Editorial for the special feature on Advanced In-flight Measurement Techniques AIM^2

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Editorial

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Flight tests of new or modified aircraft are a necessary part of the design process and provide the final validation of the full scale aircraft design. Flight testing for certification is a critical phase as all trials proving compliance, with respect to specifications and regulations must be completed in the shortest possible time, while maintaining high standards in the certification process. Usually significant instrumentation is installed to validate the predicted behaviour of the aircraft and also to detect unforeseen problems so that, if necessary, fast modifications can be done.

Optical measurement techniques can minimize the installation effort and reduce the testing time as they are able to capture a large number of parameters within a short time. The EU funded research project 'AIM—advanced in-flight measurement techniques' (contract AST5-CT-2006-030827 funded within the 6th Framework Programme) and the follow on project 'AIM^2—advanced in-flight measurement techniques 2' (contract 266107 funded within the 7th European Programme), proved the principal feasibility to apply modern optical measurement techniques from industrial wind tunnels to flight testing and started to further develop those methods. AIM^2 primarily focused on developing reliable and easy to use, dedicated measurement systems and on defining design and application rules for these new in-flight measurement techniques [4]. The prime objective was to enable aerospace industries to use such measurement systems in future tests to reduce testing time and costs.

This special issue focusses on the work completed in AIM^2 and presents a total of eight papers [1, 2, 5–10]. The papers present an overview on optical methods for in-flight flow and structural measurements as well as state-of-the-art methods. In the work presented, the optical measurement techniques are continuously developed throughout the project. These techniques include the structural shape and deformation measurement method IPCT ('image pattern correlation technique') [5, 7, 10], the flow field measurement techniques PIV ('particle image velocimetry') [3], IRT ('infrared thermography') [8] and LIDAR ('light detection and ranging') [1], as well as the method of 'interferometric laser imaging for droplet sizing' (ILIDS) [2] and pressure and strain sensors based on optical fibre sensor technology [9]. Therefore we hope you will enjoy reading these papers and would encourage you to directly contact the authors of the papers and the editors for your feedback and to get information about the latest developments.

It has been our pleasure to be part of the outstanding AIM^2 project and finally be the Guest Editors of this special issue. We would like to thank all project partners and the authors of the papers for their excellent contributions. We also extend our thanks to the referees in devoting their time and effort, on a volunteer basis, in order to ensure high quality contributions. Finally, we would like to thank the journal Editors for enabling this special.

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