interactIVe

Accident avoidance by active intervention for Intelligent Vehicles

Safety Enhancement through Continuous Driver Support Development and Evaluation Results

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interactIVe Final Event

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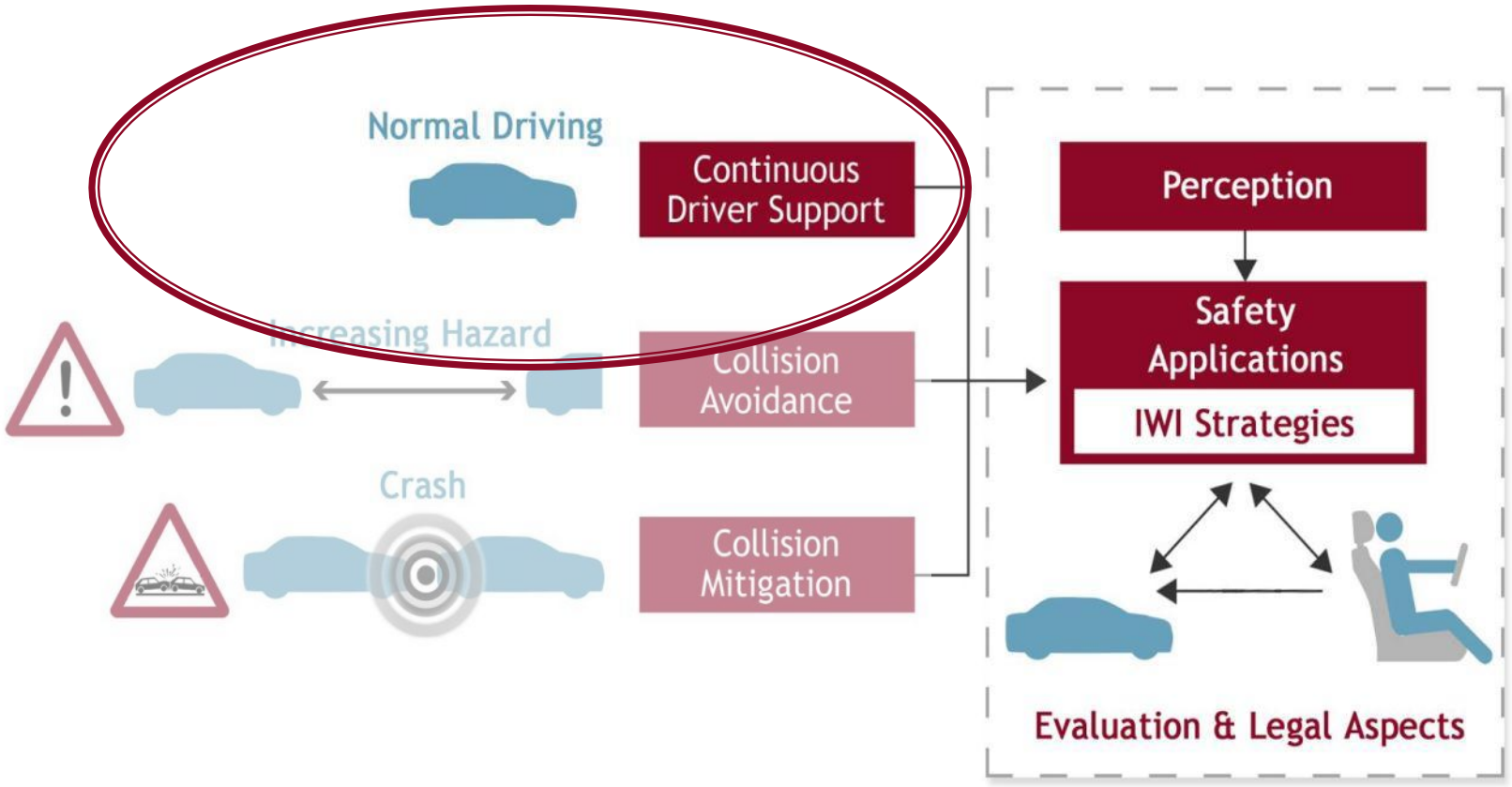
Roles within interactIVe



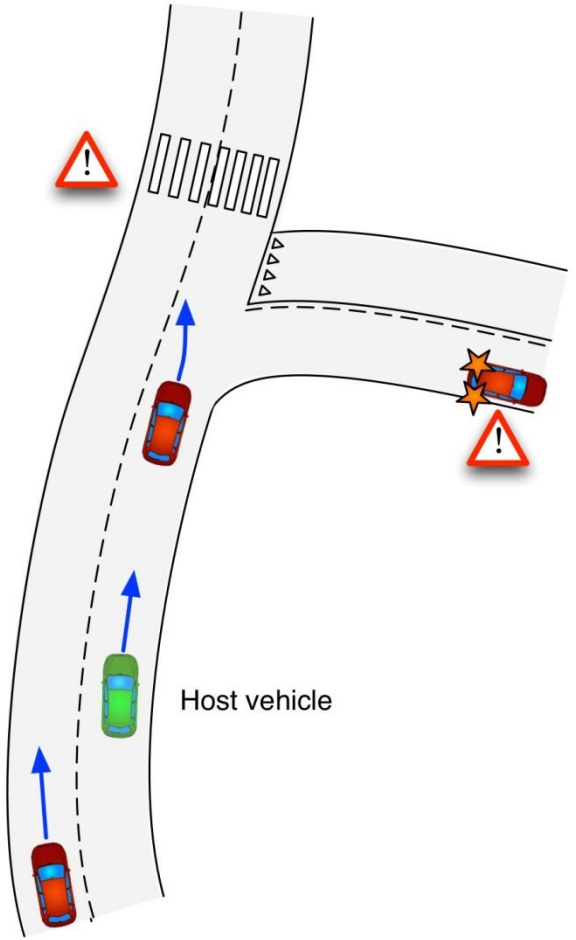
Driver and Co-driver

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.

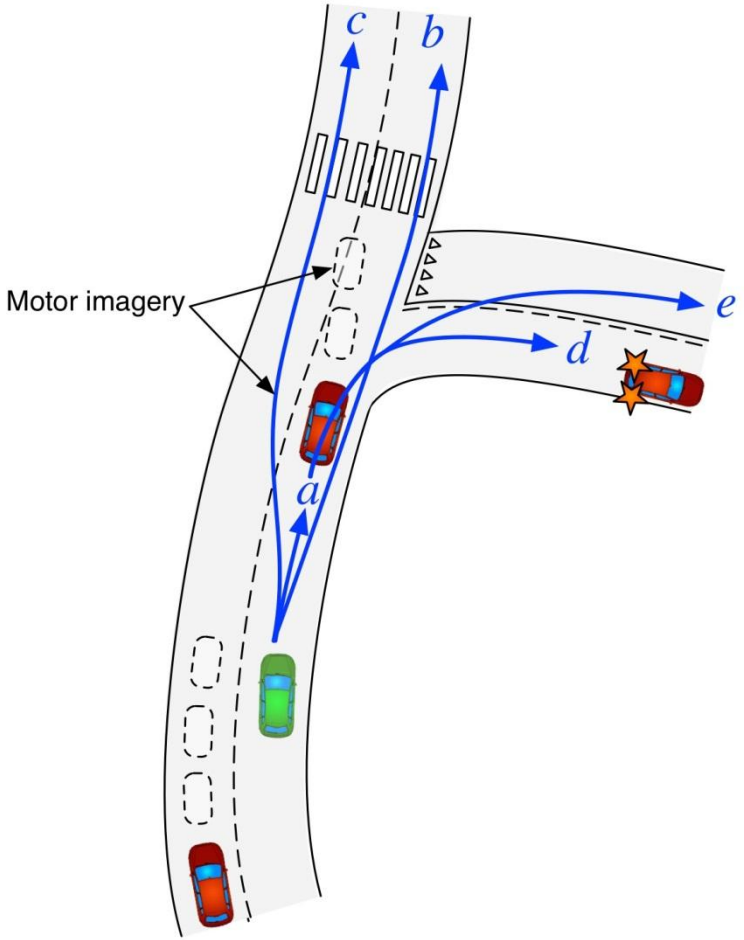
Technical Solutions #1

- Perception Platform to deliver a coherent and rich view of the current situation around the vehicle.

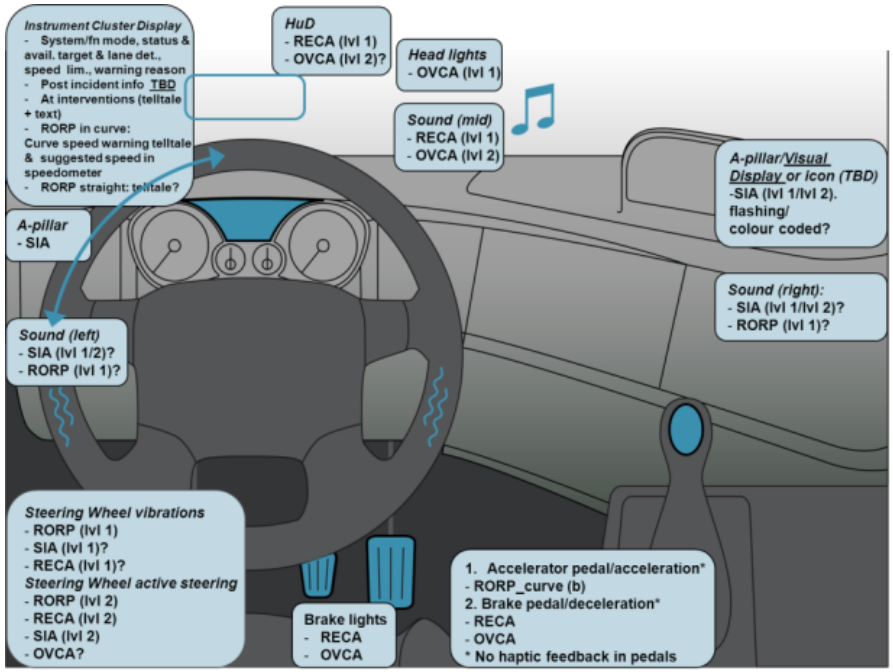


Technical Solutions #2

- 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



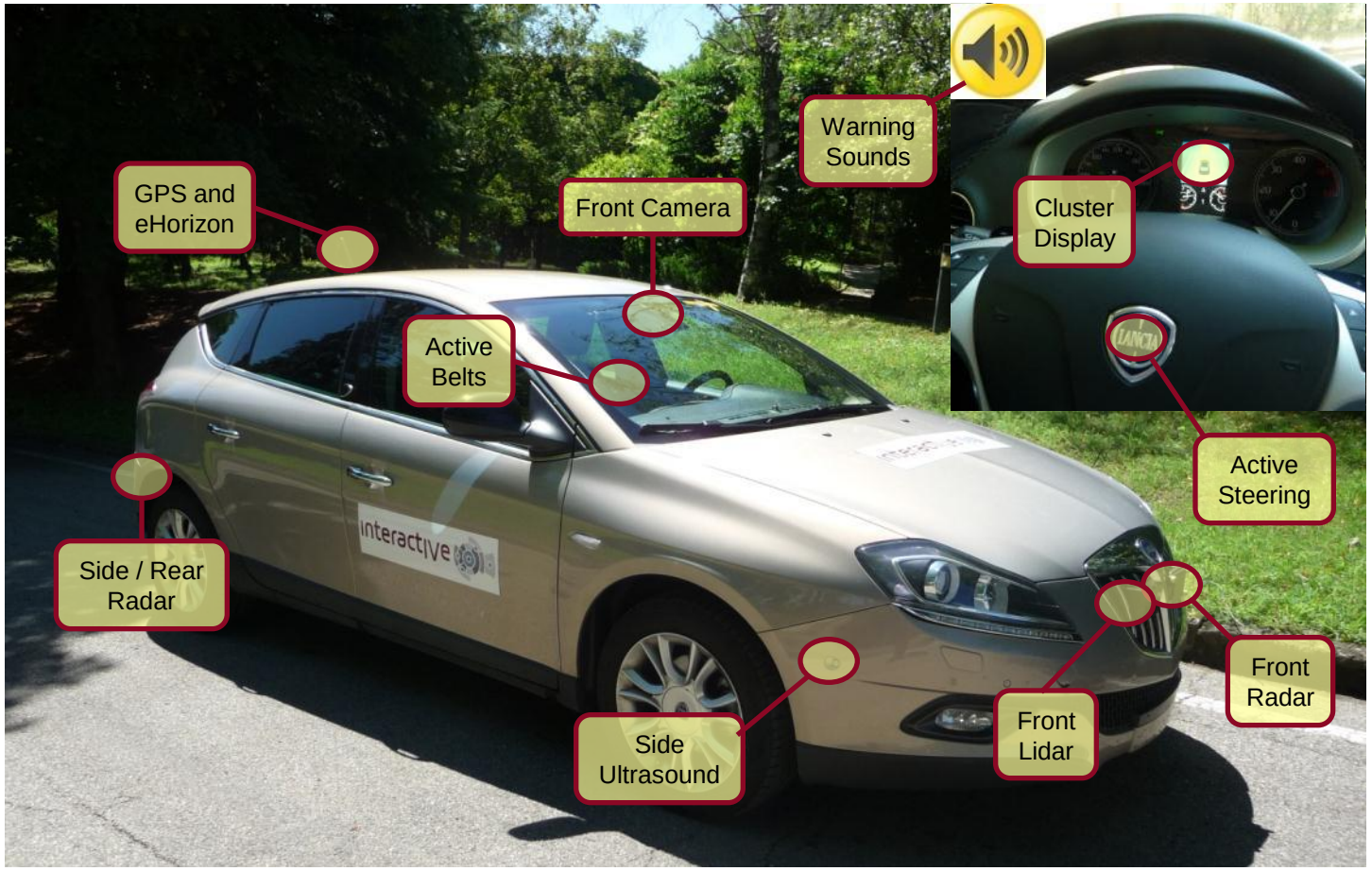
- Information, Warning & Intervention strategies, acting on multiple driver interaction channels, with wide use of haptic channels, operating at different support levels depending on the risk level.

Overview of Demonstrator Vehicles

Shared with SP5

Shared with SP5

CRF Demonstrator Vehicle



CRF Demonstrator Vehicle
Implemented Use Cases

Alert Mode / Active Mode

Normal situation

Unintended lane departure

Drift to side barrier

Exceeding speed limit

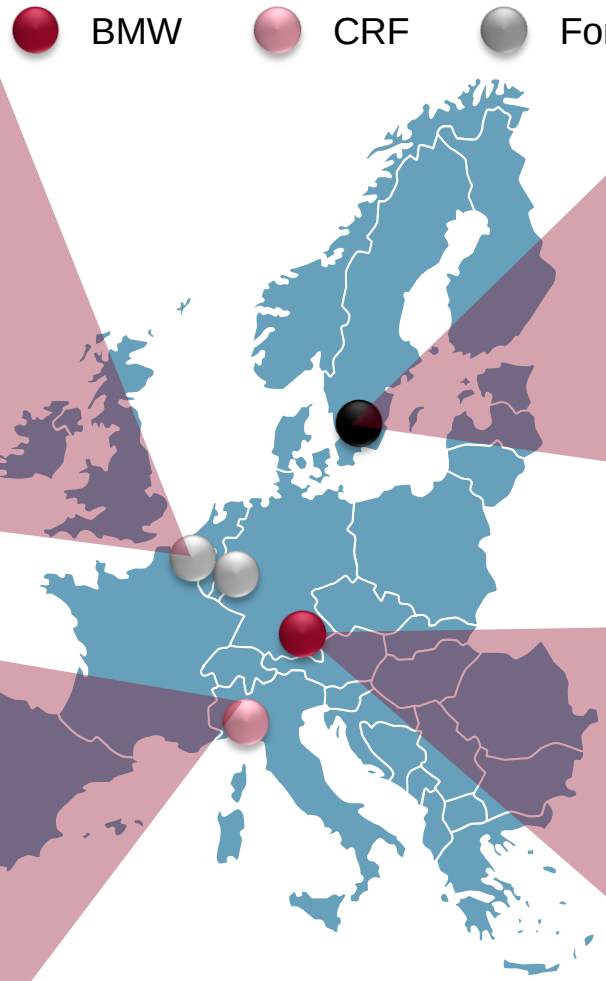
Vulnerable road user

Rear-end collision

Vehicle in blind spot

High speed at curve

Final Evaluation



Ford
Technical tests
- Lommel
- Accident scenarios: 5
- Number of test runs: 308

User-related test
- Aachen
- Driving with the function on a test track
- Number of test persons: 19

VCC
Technical tests
- Hällered
- Accident scenarios: 6
- Number of test runs: 133

User-related test
- Hällered
- Driving with the function on a test track
- Number of test persons: 10

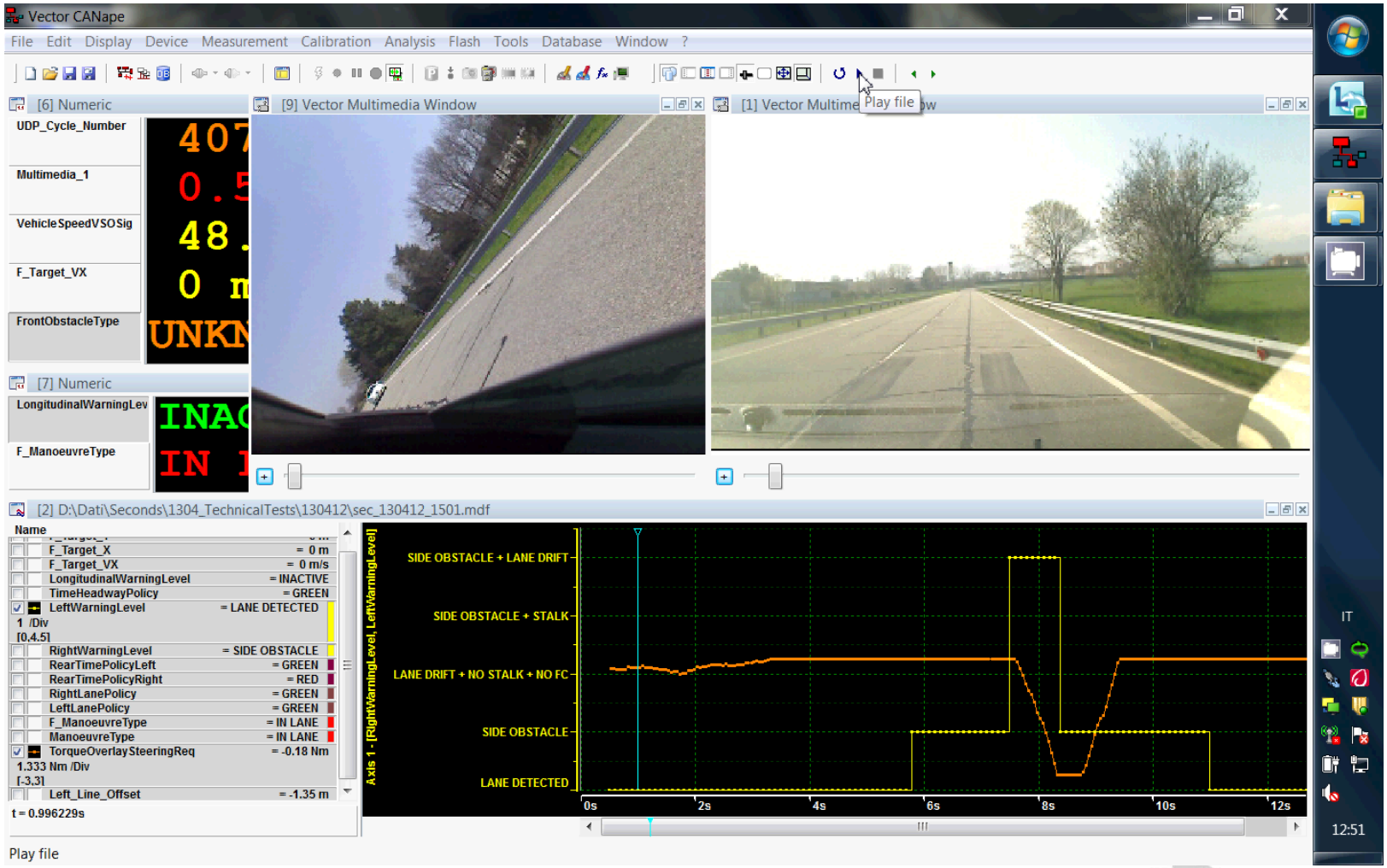
CRF
Technical tests
- Orbassano
- Accident scenarios: 7
- Number of test runs: 261

User-related test
- Turin
- Small field test
- Number of test persons: 24

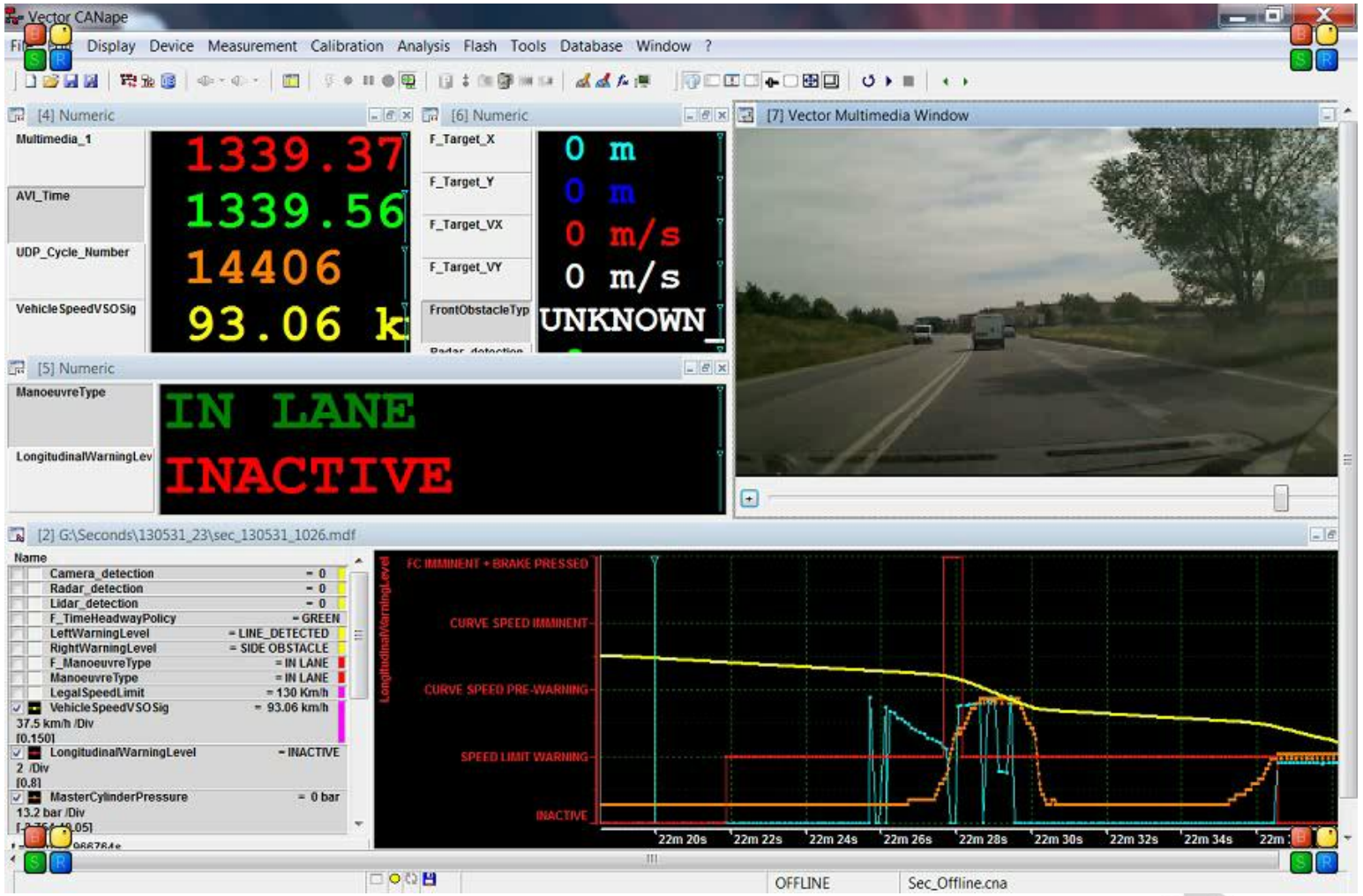
BMW
Technical tests
- Königsdorf
- Accident scenarios: 1
- Number of test runs: 23

User-related test
- Aachen
- Focus group study
- Number of test persons: 17

Technical Tests – Example Scenario



Road Tests – Example Results



Summary of Evaluation Results
Technical Tests

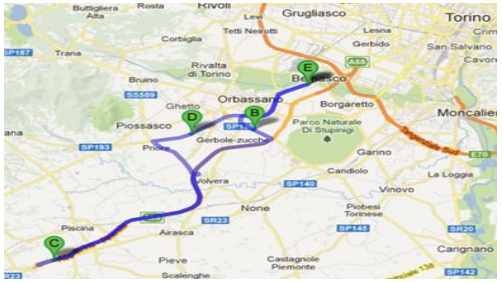
- The data about system activations collected during 725 test runs have been used to check the functions as implemented in the demonstrators against 34 test hypotheses with a 5% level of significance

- 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

Acknowledgments

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SEVENTH FRAMEWORK
PROGRAMME

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