A Simple Test

Automating Closed-Loop Testing

01 THE CHALLENGE

System testing is a delicate process – if one thing goes wrong, then the test must be run again. No questions asked. With that in mind, there is a pressing need for automated testing solutions within the industry.

Our client requested support in the certification of a highly configurable Remote Interface Unit whose behaviour depends on the target aircraft and unit location in the Aircraft Data Network. The interface has a multitude of analogue and digital interfaces (such as ARINC 629, ARINC 664 and ARINC 825) and must comply with DO-178C Level A.

It was taking our client over a month to run the entire test set. Tasks such as changing cables connected to the remote unit were performed manually and if something happened during test execution, they had to repeat the whole test set.

02 THE SOLUTION

It was clear that the automation of the testing process was the way to go. This would be done by adapting Critical Software's System Validation Facility (SVF) platform, which is qualified for formal validation of Software with Hardware-in-the-Loop according to DO-178C Level A.

A package to allow the qualification of the SVF against any safety standard like IEC/EN 61508 or its derivatives it's available.

The development of tests, integrating the SVF and producing certification evidence was performed using Critical Software's High Integrity Systems Agile process, enabling the customer to iteratively approve the work being performed by our validation team.

The main tasks were identifying the target system's physical and logical interfaces, implementing the test sets in the platform, and configuring the measuring equipment.

The modular approach of the SVF allowed the reuse of building blocks and interface modules (ARINC 629, ARINC 664 and ARINC 825), reducing the time to implement the automated tests.

SVF virtually supports any physical interface that can be connected to a computer, including: CAN, ARINC, MIL-STD-1553, Serial, ZigBee, STANAG 3910, IEEE 802, NTDS, JTAG, RS-222, RS-485, Modbus.

With this, it was possible to automate the whole test campaign and produce reports and other documentation needed to support the DO-178C Level A certification.

03 THE RESULTS

By using an Agile approach and our highly configurable and extensible SVF, we managed to improve Remote Interface Unit testing activities, enabling certification to a DO-178C Level A standard.

This automated test set improved the quality of the final product by adding regression testing capabilities, the prospect of repeatability, and the optimisation of the V&V activities by lowering the execution time to two and a half days.

Critical software

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ABOUT CRITICAL SOFTWARE

Critical Software provides systems and software services for safety, mission and business-critical applications. We work closely with our clients, helping them to meet the most demanding standards for performance and reliability.

We were founded in 1998, with NASA our very first client. Today, we work across many international industries and have offices across the globe.

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We are CMMI Maturity Level 5 rated.
For a list of our certifications & standards visit our website.