

Innovative technique for the implementation of three dimensional indoor temperature measurements using infrared thermography

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Abstract

The definition of the air temperature distribution in space is a key input for the determination of the energy performance of buildings, as well as for the calculation of key parameters related to thermal comfort. The measurement however of temperature distribution is not a simple task, as the existing techniques are restricted to single point measurements.

In this study a novel technique for the implementation of three-dimensional temperature measurements in space using infrared (IR) thermography is introduced. The proposed technique is based on the use of a modular measurement target, with suitable for thermography radiation properties, which does not affect the temperature distribution in space. The rationale of the measurement target design, using finite element numerical analysis, is presented and discussed. Measurements of temperature field under various conditions indoors using IR thermography are presented and interpreted, and the importance of the proposed method is justified.