



Copernicus

Status update





Copernicus

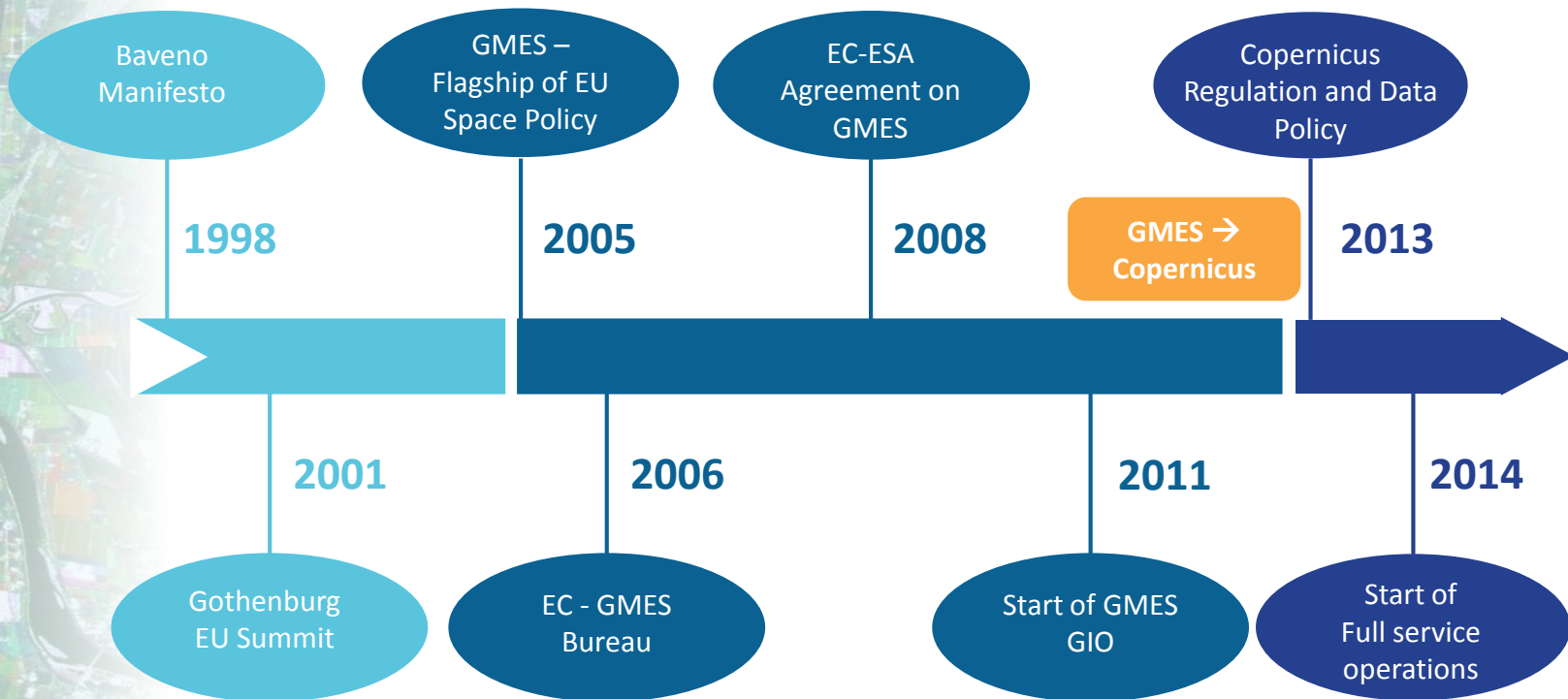
C O P E R N I C U S I N B R I E F

- **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?

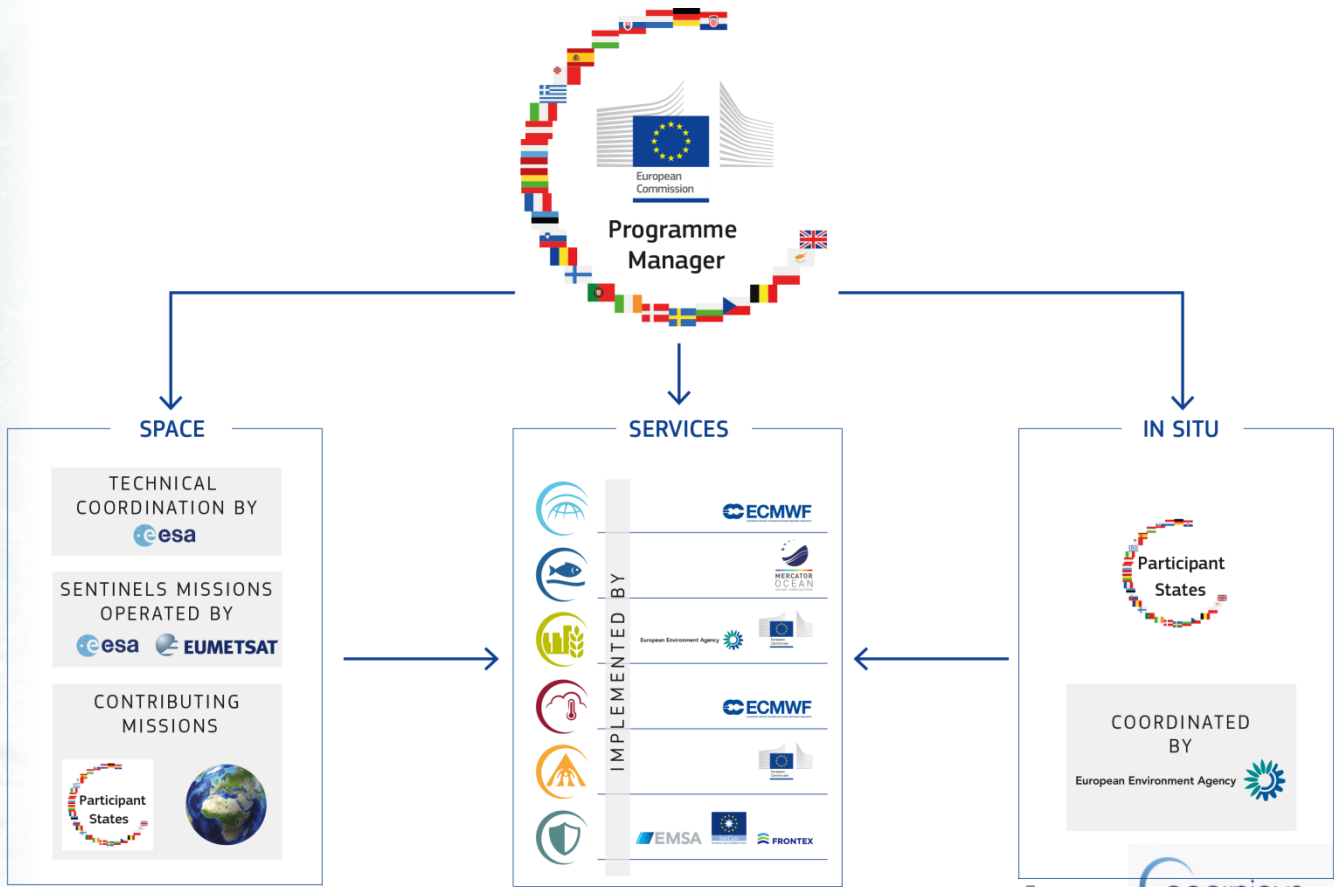
From research to operations





Copernicus

COPERNICUS GOVERNANCE





Copernicus

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

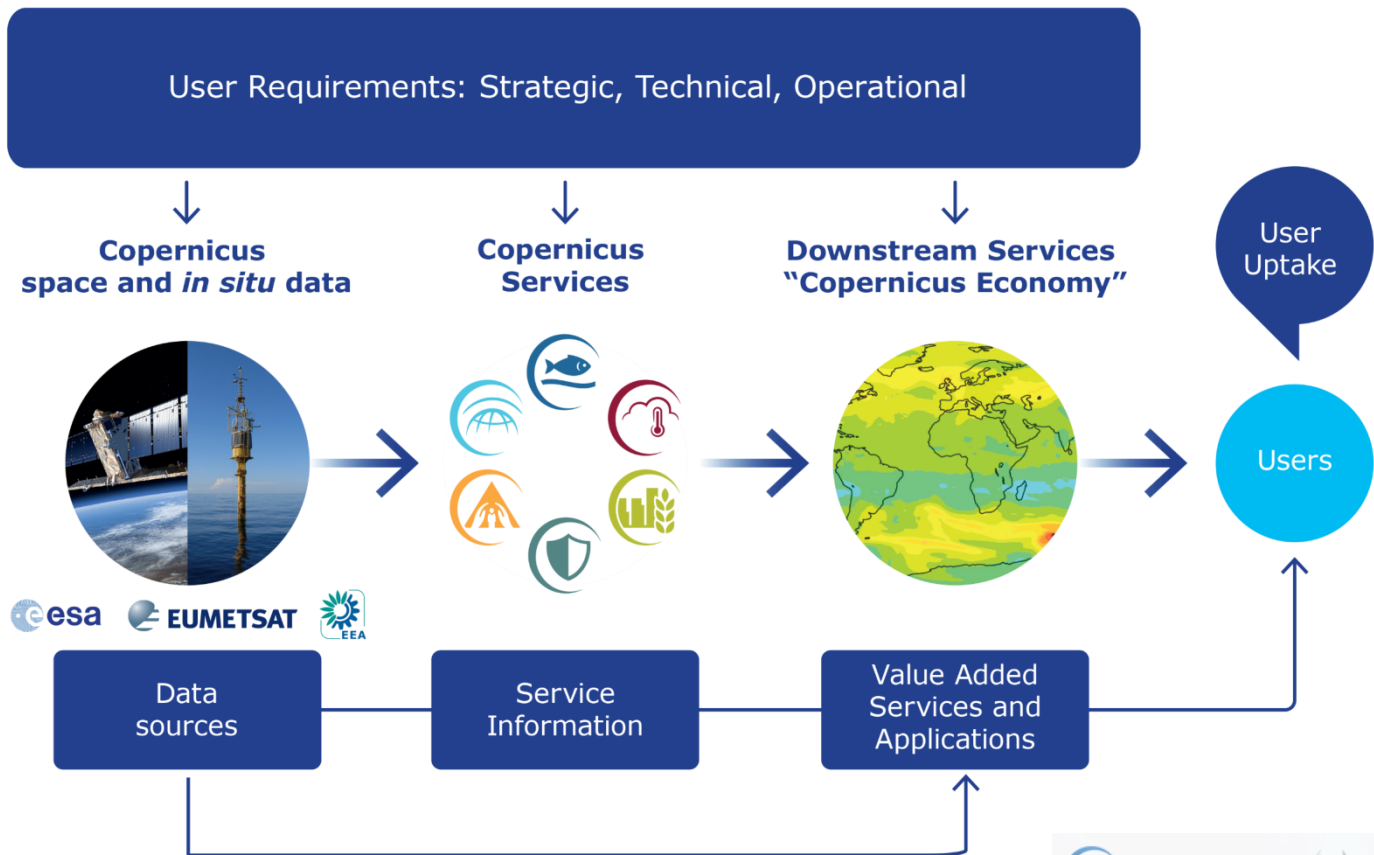


~50.000 jobs
maintained/
created in the
next 15 years



Copernicus

COPERNICUS IS DRIVEN BY THE USERS








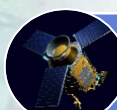



Space Component

THE SENTINELS

FULL, FREE AND OPEN

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>

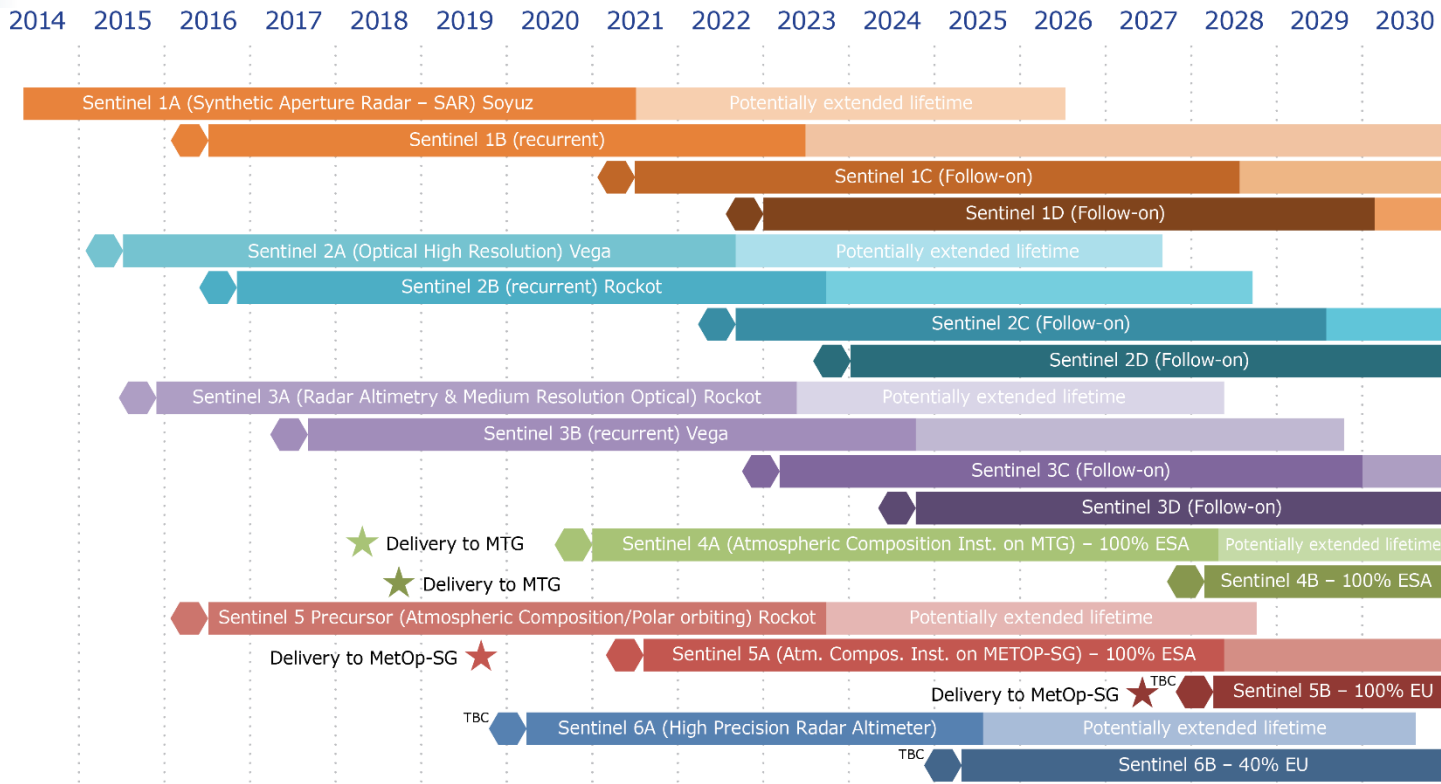
Key Features

- 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



Space Component

SENTINEL FAMILY DEPLOYMENT SCHEDULE

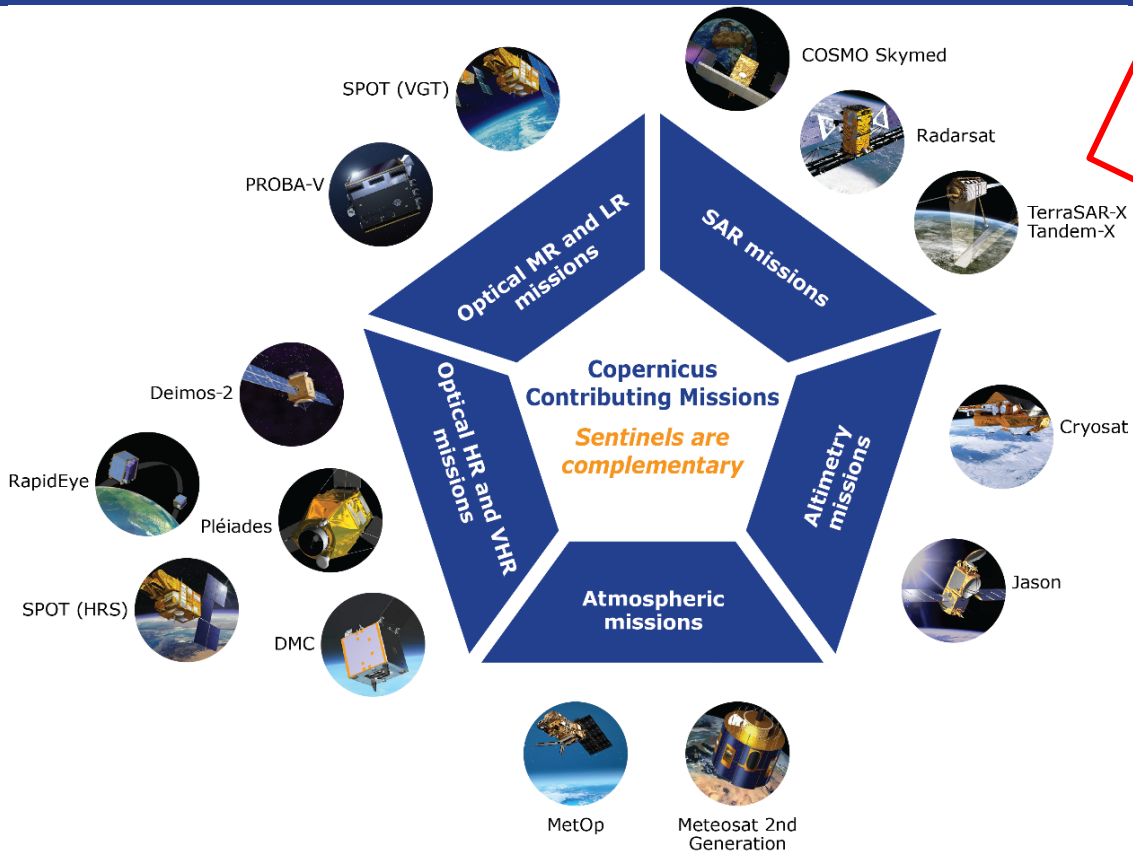


Legend: ◻ Flight Acceptance Review



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





Copernicus

COPERNICUS SERVICES

Monitoring the State of the Earth System Environment ...



... Six cross-cutting Thematic Services



Emergency
Management

EMERGENCY MANAGEMENT SERVICE IN BRIEF

The Emergency Management Service supports actors (e.g. civil protection, insurance, risk evaluation and humanitarian aid) dealing with:



Emergency
Response

Natural Disasters



Man-made
Emergency Situations



Humanitarian Crises



Preparedness and
Recovery Activities

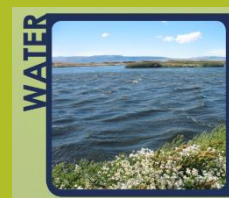
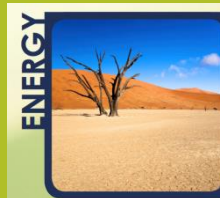




Land
Monitoring

OVERVIEW

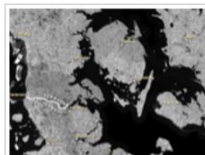
Global



Pan-European



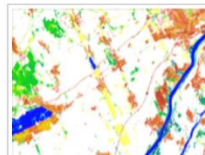
European Environment Agency



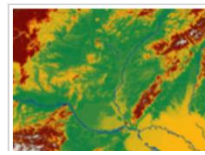
[Image Mosaics](#)



EU Land Cover



Specific land cover info



Hydrographic and elevation reference maps



% of built-up area

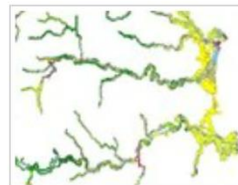
Local



European Environment Agency



[Urban Atlas](#)



[Riparian Zones](#)



[Natura 2000 \(N2K\)](#)



Air Quality and Atmospheric Composition



Climate forcing



Ozone layer & UV

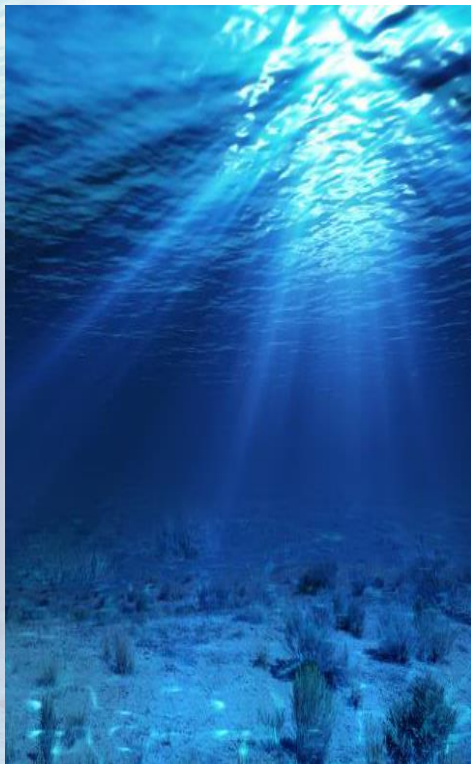


Solar radiation



Emissions and surface fluxes





Maritime Safety



Marine Resources



Coastal and Marine Environment



**Weather, Seasonal, Forecasting
and Climate**





Security

OVERVIEW

Border Surveillance



Maritime Surveillance



Support to EU External Action





Climate
Change

OVERVIEW



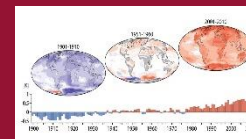
**Consistent Estimates of the
Essential Climate Variables (ECVs)**



**Support to Mitigation and
Adaptation Strategies**



**Global and Regional
Reanalyses**



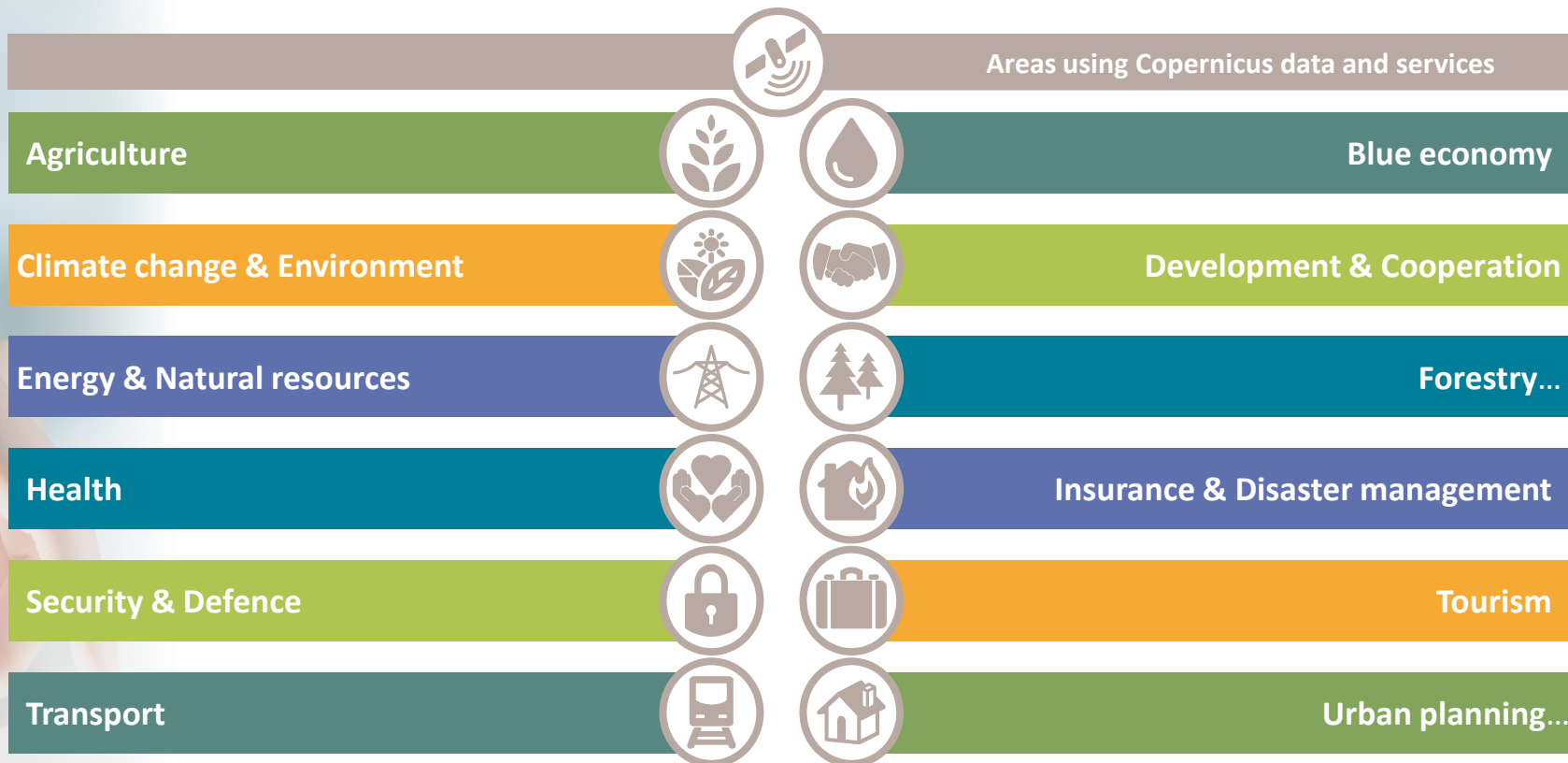
**Seasonal Forecasts
And Climate Projections**





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>

 <p>FULL, FREE AND OPEN</p> <p>Scientific and Other Access</p> <p>https://scihub.copernicus.eu/</p>	 <p>FULL, FREE AND OPEN</p> <p>Access for Copernicus Services</p> <p>Restricted to the Copernicus Service Projects</p>	 <p>RESTRICTED</p> <p>Access for Collaborative Ground Segment</p> <p>Copernicus Space Component Data Access Portal*</p>	 <p>RESTRICTED</p> <p>Access for International Agreements</p> <p>Restricted to international partners</p>
---	---	---	---

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

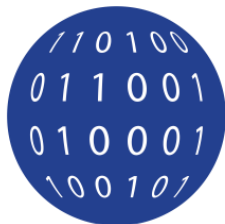
(*) Includes instructions on how to access Contributing Missions data



Data
Access

THE BIG DATA CHALLENGE

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

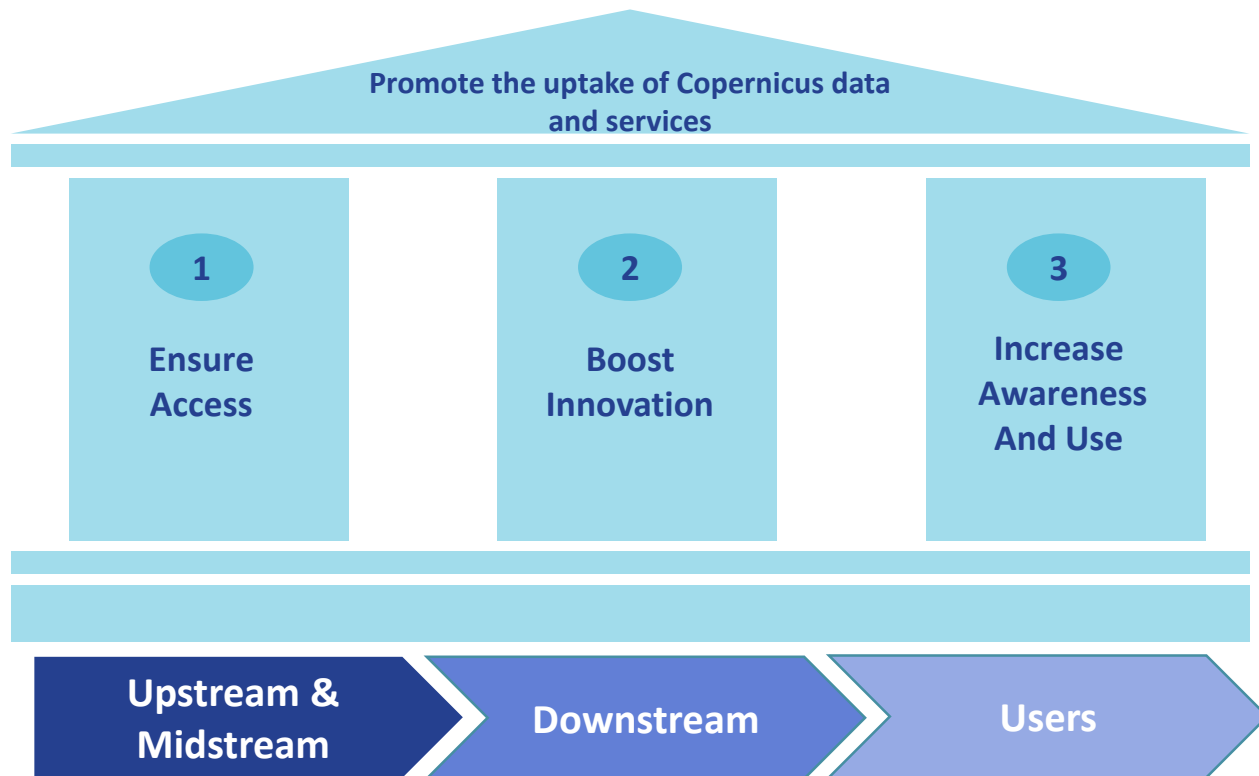


ca. 8 Terabyte/day or ca.
3 Petabyte/year
with just Sentinels-1, -2
and -3 fully operational

- 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

COPERNICUS USER UPTAKE STRATEGY

User
Uptake





Copernicus

COPERNICUS IN ACTION



<https://www.youtube.com/watch?v=MGJss4lDaBo>





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



Monitor the environment



Facilitate adaptation to climate change

Foster downstream applications in a number of fields

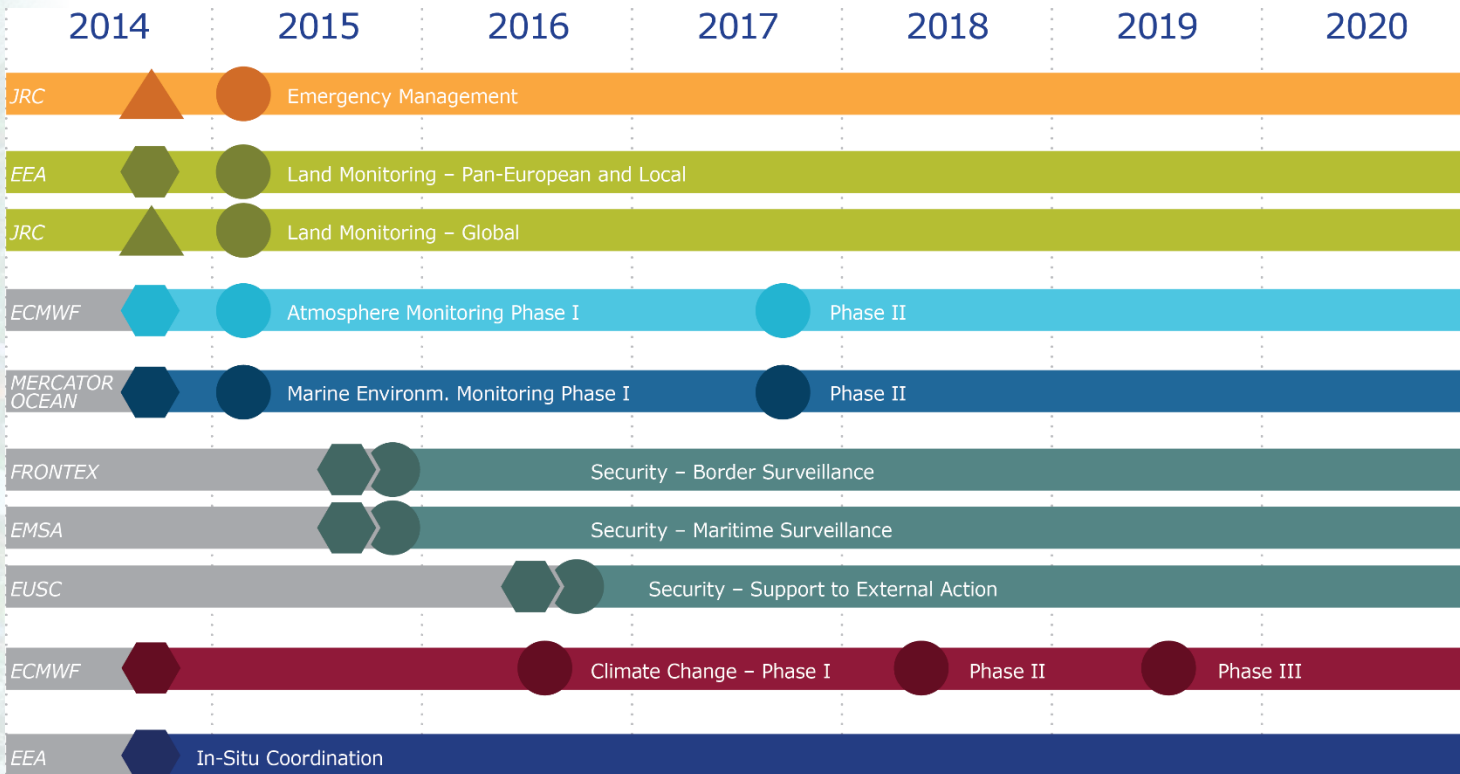


Help managing emergency and security related situations



Copernicus

SERVICES IMPLEMENTATION SCHEDULE



Legend: ◻ Delegation agreement ◻ Direct Management ◯ Operational phase