

# ZF: Testing more efficiently with EXAM

The Car Powertrain Technology business unit at ZF Friedrichshafen AG is already relying on EXAM to test new control units extensively and efficiently during the development process.

TEXT: Stephanie Homm PICTURES: © learchitecto / Fotolia.com

The automotive supplier ZF Friedrichshafen AG had already evaluated an initial pilot application with EXAM (EXtended Automation Method) back in 2009 and 2010. Performed at the Group's ZF Engineering Plzeň s. r. o. test center, this evaluation produced very satisfactory results. In view of this, ZF decided to launch EXAM as a standard for new customer projects and rolled out the solution in numerous departments in subsequent years. The test automation solution is used together with Hardware-in-the-Loop(HiL) and Software-in-the-Loop(SiL) systems which precisely replicate the environment in which the

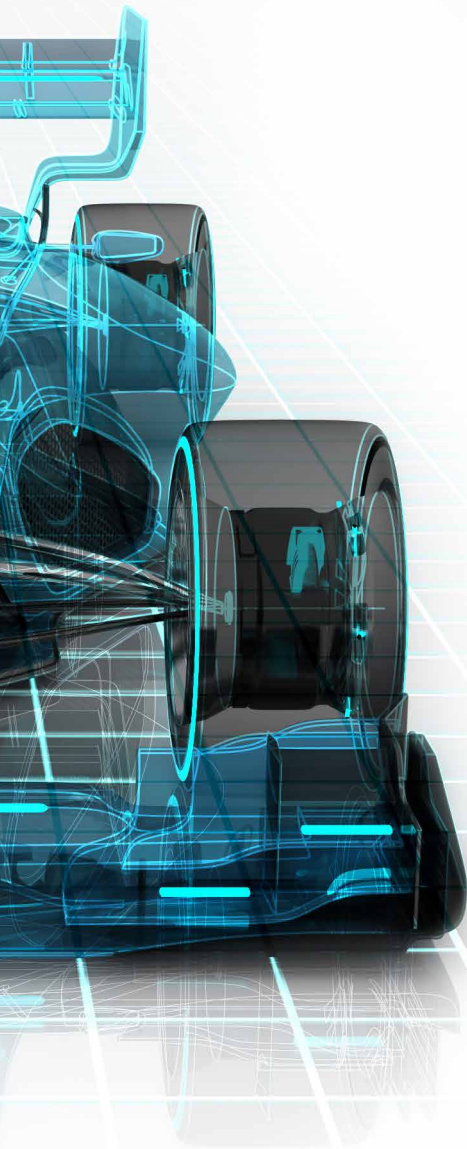
control unit will be operated at a later date, such as powertrains or complete vehicles. This way, the control unit can be subject to realistic function tests in conjunction with other components.

Like other business units at ZF, Car Powertrain Technology already had a different test automation solution in place for long-term existing customer projects. Upgrading that system for new projects or platforms had proven time-consuming. A further disadvantage was that the entire project could not proceed while a specific test was being performed. This meant that test engineers were unable to continue

working on cases unrelated to the test that was being run at the time. In view of this, in early 2015 the division decided to look for a more flexible solution and reviewed EXAM as a potentially more suitable alternative.

## Stable, platform-independent, and central

Based on its experience as outlined above, the Car Powertrain Technology business unit had specific requirements for any future solution. It should be stable, able to operate independently of specific platforms, and allow for centralized test case storage.



This way, different business units within the Group would be able to access test cases on an inter-project basis. The business unit also specified that the time needed to switch between different products and customer versions should be kept to an absolute minimum.

To obtain a valid basis for its decision and results that could be easily compared, over a three-month evaluation period ZF implemented three identical test cases – both in its existing test system as well as in a system using EXAM as a potential new solution. By the end of the evaluation, the benefits of working with EXAM were clearly apparent.

#### Efficient testing with EXAM

EXAM's integrated interface concept makes it possible to abstract test cases at the topmost level. This means that cases developed during evaluation phases can be used not just for one platform, but subsequently at no significant additional expenditure for several customer and project versions. Working with EXAM's DOORS synchronizer, the DOORS connection requested by the business unit could also be established without any difficulty. Because of its interfaces, EXAM had one further advantage: it could easily be integrated into the existing toolchain at ZF Friedrichshafen AG.

EXAM's modular structure also helps to ensure efficient testing. It enables test engineers to work on test cases while EXAM is in the middle of performing a test run, and that without influencing the current run. This way, the Car Powertrain Technology business unit can optimize the use of test times on its eight connected HiL systems. As MicroNova's test automation solution has proven successful in practice, the business unit can now easily recycle existing test cases for other powertrain projects, an approach that generates substantial time savings for the test case developers.

#### All-round success as replacement solution

Since 2016, EXAM has gradually replaced the existing solution, a process that will continue until Car Powertrain Technology has completed the new system launch throughout the business unit. Test engineers from all departments already working with EXAM stand to benefit from the advantages of a uniform modular solution, one that offers exchangeable and recyclable test cases, as well as from the ongoing enhancement of EXAM.

#### Flexible exchange and extension of test case libraries thanks to open source

The methodology used for the graphic development of test cases is available as freeware. The relevant libraries are published under an open source license, which means that other users' test cases can also be used. MicroNova already provides a standard library in the distribution version. ZF Friedrichshafen AG has extended this with its own ZF standard library, which is accessible throughout the ZF Group.