



## Deliverable D1.7 | System Architecture and Updated Specifications Executive Summary

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### Authors

Jitendra Shah – FFA  
Ahmed Benmimoun – FFA  
Andrea Saroldi – CRF  
Jan Loewenau – BMW  
Mattias Bengtsson – VCC  
Claes Olsson – VCC  
Lars Bjelkeflo – VTEC  
Agneta Sjögren – VTEC  
Andreas Ekfjorden – VTEC  
Grant Grubb – VTEC  
Philip Heck – VW  
Andree Hohm – Conti  
Ulrich Stählin – Conti  
Tobias Hesse – DLR  
Nicola Fricke – DLR  
Emma Johansson – VTEC  
Ida Esberg – VTEC  
Martin Brockmann – ATG  
Amon Rambaldini – CRF  
Giuseppe Varalda – CRF  
Sara Silvagni – CRF  
Anastasia Bolovinou – ICCS

### Project Coordinator

Aria Etemad  
Ford Research & Advanced Engineering  
Europe

Suesterfeldstr. 200  
52072 Aachen  
Germany

Phone: +49 241 9421 246  
Fax: +49 241 9421 301  
Email: aetemad1@ford.com

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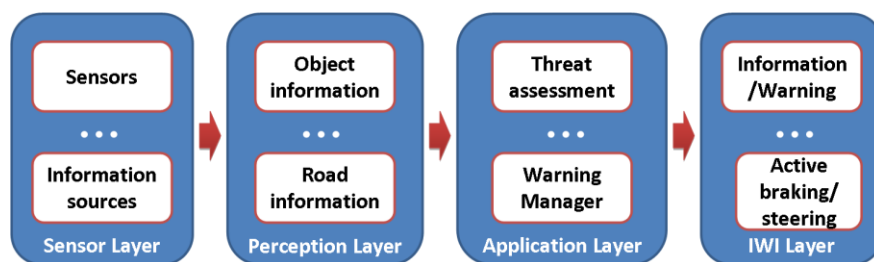
## Executive Summary

This deliverable presents the architecture and updated specifications that will be used for the implementation of the interactIVe project, as well as updates and expansions to the specifications. The deliverable also provides a first version of a process for the IWI (Information Warning and Intervention) methodologies, to make sure the driver's needs are met. Furthermore, the deliverable provides a detailed overview of all the seven demonstrators that will be developed in the project.

The deliverable is the Milestone *M1.3 – System Architecture* which has been achieved and thus provides a foundation for the development and implementation of the interactIVe functions and demonstrators.

The system is built of four separate layers:

1. the Sensor Layer
2. the Perception Layer
3. the Applications Layer
4. the Information, Warning, and Intervention (IWI) Layer



### System Architecture

The system architecture has to a large extent already been outlined in *D1.6 – System initial Specifications*, describing modules and functions. This deliverable refines the architecture, especially with respect to the Perception Layer.

#### Sensors

The interactIVe functionality relies on information from sensors to monitor the vehicle's surroundings, as well as the vehicle's own status. Generic sensor types have been defined to facilitate the development of sensor interfaces.

The generic sensor types to be used range from vehicle data (such as speed and yaw rate) to object sensors based on radar, lidar and camera technologies. Map data in combination with GPS is considered as a separate sensor.

The sensors that will be used in the project are presented together with the partners responsible for creating the necessary sensor interfaces into the Perception Platform. Detailed performance information for all sensors is given (except in a few cases where these numbers are confidential) for each demonstrator.

#### Perception Platform

The Perception Platform is a major component of this deliverable. The architecture of the perception platform is updated and refined since deliverable *D1.6 – System Initial Specifications*. The modules in the Perception Platform are described, providing information on the intended functionality as well as expected input and output signals.

Time synchronisation is a critical part of systems that are collecting data from different data sources (sensors) in real-time. The internal structure for time alignment of sensors data as well as the processing order between the Perception Platform internal modules has been defined.

### **Perception Horizon**

The Perception Horizon, which is the important interface between the Perception Platform and the Application Layer i.e. the interface between SP2 - Perception Platform and three application sub-projects SP4 - SECONDS, SP5- INCA and SP6 - EMIC is described. The first release for implementation is provided in the Annex.

### **IWI – Information Warning and Intervention**

The deliverable describes recommendations on IWI functionalities for the demonstrator vehicles. The IWI Layer takes the output from the Application Layer and transforms it into an action, both interaction with the driver and direct control of the vehicle. However, there is no clear distinction between the interaction with the driver and control of the vehicle. The deliverable describes a method to be used in interactive to integrate the user's needs in the development process of the demonstrator vehicles. The development process is supported by information on relevant standards, research and legal requirements for the possible human-vehicle interaction functions that is considered for use in the project.

### **The Individual Demonstrators**

The deliverable provides the foundation for the demonstrator vehicle implementation that will be used. All demonstrators are used in multiple interactive sub-projects.

Seven demonstrator vehicles from FFA, CRF, BMW, VCC, VTEC, VW and Conti are used for development within the project - six passenger cars in different market segments and one long haul truck. This deliverable provides a common, detailed view of all demonstrators.

Each demonstrator is presented in a separate chapter. The basic vehicle is described, the sensors it uses listed, and the performance of the sensors is presented, except in a few cases where the details are confidential. The perception and application processing units are listed.

The individual architecture for each vehicle is described from different aspects: from a hardware perspective, from component module perspective, as well as software allocation perspective.

The IWI functions that will be used by each vehicle are presented, including references to standards and current legal requirements.

### **Annexes**

The four annexes contain details on:

- the Perception Platform,
- the Perception Horizon (the data structure used by the Perception Platform for data output),
- IWI requirements linked to various source for use, such as ISO, recommendations from research reports and legal requirements,
- preliminary IWI strategies.