EM-TECH - Innovative e-motor technologies covering e-axles and e-corners vehicle architectures for high-efficient and sustainable e-mobility

EM-TECH

Objectives

EM-TECH brings together 10 participants from industry and academia to develop novel solutions to push the boundaries of electric machine technology for automotive traction, through:

i) innovative direct and active cooling designs;
ii) virtual sensing functionalities for the high-fidelity real-time estimation of the operating condition of the machine;
iii) enhanced machine control, bringing reduced design and operating conservativeness enabled by ii);
iv) electric gearing to provide enhanced operational flexibility and energy efficiency;
v) digital twin based optimisation, embedding systematic consideration of Life Cycle Analysis and Life Cycle Costing aspects since the early design stages; and
vi) adoption of recycled permanent magnets and circularity solutions.

EM-TECH obtained the support of several car makers (AUDI AG and Changan UK R&D Centre Ltd) as well as a Tier 1 supplier (PUNCH Turino S.p.A.), which will strengthen the exploitation strategy.

We are very much looking forward to the cooperation.

Facts

Funding scheme: HORIZON-CL5-2022-D5-01-09
Status: Project start by January 1st, 2023
Duration: 3 years
Consortium: 10 partners
Total budget: approx. 4.920 k€
Coordinator: AVL List GmbH

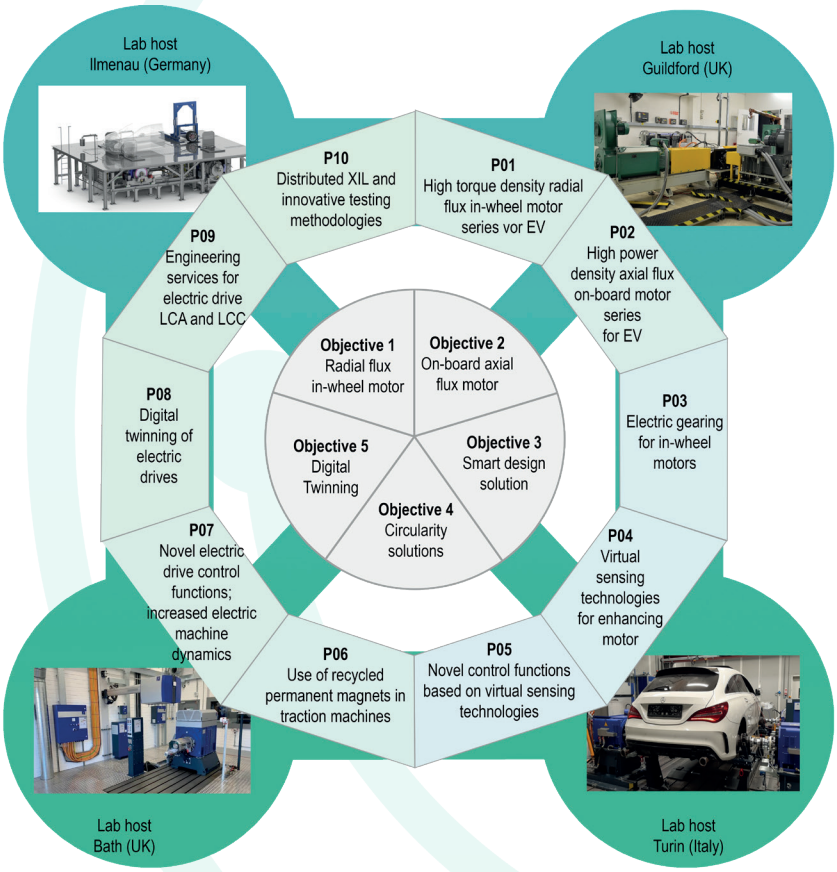
EM-TECH Partners

The EM-TECH consortium partners are:

1. AVL List GmbH
2. Technical University of Ilmenau
3. Politecnico di Torino
4. Elaphe Pogonske Tehnologije Doo
5. Vaionic Technologies GmbH
6. Ideas & Motion SRL
7. UrbanGold GmbH
8. Armengaud Innovate GmbH
9. University of Surrey
10. University of Bath

EM-TECH overall approach

The proposed innovations will be implemented in new series of radial flux direct drive in-wheel motors characterised by so far unexplored levels of torque density (>150 Nm/litre, >50 Nm/kg), and on-board single stator double rotor type ironless axial flux machines providing power density and specific power levels in excess of 30 kW/litre and 10 kW/kg. The solutions will address both passenger car and van applications (continuous power levels of 50 kW - 120 kW), providing competitive costs (<6 Euro/kg for a production of 100000 units/year), and leading to significant reduction of motor energy loss during real vehicle operation (>25%), and to >60% decrease of the rare earth content, including implementation of magnet recycling solutions.



Target Potential Customers and Users

- *End Users*
- *OEMs*
- *Tier 1-2 suppliers, automotive engineering companies*
- *SMEs*
- *Research Sector*
- *Policy makers and public authorities*

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Funded by the European Union under grant agreement No 101096083. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Climate, Infrastructure and Environment Executive Agency (CINEA). Neither the European Union nor CINEA can be held responsible for them.

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