

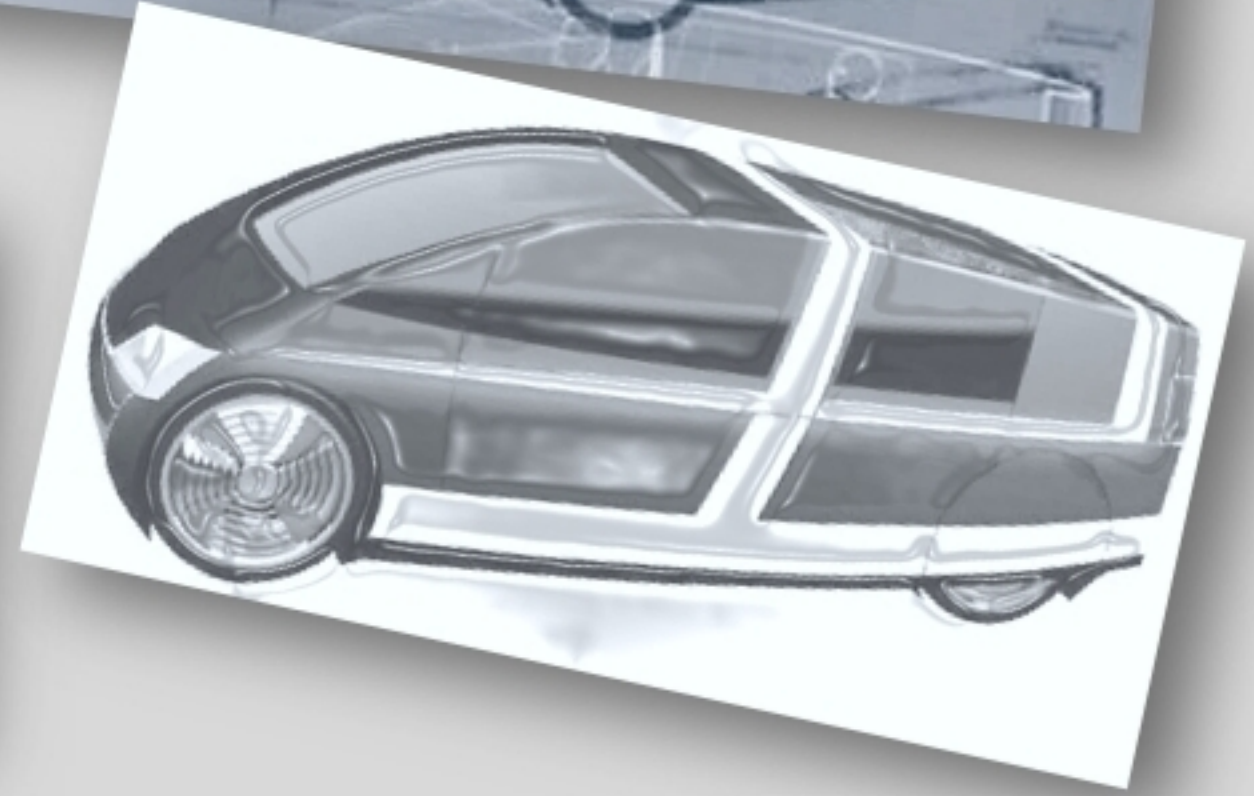
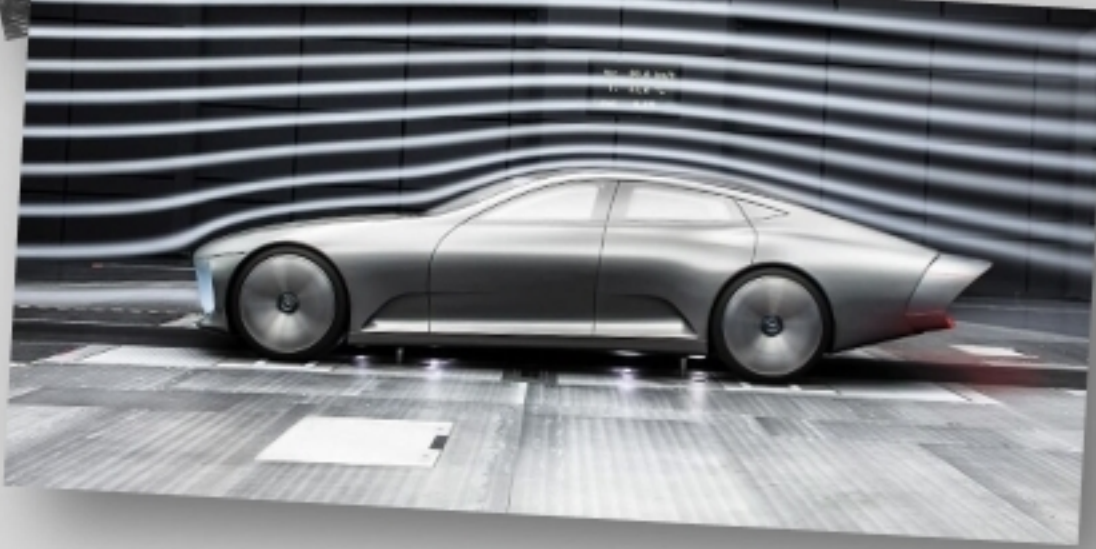
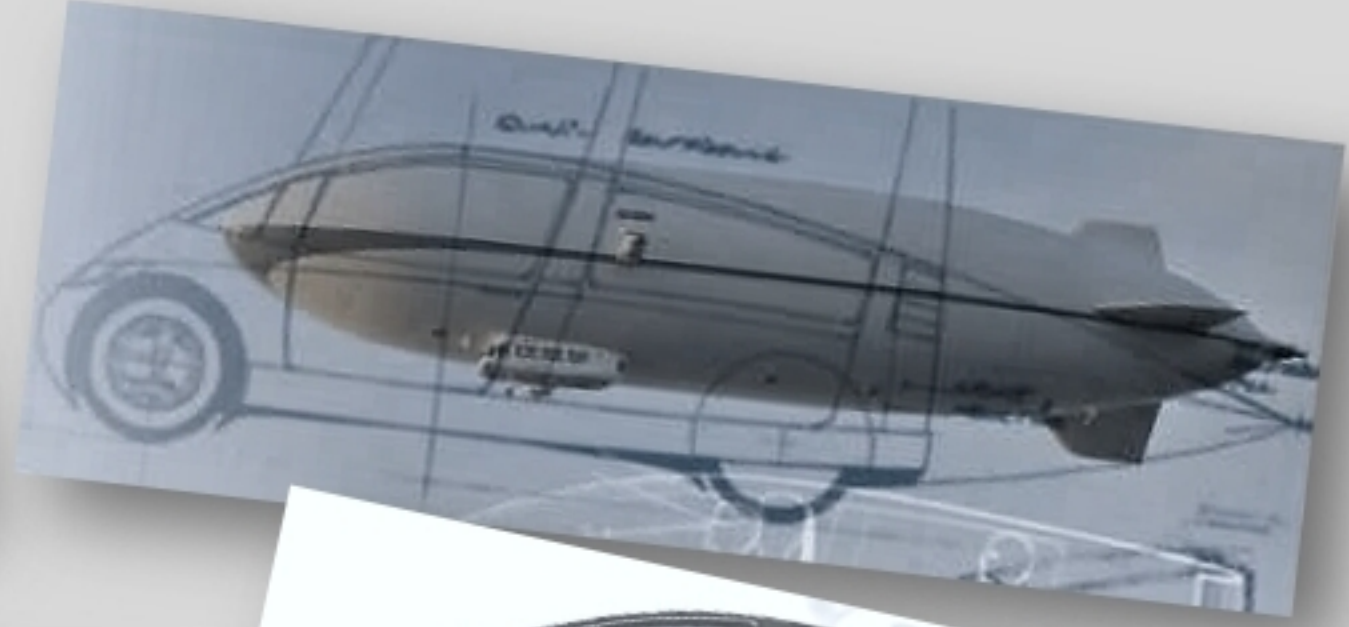


Short Course on Ground Vehicle Aerodynamics

Middle East Technical University (METU)

RÜZGEM – Center for Wind Energy Research, Ankara-Turkey

Tuesday, 25.12.2018



Dr. Emir Öngüner

German Aerospace Center (DLR)

Institute of Aerodynamics and Flow Technology

Due to increasing demand of energy efficiency in ground vehicle technology, the aerodynamic characteristics gain priority with respect to previous decades. Important aspects as greenhouse gas emissions, limited oil resources and recent competitive electric cars with rechargeable batteries keep the energy and fuel consumption in focus. The drag resistance is the most significant aerodynamic feature which directly interacts with the emissions and driving performance of ground vehicles such as maximum driving speed. Nevertheless this parameter is not the only perspective since the crosswind stability, cooling of propulsion and transmission, lift distribution, wind noise and surface soiling are also dependent on flow characteristics around the vehicle.

Within this short course it is aimed at giving a general overview on the historical development, theory and practical applications of aerodynamics on ground vehicles.



One-day course will cover following contents:

- **Historical Background: Birth of Ground Vehicle Aerodynamics**
- **Wind Forces and Their Impact on Vehicle Body**
- **Experiments vs. Simulations: Wind Tunnel Measurements and Computational Analysis**
- **How to Design & Develop a Ground Vehicle Considering Aerodynamics?**
- **Outlook: Future Challenges**

09:30 - 10:00

Introduction & Motivation

10:00 - 10:10

Coffee Break + Discussions

10:10 - 10:40

Historical Background: Birth of Ground Vehicle Aerodynamics

10:40 - 10:50

Coffee Break + Discussions

10:50 - 11:20

Wind Forces and Their Impact on Vehicle Body

11:20 - 13:00

Lunch + Discussions

13:00 - 13:30

Experiments vs. Simulations: Wind Tunnel Measurements and Computational Analysis

13:30 - 13:40

Coffee Break + Discussions

13:40 - 14:10

How to Design & Develop a Ground Vehicle Considering Aerodynamics?

14:10 - 14:20

Coffee Break + Discussions

14:20 - 14:50

Outlook: Future Challenges

14:50 - 15:00

Final Comments incl. Open Discussion

15:00 - 15:30

RÜZGEM Large Scale Wind Tunnel Site Visit

NOTE: Those who would like to attend should send their name, affiliation, job position and contact information to uzol@metu.edu.tr before December 15th.