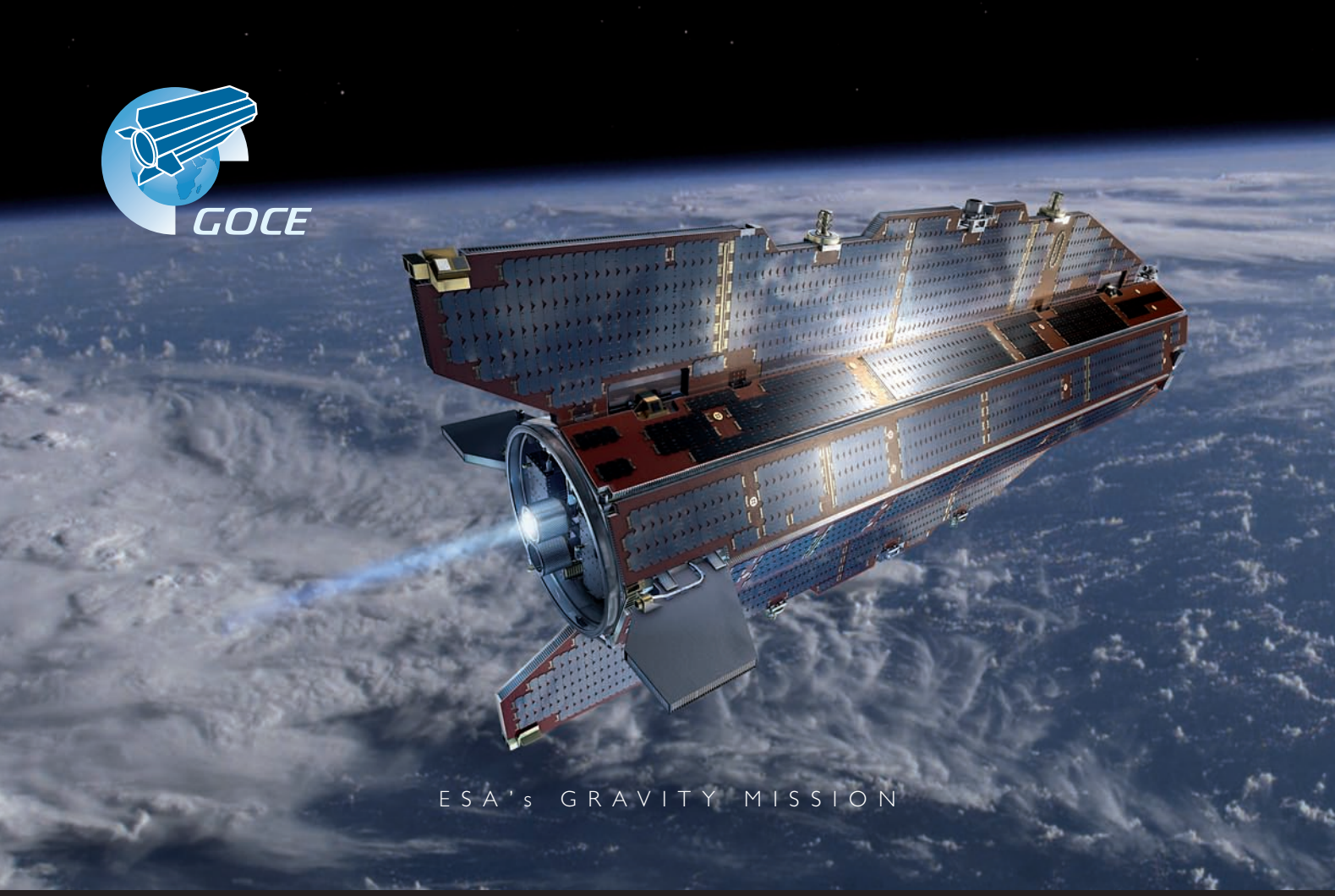
GOCE



ESA's GRAVITY MISSION

ESA's gravity mission GOCE

The GOCE (Gravity Field and steady-state Ocean Circulation Explorer) mission is dedicated to measuring Earth's gravity field and modelling the geoid with unprecedented accuracy and spatial resolution. Data from this advanced gravity mission will improve our knowledge of ocean circulation, which plays a crucial role in energy exchanges around the globe, sea-level change and Earth-interior processes. GOCE will also help to make significant advances in geodesy and surveying.

Mission Objectives

– to determine gravity-field anomalies with an accuracy of 1 mGal (where 1 mGal = 10^{-5} ms^{-2}).
– to determine the geoid with an accuracy of 1-2 cm.
– to achieve the above at a spatial resolution better than 100 km.

Mission Details

Launch: 2008
Duration: about 20 months, including a 3-month commissioning and calibration phase, followed by science measurement phases adapted to a long-eclipse hibernation period.

Configuration

GOCE is a slim, octagonal spacecraft approximately 5 m long and 1 m in diameter. It is a rigid structure with no moving parts weighing about 1050 kg.

Mission Orbit

Orbit: Sun-synchronous, near-circular, dawn-dusk, low-Earth.
Inclination: 96.7°
Measurement altitude: about 250 km
Hibernation altitude: above 270 km

Payload

– gradiometer; 3 pairs of 3-axis, servo-controlled, capacitive accelerometers (each pair separated by a distance of about 0.5 m).
– 12-channel dual-frequency GPS receiver with geodetic quality.
– laser retroreflector enables tracking by ground-based lasers.

Launch Vehicle

Rockot (converted SS-19), from Plesetsk, Russia.

Flight Operations

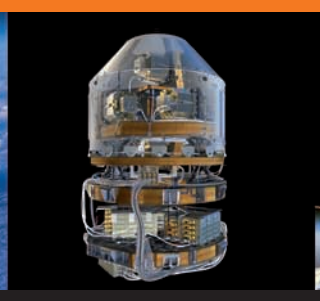
Monitored and controlled by ESA-ESOC via the Kiruna ground station in Sweden and secondary ground station in Svalbard, Norway.

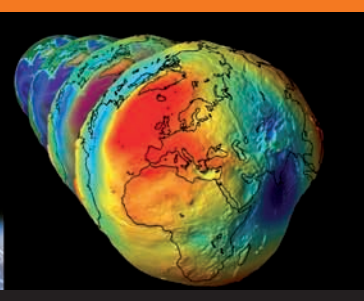
Data Processing

– level-1b products generated by the Payload Data Ground Segment (PDGS) at ESA-ESRIN.
– level-2 products (including gravity-field models and precise GOCE orbits) generated by the High-level Processing Facility (HPF) - a European consortium of ten scientific institutes.

European Space Agency
Agence spatiale européenne

SP-1314 April 2008





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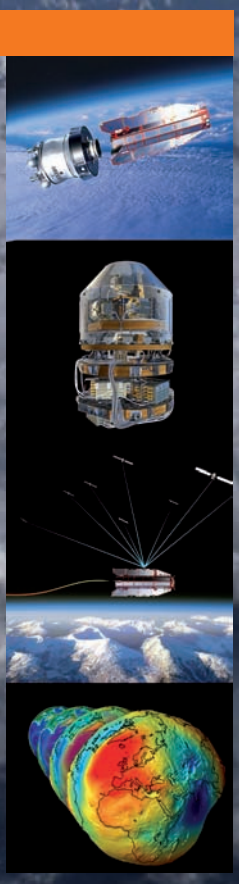

GOCE

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