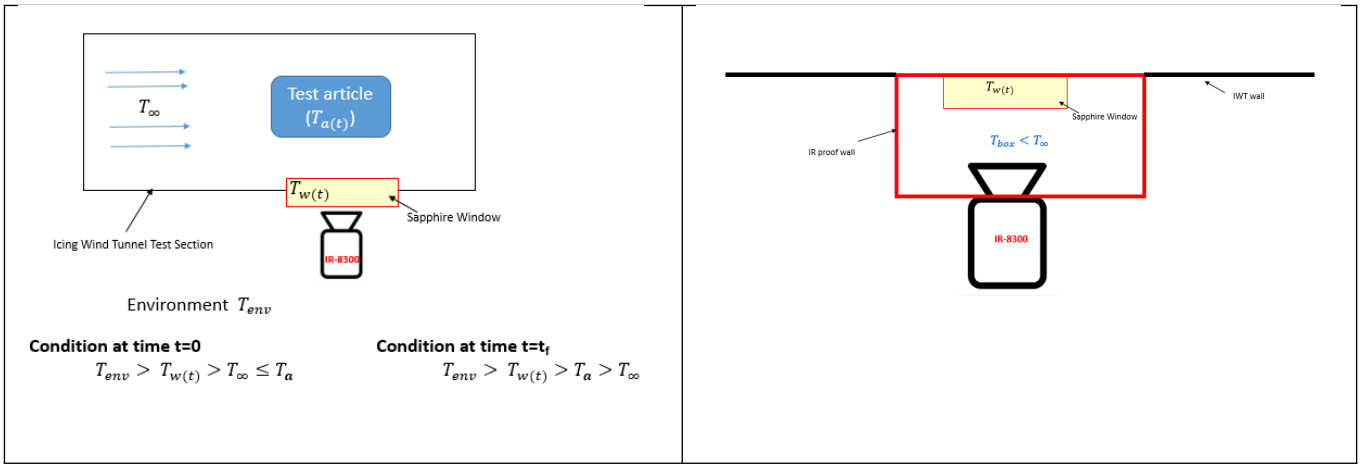
Technische Universität Braunschweig | Institut für Strömungsmechanik
Hermann-Blenk-Straße 37| Braunschweig | Deutschland

Bachelor Arbeit: IR thermography corrections (Posted on 13.09.22)

All bodies above 0K radiate energy, IR thermography exploits this phenomenon to correlate to the apparent temperature of the body. Braunschweig Icing Wind Tunnel uses Image IR-8300 camera to measure the temperature on an airfoil during ice accretion in an Icing Wind Tunnel. The Wind tunnel temperature is maintained from the 0 to -20°C, the camera is mounted outside the wind tunnel is exposed to environmental temperature of the room 19 to 26°C. The wind tunnel is provided with a Sapphire window to facilitate the IR measurements. As the outer surface of the IR window is exposed to environment, the window temperature is higher than the temperatures of wind tunnel and the substrate, this significantly alters emissive coefficient. The setup and the temperatures description are shown below.



The reflected temperature and the emissivity value set for the hot substrate are not valid as the substrate is cooled below the window temperature. To improve the measurement, it is planned to build IR shielded box around the lens and the window and maintaining the temperature inside the box lower than the temperature of the wind tunnel as shown below. Thereby, minimizing the reflected temperature.

Your Work:

- Design the box, PID controlled cooling system with Peltier Elements
- Calibration of the emissivity
- Develop corrections for the transmission efficiency and the orientation of the camera

Requirements

- Good understanding of Heat Transfer
- Interest in electronics and construction

Are you **interested?** For more information, please contact.

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