“Ageing populations, reducing CO₂ emissions and improving road safety are the main drivers for developing new driver assistance systems. Now after introducing a number of these solutions to the market, AdaptIVe is taking the next step toward the development of automated driving applications for daily traffic while considering the needs of new generations of drivers.

With the AdaptIVe applications, vehicles will react more effectively to external threats, will be resilient to different types of human and machine errors and dynamically adapt the level of automation according to the current situation.

Response & Scrutinise legal aspects

Today’s legal framework for automated driving is based on the premise that safe driving is the driver’s sole responsibility. With a move towards automation in driving, controllability by the driver at all times may no longer be a basic design criterion. The requirements set up by the legal framework must provide answers for the implications of this fundamental change. To avoid inconsistent terminology, the project is defining a classification scheme for automated systems and typical scenarios that can occur when using an automated driving system. Legal questions will be raised based on this naming scheme. AdaptIVe comprehensively reviews the current legal frameworks in various EU member states and assesses their applicability to automated systems. The review will also cover current activities in the United States. The examination of the legal framework will detail the relevant aspects found during the review.

Human factors Define modes of cooperation

As long as there are no fully autonomous vehicles, systems must always interact with humans at different times and to varying degrees. AdaptIVe investigates the best modes of cooperation between drivers and automated applications in different scenarios. The system design takes into account diverse intentions and actions. AdaptIVe provides guidelines that specify how, when and where information, signals and interventions should be implemented. Guidelines for the interface and signals, regardless of product type, will be provided for the development of the various functions.

New methods Evaluate automated driving

Existing evaluation methods for Advanced Driver Assistance Systems (ADAS) do not cover the requirements for the evaluation of automated driving functions. Therefore, new comprehensive approaches and test methods are required. AdaptIVe defines specific evaluation methodologies for automated driving functions.

In a demonstration framework, the test and evaluation framework considers the technical, user-related and in-traffic behavior evaluation as well as an impact analysis focused on safety and traffic efficiency. Thereby, the framework includes a specification of methodologies, test procedures, key indicators and test design, together with applicable test tools. The impact analysis is being conducted with a pan-European perspective. Ultimately, the framework and new methodologies will be applied to a set of selected representative functions in order to verify and validate the developed evaluation approaches.
AdaptIVe // Improve automated driving

With 28 partners from all over Europe and 25 million euros budget, AdaptIVe is advancing the technical performance of automated driving systems for cars and trucks. Taking automation to higher levels, the results of AdaptIVe support the goals of making driving safer and more comfortable and of reducing congestion and fuel consumption.

AdaptIVe will combine sensor data, maps and communication, based on ITS G5. Accordingly, AdaptIVe improves the interaction between driver and vehicle, increasing user acceptance of automated systems. Guidelines for how to design and implement the driver–vehicle interaction are provided to achieve collaborative automation.

The project also focuses on the legal aspects of automated driving: product liability, road traffic, regulatory law and data security are core concerns of the project.

In addition, the project defines and validates specific evaluation methodologies, addressing both the technical functionalities and the impacts of automated driving applications. Insights will be provided for the safety and environmental benefits for European road transport.

The City Chauffeur performs automatic lane changes, and handles intersections and roundabouts. For this additionally conditioned function, the automated system takes over the control of vehicle dynamics including overtaking manoeuvres.

Highways // Perform automated and cooperative manoeuvres

Highway scenarios demand a close consideration of the different automation levels and the precise implementation of the tasks of the human driver. Using the most up-to-date research, the project is pushing the limits of automated driving towards higher degrees of automation without compromising safety.

The automated AdaptIVe vehicle will enter and exit highways, perform lane changes, or guide the vehicle through other situations at the end of a traffic jam. Other functions include the cooperative response to emergency vehicles on duty also at motorway entrance ramps based on vehicle sensors. Additionally predictive automated driving to reduce fuel consumption and CO₂ emissions will be implemented as well as basic driving functions like following lane and vehicle, performing overtaking manoeuvres and handling traffic situations.

The vehicle drives towards a highway, entrance ramp. With the cooperative merging function, it can support other vehicles merging right into the flow of traffic and V2V communications. If another vehicle is attempting to merge in from an entrance ramp in front of the vehicle, the function enables the other vehicle to merge in after reducing the speed to create a gap in front of the vehicle or by completely changing lane, if possible.