

Title: Reduced Order Models for Interactive Aerodynamic Vehicle Design

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Abstract: The creation of a beautiful yet aerodynamically efficient car shape requires a close and continuous collaboration between the styling department and the aerodynamic experts. The iterative loop between these two groups is largely determined by the still significant computational turnaround time for the aerodynamic simulations. Reduced Order Modeling (ROM) bears the promise of providing aerodynamic real-time responses to design changes and would thus allow for a truly interactive aerodynamic design process, with stylists and aerodynamicists evaluating and optimizing both aesthetics and aerodynamics concurrently in joint sessions.

It is this interactive process that we are heading for at Volkswagen and that motivates our participation in the ARIA project. To that end, we have provided a classic aerodynamic test case to the consortium: the Ahmed body. In our talk, we will detail the requirements of ROM-based interactive aerodynamic design, explain how they are reflected in the choice of the test case and show first Ahmed body results of the hybrid Neural Network/ROM-approach that we are pursuing with our partners from SISSA.