

PRESS RELEASE

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Lightweight Construction and Ecological Design for Electric Vehicles

EU Project ALMA: Thinking Ahead to Electromobility Electromagnetic Waves

E-mobility and lightweight construction are two crucial building blocks of modern vehicle development to drive the energy transition. They are the focus of the ALMA project (Advanced Light Materials and Processes for the Eco-Design of Electric Vehicles). Nine European organizations are now working in the EU project to develop more energy-efficient and sustainable vehicles. Companies from research and industry are optimizing the efficiency and range of electric vehicles, among other things by reducing the weight of the overall vehicle. The Fraunhofer Institute for Industrial Mathematics ITWM is providing support with mathematical simulation expertise.

According to the low emissions mobility strategy, the European Union aims to have at least 30 million zero-emission vehicles on its roads by 2030. Measures to support jobs, growth, investment, and innovation are taken to tackle emissions from the transport sector. To make transport more climate-friendly, EU measures are being taken to promote jobs, investment and innovation. The European Commission's Horizon 2020 project ALMA represents one of these measures.

Focused Expertise: ITWM Supports with Simulation Expertise

The EU-funded project started on February 23 and 24 with a digital kickoff meeting that brought together nine partners from four European Union countries. »We, as Fraunhofer ITWM, bring our long-standing expertise in the field of efficient multiscale simulations of the manufacturing of fiber-reinforced composite components to the project. Our customized simulation tools create a digital twin and support the optimization of lightweight structures during vehicle development,« said Dr. Konrad Steiner, head of the department »Flow and Material Simulation« at Fraunhofer ITWM. »This includes the simulation of the forming processes of the SMC components to calculate the local fiber concentration and fiber orientation with FLUID, and multiscale thermomechanical simulations with FeelMath to predict the strength and damage behavior.«

The ALMA consortium includes the following companies: The Automotive Technology Centre of Galicia (Spain) is responsible for project management and material characterization. ArcelorMittal Maizières Research (AMMR) from France is dedicated to the development of advanced steels for automotive applications. Ford-Werke from Germany are working on the project from an end-user and CAE analysis perspective.

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Innerspec Technologies Europe from Spain is contributing solutions for non-destructive testing. BATZ S. Coop. of Spain is on board as an automotive supplier. RESCOLL from France is an SME specialized in adhesives and polymers. The Dutch research organization TNO is developing Live Cycle Management together with the International Solid Waste Association, ISWA.

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Focus on Concrete Goals in Lightweight Construction and Circular Economy

To improve the efficiency and range of electric vehicles, the weight of the overall vehicle is to be reduced. In addition, the upcoming stricter EU regulations require the optimization of the production process towards a more sustainable circular economy – here, the entire life cycle of the vehicles and the supply chains are being looked at. In this context, the companies and research institutions are also working together on the sustainable life cycle of an e-vehicle platform. This includes intelligent recycling and possible options for material recovery.

This is a three-year project which aims to achieve innovation and sustainability. To respond to this challenge, ALMA will develop a novel battery electric vehicle (BEV) structure for a passenger car with 45 percent weight reduction potential compared to current baseline at affordable costs. For this purpose, ALMA will develop a multimaterial modular platform made of a combination of Advanced High Strength Steels (AHSS), Advanced-SMC and steel-hybrid materials, characterized with multiscale modelbased tools.

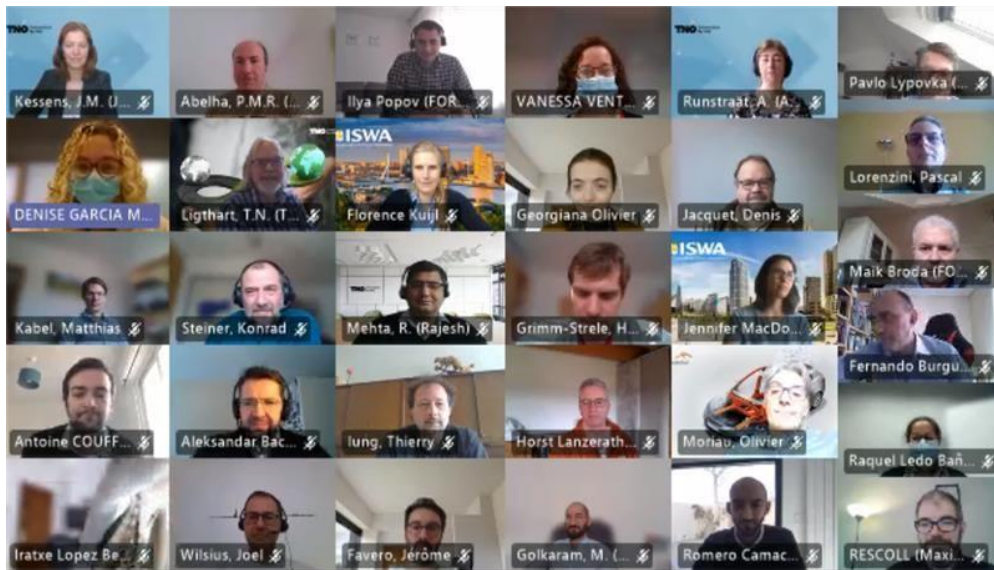
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Visuals

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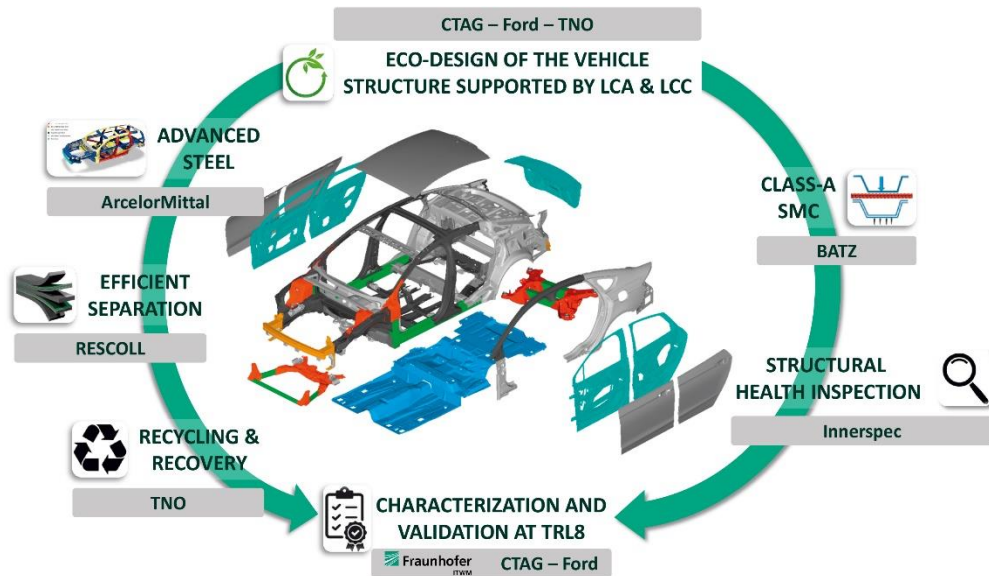


Screenshot of Alma's Digital Kickoff Meeting in End of February 2021. ©Fraunhofer ITWM



ALMA Logo ©ALMA

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Alma Concept in a Schematic Graphic. ©ALMA

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About the Fraunhofer Institute for Industrial Mathematics ITWM

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The Fraunhofer Institute for Industrial Mathematics ITWM in Kaiserslautern is one of the largest research institutes for industrial mathematics worldwide. We see our task in further developing mathematics as a key technology and providing innovative impetus. Our focus is on the implementation of mathematical methods and technology in application projects and their further development in research projects. The close cooperation with partners from industry guarantees the high practical relevance of our work.

Their integral components are consulting, implementation and support in the application of high-performance computer technology and the provision of tailor-made software solutions. Our various competencies address a wide range of customers: automotive industry, mechanical engineering, textile industry, energy and finance. This also benefits from our good networking, for example in the High performance center "Simulation- and software-based innovation".