SARTRE Report Summary

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Periodic Report Summary 2 - SARTRE (Safe road trains for the environment; developing strategies and technologies to allow vehicle platoons to operate on normal public highways ...)

Project context and objectives:

The SARTRE project is exploring the challenges and some of the potential strategies that will enable road trains (i.e. platoons) of mixed vehicle types (e.g. trucks and cars) to operate on public highways (i.e. motorways) without requiring any infrastructure changes and with full interaction with other road users. The lead vehicle of a platoon will have a professionally trained driver who has additional platoon specific training. Following vehicles within the platoon will be autonomously controlled, following instructions received from the lead platoon vehicle.

Through the development of platoon systems and concepts the project aims to demonstrate some core concepts of platooning leading to an eventual step change in transport usage. The benefits are expected to address congestion, environmental and road safety challenges as well as providing added convenience for platoon users who would be able to utilise their time more effectively.

The project is analysing platooning concepts and strategies and also implementing a subset of these in a demonstrator consisting of 2 trucks and 3 cars. The demonstrator is targeting use of existing (rather than developing new) sensors and actuators. The demonstration will also include a back office assistant that will allow 'navigate to platoon' to be demonstrated. This function is an aspect of a paid for service where the lead vehicle owners benefit commercially from leading a platoon of vehicles. The service thus needs to ensure 'clients' are able to find and join a platoon when required. The project will include assessments of a business model and specific human factors criteria that may affect the successful adoption of platoons.

Project results:

The SARTRE project is a Seventh Framework Project (FP7) which aims to develop strategies and technologies to allow vehicle platoons to operate on normal public highways with significant environmental, safety and comfort benefits.

The overall concept of SARTRE is to have a group of vehicles driving together with a lead vehicle, driven normally by a trained professional driver, and several following vehicles driven fully automatically by the system with small longitudinal gaps between them. Driving in this way in a platoon brings benefits in fuel consumption, safety and driver convenience. In addition to investigating the concept, a demonstrator system has been developed consisting of 5 vehicles: a lead truck, a following truck, and 3 following cars. An off-board system has also been developed to allow a potential SARTRE driver to find, and navigate to, a suitable platoon, although this has not been fully integrated into the vehicle system. The project has investigated the human factors aspects of platooning from the point of view of the lead driver, the following drivers, and the other road users. Safety analyses have been carried out on the system considering not only the effects of potential faults, but also the effects of potential misinterpretation by a driver as well as deliberate malicious actions by third parties.
The demonstration system has been successfully tested on test tracks and public motorways, and demonstrated to industry stakeholders as well as members of the press. Using these vehicles, the fuel consumption benefits of platooning have been measured.

The commercial viability of product offerings based on platooning has been studied, looking at the different range of options for trucks and for cars. The policies which would be affected by platooning of automated vehicles have been outlined.

Potential impact:

We believe that platoons could encourage national changes on how the cost of the highway can be paid. This is not a necessary change but an optional improvement that platoons could encourage. Regarding the road maintenance concerns, the road is actually worn out by every vehicle that passes, without any time input, so no modification would be needed.

Another important aspect of the project was the effect on the environment. The project attempted to achieve a reduction in fuel consumption which is directly linked to a reduction in the gases emitted to the atmosphere. Projects based on sustainability are gaining an increasing interest at a worldwide scale and during the project emission reductions were encountered when taking advantage of the aerodynamic benefits of platooning. It was decided that the best way to understand the impact that this project could have on the environment was to carry out a numerical example that supplies the reader with realistic values concerning the emission reductions that are achieved in platooning. The total accumulated amount of carbon dioxide equivalent (CO2eq) reduced from the 3 vehicles in the example, would be approximately 3 tonnes per year.

In conclusion, only the road side barriers can be considered to be not optimised to absorb the impact of a platoon. Regarding the environment a truck can save up to 2.8 tons of CO2eq in a single year and a car up to 0.1 tons simply by platooning.

List of websites: [http://www.sartre-project.eu](http://www.sartre-project.eu)

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