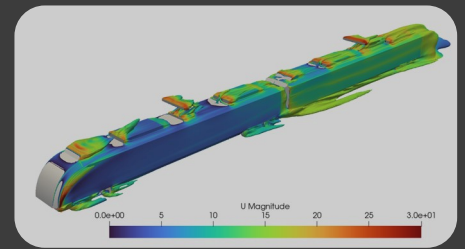


Tram External Aerodynamics



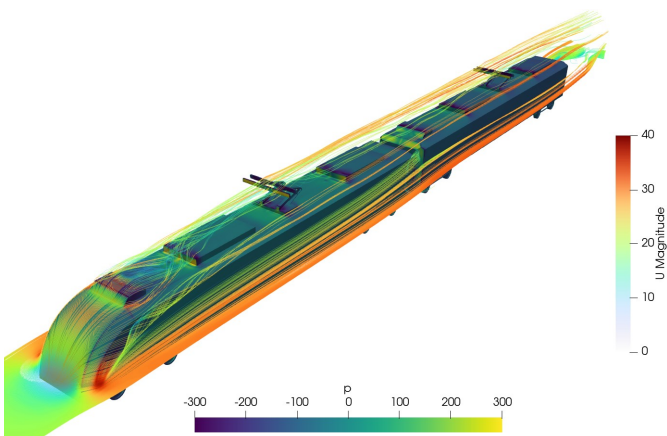
At SynergySim, we specialize in designing and analyzing external airflow dynamics and their impact on overall systems. Leveraging advanced airflow simulation techniques, our team optimizes designs for maximum performance. With a deep expertise in fluid dynamics, we address complex fluid flow challenges, delivering innovative and reliable solutions. Below is an example of our work showcasing the external airflow analysis of a tram.

Project Overview

This project focuses on analyzing airflow around a tram to understand its aerodynamic performance. Key objectives include identifying drag sources, turbulence effects, and their impact on energy efficiency and stability. The insights aim to optimize design for reduced drag and improved performance in diverse operating conditions. Additionally, the study addresses environmental challenges such as crosswinds and weather impacts on overall aerodynamics.

What can we expect?

- ⇒ Detailed Airflow Visualization
- ⇒ Drag Force Analysis
- ⇒ Aerodynamic Performance Optimization
- ⇒ Wind Noise Prediction



Key Highlights

Challenges

- **Aerodynamic Drag:** Trams' boxy designs create significant aerodynamic drag at high speeds, making drag reduction a challenging task without affecting structural integrity.
- **Wind Noise:** Turbulence and airflow around external components such as mirrors, doors, overhead lines and catenaries.
- **Weather & Environment Conditions:** Cross wind stability and wind resistance.

Approach

- **Fluid-Flow Simulation:** Utilization of a state-of-the-art CFD tools to simulate the external air-flow under various wind conditions.
- **Efficiency:** Evaluation of drag forces and detailed airflow visualization for aerodynamic performance.

Outcome

- Flow behavior analysis that includes areas of turbulence, recirculation and stagnation.
- Drag and lift forces that provides insights into aerodynamic forces impacting its performance or stability.
- Pressure distribution that identifies high and low-pressure zones, aiding in structural integrity.