Verifysoft TECHNOLOGY

zepp.solutions

Testwell CTC++ User Testimonial

zepp.solutions is a young company that develops application specific hydrogen fuel cell systems. Hydrogen fuel cell systems offer a clean alternative to conventional diesel engines in a whole range of mobile applications or other high power demand applications without any drawbacks on uptime, cost or lifetime.

1. Figure - office building

Hydrogen fuel cell technology is very attractive for applications which combine a demand for high continuous power output with long operational uptimes. The operations strongly benefit from the quick refueling capabilities of the hydrogen fuel as well as from the scaling of the system cost with respect to power demand. Current alternative energy storage systems, such as battery technology, will require long charging times and scale their system costs with respect to energy content.

To configure the optimum zero emission power-system for our clients, zepp.solutions develops fuel cell hybrid systems, combining hydrogen fuel cell technology with a small battery energy storage. The configuration, integration and control of these client specific systems are our key competence.

Hydrogen fuel cell systems combine the fuel, hydrogen, with oxygen from the air surrounding the system to produce electrical energy through an electrochemical process. A large amount of software is required to control of this process, as all pressures, temperatures and gas compositions entering and leaving the fuel cell need to be controlled. To achieve this, the software controls numerous valves, pumps and converters and reads numerous sensors. All this software is developed in-house by zepp.solutions.

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Software failures could cause costly component damage or lead to potentially hazardous situations. It is therefore of utmost importance that the software is tested thoroughly. To achieve adequate software reliability, large parts of the software (not just the safety critical parts) are developed according to IEC 61508 SIL 2.

One of the requirements from IEC 61508 SIL 2 is to achieve 100% decision coverage. In order to verify this requirement, the coverage needs to be measured. We chose for Testwell CTC++ to do the job.

2. Figure - zepp.solutions office

Testwell CTC++

The main reason to choose for Testwell CTC++ is its flexibility. The software we develop at zepp.solutions is much too large to allow for quick coverage results of the entire test suite on the target hardware.
To circumvent this issue, software is also built and tested on the host, with a different compiler. This allows for small test driven development (TDD) cycles. The flexibility of Testwell CTC++ allows it to be used not only for target tests, but also for host tests, as multiple compilers are easily supported.
Building different unit tests whilst reusing instrumented C files and merging coverage results also proved possible to set up with Testwell CTC++. This allows developers to quickly obtain detailed coverage information early on, when still testing on the host, with minimal overhead.

A further advantage is that Testwell CTC++ offers machine-readable output formats. The default HTML listings are insightful, but the machine-readable JSON and XML formats allow for optimal integration into the development workflow. These formats can be easily parsed, such that coverage listings can be integrated directly into the integration pipeline (we use Jenkins Blue Ocean). This keeps the overhead for developers to a bare minimum, whilst offering high quality coverage information.

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Finally, the quality of the accompanying documentation is high, which allowed us to set Testwell CTC++ up ourselves in little time, except for one issue, which was quickly resolved by the competent and very helpful support teams of Verifysoft and Testwell.

In conclusion, Testwell CTC++ proved to be the right choice for us.

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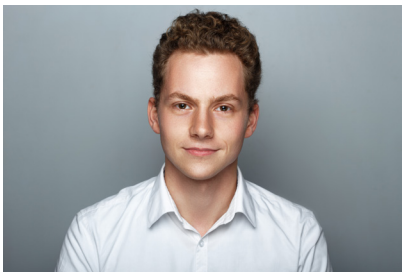

Mr. Remco Duba, co-founder of zepp.solutions

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For further questions please visit www.verifysoft.com and contact us at +49 781 127 8118-0