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CHAMELEON - PRE-CRASH APPLICATION ALL AROUND THE VEHICLE

In the last years, the introduction within the car of safety systems (seat belts, frontal and side airbags) has resulted in an estimated annual saving of 120,000 traffic fatalities and seriously injured persons in the countries of the European Union. Two ways of safety improvements are purchased until now: [i] optimising the construction of car structure in to lower the overall crash severity; [ii] assisting directly the driver and passengers for a better management of those critical situations. Nevertheless, in taking into account the short term economical aspects, the costs of solutions [i] are seen to be more important than those associated with the development of new protective strategies [ii].

As a pre-crash sensorial system has to detect an impending collision in the last seconds before intrusion happens, it falls into the category of passive safety concepts. Nevertheless, it could also contribute to make an innovative link with active protections. Indeed, if critical situations are detected in advance, new input information concerning dynamic characteristics of potential obstacles will be transmitted to the vehicle electronic unit and added to the input information related to occupant characteristics, in order to optimise the deployment of the protection means (for instance the possibility to pre-tension the seat belts, even before a collision happens). Moreover, in the future, it will be reasonable to use common sensors for pre-crash applications and other Advanced Driver Assistance Systems (Adaptative Cruise Control and “Stop & Go”) reducing the overall cost of those systems.

With respect to the passive safety, the targeted area of CHAMELEON project is primary the reversible systems (i.e. systems which can be armed and disarmed without producing any damage), as well as short-term intelligent vehicle market is concerned, and secondary the irreversible systems (i.e. systems which are not reusable after deployment) when the sensorial requirements will be reliable and tested for a long time.

The project has started in the year 2000 with the specification of the application concept and the identification of the related users needs.

Simulation tools have been developed in order to identify the requirements for the sensorial systems to be applied. The aim was to virtually link the technical characteristics of existing detection devices (i.e. scan rate, field of view, positioning of the sensors on the car, etc.) to a set of relevant system output parameters (i.e. time to impact, impact probability, impact speed, etc.). Starting from an initial system configuration and adopting an iterative procedure some guidelines have been identified to adapt the available detection technologies to the pre-crash application requirements.

To demonstrate the CHAMELEON system, a prototype vehicle is going to be equipped by CRF, involving four different sensor technologies: laser, stereo vision and microwave radar sensors.

In this project, ika/fka develop a dedicated test site, where the final validation of the system will be possible. It is also included the development of single tests, assessment outline and identification of test-site requirements and the definition of the test methods of pre-crash sensor systems using the experience of sensor testing at ika/fka.

Project Partners:

Centro Ricerche Fiat S.C.p.A, PSA Peugeot Citroen Automobile, Temic Telefunken Microelectronic GmbH, Thomson-CSF Detexis, Volvo Car Corporation, Porsche AG, Regienov Renault Recherche Innovation, IBEO Lasertechnik Hipp KG, SAAB Bofors, EICAS Automazione S.p.A., ika, Centro Studi sui Sistemi di Trasporto (CSST), Israel Aircraft Industries - TAMAN, RAMOT (Tel Aviv) University Authority for Applied Research and Industrial Development Ltd.

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