![Lauterbach Development Tools logo]

FEATURE OVERVIEW
Using TRACE32 for DO-178C

TRACE32 for DO-178C at a Glance

- TRACE32 Tool Qualification Support-Kit streamlines TRACE32 tool qualification effort and costs.

- TRACE32 TQSK is fully featured, field proven and ready to cover new use cases and requirements.

- TRACE32 TQSK Customer Interface provides full support and service around tool qualification.

- All test suites run in the target environment and are fully multicore aware.

- Test Suite Coverage includes statement and branch coverage, as well as MC/DC.

Website-Links

TRACE32 Trusted Tools for Functional Safety	www.lauterbach.com/trusted_tools.html
TQSK Customer Portal	www.lauterbach.com/register_tqsk.html
TRACE32 Code Coverage	www.lauterbach.com/coverage.html
TRACE32 Instruction Set Simulator	www.lauterbach.com/sim.html

The TRACE32 Tool Qualification Support-Kit (TQSK) provides everything needed to qualify TRACE32 tools for use in safety-related avionics projects. It is designed for the qualification of TRACE32 as a TQL-5 tool.

Tool Qualification Process

The toolchain in safety-critical projects usually consists of a large number of software tools. Knowledge about the use of the individual tools and their embedding in the project environment is essential for the qualification approach in accordance with DO-178C. The tool user has the final responsibility for establishing confidence in all tools that support required tasks or activities. But the tool provider can prepare everything in such a way that the final qualification can be done with little effort.

The tool provider can, in the case of commercially available (COTS) tools, prepare the documentation required for the qualification process, develop appropriate test suites for each use case of the tool, perform a pre-qualification, and make the resulting data available to the tool users in the form of a Tool Qualification Support-Kit (TQSK). Figure 1 illustrates the 2-stage qualification process Lauterbach has decided to use.

Tool Qualification Support-Kit

The current version of TRACE32 TQSK (v3.1 from August 2021) contains all documents necessary to accomplish and complete the tool qualification for any safety level and, most importantly, the "Developer Safety Manual". The included test suites cover the tool use cases Coverage and Debug. Both test suites can be used by TRACE32 customers free of charge. The paid Test Suite Simulator TriCore allows the TRACE32 Instruction Set Simulator for TriCore to be qualified as a tool for use in a safety-related project.
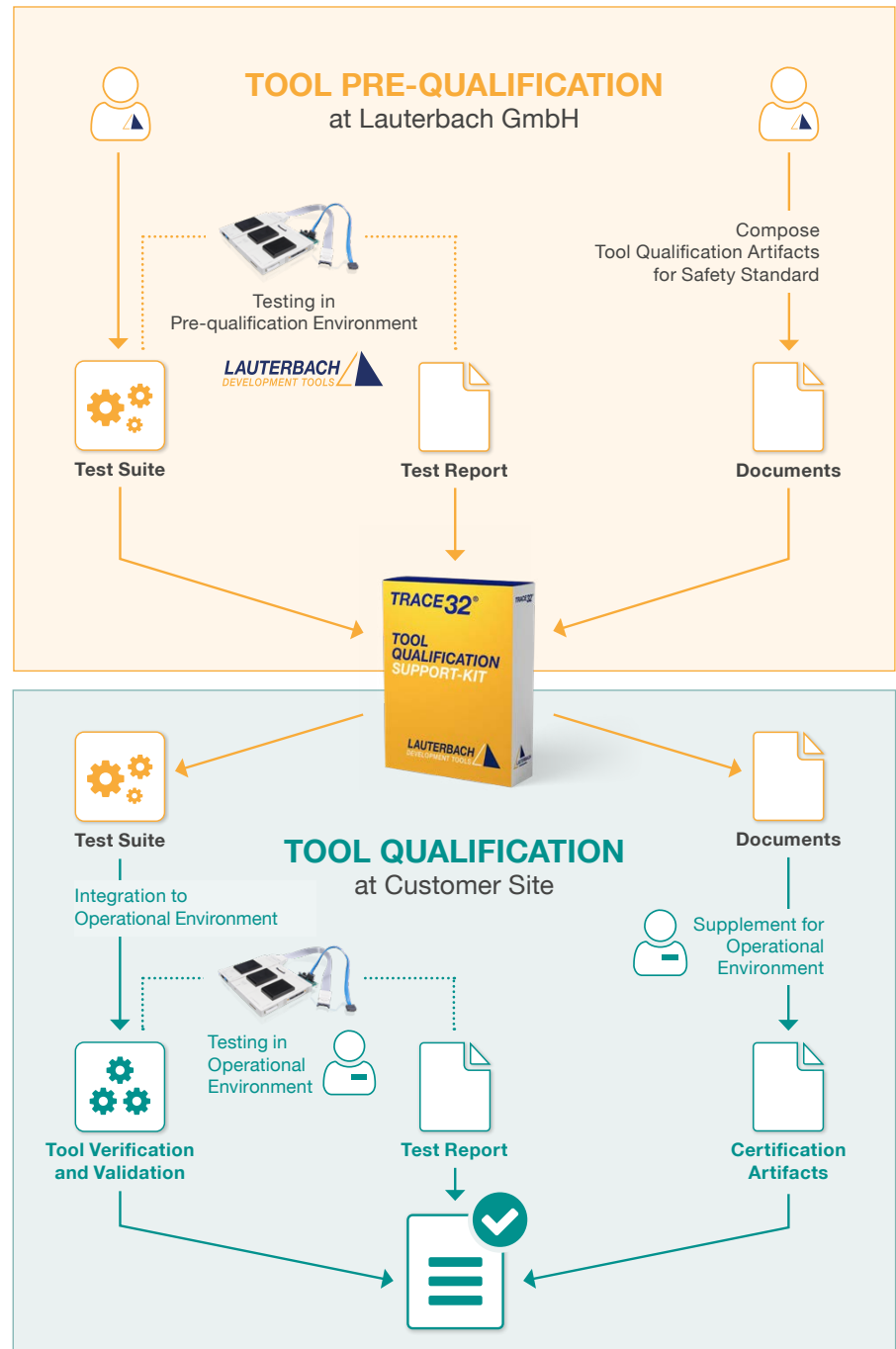

TOOL PRE-QUALIFICATION
at Lauterbach GmbH

Compose
Tool Qualification Artifacts
for Safety Standard

Testing in
Pre-qualification Environment

LAUTERBACH
DEVELOPMENT TOOLS

Test Suite   **Test Report**   **Documents**

TRACE32®
TOOL QUALIFICATION SUPPORT-KIT
LAUTERBACH

Test Suite   **Documents**

TOOL QUALIFICATION
at Customer Site

Integration to
Operational Environment

Supplement for
Operational
Environment

Testing in
Operational
Environment

**Tool Verification
and Validation**   **Test Report**   **Certification
Artifacts**

Figure 1: The 2-stage qualification process
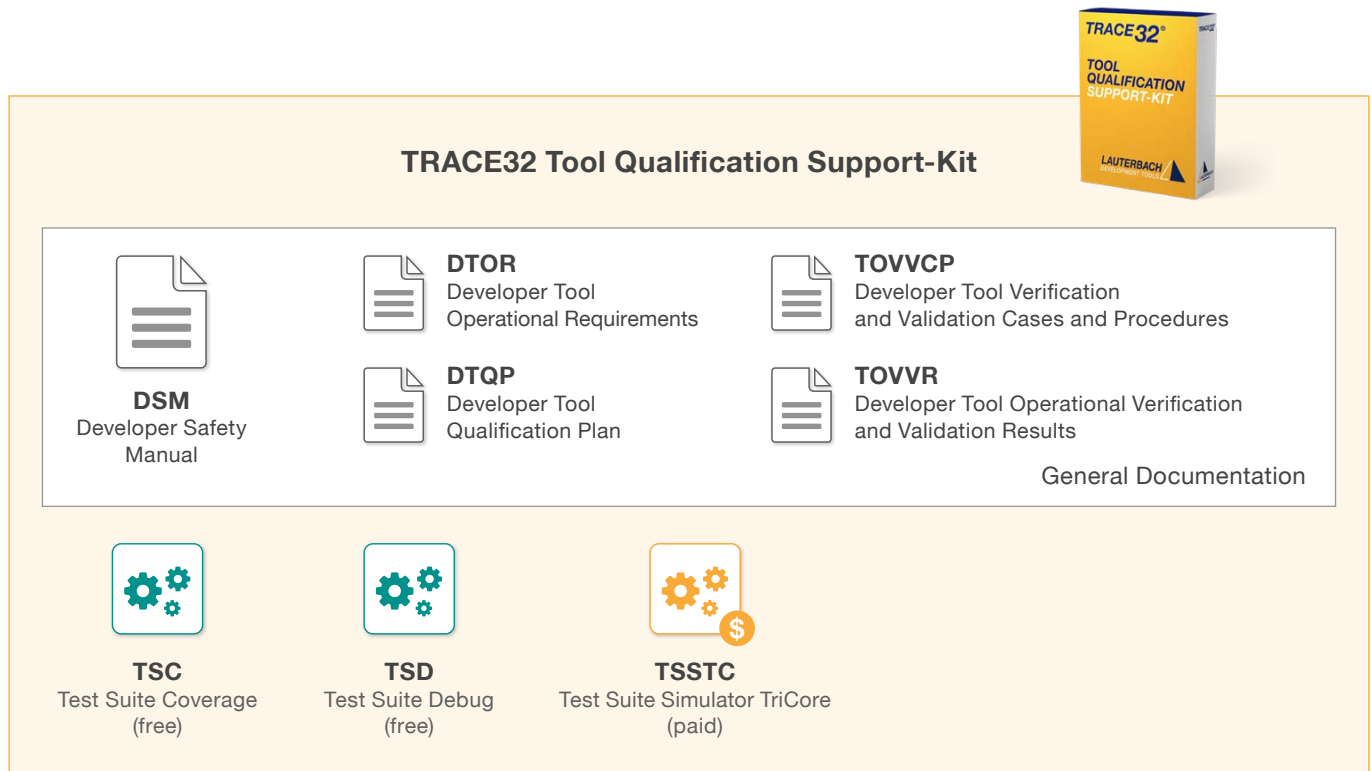
FEATURE OVERVIEW

Figure 2: TQSK structure as of August 2021

All test suites run in the target environment and are fully multicore aware. Like all Lauterbach solutions, TRACE32 TQSK is fully featured, field proven and ready to cover new use cases and requirements. Figure 2 gives an overview of its current structure.

Lauterbach manages its own *TQSK Customer Interface* to provide its customers with a complete service for tool qualification. This includes for registered customers:

- Download of personalized versions of TQSK

- Access to all notable TQSK-related changes to the TRACE32 software

- Access to all known TQSK-related issues and their status

The individual test suites and the use cases they cover are described in the following.

Test Suite Coverage

Structural coverage is among the tool use cases that need to be qualified. TRACE32 offers trace-based code coverage and supports the following coverage metrics for requirement-based testing:

- Statement coverage

- Branch coverage

- MC/DC

Test Suite Simulator

Upon customer request, Lauterbach also provides a test suite for its TriCore Instruction Set Simulator. Test suites for for other architectures are already being planned.

Test Suite Debug

The Test Suite Debug includes all basic debugging functionality such as target configuration, programming onchip and NOR flashes, loading programs, setting breakpoints and reading/writing of memory and variables.

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