

Deliverable D1.7 //

System architecture and updated system specification

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*Automated Driving Applications and
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1 Summary

This document presents updated system specifications for the AdaptIVe functions implementing automated driving. It enhances the work described in the previous deliverable D1.6 (Initial system specifications) especially by defining input sensors, communication technologies, and actuators for the eight demonstrator vehicles to be developed.

In this context, it is a major step in the overall methodology followed by the project, starting from the definition of use cases and requirements, proceeding to preliminary specifications, and leading to a general architecture (complemented by specific architectures for each vehicle) together with detailed technical specifications. The iterative specification process reflects the gradual advancement in the understanding of automated driving issues for the three scenarios covered by the project: close-distance manoeuvres, urban environment and highways. Therefore details could be progressively defined for all the parts and their interfaces. All these results are clustered per each demonstrator vehicle inside Chapter 8.

Besides this technically-oriented work, the present deliverable discusses a number of important topics for the safe deployment of applications. In particular, the following aspects can be highlighted:

- A method for functional safety analysis is developed and applied to the representative case of 'Lane Change'. This has a relevant impact for the definition of a fault tolerant architecture. (Chapters 3 and 4)
- A structured approach is established regarding the implementation of the sensor system. The work addresses aspects like redundancy, data fusion and the specific demands to bring the vehicle to a safe state in case of failure. (Chapter 5)
- Communication protocols and messages are investigated, in view of several functions under development which involve cooperative manoeuvres and a link with the infrastructure. Possible extensions of existing standards are also proposed. (Chapter 6)
- Finally, a scheme is introduced as a basis for the on-going definition of Human Factors requirements. Those requirements can deliver essential input to ensure an efficient and well-accepted system design, with a focus on driver-automation integration. The goals are to develop a common understanding in this area, and ensure proper and consistent demonstrators at the end of the project. (Chapter 7)

In the timeline of the project, this report almost sets a conclusion for the specification phase and is the groundwork for the next phase on system development. It shows how the partners implemented a close collaboration, especially between the development sub-projects and methodological sub-projects, by integrating different scientific and technical areas.