosures dropped by 20-40% during the COVID

The ESA Φ-lab – How?

Φ-lab aims to become "the reference" for the transformational innovation and a key influencer (by reputation and authority) in the Earth Observation ecosystem

Catalyst

- Attract EO academic and industrial researchers to generate transformative ideas
- Exploit fail fast ethos, rapidly prototyping concepts
- An informal but rigorous, multi-disciplinary, collaborative environment
- Act as facilitator to foster competitiveness growth and entrepreneurial initiatives
- Implement investment actions from ESA MSs or in the investors industry

Bridge

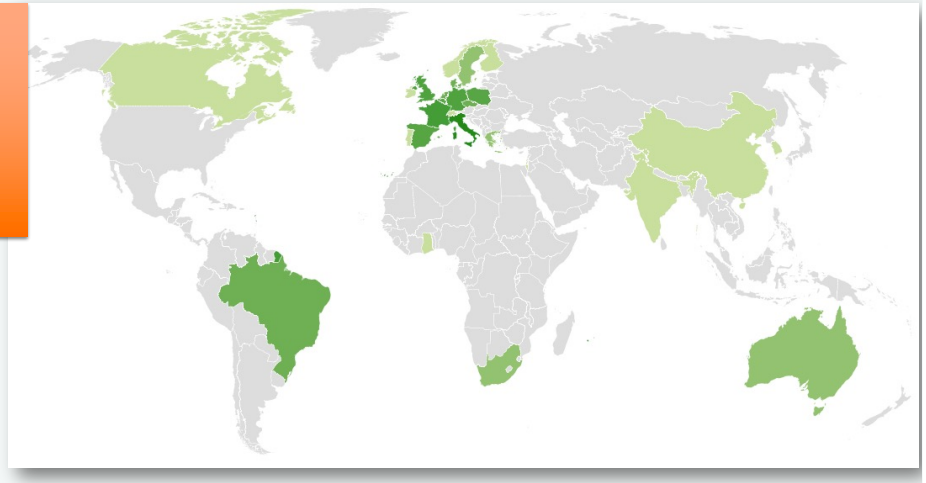
- Be the bridge between the European start-ups, academic and industrial researchers, New Space operators, Investors, ICT players, EO world leaders, and ESA
- Act as hub stimulating, connecting, and developing a growing ecosystem of talents and capabilities across Europe

The ESA Φ-lab location and people

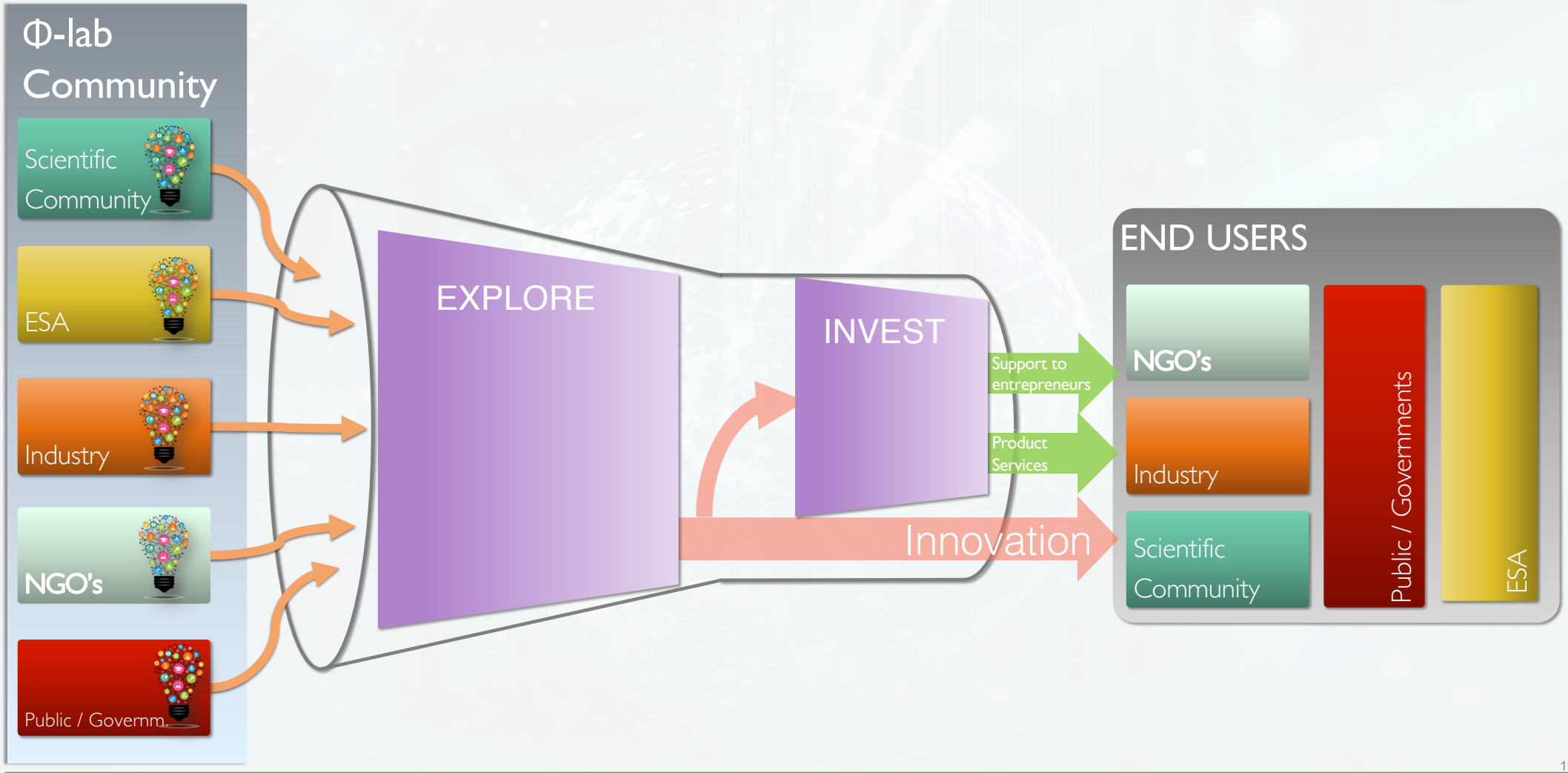
- Based in ESRIN, Frascati – Italy
- Established in 2018
- >20 strategic partnerships
- About 40 members

In the past 4 years

26 nationalities
124 people



Φ-lab open innovation lab



The ESA Φ-lab tools

Open Reserach Lab
Our collaborative and open research environment

Φ-lab Challenges
To stimulate transformational innovation

Φ-lab Community
Our network of companies, researchers, professors and key institutions

InCubed Development and Invest Actions
To facilitate access to innovation investments

Flagships programme
Key programmes as targets of our transformational innovations

Working with us it is easy

- Visiting Professor
- Visiting Researchers (Industrial and Scientific)
- ESA Research Fellowships
- ESA Co-funded PhD
- ESA Young Graduate Traineeships (YGT), Internships, National trainee

Collaboration opportunities at Φ-lab

Shared mutual interest

Join the Φ-lab to explore disruptive ideas

as a **Visiting Researcher (industry, academia)**,
Visiting Professor, Research Fellow, PhD, YGT, etc.

Funded

1. Φ-lab's Invitation To Tender on ESA-STARS
   - Foundation Models, Generative AI, QC4EO, Edge computing, Web 3.0, etc..
2. InCubed : partnership development of commercial products or services
3. Open Space Innovation Platform : co-funded research or researchers
4. EO Science4Society : no SOW, 100/200K, 6/18 months
5. ESA Technology Programmes like GSTP and TDE

Some of Φ-lab successes*

19
Φ-lab contributed satellites and constellations

21
Strategic collaborations with companies, agencies, research centres and private investors

€225M
InCubed fund size

140
InCubed activities @62% co-funding rate

140+
Publications on peer reviewed journals and conferences

15+
Visiting Professors

70+
Visiting researchers

AI4EO
QC4EO
Contributing to European R&D agenda

*The ESA Φ-lab successes: as of August 2024

(some) Collaborations and parternships

The ESA Φ-lab Offices

Φ-lab Explore Office

Explores the innovation universe and connects together EO and digital revolution

A team of Researchers
and innovation seed funding (FutureEO)

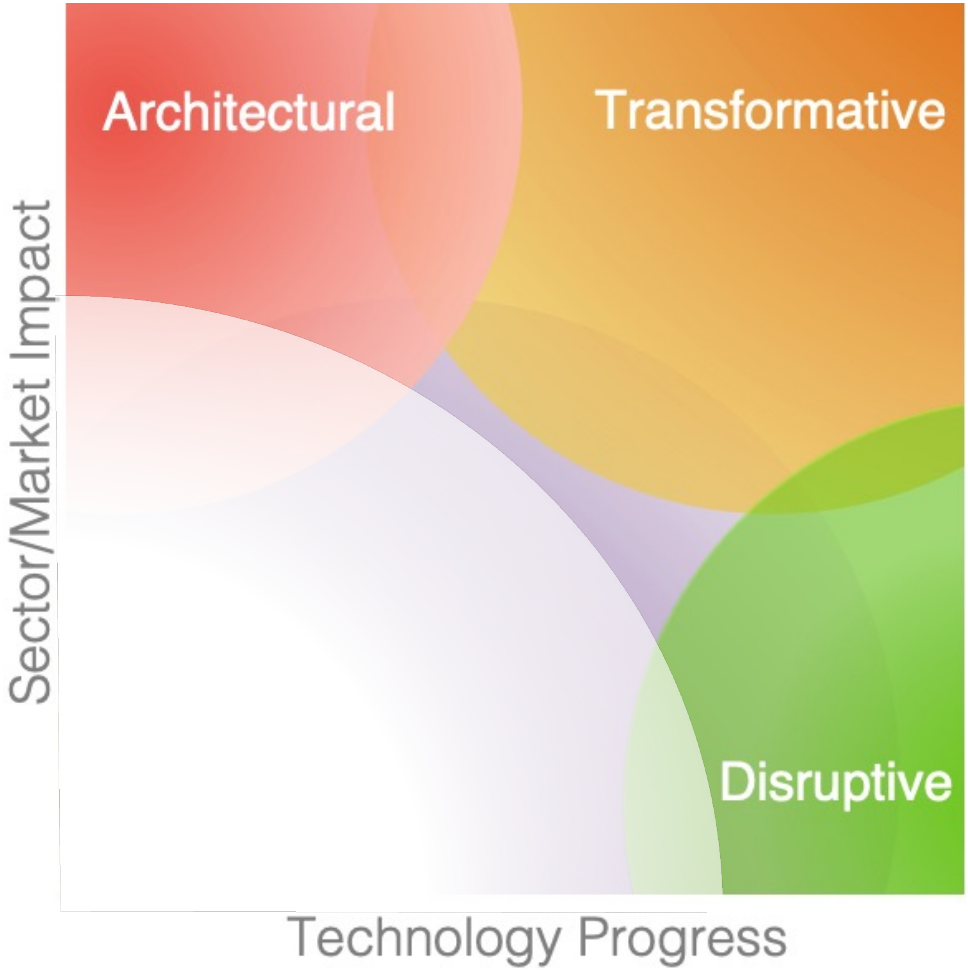
Φ-lab Invest Office

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 comes in multiple flavors

Transformative innovation delivers unique competitive advantage



Innovation Technologies axis and Applications

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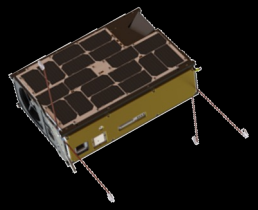
AXIS I	AXIS II	AXIS III
Artificial Intelligence and Machine Learning	Quantum and Edge Computing	IOT, Blockchain, Web 3, Cognitive Space

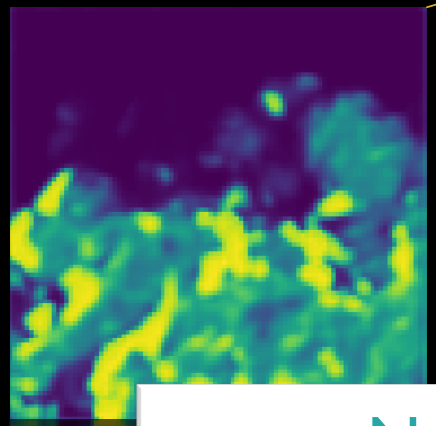
- Flight HW
- Flight SW applications
- Downstream applications
- End to end systems
- Innovative business models

Φ-sat-1 is the first AI-powered European EO mission

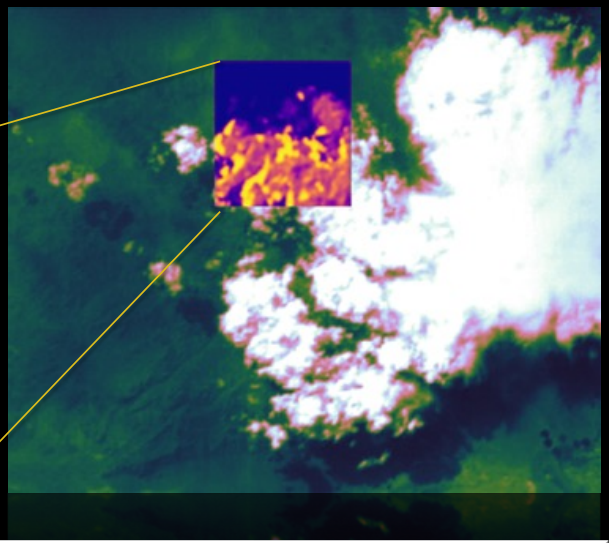
esa



AI-computed Cloud mask



Cloud mask superimposed on the hyperspectral image



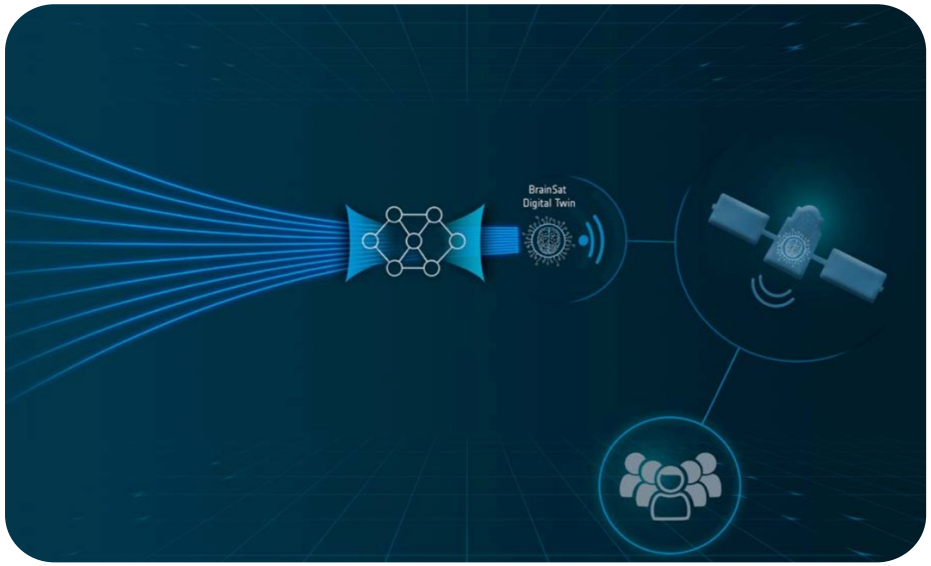
Now AI on Φ-sat-2,
On Copernicus expansion missions and more..

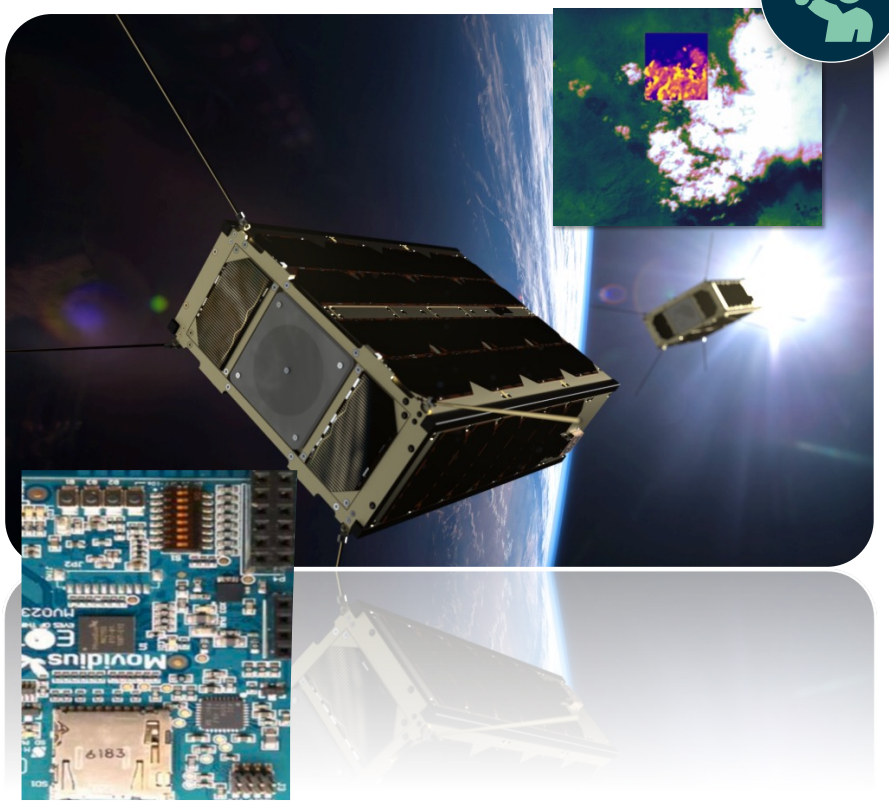
The Myriad 2 chip

Image: Maximilien Brice/CERN

AI chip and the Φ-sat-1 neural networks are perfectly working with the expected performance

Edge Computing in Earth Observation





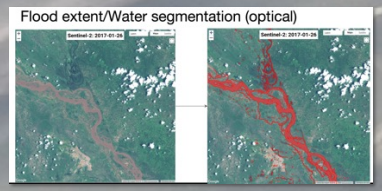
> *The value of satellite-based EO no longer grows with the ability to collect and transmit data back to Earth, it increasingly lies with the ability to transmit customer-relevant insight in real-time.*
>
> **Peter Platzer,**
> *Spire, Φ-week 2019*

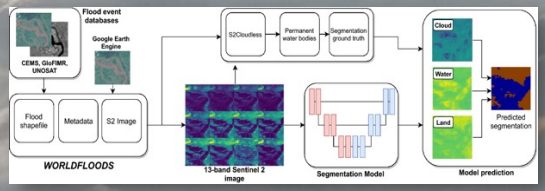
Actionable insight in space, low latency, autonomy

Europe as precursors: Cognitive Cloud Computing in Space

World Floods Mission demonstrated ability to identify flooding and send flood map alert to emergency responders seconds after image acquisition

Wild Ride Mission, first ever ML4EO training on-board ION Platform with 6 cubesats, 20+Machine Learning Apps on SpaceCloud






scientific reports

OPEN

Towards global flood mapping onboard low cost satellites with machine learning

Gonzalo Mateo-Garcia[1,3✉], Joshua Veitch-Michaelis[2,3], Lewis Smith[3,3], Silviu Vlad Oprea[4], Guy Schumann[5,6], Yarin Gal[2], Atılım Güneş Baydin[3] & Dietmar Backes[7,8]

Spaceborne Earth observation is a key technology for flood response, offering valuable information to decision makers on the ground. Very large constellations of small, nano satellites— 'CubeSats' are a promising solution to reduce revisit time in disaster areas from days to hours. However, data transmission to ground receivers is limited by constraints on power and bandwidth of CubeSats. Onboard processing offers a solution to decrease the amount of data to transmit by reducing large sensor images to smaller data products. The ESA's recent PhiSat-1 mission aims to facilitate the demonstration of this concept, providing the hardware capability to perform onboard processing by including a power-constrained machine learning accelerator and the software to run custom applications. This work demonstrates a flood segmentation algorithm that produces flood masks to be transmitted instead of the raw images, while running efficiently on the accelerator aboard the PhiSat-1. Our models are trained on Worldfloods: a newly compiled dataset of 119 globally verified flooding events from disaster response organizations, which we make available in a common format. We test the system on independent locations, demonstrating that it produces fast and accurate segmentation masks on the hardware accelerator, acting as a proof of concept for this approach.

Floods are among the most destructive extreme weather events—between 1995 and 2015, over 2.2 billion people were affected by floods comprising 53% of the total of people affected by all weather-related disasters[1,2]. Situational awareness on the ground is crucial for effective disaster response, and, today, satellite imagery is one of the most important sources of this information[3]. Both passive optical (multi-spectral) and synthetic-aperture radar (SAR) imagery are routinely used to determine flood extent and further derived products[4] (Fig. 1).

Some regions, like the USA, Europe and Japan have access to high-quality imaging resources from defence organisations and commercial satellite operators through domestic space agencies (i.e., NASA, ESA, JAXA). However, several of the worst flood-affected regions are in developing countries: of the top 20 countries by disaster mortality in proportion to their population for the years 1990–2017, the top five are low or lower-middle-income countries, and only five are upper-middle income[5].

Many of these countries have almost no means of getting access to higher quality imaging resources via domestic channels. To address this, organisations such as the International Charter "Space and Major Disasters"[6], initiated by the European Space Agency (ESA), liaise with space agencies and associated commercial organisations to produce free high resolution maps for end-users in the field. Despite best efforts it can take many days to provide actionable information, mainly due to image down-linking and subsequent image analysis[4]. Commercial organisations are able to provide the highest-frequency (daily) and highest-resolution (sub-metre) images, but their satellites must also be tasked and their images may only be freely available for a limited period of time during disasters via the International Charter Space and Major Disasters. ESA's Copernicus program[7] provides open data globally at 10 m resolution, but the optical component, Sentinel-2 (S2)[8], has a revisit time of five days at the equator and two to three days at mid-latitudes. This leads to wait[illegible] days in areas such as central Africa where alternatives for rapid data capture

In this work we investigate how a constellation of small, inexpensive satellites with commercial off-the-shelf (COTS) hardware, also known as CubeSats[9], can be used for flood response, using PhiSat-1 as a case study. The main advantage of using CubeSats is

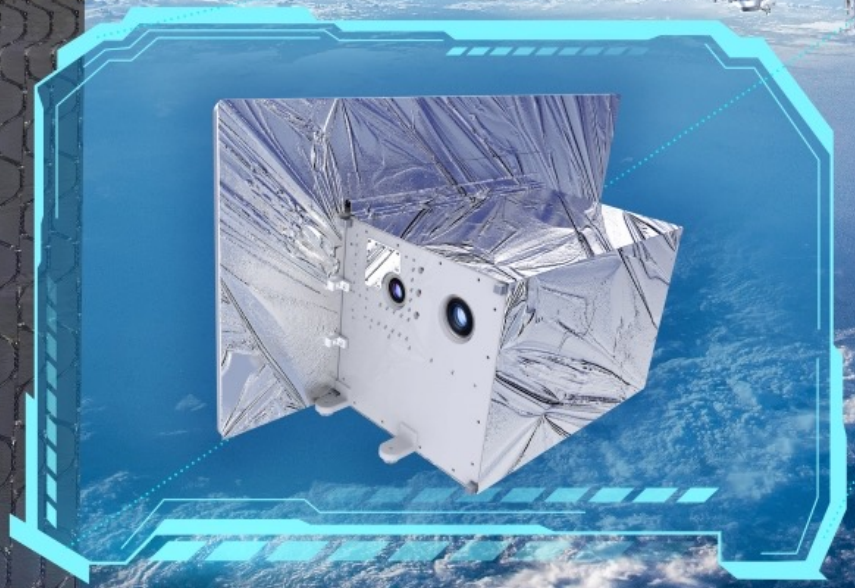
[1]Universidad de Valencia, Valencia, Spain. [2]Univer[illegible] Oxford, Oxford, UK. [3]University of Edinburgh, Edi[illegible] Dudelange, Luxembourg. [5]University of Luxem[illegible] London, UK. [6]These authors contributed equ[illegible] Smith. ✉email: Gonzalo.Mateo-Garcia@uv.es

The ML SpaceCloud App is developed by the Frontier Development Lab (FDL), a partnership led by Trillium Technologies with the Univ. of Oxford and ESA Φ-lab

AI for EO on ISS

Automatic detection of :

- Oceanic ecosystem anomalies
- Water resources anomalies
- Crop water stress
- Wildfire



ThalesAlenia Space
a Thales / Leonardo company

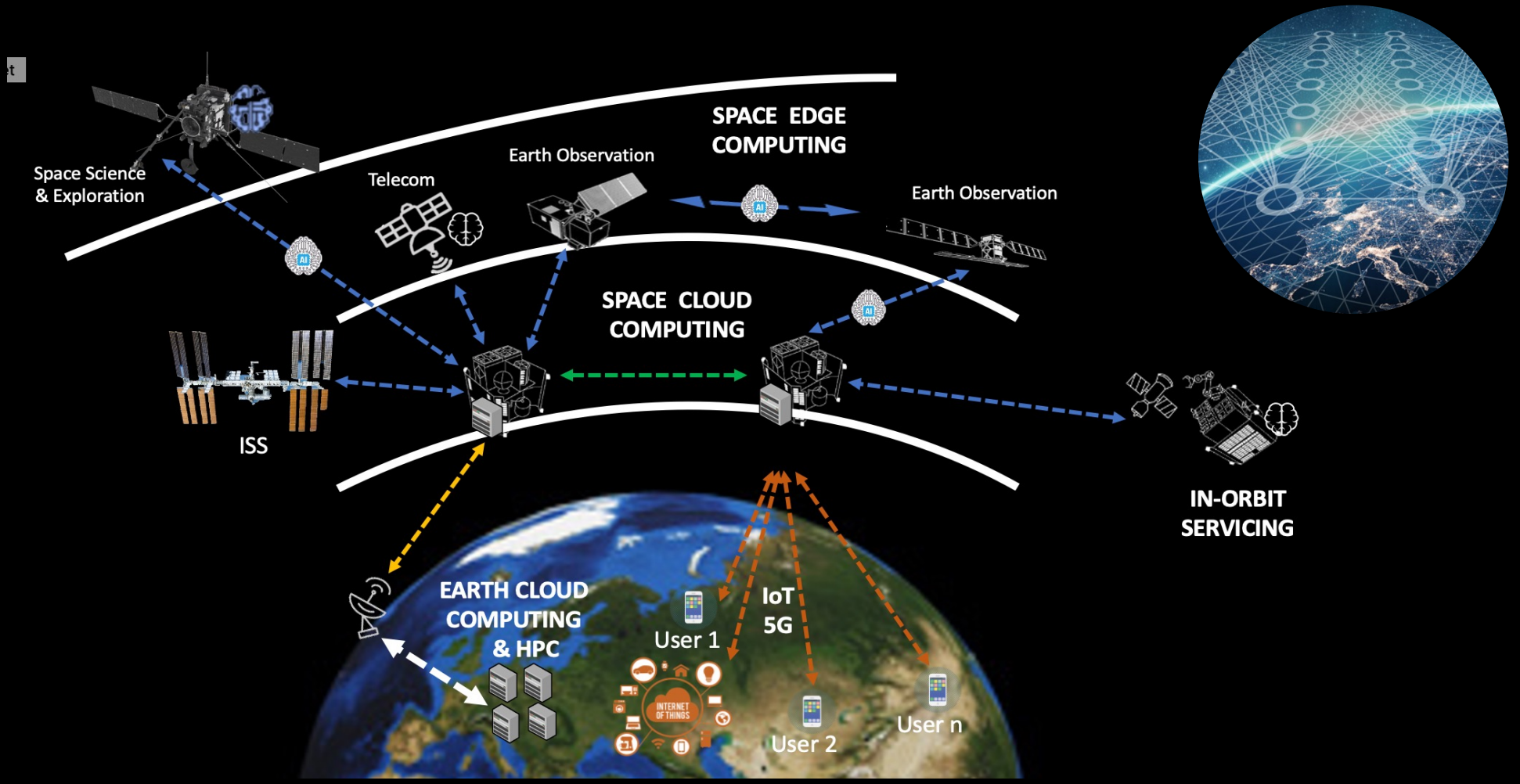
Microsoft

esa

Φ-lab

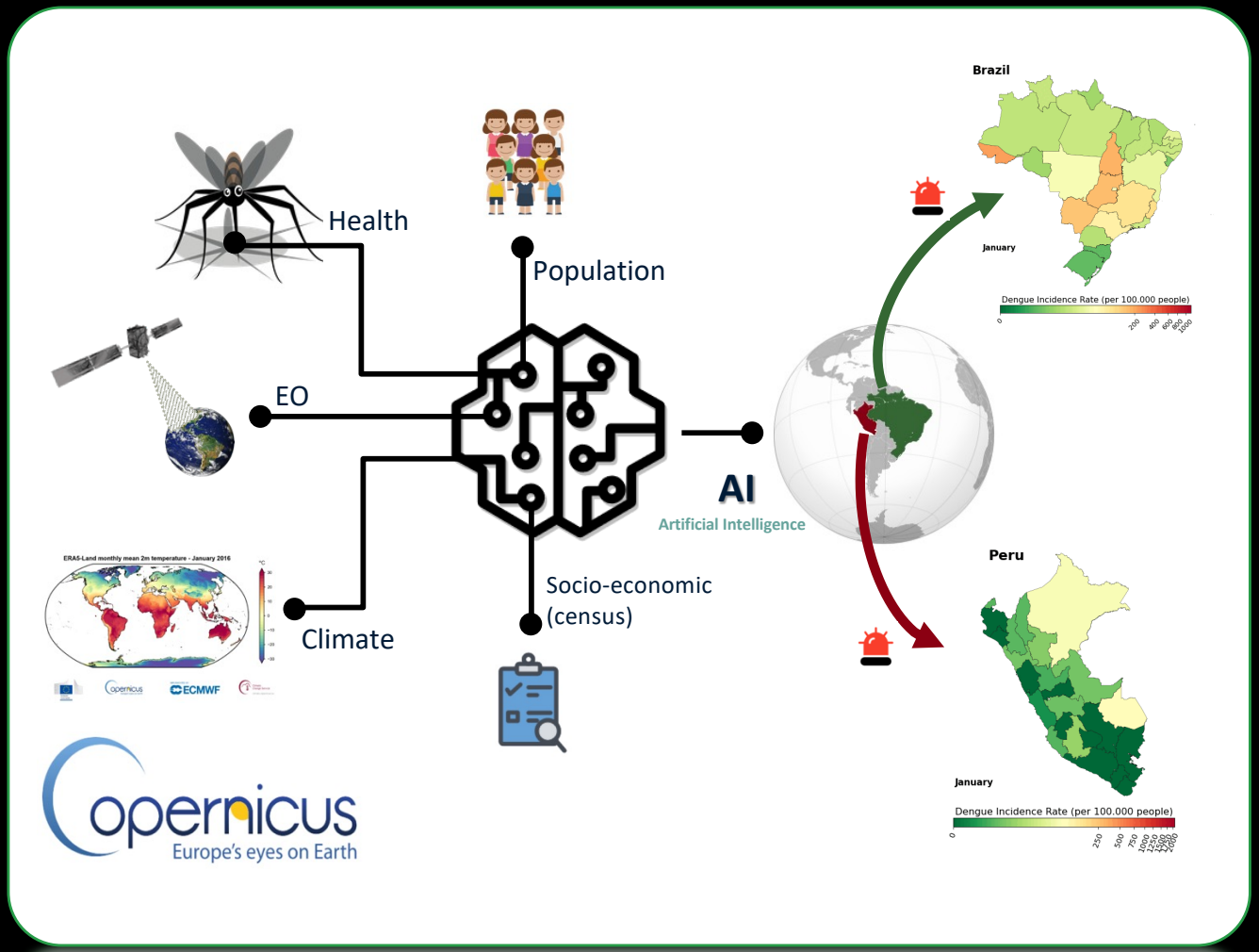
IMAGIN-e

Cognitive Cloud Computing in Space (C3S)



Courtesy: Letter to DG on Cognitive Computing in Space, from 10 European New Space Companies

Quantifying health-risk with EO data and AI (application to Dengue)



unicef INNOVATION

esa

1 – UNESCO – IRCAI

United Nations Educational, Scientific and Cultural Organization

International Research Centre of Artificial Inteligence under the auspices of UNESCO

GLOBAL TOP 100
AI solutions for SDGs

2 - Best of UNICEF Research

showcase the most rigorous, innovative and impactful research produced by UNICEF offices worldwide

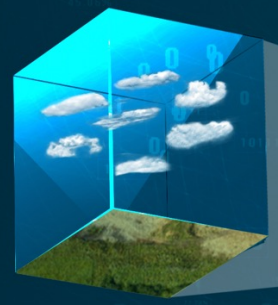
3 – Wellcome Trust support

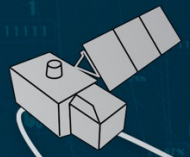
Independent charitable foundation

wellcome

The Wellcome Trust has granted **over €600 000** to UNICEF and partners to develop an end-user web application

The Destination Earth : AI4DTE





OBSERVATION

LEARNING

MODELS

INFERENCE

PREDICTIONS

POLICIES

AI-SW (SomeWhere)

European Commission

ECMWF

EUMETSAT

→ THE EUROPEAN SPACE AGENCY

QC4EO

AI-enhanced Quantum Computing for EO

CERN

esa

DLR

ECMWF

JÜLICH Forschungszentrum | JÜLICH SUPERCOMPUTING CENTRE

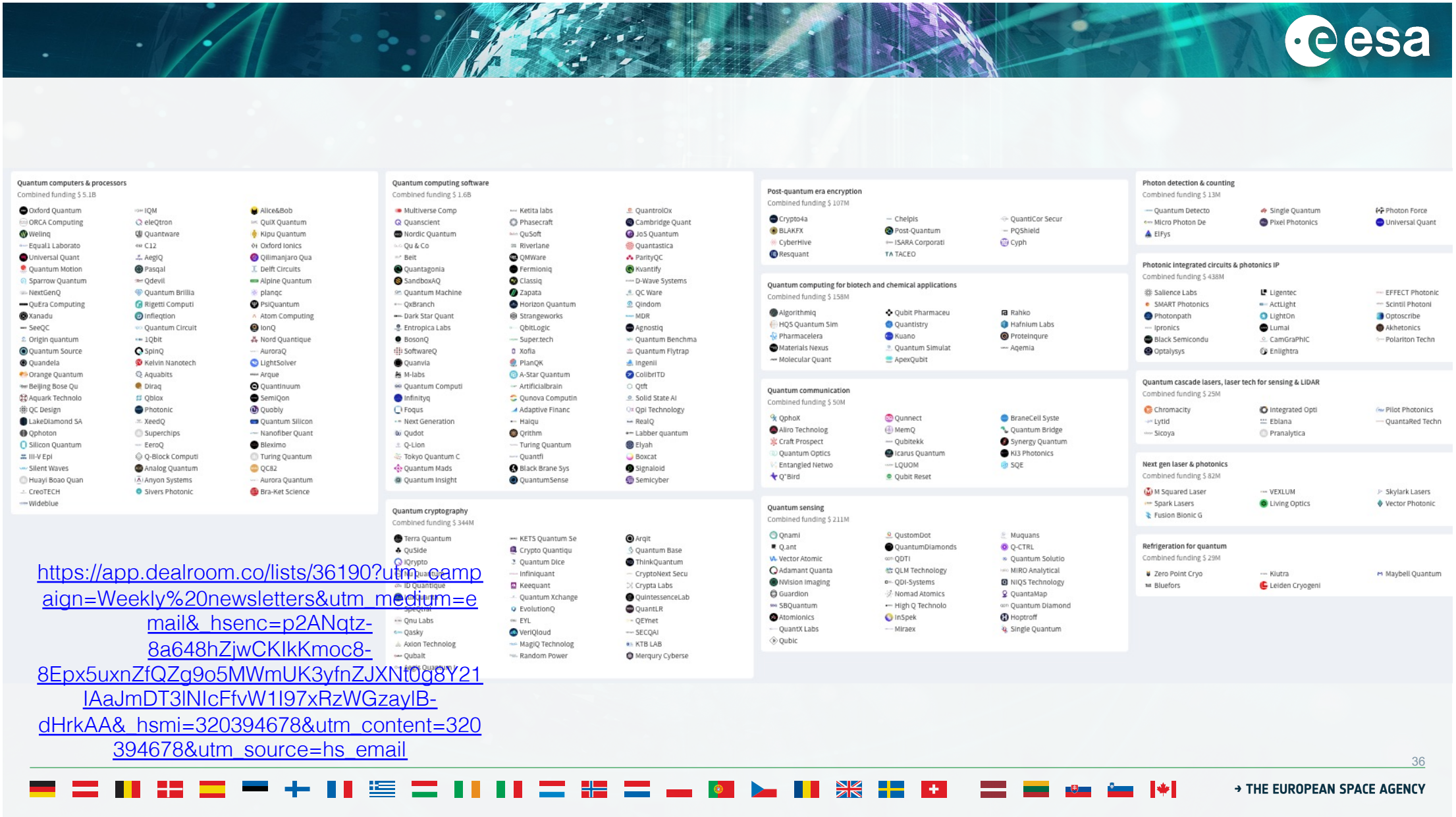
UNIVERSITÀ DEGLI STUDI DI BARI ALDO MORO

NICOLAUS COPERNICUS ASTRONOMICAL CENTER OF THE POLISH ACADEMY OF SCIENCES

UNIVERSITY OF WARSAW

JAGIELLONIAN UNIVERSITY IN KRAKÓW

ellis European Laboratory for Learning and Intelligent Systems



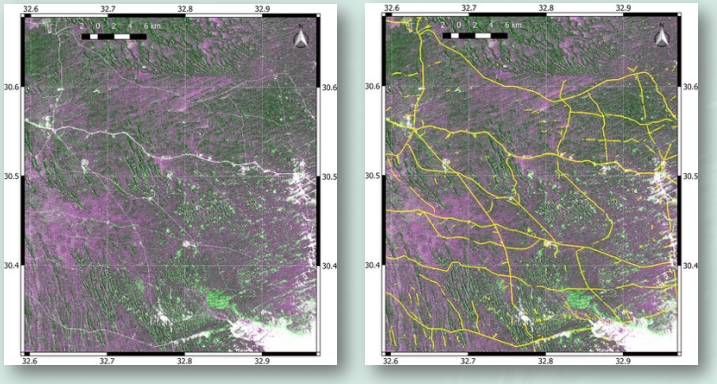
https://app.dealroom.co/lists/36190?utm_campaign=Weekly%20newsletters&utm_medium=email&_hsenc=p2ANqtz-8a648hZjwCKIkKmoc8-8Epx5uxnZfQZg9o5MWmUK3yfnZJXNt0g8Y21IAaJmDT3lNIcFfvW1I97xRzWGzayIB-dHrkAA&_hsmi=320394678&utm_content=320394678&utm_source=hs_email

AI4EO for SDGs – WFP Innovation Accelerator and Φ-lab

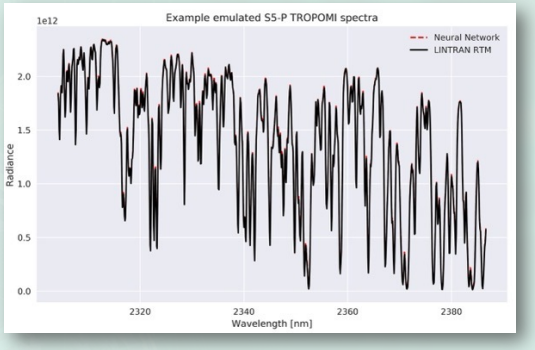
	Data driven agribusiness		on-the-ground data to better serve smallholder farmers in Kenya.
Climate Risk Insurance	ibisa	**Formentera**	Forecast-based insurance for smallholder farmers in the Chiquimula region of Guatemala using continuous **rainfall and dry days as triggers** (25 and 10 respectively)
Disaster Prediction & Mitigation	OXEO	**Novel Hydrological Drought Index**	The novel hydrological drought index (HDI) combining **surface water availability**, **precipitation**, and **soil moisture** to complement the traditional meteorological drought indices (MDI).
Infrastructure Assessment & Development	RAMANI B.V.	**CHEETAH**	AI to improve **post-harvest loss** by monitoring farm-to-mark supply chain.

WFP World Food Programme | INNOVATION ACCELERATOR

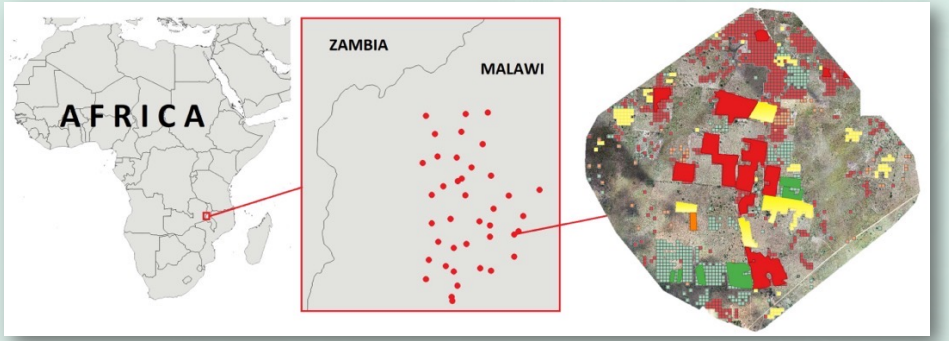
EXPLORE Use Cases – Some examples



Infrastructure monitoring in desert regions



Physics-aware machine learning emulation of RTMs
Copernicus Sentinel-5p methane retrieval



Crop types mapping using drones,
Copernicus Sentinel-2 and daily life images

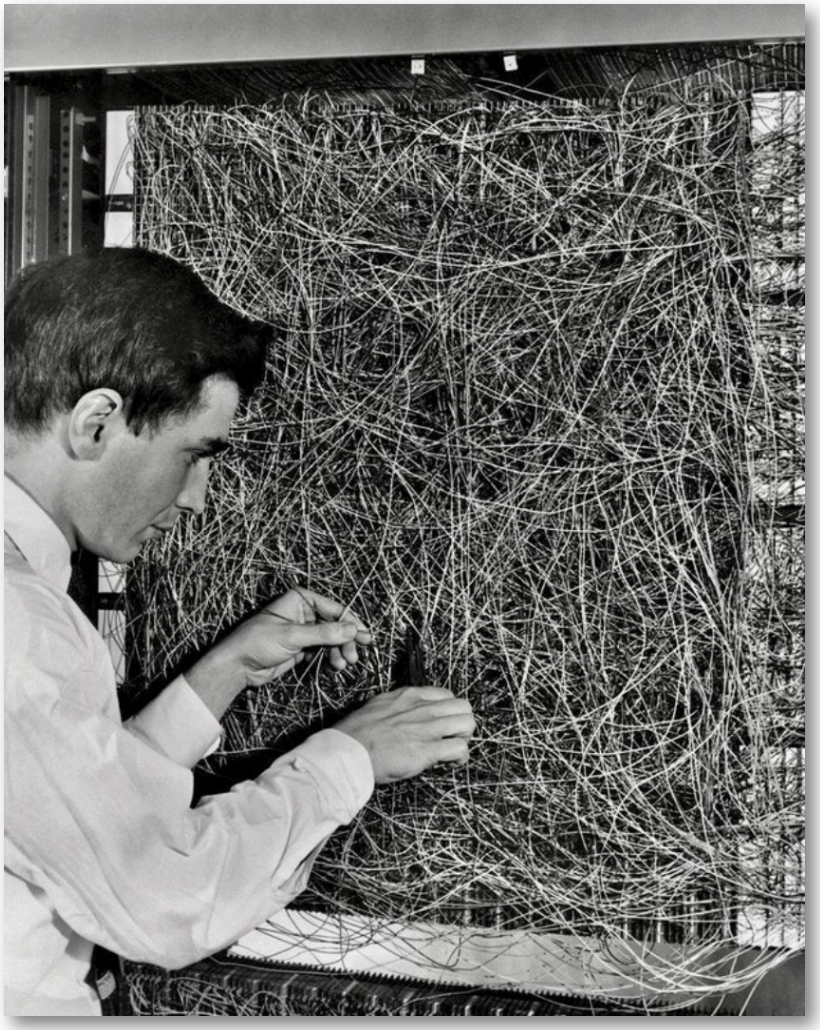
ICEYE Use of AI for SAR image for on-board object detection and classification

The Deep Learning Big Bang

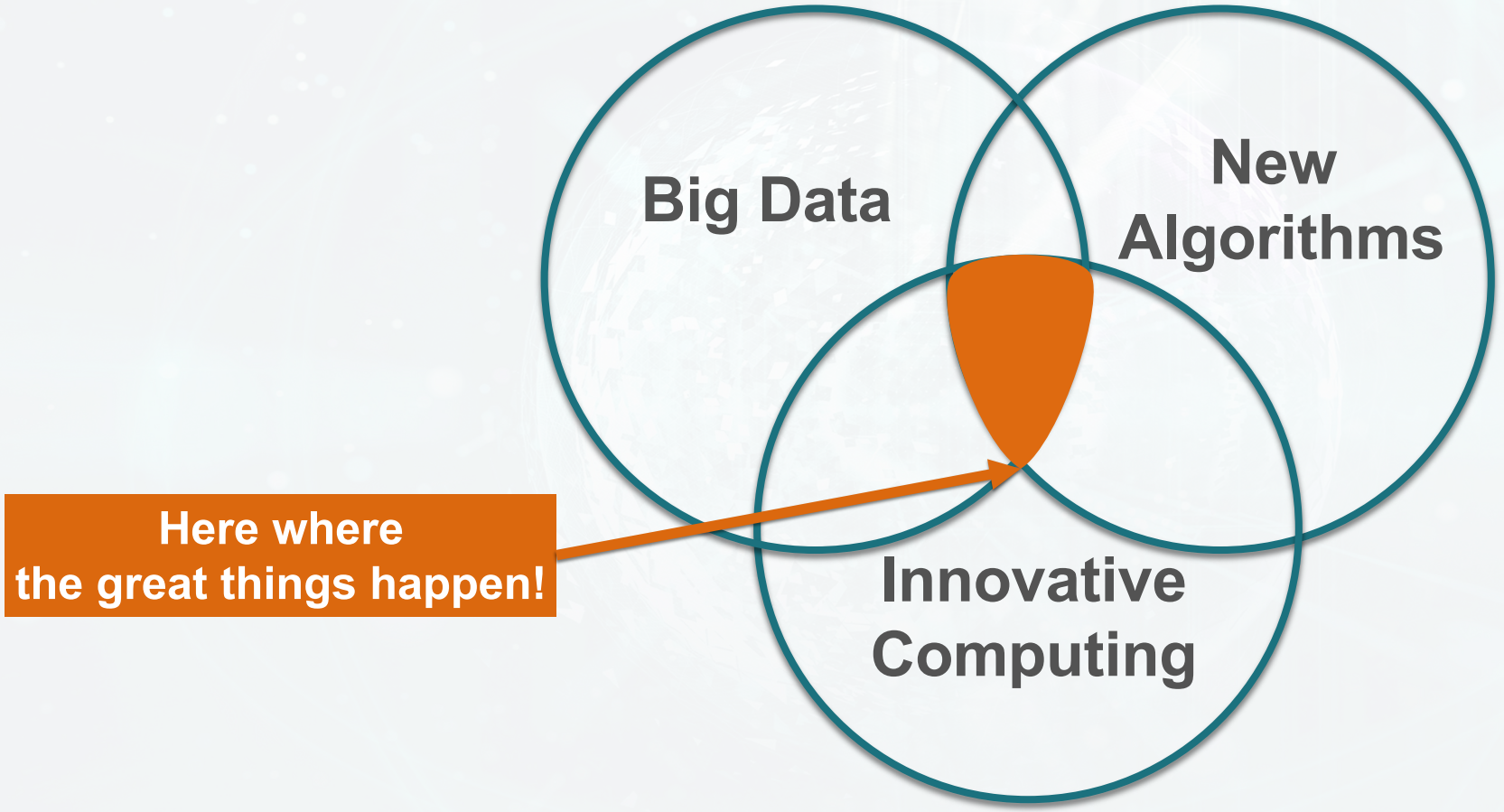
Frank Rosenblatt, 1957

Perceptron

One layer ML



The ICT, AI and ML Revolution in EO



Oxford English Dictionary defines artificial intelligence (AI)

'The theory and development of computer systems able to perform tasks normally requiring human intelligence'

and intelligence

'The ability to acquire and apply knowledge and skills'

This definition encompasses the capacity for learning, understanding, and problem-solving,
highlighting both the acquisition of knowledge and the practical application of that knowledge in various contexts

"If a machine is expected to be infallible, it cannot also be intelligent."

– Alan Turing

"A computer would deserve to be called intelligent if it could deceive a human into believing that it was human."

– Alan Turing

"Sometimes it is the people no one imagines anything of who do the things that no one can imagine."

– Alan Turing

Artificial Intelligence

- performs much better than other in specific sectors
- can easily generalize
- but it sometime allucinate
- responses are not fully explainable
- failure modes are hard to predict
- not transparent (black box)

Artificial Intelligence

- it is an opinion maker, not a fully reliable decision maker
- use it if you can afford small-scale risks and inaccuracies
- use an ensemble if you need higher accuracy
- the ultimate decision is of the human being

Thinking More About AI as an "Opinion maker"

Less Focus	More Focus
Replacing humans	**Augmenting** humans
Artificial **General** Intelligence	**Human-Centered** AI
Autonomy in decision/mission	Decision/mission **support**
Black Box	Make trustable the Black Box
Empirical approach	**Theoretical** methods
New methods	Application of **existing** methods

Foundation Models emergent properties

Complex abilities arising from architecture/training, not programmed:

- **Problem Solving**: Applying reasoning to solve problems
- **Adaptability**: Generalizing knowledge to new tasks and domains
- **Contextual Understanding:** Ability to comprehend and generate contextually appropriate responses
- **Pattern Recognition**: Identifying and leveraging patterns in data for tasks like translation and summarization
- **Language Generation**: Creating coherent and contextually relevant text

The ESA Φ-lab Offices

Φ-lab Explore Office

Explore the innovation universe
connecting EO sensor revolution
with the digital revolution

Team of Researchers
and an innovation seed funding (FutureEO)

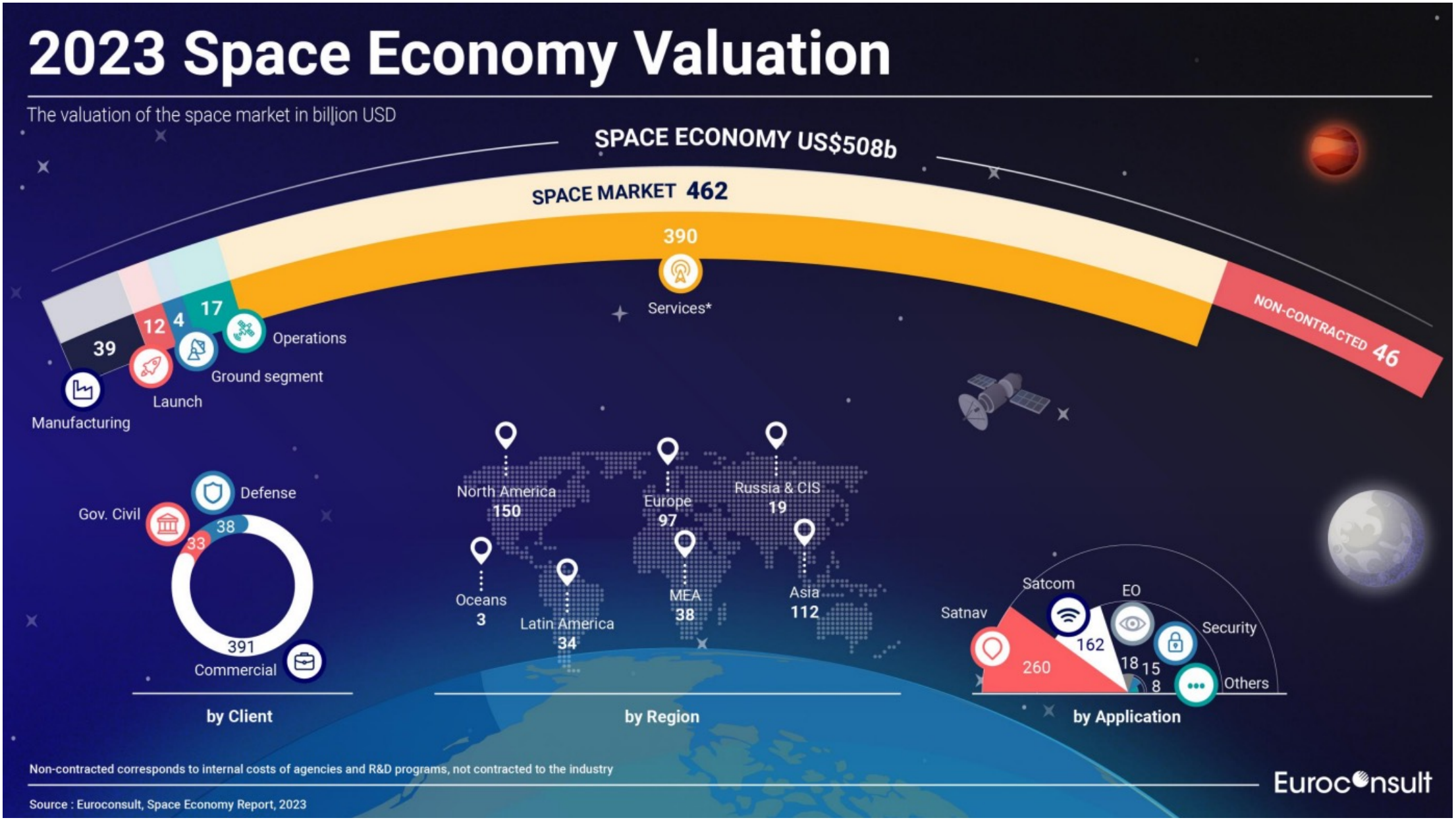
Φ-lab Invest Office

Stimulate competitiveness fostering entrepreneurial
initiatives growth with investment actions from ESA MSs
and private investors

Team of Business Innovators
and commercial co-funding programme (InCubed)

2023 Space Economy Valuation

The valuation of the space market in billion USD



Non-contracted corresponds to internal costs of agencies and R&D programs, not contracted to the industry

Source : Euroconsult, Space Economy Report, 2023

Euroconsult

Boost European EO commercialisation

Fast Innovation and Talents

Generate unique competitive advantage via talent creation and fast disruptive innovation

+

Mitigate/Share Risks

Mitigate industrial Dev. and Mkt. risks exploiting ESA huge technical, programmatic, and industry understanding and via anchor customer actions

+

Access to Risk Capital

Stimulate private risk capital, and synergise with the public ones to scale up

+

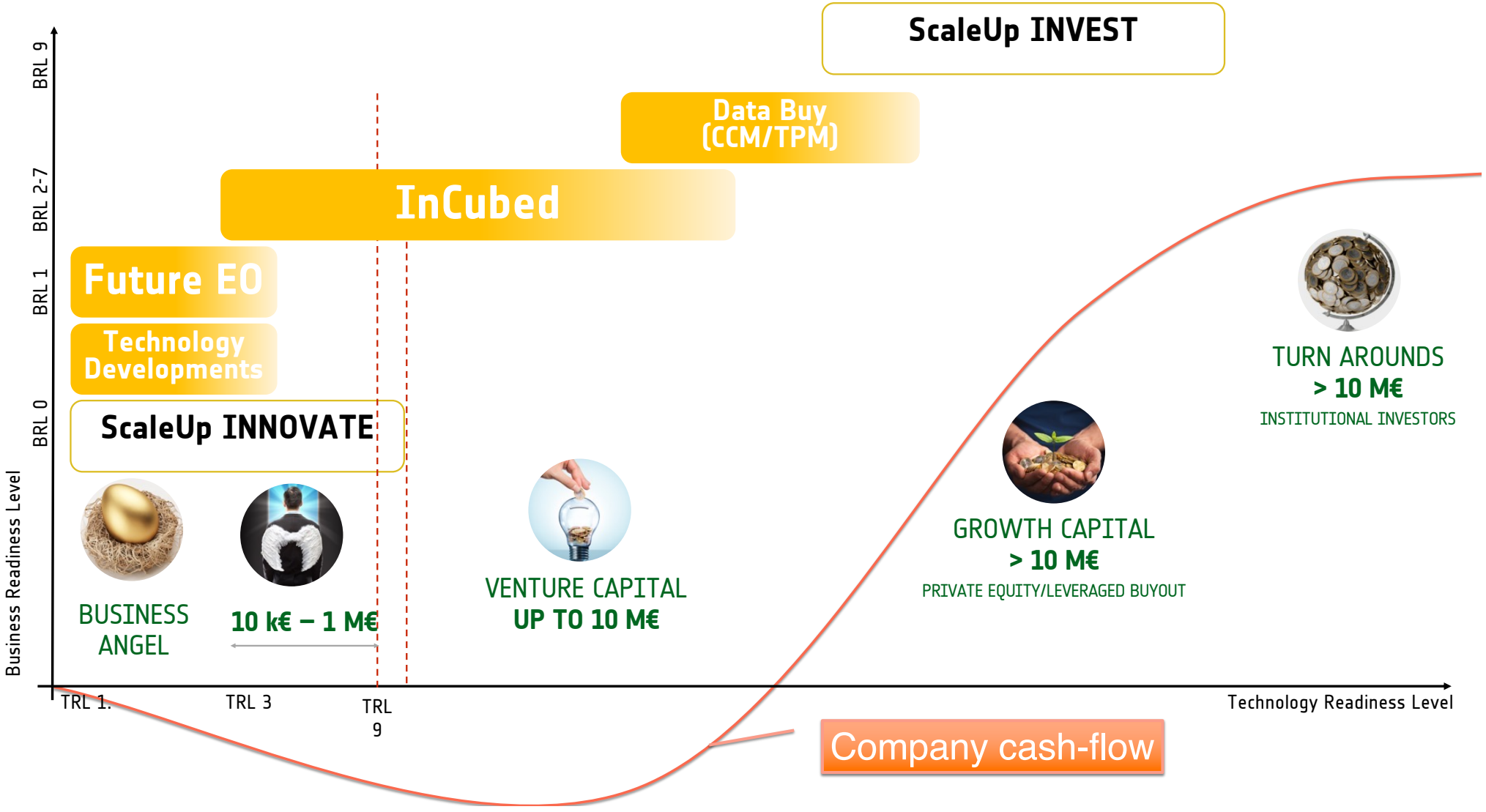
Easy Regulations

New Space tailored regulations and procurement rules minimizing burden and uncertainty

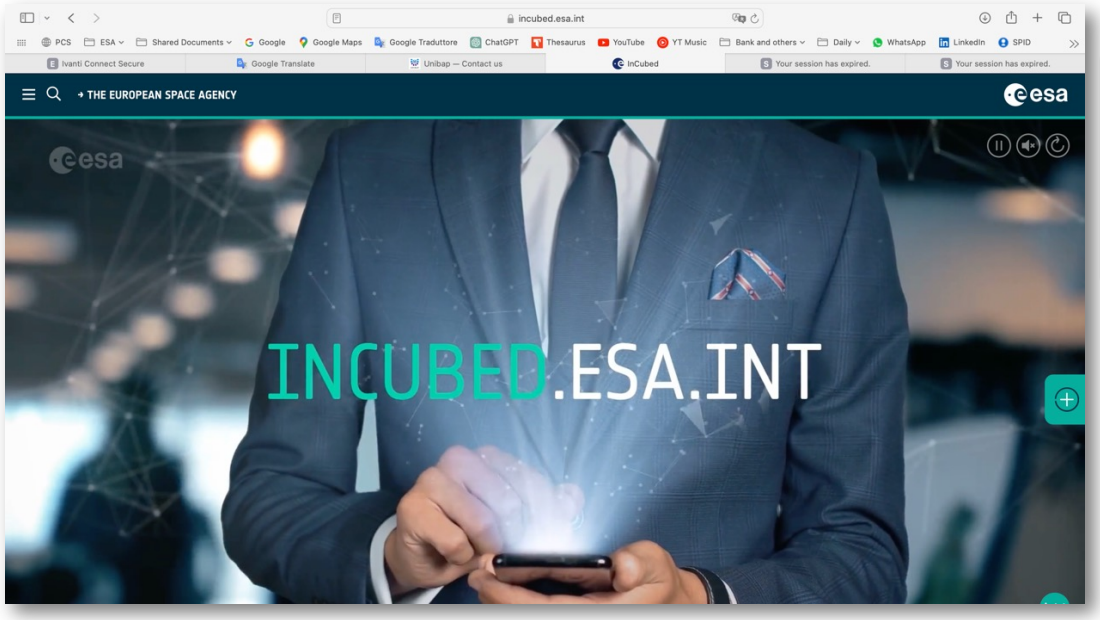
ESA roles

1. ENABLER of a sustainable commercial EO by closing know-how and technology gaps
2. PARTNER the development of innovative product/services to reduce dev and fin risk
3. CUSTOMER of commercial products and services to reduce market risks (e.g. anchor customer)

ESA contributions in the EO company life-cycle



Φ-lab run Investing in Industrial Innovation (InCubed)



€225M
InCubed fund size

140
Activities
@62% co-funding rate

100k€ to >15m€
Project size

NATIONAL DELEGATIONS

ESA

INDUSTRY

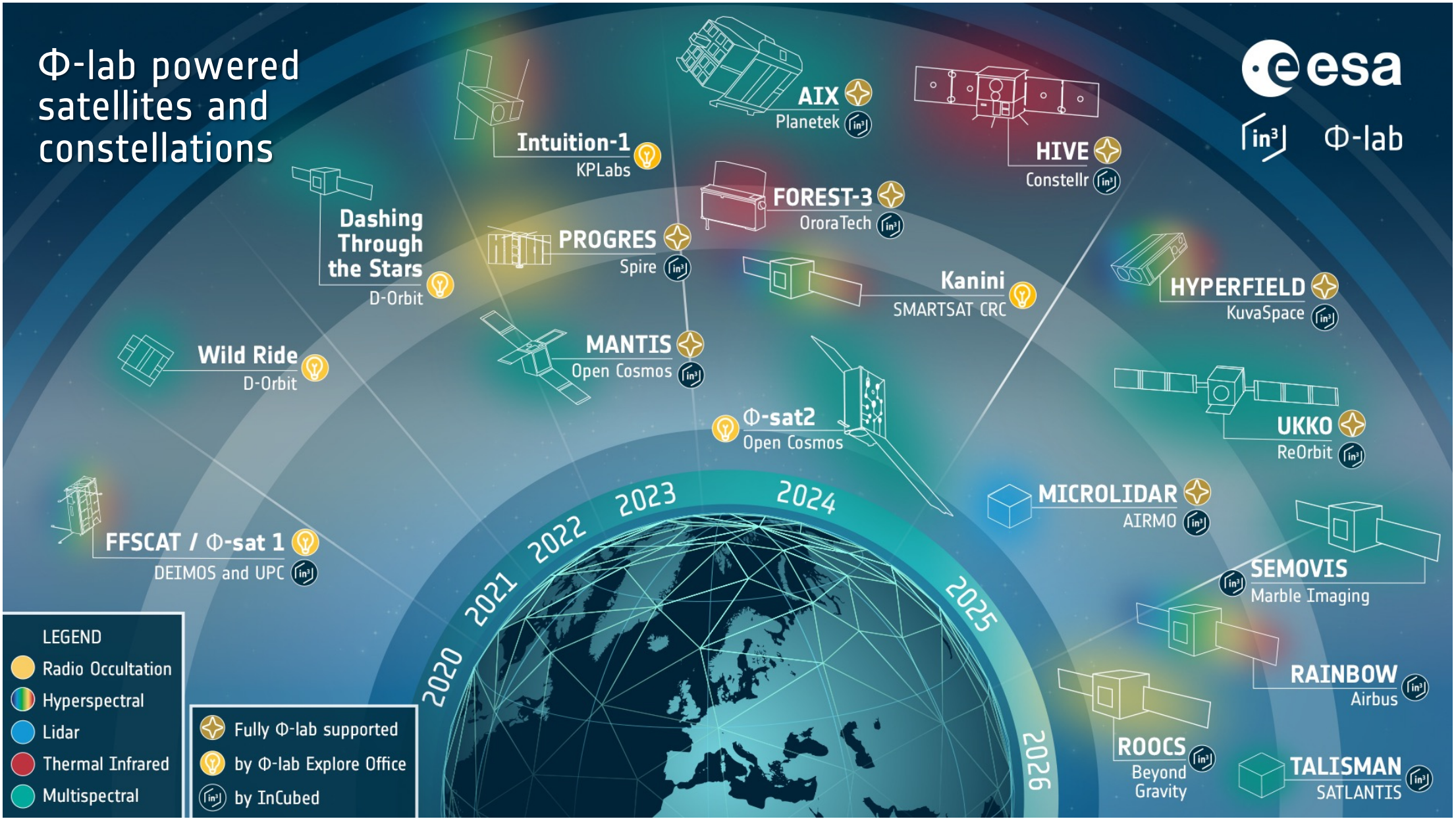
Personalised technical and commercial guidance

Zero-equity and zero-IPR

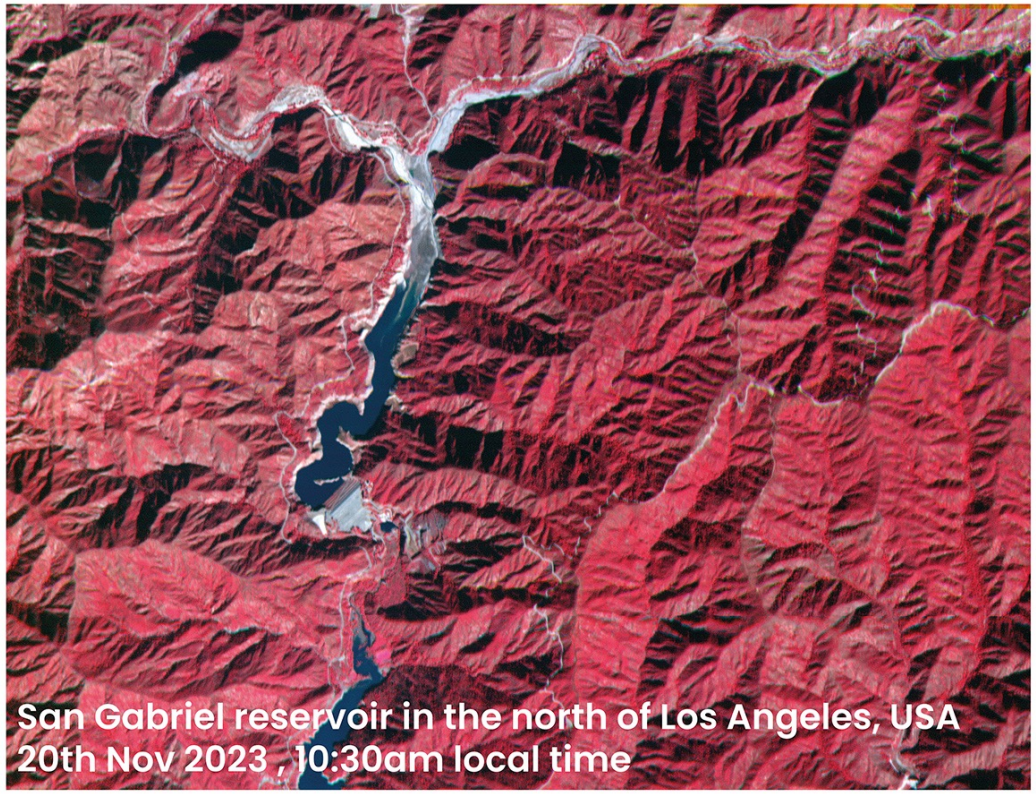
ESA stamp of credibility

Privileged access to commercial services enabling your development

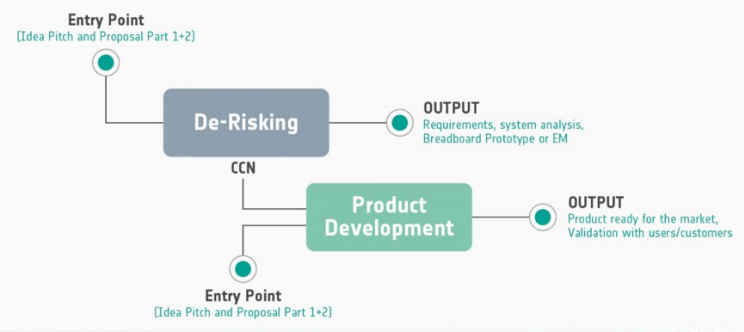
Access to ESA EO facilities and Φ-lab community


Φ-lab powered satellites and constellations
esa
in³ Φ-lab
AIX
Planetek
Intuition-1
KPLabs
HIVE
Constellr
FOREST-3
OroraTech
Dashing Through the Stars
D-Orbit
PROGRES
Spire
Kanini
SMARTSAT CRC
HYPERFIELD
KuvaSpace
Wild Ride
D-Orbit
MANTIS
Open Cosmos
Φ-sat2
Open Cosmos
UKKO
ReOrbit
MICROLIDAR
AIRMO
FFSCAT / Φ-sat 1
DEIMOS and UPC
SEMOVIS
Marble Imaging
RAINBOW
Airbus
ROOCS
Beyond Gravity
TALISMAN
SATLANTIS
2020
2021
2022
2023
2024
2025
2026
LEGEND
Radio Occultation
Hyperspectral
Lidar
Thermal Infrared
Multispectral
Fully Φ-lab supported
by Φ-lab Explore Office
by InCubed

MANTIS first image



InCubed Process - How to apply | InCubed.esa.int

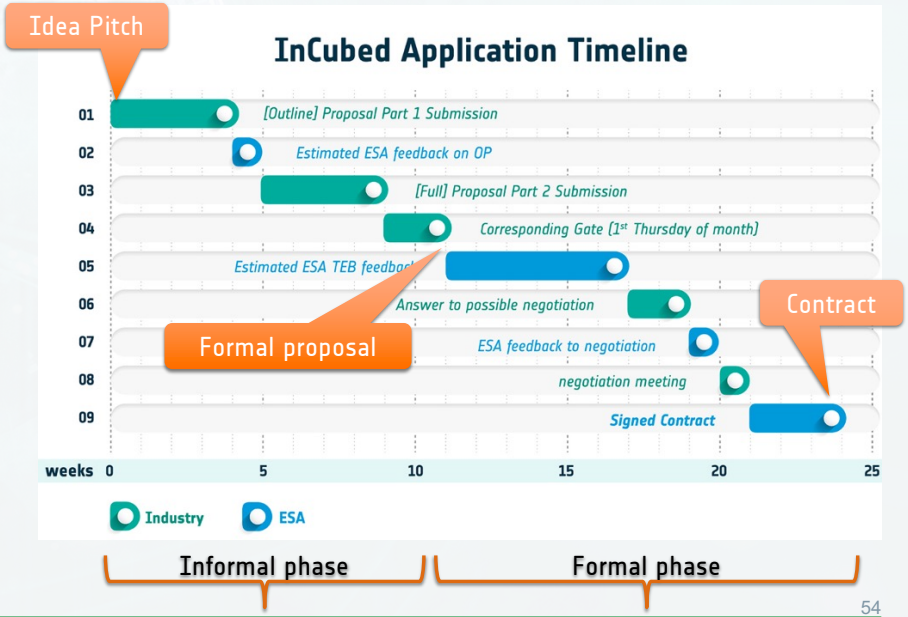


Cycle	TRL	ASRL	Funding Level up to % (of total allowable cost)		Funding level for Universities or Research Institutes with no commercial Interest in the Product
			Large Companies	SME	
De-risking	Up to 4-6 [1]	Up to 3	Up to 75%	Up to 80%	Up to 100% of maximum 30% of the cycle costs
Product development	Up to 7 (8 for IOV)	4 Up to 8	Up to 50%	Up to 80%	Up to 100% of maximum 30% of the cycle costs

[1] Depending on the technological or market risks as assessed by the Agency

Cycle	Main activities	Objectives
De-risking	Technical study, technical riskmitigation excluding any qualification or industralization	for all segments: system analysis, Business analysis, EM, breadboard of prototype of full to partial end-to-end integrated system
Product development	Development, qualification, verification, indusrialization and validation	Space: (E)QM or similar Ground/Data: verified product in a (pre)operational environment OPTIONAL: Validation of all segments in a (pre)operational environment

Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Slovenia, Spain, Sweden, United Kingdom



InCubed introduces several innovative methodologies

1. **Market pull** : Co-development partnership with priority on business case, no technology push
   - Spiral development typical of NewSpace economy
2. **Embeded Finance industry**: operative co-operation
   - VCs and debt financing, DeepBlue Venture, OTB, PrimoSpace and EIB
3. **Risk management** based on **Steering committees**
   - Industry, Delegation, ESA
4. **Pipeline** with FutureEO, CCM and ScaleUp for effective company's life cycle support
5. Support **disruptive innovation** for unique competitive advantage generation
   - e.g. HPC and AI in-orbit platform, AI4EO solution factories, cloud-based ML for SAR phase unwrapping, RF Geolocation methods, Sentinel complementary data (TIR, HYP, MS VHR-50 cm), TDI on CMOS detector, super-resolution, agnostic AI Fusion Engine for disasters, and innovative business models

1. Methods for **reduced time-to-contract**

InCubed, ScaleUp, and CCM synergetic pipeline

- Five InCubed companies have been awarded with a CCM contract providing quality data for operational public needs within the Copernicus framework
- Two others (ConstellIR and ReOrbit) have qualified also for ScaleUp Invest step I for scaling up their service
- The success of these InCubed companies is a testament to the value of what small emerging European companies are doing with the support of the different teams at ESA

InCubed impacts to the EO commercial industry

InCubed as VC enabler

SPACENEWS

News Opinion Military Launch Commercial Sponsored More Advertise

Thermal infrared imagery showing fields and forests around Dusseldorf, Germany. Credit: constellr

SAN FRANCISCO – German thermal satellite data startup constellr raised 17 million euros ($18.93) in seed funding.

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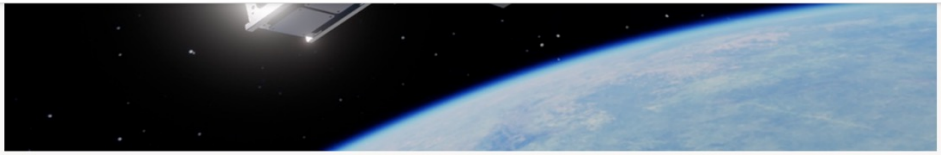
News Opinion Military Launch Commercial Sponsored More Advertise



OroraTech, which launches its first thermal imager on a cubesat in January, will use the funding for a second, improved imager launching next year. Credit: OroraTech

WASHINGTON — OroraTech, a German company developing a constellation of thermal mapping satellites for tracking wildfires and other applications, has raised an additional 15 million euros ($15.4 million) to support work on future satellites.

SPACENEWS

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Commercial

Airmo raises 5.2 million euros for climate-monitoring constellation

Debra Werner June 27, 2023

- ESA boosts the opportunities the companies have to raise private investment:
  - ConstellR (InCubed HIVE) €17Mi in 2023
  - AIRMO (InCubed Microlidar) €5.M2
  - OroraTech (InCubed OroraFire) €15M
  - OpenCosmos (InCubed MANTIS) €50M

InCubed Activities – Some examples

Innovative solutions for VHR EO satellites, AOCS and the Instrument for high-quality VHR satellite imagery and geo-analytics

deimos elecnor group · SURREY · TELEDYNE e2V Everywhereyoulook

EO PLUG-IN HUB

Improve potato production yield. A paradigm change for Earth observation integration in the agro-food industry

GeoVille · HLB · HERMESS · eod

ai4eo SOLUTION FACTORY

Combine EO data and AI tools to identify new business cases addressed with customized solutions, created in a knowledge base and modules repository factory

DFKI · VISION IMPULSE

AIX SMART IN-ORBIT DATA PROCESSING

AI-express (AIX) is a hybrid edge ecosystem based on state-of-the-art technologies (AI with dedicated processing units and Blockchain) targeting reactivity, responsiveness, and low-latency

planetek italia · AIKO INFINITE WAYS TO AUTONOMY · D-ORBIT

InCubed Activities – Some examples

Sat4Flood

Globally visualizes the risks of levee failure based on the most recent EO satellite data. This development combines the innovative technologies of satellite high-resolution soil moisture data with Interferometric SAR deformation data.

Deep Property

Enabling automated extraction of building features with AI-based techniques applied to geospatial datasets. The core market is the re/insurance sector, where these fine-granularity data improve the businesses' efficiency in multiple areas including underwriting risk modelling and pricing.

InCubed Activities – Some examples

SaferPlaces

A Digital Twin Platform able to support multiple users in assessing data-driven decisions for flood risk for cities. Open EO-Data and AI-based models are combined into a cloud-computing environment to provide incredible insights in terms of flood risk intelligence.

Signaleyes

A clear view on change

SignalEyes analyses spatial changes in objects including buildings, trees, water courses and roads.

HyperScout-2 for the FSSCAT mission. Miniaturized hyperspectral and thermal imaging coupled with Artificial Intelligence for breakthrough operational space missions

cosine

??????????????????

InCubed Activities – Some examples

ConstellR HiVE

High-resolution VEgetation monitoring to enable “more crop per drop” with MicroSatellites

constellr OHB

MultiSpectral Companion Mission

To provide a daily global coverage, high quality multispectral data product, with interoperability with Sentinel-2 data products.

aerospacelab

ORORA TECHNOLOGIES

To combat global wildfires, they'll close current thermal-infrared satellite data gap, enhancing wildfires detection, and enabling new business models.

mantis

MANTIS is a demonstration mission to develop, build, launch and operate an innovative nanosatellite that will fly a high resolution camera

OPEN COSMOS Terrabotics Space-to-Earth Analytics SATLANTIS

InCubed Activities – Some examples

HYPERFIELD

Hyperfield service provides global, daily and actionable real-time data on ecological assets through spaceborne hyperspectral imaging and AI. This novel small satellite-based solution enables creating a constellation of tens of satellites highly cost-efficiently, providing affordable data even for developing countries.

KUVA SPACE VTT

To provide a daily global coverage, high quality multispectral data product, with interoperability with Sentinel-2 data products.

To combat global wildfires, they'll close current thermal-infrared satellite data gap, enhancing wildfires detection, and enabling new business models.

MANTIS is a demonstration mission to develop, build, launch and operate an innovative nanosatellite that will fly a high resolution camera

Open positions at ESA Φ-lab

- ESA Φ-lab is looking for great candidates for :

2 International Research Fellows

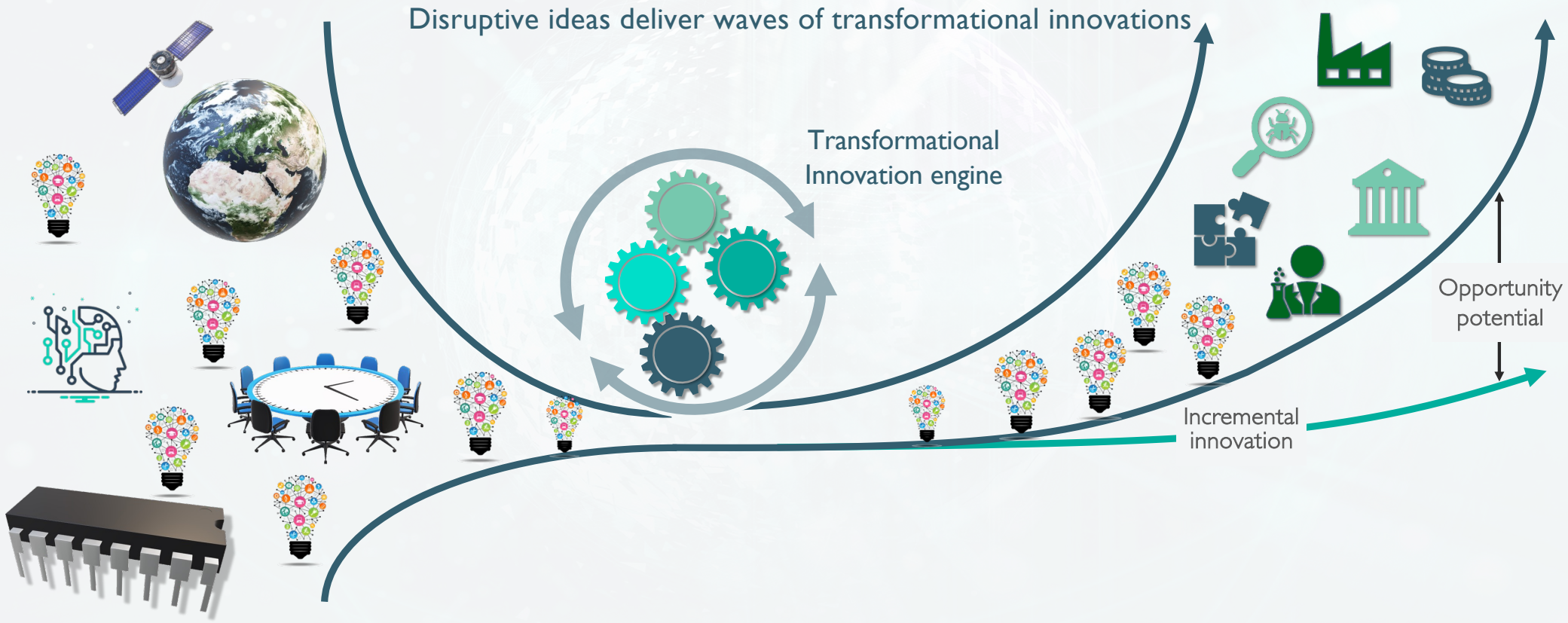
- From South-America and Indo-Pacific (post PhD)
- 2+1 years contract
- Please send your research proposal and CV at philab@esa.int

??? Industrial PhD and PostDoc

- From Finland, Italy, and Germany
- ?????? years contract
- Please apply here ??????

The ESA Φ-lab Innovation Model

Discover | Nurture | Develop | Fund | Enter market



Thank you for your attention. Questions ?

Giuseppe.Borghi@esa.int

To know more, visit our website:

philab.esa.int incubed.esa.int