Intelligent Vehicles at the starting line for safer roads and improved traffic flow

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Credit: AI-generated image (disclaimer)

A milestone in the ADAPTIVE project was recently reached, with the announcement that its demonstrator vehicles had all been successfully equipped and are now ready for test scenarios. Eight vehicles in all, seven passenger cars and one truck, were fitted with their respective hardware.

The project has set out to enhance the performance of automated vehicles by developing new functionality, which through improved traffic safety and circulation efficiency will help to bolster wider public acceptance of driverless vehicles.

Developing a range of automated driving functions for daily traffic

Following the 'shared control' approach, ADAPTIVE seeks to optimise interaction between drivers and automated technologies using a variety of systems including vehicle-to-vehicle (V2V) interaction, obstacle sensors and technologies responding to driver status. The project will test four of the six SAE (Society of Automotive Engineers) levels of automation namely: assisted, partial, conditional and high automation. The eight demonstrator vehicles range from city cars to larger passenger cars, along with one heavy goods truck.

The vehicles share a number of automation functionalities including an electric steering wheel for lateral manoeuvres; driveline and brake control for longitudinal manoeuvres; forward looking long range radar; a forward looking camera; 360 degree sensors; and modified Human Machine Interface (HMI) designs. Having common features enable lessons to be learned about risk, ergonomics, fault-tolerance, and human factors such as driver behavior, with Information and Communications Technology (ICT) key to the functioning of the system.

Creating an enabling environment

With the design phase complete, the project now moves towards trial and evaluation of the technology. The testing will involve three scenarios. Close distance testing will include manoeuvring for parking or in crowded environments, at speeds of under 30 km/h, with the

challenge being that the sensors and algorithms required first need to be developed. Urban scenarios will involve testing with a range of everyday traffic hazards at speeds of 10 to 70 km/h, with challenges coming from the complexity of the environment and density of traffic. Highway scenarios will have vehicles travelling up to 130 km/h and will test manoeuvres such as lane changes and traffic filtering, with challenges around optimising fault tolerant.

As current Advanced Driver Assistance Systems (ADAS) evaluation methods do not adequately extend to automated driving, the project will also develop new evaluation methods. An impact assessment will be conducted at the pan-European level.

The successful introduction of automated systems into the European market will also require an enabling legal framework.

Currently the law is predicated on safe driving being the responsibility of the driver. However automated systems call this into question. Therefore, ADAPTIVE is also examining issues such as road traffic laws and liability, as well as those around data privacy and data security. The project will review the legal framework in a number of EU Member States as well as the United States, identifying implications for manufacturers and drivers, recommending any necessary changes in regulation.

By evaluating safety and traffic flow, the technology and driver behaviour, as well as legal aspects, ADAPTIVE, with the the use of its newly fitted demonstrator vehicles, will significantly help position European industries at the forefront of Intelligent Vehicles design, which promises to open a major new market in the automotive industries.

More information: For more information, see www.adaptive-ip.eu/

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