Safety Enhancement through Continuous Driver Support Development and Evaluation Results

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interactIVe Final Event

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Roles within interactIVe
Driver and Co-driver
Main Challenges and Objectives

- Easy comprehensibility of the system that the driver should perceive as a whole in front of integration of many different driver support functions.

- Coverage of many different driving situations implies use of an extended view of the road and traffic scenario with fusion of information from different sources (sensors, maps, communication, GPS, vehicle sensors, …).

- Deep integration of longitudinal and lateral functions to assist the driver in a continuous and coherent way at different levels: information, warning, advice, support, automatic vehicle control.

- Simple and easy to use function for the driver hides complexity of the system, architecture, and modules.

- Fasten product deployment after project end.
Technical Solutions #1

• Perception Platform to deliver a coherent and rich view of the current situation around the vehicle.
Technical Solutions #2

- Simultaneous planning of multiple manoeuvres in order to identify current goal of the driver and best manoeuvre to be undertaken. This allows detection of risks associated to current manoeuvre and corrective actions.
Technical Solutions #3

- Information, Warning & Intervention strategies, acting on multiple driver interaction channels, with wide use of haptic channels, operating at different support levels depending on the risk level.
Overview of Demonstrator Vehicles
CRF Demonstrator Vehicle

- GPS and eHorizon
- Front Camera
- Warning Sounds
- Cluster Display
- Active Steering
- Front Radar
- Front Lidar
- Side / Rear Radar
- Active Belts
- Side Ultrasound
CRF Demonstrator Vehicle Implemented Use Cases

Alert Mode / Active Mode

- Normal situation
- Unintended lane departure
- Drift to side barrier
- Exceeding speed limit
- Vulnerable road user
- Rear-end collision
- Vehicle in blind spot
- High speed at curve
Final Evaluation

**Technical tests**
- **Ford**
  - Location: Lommel
  - Accident scenarios: 5
  - Number of test runs: 308
- **CRF**
  - Location: Orbassano
  - Accident scenarios: 7
  - Number of test runs: 261
- **VCC**
  - Location: Hallersted
  - Accident scenarios: 6
  - Number of test runs: 133

**User-related test**
- **Ford**
  - Location: Aachen
  - Driving with the function on a test track
  - Number of test persons: 19
- **CRF**
  - Location: Turin
  - Small field test
  - Number of test persons: 24
- **BMW**
  - Location: Konigsdorf
  - Accident scenarios: 1
  - Number of test runs: 23
  - User-related test
    - Focus group study
    - Number of test persons: 17
Technical Tests – Example Scenario
Road Tests – Example Results
Summary of Evaluation Results

Technical Tests

• The data about system activations collected during 725 test runs have been used to check the functions as implemented in the demonstrators against 34 test hypotheses with a 5% level of significance.

• In general, the developed functions for Continuous Support showed a good level of performance on 8 different test scenarios.

• Technical tests have also been used to identify recommendations in order to improve the performances from a technical viewpoint.
User Related Tests

Field test on public roads, 24 test persons

Driving without and with the system, within subjects design

Effects
+ Curve speed warnings gave the expected effect
+ Better speed adaptation to the speed limits and situations
+ Less dangerous lane changes with the system active
- Slightly more late adaptations of speed before intersections and obstacles

Opinions
• Useful
• Blind spot warning especially useful in the overtaking process
• Appreciated the fact that the system is not giving information all the time
Conclusions

• Deep integration of driver assistance functions structured at different support and automation levels is a key point in the introduction of ADAS

• SP4 SECONDS provided good examples on how this can be implemented, considering different aspects: architecture, HMI, co-driver module, etc.

• This integration is effective and well accepted by users

• Live demo tomorrow on Lommel test track
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Thank you.

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