**Optimal route and speed (3D navigation) for minimising fuel consumption of trucks**

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**Background**

Drivers and logistics companies traditionally use GPS for route advice. A two-dimensional route is selected mainly based on the distance and traffic condition. The influencing factors on vehicle fuel consumption can be broadly categorised into road related (e.g. geometry, pavement), traffic related (e.g. speed), vehicle related (e.g. tyre, engine) and weather related (e.g. temperature, wind). Road gradient and pavement-tyre interaction have significant effects on fuel consumption, and thus should be taken into account in vehicle route choice.

**Aim and Scope**

This project is to establish numerical relationships between road and pavement with vehicle fuel consumption, to develop, test and evaluate a model and simulation tool of such relationships, with solutions and strategies to reduce fuel consumption. This study will review state-of-the-art literature on the modelling of vehicle resistance; it will take findings from on-going (e.g. optiTruck) as well as recently completed projects (e.g. ECRPD (Energy Conservation in Road Pavement Design, management and utilisation) and MIRIAM (Models for rolling resistance In Road Infrastructure Asset Management Systems)). It will devise a method to integrate the findings to existing route optimisation framework. The outputs aim to help to significantly reduce the fuel consumption of long distance trucks.

This project will identify a case study to demonstrate the usefulness of the tool. The case study could cover one or more of (but not limited to) the following areas:

* Route planning: to enhance the connection between nodes, not only at the congested nodes but over the entire network;
* Dynamic routing: to enhance the feedback loops which are lacking in the current architectures and systems of global logistics, to allow for deviation management and corrective and preventive actions;
* Life cycle assessment (LCA) of roads: to expand the boundary of road LCA studies such that use phase impacts (i.e. traffic emissions) can be included;

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