



# 106<sup>th</sup> DGINS Conference Warsaw, 27-28 Oct 2021

## Copernicus

**Mauro FACCHINI**

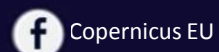
Head for Earth Observation

Directorate-General for Defence Industry and Space

**European Commission**



Space



Copernicus EU



Copernicus EU



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[www.copernicus.eu](http://www.copernicus.eu)



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# The new EU space programme 2021-2027

## Goals:

- provide space-related services to users and support EU political priorities
- strengthen the EU's role as a leading global player
- boost an innovative space industry
- maintain the EU's autonomous access to space







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# EU SPACE PROGRAMME OVERVIEW

- Space regulation adopted by the Council and the European Parliament on 28 April 2021.
- Budget: €14.88 billion



## COPERNICUS

Earth Observation (EO) and monitoring based on satellite and non-space data

**Nr.1 world provider of space data and information**



## GALILEO

Global satellite navigation and positioning system (GNSS)

**10% of the EU GDP enabled by satellite navigation**



## EGNOS

Reliable navigation signals for safety of life use

**Operational in 360+ airports & helipads in 23 countries**



## SSA

Space situational awareness monitoring and protecting space assets

**Providing surveillance and tracking services to 210+ satellites**

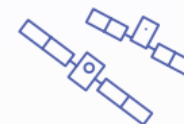


## GOVSATCOM

Secure satellite communications for EU security actors

**Delivering rapid support over crisis areas**

## AN INVESTMENT IN A FUTURE READY EUROPE



### Competitive edge

Completing current satellite constellations, developing and launching the next-generation of satellites



### Research innovation

Ambitious research and innovation programme benefiting from Horizon Europe



### Fighting Climate Change

Monitoring biodiversity, environmental compliance and CO2 emissions (Paris Agreement)



### EU as a global actor

Supporting disaster relief, humanitarian assistance and security operations





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# The new EU Space Programme

## AN ENABLER FOR THE DIGITAL TRANSITION

The EU Space programme provides critical infrastructure for the digital transformation. Space data is a key enabler of digital innovations such as **Autonomous vehicles**, **smart solutions** and **5G wireless telecommunication networks**.



game changer for autonomous driving and commercial drones



training Artificial Intelligence and enabling big data analytics in many areas of application

## SOME AREAS OF APPLICATION



### Agriculture

EU Space enables precision agriculture and integrated farming solutions. It helps farmers increase yields by 10%+ and save 20%+ on fertilizer, fuel and pesticides, and enables safe landings and autonomous machines.



### Response to Natural disasters

EU Space supports rescue operations during floods, fires, earthquakes and hurricanes as well as man-made disasters.



### Smart Cities

EU Space is crucial for urban mapping, planning and infrastructure monitoring, notably enabling better urban transport and smart waste management.



### Renewable Energies

EU Space supports the siting of renewable energy facilities assessing potential energy generation and environmental impacts.



### Health

EU Space helps to forecast air quality and UV radiation having impact on our health.



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Kangerlussuaq Fjord

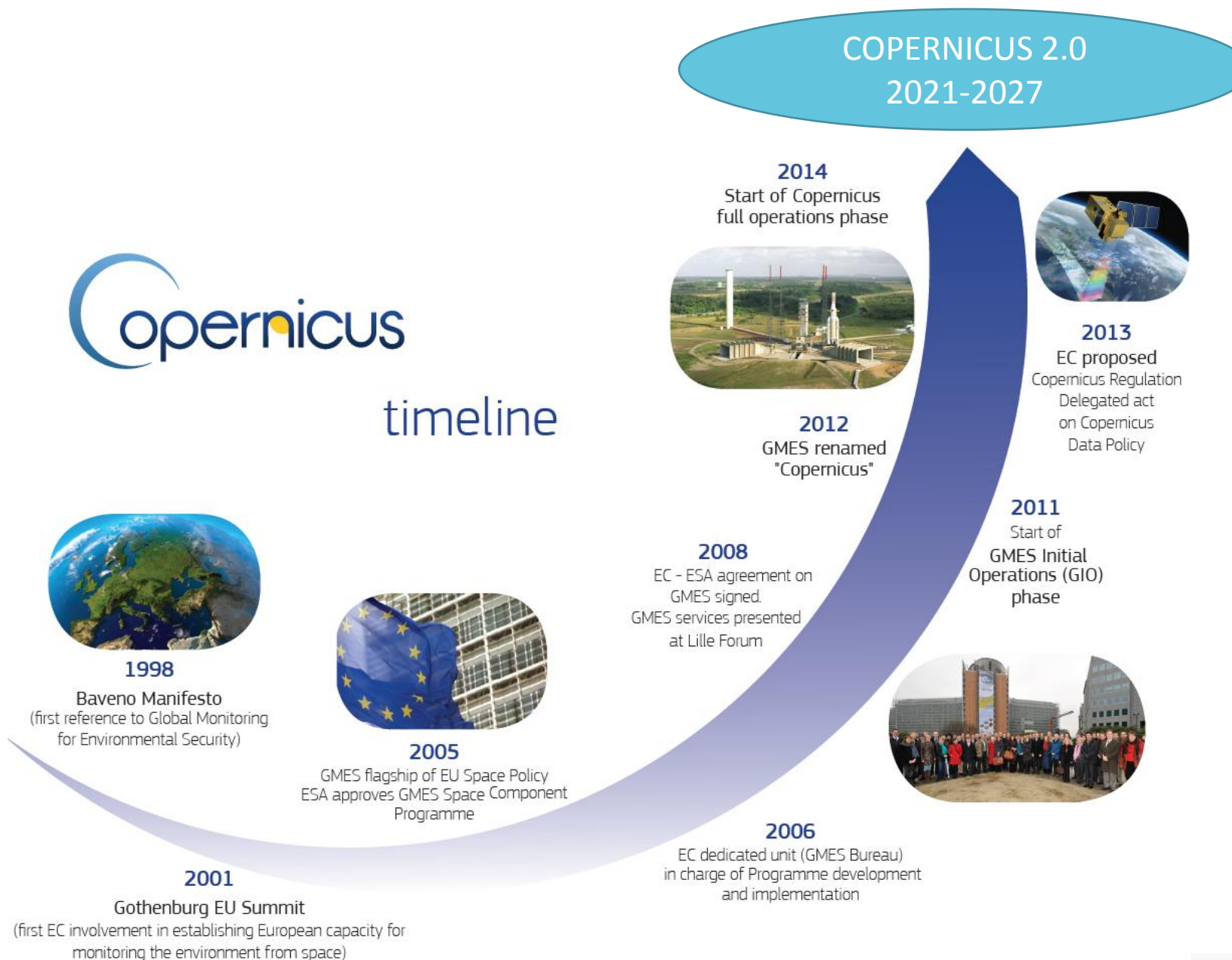


5 km





## timeline

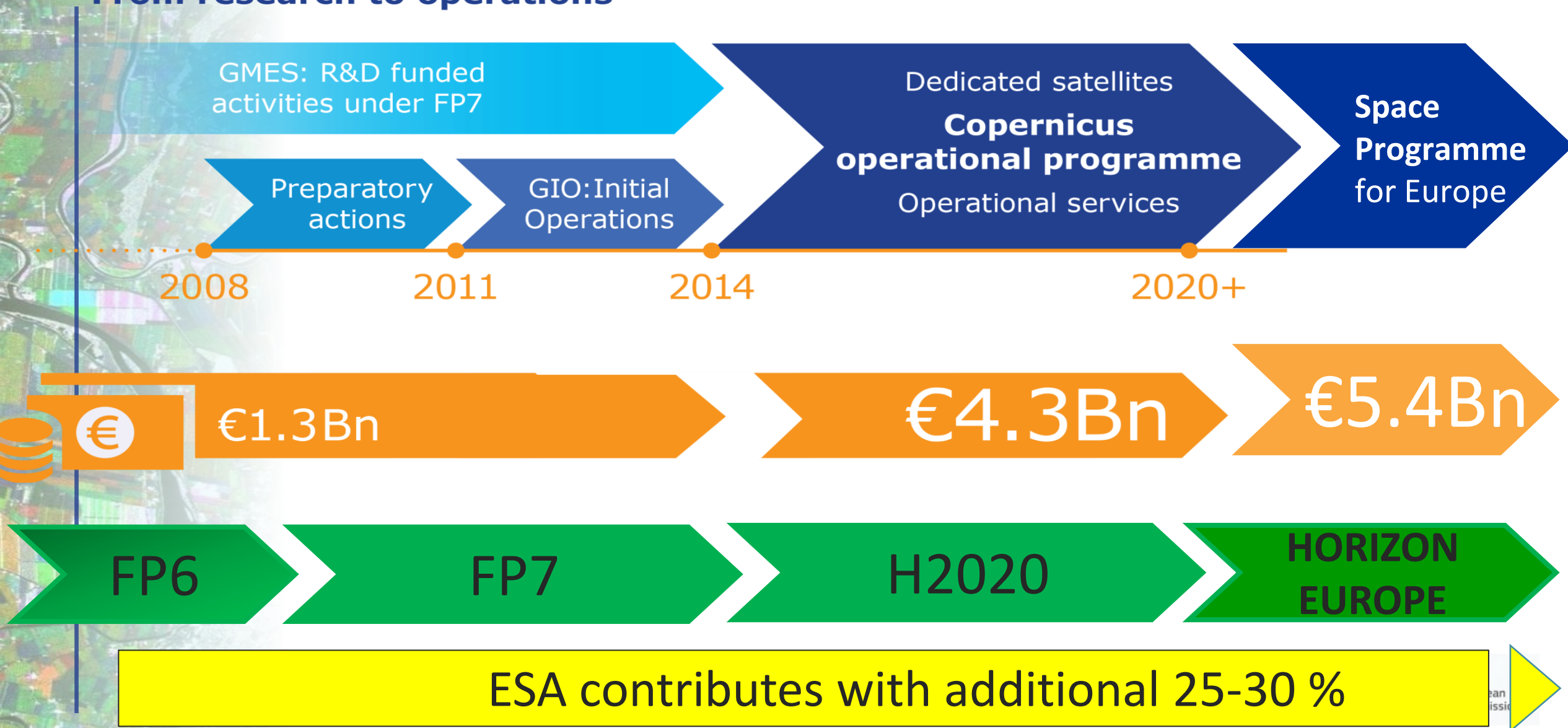




# Copernicus timeline... another perspective

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## From research to operations





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# Copernicus Architecture

6 services use Earth  
Observation data to  
deliver ...



Sentinels



...added-value products



Contributing  
missions



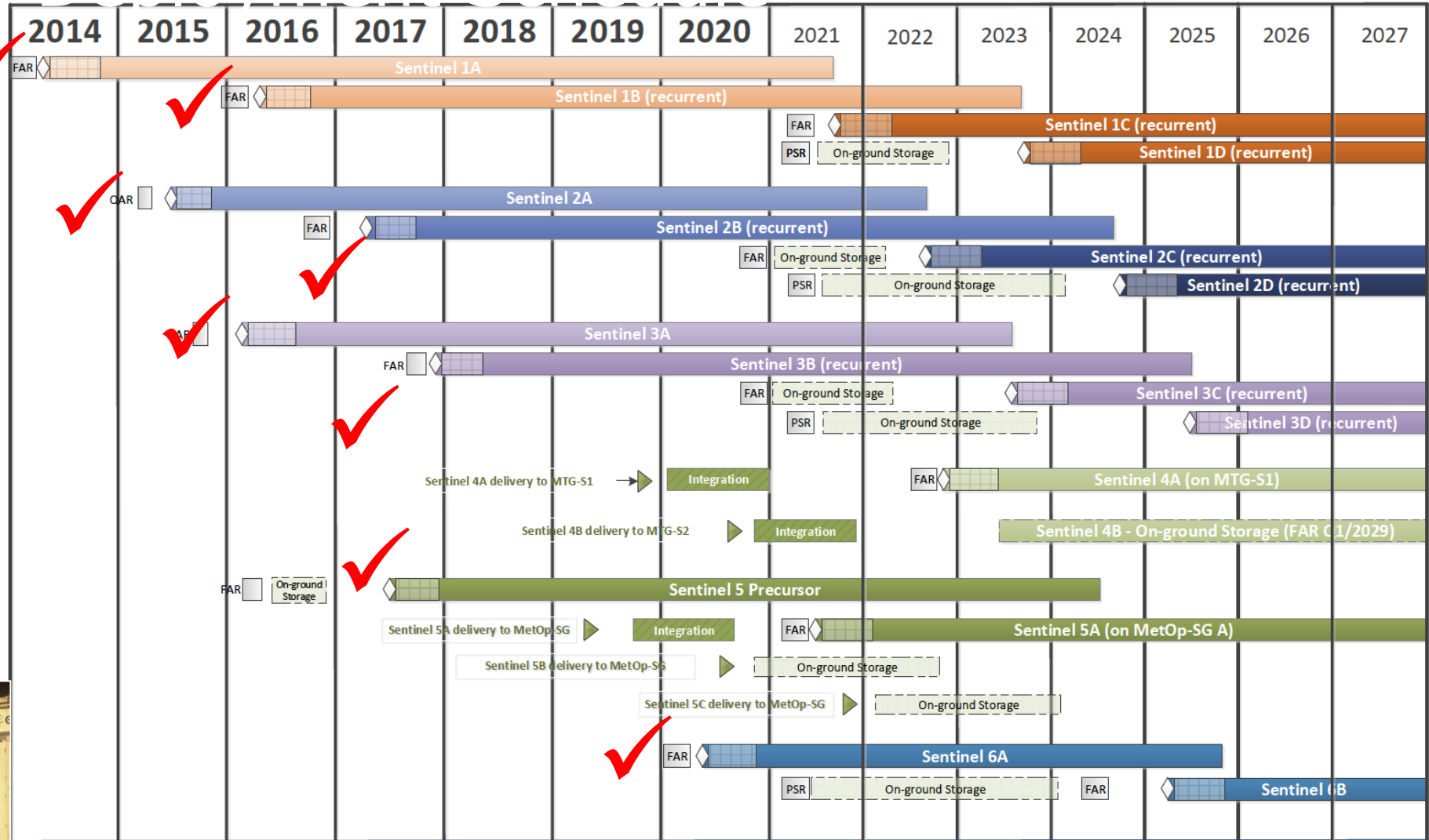
Copernicus  
Europe's eyes on Earth





# Continuity up to 2030

Full, free and open data policy



**Legend:**

- Qualification Acceptance Review (QAR)
- Flight Acceptance Review (FAR) or PreStorage Review (PSR)
- On-ground Storage
- Tentative launch date
- In-orbit Commissioning

Operational predictability & continuity allows business plans to emerge





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# WARSAW (Sentinel 2 picture)







# IN - SITU : O V E R V I E W

- *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

Subject to Data  
Owner's Data  
Policy



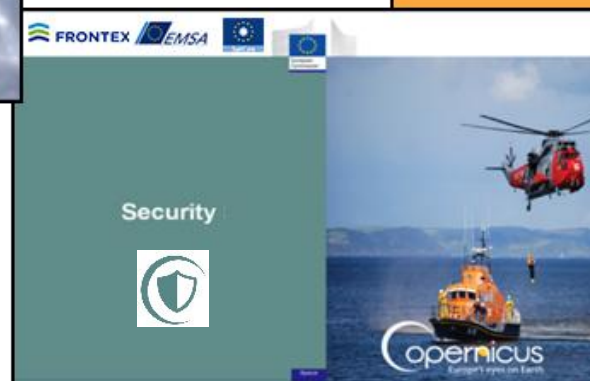
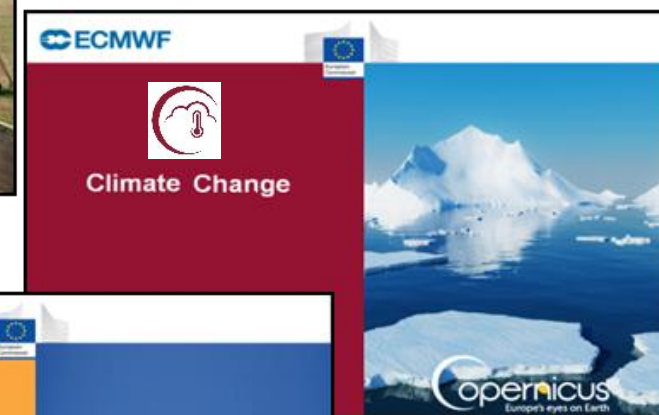


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# COPERNICUS SERVICES

Full, free and  
open data policy

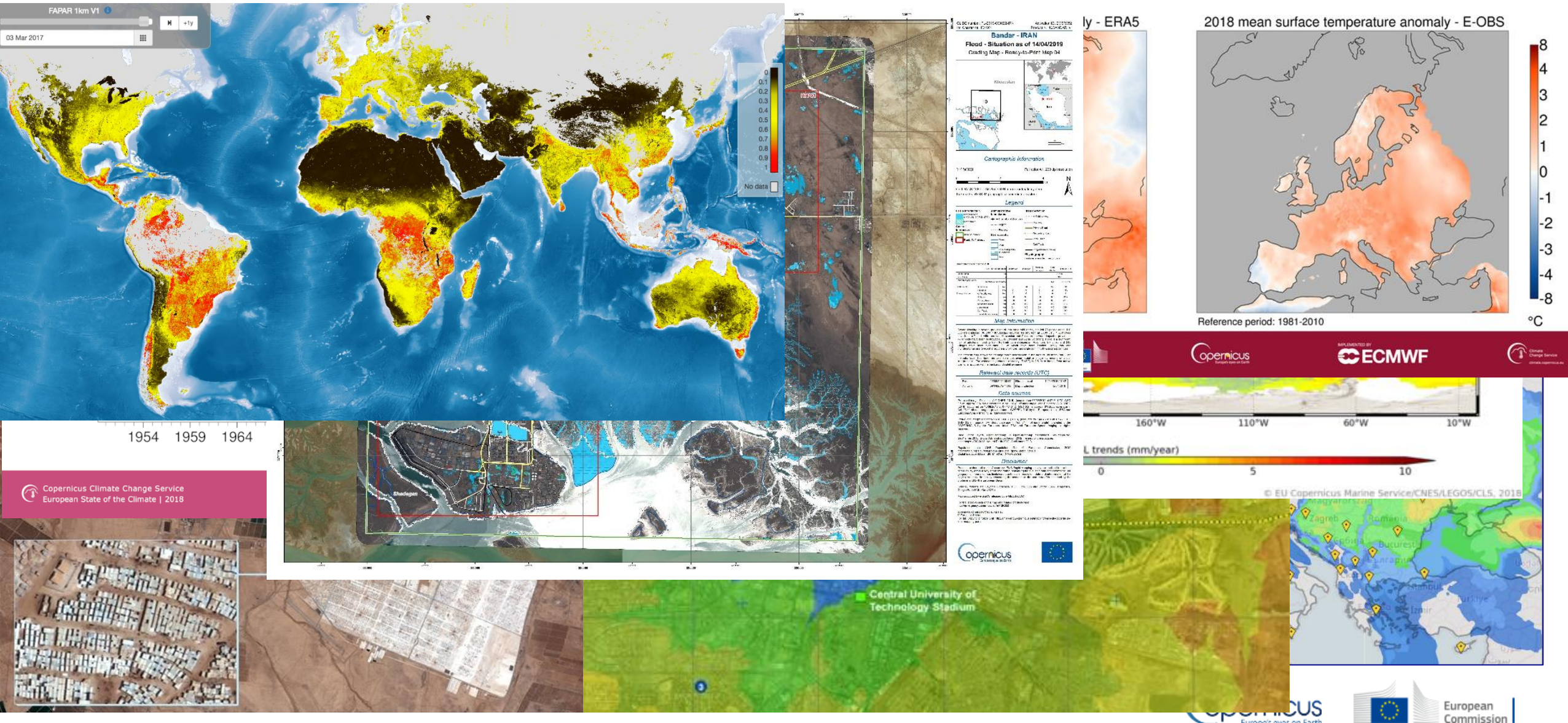
*Monitoring the State of the  
Earth System Environment ...*



*... Six cross-cutting  
Thematic Services*



# Copernicus : Examples

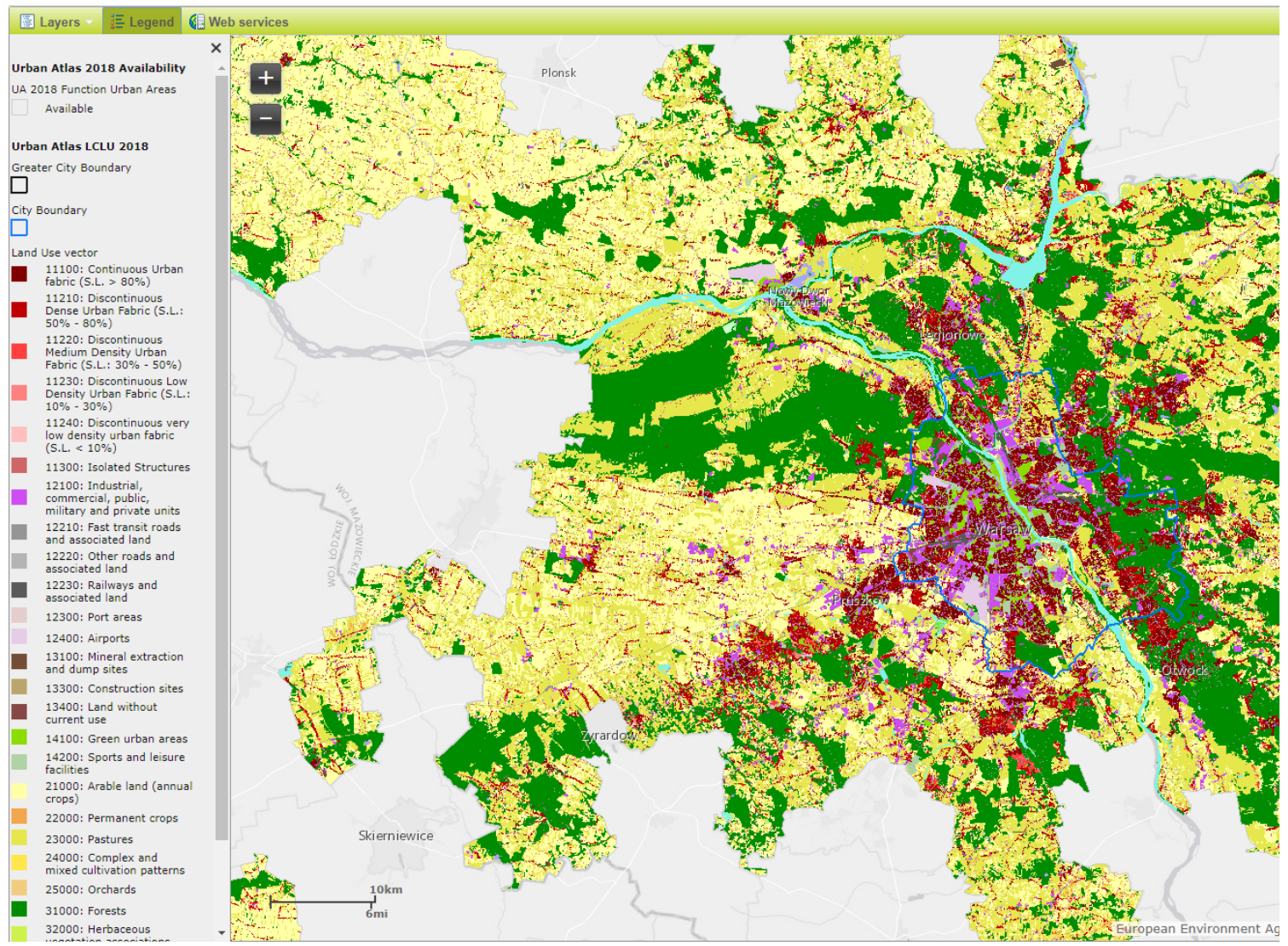






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# Urban hot spot Warsaw area







# DATA DISSEMINATION MEANS

**HUB TO HUB  
CONNECTIONS**

**EUMETCAST IN  
AFRICA**

**COOPERATION WITH  
DG CNECT ON SPECIFIC  
INFRASTRUCTURES**

**PARTNERSHIP WITH  
DIAS**

**RED CLARA  
(SOUTH AMERICA)**

**DISTRIBUTION OF COPERNICUS DATA  
VIA GEANT NETWORK**

**TRANSATLANTIC CABLE**





#### Land Monitoring Service

15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements



#### Land Monitoring Service

2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality



#### Marine Environment Monitoring Service

14.4 By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics



#### Security Service

15 LIFE ON LAND

14 LIFE BELOW WATER

13 CLIMATE ACTION



#### Climate Change Service

13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning



#### Emergency Management Service

11.4 Strengthen efforts to protect and safeguard the world's cultural and natural heritage

2 ZERO HUNGER

3 GOOD HEALTH AND WELL-BEING



#### Atmosphere Monitoring Service

3.d Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks



#### Land Monitoring Service

6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes

6 CLEAN WATER AND SANITATION

7 AFFORDABLE AND CLEAN ENERGY



#### Climate Change Service

7.3 By 2030, double the global rate of improvement in energy efficiency



#### Atmosphere Monitoring Service

SUSTAINABLE DEVELOPMENT GOALS





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# C O P E R N I C U S   B R O A D E R   B E N E F I T S

Climate change & Environment



Development & Cooperation

Security & Defence



Tourism

Health



Insurance & Disaster management

Blue economy



Urban planning...

Energy & Natural resources



Forestry...





# Thank you





# Backup slides





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# Benefit areas and products examples

Ecosystems

Biodiversity

Agriculture

Forestry

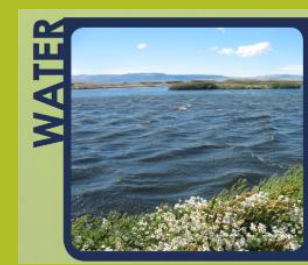
Energy

Natural Resources

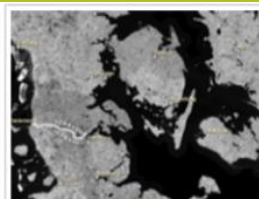
Water

Urban planning

## Global



## Pan-European

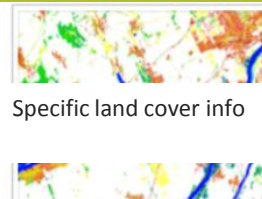


[Image Mosaics](#)



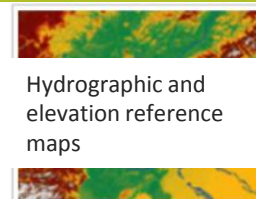
EU Land Cover

[CORINE Land Cover](#)



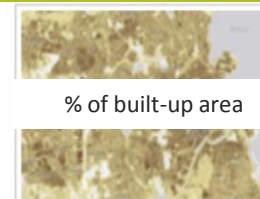
Specific land cover info

[High Resolution Layers](#)



Hydrographic and elevation reference maps

[Reference Data](#)



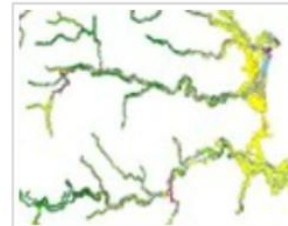
% of built-up area

[Related Pan-European products](#)

## Local



[Urban Atlas](#)



[Riparian Zones](#)



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





# Benefit areas and products examples

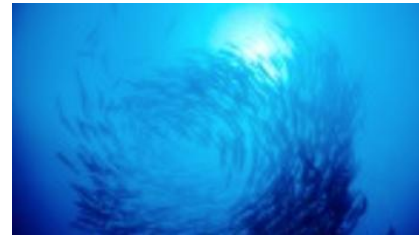
**Marine safety**

**Marine resources**

**Coastal and marine  
environment**

**Climate and  
meteorological  
forecasting**

**Other: Transport,  
Tourism, Environment,  
Pollution, Energy, etc.**



**Sea Level**

**Ocean Salinity**

**Ocean Temperature**

**Sea Ice**

**Wind**

**Ocean Currents**

**Ocean Colour / Biogeochemistry**  
(e.g. optics, chlorophyll, biology, chemistry )





Marine  
Monitoring

# Benefit areas and products examples

Health

Environment

Pollution

Climate

Renewable Energy

Air Quality and Atmospheric Composition



Climate forcing



Ozone layer & UV



Solar radiation



Emissions and surface fluxes







# Benefit areas and products examples

**Climate change**

**Mitigation and  
adaptation**

**Weather forecast**

**Pollution**

**Environment**

**Health**

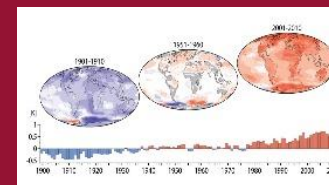
**Consistent Estimates of the  
Essential Climate Variables (ECVs)**



**Support to Mitigation and  
Adaptation Strategies**



**Global and Regional  
Reanalyses**



**Seasonal Forecasts  
And Climate Projections**







Marine  
Monitoring

# Emergency: Benefit areas and products examples

**Natural &  
Man-made  
Disasters**

**Humanitarian  
Crises**



## Risk & Recovery Mapping:

- Reference Maps
- Pre-disaster Situation Maps
- Post-disaster Situation Maps

## Rapid Mapping:

- Reference Maps
- Delineation Maps
- Grading Maps

## Early Warning & Monitoring:

- Floods: EFAS/GloFAS
- Forest Fires: EFFIS/GWIS
- Drought: EDO/GDO

EFAS = **European Flood** Awareness System; GloFAS = **Global Flood** Awareness System

EFFIS = **European Forest Fire** Information System; GWIS = **Global Wildfire** Information System

EDO = **European Drought** Observatory; GDO = **Global Drought** Observatory



# Benefit areas and products examples

## Border Surveillance

- Coastal monitoring
- Pre-frontier monitoring
- Reference mapping



## Maritime Surveillance

- Maritime surveillance of an area of interest
- Vessel detection
- Vessel tracking and reporting
- Vessel anomaly detection



## Support to EU External Action

- Road network status assessment
- Conflict damage assessment
- Critical infrastructure analysis
- Reference map
- Support to evacuation plans
- Crisis situation map
- Border map
- Camp analysis

