



Copernicus for Polar & Arctic Present and future

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Space



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Europe's eyes on Earth



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

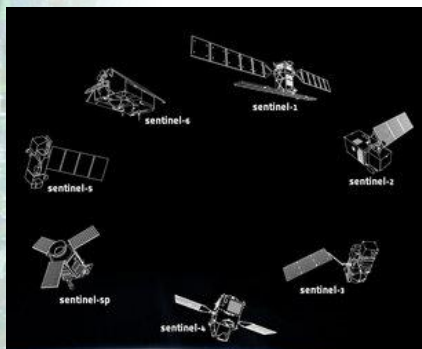
- **The Copernicus programme** is a cornerstone of the European Union's efforts:
 - To monitor **the Earth**, its environment and ecosystems
 - To ensure its citizens are prepared and protected for **crises, security risks** and **natural or man-made disasters**
- Places a world of insight (data and information) about our planet at the disposal of citizens, public authorities and policy makers, scientists, entrepreneurs and businesses on a **full, free and open basis**
- Is a tool for **economic development** and a driver for the **digital economy**



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COPERNICUS ARCHITECTURE

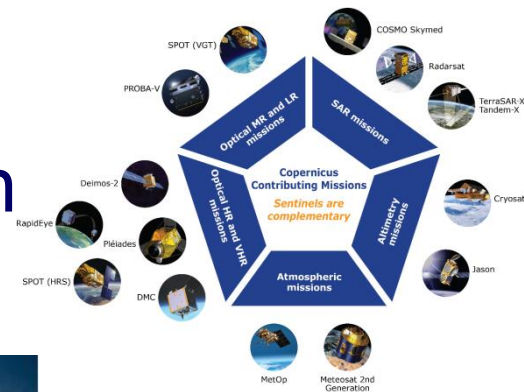
6 services use Earth Observation data to deliver ...



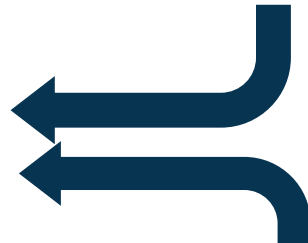
Sentinels



...added-value products



Contributing missions



Adopted budget appropriations 2014-2020

Space component - **3.394 M€**
Service & In-situ component - **897 M€**



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COPERNICUS SIX SERVICES

FULL, FREE
AND OPEN





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THE SENTINELS

Sentinel Mission and Status

Key Features

FULL, FREE AND OPEN



SENTINEL-1:
4-40m resolution, 3 day revisit at equator

2 Sats in orbit ✓

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



SENTINEL-2:
10-60m resolution, 5 days revisit time

2 Sats in Orbit ✓

Polar-orbiting, multispectral optical, high-res imaging



SENTINEL-3:
300-1200m resolution, <2 days revisit

2 Sats in Orbit ✓

Optical and altimeter mission monitoring sea and land parameters



SENTINEL-4:
8km resolution, 60 min revisit time

1st Launch in 2020

Payload for atmosphere chemistry monitoring on MTG-S



SENTINEL-5p:
7-68km resolution, 1 day revisit

in Orbit ✓

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



SENTINEL-5:
7.5-50km resolution, 1 day revisit

1st Launch in 2021

Payload for atmosphere chemistry monitoring on MetOp 2ndGen



SENTINEL-6:
10 day revisit time

1st Launch in 2020

Radar altimeter to measure sea-surface height globally



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European Union Arctic Policy (1)

In 2014, the Council and European Parliament asked the Commission and the High Representative for Foreign Affairs and Security Policy to develop an **integrated policy on Arctic matters**, and to develop a more coherent framework for **EU action and funding programmes**.

The Joint Communication sets out the case for an EU policy that focuses on advancing **international cooperation** and on promoting and contributing to **sustainable development**.

The integrated EU Arctic policy is therefore proposed in 3 priority areas:

1. Climate Change and Safeguarding the Arctic Environment;
2. Sustainable Development in and around the Arctic;
3. International Cooperation on Arctic Issues.



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European Union Arctic Policy (2)

Many of the points raised in the Communication are linked to Space related aspects:

- *"The lack of terrestrial communications means that space infrastructure has an increasingly important role to play..."*
- *"The operational infrastructure and services of Copernicus will provide input to Arctic research activities..."*
- *"Once deployed, the European Global Navigation System (Galileo) will offer coverage of the Arctic region..."*
- *"The EU will also promote an integrated pan-Arctic observing system through the GEO Cold Region Initiative..."*

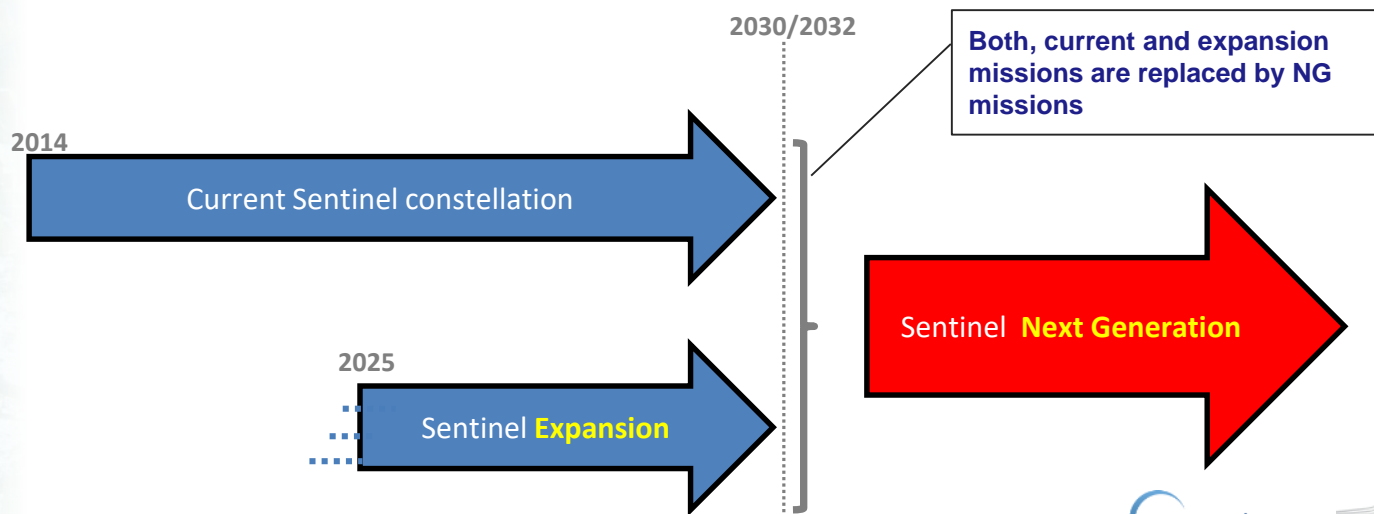


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Space component evolution

The Copernicus Arctic/polar dedicated mission(s) will be developed as part of Sentinel Expansion missions in order to address the EU Arctic Policy challenges.

This initiative relies on DG GROW actions among which a Polar Workshop and more specifically a Polar Experts Group.





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Prioritized Users' requirements

1. **Sea ice** parameters (5) as **key to operational services** (navigation, marine operations ...) as well as to climate modelling
2. **Iceberg and ice** (glaciers, caps) with in total 5 parameters **essential for climate change/sea level rise** as well as for **marine safety/navigation**
3. **Surface Fresh water** as an important resource for the **supply of water to populations as well as for transport activities**
4. **Permafrost** monitoring,
5. **Snow,**
6. **Ocean salinity.**





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Future Arctic mission - CIMR features

Following the experts' conclusions, it has been agreed with ESA to launch the initial phases for the development of 2 concepts of mission addressing the top priority requirements:

1. **An imaging Passive Microwave Radiometer** mission with high resolution and spectral channels (including L-band) for Sea Ice Concentration and Sea Surface Temperature retrievals and a swath width that offers revisits in the Polar Regions (i.e. both Arctic and Antarctic). This mission if developed will be a major step in Arctic observation, allowing a full coverage of the Arctic area every 7 hours and contributing to key services like iceberg detection, ice and snow observation. .
2. **A Topography altimeter** mission specialised in nadir altimetry in Polar Regions.

A concept based on L-band SAR might also be considered to contribute to Arctic observation as identified in the EU Arctic Policy



Have a nice meeting!



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