

# Φ-Lab & the Investing in Industrial Innovation (InCubed) Programme

Czech Space Week – 10<sup>th</sup> November 2021

Amanda Regan ([amanda.regan@esa.int](mailto:amanda.regan@esa.int))

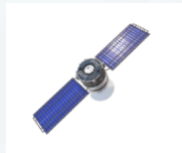
Head of  $\phi$ -lab Invest Office & InCubed Programme Manager

ESA-ESRIN, Frascati, Italy

European Space Agency

# The Earth Observation Perfect Storm

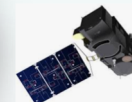
- Lower access costs
- Smart sensors, better performance, lower SWaP-C
- Commercial constellations
- Cloud computing
- Huge computational power available in space
- Artificial Intelligence and IOT in space



Major  
technology  
advancements

New  
entrepreneurial  
spirit

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



More EO data  
than ever  
before

Connected  
thinking

- 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



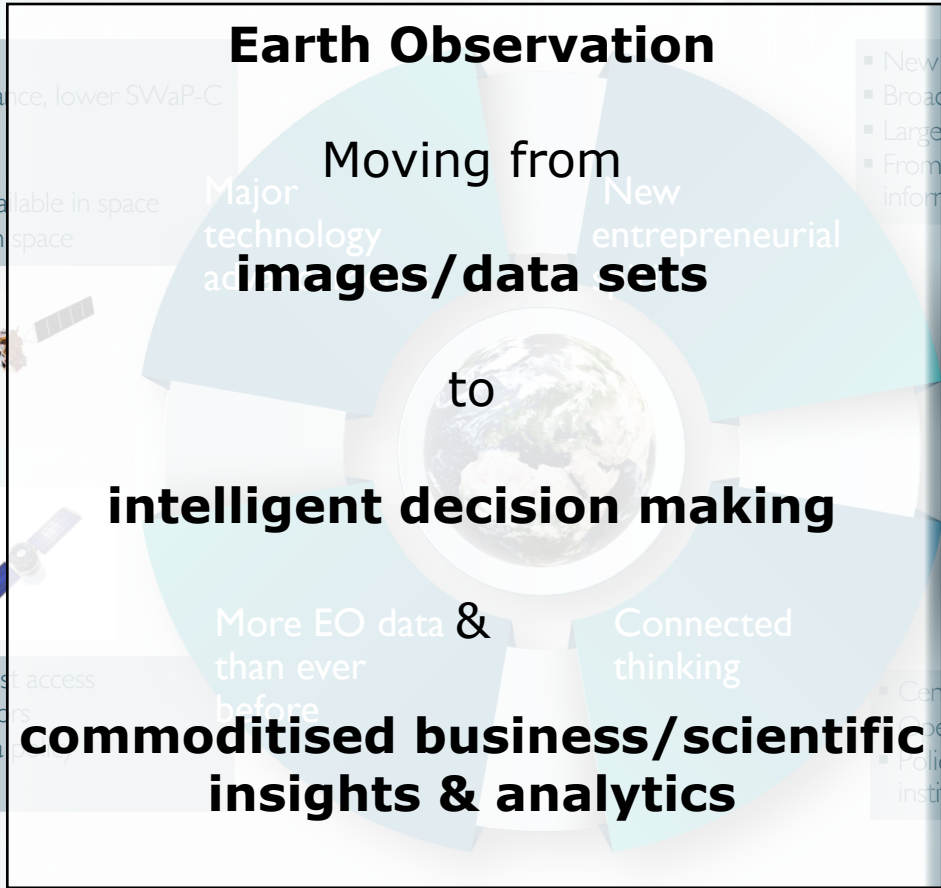
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## Earth Observation

Moving from

**images/data sets**

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

**From Earth Observation**

**to**

**Earth Insights & Analytics**

- Huge data availability and easiest access
- Constellations with richer sensors
- Copernicus free and open data
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**commoditised business/scientific insights & analytics**

- Centralised vs distributed and connected thinking
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## Accelerate the future of Earth Observation

### via transformational innovation\*

### strengthening Europe's world-leading competitiveness





## $\Phi$ -lab Explore Office

Explore the innovation universe  
and connect EO sensor revolution  
with the digital revolution e.g. AI4EO, DTE



## $\Phi$ -lab Invest Office

Stimulate competitiveness growth  
fostering entrepreneurial initiatives  
by investment actions from ESA member  
states and external investors  
(InCubed)

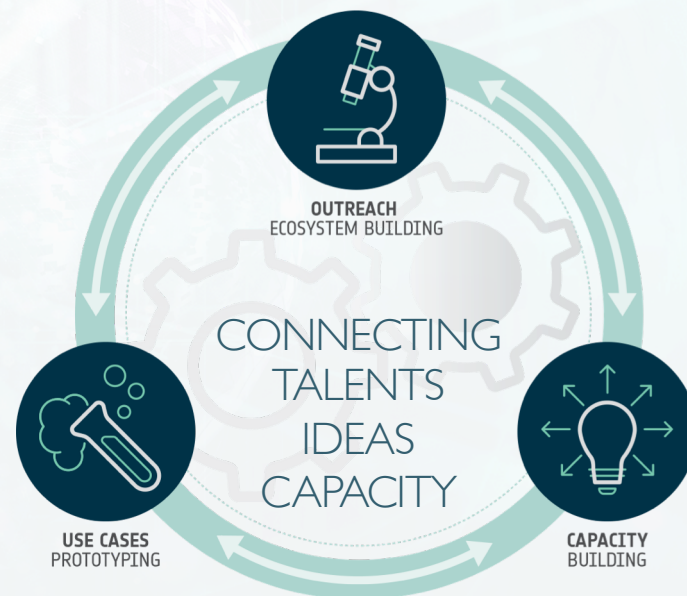
# Innovation cycle to deliver transformative and viable ideas

## Explore Office focuses on:



The innovation cycle within the  $\Phi$ -lab Explore office is:

- Focus on a meaningful problem
- Connect expert partners
- Enable solutions developing capacity
- Experiment “fail and recover fast” on use cases



# Φ-lab Investing in Industrial Innovation (InCubed)



## What is it

Industry-led commercial programme in Earth Observation  
18 countries with a total size of 103 M€

## Focus

Develop innovative & commercially viable products and services based on strong customer engagement

## Managed by

Φ-lab in ESRIN (Frascati, Italy)

## Wide scope

Anything from building satellites to data platforms, flight HW and SW and innovative business models. Start TRL 4 up to at least TRL 7 (Minimum viable product)

## When

Always, it is an open call (some delegations choose to operate calls)

## Who

ESA, National Delegations, and Industry

## Aim

Development de-risk to reach minimum viable product triggering customers and potential investors interest

## Co-Funding

Typically 50%, up to 80% SMEs

## Present portfolio

~60 activities - ranges 150k to 17 MEuros (co-funded)





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## When

2014-2020 (some delegations choose to operate calls)

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ESA aims to de-risk to reach minimum viable product  
triggering customers and potential investors interest

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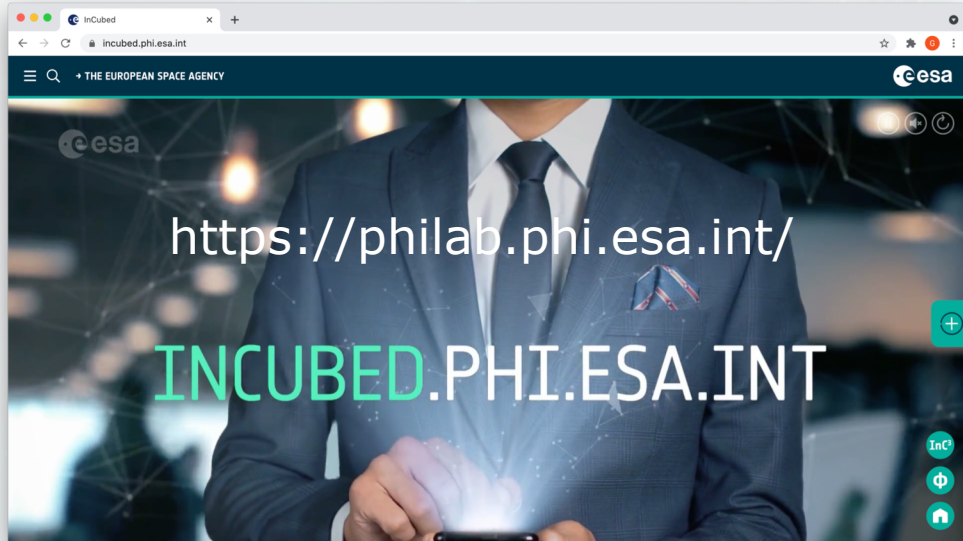
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**Investing in Industrial Innovation (InCubed)**  
Aims to stimulate and develop the European EO commercial sector

# Φ-lab Investing in Industrial Innovation (InCubed)



Personalised guidance  
technical and  
commercial support



Zero equity and  
IPR full ownership  
co-funding



ESA stamp of  
credibility



Access to ESA  
EO facilities  
and Φ-lab



Membership  
of the Φ-lab  
community



# Working with the $\phi$ -Lab

- **Visiting Fellows (Industrial, Scientific and Research)**

We host representatives from industry, or academia who can propose to work with us on their own innovative case study, getting access to ESA EO huge competence, our computing resources, and facilities. They usually stay with us from 4 weeks for a full immersion up to 2 years for a more strategic partnership

- **Visiting Professors**

Visiting Professors help  $\Phi$ -lab in setting the research agenda identifying the most valuable scientific problems and methodologies. We count now in 10 among the most representative professional researchers in Europe

- **Research Fellowships**

ESA's postdoctoral Research Fellowship offers scientists and engineers the possibility of two years in the lab to carry out research on case studies of yours and  $\Phi$ -lab interest

- **Young Graduate Traineeships (YGT)**

ESA's YGT scheme is aimed at Master degree graduates to work with us for one year to gain valuable experience in cutting edge EO activities

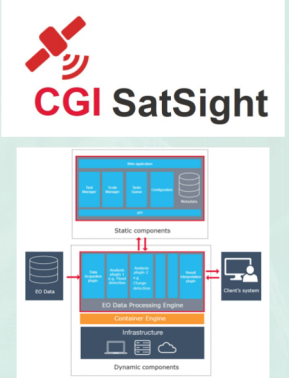


# Examples of InCubed supported EO commercial products & services along the EO value chain

# InCubed Activities – Some examples

## SPACEKNOW

The Global Economy Monitoring System delivering Transparency and Online Expertise (GEMSTONE) aims to develop a platform comprising AI algorithms providing actionable insights for various industries & commodities e.g. banks, hedge funds, energy insurance & automotive sectors



The aim is to develop a platform for automated processing of EI imagery to help commercial customers identify cost effective operational solutions in terms of e.g. planning, maintenance and asset monitoring

**EO PLUG-IN**  



A paradigm change for Earth observation integration in the agro-food industry leading to a spun out start-up

 **mantis**

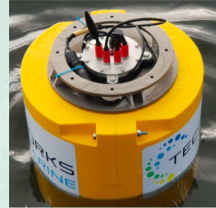
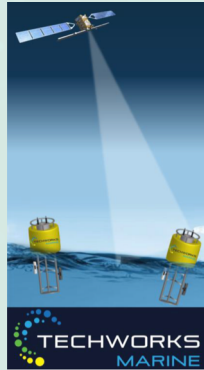
## OPEN COSMOS

Mission and Agile Nanosatellite for Terrestrial Imagery Services focused on serving the energy sector



# InCubed Activities – Some examples

CoastEO aims to a validated water quality commercial service using low cost buoy platforms & satellite data



AI Data Enhancement toolkit helps to remove phenomena such as haze, colour distortion and poor resolution using AI techniques



sobolt 



cosine | measurement systems

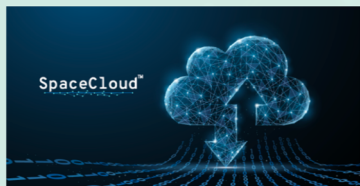
HyperScout-2 for the FSSCAT mission.  
Miniaturized hyperspectral & thermal imaging coupled with Artificial Intelligence for breakthrough operational space missions



aerospacelab

Multispectral Companion Satellite Prototype aiming at generating Sentinel-2 like optical data products with a daily global coverage (with constellation)

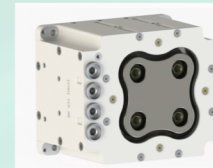
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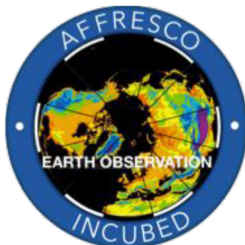
The Unibap SpaceCloud™ Services (USS) aims to support and augment future space systems with a radiation tolerant / flexible infrastructure for mesh networks, app deployment, AI and IoT capabilities



ENPULSION



Development & qualification testing of a high reliability version of electric propulsion IFM nano and micro COTS thrusters



Architecture for future EO space component (AFFRESCO) - High speed (> 100 Gbps) optical modem and novel networking methodologies to provide real time linking for future EO satellite constellations

Online platform to globally visualise levee failure risk combining high resolution soil moisture info with InSAR deformation data & other EO data



miramap



52impact

# Is InCubed right for me?

If you have a **commercially focused EO based product or service** in mind, you are doing something **innovative** and you have **potential commercial customers already engaged** then InCubed is a great tool to help you **de-risk** your development (overall end to end developments, satellites, instruments, sub-systems, platforms, data delivery systems)

InCubed partnership aims to support your idea up to at **least minimum viable product** level so that its added value can be demonstrated to commercial customers or potential investors

For satellite developments, e.g. we can help you to de-risk the first demonstrator unit - you can then seek further investment for a full constellation roll out



**Intellectual  
Property  
Rights stay  
100% with  
you!**

