



Radiation measuring set-up at PTB for the calibration of thermal radiators and infrared cameras

Advantages

- **Fast calibration of imaging systems and focal plane detectors (FPAs)**
- **Fast calibration of large-area infrared radiators**
- **Radiation sources of the highest homogeneity**
- **For thermal imaging and photometry**

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Homogenization of Radiation Sources and Focal Plane Arrays (FPAs)

A novel, software-based procedure makes it possible to clearly improve the calibration of multi-element sensors (FPAs) and imaging systems (cameras). In the case of two-dimensional radiation sources, the additional targeted closed-loop control of area elements can lead to a surface homogeneity which – in general – has so far not been attained.

Large-area radiation sources serve to calibrate locally resolving radiation sensors; thereby, it is assumed that the emission surface of the radiator is, in principle, homogeneous with regard to its radiance or radiance temperature. A common procedure to characterize small nonuniformities of a surface radiator is to scan the emission surface point-by-point by means of a single detector.

The new PTB procedure is considerably faster as it uses the multi-element sensor (FPA) (which is the "device under test") itself and thus always records an overall picture of the source. If further images are now recorded via shifted lines or columns, a mathematical algorithm allows the sensor and also the source to be completely characterized by means of just three images.

If surface elements of the radiation source are closed-loop-controlled individually, it will even be possible to attain radiation sources of extremely high homogeneity in the "online" mode by means of the determined correction values.

Economic Significance

Imaging systems, FPA detectors and homogeneous radiation sources are relevant for research and development, for process technology, for the characterization of the energy efficiency of buildings, for the development of new components with a high thermal load, and in many other areas. However, the mathematical algorithm can be applied to various types of camera systems. It can thus also be used for the quality assurance of CCD cameras or even for the consumer goods market.

Development status

A German patent was granted under the number DE 10 2014 018 340 B3. A PTC application is pending. To implement this concept, PTB is looking for cooperation and license partners from the fields of thermal imaging, radiometry and photometry.

Licenses for the utilization of this new method are available.