



MISSION STATEMENT

The European Student Earth Orbiter (ESEO) is a micro-satellite mission to Low Earth Orbit. It is planned to be developed, integrated, and tested by European university students as part of the ESA Education Office projects. ESEO will orbit the Earth taking pictures, measuring radiation levels and testing technologies for future education satellite missions. ESEO is aimed at providing students with valuable and challenging hands-on space project experience in order to contribute to prepare a well qualified space engineering workforce for the future.

MISSION OBJECTIVES

- ▶ To take pictures of the Earth and/or other celestial bodies for educational outreach purposes.
ESEO will carry a camera.
- ▶ To provide measurements of radiation levels in Low Earth Orbit.
Dedicated sensors (a Langmuir probe and a TriTel three axis dosimeter will measure the absorbed radiation dose, the dose equivalent and the LET spectra of the cosmic radiation).
- ▶ To gain experience with technologies for possible future ESA education missions
ESEO will test a reaction wheel and a Star Tracker developed by university students, to be space qualified for possible usage on the European Student Moon Orbiter mission, ESMO.

BRIEF DESCRIPTION OF ESEO

ESEO is the second mission within ESA's Education Satellite Programme and builds upon the experience gained with SSETI Express (launched into LEO in 2005).

The project is currently in Phase B2, and at the present time about 100 students are actively involved from 13 Universities across all Europe.

The ESEO spacecraft is being developed to be launched into Low Earth Orbit in year 2012. The exact launch opportunity has yet to be confirmed, although ESEO is candidate for launch with one of the VEGA VERTA flights. However, the design aims at preserving adaptability to other launch vehicles.

In LEO the spacecraft will perform its payload operations over a period of six months, with the possibility for mission extension. The orbit will be Sun Synchronous, and the remaining orbit parameters (maximum altitude < 600 km) will be selected in a proper manner to ensure that the natural orbital drag will ensure re-entry within 25 years (by using purely passive means), thus complying with the European space debris code of conduct.

An Industrial System Prime Contractor (Carlo Gavazzi Space, CGS) is managing the ESEO project and in coordination with the ESA Education Office they provide system-level and specialist technical support to the university student teams during the execution of the project. The students obtain training and benefit from access to the CGS and ESA in-house expertise, and can use Industry and ESTEC facilities for spacecraft assembly, integration and testing.

The student teams are expected to provide most of the spacecraft subsystems, payload and ground support systems in coordination with their universities and European space industry in order to deliver their elements of the mission as part of their academic studies.

TECHNICAL FACTS

Dimensions	Within a cube of 100 x 100 x 100 cm
Mass	< 100kg
Expected Lifetime	Six months mission, extendable until end-of-life
Attitude determination system	2 sun sensors, two magnetometers, one 3-axis gyroscope,
Attitude Control System	3 magnetotorquers and 1 momentum wheel.
On-board Data Transfer	CAN bus
Telemetry	
- S-Band Primary	512 kb/s
- S-Band/Amateur-Band Secondary	38.4 kb/s
Power	Body mounted solar-cell panels
- Average	100 W
- Peak	180 W
Batteries	Li-Ion, 190Wh
Power Bus	24-32 V Unregulated
Thermal Control	Passive MLI & coating + Active heaters