

Five Stars for dSPACE

Mechatronics Demands
Top-Notch Software Quality



The demands on today's embedded software are high. And the requirements on the development software and the testing software are just as tough. What does this mean for dSPACE products? Dr. Hans Joachim Rabe, Head of Product Development at dSPACE, explains.



Why do development tools for embedded software have to meet such extraordinarily high requirements?

With embedded software, especially in safety-critical applications, there must be absolutely no failures. With an ESP controller, for example, you can't just tell the driver, "Could you please wait a bit till the controller reboots, then we'll have another go at braking." Embedded software and its hardware have to function perfectly. These rigorous requirements mean that the software used for development and testing – in this case dSPACE software products – also has to fulfill enormously high requirements. Applications outside the automotive industry are also highly complex and make extremely high demands on tool quality. In a word: We're equipped for anything.

What does software quality mean at dSPACE?

At dSPACE, software quality doesn't just mean having very few errors or passing formal requirements and approval tests. In the face of high customer requirements, we take a much wider view of quality. When we develop a product, we apply comprehensive quality guidelines for designing dSPACE products and associated services from the word go.

What do the dSPACE Quality Guidelines actually look like?

The catalog of criteria includes not only the "classic" best practices for software development, but also addresses software usability and customer support, plus support of industry standards, documentation, and training for our users. Our Quality Guidelines have helped us shape the open tool chain that our



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customers need and that we provide, ensuring that dSPACE products can be combined with third-party products. The automatability of our tools is also a major goal right from the outset of development work.

What part does automation play in today's development processes?

In many fields, fast development cycles and a zero-error policy result in our customers having to run countless tests within an extremely short time. So the components in the tool chain have to communicate with each other directly and allow automated interventions. Intermediate manual activities would be impossible in many areas because of the work and time they require.

How is automatability reflected in dSPACE tools?

Users expect the necessary automation options and interfaces to be on board dSPACE products – as indeed they are. The TargetLink Automation API, the CalDesk Automation Module, and ControlDesk's automation features are just a few examples. And we also have a powerful automation tool: AutomationDesk. Moreover, if our customers so request, we can provide experienced engineers who carry out the automation and development of processes and tests as an engineering service.

How are dSPACE software products tested?

More than a third of the effort of all our projects is spent on product test-

ing. Unit tests, regular build runs, integration tests, usability tests – our products are really run through the mill. And we ourselves use our products' extensive automation features so that we can test an enormous number of scenarios and variants before a product goes out to the customer. We couldn't cope with the

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vast number of tests without a very high degree of automation.

How important is testing in general these days?

When computer scientists come to us for job interviews, I'm always amazed that their universities have taught them a lot about software development, algorithms, architectures, etc., but told them almost nothing about software tests. But the fact is that if you find an error early, you can often repair it at minimal expense. The selfsame error, discovered at a later stage, can endanger an entire project. I often get the impression that educational institutions treat testing as an additional nuisance and regard actual program development as the essential activity. In reality, though, the twin arts of test development and test execution both require immense skill and expert knowledge. All testers at dSPACE therefore have ISTQB

certification (ISTQB = International Software Testing Qualifications Board).

What parts of the software development process require the greatest investment?

In addition to actual software development, there are three areas that involve the most work: collecting and consolidating requirements, developing the necessary, frequently innovative concepts and architectures, and comprehensive software testing.

How are dSPACE's high quality standards reflected in the engineers' qualifications and work methods?

At dSPACE, we make high demands on our employees' expertise and soft skills, to ensure that customers get the quality of products and services that they require. And by the way, we regularly see what high standards dSPACE people set for themselves: Developers, particularly experienced ones, put themselves in the customer's shoes and scrutinize their own work results with a critical eye. This attitude is invaluable, especially in customer support. It's no coincidence that customer satisfaction surveys have given us top grades for our support services for years.

Thank you for speaking to us.