

COARSE EARTH SUN SENSOR: CESS

Product Information

CESS

The Coarse Earth and Sun Sensor CESS is a passive sensor that provides spacecraft orientation at any time, crucial for SC deployment, de-spin, and survival in safe mode.

After launcher release and in case of emergency, a spacecraft typically operates a so-called safe mode. In this phase, a reliable sensor is essential to provide orientation information, relative to Sun and Earth.

The CESS is a passive device which can provide instantaneous attitude information, independent of the satellite orientation. It is equipped with two thermo-optical sensor areas, which react differently to solar and infrared heat sources. With 6 CESS heads accommodated along the +/- axes of the satellite, a simple algorithm determines the different heat contributions, by means of space qualified thermistors.

The different temperature read-outs allows for in-situ determination of its orientation, relative to Earth and Sun. This is fundamental for the spacecraft's attitude and orbit control system as well as for the power charging via solar arrays.

Heritage

The CESS has been used successfully on various satellite missions (GRACE, CHAMP, CryoSat-2 etc.). The success story of the Coarse Earth and Sun Sensors as most reliable acquisition and safe mode sensors will continue.

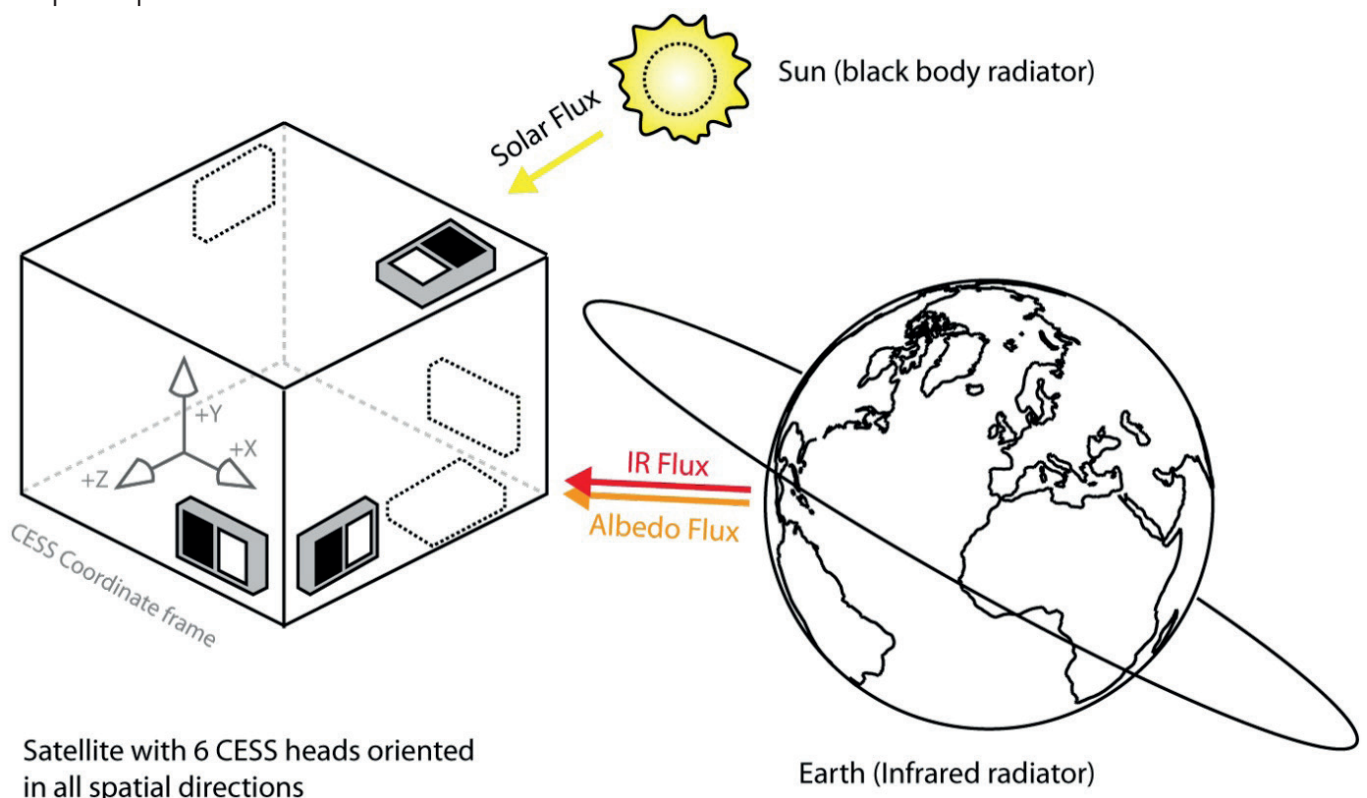


Illustration of different heat sources from earth and sun on 6 CESS heads accommodated to spacecraft

CESS Head Specification and Sensor Performance

Mechanical

Dimensions	108 x 42 x 58 mm ³
Mass	80 g
Interface	4 x M4 Mounting

Electrical

Thermistors	6x Heraeus M222 PT1000
Measurement Current	<0.5 mA (permanent) <5 mA (switched)
Interface	26 Pin HD D-Sub Connector
Thermistor Readout	12-bit ADC or higher

Environmental

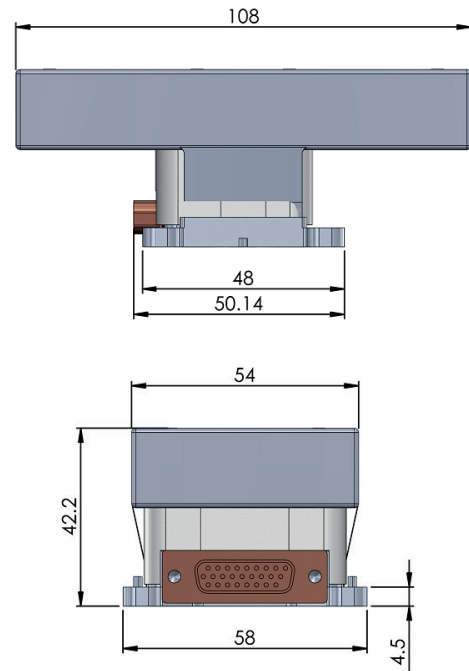
Operating Temp. Range	-175 °C to +150 °C
Shock (Qual.)	25 g (25 Hz) - 2000 g (> 1500 Hz)
Vibration (Qual.)	100 g sine (in all axes) 50.3 g RMS (in all axes)
ATOX Resistance	Teflon SSM Foil
Lifetime / Storage	15 years / 5 years

Performance

	Percentile	LVHL	ROT.
EARTH vector error	68%	7.3°	12.6°
	99%	19°	24.4°
	99.9%	25°	29.6°
SUN vector error	68%	4.4°	9.8°
	99%	10.6°	16.6°
	99.9%	13°	19.9°

TRL

TRL	9 / 8 (improved HW)
Heritage	CHAMP, GRACE, Terra-SAR-X, TanDEM-X, Paz, CryoSat-2, SWARM



CESS dimensions

Deliverables

- 6 FM + 2 spare CESS heads incl. protective caps (= S/C set)
- Performance and thermal simulator (Matlab/Simulink or C/C++)
- Flight S/W algorithm

Unique Features of the CESS at a Glance

- Provides both attitude information during de-spin and earth-oriented safe mode
- Robust, lightweight, easy to accommodate
- Zero power consumption
- Excessive flight heritage

If you are interested in our existing components or are in need of a new development, please do not hesitate to contact us.

SpaceTech (STI) is a privately owned company and independent from large aerospace companies. Located in Immenstaad, Germany, on the shore of Lake Constance, we are ideally situated in the centre of a high tech area together with several other aerospace companies and have access to a strong network of experienced suppliers. Founded in 2004, STI has developed into an established and well recognized medium size enterprise in the space industry.

STI offers a wide spectrum of products and services for space missions, from challenging prototypes for institutional science and earth observation missions to low cost series production for mega constellations. Our main capability is the design, development and manufacturing of innovative, high quality space equipment. Our products in particular include:

- Small satellite system design, production, integration
- Solar arrays, satellite structures, deployment mechanisms, electronics, and cold gas propulsion systems
- Laser-optical instruments and components, ICARUS systems

Key to STI's success is our profound knowledge of satellite system and subsystem design which allows us to find smart solutions for each customer and mission from a holistic point of view. SpaceTech systems and equipment operate flawlessly on more than 300 satellites in orbit. We are known in the space industry for our straight forward and pragmatic approach, tailored processes and safe in-orbit function. The momentum as a young and dynamic space enterprise with innovative ideas is a perfect match for many of the new space challenges. This is why SpaceTech attracts highly qualified personnel, many with long standing and exceptional experience in the space business but also young and highly motivated engineers and scientists. And this is why we can deliver you the best solution for your needs.

When can we launch your space vision?



SpaceTech GmbH
Seelbachstraße 13
D-88090 Immenstaad

email: info@spacetech-i.com
fon: +49-7545-93284-62
fax: +49-7545-93284-60

www.spacetech-i.com

Contact Person
Joachim Krieger
Head of Electronics

email: electronics@spacetech-i.com
fon: +49-7545-93284-25
fax: +49-7545-93284-60