

Integrated Lateral support: The PReVENT approach



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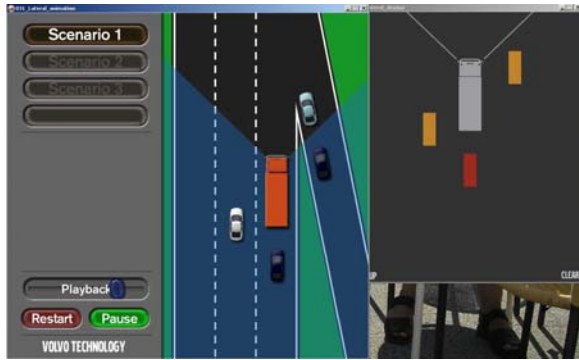
Preventive and active safety applications are among the most promising technologies reducing the number of fatalities on the roads in the next ten years. A large number of European car manufacturers and equipment suppliers are working actively on the development of more intelligent and more reliable safety features. The most prominent example of cooperation in Europe is the Integrated Project PReVENT under the 6th Framework Programme of the European Commission. Supported by EUCAR, CLEPA and ERTICO, a consortium of more than 50 companies is actively building a common platform for preventive and active safety applications.

The challenge is to decouple the sensors from the applications and its interaction with the driver. In PReVENT, engineers are creating an architecture in which all the sensors participate to create an accurate and reliable perception of the environment. Combined with vehicle information and driver monitoring, the platform can compile a wide set of information needed for the numerous safety applications. Such perception platform will decrease dramatically the cost of the newest safety applications as they will reuse the existing sensors and increase the development cycle before they reach the market.

PReVENT offers a challenging, integrated safety approach considering all relevant components (sensors, actuators, control algorithms, system integration) in all fields of preventive and active safety systems. The systems are based on advanced sensor techniques (fusion of radar, infrared, far infrared, computer vision) interfaced with digital maps as well as communication systems to provide the required perception robustness, performance, and reliability for the different applications.

Among others, one of the PReVENT function field addresses all lateral support issues such as lane keeping, rear monitoring and blind spot monitoring strongly linked to other cross-functional subproject enabling the use of digital maps and sensor data fusion.

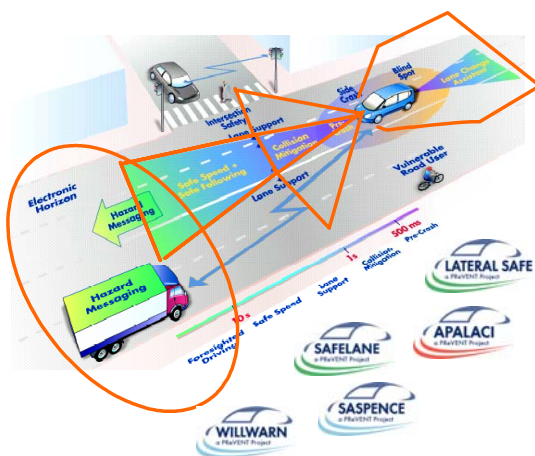
At the ITS world congress in November, the PReVENT lateral support Special Session, chaired by Dr Angelos Amditis (ICCS, Athens), presented the latest advances of systems providing lateral and lane-keeping support in adverse road and driving conditions in the PReVENT LATERAL SAFE and SAFELANE subprojects.



Uwe Kaiser–Dieckhoff from BOSCH focused in his speech on the prevention of lateral/rear related accidents and the active assistance in adverse or low visibility conditions and blind spot areas. “A common multi-sensor platform is used in order to evaluate a set of applications within the LATERAL SAFE subproject.”,

said Kaiser-Dieckhoff. “The functions are integrated with a lateral and rear monitoring system, a lane change assistant and a lateral collision warning, extending the operative scenarios of existing systems to all weather conditions and congested urban areas.”

Complementing the lateral and rear support, the advanced lane keeping support system developed within PReVENT, called SAFELANE, is also designed to operate safely and reliably in a wide range of road and driving situations. The system is taking the driver



response into account: “If an unintentional lane departure is detected the adaptive decision system first triggers a driver warning. If the driver does not react, the system will steer the vehicle back in the lane.” said Jonas Nilsson from Volvo Technology AB describing the flexible and modular approach of SAFELANE application in commercial and passenger vehicles. “In order to support the decisions,

we make use of a simple platform of sensors including a camera and access to digital maps. The use of forward-looking active sensors such as RADAR and laser scanners is optional but improves even more the reliability of the application.”

By integrating the PReVENT safety applications, “the final objective is to see these applications integrated in a single vehicle together with other applications creating a virtual safety belt around the vehicle” explained Dr. Amditis from ICCS. He showed how the PReVENT safety functions are merged in an integrated lateral and longitudinal support system being investigated in INSAFES, one of the new PReVENT phase 2 subprojects. “An integrated approach, linking the consecutive information, warning and intervention applications within PReVENT, will improve the functionality and reliability of the whole system and increase the user acceptability,” Amditis said. “It is a priority to focus on full coverage of the surrounding of a vehicle in order to warn the driver and intervene or mitigate the effects of an accident.” The resulting demonstration will reach a high level of integration

of a series of functions: collision mitigation, pre-crash, lane change assist lateral collision warning, Safe Speed & Safe Distance, lane keeping; and early danger warning through communication. Dr. Saïd Mammar from University of Evry, France, supported the concept of INSAFES showing a concrete example of a platform integrating ESP, lateral control, autonomous modes, car following, etc. "Apart from integration, INSAFES will add more intelligent perception using enhanced digital maps and cooperative components such as vehicle-to-vehicle communications and vehicle-to-infrastructure communications." said Dr. Mammar.

One of the main concerns of the automotive industry is the transition from technological prototypes to products. Henrik Lind from Volvo Cars investigated future market trends and deployment issues. As the new lateral support applications will add a significant contribution to enhanced and integrated lateral support systems, this technology should be accompanied by further measures to guarantee deployment: "further interaction between road authorities, insurances and vehicle manufacturers is the next step. One needs to push financial incentives with lower insurance fees or tax reductions when purchasing vehicle safety systems."

The subprojects SAFELANE and LATERAL SAFE are in the latest phase of their implementation and new results will be announced soon after the testing and evaluation procedures, while INSAFES is currently working on use cases for integrated functions and their requirements. Demonstrations of these applications are planned during future exhibitions and in the PReVENT final exhibition in 2007 with more than 15 experimental cars.

Note to the Editor

About IP Prevent: Preventive safety applications Integrated Project

Duration and Funding

February 2004 - March 2008, funding through the EC Directorate General Information Society

Consortium

IP Coordinator: DaimlerChrysler AG

IP Management: ERTICO and Irion Management Consulting

Core team: BMW, CRF, DaimlerChrysler AG, Ford, INRETS, PSA, Renault, Robert Bosch, SAGEM, Siemens VDO Automotive, Volvo

Partners: Audi AG, BMW AG, BMW Forschung und Technik GmbH, Centro Ricerche FIAT SCPA, Ford Forschungszentrum Aachen GmbH, Peugeot Citroën Automobiles SA, Regienov - Renault Innovation, Volvo Technology AB, Volvo Car Corporation, Volkswagen AG, Blaupunkt GmbH, Robert Bosch GmbH, Delphi Delco Electronics Europe GmbH, Ibeo Automobile Sensor GmbH, Navteq BV, Philips GmbH Forschungslaboratorien, Siemens AG, Sagem SA, Siemens VDO Automotive AG, Siemens VDO Trading BV, Tele Atlas NV, TRW Ltd., FCS Simulator Systems, Imita AB, Lewicki Microelectronic GmbH, Navigon GmbH, Transver GmbH, Ministerie van Verkeer en Waterstaat, Fraunhofer-Gesellschaft zur Förderung der Angewandten, Forschung e.V.,

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Visit the **PREVENT website** (<http://www.prevent-ip.org/>)

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