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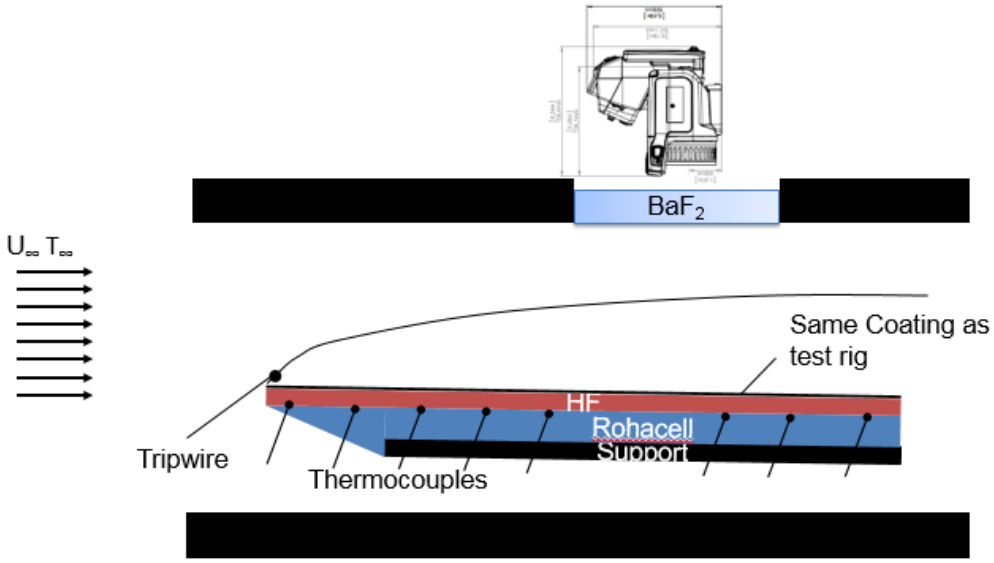
Master Thesis Task Description

Experimental investigation of Heat Transfer on a Flat Plate

High-bypass ratio turbofan engines are commonly employed in aircrafts. For higher bypass ratio, turbine transition ducts between high pressure system (HP) and low pressure (LP) system have to be designed as short as possible with larger radial offsets to avoid increase in engine weight but without decreasing performance. Past and recent research have been performed on this topic. Detailed heat flux measurements will be carried out at the hub of the turbine center frame in a representative turbine test setup, installed in the Transonic Test Turbine Facility at Graz University of Technology with the use of IR-Camera technologies.



Flat plate experiment

The main aim of this thesis is to set up an existing flat plate test module available in a subsonic wind tunnel located at TU Graz and to perform an experimental analysis of the flat plate turbulent boundary layer. The idea is to conduct a feasibility study in order to test the calibration of the IR camera, the heating foils (HF) measurement technique and materials that will be then applied in the big test rig. IR measurements will be carried out with different heater settings, performing an in situ calibration on IR temperatures and arriving to calculate the heat transfer coefficient. The results obtained will be compared with the well known flat plate experimental results in order to test the validity of our approach. The thesis is part of a project in cooperation with GE and MTU Aero Engines.

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