



Copernicus

General Overview

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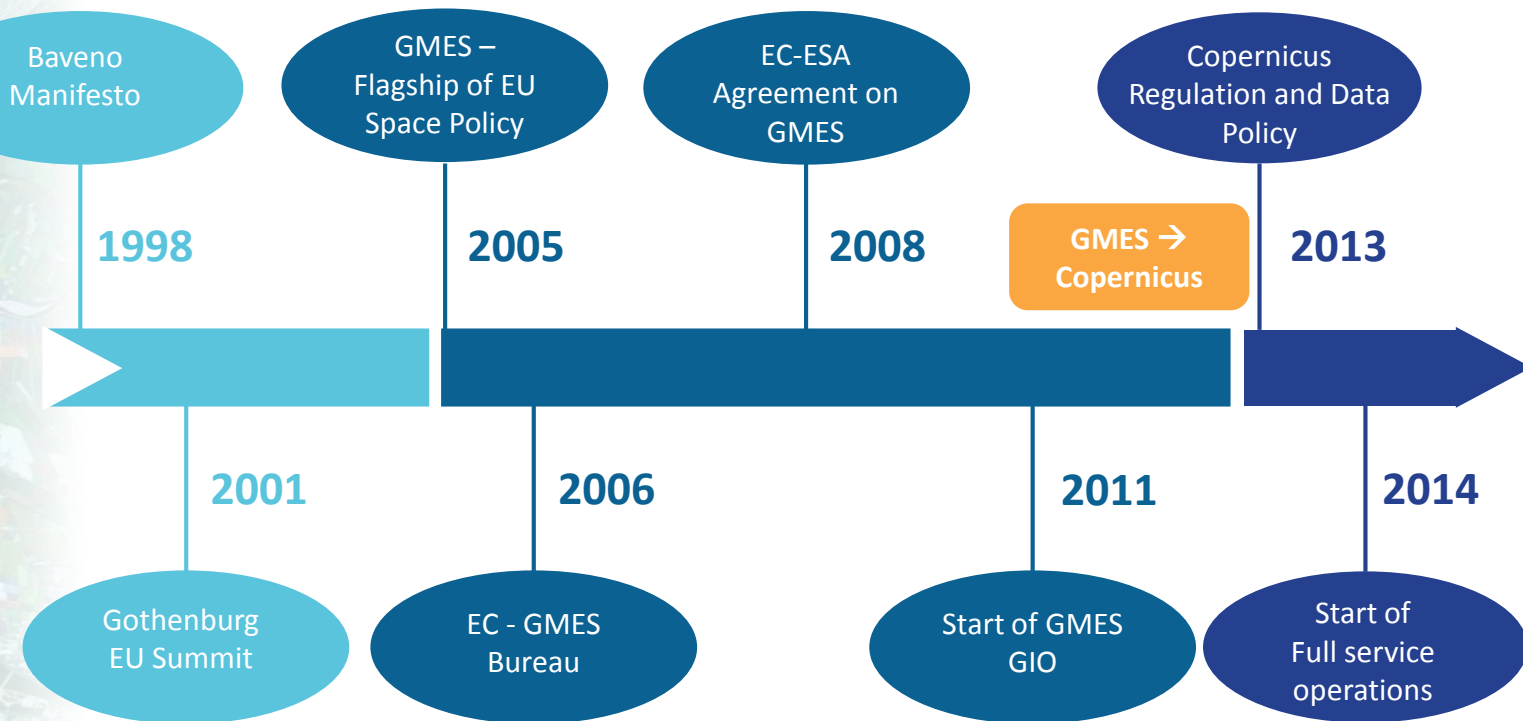
C O P E R N I C U S I N B R I E F

- **Copernicus, a flagship 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**
- Adopts a **full, free and open data policy**
- Is a tool for **economic development** and a driver for the **digital economy**



Copernicus

COPERNICUS HISTORY



GIO = GMES Initial Operation



Copernicus

COPERNICUS FUNDING

Almu can you please reduce the distance between the 2 orange arrows?

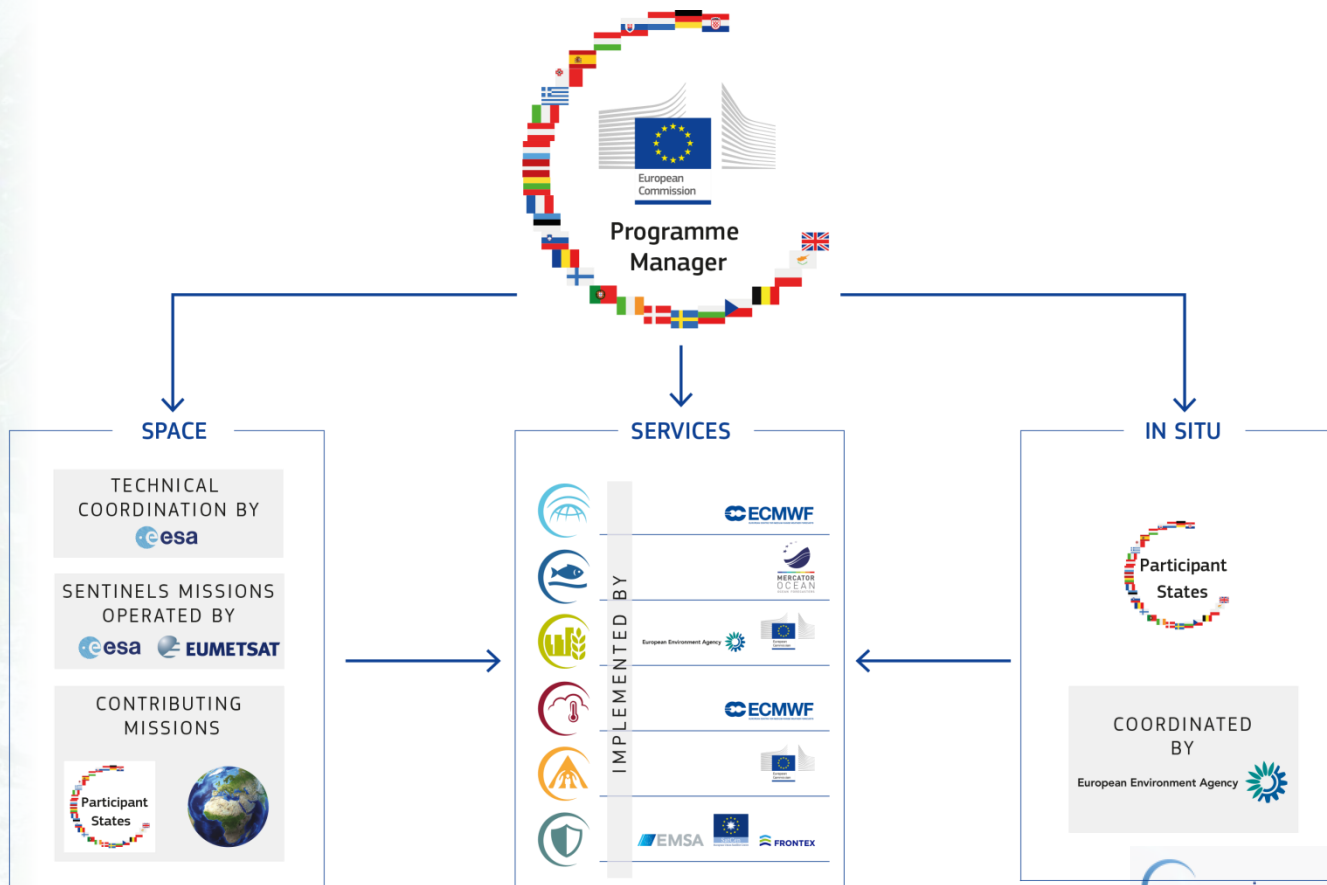
From research to operations





Copernicus

COPERNICUS GOVERNANCE





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COPERNICUS SOCIO-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



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COPERNICUS ECONOMIC VALUE (EXAMPLES)



Pipeline Infrastructure
Monitoring in the
Netherlands

Benefits for the
Netherlands:
€15 to €18 M/year



Forest Management in
Sweden

Benefits for Sweden:
€16 to €22 M/year



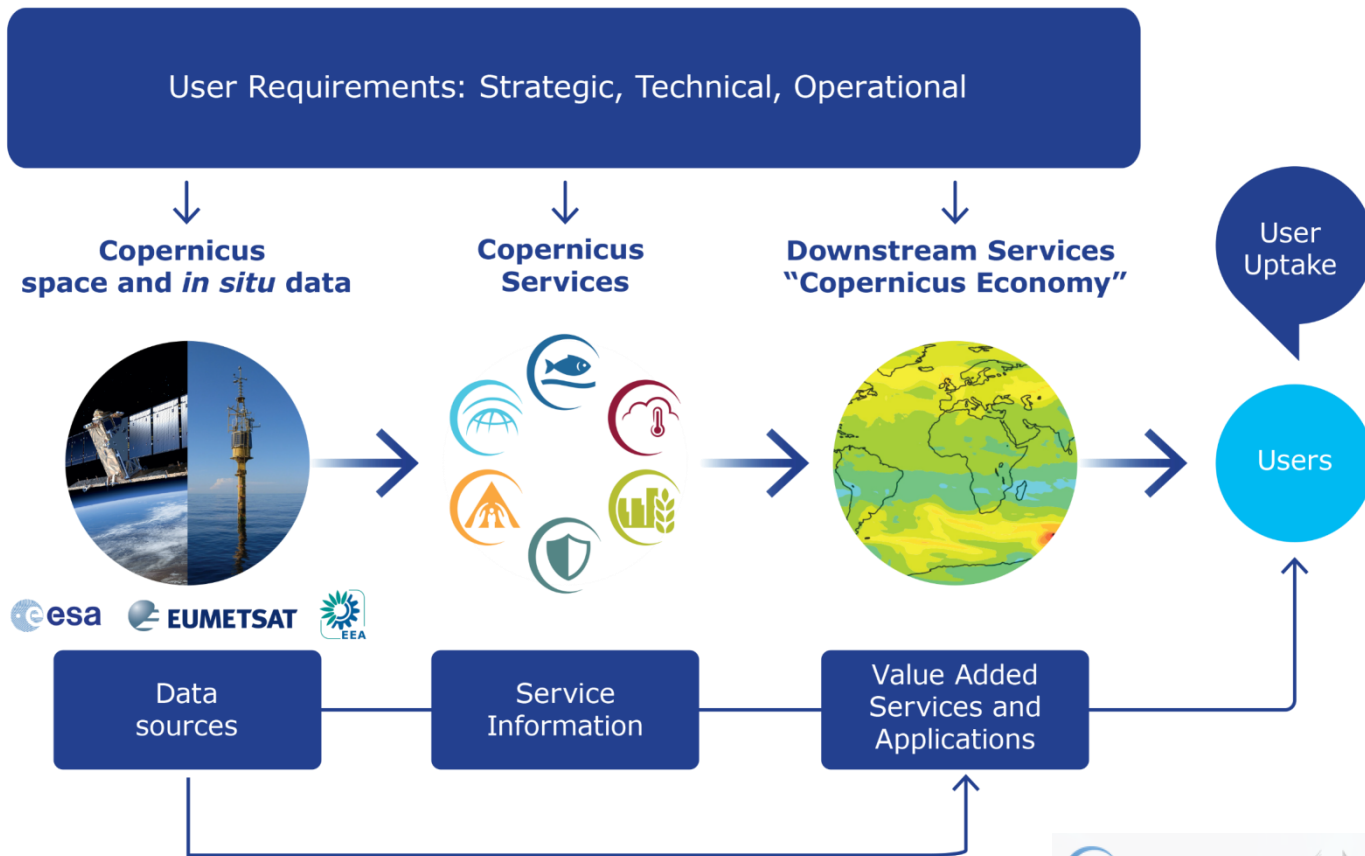
Winter Navigation in the
Baltic

Benefits for Sweden
and Finland:
€24 to €106 M/year



Copernicus

COPERNICUS IS DRIVEN BY THE USERS












Space
Component

THE SENTINELS

Sentinel Mission and Status

	SENTINEL-1: 4-40m resolution, 3 day revisit at equator	<i>2 sats in orbit</i>
	SENTINEL-2: 10-60m resolution, 5 days revisit time	<i>1 Sat in Orbit</i>
	SENTINEL-3: 300-1200m resolution, <2 days revisit	<i>1 Sat in Orbit</i>
	SENTINEL-4: 8km resolution, 60 min revisit time	<i>1st Launch in 2020</i>
	SENTINEL-5p: 7-68km resolution, 1 day revisit	<i>Launch by end 2016</i>
	SENTINEL-5: 7.5-50km resolution, 1 day revisit	<i>1st Launch in 2021</i>
	SENTINEL-6: 10 day revisit time	<i>1st Launch in 2020</i>

Key Features

Polar-orbiting, all-weather, day-and-night radar imaging

Polar-orbiting, multispectral optical, high-res imaging

Optical and altimeter mission monitoring sea and land parameters

Payload for atmosphere chemistry monitoring on MTG-S

Mission to reduce data gaps between Envisat, and S-5

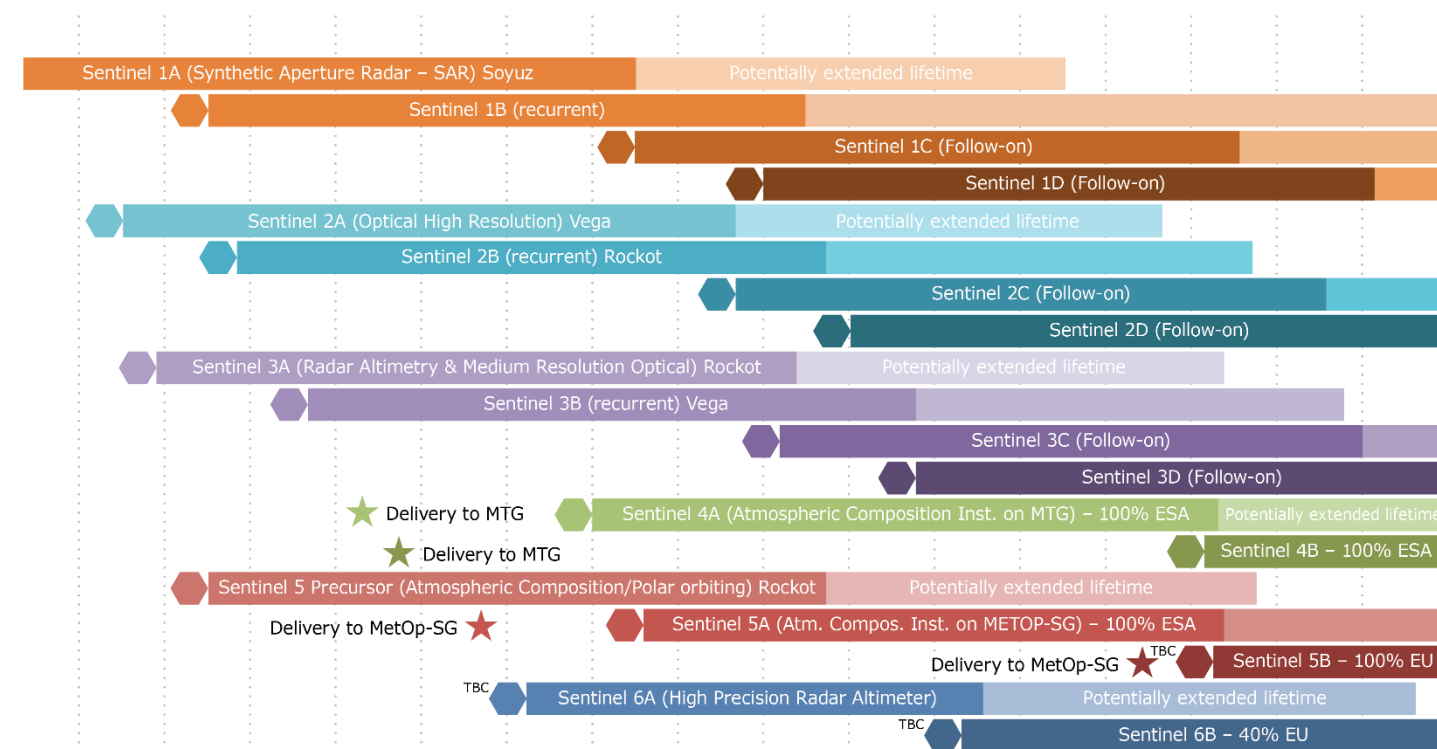
Payload for atmosphere chemistry monitoring on MetOp 2ndGen

Radar altimeter to measure sea-surface height globally

FULL, FREE
AND OPEN



2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030

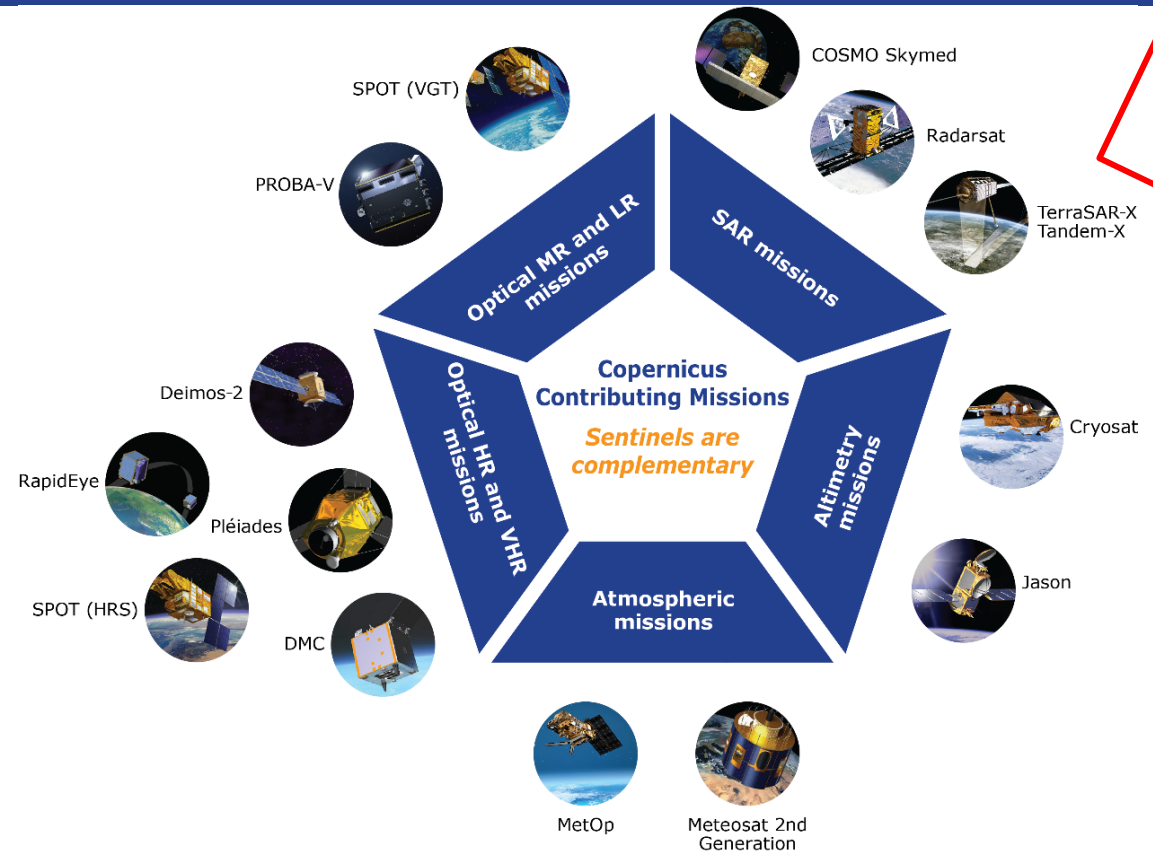


Legend: Flight Acceptance Review



Space
Component

THE CONTRIBUTING MISSIONS



**RESTRICTED
ACCESS**



In situ

IN - SITU : OVERVIEW

- *In situ* data = observation data from ground-, sea-, or air-borne sensors, reference and ancillary data licensed for use in Copernicus
- Use of *In situ* data:
 - Validate & calibrate Copernicus products
 - Reliable information services
- Implementation in two tiers:
 - Tailored *in situ* data for each Copernicus service level
 - Cross-cutting coordination across services by the EEA





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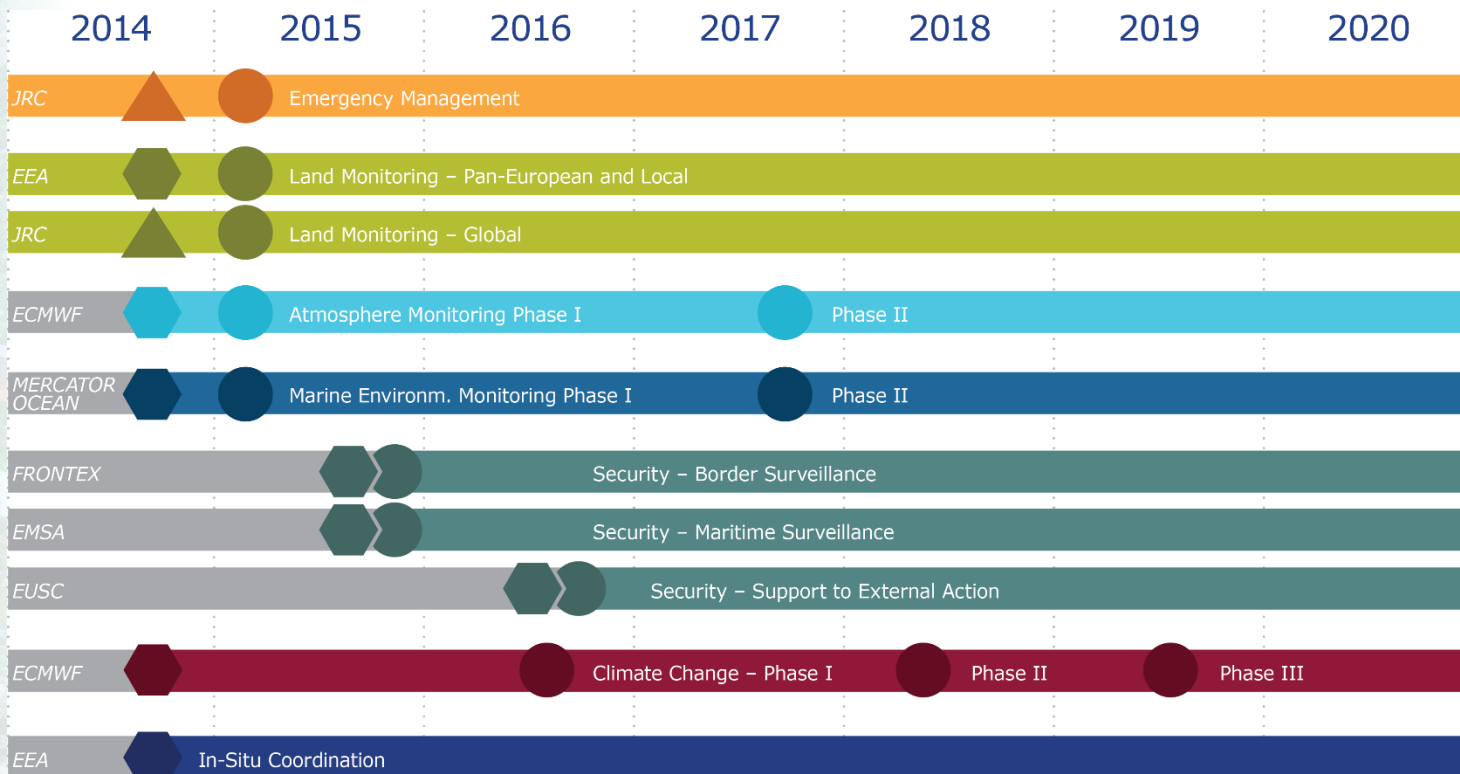
COPERNICUS SERVICES

*Monitoring the State of the
Earth System Environment ...*



*... Six cross-cutting
Thematic Services*

SERVICES IMPLEMENTATION SCHEDULE

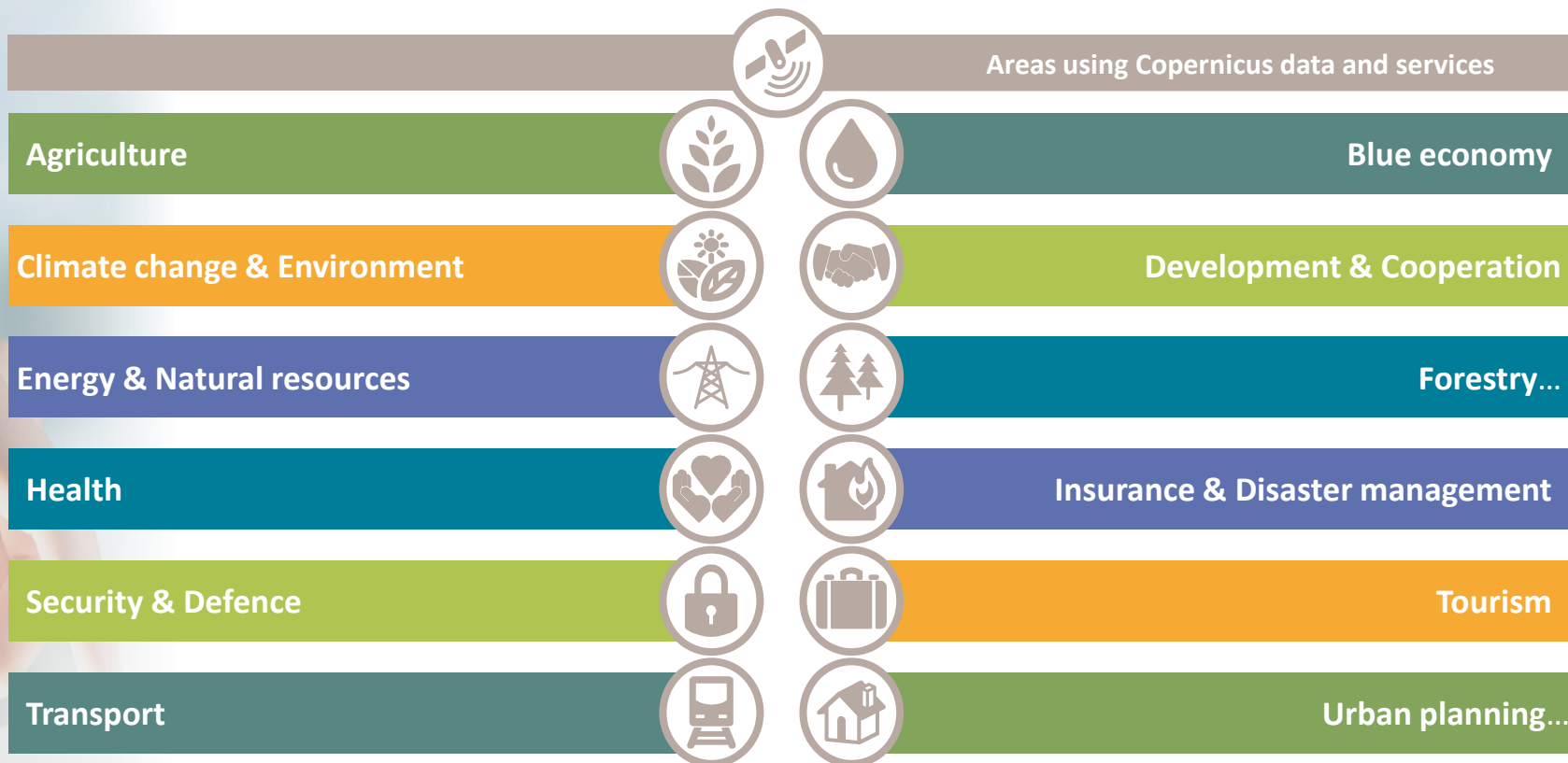


Legend:  Delegation agreement  Direct Management  Operational phase



User
Uptake

KEY SECTORS LEVERAGING COPERNICUS



Sources: PwC-Strategy& analysis & European Commission, 2015. Space tech and services - Applications related to Earth Observation - Case study 63; European Commission, 2015. Copernicus Brochure)




Data
Access

COPERNICUS DATA ACCESS

Access to Satellite data: <https://sentinel.esa.int/web/sentinel/sentinel-data-access>

**FULL, FREE
AND OPEN**



**Scientific and
Other Access**

<https://scihub.copernicus.eu/>


**FULL, FREE
AND OPEN**



**Access for
Copernicus Services**

*Restricted to the
Copernicus Service
Projects*

RESTRICTED



**Access for Collaborative
Ground Segment**

*Copernicus Space
Component Data
Access Portal**

RESTRICTED



**Access for International
Agreements**

*Restricted to
international
partners*

Access to Copernicus Services Data

- Land-related data: <http://land.copernicus.eu>
- Atmosphere-related data: <http://atmosphere.copernicus.eu>
- Marine-related data: <http://marine.copernicus.eu>
- Emergency-related data: <http://emergency.copernicus.eu>
- Climate change-related data: <http://climate.copernicus.eu> (Beta version)

**FULL, FREE
AND OPEN**

(*) Includes instructions on how to access Contributing Missions data



Data
Access

Access Copernicus Contributing Missions

- Data from ESA, EUMETSAT, third party mission operators
- Data Access (Key Info):
 - Registration with eosupport@Copernicus.esa.int
 - Access restrictions:
 - Public authorities
 - EU Research projects
 - EU institutions
 - Copernicus Services
 - <https://spacedata.copernicus.eu/web/cscda/copernicus-users/access-rights>
 - Order quota (for R&D and Copernicus services only)

RESTRICTED



Data
Access

THE BIG DATA CHALLENGE

- Massive amounts of data
- Full, open and free-of-charge



ca. 8 Terabyte/day or ca.
3 Petabyte/year
with just Sentinels-1, -2
and -3 fully operational

- Different types of **dissemination** infrastructures
- **New technology** developments
- ICT and EO **cross-fertilisation**
- **Interoperability** with non-EO datasets
- Global EO **competition**
- Growth and jobs in **downstream** sector



Data
Access

COPERNICUS BIG DATA APPROACH

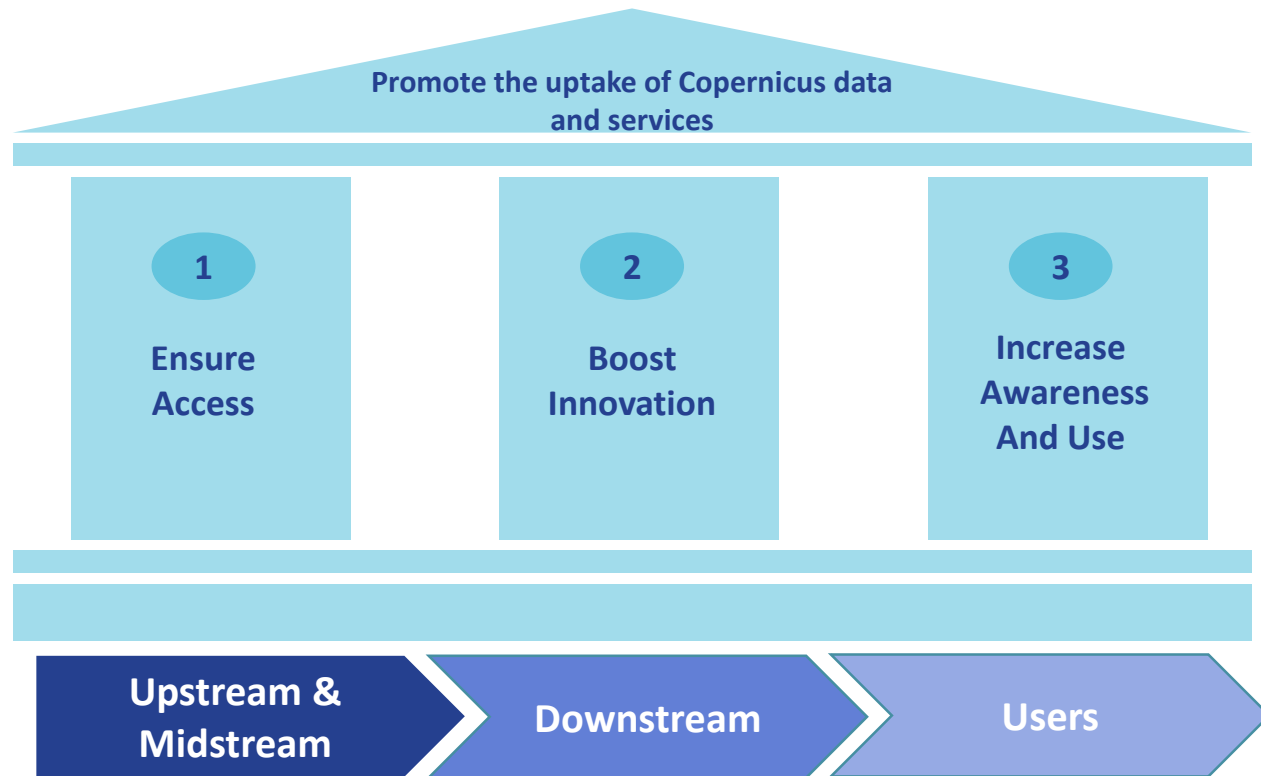
- Imminent launch of a **Data Access and Information Service**
- Intention to procure parallel services from three suppliers:
 - **3 platforms** to provide equal access to the basic data and services
 - **Run by 2 entrusted entities:** EUMETSAT (1 platform) and ESA (2 platforms)
- Overall **ensuring that Copernicus data is easily accessible and used!**





User Uptake

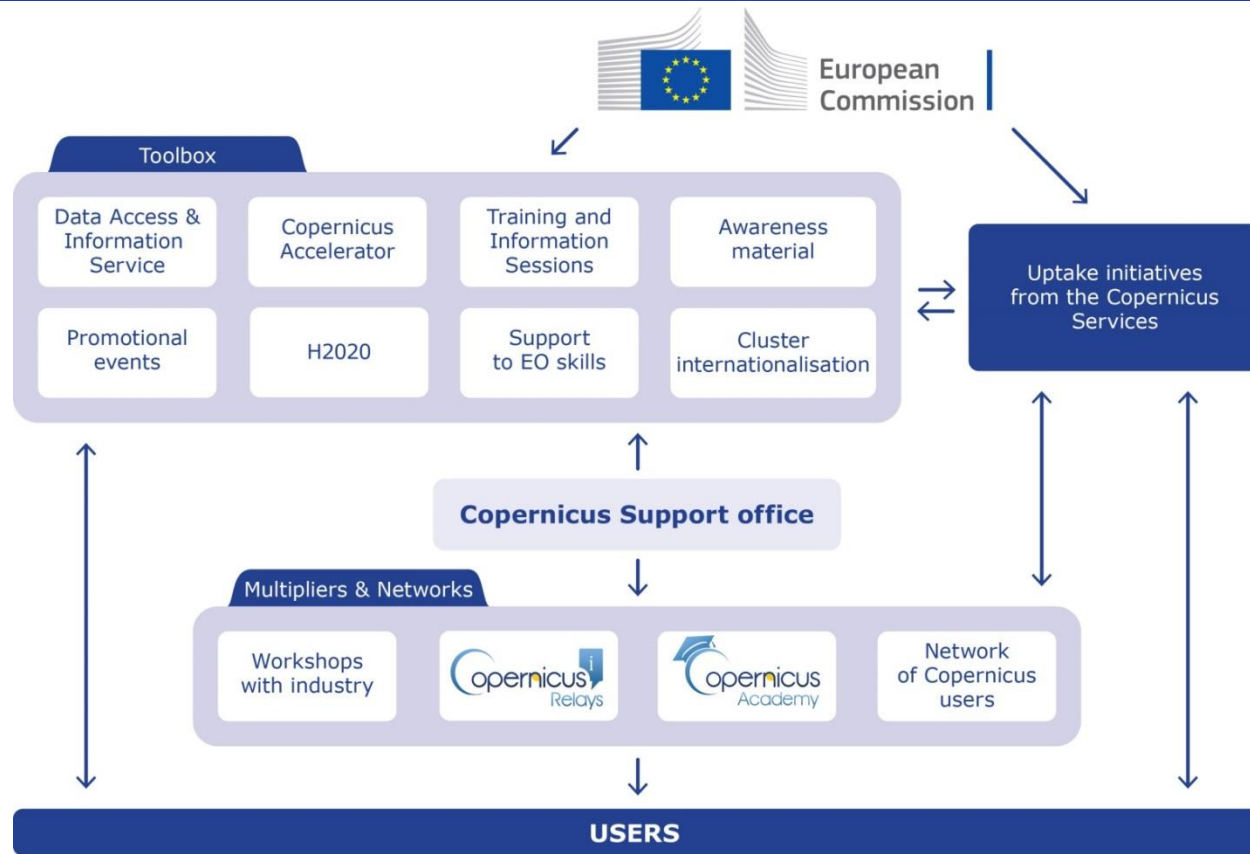
C O P E R N I C U S U S E R U P T A K E S T R A T E G Y





User Uptake

COPERNICUS USER UPTAKE INITIATIVES





Copernicus

CONCLUSIONS

The Union **Earth Observation** and monitoring programme

Increase general knowledge
on the state of the Planet



Protect people
and assets



Improve environmental
policy effectiveness



Facilitate adaptation
to climate change



Monitor
the environment



Foster downstream
applications in
a number of fields



Help managing emergency
and security related situations



THANK YOU!

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