

# KONVOI: Electronically coupled truck convoys

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## Abstract

KONVOI is an interdisciplinary project that is being conducted at the RWTH University Aachen. It investigates electronically coupled truck convoys. A convoy consists of up to five vehicles, whereupon the first driver operates manually, while the other vehicles follow fully automatic (lateral and longitudinal guidance). Coupling and decoupling take place while driving on the highway as well as manoeuvres such as lane changes can be executed in the coupled mode. During the automation, the driver is entrusted with the monitoring of the system and must take over the vehicle guidance in some situations (e.g. construction areas). Automation however, can possibly lead to changes in workload and performance, which had to be investigated due to safety concerns. In a simulator experiment, the Institute of Psychology at the RWTH University examined the demand of the driver's mental workload as well as their driving performance in comparing the usage of the KONVOI-system and manual driving. The results in subjective RSME ratings, objective lane keeping (SDLP) and following behaviour (THW) showed no critical changes through the automation.

## Introduction

Since the idea of electronically coupled vehicles was introduced with the PROMETHEUS-Project (Program for European Traffic with Highest Efficiency and Unprecedented Safety) in 1988 and the development of the automated highway system (AHS) in the United States, research on this subject has come a long way. For a couple of years, an interdisciplinary project-group at the Rheinisch-Westfälischen Technischen Hochschule Aachen (RWTH University Aachen), funded by the German Ministry for Education and Research (BMBF) and in association with various partners from industries and businesses, have been working to realize simulator and on-the-road testing of electronically coupled truck convoys. The concept has been established through the EFAS- and MFG-projects, while the testing of the automation is occurring within the KONVOI project.

The KONVOI-system requires the first driver of a convoy of a maximum of 5 vehicles to manually control his truck, while the ones behind are connected through an "electronic drawbar" following fully automatic. It is designed to be used on the highway system (Autobahn), when individual truck drivers occasionally meet and head in the same direction for a long period of time.

In D. de Waard, F.O. Flemisch, B. Lorenz, H. Oberheid, and K.A. Brookhuis (Eds.) (2008), *Human Factors for assistance and automation* (pp. 243 - 256). Maastricht, the Netherlands: Shaker Publishing.