Institut für Hydromechanik (IfH)
Leitung: Prof. Olivier Eiff, Prof. Markus Uhlmann,

- Research group: Building and Environmental Aerodynamics -

Offer of Final Year Thesis (BSc or MSc)

Topic:

Aerodynamics of Velomobiles

Motivation

Velomobiles are fully-faired recumbent bikes also referred to as human powered vehicles (HPV). Due to their streamlined shape, velomobiles experience considerably lower drag than other bicycle types. Drag coefficients of velomobiles are typically less than one fifth of those of cyclists riding in an upright sitting position. Velomobile riders report that they can easily maintain riding velocities of around 50 km/h for one hour or even more. However, riders also report a pronounced crosswind susceptibility of their velomobiles which is obviously attributable to their large lateral area of wind attack.

Figure 1: Velomobile in road traffic and wind tunnel model of scale 1:10.

Objectives

The aim of the project is to study aerodynamic characteristics of velomobiles by means of scaled models (1:10) in wind tunnel experiments. Particular focus is on their crosswind susceptibility and possible remedial measures by passive flow control devices. To this end, various velomobile models shall be tested and different passive flow control devices applied and their influence on aerodynamic characteristics and on crosswind susceptibility shall be tested.

Tasks

- Measurement of aerodynamic forces on velomobile models under different crosswind conditions
- Study of passive flow control devices on the aerodynamic forces for selected velomobile types
- Determination of aerodynamic coefficients and analysis of their Reynolds number sensitivity
- Measurement and analysis of the flow field around the velomobile models (MSc thesis only)
- Documentation of the work and results

Availability: with immediate effect

Daily supervisors:

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