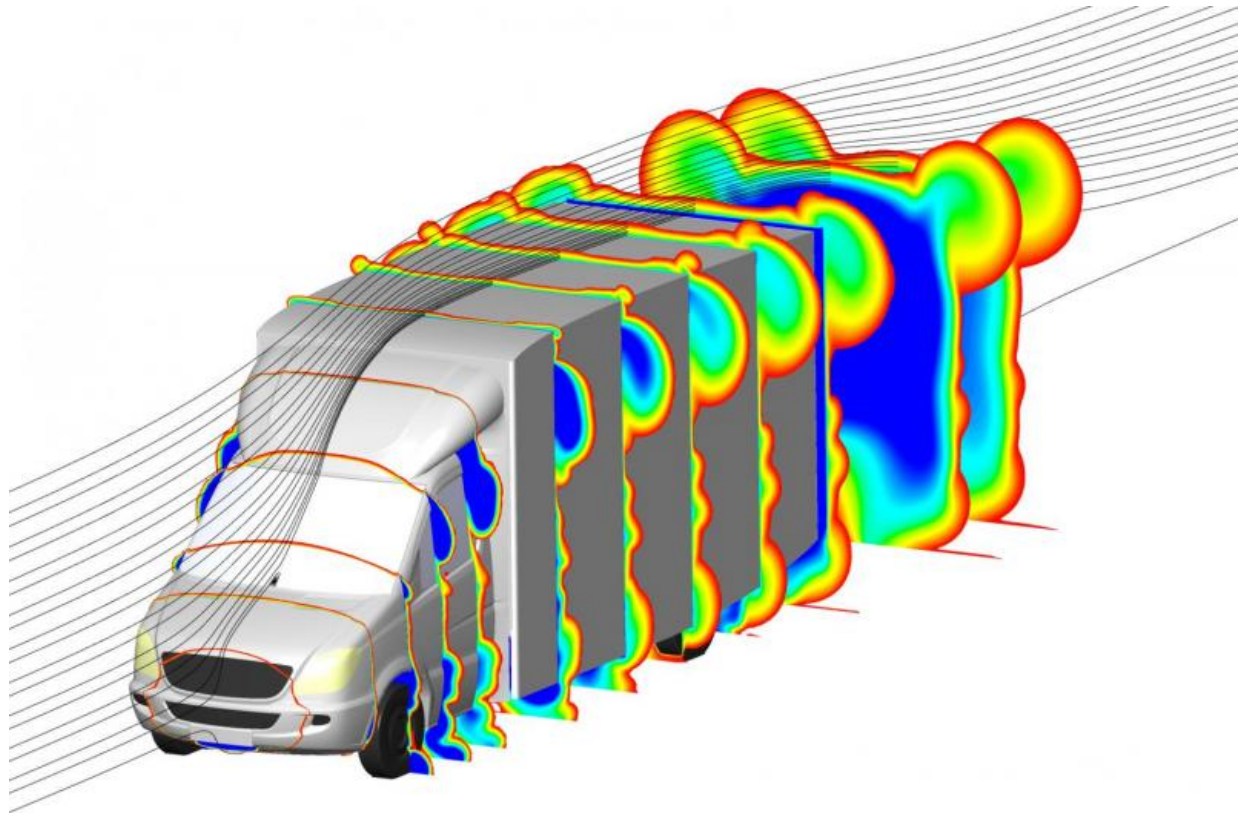


Transport vehicles of the future

February 19 2016



Credit: Simulaton made by Petter Ekman at the National Supercomputer Centre (NSC) at Linköping University

Emissions from the transport sector can be drastically reduced with more streamlined trucks. Researchers at Linköping University have calculated, and road carrier owner Erik Alfredsson has built an initial version of the

transport vehicle of the future. The results have also been published in connection with the 2015 and 2016 SAE World Congress.

More and more goods are being transported on the roads; despite all the ambitious environmental goals and [environmental policies](#), the number of light trucks in Sweden have increased by 33 percent – and the emissions from them have more than doubled over the last 15 years.

But there is a light at the end of the tunnel for everyone worried about the climate and the environment. Erik Alfredsson, owner of Alfredssons Transport AB in Norrköping, today has 55 both light and heavy vehicles in his fleet; they've been running free of [fossil fuels](#) for two months. The vehicles run on HVO 100, a synthetic biodiesel that is produced from such things as offal.

For a few years now, he's also been working intensely with Professor Matts Karlsson and his doctoral student Petter Ekman from the Division for of Applied Thermodynamics & Fluid Mechanics in at the Department of Management and Engineering. The goal is to bring down fuel consumption through reducing [air resistance](#). Using advanced computer calculations at National Supercomputer Centre (NSC) at Linköping University LiU's National Super Computer Centre, they have produced a body profile for a light truck in which air resistance is substantially reduced without decreasing its carrying capacity.

Mr Alfredsson has had the vehicle built. The base is a traditional Mercedes light truck that has been given self-supporting floors and new, lighter material in parts of the body. The forms box hasve been rounded off; all sharp corners and edges are gone, the wheels have been partially enclosed and the roof has a slight, gentle slope backwards like a wing. Over the 90,000 kilometers the truck has travelled so far, its fuel consumption has decreased by at least 12 percent compared to the same vehicle with a traditional body. On average, it consumes approximately

9.1L of biodiesel per 100 km and can load up to 950 kg.

"The environment is important, and it requires us to constantly develop and think in new ways," Mr Alfredsson says.

That's why he wants to go further – what works on a small truck should also work on the bigger ones.

"Here, the problem is that no one has total responsibility: the truck is manufactured in one place, the addition in another, and the trailer in a third. What Volvo, Scania and other vehicle manufacturers do to bring down fuel consumption in the vehicle is quickly eaten up by the large, angular cabinet the vehicle is supposed to pull," he states.

The way forward is an issue of collaboration; the work is under way and the ideas are flowing. Contact has been established between Professor Karlsson and his research team, Mr Alfredsson as a road carrier owner, a company that builds the cabinets that sit on the back of the trucks, another that builds trailers, and finally a company that is developing a system in which drivers' competence can be assessed. The drivers can compete both against themselves and each other in handling the vehicle as efficiently as possible, [fuel consumption](#) and tire wear included

There is certainly vast amounts of fuel to save by reducing air resistance as much as possible. Air resistance is responsible for a full 30 percent of the total energy consumption; heavy trucks are teeming with 'energy thieves'. For Professor Karlsson and Mr Ekman, there is only one problem:

"Everyone is talking about the environment, the goals of going fossil fuel-free and lower carbon dioxide emissions from the transport sector are ambitions both in Sweden and in the EU. But when you get down to it, there is almost no research and very little research funds to apply for in

heavy [vehicle](#) development," says Professor Karlsson.

"And I wonder how many transport clients really live up to their own environmental policy – that's something you should research at LiU," Mr Alfredsson says.

More information: Aerodynamic Drag Reduction of a Light Truck – from Conceptual Design to Full Scale Road Tests.

papers.sae.org/2016-01-1594/

Aerodynamic Drag Reduction - from Conceptual Design on a Simplified Generic Model to Full-Scale Road Tests. [DOI: 10.4271/2015-01-1543](https://doi.org/10.4271/2015-01-1543)

Provided by Linköping University

Citation: Transport vehicles of the future (2016, February 19) retrieved 26 June 2024 from <https://phys.org/news/2016-02-vehicles-future.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.