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## Aerodynamic Optimization of Chalmers Formula Student Vehicle



STAR-CCM+ software was involved in the evaluation and optimization of a formula student vehicle design. The Chalmers University team participated in formula student competitions, taking place at Silverstone (UK) as well as at Hockenheimring (Germany). Team focused on the design of an aero package aiming to obtain the highest aerodynamic efficiency. It consisted of a front and a rear wing, diffuser, also ducts for proper radiator and brake cooling. Starting from 2D simulations for different airfoil profiles until the full detailed vehicle the STAR-CCM+ was played a decisive role for determining our final vehicle design. Mainly, polyhedral mesh was generated with refined mesh (prism layers) close to the walls and steady state (RANS) simulations were operated, using k- $\epsilon$  turbulence model. The radiator was defined as a porous region and aligned trim mesh was generated. Mostly, the half vehicle was simulated, saving time, yet whole vehicle simulations operated aiming to obtain its roll and yaw momentum for vehicle dynamics purposes. STAR-CCM+ simulation tools aided to be developed a competitive racing vehicle, reaching the 4th overall place in German formula student competition, one of the most demanding race circuits in the world.

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Chalmers Formula Student

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### **Industries:**

[Academic](#)<sup>[2]</sup>

[Sports](#) <sup>[3]</sup> ? Sports - Application

### **Products:**

[STAR-CCM+](#)<sup>[4]</sup>

### **Conference:**

[STAR Global Conference 2014](#)<sup>[5]</sup>

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