

# Kopernikus -

## Focus on Environment and Climate

### Kopernikus is the next flagship initiative for space in Europe, after Galileo.

It was confirmed as the European Union's priority at the 2001 Summit in Gothenburg, where the Heads of State and Government requested that "by 2008 the Community contribute to establish a European capacity for Global Monitoring for Environment and Security".

ESA is the main partner to the European Union in Kopernikus and has contributed with programmatic activities since 2001. ESA has worked on the development of the pilot services in close conjunction with a large community of operational users. ESA is also working on multi-mission facilities and ground segment operations, and is preparing the Space Component for Kopernikus with a series of studies and preparatory activities for the development of a series of satellites missions (the Sentinels). Furthermore, it is preparing for the integration of national and European missions, in order to guarantee continuity of data and services.

Kopernikus also represents the European contribution to the international Global Earth Observation System of Systems, GE-OSS.

When the European Union earlier this decade adopted the Global Monitoring for Environment and Security (GMES) programme, it was clear that different types of satellites were going to become the backbone of the programme with regard to monitoring the state of the environment on land, sea and in the atmosphere. Additionally, they were meant to improve the security of the citizens in a world facing an increased risk of natural and other disasters.

Kopernikus is the new name of the European Commission's earth observation activities, previously known as GMES. Kopernikus is supposed to use terrestrial, maritime and atmosphere network and satellites to observe the environment, and it is in the field of satellites EUMETSAT will be an attractive partner in the programme. The organisation has an extensive practice in delivering satellite data with great regularity. In addition, several of the new satellites intended to search for meteorological clues are also very useful for some of the sensors that are planned in connection with Kopernikus.

From the very beginning, EUMETSAT has focused on the task of delivering data for the European meteorological community, something that will not change in any near future; however, in addition, the organisation plans to implement environment and climate in their field of responsibility. Doing just that, the organisation becomes one of the data suppliers for the Kopernikus-programme.

Five different types of satellites were identified to fulfil the demand of

global monitoring and the satellites were named Sentinel. The programme will, as mentioned, involve several types of satellites, as well as a comprehensive ground segment for receiving and processing data, however, it will also involve a large number of scientists and researchers to interpret data, and conclusively, it will involve end users in different fields.

### The Sentinel Family

In the early phase of the GMES programme, one defined the need for five new types of sensors/satellites, named Sentinel 1-5. One also focussed on the use of existing and future platforms and reuse of existing technology.

### Sentinel-1. C-band SAR

Today Envisat delivers data for this task, possibly until the year 2010. Before that, ERS-1 and 2 delivered the same data. As a supplement to Envisat, the Canadian RADARSAT, which operates in the same field, can deliver data for the programme. One has therefore ensured an unbroken flow of data from 1991 to the time Envisat/RADARSAT ends their missions. The next step is to develop and build the Sentinel-1, day-and night radar imaging satellite for land and ocean services, and to have the satellite launched by the time Envisat is near the end of the service.



*Sentinel-1. The first satellite for the Kopernikus programme. Picture: ESA - P. Carril*

### Sentinel-2. Super Spectral.

Numerous services of high strategic importance and economical value are today being taken care of by SPOT 5 and the Landsat satellites. Contracts are, however, being signed for a new satellite that will provide data mapping of land cover, land use, change and geophysical variables. The mission objective is systematic coverage of the Earth of the land's surface from between -56 and + 83 degree, to produce cloud-free imagery typically every 15-30 days over Europe.

### Sentinel-3. Ocean and Medium-Resolution Land Mission

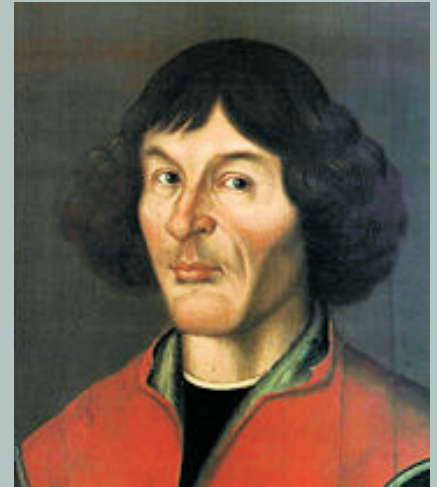
The satellite will continue the measurement that has begun with satellites such as ERS, Envisat and Spot. Sentinel-3 is for global ocean and land monitoring missions which include an altimetry

instrument package. This part will further complement Jason and other altimeter satellites to contribute to a worldwide operational oceanographic service.

### Sentinel- 4/5 Atmospheric Chemistry.

These sensors will be placed on the future Meteosat Third Generation (MTG) and Post EPS.

Users have identified atmospheric monitoring as an area of high priority for the programme including real time services related to atmospheric chemistry, pollution, ozone and aerosols. Of the planned sensors, Sentinel-4 is placed on the future Meteosat Third Generation – Sounder, while Sentinel-5 is placed on the polar platform Post EPS.



### Nicolaus Copernicus

(February 19, 1473 – May 24, 1543) was the first astronomer to formulate a scientifically-based heliocentric cosmology that displaced the Earth from the center of the universe. His epochal book, *De revolutionibus orbium coelestium* (*On the Revolutions of the Celestial Spheres*), is often regarded as the starting point of modern astronomy and the defining epiphany that began the Scientific Revolution.

Although Greek, Indian and Muslim savants had published heliocentric hypotheses centuries before Copernicus, his publication of a scientific theory of heliocentrism, demonstrating that the motions of celestial objects can be explained without putting the Earth at rest in the center of the universe, stimulated further scientific investigations and became a landmark in the history of modern science that is known as the Copernican Revolution.

Among the great polymaths of the Renaissance, Copernicus was a mathematician, astronomer, physician, classical scholar, translator, Catholic cleric, jurist, governor, military leader, diplomat, and economist. Among his many responsibilities, astronomy figured as little more than an avocation — yet it was in that field that he made his mark upon the world.

Source: Wikipedia