

# LDA-Measurements of Transitional Flows in a Large Refractive Index Matched Flow Facility

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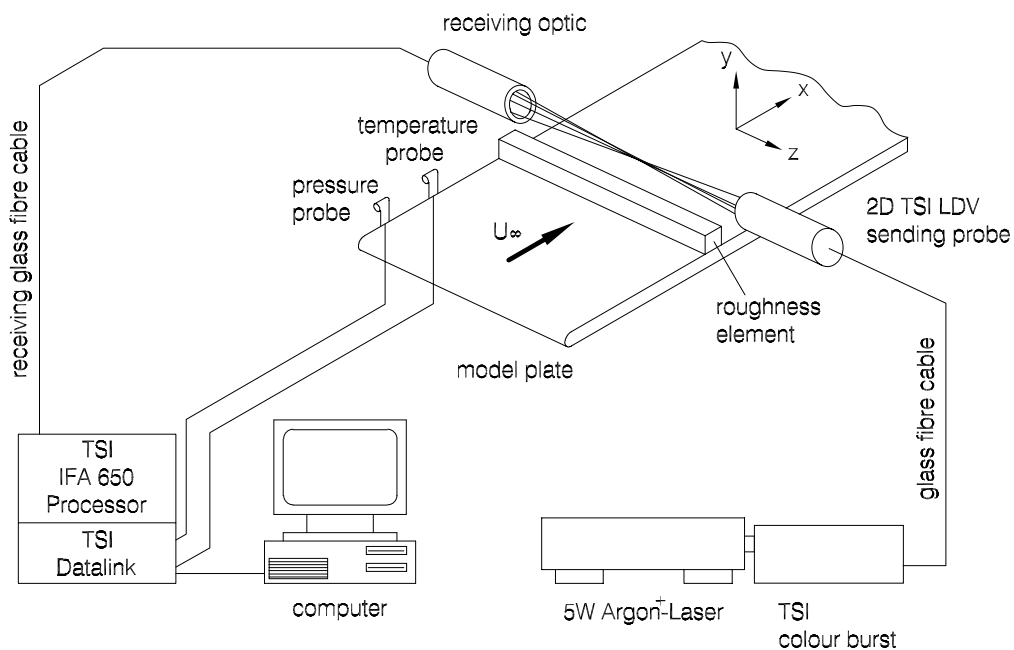
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## Abstract

Useage of laser-Doppler anemometry (LDA) requires optical access to the flow field of interest. This is not always easy, since complex geometries or very near-wall boundary layer measurements can optically distort the laser beams. One solution is to employ a solid material and fluid of the same index of refraction. In this case, there is minimal optical interference of the solid with the LDA. Although this technique is not new, previous studies have been limited to relatively small and specialized flow aparati as well as unpleasant fluids. Two large scale flow facilities have now been constructed, permitting matched-index-of-refraction (MIR) LDA measurements in difficult geometries at higher Reynolds numbers and with increased spatial resolution than previously possible. This paper describes the facilities and fluids employed, and presents some preliminary results for very near wall measurements of a transitional boundary layer behind a roughness element (Figure 1).



**Figure 1.** Schematic of flat plate with roughness element and LDA measurement system.