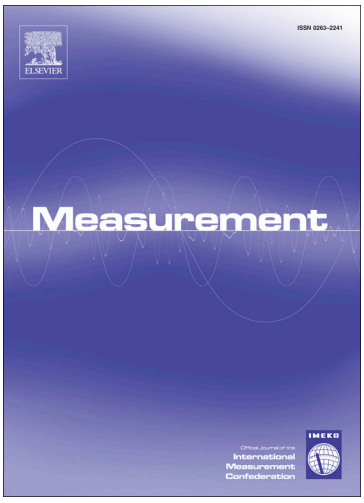

Towards quantitative small-scale thermal imaging

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PII: S0263-2241(17)30794-7
DOI: https://doi.org/10.1016/j.measurement.2017.12.023
Reference: MEASUR 5154

To appear in: *Measurement*

Received Date: 15 May 2017
Accepted Date: 14 December 2017

Please cite this article as: J.L. McMillan, A. Whittam, M. Rokosz, R.C. Simpson, Towards quantitative small-scale thermal imaging, *Measurement* (2017), doi: https://doi.org/10.1016/j.measurement.2017.12.023

Towards quantitative small-scale thermal imaging

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Abstract. Quantitative thermal imaging has the potential of reliable temperature measurement across an entire field-of-view. This non-invasive technique has applications in aerospace, manufacturing and process control. However, robust temperature measurement on the sub-millimetre (30 µm) length scale has yet to be demonstrated. Here, the temperature performance and size-of-source (source size) effect of a 3 µm to 5 µm thermal imaging system have been assessed. In addition a technique of quantifying thermal imager non-uniformity is described. An uncertainty budget is constructed, which describes a measurement uncertainty of 640 mK ($k = 2$) for a target with a size of 10 mm. The results of this study provide a foundation for developing the capability for confident quantitative sub-millimetre thermal imaging.

Keywords: thermal imaging, small-scale, sub-millimetre