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**www.volvo.com**  
Sweden



**www.daf.com**  
Netherlands



**www.daimler.com**  
Germany

## TRAILER MANUFACTURERS:



**www.cargobull.com**  
Germany



**www.vaneckgroup.nl**  
Netherlands

## END USERS:



**www.pg.com**  
Belgium



**www.iru.org**  
Belgium

## SUPPLIER:



**www.bosch.com**  
Germany

## RESEARCH INSTITUTES:



**www.fraunhofer.de**  
Germany



**www.v2c2.at**  
Austria



**www.ifsttar.fr**  
France



**www.fehrl.org**  
Belgium



**www.tno.nl**  
Netherlands

## SERVICE SUPPLIER:



**www.uniresearch.com**  
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**Full name:**

Configurable and Adaptable Trucks and Trailers for Optimal Transport Efficiency

**Acronym:**

TRANSFORMERS

**Duration:**

42 months

**Start date:**

1 September 2013

**Total budget:**

8.0 M€

**EC Funding:**

5.2 M€

## CONTACT

Configurable and Adaptable  
Trucks and Trailers for  
Optimal Transport Efficiency

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## BACKGROUND

Today trucks and load carriers are designed and optimised towards a limited variance set of usage and for maximum payload.

In the future there will be an increasing need for optimised load efficiency for each mission of a truck, and for optimising the freight carried on a finite length of road.

Ideally, future trucks and load carriers are easily adaptable for each freight, load and mission.

And, in the operation phase, the vehicle combination automatically adjusts itself to the actual driving environment (i.e. traffic situation, topology, and payload).

This option has large potential to contribute to the achievement of the European Commission's targets for reducing the consumption of fossil energy resources, increasing transport- and fuel efficiency and reduction of greenhouse gas emissions.

# TRANSFORMERS

## OBJECTIVES

- Develop and demonstrate an innovative tractor-semitrailer with a configurable distributed electric Hybrid-on-Demand driveline in the (semi)trailer
- Develop a pre-standard framework for the electric Hybrid-on-Demand driveline concept
- Develop and first-time demonstration of a tractor semitrailer vehicle featuring a distributed hybrid driveline including an electrically driven semitrailers
- Develop toolbox with aerodynamic devices / technologies including guideline for selecting options, and demonstrate devices as part of the total vehicle demonstrations
- Develop toolbox with load – and loading efficiency devices / technologies including guideline for selecting options, and demonstrate devices as part of the total vehicle demonstrations

## RESULT

The overall aim of the TRANSFORMERS project is to develop and demonstrate innovative and energy efficient trucks and load carriers for long distance transport assignments with an improved load efficiency leading to an overall 25% less energy consumption on a ton.km basis, with the below split to achieve this:

- Fuel consumption reduction of 18%  
8% by the Hybrid-on-Demand driveline  
2% by the downsize of the engine  
8% by the mission-based configurable aerodynamic toolbox
- Load efficiency of 10%

The resulting improvement on energy consumption  $i_e$  [%] is calculated by:

$$i_e = 100 \left( 1 - \frac{100 - i_f}{100 + i_l} \right)$$

with  $i_f$  the improvement on fuel consumption [%] and  $i_l$  the improvement on load efficiency [%].

The relationship of reduced fuel consumption and increased load efficiency is shown in this figure. Thus, by reducing the fuel consumption by 18 % and simultaneously increasing the load efficiency by 10 %, the outcome of TRANSFORMERS is estimated to achieve approx. 25.5 % less energy consumption per ton.km compared to a state-of-the-art truck-(semi)trailer.

TRANSFORMERS focuses on achieving these key innovations within the existing European legal and regulatory framework in terms of dimensions, weight and loads.

