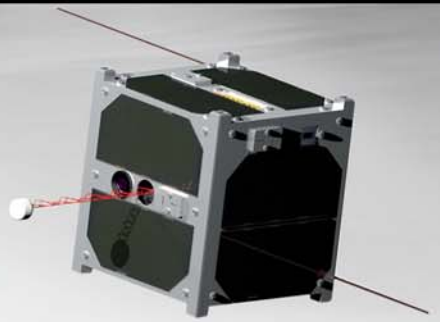
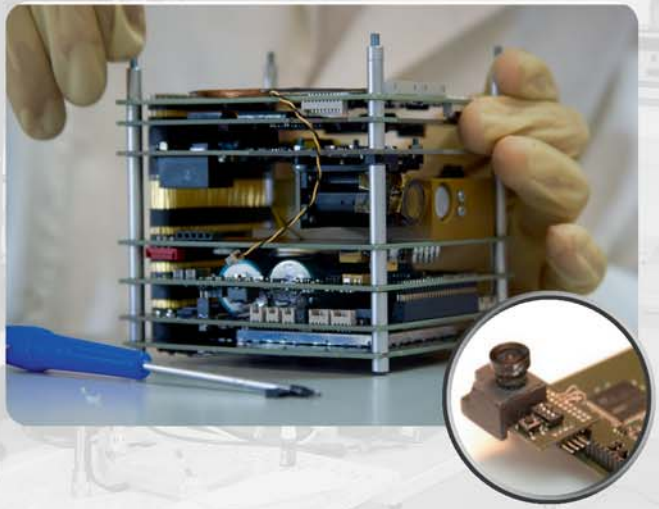


SPACE TECHNOLOGY

The laboratory for development of space technology provides services for designing, assembling, prototyping as well as testing a wide range of different equipment. That includes electronic boards, controllers, radio transmitters, receivers, cameras etc. The available tools involve Altium Designer, Labview, soldering stations and microscopes.

The first Estonian nanosatellite ESTCube-1, launched successfully in 2013, was designed and constructed in the laboratories of Tartu Observatory. In cooperation with several universities and research institutes we can provide in orbit space technology validation service on nanosattelites as a part of our upcoming future missions.



MODERN LABORATORIES

for space technology, calibration and testing

The laboratory complex of Tartu Observatory, Estonia is devoted to three main activities: development and testing of space technology, environmental testing, and optics. The laboratories include special electrostatic discharge (ESD) safe areas, cleanroom and anechoic environment. All laboratories include automatic control for ambient temperature and humidity conditions.

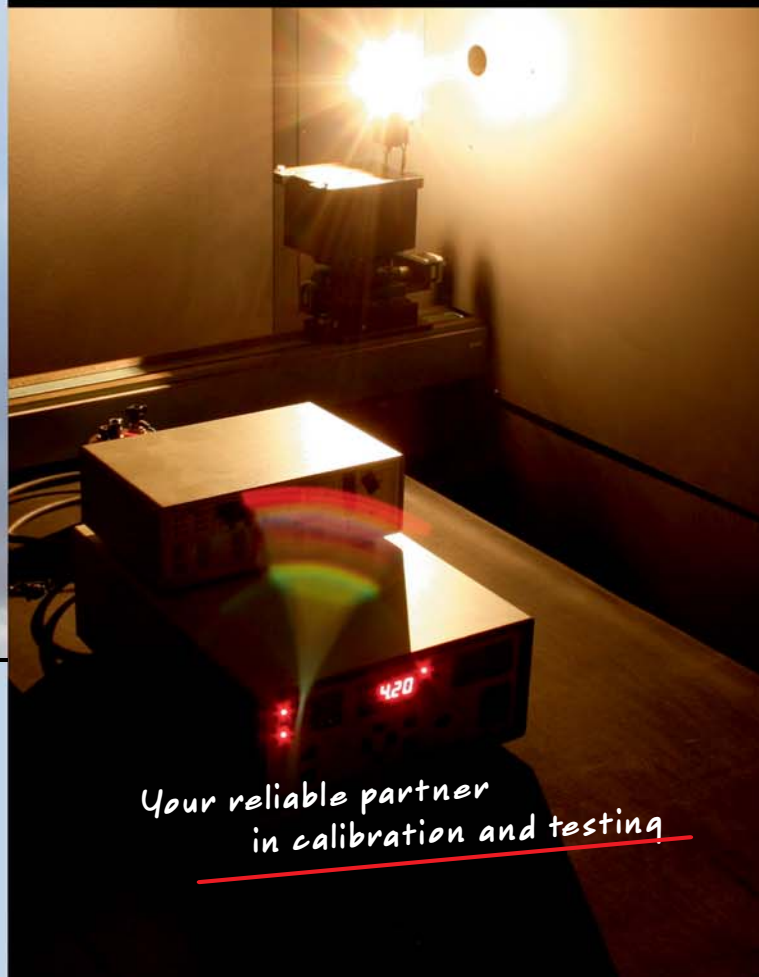
TARTU OBSERVATORY
space research centre

Testing and Calibration Laboratories
Observatooriumi 1, Tõravere
EE-61602 Tartumaa, Estonia
www.to.ee/en/services

TARTU OBSERVATORY
space research centre

LABORATORIES

Space technology
Calibration
Testing



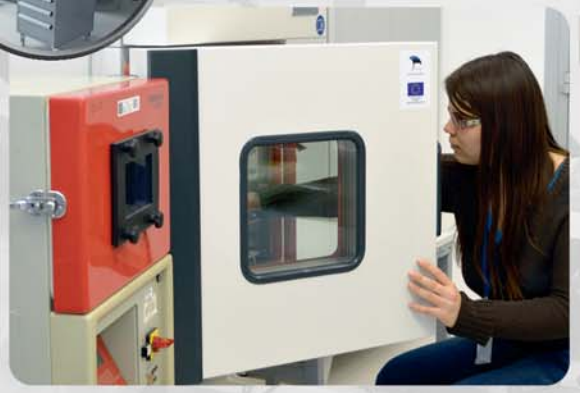
Your reliable partner in calibration and testing

ENVIRONMENTAL TESTING

Laboratories for environmental testing include test stations for climatic conditions (temperature and humidity), sinusoidal and random vibration, thermal vacuum, and electromagnetic compatibility in an anechoic chamber.

Climatic conditions

- Climatic chamber;
- dimensions of the test space 400 mm × 470 mm × 345 mm;
- temperature (-40…+150) °C;
- humidity (30…90)%.

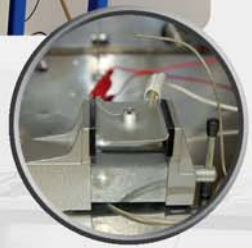


Vibration

- Sinusoidal (5…4000) Hz, max acceleration 720 m/s^2, max force 1.5 kN;
- random (5…4000) Hz, max acceleration 480 m/s^2, max force 1 kN.

The figures are depending on load.

Thermal vacuum

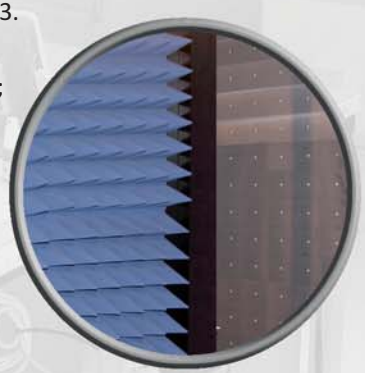


- Chamber volume 220 L;
- inner diameter 651 mm;
- inner length 650 mm;
- lowest pressure 5×10^{-7} hPa;
- adjustable temperature range (-40…+250) °C.

Electromagnetic compatibility

The anechoic chamber located at the laboratories of Tartu Observatory is based on the Frankonia Ultra Compact Chamber with ferrite absorbers on all walls and additional hybrid absorbers on one of the walls. The chamber is suitable for RF immunity and precompliance measurements according to the standard IEC/EN 61000-4-3.

- Dimensions of the test space 4 m × 3 m × 2.5 m;
- frequency range 30 MHZ…18 GHz;
- distance from the test object 1 m;
- size of the uniform field area 0.5 m x 0.5 m.



OPTICS

The laboratories for optical measurements, are located in the cleanroom environment (Class 8, ISO 14644-1).

Spectral responsivity of radiometric sensors

- Irradiance and radiance in the wavelength range (340…1500) nm;
- angular responsivity;
- inherent stray light effects;
- uniformity of the flat-field view;
- temperature effects.

Calibration and characterization of light sources

- Spectral irradiance and radiance in the wavelength range (340…1500) nm;
- optical power 5 µW…100 mW in the wavelength range (250…3000) nm.

Ground support for remote sensing measurements

- 10 m x 10 m reference panel with removable roof for calibration of air- and space-borne remote sensing spectral sensors.

Characterization of materials

- Reflectance and transmittance in the wavelength range (340…1500) nm.