

Experiments in Fluid Mechanics 2015

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Title of presentation:
Experimental in-flight boundary layer measurements by IRT on RUT PW-6 glider in frame of AIM2 Project
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Abstract: In flight testing is a necessary part of the design process and provide the final validation of the full scale aircraft design. The FP7 Project AIM ² - Advanced Measurement Techniques 2 http://aim2.dlr.de - developed optical measurements techniques to be applied to in flight testig with industrial demand. One of them, Infrared Thermography (IRT), was examined to apply it to in-flight investigations of the unsteady behaviour of the boundary layer (BL). In this presentation the results of the IRT measurements of BL transition on PW-6 glider wing acquired during in-flight tests will be presented. The flight tests were completed in August 2014 on the Rzeszow University of Technology airfield. In order to induce unsteady conditions of flight (rapid change of laminar-turbulent transition), special maneuvers has been flown. For in-flight tests, the PW-6 gilder was strongly modified. In spite of construction and dimensions of the glider and its cabin, a special IRT camera holder (pod) was designed, constructed and mounted on PW-6 glider. Before in-flight IRT boundary layer measurement started, laboratory investigations of potential film material combinations to be stuck on the glider wing surface have been performed. The PW-6 flight tests and the analysis of the measured data have shown usefulness the IRT method in BL investigations but behaviour of the temperature distribution, as an effect of the behaviour of the unsteady laminar-turbulent transition, is some what more difficult than expected. To get more insight in the thermal characteristics and to achieve more quantitative results further study is needed.

