Aerodynamic Design of PAC-Car II (Summary)

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Figure 1: PAC-Car II on the track

This report is about the development of the aerodynamic design of the body shape of PAC-Car II, the world's most fuel-efficient vehicle. The world record was broken with a consumption of 5385 kilometres to one litre of petrol at the fuel economy competition Shell Eco-marathon in Ladoux (F) in 2005.

As the body shape contributes significantly to the over all drag of the vehicle, it had to be reduced to the minimum. This was achieved using both experimental and numerical methods during the aerodynamic design process of PAC-Car II.

The design of the body shape of PAC-Car II is constrained by qualitative and quantitative parameters. They originate from a number of sources, including the race regulations of the Shell Eco-marathon, ergonomics, and aerodynamics. After first preliminary designs several iterations were performed with the help of wind tunnel tests and CFD to find the ideal aerodynamic shape. For the wind tunnel tests wind tunnel models were used in scale 1:2, for CFD a Navier-Stokes-Multiblocks Solver was used. The results of CFD and of the wind tunnel showed good agreements.