Press Release

interactIVe research demonstrates the next generation of Advanced Driver Assistance Systems for safer and more efficient driving

Aachen, 20 November 2013 - The interactIVe consortium unveiled the results of a four-year research project on the development of intelligent systems that autonomously brake and steer around vehicles, and may help avoid pedestrians at a conference today.

The main achievement of the interactIVe project – which stands for Accident avoidance by active intervention for Intelligent Vehicles - has been the creation and evaluation of integrated driver assistance systems, characterised by an outstanding capacity to support drivers in a variety of traffic scenarios and, specifically, to avoid a collision if the driver fails to react to warnings.

The €28.4 million large-scale, integrated research project - which began in January 2010 and involved 30 companies, organisations and research institutes - was led by Ford's European Research Centre in Aachen, Germany (originally by Aria Etemad and then by Christoph Kessler).

Key Research Findings and Results:

A set of **new assistance functions** were built and evaluated **in six passenger cars and one truck** by a cross-functional research team, using both simulator and test track studies in three key areas: **continuous driver support**, **collision avoidance** and **collision mitigation**. In this environment, the driver is continuously supported by the interactIVe systems, which not only monitor the situation but can also react in any driving situations, using **active braking or steering in order to protect occupants of vehicles and vulnerable road users**.

interactIVe research project covered a wide range of Advanced Driver Assistance scenarios in a user-centric approach where **the system plays the role of an attentive co-driver,** making near real-time assessments of the situation based on the dynamic environment perception provided by a commonly **shared Perception Layer**. This integrates multi-sensor data fusion modules combining digital map communication and sensor data with advanced information-processing algorithms. Special attention has been given to developing feasible solutions for a range of different vehicle types.

The **support functions featured** include; SafeCruise, Curve Speed Control, Enhanced Dynamic Pass predictor, Lane Change Collision Avoidance, Oncoming Vehicle Collision Avoidance/Mitigation, Side Impact Avoidance, Run-Off Road Prevention, Emergency Steer Assist and Cost-efficient Collision Mitigation. Their development has been supported by **research on vehicle dynamics, path prediction and path stability control algorithms,** coupled with extensive **research on human factors** which led to the definition of i**nformation, warning and intervention strategies** for each function.

In the final phase of the research project, interactIVe demonstrator vehicles underwent a **comprehensive evaluation** on test tracks and in the field combined with driving simulator

experiments. In general, **users** found the interactive functions useful and were very **willing to use them**.

The project also identified **potential legal barriers** that might hinder the market introduction of these functions, highlighting the need to review the European legal framework.

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Note to the editor

interactIVe project is a consortium of 28 organisations, including car manufacturers, suppliers, universities, research institutes and other stakeholders. The general objective of interactIVe was to develop new high performance and integrated Advanced Driver Assistance Systems, enhancing the intelligence of vehicles and promoting safer and more efficient driving. The project built on the convergence of recent trends in the leading European automotive industry and addressed this objective based on:

- The **integration of** previously **independent functions**;
- **New** concepts for the **sensor data fusion** platform;
- Decision strategies and **novel techniques for the driver-vehicle interaction**;
- **Active interventions** performed in specific dangerous situations designed for both vehicle and truck;
- Low-cost **sensors and architectures fitted to** passenger vehicles in the **lower segments**.

interactIVe work was conducted in response to customers' needs and to the challenges for sustainable mobility posed by the high number of accidents on European roads and is particularly relevant to the European Commission White paper "European Road Safety Action Programme 2011-2020", which was published in 2010 aiming to cut road deaths in Europe in half in the next decade.

Multiple support functions have been developed and evaluated through seven demonstrator vehicles covering the three main pillars of interactIVe, namely Continuous Support, Collision Avoidance and cost-efficient Collision mitigation. The work started by the creation of a large set of use cases covering all interactIVe functions and all demonstrator vehicles. Then, Information, Warning and Intervention strategies have been developed for each function as well as to be used beyond the project. These strategies have been tested in more than 10 experiments in simulators and on test tracks. The experiments have covered different issues and the interplay between the function and driver through visual, auditory and haptic channels including active vehicle steering, braking and acceleration through actuators. Finally, common haptic, graphics and sound elements have been designed and adopted.

Highlights of the Perception Layer include:

- Generic interface structure for each sensor type or information source (supporting plug & play concept)
- Multiple perception modules treating sensor, object and situation level fusion in a near real-time framework
- Unified output via the Perception Horizon interface (100ms update cycle)

- One reference implementation used by the interactIVe demonstrator vehicles

In parallel, driving environment perception dedicated research has been conducted through the implementation and evaluation of 7 experimental modules namely the Road Edge Detection, the Moving Object Classification, the All-around track-id maintenance, the Dynamic Scene Classification, the Pedestrian Detection, the Frontal Near Range Perception and the Recognition of Unavoidable Crash Situation modules.

The final phase of the project involved testing and evaluation of all the developed functions according to the evaluation methodology defined. Test data were obtained by testing the addressed scenarios on test tracks or on public roads. For this purpose specific tools (e.g. dummy obstacles) were set-up. Besides the technical aspects, also the potential users' acceptances of the functions as well as the interaction between them and functions were evaluated in driving simulator studies and on public roads. The evaluation was completed by an assessment of potential safety impacts of the individual functions. Therefore, real accidents were re-simulated under consideration of the functions. Especially, in rear-end conflicts the interactIVe research functions showed high potential to avoid accidents or at least mitigate their consequences.

This research project ran from January 2010 until November 2013 and was co-funded by the European Commission Directorate General for Communications Networks, Content & Technology (DG CONNECT) under the Seventh Framework Programme (FP7) for research and technological development. The final results were presented in Aachen, Germany 20-21 November 2013 through technical presentations and a respective.

Duration:	January 1st 2010 - October 31st 2013
Total cost:	EUR 30 Million
Coordinator:	Ford
Partners:	Ford, BMW Group Research and Technology, Centro Ricerche Fiat, Daimler, Volvo Cars Corporation, Volvo Technology Corporation, Volkswagen, Autoliv, Continental, Delphi Delco Electronics Europe, Here, TRW, The Federal Highway Research Institute (BASt), The Galician Automotive Technology Centre (CTAG), German National Research Center for Aeronautics and Space (DLR), Institute of Communication and Computer Systems (ICCS), Institut für Kraftfahrzeuge – RWTH Aachen University (ika), Netherlands Organisation for Applied Scientific Research TNO, VTT Technical Research Centre of Finland, Lund University, Université Joseph Fourier Grenoble, Chalmers University of Technology, University of Passau, Czech Technical University in Prague, University of Trento, Allround Team, Alcor, European Center for Information and Communication Technologies EICT.

Website: www.interactIVe-ip.eu