**Add value.
Inspire trust.**

Assessment of automated vehicles with scenario-based testing

Testing of critical scenarios in a controlled environment

Your challenges

To achieve widespread market acceptance, manufacturers must meet regulatory requirements and be confident of the safety of their autonomous vehicles (AV). AV technologies must therefore be thoroughly tested and proven. To be assured of consistent results, the testing toolchain must be at the same technological level as the AV functions. This requires a test regime that is smart, efficient, reliable, repeatable, accurate and precise. Modern automated driving functions can therefore only be verified by testing complex, critical and representative scenarios on a proving ground, using multiple dynamic objects in a precisely controlled and repeatable testing environment.

Why is AV scenario-based testing important?

Whether you are developing vehicles with AV functions; integrating your camera, LIDAR or radar-based platform; or need your sensor models verified, testing in a real-world environment is necessary. This will help to assure the market that your AV is safe to use on public roads

and gain end-user trust and acceptance. However, the verification of automated driving functions using critical and representative testing scenarios is complex and demanding as it requires a safe, fully synchronised and controlled proving ground test environment.

During the test all dynamic and static objects, such as the vehicle under test and surrounding vehicles that represent the criticality of a defined scenario, are connected by a low latency data connection. The surrounding vehicles must be able to dynamically adjust their trajectory, according to the applied strategy of the vehicle under test, as modern AV functions might display non-deterministic behaviour.

How can we help you?

As one of the leading experts in the field of autonomous driving technology testing, TÜV SÜD offers a turnkey service for the verification of AV functions, using scenario-based testing on the proving ground. Our AV testing approach has been developed and verified during

TÜV SÜD

TÜV®

the German government-funded PEGASUS project, a consortium of industry stakeholders focused on the assessment, verification and validation of highly automated driving systems on highways. We verify your AV function and performance using end-to-end testing with the newest physical testing technology. We also confirm that your tests are conducted correctly and the results are reliable, representative and trustworthy.

Our AV scenario-based testing service

TÜV SÜD offer various services to verify your automated driving functions via proving ground tests:

- **Physical test execution**
  Our full testing service includes scenario definition, KPI definition and evaluation, safety concept definition and test preparation, test execution, data postprocessing and reporting. Our integrated, flexible and transportable toolchain allows testing on all international proving grounds.
- **Assessment of your testing workflow**
  We assess your testing toolchain and environment, as well as your testing capabilities and processes. Our technical assessment and improvement report includes an evaluation matrix and gap analysis.
- **Partnership and licensing**
  By eye witnessing your tests, we assess your testing workflow and confirm tests have been executed correctly. We can add value to your test reports by approving them with a TÜV SÜD conformity declaration.
- **Consulting services**
  We support you in realising or optimising your testing workflow, while building-up your knowledge, sustainability and efficiency of scenario-based testing.

Your business benefits

- **Develop safe AV technologies** – TÜV SÜD's turnkey solution uses state-of-the-art testing technology, tools and methods to ensure the safety of your AV functions.
- **Optimise your testing workflow** – TÜV SÜD's assessment will help you to implement a safe testing workflow, achieving precise and reliable results.
- **Prove your performance assurance** – by testing and verifying the performance of your AV function or sensor model to increase market acceptance.
- **Gain a competitive edge** – by using TÜV SÜD's independent third-party reports to gain customer trust and confidence in the capabilities of your AV functions, sensor models or test results.

- **Be ready for new standards** – by testing your AV-function under consideration of upcoming standards and directives for international homologation and type approval of SAE L3 to L5.

Why choose TÜV SÜD?

TÜV SÜD works with top automotive OEMs and suppliers globally and has been at the cutting edge of vehicle safety and performance testing for over a century. Our TÜV SÜD experts are involved in various global projects, including our work with Singapore's Centre of Excellence for Testing and Research of Autonomous Vehicles (CETRAN), to address the new challenges of regulation development and functional safety of AVs within urban environments. We are also a charter member of the International Alliance for Mobility Testing and Standardization (IAMTS), which aims to develop a commonly accepted framework of regulations, test scenarios, verification, validation and certification methods and terminology. By joining several working groups, our experts are deeply involved in reworking international standards that address the homologation and type approval of AV-functions, such as the upcoming UNECE regulation for ALKS (1st SAE L3 system). Based on our international expert network and industry know-how we can support you in the safe development and global roll-out of your automated technologies.

Add value. Inspire trust.

TÜV SÜD is a trusted partner of choice for safety, security and sustainability solutions. It specialises in testing, certification, auditing and advisory services. Through more than 24,000 employees across over 1,000 locations, the company adds value to customers and partners by enabling market access and managing risks. By anticipating technological developments and facilitating change, TÜV SÜD inspires trust in a physical and digital world to create a safer and more sustainable future.

Related services

TÜV SÜD provides the following related services:
- ISO 26262 Functional safety training and certification
- AV-Permit for operating autonomous vehicles on public roads
- ISO/PAS 21448 SOTIF Training / Process fitness check
- Cybersecurity assessment for connected and automated vehicles