



EUROPEAN COMMISSION

MEMO

Brussels, 3 April 2014

Earth observation: first Copernicus satellite Sentinel 1A

Copernicus (formerly known as GMES, Global Monitoring for Environment and Security) is the European Union's Earth observation and monitoring programme, a user driven programme, building on the existing national and European capacities and establishing new infrastructure and services.

Copernicus consists of a complex set of systems which collect data from multiple sources: Earth observation satellites, as well as in situ sensors such as ground stations, airborne and sea-borne sensors. It processes these data and provides users with reliable and up-to-date information through a set of services related to environmental and security issues.

The [services](#) address six thematic areas: land monitoring, marine monitoring, atmosphere monitoring, climate change, emergency management response and security. They support a wide range of applications, including environmental protection, management of urban areas, regional and local planning, agriculture, forestry, fisheries, health, transport, climate change, sustainable development, civil protection and tourism.

Some key users of Copernicus services include policymakers and public authorities at European, national and regional level who need the information to develop environmental legislation and policies or to take critical decisions in the event of an emergency, such as a natural disaster or a humanitarian crisis.

Based on the Copernicus data and services, many value-added services can be tailored to specific public or commercial needs, resulting in new business opportunities. In fact, several [economic studies](#) have already demonstrated a huge potential for job creation, innovation and growth. The benefits arising from Copernicus through 2030 are estimated at some €30 billion.

The Copernicus programme is coordinated and managed by the European Commission. The development of the space observation infrastructure is performed by the European Space Agency (ESA). Recognising that ESA has a unique expertise to develop space related programmes at European level, the EU will continue to entrust to ESA the development activities, i.e. design, construction and procurement of satellites and related ground segment.

Until 2013, the development of the space observation infrastructure was co-funded by the EU and ESA. The Commission, on behalf of the EU, contributed about 30% to the overall budget, i.e. about €730 million out of €2.4 billion, through the Space theme of the EU's Seventh framework research programme (FP7) as well as dedicated funds for GMES and its initial operations.

The evolution of the programme after 2014 will be defined by the Regulation establishing the Copernicus programme, submitted by the Commission to the Council and the Parliament in July 2013, and on which a political agreement has already been achieved. Under this Regulation, the EU will cover about €3.3bn of the overall costs of the Copernicus space infrastructure between 2014 and 2020 (66% of the total), while ESA's own funding is expected to amount to about €1.7bn. Together with funding for the Copernicus services, the EU's overall Copernicus budget is around €4.3bn for the period 2014 to 2020.

The Commission's proposal entrusts the operations of the developed space infrastructure to ESA and EUMETSAT respectively. EUMETSAT will be entrusted with the operations of satellites and instruments particularly relevant for the atmosphere and marine communities (i.e. Marine part of Sentinel 3, Sentinels 4, 5 and 6) which are very close, often identical, to its own domain of competences.

The Copernicus programme is also a key component of the [Horizon 2020](#) strategy for Research and Development, Industrial and Societal Innovation.

Sentinel-1

Sentinel-1 is the first of the six missions in the framework of the Copernicus initiative. The Sentinel-1 mission is composed of a constellation of two polar-orbiting satellites, Sentinel-1A and Sentinel-1B, sharing the same orbital plane, operating day and night, performing Synthetic Aperture Radar (SAR) imaging. SAR is often used in remote sensing applications, for example also by the Italian Cosmo-SkyMed mission. The advantage of a radar imaging, as compared to imaging in the range of visible light like a film or TV camera (called optical imaging), is the following:

- They use different frequencies or wavelengths. This difference in wavelengths means that SAR can be used to see through clouds and storms, acquiring imagery regardless of the weather, while optical sensors cannot. Objects on the Earth's surface will also look quite different to radar and optical sensors, meaning they will create information complementary to each other.
- Optical sensors rely upon the sun's illumination. In contrast, a SAR sensor carries its own illumination source, in the form of radio waves transmitted by an antenna. This means that the optical sensor's image depends upon the time of day while SAR can be used with equal effectiveness at any time of the day or night.

Sentinel-1 is operated in four imaging modes with different resolution (down to 10 m) and coverage (up to 250 km), offering reliable, repeated wide area monitoring. It is designed to work in a pre-programmed, conflict-free operation mode, imaging all global landmasses, coastal zones and shipping routes at high resolution and covering the global ocean. This ensures the reliability of service required by operational services and a consistent long term data archive built for applications based on long time series.

Sentinel-1 services include applications such as:

- Monitoring sea ice zones and the Arctic environment
- Assimilation of sea ice observations in the forecasting systems
- Surveillance of marine environment, including oil-spill monitoring and ship detection for maritime security
- Monitoring land surface motion risks
- Mapping of land surfaces: forest, water and soil, sustainable agriculture
- Mapping in support of humanitarian aid in crisis situations
- Climate monitoring

The first Sentinel-1 satellite (Sentinel-1A) is planned for launch on a SOYUZ rocket from Europe's Spaceport in Kourou, French Guiana in April 2014, followed by the second (Sentinel-1B) in late 2015.

Sentinel-1 data products – as [open data](#) - are made available systematically and free of charge to all data users including the general public, scientific and commercial users. Radar data will be delivered within an hour of reception for Near Real-Time (NRT) emergency response.

The Sentinel-1 satellite units (A and B units) are being built by an industrial consortium led by Thales Alenia Space Italy as Prime Contractor.

The launch is expected to take place today from Kourou.

More information

<http://copernicus.eu>

[Copernicus on Europa](#)

[IP/14/257 EP adopts European Earth Observation programme Copernicus](#)

[IP/14/78 Eurobarometer on Europeans' attitudes to Space Activities](#)