New European Approach for Intersection Safety – Results of the EC-Project INTERSAFE

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***Abstract*-- The INTERSAFE project was created to generate an European Approach to increase safety at intersections. A detailed accident analysis was carried out. Based on the derived relevant scenarios driver assistant functions are developed to support the driver in critical intersection situations. In adddition evaluation and user test results of the Intersection Driver Warning System are presented and discussed.**

***Index terms*-- Intersection safety, situation analysis, risk assessment, Laserscanner, video.**

I. INTRODUCTION

In the 6th Framework Programme of the European Commission, the Integrated Project PReVENT includes Intersection Safety. The project started on February 1st, 2004 and will end by January 2007.

INTERSAFE partners:

- Vehicle manufacturer: BMW, VW, PSA, RENAULT
- Automotive supplier: TRW, IBEO
- Institute/ SME: INRIA, ika, FCS, Signalbau Huber

The main objective of the INTERSAFE project is to improve safety and to reduce (in the long term avoid) fatal collisions at intersections. In order to identify the most relevant scenarios for accident prevention, a detailed accident analysis was carried out. Based on the scenarios and the driver mistakes derived from the accident analysis a basic functionality is described. It considers for example the time budget, which is available in order to warn the driver.

The importance of these accidents leads to a deeper analysis of the scenarios. An in depth analysis of available data from reconstructed accidents in France and Germany shows the central position of two accident types:

– Collisions with oncoming traffic while turning left and

– Collisions with crossing traffic while turning into or straight crossing an intersection.

Additionally the importance of the actual right of way regulation leads to the consideration of traffic light controlled intersections. The specification of the key technology components like sensors and communication technologies are derived from the given requirements.

Altogether, about 60%-72% of all car related accidents in intersections are covered directly by the selection of these three scenarios. The possible coverage of other comparable accidents needs further investigations.

A general overview on the INTERSAFE subproject was given in [1]. The main focus of this paper is to give a better understanding of the functionality of the sensor based test vehicle used in this project.

II. INTERSAFE CONCEPT & VISION

The INTERSAFE project realises two different approaches in parallel.

The first approach is a Bottom-Up Approach, based on state of the art sensors and vehicle-to-infrastructure (V2I) communication. Furthermore, some communication modules are installed at selected intersections in public traffic to realise the bidirectional communication between the vehicle and the traffic lights. This approach results in a basic intersection system, which can be evaluated in public traffic at selected intersections.

The second approach is a Top-Down Approach, based on a BMW driving simulator. The driving simulator allows the analysis of dangerous situations, independent of any restricted capabilities of the sensors for environmental detection. The results of this approach are used to define an advanced intersection safety system, including requirements for advanced on-board sensors.