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RAPITA
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Safety through quality

CASE STUDY

≈ R**VS**

Verifying Airborne Video Systems for Air-to-Air Refueling using R**VS**

Case study: R**VS**

*"R**VS** has helped us achieve our DO-178C verification goals efficiently and we were very impressed with the unbelievably fast support from Rapita."*

Kappa optronics has over 40 years of experience with application-specific cameras and vision systems in rugged and certifiable design. It provides innovative vision solutions for day and night operations, ensuring maximum performance for a range of applications and industries including safety-critical avionics applications.

Kappa approached Rapita looking for a solution to replace their existing COTS software verification approach to support verification of their 3D camera software application to DO-178C.

The Challenge

Kappa were developing a 3D camera system to support automated refuelling on the Airbus A330 MRTT, which needed to follow DO-178C design assurance processes. Kappa were using the Keil IDE and Keil debugger to develop and debug their code, which runs on an STM microcontroller. To ensure an efficient verification workflow, Kappa wanted their verification tooling to integrate with their software development toolchain.

A330 MRTT in flight

Kappa had verification tooling in place already, but were looking for a tool solution that better met their project's needs. In particular, they were seeking tooling that had enhanced integration capabilities with their software development toolchain, along with improved support and qualification assistance. Crucially, the solution needed to be ready for DO-178C.

Summary

The challenge

- Replace existing COTS tooling for DO-178C software verification with tooling that integrates with the customer's development toolchain and is dependable, robust, and offers excellent qualification support

The solution

- Rapi**Test** and Rapi**Cover** integrated with Kappa's Keil development toolchain for DO-178C-qualifiable functional testing and structural coverage analysis

The benefits

- World class support from the Rapita FAE team; Kappa's support queries were resolved "unbelievably fast"
- Seamless integration achieved efficiently through collaborative working
- DO-330 qualification kits and a qualified integration service that can be relied upon to meet DO-178C tool qualification requirements efficiently

A330 MRTT clears F-15 fighters for automatic refuelling

The Solution

Rapita integrated the R**VS** tools Rapi**Test** and Rapi**Cover** into Kappa's target environment and development toolchain to support functional testing and structural coverage analysis on the 3D camera application code.

The integration that was developed allowed R**VS** to trigger software builds and runs from the Keil IDE and collect execution results for R**VS** analysis using the Keil debugger. The integration was achieved collaboratively – while Rapita ensured that the R**VS** integration could interface with the development toolchain, Kappa developed an executable that supported the collection of execution data using the Keil debugger. Throughout development of the integration, Rapita's support team worked alongside Kappa to answer questions and quickly remove obstacles.

The integration allowed Kappa to automatically run requirements-based tests on their STM target using the Keil debugger to collect test execution and structural coverage results during test runs. Kappa used RapiTest's spreadsheet format to write functional tests, which makes test authoring and review easy by not requiring tests to be written in programming languages.

Rapita's qualification kits and Qualified Target Integration Service supported Kappa's use of R**VS** to produce evidence to meet DO-178C objectives in this specific integration.

The Benefits

By choosing to work with Rapita and use the R**VS** tool suite, Kappa realized the following benefits:

- World-class support – Kappa's support queries were resolved "unbelievably fast", with most queries being resolved within a couple of days, and a new wavefront version of R**VS** being delivered to Kappa in less than a week when this was required.

- Seamless integration with Kappa's specific development toolchain – Rapita's FAE team deployed a fully automated integration that allowed R**VS** to work alongside Kappa's existing development toolchain rather than outside it. This was made possible by R**VS**'s flexible integration capabilities and Rapita's expert FAE team.

- Qualification you can trust – R**VS** qualification kits and qualified target integration service made it easier for Kappa to provide the necessary evidence to qualify their use of R**VS**. R**VS** qualification kits include over 1200 tests and 180k LOC, have been accepted as standalone evidence of tool robustness in multiple DO-178C DAL A projects, and include qualification of the instrumentation engine and merging coverage results, eliminating the need for expensive manual review.

> "We're really happy that we chose to work with Rapita to enhance our verification tooling. R**VS** has helped us achieve our DO-178C verification goals efficiently and we were very impressed with the unbelievably fast support from Rapita."
>
> **Paul Staab**
>
> Head of Verification and Validation
> **Kappa Optronics**

Next steps

To learn more about how Rapita can help you with software verification, visit our R**VS** webpage at rapitasystems.com/products/rvs.

To find out more about what Rapita can do for you, contact us at info@rapitasystems.com.

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About Rapita

Rapita Systems provides on-target software verification tools and services globally to the embedded aerospace and automotive electronics industries.

Our solutions help to increase software quality, deliver evidence to meet safety and certification objectives and reduce costs.

Find out more

A range of free high-quality materials are available at:
rapitasystems.com/downloads

SUPPORTING CUSTOMERS WITH:

Tools	Engineering Services	Multicore verification
Rapita **Verification Suite**:	V&V Services	**MACH**[178]
Rapi**Test**	Integration Services	Multicore Timing Solution
Rapi**Cover**	Qualification	
Rapi**Time**	SW/HW Engineering	
Rapi**Task**	Compiler Verification	

Contact

Rapita Systems Ltd.
Atlas House
York, YO10 3JB
UK

+44 (0)1904 413945

Rapita Systems, Inc.
41131 Vincenti Ct.
Novi, Mi, 48375
USA

+1 248-957-9801

Rapita Systems S.L.
Parc UPC, Edificio K2M
c/ Jordi Girona, 1-3
Barcelona 08034
Spain

+34 93 351 02 05

rapitasystems.com

linkedin.com/company/rapita-systems

info@rapitasystems.com