



## DELIVERABLE REPORT

DELIVERABLE N<sup>0</sup>: **D3.3**

DISSEMINATION LEVEL: **RESTRICTED**

TITLE: **DEMONSTRATOR OF A CONFIGURABLE ELECTRIC TRAILER  
DRIVELINE RUNNING IN THE TRAILER**

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VERSION: **FINAL 1.0**

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PROJECT TYPE: **THEME 7 TRANSPORT – SST GC.SST.2012.1-5: INTEGRATION AND  
OPTIMISATION OF RANGE EXTENDERS ON ELECTRIC VEHICLES**

PROJECT ACRONYM: **TRANSFORMERS**

PROJECT TITLE: **CONFIGURABLE AND ADAPTABLE TRUCKS AND TRAILERS FOR  
OPTIMAL TRANSPORT EFFICIENCY**

PROJECT START DATE: **01/09/2013**

PROJECT WEBSITE: **WWW.TRANSFORMERS-PROJECT.EU**

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## Executive summary

The objective of the EU-funded project TRANSFORMERS is to demonstrate highly efficient truck-trailer concepts for long-haulage applications. Therefore, TRANSFORMERS combines a modular approach for mission rightsizing by means of hybridization, truck engine downsizing and a trailer design that addresses simultaneously aerodynamics and load efficiency improvements. The overall goal is to achieve a 25% higher load efficiency (in energy/km.tn) in a real world application, while taking the needs to maintain road infrastructure and traffic safety into account.

A key innovation of TRANSFORMERS is the so-called Hybrid-on-Demand-Driveline (HoD-Driveline). For the first time, this system enables an augmentation of conventionally driven trucks and tractors to fully functional mission-adaptable hybrid vehicles, simply by coupling them to an innovative trailer equipped with an electric driveline. Hence, the HoD-Driveline concept is applicable to many kinds of truck-trailer combinations.

In addition to the HoD-Driveline concept TRANSFORMERS has developed a pre-standard HoD-Framework. The objective of this framework is

- to ensure the interoperability of the HoD-Driveline concept with today's and with future trucks featuring advanced energy management capabilities,
- to provide a slim common interface between trucks and trailers, that requires only minimal changes in trucks.

Deliverable D3.2 provides a first holistic draft of the Hybrid-on-Demand Framework including

- Specification of the logical and E/E-architecture of the HoD-Driveline,
- Specification of the involved interfaces, and
- Specification of the functions of affected electronic control units.

Based on these specifications Deliverable D3.3 provides a running, fully electric driveline within a semitrailer. The combination with the truck is not considered, yet. The key achievements of this deliverable are:

- Battery installed in battery housing as self-contained ESU system including cooling/heating, controller, and communication interfaces
- ESU system, EMG, EMG inverter, and clutch mechanically installed in the trailer
- System control units for EMG, Battery, and overall energy management are
- Wiring and individual test of all components
- Implementation of controller software for EMG-ECU, ESU-ECU, and TDMS
- Complete electric trailer driveline tested in the trailer

During demonstrator development the HoD-Framework was continuously refined. Primarily, the changes affected the interfaces defined in D3.2. Several additional signals were added e.g. due to certain safety requirements. An updated HoD-Framework description will be provided at the end of the project.

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[http://cordis.europa.eu/fp7/cooperation/home\\_en.html](http://cordis.europa.eu/fp7/cooperation/home_en.html)

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