TRA 2008 Conference

eVALUE –

*Testing and Evaluation Methods for ICT-based Safety Systems*

Ljubljana, 24 April 2008

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The research leading to these results has received funding from the European Community’s Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 215607.

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Project Overview

• **Budget**
  - Overall budget: 3,760,442 €
  - EC funding: 2,349,982 €

• **Duration**
  - Start: 1 January 2008
  - End: 31 December 2010

• **Consortium**
  - Coordinator: Micha Lesemann, IKA RWTH Aachen University
  - Partners: SP Sweden, VTI, VTEC, IDIADA, Tecnalia Robotiker, IBEO, CRF
Project Overview
Overall Objectives of the Project

To develop testing and evaluation methods for ICT-based safety systems.

AND thereby

To increase public perception and customer acceptance of ICT-based safety systems.

To support development of ICT-based safety systems at vehicle OEMs and suppliers.
Results of the ASTE Study

• ASTE - a feasibility study for setting up of a performance testing programme for ICT based safety systems for road transport

• Aims of the ASTE study
  - Feasibility of setting up an independent performance and conformance testing programme for IVSS
  - Needed methods and principles for V&amp;V of ICT-based safety systems
  - Consensus on the proposed principle

• ASTE partners:
  - Lindholmen Science Park
  - Volvo Car Corporation
  - Volvo Technology
  - SP
  - VTI Swedish National Road and Transport Research Institute
Overall Approach and Methodology

Problem addressed

Type of traffic scenario

Expected effect

Testing

Estimated effect from testing

Verified effect from real world scenarios

Result
System-based performance Testing

- Test cases derived from specific system capabilities and mapped to traffic scenarios
- Performance of different systems with similar functions but with different layout and technology (by clustering systems)
- As a first step, development of minimum requirements would be required
Scenario-based performance Testing

- Test cases derived from traffic scenarios
- Testing on vehicle level - with vehicle as "black box"
- A limited amount of representative test scenarios are needed to be defined? Possible?
Document-based performance Testing

- Used as complement to physical testing
- In particular valuable for e.g. HMI testing?

Vehicle

Design documentation

Safety case

Performance Testing

List of safety systems

Design review
Safety case assessment
Demo of functionality
Conclusions of the ASTE Study

• Performance testing is technically and economically feasible
• Vehicle active safety performance shall be tested in traffic scenarios
• The performance test results must be possible to communicate in a very simple way
• Consensus between different stakeholders will be possible
**Overall Objectives of eVALUE**

![Diagram](image)

**eVALUE** has a similar goal like Euro NCAP, namely the objective and easy-to-understand assessment of safety systems.
Overall Objectives of the Project

Assessment of ICT-based Safety Systems

Research and Development of New Safety Systems

Customer Awareness and Widespread Application

*eVALUE* takes all concerned interest groups into account.
Major Achievements of the Project

• What we will do:
  - Define objective evaluation and testing methods and performance criteria
  - Build a de-facto standard
  - Regard current and upcoming active safety systems
  - Consider system interaction and system integration
  - Physical testing, supported by simulation
  - Communication with key stakeholders like OEMs, suppliers, national authorities, customer organisations, ISO working groups etc.
  - Raise public awareness for the topic, e.g. by easy-to-understand benchmarks

• What we will not do:
  - Direct standardisation of testing
  - Define fail/pass criteria for the developed test methods
Roadmap – Time Horizon for safety relevant ICT-Systems in the 4 Domains

**Longitudinal Assistance Domain**
- Long. Collision Avoidance
- Warning Traffic Jam End
- Curve Speed Assistant
- Collision Mitigation by Braking
- ACC Stop&Go

**Lateral Assistance Domain**
- Lane Change Assistant
- Intersection Assistant
- Overtaking Assistant
- Left Turning Assistant
- Lane Change Warning
- Lane Keeping Assistant

**Yaw/Stability Assistance Domain**
- Curve Speed Assistant
- Speed Alert
- Obstacle and Collision Warning
- ACC Stop&Go
- LDW
- Lane Keeping Assistant

**Additional Assistance Domain**
- Adaptive Brake Assistant
- Driver Drowsiness Warning
- Brake Assistant
- Blind Spot Monitoring
- Damper Control
- Roll Stability Control
- Round Vision
- Night Vision
- ESC
- Traction Control
- Active Font Steering
- Traction Control
- Torque Vectoring
- IVDC
- Active Rear Steering
- Damper Control
- Roll Stability Control
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Scope of eVALUE - Chosen Systems

- Systems for automotive preventive safety systems, address at least one domain and available on the market with penetration rates of >50,000 vehicles

- System Cluster 1 (longitudinal assistance):
  - ACC
  - Forward Collision Warning
  - Collision Mitigation, by braking

- System Cluster 2 (lateral assistance):
  - Blind Spot Detection
  - Lane Departure Warning
  - Lane Keeping Assistant

- System Cluster 3 (yaw/stability assistance):
  - ABS
  - ESC

- System Cluster 4 (additional assistance):
  - Not defined at this stage (ICT-based systems becoming available during project duration)
eVALUE Testing & Evaluation Methods
General Approach

Accidents (2007)

Relevant scenarios (2007)
e.g. TRACE, PReVENT

State of the art systems (2008+)

System verification & validation

Testing & Evaluation Methods
(independent from the systems)

SAFETY IMPACT
Contact

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