

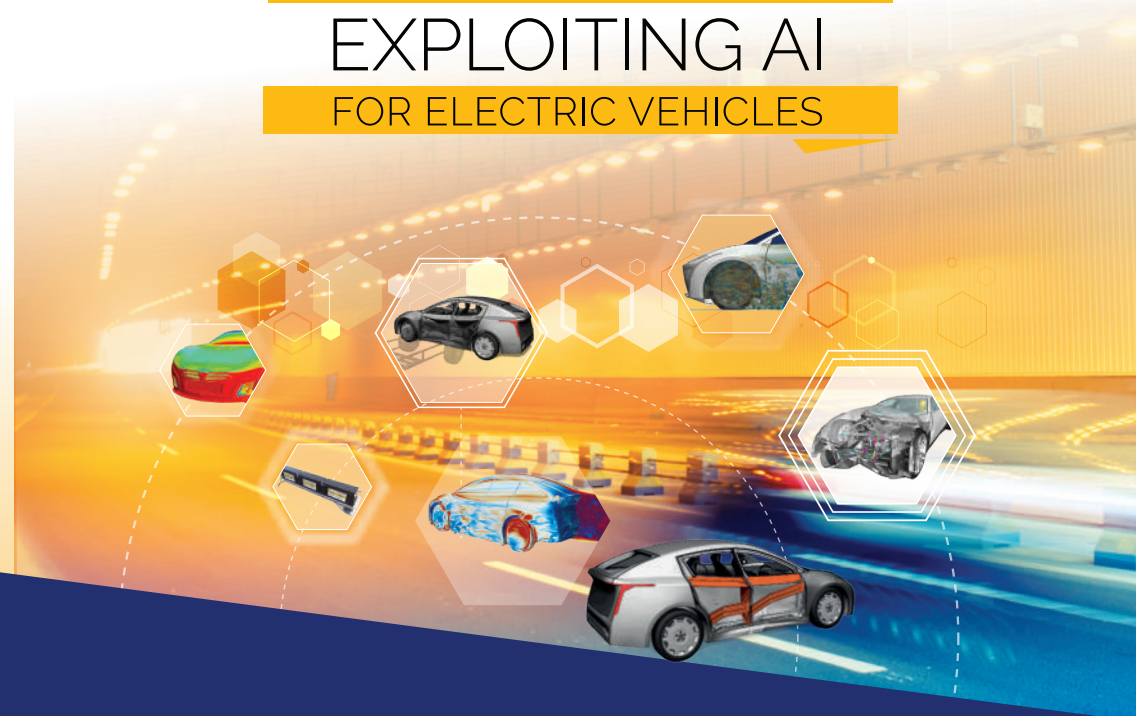


PROJECT PARTNERS



# UPSCALING

PRODUCT DEVELOPMENT  
SIMULATION CAPABILITIES  
EXPLOITING AI  
FOR ELECTRIC VEHICLES



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**UPSCALE** is the first EU project with the specific goal of integrating **AI** with traditional physics-based **Computer Aided Engineering** to reduce the development time and increase the performance of electric vehicles (EVs).

Nowadays High-Performance Computing (**HPC**) and Computer Aided Engineering (**CAE**) play a decisive role in vehicle development processes.

The two most **HPC and CAE** intensive parts of the development of EVs are vehicle aero-thermal and vehicle crash performance, by implementing AI these two areas will be improved generating a 20% reduction of the vehicle development time.

## PROJECT GOALS AND MISSION



ENHANCE THE PERFORMANCE OF EXISTING CAE TOOLS FOR CRASH AND AERODYNAMICS BY MACHINE LEARNING



IMPLEMENT AI FOR AERODYNAMIC DESIGN



IMPLEMENT AI FOR CRASH DESIGN



COMPUTER-AIDED ENGINEERING PROCESS ACCELERATION



20% REDUCTION OF THE VEHICLE DEVELOPMENT TIME

RESEARCH

TRL 2/3

OBJECTIVE 1



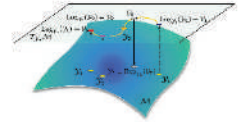
Convolutional Neural Networks for aero-thermal CFD simulations

OBJECTIVE 3



Machine Learning for geometric parametrization

OBJECTIVE 2



Reduced Order Model for Crash simulation predictability

FRAMEWORK FOR AI BASED DESIGN

INTEGRATION

TRL 5/6

OBJECTIVE 4

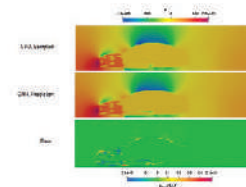
INTEGRATED AERO-THERMAL OPTIMIZATION FRAMEWORK DEMONSTRATED IN INDUSTRIAL ENVIRONMENTS

OBJECTIVE 5

INTEGRATED AI-BASED CRASH DESIGN FRAMEWORK DEMONSTRATED IN INDUSTRIAL ENVIRONMENTS

WP2 AERO THERMAL FRAMEWORK

Integration of Reduced Order Models for aerodynamic performance under constraints of thermal management



WP3 CRASH FRAMEWORK

Integration of Reduced Order Models for crashworthiness battery performance

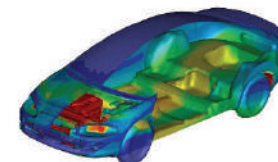


DEMONSTRATION

TRL 7/8

WP4 AERO THERMAL DEMONSTRATION

- Optimization with vehicle geometrical model
- Results with high fidelity simulations



WP5 CRASH DEMONSTRATION

AI model training and validation in crash simulations

