

## Reliable e-mobility and infotainment on the move – thanks to TestBench

### Tool support in QA of Panasonic Automotive Systems Europe GmbH

#### The starting situation

The Panasonic Automotive Systems Europe GmbH offers companies of the automotive industry innovative components and comprehensive solutions that support a safe, future-oriented and sustainable automotive industry.

From infotainment systems via driving assistance technologies to batteries for hybrid and electric vehicles, Panasonic offers solutions that are suitable to make mobility more comfortable, safer and more environmental friendly. Following the slogan “Innovation Driven Forward”, Panasonic significantly contributes with the continuous development of solutions for improved safety, energy efficiency and connectivity to value creation and growth potential of the European automotive industry.

The range of Panasonic’s Automotive Solutions in the field of infotainment consists of the fields navigation, multimedia, live presentation of traffic data (TMC) as well as driving assistance systems, such as headup displays or display and operating systems. In the field of e-mobility, the main focus is on load control.

In Germany, the software quality assurance of Panasonic Automotive at the location in Langen operates according to the v model and in Neumünster according to the agile procedure with sprints with a length of one to two weeks.

#### Our task

The aim was to support the global collaboration of the software quality assurance teams of Panasonic Automotive that are based at both German locations as well as in India. In Langen, about 30 to 40 testers are employed that are supported by a team of about 10 persons during the test implementation based in India. In Neumünster, the team consists of about 20 to 30 testers which, in the near future, will be supported by just as many testers in India during the test implementation.

Moreover, imbus has been commissioned to create the basis of SPICE assessments by OEMs: A proof was needed for a corresponding coverage of the requirements. For this purpose, a tamper-proof traceability from the requirement via the test specification and the test result to the error message was absolutely necessary in order to fulfil legal standards, such as the quality standard ISO TS 16949, ASIL of ISO 26262 and SPICE 15504-5.



It was aimed to reduce the customization effort for the test specification while simultaneously modifying the underlying requirements. In addition, it was planned to reduce the efforts during the preparation of reports. And last but not least, it is expected that significant training efforts for new employees should be lower in future.

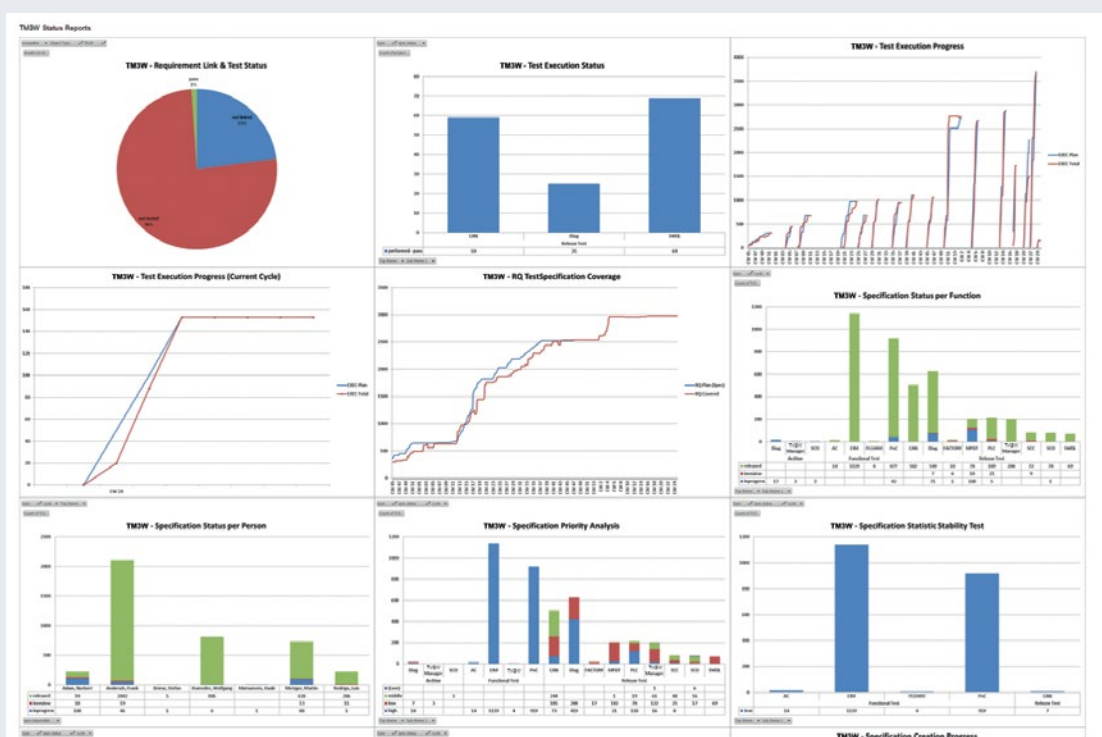
The aim was to create a consistent and continuous information basis during the test which combines the manual and automatic test results. The quality assurance of the test specification by means of reviews should become a well-established process. All in all, it was aimed to considerably reduce the test efforts.

### The concept

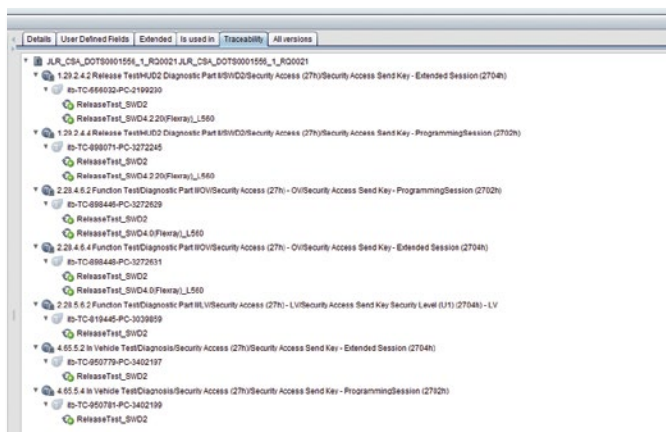
It was specified to centrally combine the whole testware. This included the manual test results as well as the test automation results. Based on a risk assessment, a conscious planning of the test amount for all test cycles should be established which consisted of full tests for new functions and delta tests for changes.

For this purpose, it was needed to link the requirements to the test cases and to measure and complete the coverage of the requirements by test cases. Based on this link, the test status of the requirements should be determined due to the test results. Moreover, using an impact analysis, it was intended to answer the question as to which test cases should be reviewed and possibly adjusted in case the requirements were changed. With a central tool for test management, test design and test implementation, the processes of all projects and project participants in Langen, Neumünster and in India should be merged. The aim was to automatically create identical reports that can be handed over to the OEM without manual reworking.

A Panasonic-internal portal should bundle all relevant information about current projects, especially the coverage of the requirements, the achieved quality, the progress during the creation of the test specification and test implementation as well as the occurrence of errors. It was intended to shift the test cases review carried out by system engineers from a document-based process to an online process.



The aim was to ensure the revision safety based on a continuous traceability of all requirement versions, from the versions of related test cases and all results of even repeated test implementations to the whole defect history.



Tracibility-tree

When setting up a new project, the testware that had been created so far should be used, i. e. test sequences should be used with other parameters.

## The implementation

The imbus TestBench had been introduced to the software quality assurance of Panasonic Automotive Systems Europe GmbH. It manages all requirements, test cases, test results and defects. In addition, it offers interfaces to the requirements management DOORS and the defect management Jira.

Together with Jenkins, the TestBench delivers reports during sprint monitoring. The review process will be mapped by relevant status changes of the test cases, which will be implemented by the system engineers, from “in review” to “approved” or in progress”, together with corresponding review comments.

Revision safety is ensured, as the TestBench-internal versioning is used. Versions that have already been checked in cannot be changed anymore. At the same time, however, it is possible to create any number of work versions for requirements, test cases, test results and defects. The TestBench automatically manages the whole related traceability.

In order to map the test process, the role and status model of the TestBench is used. Thus, it is possible to map the different roles such as test manager, test designer, reviewer, tester, project administrator and test automation specialist. The German locations as well as the globally spread locations have access to a central repository.

## The result

With the TestBench, there is much more transparency at any time about the status of the test operations and the achieved quality. The tool serves as a complete information basis for assessments and can be accessed at any time. All assessments, that have been implemented since the TestBench has been launched at Panasonic Automotive, were successful.

The test coverage based on requirements has considerably improved. The QA team of Panasonic Automotive can rest assured to have covered all relevant requirements in the test. The efforts for creating the reports could be significantly reduced and the reports themselves can be understood more easily. With the TestBench, the test managers can access all required and up-to-date information at any time.

Moreover, they can rely on plans that have already been implemented. Thus, the test planning can significantly be accelerated, simplified and improved. Administrative efforts, too, have been reduced, such as in the field of defect management via a bi-directional link to Jira.

The TestBench offers test managers a good overview about the current progress of the projects for which they are responsible. Thus, they can take measures in a timely manner. The next step at Panasonic Automotive Systems Europe GmbH is to further unify the test process using the TestBench on different projects and locations.

It is planned to roll out the TestBench for Neumünster for 20 to 30 more testers to India and to use it for future projects, too. In addition, it is thought about introducing the variant management TestBench feature which allows a more intensive reutilization and could contribute to a further increase in efficiency.



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