

EARTH OBSERVATION SYMPOSIUM (B1)  
International Cooperation in Earth Observation Missions (1)

Author: Mr. Aniceto Panetti  
Thales Alenia Space Italia, Italy, aniceto.panetti@thalesaleniaspace.com

Mr. Friedhelm Rostan  
Airbus Defence and Space, Germany, friedhelm.rostan@airbus.com  
Dr. Michelangelo L'Abbate  
Thales Alenia Space Italia, Italy, michelangelo.labbate@thalesaleniaspace.it  
Dr. Claudio Bruno  
Thales Alenia Space Italia, Italy, claudio.bruno@thalesaleniaspace.com  
Mr. Roberto Baldassarri  
Thales Alenia Space Italia, Italy, roberto.baldassarri@thalesaleniaspace.com  
Mr. Antonio Bauleo  
Thales Alenia Space Italia, Italy, antonio.bauleo@thalesaleniaspace.com  
Mr. Toni Catalano  
Thales Alenia Space Italia, Italy, toni.catalano@thalesaleniaspace.com  
Mr. Marco Enrico Maria Cotogni  
Thales Alenia Space Italia, Italy, marco.cotogni@thalesaleniaspace.com  
Mr. Luigi Galvagni  
Thales Alenia Space Italia, Italy, luigi.galvagni@thalesaleniaspace.com  
Mr. Fabio Ippoliti  
Thales Alenia Space Italia, Italy, fabio.ippoliti@thalesaleniaspace.com  
Mr. Pierluigi Petrini  
Thales Alenia Space Italia, Italy, pierluigi.petrini@thalesaleniaspace.com  
Mr. Sergio Pica  
Thales Alenia Space Italia, Italy, sergio.pica@thalesaleniaspace.com  
Mr. Andrea Pietropaolo  
Thales Alenia Space Italia, Italy, andrea.pietropaolo@thalesaleniaspace.com  
Ms. Francesca Spataro  
Thales Alenia Space Italia, Italy, francesca.spataro@thalesaleniaspace.com  
Mr. Giacomo Taini  
Thales Alenia Space Italia, Italy, giacomo.taini@thalesaleniaspace.com  
Dr. Paolo Venditti  
Thales Alenia Space Italia, Italy, paolo.venditti@thalesaleniaspace.it  
Mr. Mathias von Alberti  
Airbus Defence and Space, Germany, Mathias.Alberti@airbus.com  
Dr. Ramon Torres  
European Space Agency (ESA), The Netherlands, ramon.torres@esa.int  
Mr. Svein Lokas  
European Space Agency (ESA), The Netherlands, svein.lokas@esa.int  
Mr. David Bibby  
ESA, The Netherlands, david.bibby@esa.int

**Abstract**

The GMES Sentinel-1 Earth Radar Observatory, a project funded by the European Union and developed by ESA, is a constellation of two C-band radar satellites. The satellites have been conceived to be a continuous and reliable source of C-band SAR imagery for operational application such as mapping of global landmasses, coastal zones and monitoring of shipping routes. The Sentinel-1 satellites are built by an industrial consortium headed by Thales Alenia Space Italy as Prime Contractor. The paper presents an outline of the general satellite architecture, the spacecraft subsystems, AIT flow and satellite key performances. The GMES Sentinel-1 satellite represents the state of the art for a LEO spacecraft, in terms of SAR performances, avionics performances, data storage and transmission capability, optical communication link capability, electrical power generation and management and large payload accommodation capability of PRIMA bus. The key payload is the C-SAR instrument, which has been developed and built under the responsibility of AIRBUS Defence Space. The C-SAR Instrument has to provide a dual polarisation capability as well as four operational modes, i.e. Stripmap, Interferometric wideswath, Extra Wideswath as well as Wave Mode. These shall allow for resolutions of up to 5 m x 5 m as well as for swath widths up to 400 km. The demanding operational requirements require an active phased array antenna allowing a fast beam shaping and steering capability in both azimuth and elevation as well as a powerful central electronics for command and control of the whole SAR instrument including pulse generation and echo reception, down-conversion, compression and formatting.

Sentinel-1 spacecraft has just successfully completed its full space qualification program and has now been shipped to the Guyana Space Centre for a Soyuz launch. The paper will present the final results of Sentinel-1 on ground qualification and test programme and the early results of in orbit commissioning.