



Factsheet

Start of *Sentinel-1A* mission

Sentinel-1A and 1B are the first two of a series of satellites to be developed for the Copernicus programme – formerly known as Global Monitoring for Environment and Security (GMES). On 3 April 2014, the European Space Agency (ESA) placed *Sentinel-1A* into orbit. Sentinel-1A and 1B are radar imaging satellites designed to transmit data for such purposes as surveillance of marine environments, monitoring of land surface motion risks and mapping to facilitate response to natural or technological disasters. Participation in the ESA's programme to develop Sentinel satellites allows Switzerland to secure procurement contracts and gain access to scientific data. In addition, because Switzerland is a full-fledged member of the ESA, it is able to work with international partners and share in decision-making at the intergovernmental level. Swiss research institutes and companies were actively involved in development of the Sentinel-1 pair.

***Sentinel* missions for Copernicus operational services**

In addition to the Earth observation satellites used for meteorology and scientific research, the ESA is currently planning a series of missions for the Copernicus programme – formerly known as Global Monitoring for Environment and Security (GMES). The European Commission is responsible for overall coordination of the programme. The aim is to provide Europe with its own Earth observation capabilities for environmental and security applications. At the same time, the programme will enable Europe to develop and operate geoinformation services for the environment, climate protection, sustainable development, humanitarian aid and security. Earth observation from space will help to produce a comprehensive range of data. The Copernicus infrastructure will rely on existing national and international systems as well as on a range of *Sentinel* satellites developed for specific missions under the Copernicus programme.

The ESA is responsible for development of *Sentinel* satellites. The corresponding programme began in 2005. A total of five missions are planned, each devoted to monitoring a specific environmental aspect (e.g. oceans, land, vegetation, atmosphere, etc.) and each having to meet different technical specifications.

Switzerland has supported this programme from the beginning and considers space to be a means of analysing and solving global challenges such as climate change, environmental protection and disaster prevention.

***Sentinel-1* – radar mission**

The main purpose of the *Sentinel-1* mission is to provide data for operational services associated with such applications as the monitoring of sea ice and arctic regions, the monitoring of land surface motion risks (landslides, etc.) and mapping to facilitate response to natural or technological disasters. For example, maps can be generated showing ice-free routes to ensure safe maritime traffic; oil slicks can be detected in oceans; water levels and landmasses can be monitored to determine whether they are rising (e.g. volcanic regions) or falling. The two *Sentinel-1* satellites will carry a C-band Synthetic Aperture Radar (SAR) to provide



Sentinel-1 (künstlerische Darstellung) © ESA

users with continuous images, day and night, in all weather conditions. The satellites will also have a 12-m long radar antenna, enabling Earth imaging at spatial resolutions ranging from 20x20 km to 5x5 m (depending on the operational mode). Interferometry will be used to detect even slight land surface motion. In order to achieve global coverage as quickly as possible, the *Sentinel-1* mission will be comprised of a constellation of two satellites (*Sentinel-1A* and *1B*).

The launch of *Sentinel-1A* from the European Space Port in Kourou (French-Guyana) is scheduled to take place on 3 April 2014 (at 11:02 p.m. Swiss time). A Soyuz launch vehicle will place the 2.3 tonne satellite into a sun-synchronous near polar orbit of 693 km above the Earth's surface. Following a test phase, *Sentinel-1A* will remain operational for seven years. The launch of *Sentinel-1B* is planned for 2015.

Swiss participation in the *Sentinel-1* mission

Thales Alenia Space (IT) is the prime contractor responsible for development of the *Sentinel-1* pair and Airbus Defence and Space (DE) is responsible for the radar system.

The following Swiss industrial companies also contributed:

- RUAG Space delivered key components used for development of the structure and frame of the 2.8m x 2.5m x 4m satellites as well as support structure components for the radar antennae. It also developed a telescope unit and support structure components for laser communication equipment.
- APCO Technologies SA delivered structural components for the satellites and developed specific mechanical ground support equipment to ensure the safe handling, integration and transport of satellites and instruments.
- Syderal SA delivered the electronic modules for the radar instrument. These modules enable monitoring of all instrument functions as well as activation of the radar instrument once the satellite has been placed into orbit.
- Clemessy Switzerland was responsible for special electronic support and testing equipment, in particular to monitor power supply to the satellite during ground tests and up until countdown.



Sentinel-1 structure © RUAG

In addition to Swiss industrial companies, Swiss SMEs and research institutes contributed key algorithms for the analysis and use of data.

Swiss participation was made possible thanks to Swiss financial contributions to the ESA's optional Earth observation programmes. Swiss industrial companies and researchers have therefore gained the experience and expertise needed to position themselves in the field of Earth observation, and take part in the ESA's future development activities.



Control module instruments
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Contact

Jürg Schopfer, Scientific Advisor for Earth Observation and Security Programmes
State Secretariat for Education, Research and Innovation SERI
Space Office
Effingerstrasse 27, CH-3003 Bern
Tel. +41 58 464 10 72
Fax +41 58 462 78 54
juerg.schopfer@sbfi.admin.ch
www.sbfi.admin.ch