www.pegasusprojekt.de

TESTING AND SAFEGUARDING – Booth No. 23

PROVING GROUND – TOOL CHAIN

PEGASUS

PEGASUS Method for Assessment of HIGHLY Automated Driving Functions

The objective of PEGASUS Testing was to develop the PEGASUS method regarding completeness, correctness and consistency.

The methods developed for Proving Ground could be used in two ways:

- During the development phase for assessing the current status.
- At the end of the development used by an independent testing organization.

Test Concept

Proving Ground

Goal:	Test of selected scenarios A) Special or critical test cases, e.g. derived from certification B) critical test cases identified in simulation to validate simulation results
Input:	Vehicle Trajectories from scenarios, pass criteria, original vehicle as system under test
Output	Evaluated Scenarios and data for the validation of the simulation results

	Simulation	Proving Ground	Field Test
Test coverage	SIMULATION you will find on stand 21.	"30" scenarios, especially critical scenarios or scenarios with certification relevance	Field Test you will find on stand 27.
Effort qualification of testing tools and methods		High, but only one time.	
Effort for test setup and preparation		Very high, as controllable vehicles, measurement technology and other proving ground infrastructure have to be measured individually for each test case.	
Effort for test enforcement		Medium, depending on the number of tests and the available proving ground	
Standardization methodology and tools		No or only conditional standardization as test equipment and infrastructure are OEM-specific implemented and qualified	
Limitations		Test site not part of the ODD, HD card required in OEM-specific format Infrastructure must be suitable for level 3.	

Supported by:
Federal Ministry for Economic Affairs and Energy
on the basis of a decision by the German Bundestag

TESTING AND SAFEGUARDING – Booth No. 23

PROVING GROUND – TOOL CHAIN

PEGASUS

The PEGASUS Tool Chain

The proving ground tests of automated driving functions in new vehicles (VUT= vehicle under test) require different test objects.

1. Control Center

- Mobile design for flexible application on various proving grounds
- Control and monitoring of the test procedure
- Bidirectional data communication with all test entities
- Powerful computer with control station software
- Wireless communication network
- Autonomous operation

2. TSV – Traffic Simulation Vehicle

- Autonomous movable object
- Precise localization with real time kinematic (RKT) satellite navigation and inertial platform
- Communication unit
- Position-based trajectory control
- Direct control of internal vehicle actuators for steering, throttle and breaking

3. GST – Guided Softcrash Target

- Autonomous movable objects
- Driver-over platform for close passes and real impacts and collisions
- Precise localization with real time kinematic (RKT) satellite navigation and inertial platform
- Position-based trajectory control

Supported by:

Federal Ministry for Economic Affairs and Energy

on the basis of a decision by the German Bundestag

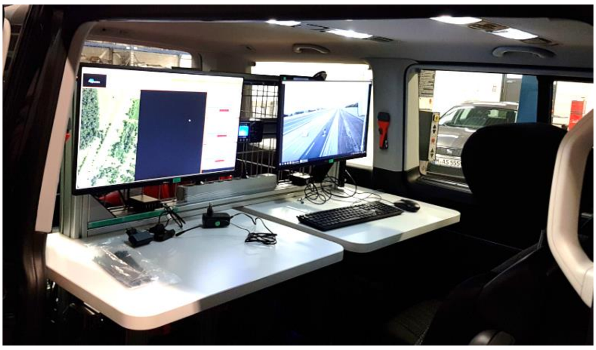
TESTING AND SAFEGUARDING – Booth No. 23

PROVING GROUND – TOOL CHAIN

PEGASUS

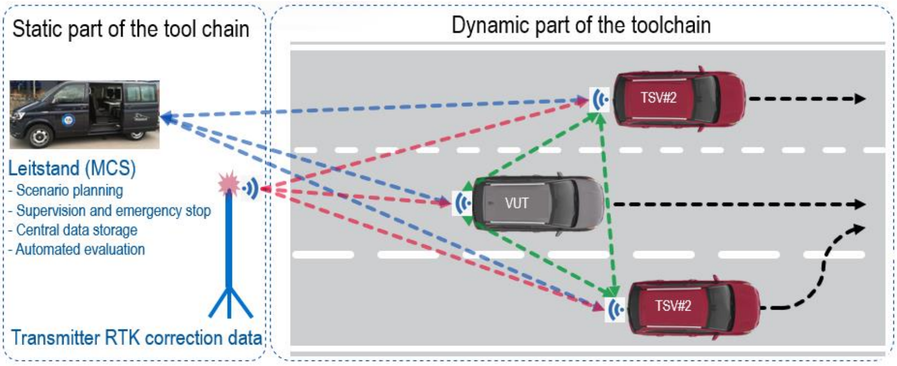
Communication and structure

1. The mobile control station (MCS) monitors the dynamic test objects on the test track, records transmitted data and has the ability to initiate an emergency stop (blue channel).



2. The dynamic test objects transmit time-critical position, distance and speed data via their own data connection (green channel).

3. In addition, position data are transmitted from a stationary GPS antenna to the dynamic objects (red channel).



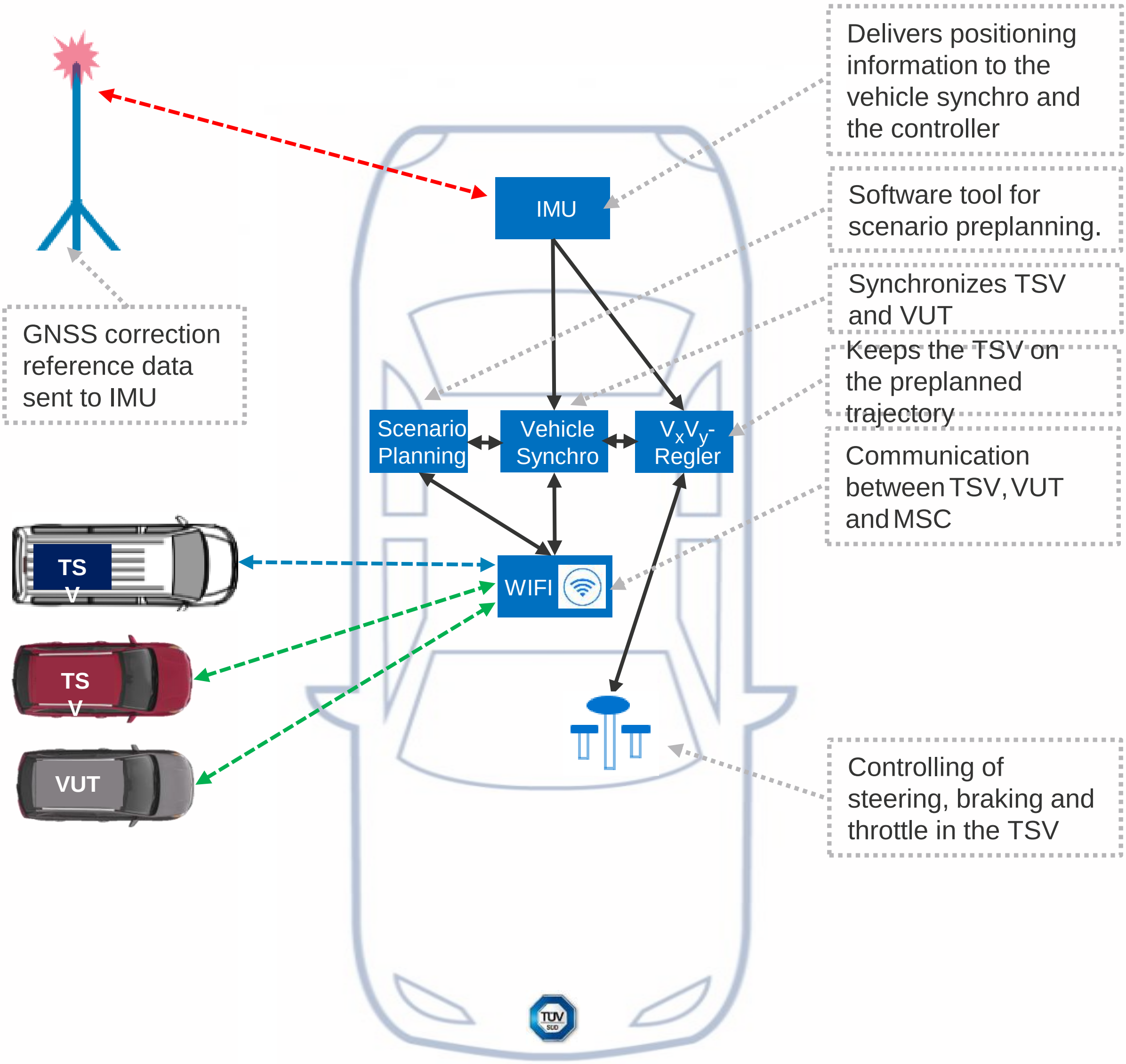
www.pegasusprojekt.de

TESTING AND SAFEGUARDING – Booth No. 23

PROVING GROUND – TOOL CHAIN

PEGASUS

Technical overview of Traffic Simulation Vehicle



Supported by:
Federal Ministry for Economic Affairs and Energy
on the basis of a decision by the German Bundestag