

Differential infrared thermography (DIT) in a flashing jet

by G. Lamanna*, H. Kamoun*, B. Arnold*, B. Weigand* and J. Steelant**

*ITLR, Universitaet Stuttgart, Pfaffenwaldring 31-70569 Stuttgart, Germany, grazia.lamanna@itlr.uni-stuttgart.de

**ESTEC-ESA, 2200 AG Noordwijk, The Netherlands, Johan.Steelant@esa.int

Abstract

This paper discusses the feasibility of differential infrared thermography for performing quantitative temperature measurements in a flashing jet. First a methodology is defined to determine locally the spray emissivity, independently from a detailed knowledge of the drop size distribution. Thanks to the differential operation, the spray emissivity can be determined very accurately both in the optically dense and dilute regions of the spray. Second all factors, which may hamper quantitative data interpretation, are carefully reviewed. The analysis includes the choice of the background temperature, multiple scattering effects and the spatial resolution of the optical system. Finally, the experimental temperature data are validated through comparison with theoretical predictions, showing a remarkable good agreement.

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