Aerodynamic and Flexible Trucks for Next Generation of Long Distance Road Transport

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Goal and objectives

**Goal**

Develop and demonstrate new technologies, concepts and architectures for complete vehicles meeting future logistics and co-modality needs.

**Boundaries & Constraints**

of the European freight transport market, the drivers, the constraints, the trends, and the mode and vehicle choice criteria.

**Technologies and Innovations**

New concepts and technologies for trucks with reduced drag, which are safer, comfortable, configurable and cost effective and ensure satisfaction of customer needs under varying transport tasks and conditions.

**18-33% Efficiency Improvement Long Haul**

**Demonstration and impact assessment**

of potential truck aerodynamics and energy management improvements.

**Recommendations**

for revising standards and legislative frameworks in order to allow the new aerodynamic and flexible vehicle concepts on the road.
Project overview

- **Budget**: €11,5 Mio.
- **23 partners from Industry, Research, Logistics, Technical Services**
- **58 Sounding Board members**
Our contribution to 30% more efficiency and 30% less GHG emissions in road transport

- **Vehicle concepts**
  - EMS provides potential for significant contribution to efficiency targets

- **Logistics operations**
  - Low and high density goods; long and short haulage
  - Consolidation of freight (precondition)

- **Transformation** of the assets (semi-trailers, boxes, wagons, cranes, locomotives) into **smart devices** (Physical Internet)

- **Smart Infrastructure Access Policies (SIAP)** for optimal matching of novel vehicle concepts and infrastructure is **highly important**
4–5% energy saving by separate platforms

4–6% energy saving by using loading space more effectively

5–12% energy efficiency improvement from the integration of more flexible, advanced powertrains

5–10% reduction in energy consumption through improved truck aerodynamics

Standardised interfaces and the resulting sharing of components leading to higher economies of scale

Front end designs to ensure survivability in crashes up to 50 km/h for occupants and vulnerable road users
Smart Loading Units

Combine heavy weight with light weight to fill both volume and weight!

- Intermodal Truck +dolly+container+chassis
- 1 x C 7,82 2x 20 ft container

Demonstrator Truck +Dolly+ VEG trailer

PUZZLE
Hybrid Distributed Powertrain

- Develop an electrically driven dolly
- Build of a EMS demo vehicle incl. the e-dolly and an electrified trailer (trailer provided by Transformers project)
Aerodynamic Features for the Complete Vehicle

- Active and passive aerodynamic features;
- simulations by CFD and wind tunnel and vehicle for demonstration
Transform complexity into sustainable pillars

- The road vehicle
- The rail wagon
- The vessel
- Infrastructure as a whole (Rail road water air)
- Regulatory framework (Legislation & Standards)
- Loading Units
- Operations
- Enforcement and Awarding

E2E Logistics
Pathway dependency on open legislative framework

<table>
<thead>
<tr>
<th>Recommendations for smart standards</th>
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<td>Proven logistics capabilities of future trucks</td>
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<td>Proven efficiency of future trucks</td>
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<td>Proven concepts and smart standards for future trucks</td>
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**Roadmap for implementation of concepts and standards**

- **2020**: Introduction of AEROFLEX concepts and smart standards
- **2025**: Large scale roll-out of concepts and standards
- **2030**: Efficiency by 30% achieved and proven

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**Key Milestones**

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Outlook 2019 and invitation to join us

Sounding Board members involved

- KoM: 36
- HVTT: 58
- 2019: ???

New SB members still welcome
The research leading to these results has received funding from the European Union.