Copernicus

General Overview

Stefano La Terra Bella

European Commission – Space Data for Societal Challenges & Growth

Copernicus Training and Information Session in Bari, 27 November 2018

Copernicus
Europe's eyes on Earth

Space

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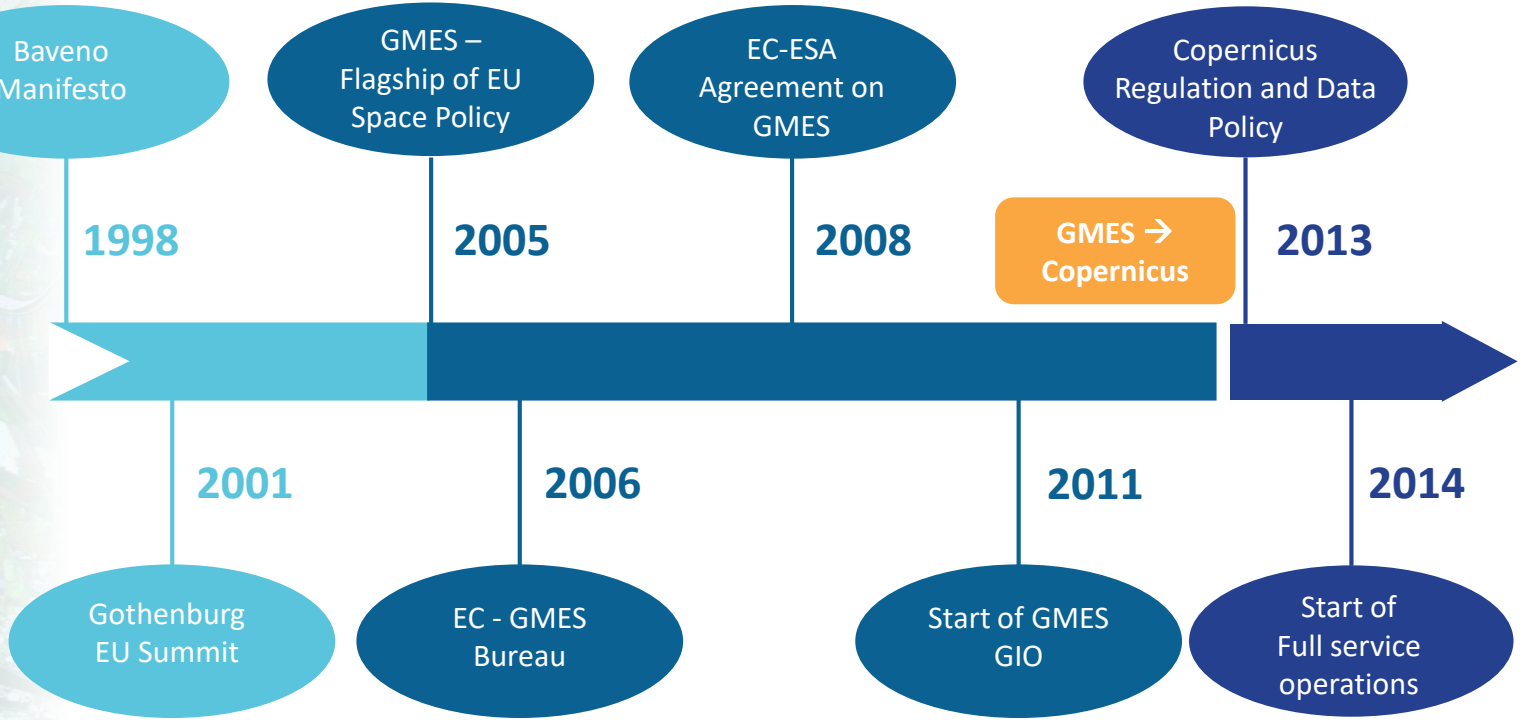
COPERNICUS HISTORY



GIO = GMES Initial Operation

COPERNICUS IN BRIEF

- **Copernicus is the flagship EO programme** of the European Union:
  - Monitors **the Earth,** its environment and ecosystems
  - Prepares for **crises, security risks** and **natural or man-made disasters**
  - Contributes to the **EU's role as a global soft power**
- Based on **User Requirements**
- **Full, free and open data policy**
- Is a tool for **economic development** and a driver for the **digital economy**

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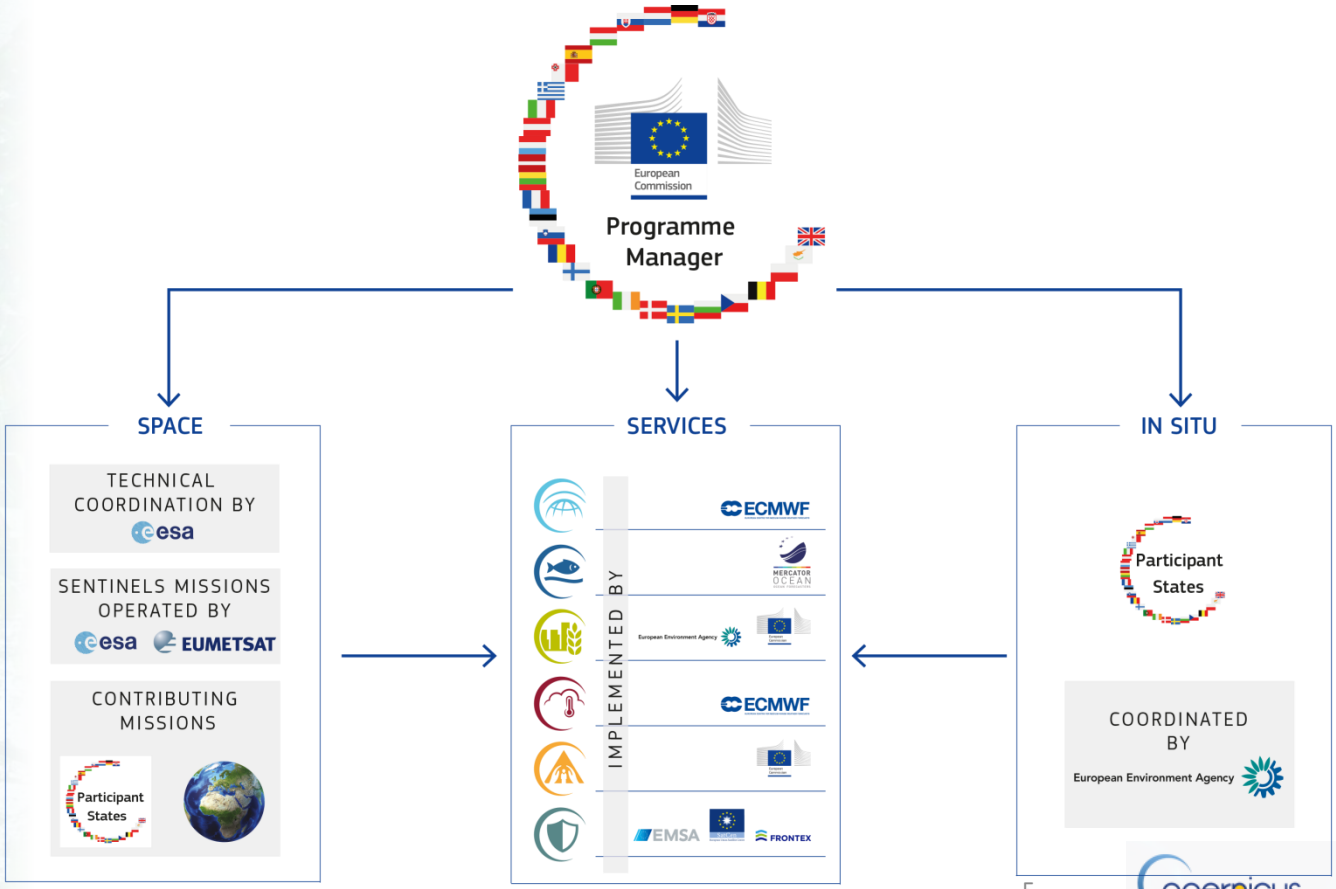
Europe's eyes on Earth

A space programme?

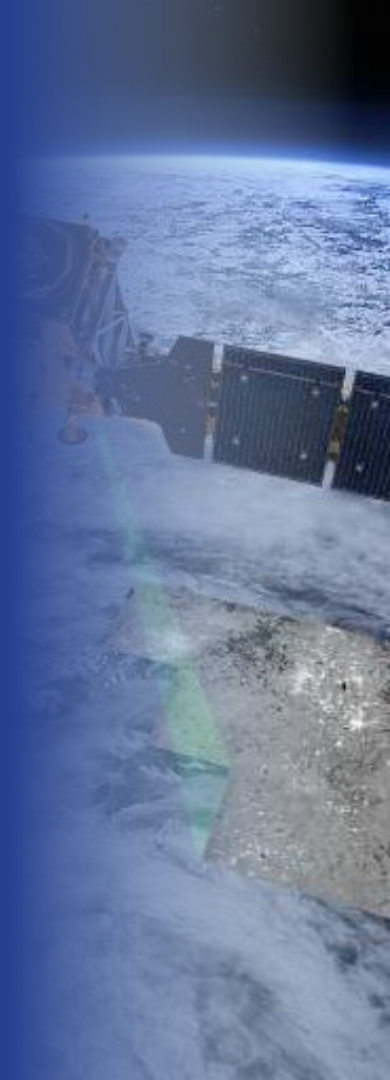
European Commission

COPERNICUS GOVERNANCE



Space Component

Copernicus Space Component



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THE SENTINELS

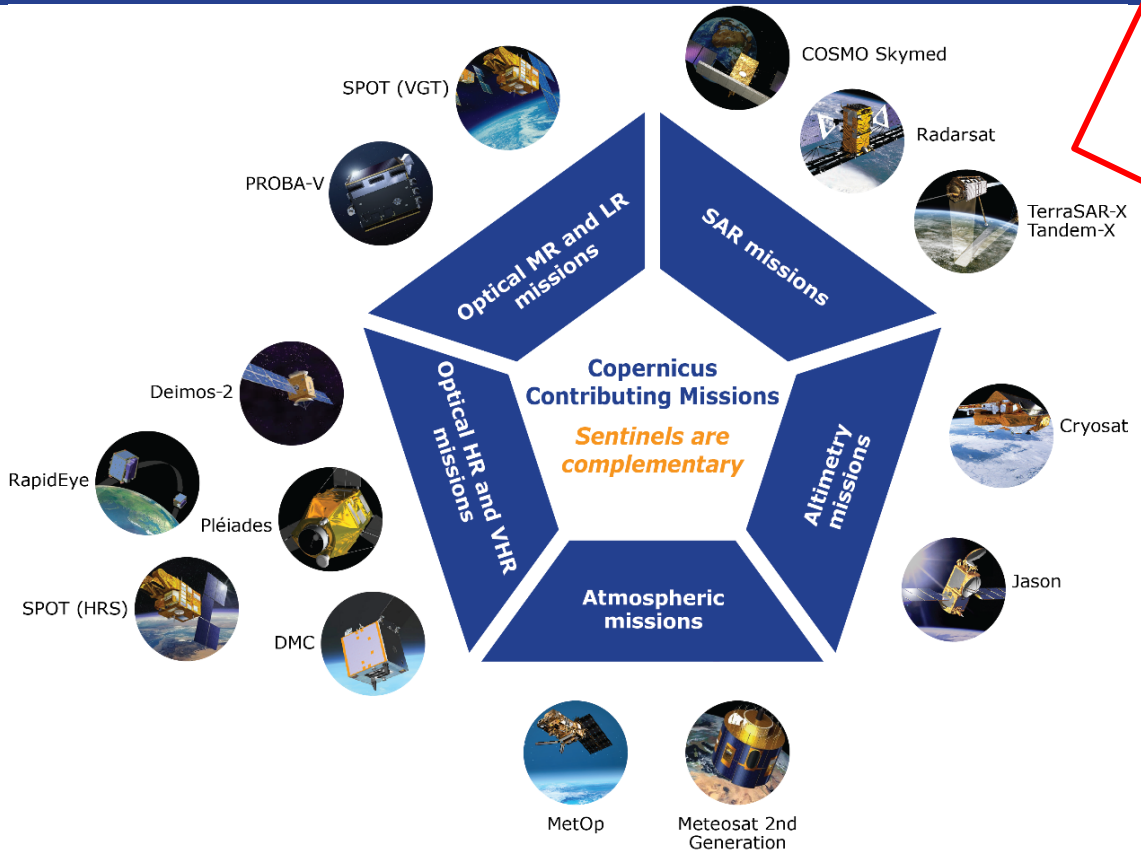
Space Component

Full, free and open access

		Key Features
 SENTINEL-1: 4-40m resolution, 3 day revisit at equator	***S1A and 1B in orbit***	Polar-orbiting, all-weather, day-and-night radar imaging
 SENTINEL-2: 10-60m resolution, 5 days revisit time	***S2A and 2B in orbit***	Polar-orbiting, multispectral optical, high-resolution imaging
 SENTINEL-3: 300-1200m resolution, <2 days revisit	***S3A and S3B in orbit***	Optical and altimeter mission monitoring sea and land parameters
 SENTINEL-4: 8km resolution, 60 min revisit time	*1st Launch 2020*	Payload for atmosphere chemistry monitoring on MTG-S
 SENTINEL-5p: 7-68km resolution, 1 day revisit	***S5P in orbit***	Mission to reduce data gaps between Envisat, and Sentinel 5
 SENTINEL-5: 7.5-50km resolution, 1 day revisit	*1st Launch 2021*	Payload for atmosphere chemistry monitoring on MetOp 2nd Gen
 SENTINEL-6: 10 day revisit time	*1st Launch 2020*	Radar altimeter to measure sea-surface height globally

THE CONTRIBUTING MISSIONS

Space Component



Subject to Data Owner's Data Policy

Copernicus In situ Component

In situ

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IN-SITU: OVERVIEW

- *In situ* data = observation **data from ground-, sea-, or air-borne sensors**, licensed for use in Copernicus
- Used to:
  - **Validate & calibrate** Copernicus products
  - Provide **reliable information** services
- Implementation on two levels:
  1. Tailored *in situ* data **for each Copernicus service**
  2. Cross-cutting **coordination across services** by the EEA





The Copernicus Services

Marine

Atmosphere

Climate change

Emergency

Land

Security

Copernicus Services Applications

Urban Planning

Transport

Tourism

Security & Defence

Health

Forestry

Insurance & Disaster Mgt.

Energy & Natural Resources

Development & Cooperation

Climate Change & Environment

Blue Economy

User Uptake

Socio-economic benefits of Copernicus

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COPERNICUS ECONOMIC BENEFITS

- Poised to generate significant **socio-economic benefits**
- Driver for **research, innovation** and the creation of **highly skilled jobs**

Key Figures

Cost per EU citizen = **~€1.07/year**

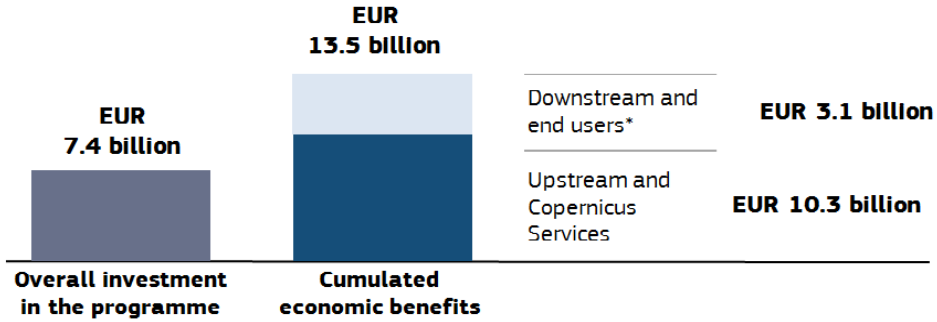
Every **€1** spent generates a return of **~€3.2**

Min. financial benefits on EU GDP = **~€30bn** by 2030

~50.000 jobs maintained/ created in the next 15 years

COPERNICUS ECONOMIC BENEFITS

Estimated direct monetary benefits between 2008 and 2020



12,450 job years supported in the downstream and end user markets

15,580 jobs years supported in the upstream

Examples of existing Copernicus benefits

70% Cost reduction of a precision farming service in Austria, thanks to Copernicus

€ 60k Yearly savings for each construction company using a work progress monitoring app

60% Higher accuracy for analysis of the impact of trans-boundaries pollutants on air quality

5% Productivity gain for fish farmers, by monitoring toxic algal blooms

50% Copernicus-based forecasts generate 50% more benefits to solar energy producers than traditional forecasts

€ 186M Benefits of Copernicus on the insurance market in 2015

* The Downstream and end user analysis includes only 8 value chains: Agriculture, Forestry, Urban Monitoring, Insurance, Ocean Monitoring, Oil & Gas, Renewable Energies and Air Quality. Estimates for end users were only calculated for Insurance, Oil&Gas and Urban Monitoring. The estimates of downstream and end user benefits should be seen as extremely conservative because they were calculated a year after the launch of the first Sentinel satellite. Benefits are likely to increase significantly as more Sentinels become operational.

User Uptake

The Commission strategy

Objective: maximizing the socio-economic benefits of Copernicus;

Challenge: geospatial data (including Copernicus) are difficult to use by non-experts;

Strategy: supporting the emerging downstream eco-system, which use Copernicus data and services to create products for non-experts.

Copernicus Europe's eyes on Earth

European Commission

The Commission Strategy

User Uptake

I) Increase **awareness** about Copernicus

II) Facilitate **access** to Copernicus

III) Support **downstream** actors (public authorities, businesses and researchers)

Leverage with actions from Member States and Entrusted Entities

The Commission Strategy

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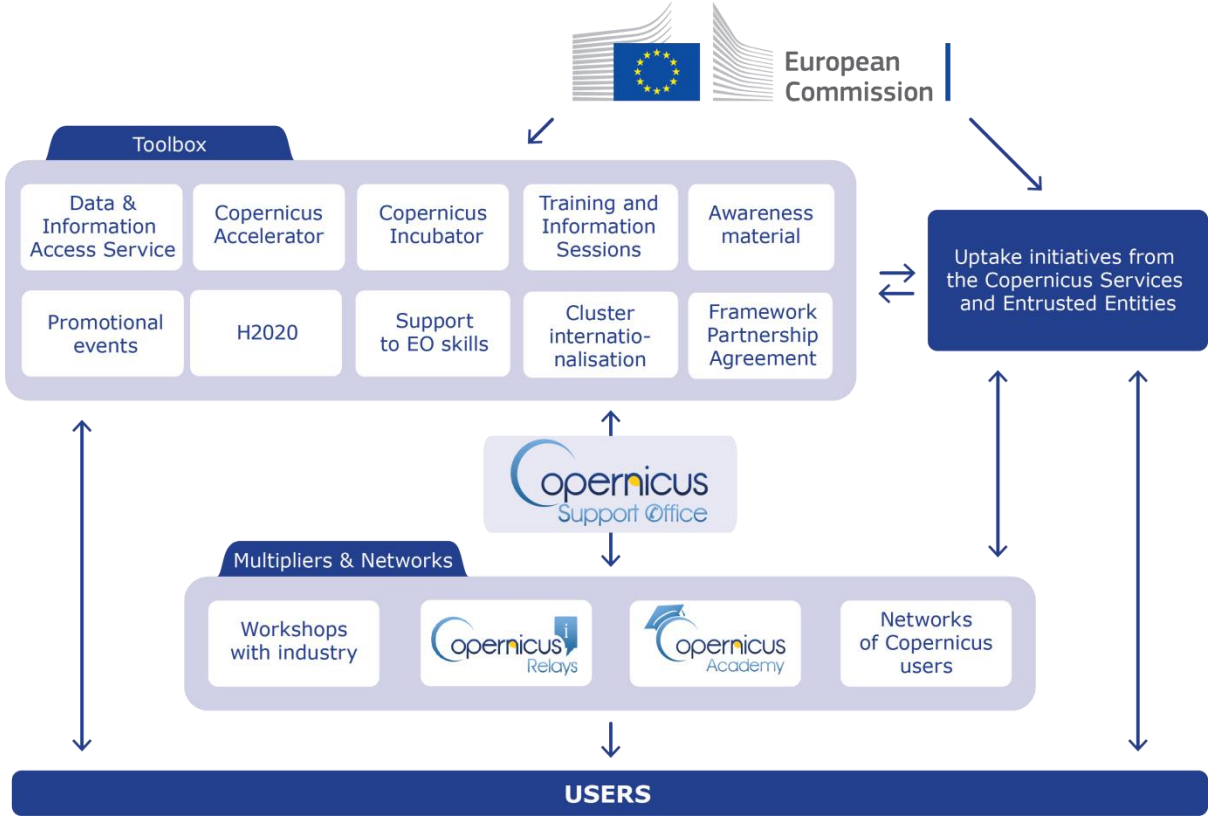
User Uptake

Copernicus User Uptake Initiatives



User Uptake

COPERNICUS NETWORKS

Copernicus Relays

+27% since last year

81 Relays
41 countries
4 continents

- Reach end-users in different countries and regions worldwide
- Foster local and global cooperation
- Support local users
- Organise promotional events and training

- **267 Copernicus-related events organized**
- **45.000+ potential users reached in 2018**

Copernicus Academy

+47% since last year

138 Academy
42 countries
4 continents

- Reach academic institutions worldwide
- Enable global EO research network
- Promote space in education
- Accelerate research to market link
- Build skills

- **353 Copernicus-related events organized**
- **107.000+ potential users reached in 2018**

User Uptake

COPERNICUS SUPPORT OFFICE

ITALIAN ACADEMY

- University of Padova
- CIMA Research Foundation
- IEST
- Fondazione CMCC
- University of Rome “La Sapienza”
- GISIG
- MEEO
- Politecnico di Milano
- StudioMapp
- TeRN
- University of Basilicata
- University of Bologna (2 departments)
- University of Rome “Tor Vergata”

ITALIAN RELAYS

- ISPRA
- IEST/iXitaly
- LazioConnect
- TeRN

- 3500+ tickets handled since start of operations
- replies within 1 or 2 days
- animates Relays and Academy

support@copernicus.eu

Twitter support
@CopernicusEU

The Commission Strategy

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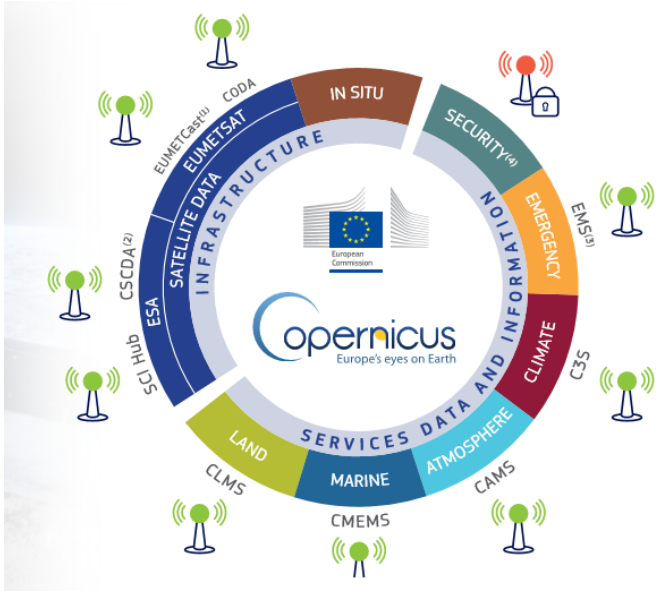
Leverage with actions from Member States and Entrusted Entities

Data Access

Copernicus Data Access Overview

- **Satellite Data distribution Hubs**
  - Sentinels
  - Contributing missions
  - Access to images in NRT
  - Access to archives

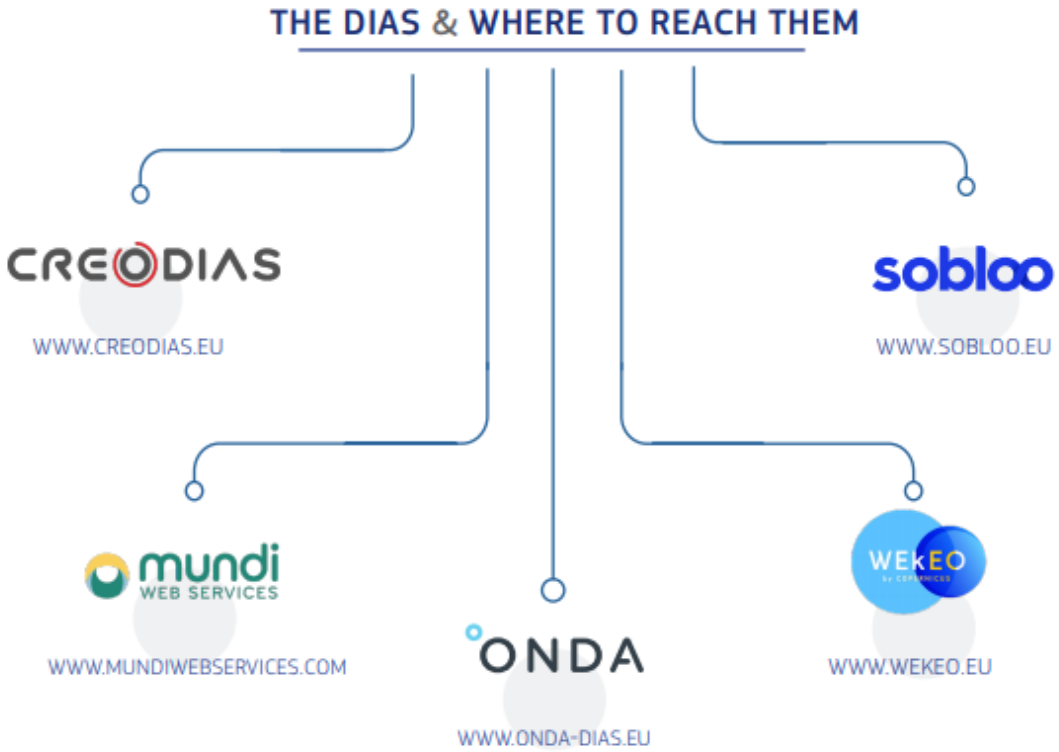


- **Services Information portals for**
  - Added value products, indicators
  - Models
  - Archives, Near Real Time and Forecasts products

Note: *Copernicus in situ component provides in situ data access, serving the Copernicus services. It is not delivering in-situ data to the end-users.*

Copernicus Big Data Approach

Data Access



The Commission Strategy

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I) Increase **awareness** about Copernicus

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User Uptake

Support downstream actors

As explained in the Space Strategy, *"**The potential of space solutions has not yet been fully exploited (…) The space sector needs to be better connected to other policies and economic areas.**"*

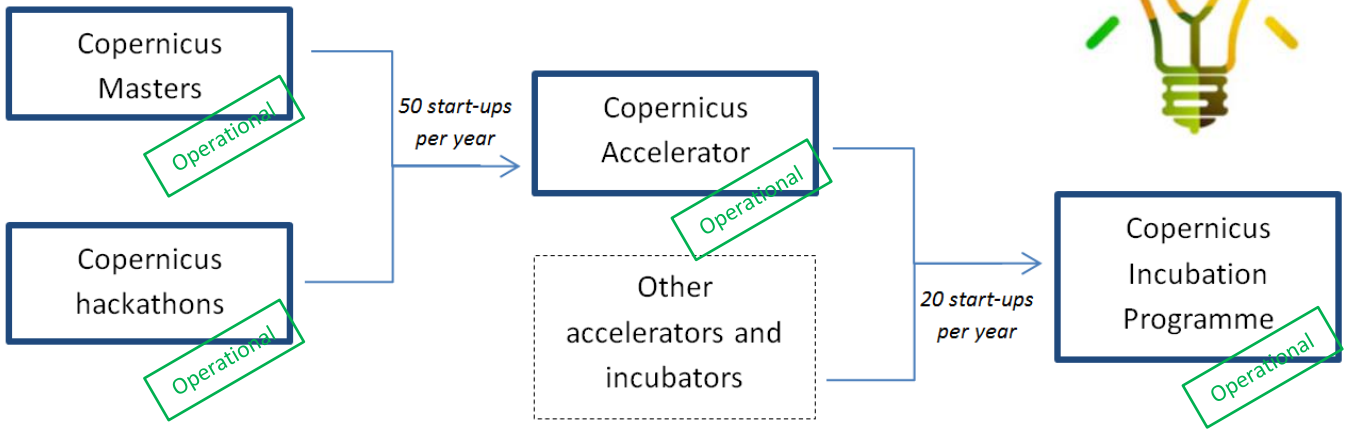
Strategy: supporting the eco-system of service suppliers that transform Copernicus data and services into the products required by end users

User Uptake

Pillar 3: Support to downstream actors

Data flow guaranteed at least **up to 2030**, with full, free and open data policy

Copernicus start-up programme



User Uptake

Pillar 3: Copernicus Masters

- A competition for **start-ups** developing applications based on Copernicus
- **16 prizes**, 600k prize pool (cash, business incubation, technical assistance…)
- Award ceremony: **December – Marseille**
- Application to the 2019 Masters will be in **Spring 2019**.

User Uptake

Pillar 3: Copernicus Hackathons

- A hackathon is a **sprint-like event** in which programmers and subject-experts collaborate to develop software based on Copernicus
- **Organisations** (clusters, companies, universities…) **can apply throughout the year**
- Every year, **the European Commission finances 85%** of the costs of 20 Hackathons, up to EUR 20,000
- 2nd application phase is **open until 31 December 2018**

Copernicus hackathons

Copernicus Europe's eyes on Earth | European Commission

User Uptake

Pillar 3: Copernicus Accelerator

- The Copernicus accelerator is a one-year **coaching programme** and has **supported 100 start-ups so far**
- Each start-up receives a **mentor** for the duration of the programme, as well as **monthly business online courses**
- The accelerator starts and closes with a BootCamp, where all costs are covered by the EU. Next one will be in Marseille
- **Access to the Accelerator**:
  - Winning a Copernicus Master
  - Winning a Copernicus Hackathon
  - Applying through an open call

User Uptake

Pillar 3: Copernicus Incubation

- The European Commission finances the **incubation of 20 start-ups per year**;
- Each start-up receives 50K voucher to spend on **business development**;
- The call for start-ups **is permanently open** (with evaluation every quarter).
- Start-ups must apply jointly the incubator/accelerator of their choice (based in Europe).

User Uptake

Pillar 3: Copernicus Skills Programme

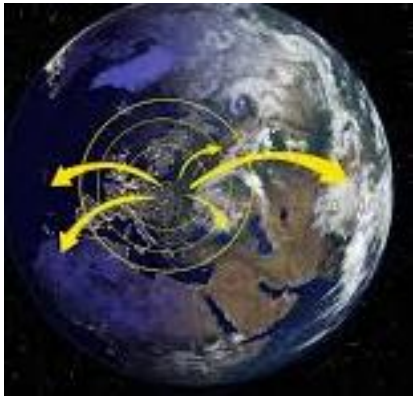
- **H2020**: forthcoming space calls in support of Copernicus user uptake
- **Cooperation with KICs:**
  - Post-doc scholarships awarded in partnership with KIC raw material
  - "Journey": summer course organised in June-July with Climate KIC
- **Ongoing ERASMUS+ sectoral skill alliance for Earth Observation** (with several Copernicus Relays)
- **Forthcoming Copernicus awareness campaign in universities** (in partnership with COSME)

User Uptake

Copernicus International Strategy

Objectives:

- Maximise the efficiency of EU investments through **cooperation with international partners**
- Promote the uptake of Copernicus data globally integrating **data from international partners** into Copernicus
- Promote access to **international markets for European companies**
- Agreements signed with USA, Australia, India, Brazil, Chile, Colombia
- Discussions ongoing with **ASEAN Countries** and **Singapore**



Copernicus Evolution

- **Stability** of the programme and **long-term commitment**
  - (Enhanced) **continuity of current data** and services
  - Continuity of **full, open and free data policy** for the environmental domain
- **Additional services** will be considered to **meet emerging needs** (non-exhaustive):
  - Monitoring CO2 to estimate anthropogenic emissions (priority)
  - Climate change and sustainable development
  - Changes in the Arctic
- **Next generation of satellites** (non-exhaustive): evaluation on-going to define observation needs in cooperation with users:
  - HR thermal infrared observations
  - Hyperspectral measurements
  - SAR L-band observations

These results do not present a commitment of the Commission

Thank you

Any questions? email me:

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Space