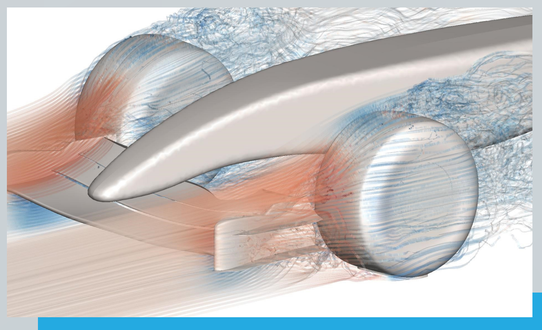
ExaFLOW

Enabling Exascale Fluid Dynamics Simulations

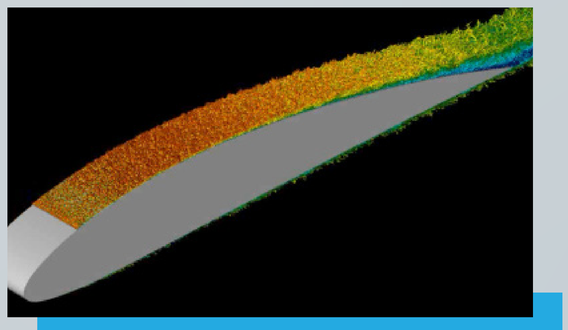
The main goal of ExaFLOW is to address key algorithmic challenges in CFD (Computational Fluid Dynamics) to enable simulation at exascale, guided by a number of use cases of industrial relevance, and to provide open-source pilot implementations.

> "CFD is in need of exascale computing and has at the same time the potential of reaching exascale performance."

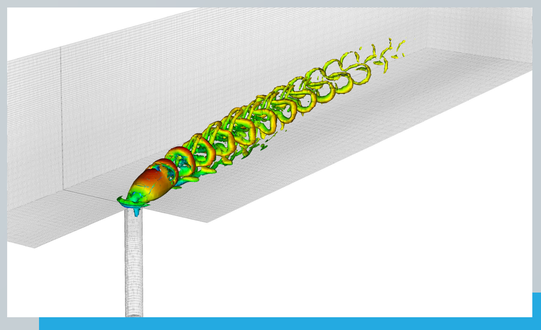
USE CASES



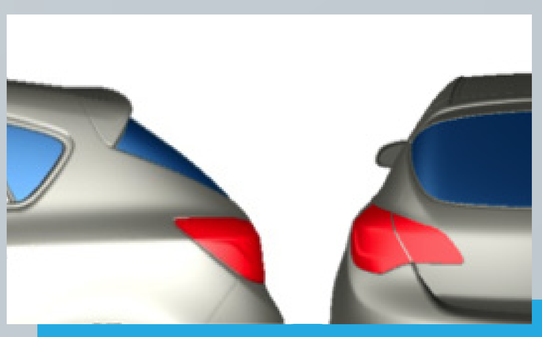
McLaren front wing



Wing profile NACA4412



Jet in crossflow



Automotive

- Innovation 1: Cost reduction through mesh adaptivity, heterogeneous modelling, and resilience.
- Innovation 2: Strong scaling at exascale through a mixed CG-HDG.
- Innovation 3: I/O data reduction via filtering.
- Innovation 4: Energy efficient algorithms reducing energy required to perform CFD computations at the exascle.

> "CFD is in the heart of modern engineering and an indispensable tool for areas such as automotive, aerospace, energy, weather and climate, biotechnology, etc."

> "10% of the energy use in the world is spent to overcome turbulent friction"

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