# DEMICON

**Case Study**
AUMOTIVE

---

EFFICIENT TEST PROCESSES AS AN
INTEGRATIVE PART ACCELERATE
THE DEVELOPMENT OF
# EMBEDDED SOFTWARE
# FOR SAFETY-CRITICAL
# APPLICATIONS

How DEMICON supported an automotive supplier's software development for quality assurance and compliance with safety standards for safety-critical applications. Effective test management and seamless integration of test processes not only increased the efficiency of quality assurance, but also significantly shortened development cycles.

demicon.de

As an established supplier for big national and international automotive manufacturers, the customer has been developing central components for cars on our streets for a long time. Due to new technologies and constant innovation, the need for new developments increases parallel to the requirements for further development, extension and maintenance of existing solutions. For this reason, the customer department responsible for developing the embedded system to control the central component decided to seek support from DEMICON. DEMICON not only took over the unit tests for the ongoing development, but also the creation of the test strategy and the implementation of the unit and integration tests for the new development.

**INDUSTRY** AUTOMOTIVE

**CLIENT**  SUPPLIER FOR BIG AUTOMOTIVE MANUFACTURERS

**TOOLS**  LAUTERBACH TRACE32, TESSY, JIRA

**COMPETENCES OF DEMICON**
· Extensive knowledge about test concepts, test techniques, tools and the requirements for safety-critical applications
· Practical experience in testing, the appliance of test methods and the utilisation of test tools as well as in software development
· In-depth knowledge of embedded software development and embedded system architectures, as well as debugging and troubleshooting

"With the support of DEMICON, the customer was able to concentrate completely on the development. At the same time, he could rely on the promptly validation of functionality and feedback on potential security risks or quality deficiencies, which means that the risks could be eliminated in a shorter time. Through a combination of optimised testing processes, short response times and good communication, development cycles were shortened and critical deadlines were met."

**CHRISTOPH SCHÖTZ**
SOFTWARE DEVELOPMENT OPERATIONS
MANAGER AT DEMICON

BENEFITS FOR OUR CLIENT

Efficient Quality Assurance

Optimised processes & integration

Well-integrated test environment which is up-to-date

Documentation, result reports & traceability

# EFFICIENT TEST PROCESSES AS AN INTEGRATIVE PART ACCELERATE THE DEVELOPMENT OF EMBEDDED SOFTWARE FOR SAFETY-CRITICAL APPLICATION

BERLIN & STUTTGART, DEMICON

## THE PROJECT & ITS CHALLENGES

The customer's existing software had grown to several tens of thousands of code lines, for which the test coverage of the recently developed components was only 40% due to personnel bottlenecks.

Therefore, the necessary quality measures in compliance with ISO 26262, such as the software architecture and the code structure, had not yet been validated for further development. There were also very old versions of software test tools in use and the logging of results was realised with Excel files. The cooperation and the exchange of information with external partners also had to be built up and established.

For the new development, the concept of quality assurance was still on the stocks at the time and additional consulting was necessary.
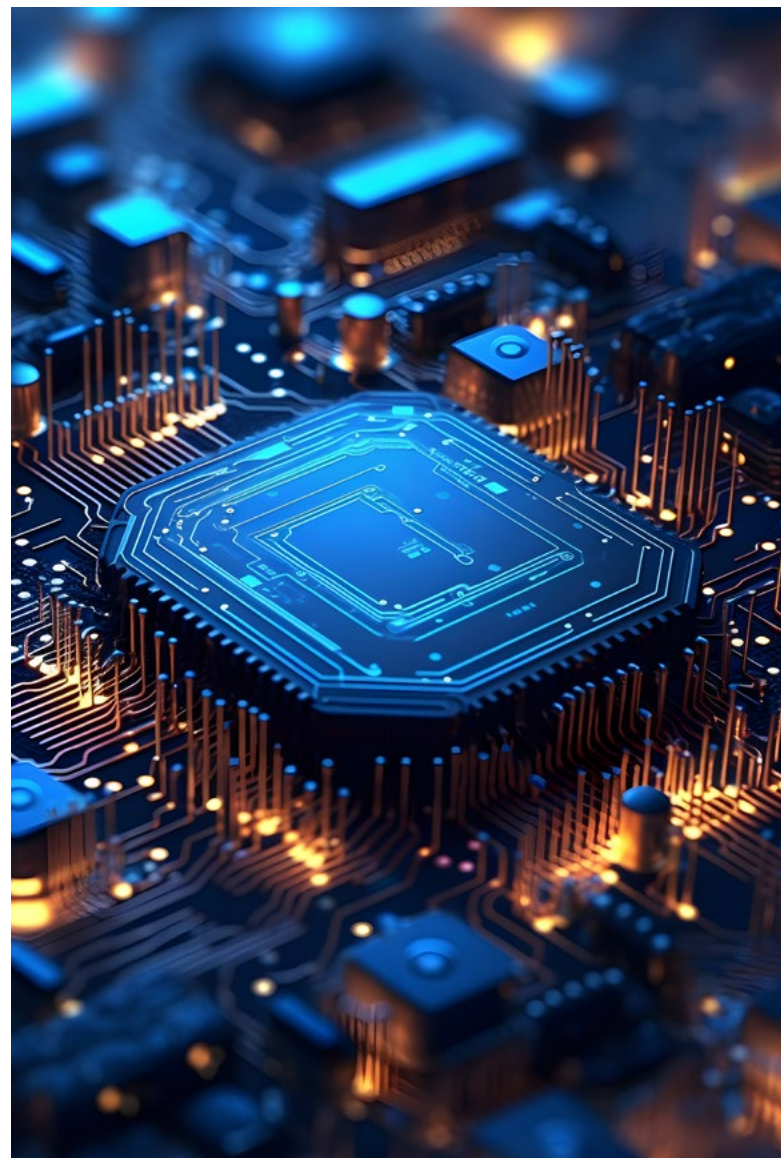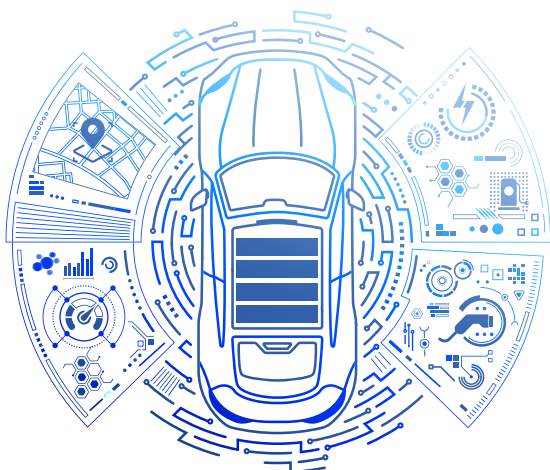
## OUR SERVICES & SOLUTIONS

To ensure the quality of the ongoing development, a requirements workshop was first held to understand the current status, such as the tools, workflows, constraints and parameters currently in use.

For example, a current tool for static code analysis was already well integrated and in use. Based on this, further steps to set up the test environment and process integration could be conceptualised.

This included an update of the test tool in use and the migration of the existing tests to the newer tool version as well as the integration of test management into the customer's project management tool. The organisational boundary conditions could also be defined and coordinated.

**The test coverage of the existing software components could then be driven to 100% in just a few weeks.** Through effectively planned regression tests for certain software releases, the test coverage was kept almost constant and **potential safety risks in the code were remedied promptly.** As a result, the test effort before a software release and thus the pressure for time were significantly reduced and mistakes could completely be avoided in these time-critical phases. Consequently, the **time-critical deadlines for the release of software updates could be successfully met.**

For the new development of the embedded software, a test strategy for software unit tests and for software integration tests was first developed and created as documents. These documents were integrated into the product's test concept for the goal of certification. Besides other content, this also includes the test goal, which additionally contains the quality measures of the software development to be tested and is also reflected by the description of the methods to be used for test case creation.

## EQUIPPING YOU WITH THE FUTURE OF IT.

TAKE A LOOK HOW

Another part of the test strategy is the definition of the test environment with all utilised software tools, such as the unit test tool or the compiler including the version information. The test strategy for the software integration tests, which were executed on hardware, additionally contains the information about the test system structure, like the utilised debugger and the hardware revision of the embedded system under test. The availability of all tools and hardware, the software version to be tested as well as shared access to Jira and Confluence, are also part of the documented test requirements. These requirements must be met so that efficient testing is possible and the test creation can begin.

The combination of regular coordination, cooperative planning and the possibility of direct communication allowed smooth cooperation. With the help of easily accessible tools, such as **Jira for transparent project planning** and the **comfortable documentation in Confluence**, the e**ffective exchange of information between testers, developers and management** was facilitated. This could ensure **seamless integration into customer processes and continuous traceability**. In conjunction with the detailed description of potential defects in the software or the specification, of its effects and of proposals for improvement, the **productivity in quality assurance was extremely increased**.

Through increasing the software architect's and developer's awareness of quality and required measures, the number of potential defects found and consequently the effort for regression tests was fast reduced. Testing parallel to the development and giving feedback accordingly were also perceived as helpful support by the software developers.

The newly developed control unit was successfully certified in compliance with the tight time schedule and is already in use in many vehicles with flawless functionality.

## THE BENEFITS – ALL WINS AT A GLANCE

### Efficient Quality Assurance

The customer derived benefit from the support of experts who had the necessary expertise. Moreover, the experts not only have a good eye for quality assurance, but also have the overview and knowledge of the entire development process. Consequently, it is kept sight of the goal of the perfectly functioning and certified embedded system. Efficiency through knowledge of best practice and routine in test creation, result evaluation and documentation, as well as targeted automation, also accelerated the test process.

### Optimised processes & integration

Through optimal test processes that could be seamlessly integrated into the development process and were realised by suitable tools, the test processes and reporting were easily optimised and the entire development cycle was shortened. The selection and customisation was done by taking into account the existing processes and already utilised tools. They were integrated either as an addition or as a replacement for improvement. This also allowed the optimal implementation of information exchange and cross-team collaboration.

### Well-integrated test environment which is up-to-date

A big advantage of the update of the commercial test tool were the improvements for test creation, which provided much more user comfort and faster workflows. Additionally, the new available export formats of the test results supported the import of them into test management tools in a simple way.

### Documentation, result reports and traceability

The documents created, such as the test strategies and results reports including test case specifications and descriptions of test incidents, were used for certification by the TÜV.

## CONCLUSION

Efficient quality assurance consists of more than just creating test cases for validation. Expertise, know-how, qualified tools and customised processes as well as the right approach for smooth cooperation is needed to increase productivity in the test and development process and to minimise effort and costs.

DEMICON is a multi-award winning IT service provider founded in 2008, and one of the leading AWS and Atlassian Platinum & Enterprise Solution Partners in the DACH market.

DEMICON has built a legacy based on deep technical expertise and strategic thinking, combined with a people-first approach. Our services range from customised software development and implementing scaled, agile methods, such as SAFe, to consulting on agile processes and hosting seminars and workshops.

Our team of experienced Enterprise Architects, Technical Consultants, Software Engineers, Business Consultants and Project Managers provide a wide range of solutions to help companies reach their digital goals.

# TOGETHER WE WILL DESIGN THE RIGHT SOLUTIONS FOR YOUR VISION!

GET IN TOUCH