SELF-CALIBRATING NON-CONTACT TEMPERATURE SENSOR

The Spanish Centro de Astrobiología (CAB, INTA-CSIC) has developed the remote temperature sensor currently in use on Mars, aboard the Curiosity and Perseverance rovers. Its self-calibration capability ensures its reliability throughout the mission.

Non-contact temperature sensor (from cm to m), reliable throughout its useful life, maintenance-free, regardless of the characteristics of its environment

Video

Applications

Systems with needs for reliable remote temperature measurement in aggressive environments:

- **Industry**
- **Automotive**
- **Home appliances**
- **Electronics**

Description

This technology provides self-calibration capability to IR detectors mounted on a pyrometer or IR radiometer.
In many applications, this type of sensor works in aggressive environments or for long periods of useful life, which is associated with certain problems, such as the degradation of the optical system due to the accumulation of dust or dirt on the lenses or filters of the detector devices. The proposed self-calibration system guarantees the correct measurement of the device regardless of its degree of degradation or dirt, avoiding the need for any maintenance intervention.

The self-calibration system incorporates a heater into the detector's structure, which allows imposing different operating thermal environments on the detector. From the measurements carried out in the different thermal environments, it is possible to find a degradation parameter β, which can be physically interpreted as the unitary proportion of the field of view (FOV) that is lost due to the effect of degradation. This parameter β is used to correct the following measurements made with the IR meter.

The fact that the technology is being validated by its application in an environment as unfavorable and without any maintenance option as Mars, gives an idea of its reliability.

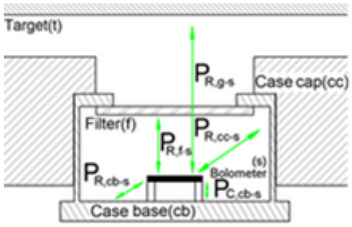
Competitive advantages

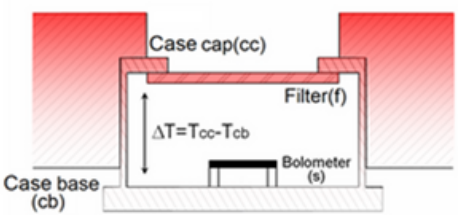
Regardless of how aggressive an environment is, the system allows temperature measurements to be obtained with total reliability without the need for maintenance.

- Built-in self-diagnosis and calibration system. Without the need of external intervention and avoiding any downtime.
- Eliminates external maintenance and calibration costs.
- Low cost technology that is easy to incorporate into current IR detectors

Situation

Patented and validated technology in a very unfavorable environment (Mars). The fact that its measurements remain correct after 10 years of operation gives an idea of the reliability of the system.
Specific applications are sought to validate their use. Open to reach agreements for the transfer of the technology.





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Spanish Version