

REDUCTION

Reducing Environmental Footprint based on Multi-Modal Fleet management System for Eco-Routing and Driver Behaviour Adaptation



REDUCTION focuses on advanced solutions that combine vehicular technologies with information and communication technologies for the management of multi-modal fleets, in order to reduce their environmental footprint.

At a Glance

Project acronym:

REDUCTION

Project type:

Specific Targeted Research Project (STREP)

Programme:

7th EU Framework Programme

Project coordinator:

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Project partners:

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University of Thessaly (GR), Aalborg
University (DK), Aarhus University (DK),
Delphi Delco electronics GmbH (DE),
Trinité Automatisering B.V. (NL),
Nordjyllands Trafikselskab-Bektra (DK),
TrainOSE S.A. (GR), CTL Cyprus
Transport Logistics Limited (CY)

Start date: Sep 1, 2011

End date: Aug 31, 2014

Total cost: € 3,971,742

EU funding: € 2,800,000

Objectives

REDUCTION aims at combining vehicular and ICT technologies for collecting and analyzing historic and real-time data about driving behaviour, routing information, and the associated carbon emissions measurements. REDUCTION sets the objectives:

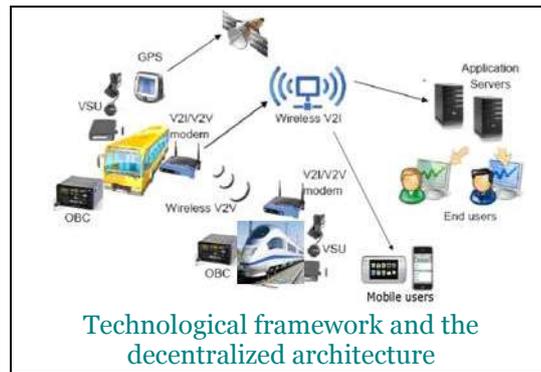
- *Optimizing driving behaviour* through effective decision making for the enhancement of drivers' education and the formation of effective policies about optimal traffic operations (speeding, braking, etc.), based on the analytical results over the data that associate driving-behaviour patterns with CO₂ emissions.
- *Eco-routing* for suggesting most environmental-friendly routes that reduce overall mileage and CO₂ emissions.
- *Multi-modality* that allows fleets operating based on various transport modes and take decisions about how to: i) balance capacity within and throughout modes of transport, ii) reduce their environmental footprint by comparing consumption data and alternative routing information that involve mode changing, iii) develop efficient driver policies for their entire set of vehicles and not only for isolated modes.

Approach

REDUCTION follows an interdisciplinary approach bringing together expertise from several communities, such as: Data collection and management, which will develop the mechanisms for handling the large volumes of streaming data; Data Mining/Machine Learning, which will be responsible for developing decentralized algorithms for predictive analytics; Wireless Networks, for developing protocols for effective vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communications; Vehicle electronics, which will develop the on board computing and sensor devices; Transportation engineering, which will be involved in the evaluation of the system and the data generated during the field-trials.

REDUCTION will develop powerful methodologies for providing predictive analytics based on advanced data mining technology, which will reveal patterns and useful information for meeting the objectives of fleet management, such as decision making for driver-adaption, eco-routing, and thus CO2 emissions control and improved fuel economy. Web-based access will be provided to clients of the provided service, in order to provide explanatory reports, based on graphical visualizations, about the discovered knowledge and for providing rapid alerting information that enables monitoring the performance of the fleets. Finally, the REDUCTION platform will provide appropriate interfaces to intelligent mobile devices (e.g., smartphones, netbooks) in order to enable public user - e.g., passenger - applications leverage the information residing in the platform.

An overview of the technological framework adopted by REDUCTION is depicted in the figure.



DESCRIPTION OF WORK

REDUCTION will run for 36 months involving 3 phases:

- Phase 1: project take-up and building an initial prototype tested in the first field trials (M1-M18).
- Phase 2: building an advanced prototype evaluated in the second field trials in terms of real-world situations (M18-M32)
- Phase 3: building a ready-to-market product (M32-M36).

Expected results

The expected outputs of REDUCTION are:

- Innovations enabling logistics and freight in EU to offer advanced services at large scale aiming at reduction of environmental footprint of the transportation sector.
- Predictive algorithms running in a novel decentralized V2V/V2I framework.
- Evaluation methodologies and an impact analysis based on field-trials with EU fleets.
- Scientific papers, contributions to standardisation bodies, and new transport-related services.

For further information:

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