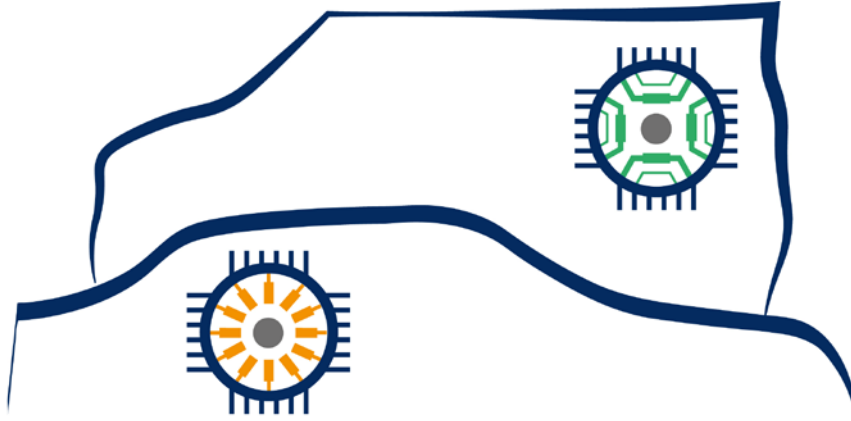




## Rare Earth Free e-Drives Featuring Low Cost Manufacturing



# ReFreeDrive

Collaborative Project

Grant Agreement Number 770143

Start date of the project: 1<sup>st</sup> October 2017, Duration: 36 months

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 770143

**Deliverable no.:** 2.3  
**Title of the deliverable:** Functional subsystems Full Technical Specifications

<b>Contractual Date of Delivery:</b>	<b>28/02/2018 (new deadline 18/04/2018)</b>
<b>Actual Date of Delivery:</b>	<b>12/03/2018</b>
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<b>Work package contributing to the deliverable:</b>	<b>WP2</b>
<b>Nature:</b>	<b>Report (Confidential)</b>
<b>Version:</b>	<b>7.0 (Final reworked)</b>

## Abbreviations

**ABS:** Anti Brake-locking System  
**ASR:** Anti Spin Regulation  
**BAS:** Brake Assist  
**BMS:** Battery Management System  
**CAN:** Controller Area Network  
**DC:** Direct Current  
**EBV:** Elektronische BremskraftVerteilung (Electronic brake-power distribution)  
**ESP:** Electronic Stability Control  
**EU:** European Union  
**EV:** Electric Vehicle  
**HMI:** Human Machine Interface  
**HV:** High Voltage  
**ICE:** Internal Combustion Engine  
**IM:** Induction Motor  
**KPI:** Key Performance Indicator  
**LCD:** Liquid-Crystal Display  
**LS:** Load Surface  
**LV:** Load Volume  
**LV:** Low Voltage  
**LWB:** Long Wheel Base  
**MPV:** Multi Purpose Vehicle  
**MS:** Milestone  
**MSD:** Material Safety Data  
**MWB:** Medium Wheel Base  
**OBC:** On Board Charger  
**OEM:** Original Equipment Manufacturer  
**PC:** Payload Capacity  
**RDO:** Rear Door Opening  
**SynRel:** Synchronous Reluctance  
**UNECE:** United Nations Economic Commission for Europe  
**VCU:** Vehicle Control Unit  
**WP:** Work Package

## Executive Summary

WP2 has defined the boundary conditions for the motor development and tests:

- Identifying measurable Motors' Key Performance Indicators (KPI) to correspond with the vehicles performances and main equipment's requirements (Driving Cycle definition) necessary for the development and layout definition of powertrain per application to correspond with the State of the Art.
- Listing vehicle-system's and all the functional subsystems' components needed to design and realize the appropriate powertrains to be integrated in the vehicles in order to respond to initial KPI and requirements.

Task 2.3 (*Powertrain subsystems and powertrain integration level definition: Technical Specifications*) aims at setting a full technical specification of the powertrain per Track application (75 kW or 200 kW) in order to define each powertrain subsystem to be developed/integrated.

For each functional subsystem, each OEM, final user and design partner have defined the technical specifications concerning the subsystem it is responsible of, and considering the KPIs resulted in Task 2.1.

D2.3 is divided in three main sections. In section 1 (*Vehicle Model selection*) the vehicle model for each targeted power (75 and 200 kW) has been selected (Figure 1). To take the best choice the different features have been considered, such as, the dimensional study for new components housing and integration, new components weights and distribution, chassis characteristics, drivetrain characteristics, accessibility, etc. Taking into consideration D2.1 and D.2.2 PRI have already selected the Mercedes Sprinter 311 CDI as the 75-KW vehicle. The 200-kW vehicles proposed by JLR is the Jaguar XJ



Figure 1: Selected vehicle model for each targeted power

Section 2 (*In vehicle integration level*) describes the procedure to carry out during the in-vehicle integration phase of the project, in order to define the framework for the definition of the subsystems technical specifications.



Finally, section 3 (*Subsystem technical specifications*) defines all the technical specifications for each subsystem to achieve the expected vehicle performance level (**ReFreeDrive Boundary Conditions – MS1**).

Finally, section 3 (*Subsystem technical specifications*) defines all the technical specifications for each subsystem to achieve the expected vehicle performance level (This section will meet the first project milestone: **ReFreeDrive Boundary Conditions – MS1**).

In D2.3 there have been no deviations in content or time from the deliverable objectives set out in the ReFreeDrive Grant Agreement.

This deliverable has defined the requirements and specifications for the induction machine design (WP3), the synchronous reluctance design (WP4) and the power electronics design (WP5).