



Transport Research Arena Europe 2010

3rd edition
Brussels, Belgium

7 - 10 June, 2010

A Test Programme for Active Safety Systems - Latest Developments of the eVALUE Project

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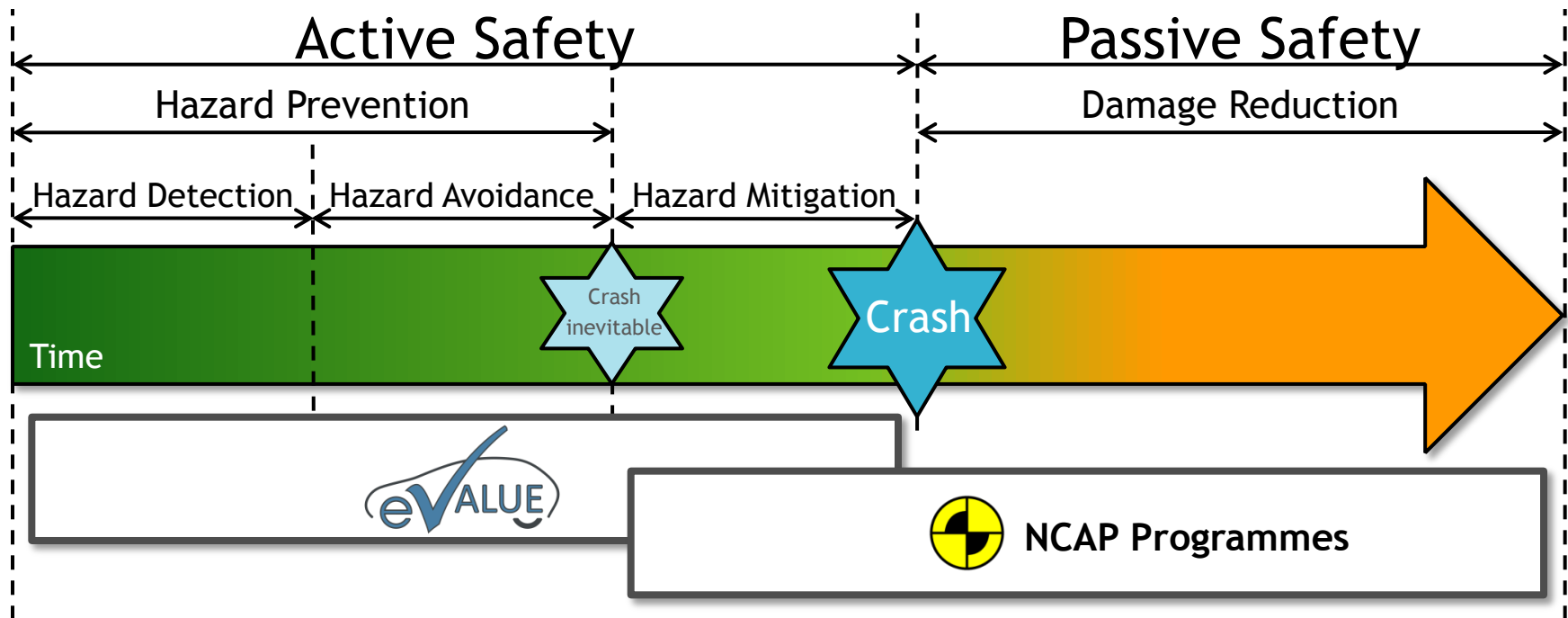
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- Introduction
- Motivation
- Approach
- Latest Results
- Next Steps
- Summary & Outlook

- Active safety is a key measure when it comes to decreasing traffic accidents, injuries and deaths.
- Advanced driver assistance systems are massively introduced into new vehicles, and many of them also contribute with active safety functionality.
- However, and in opposition to passive safety, the car buyer cannot judge the performance of a vehicle's active safety based on objective measures.
- Every vehicle OEM is promoting active safety, but mainly on system functionality rather than on safety impact.

→ Need for objective test methods for active safety!



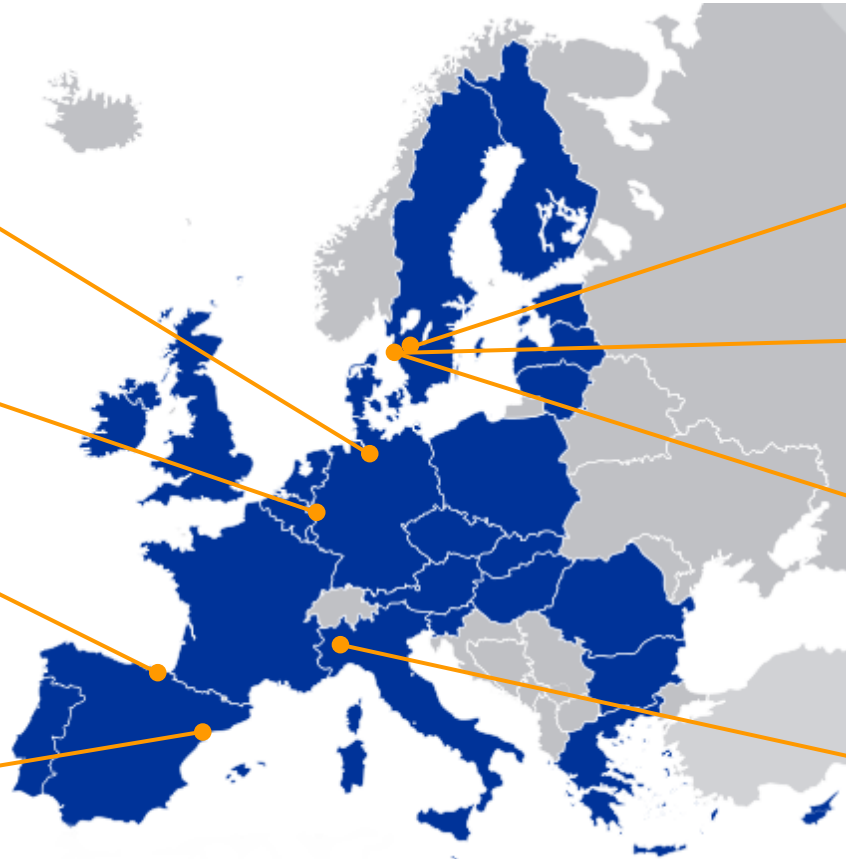
→ Active safety performance on full vehicle rather than on system level.

SICK



robotiker
tecnalia

Applus⁺
IDIADA

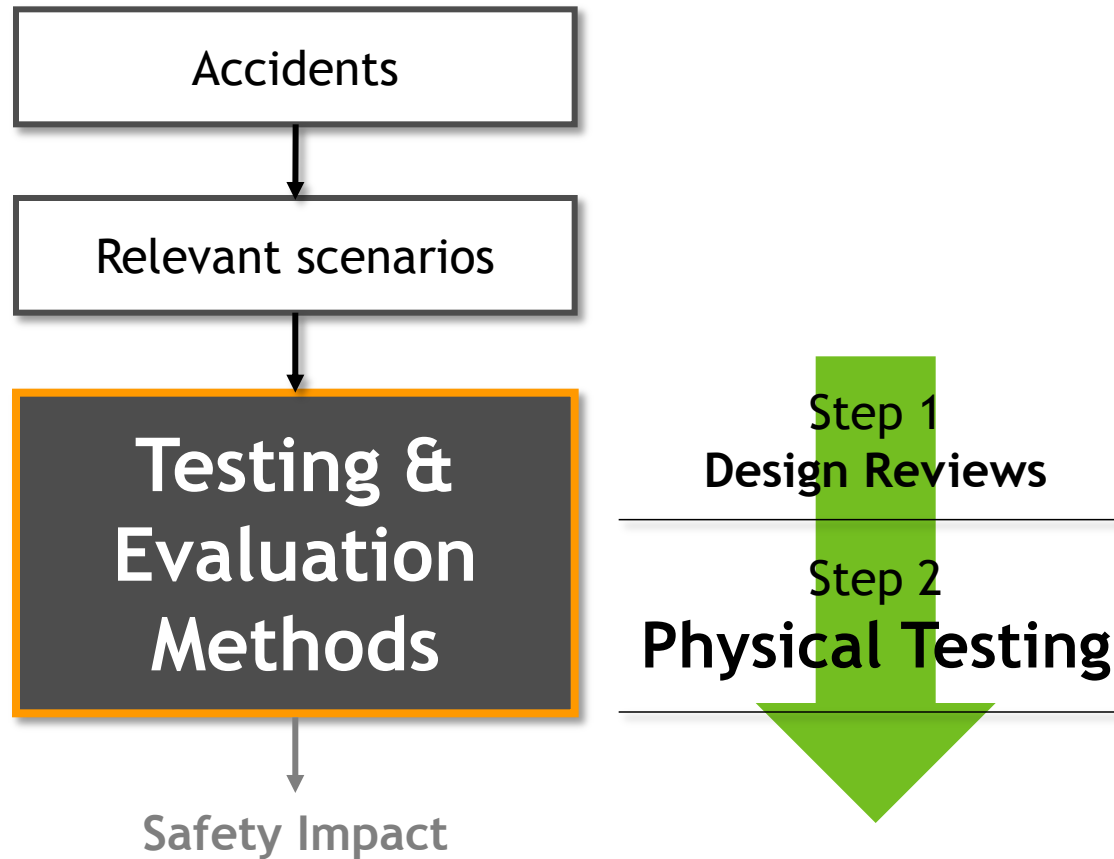


SP

vti

VOLVO





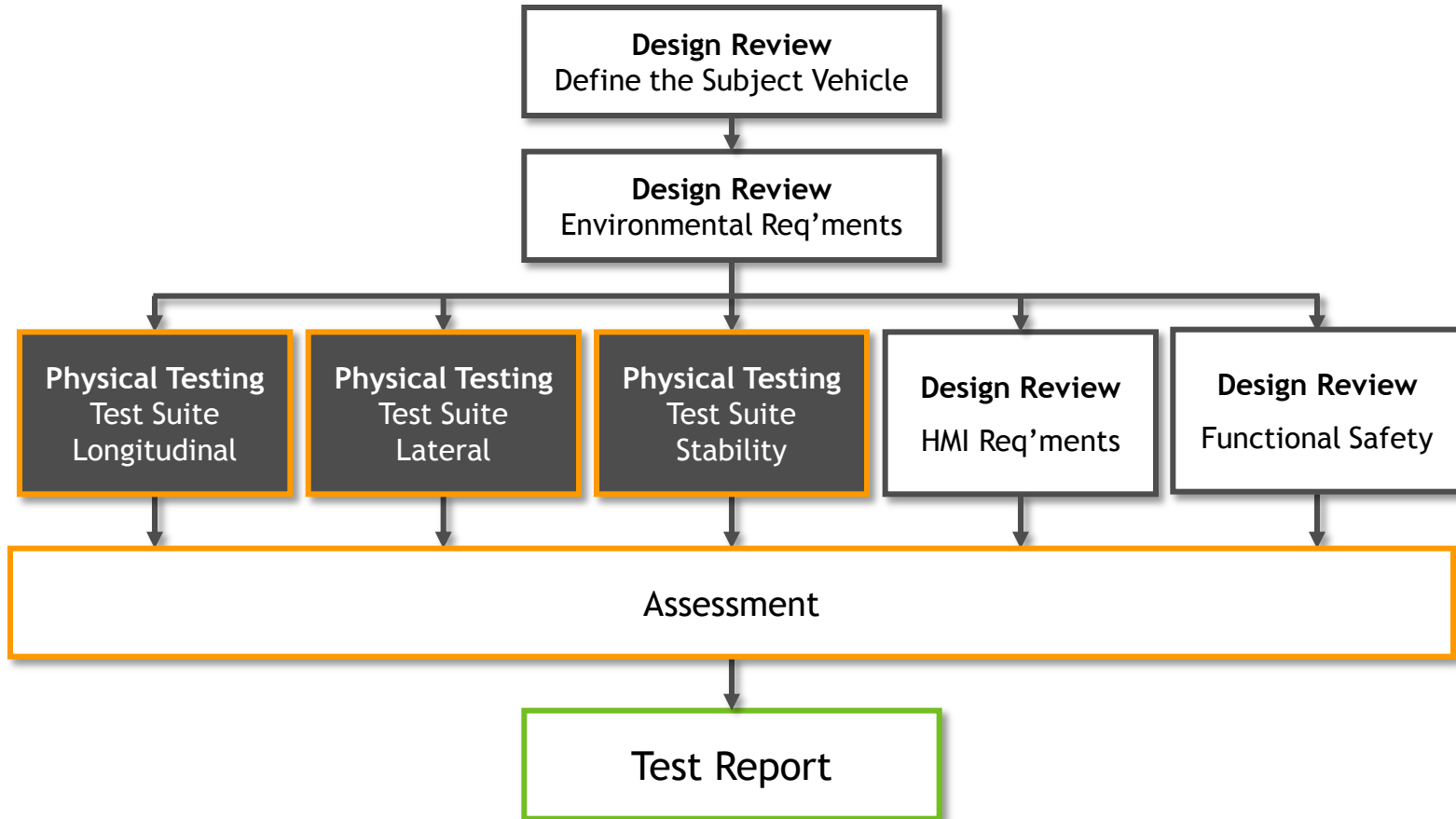
Latest Results Overview



- The eVALUE test methodology consists of two measures:
 - Design review of the considered vehicle
 - Physical testing based on relevant scenarios
- Since the beginning of the project, draft design review and testing protocols have been developed.
- Both are currently under validation.

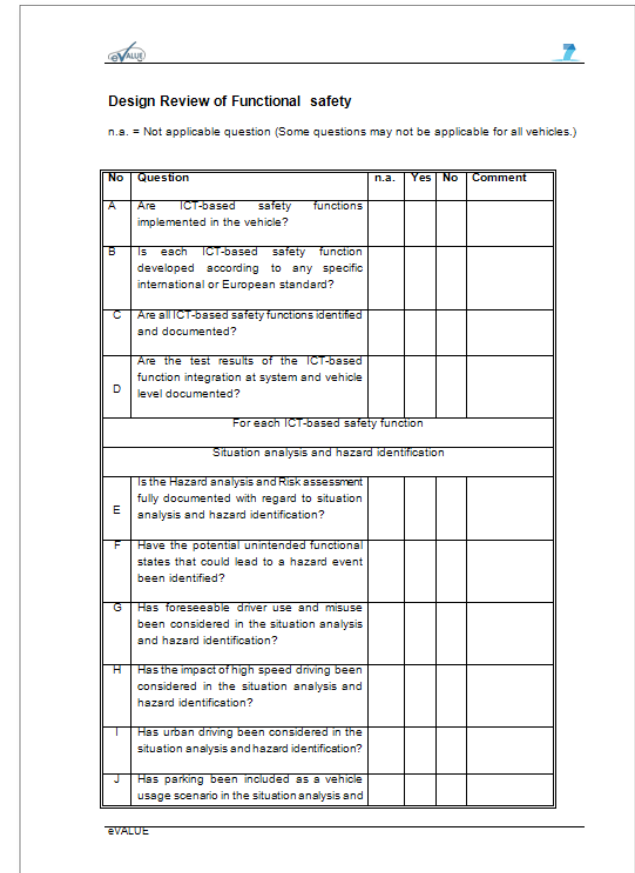


Latest Results Process



→ eVALUE does not define fail or pass criteria!

- A design review is based on simple questions and basic data.
- It may require information provided by the OEM, but is mainly based on the vehicle itself and its standard documentation.
- Requirements or limitations as stated in the vehicle documentation will be taken into account as input for physical testing.
- HMI and functional safety assessment will be based on design reviews only.



Design Review of Functional safety

n.a. = Not applicable question (Some questions may not be applicable for all vehicles.)

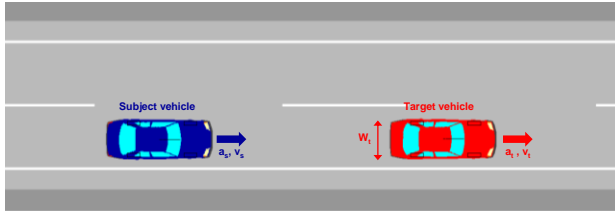
No	Question	n.a.	Yes	No	Comment
A	Are ICT-based safety functions implemented in the vehicle?				
B	Is each ICT-based safety function developed according to any specific international or European standard?				
C	Are all ICT-based safety functions identified and documented?				
D	Are the test results of the ICT-based function integration at system and vehicle level documented?				
For each ICT-based safety function					
Situation analysis and hazard identification					
E	Is the Hazard analysis and Risk assessment fully documented with regard to situation analysis and hazard identification?				
F	Have the potential unintended functional states that could lead to a hazard event been identified?				
G	Has foreseeable driver use and misuse been considered in the situation analysis and hazard identification?				
H	Has the impact of high speed driving been considered in the situation analysis and hazard identification?				
I	Has urban driving been considered in the situation analysis and hazard identification?				
J	Has parking been included as a vehicle usage scenario in the situation analysis and				

eVALUE

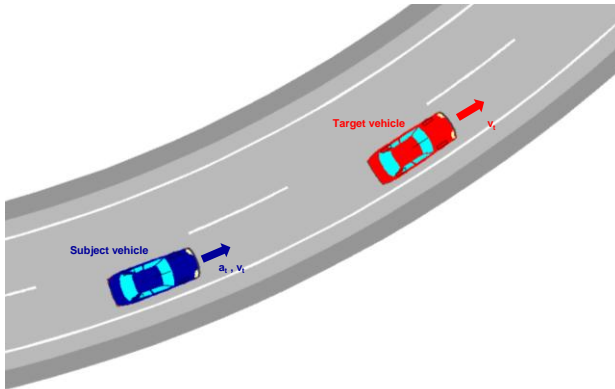
- The protocols for physical testing are based on relevant traffic scenarios, which have been analysed in the beginning of the project.
- They are separated in three clusters that represent different functionality: longitudinal, lateral and stability.
- Each protocol follows a standardised format and contains instructions for:
 - Test principle
 - Objectives
 - Drivers
 - Equipment
 - Environment
 - Required input
 - Vehicle preparation
 - Test procedure
 - Data processing
 - Uncertainties
 - Result generation
 - etc.

Latest Results

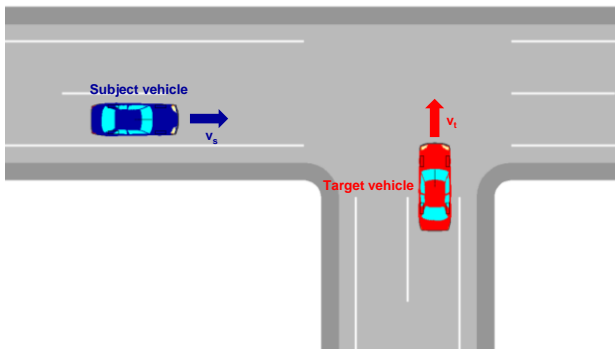
Scenarios for Longitudinal Functionality



Straight Road



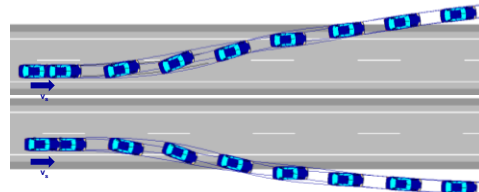
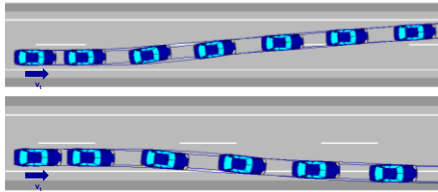
Curved Road



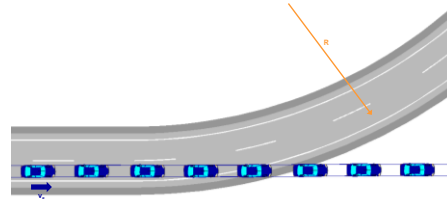
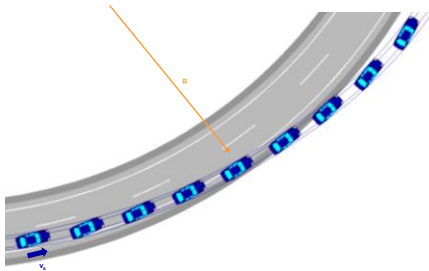
Transversally Moving Target

Latest Results

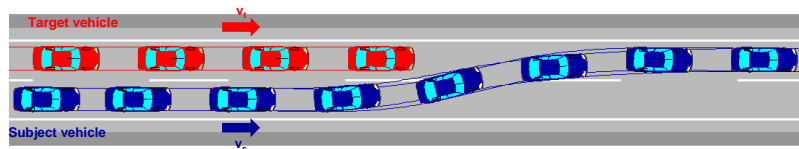
Scenarios for Lateral Functionality



Lane and Road
Departure on a
Straight Road



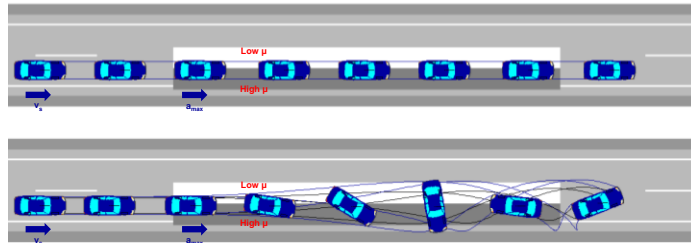
Lane and Road
Departure on Curve/
On a Straight Road
Just Before a Curve



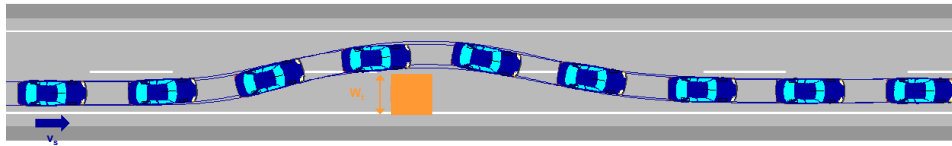
Lane Change Collision

Latest Results

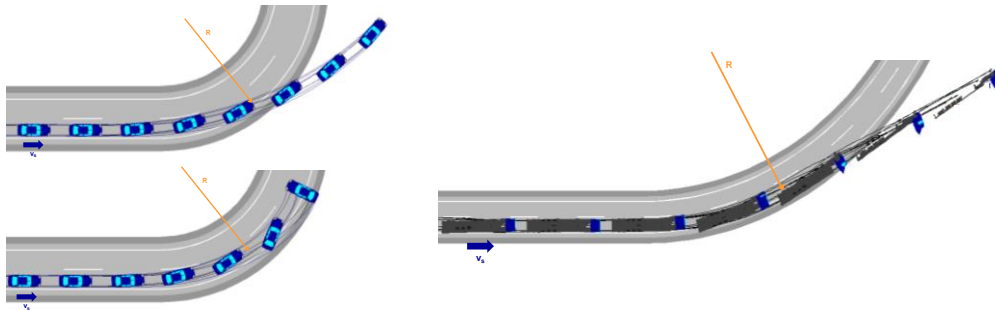
Scenarios for Stability Functionality



Emergency Breaking
on μ -Split



Driver Collision
Avoidance



Fast Driving into a
Curve / Roll Stability

Latest Results

Intended Safety Indicators



- Longitudinal Functionality
 1. Collision Speed
 2. Time of Warning or Intervention
- Lateral Functionality
 1. Collision Speed
 2. Lane Keeping Performance
- Stability Functionality
 1. Performance of the Vehicle
 2. Level of Driver Input Required
 3. Driver Intention Following
 4. Stability

→ The safety indicators are still under investigation and discussion regarding their eligibility and quality.

- Validation of the draft test protocols remains the main task until the close of the project.
 - This concerns to a very large extent physical testing as input for the improvement and sharpening of test methods.
 - The eligibility and quality of the intended safety indicators is further elaborated.
 - The current status of the project is discussed with those who might be concerned: OEMs, suppliers, authorities etc.
- A final demonstration event is scheduled for November 2010, also as a link to other initiatives active in the same field.

- Objective test methods for active safety performance are highly needed and currently under development by different stakeholders.
- The eVALUE project presents a broad approach for the assessment of vehicles based on traffic scenarios and derived test methods.
- Major efforts need to be invested into every single test procedure in order to reach acceptance by all involved stakeholders.
- Further research is needed especially for the derivation of true safety indicators based on accident statistics.
- Discussion of the existing approaches should be open and free for all interested parties.

Thank you for your kind attention!

www.evalue-project.eu



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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 no. 215607.

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