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BRINGING INTELLIGENT VEHICLES TO THE ROAD

The euroFOT project is a first of its kind, European-wide field operational test. Tested with real drivers on real roads, eight intelligent vehicle systems will be studied with regards to their impacts on safety, efficiency and driver comfort

Car and truck fleets are currently getting ready for the first pan-European field operational tests (FOTs) of active in-vehicle safety systems. The euroFOT large-scale project, part of the EC programme on Information and Communication Technologies (ICT) for mobility aimed at improving traffic safety and efficiency, will see over 1,000 equipped vehicles on the roads of Europe in 2010 for a total of 18 million kilometres.

Car manufacturers Ford, Mercedes-Benz, BMW, Renault, Volvo, Volkswagen, Audi and Fiat/Lancia, and truck manufacturers MAN and Volvo, have joined forces with automotive suppliers, universities and research institutes to test near-market advanced driver assistance systems (ADAS) in real traffic conditions.

THE EIGHT SYSTEMS

The test vehicles are equipped with data acquisition systems (DAS), varying from simple CAN-bus readers to complex video recording units, monitoring drivers' behaviour and their short and long term adaptation to the tested technologies. In addition, vehicle and traffic dynamics are analysed under all traffic conditions with the aim of contributing to future product development. Driver questionnaires and interviews will also feed the study with subjective information to get more personal feedback on the systems tested.

In addition to comprehensive technical assessments of active system performance and capability, the trial results will also provide better understanding of how European drivers handle and interact with their vehicles. It will also offer an important opportunity to raise consumer awareness for available safety technologies and their impact on our daily lives.

The eight systems tested include both longitudinal control functions – forward collision warning (FCW), adaptive cruise control (ACC) and speed regulation system (SRS) – and lateral ones – blind-spot monitoring (BLIS), lane departure warning (LDW) and impairment warning (IW). euroFOT will also test more advanced applications, such as Head-up Display (HUD) interactions (safeHMI), fuel efficiency advice (FEA) and new generation curve speed warning (CSW).

The project was officially launched in May 2008. Since then, preparatory steps have been undertaken, such as setting up data acquisition systems (DAS) and data

management centres, specifying further the research questions and their hypotheses for each of the functions and dealing with the acquisition of the drivers and the vehicles.

METHODOLOGY & PROCEDURES

As set out in the FOT handbook proposed by FESTA, the development of a common methodology is the key to the success of euroFOT and is a crucial step for any such test. The first major FOT methodology challenge was the identification, selection and specification of performance indicators describing driving behaviour, driver workload and acceptability, traffic safety, traffic efficiency, and impact on the environment.

The specification of experimental procedures to be applied represented the second challenge for the methodology. Experts have developed a set of detailed procedures explaining in detail how to investigate the different systems that are tested within euroFOT. These procedures include a list of measurements, performance indicators, events, and situational variables.

All these procedures should help researchers of euroFOT to find comparable answers to the hypotheses that were defined at the inception of the project, the 'research questions'. The analysis of the data gathered in real traffic conditions with ordinary drivers is expected to highlight several crucial aspects of the tested functionalities. The project will mainly address the following research issues:

- What is the impact of these functions on road traffic safety?
- What is the impact of these functions on traffic efficiency and on the environment?
- How does the driver react to these functions in short and long-term?

A COMMON APPROACH FOR ALL

In order to ensure a common approach and comparable results, the euroFOT project is following a common methodology promoted by the European Commission and by numerous European stakeholders – the FESTA methodology. The European network of field operational test called FOT-Net is making sure this methodology is applied and gathers further recommendations to improve it.

The best way to learn about the FESTA methodology is to read its FOT handbook containing guidelines on how to conduct a field operational test. This handbook was intended to guide the work of field operational test organisers on a general level; each FOT would need to adapt to its special needs.

For more information about the FESTA and FOT-Net project, check out www.fot-net.eu or contribute to the FOT Wiki: <http://wiki.fot-net.eu>

The first test vehicles - able to collect field test data and to perform the pilot tests - have now been prepared following a similar method across vehicle brands. This is to ensure comparable data collection.

Spread out in at least 11 operation sites around Europe, these test vehicles are currently hitting the roads in small fleets. Researchers will conduct a 4-month pilot experiment before the "real" euroFOT data collection will begin in January 2010.

The pilot tests will ensure that data acquisition systems are properly installed, that the logged data and management centres run smoothly and gather the essential data needed to answer the research questions. During these pilot tests, euroFOT researchers will also test early data mining techniques, to guarantee the identification of relevant safety incidents among the hundreds of thousands of kilometres driven.

DATA MANAGEMENT SOLUTION

For such a European-scale of field operational tests, the whole chain of data management needs to be established from data collection and storage, to analysis tools. Experts from the consortium defined and developed carefully the best suited data acquisition systems (DAS) and data storage solutions for euroFOT. Along with these data management solutions, they also ensure that common analysis tools are used and that the quality of this data is assured.

To provide the right solutions and to determine DAS-components, data management partners looked at performance indicators as well as technical and practical constraints due to the differences amongst all the vehicles to be tested. Indeed, the availability of measurements, their accuracy and frequency can vary greatly between car manufacturers. All these specifications, procedures, hardware and software implementation were delivered in a common approach. However, each vehicle centre tests a different set of safety functions and hypotheses, thus there is also a need for different data management solutions. As a whole, data management partners of the project provide a common core, as well as specific solutions for each Vehicle Management Centre (VMC).

All data acquisition systems in euroFOT are connected to the in-vehicle CAN-bus