RAPITA SYSTEMS
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Safety through quality

CASE STUDY

RapiCover

Cobham® Aerospace Connectivity: Rapi**Cover** continues to deliver on the most challenging targets

Case study: Rapi**Cover**

"Rapita provided Cobham with first class assistance in setting up the integration, as well as supporting the qualification of the tool to comply with DO-330"

Cobham® Aerospace Connectivity manufactures secure and reliable communication and navigation systems. With a pedigree of capability in Communications, Navigation and Electronic Warfare for aerospace and defence, Cobham (now Chelton) produces air, land and maritime products including Antenna Systems, Anti-Jam GPS, Radio, Audio, Air Traffic Management Systems and Electronic Warfare. Find out more on their website at www.cobhamaerospaceconnectivity.com.

COBHAM

Cobham asked Rapita Systems to support their structural coverage analysis of a Tuneable Antenna Control Unit they were developing, which is optimized for low SWaP and needed to be certified at DO-178C Level C. Rapita supported this through integration of Rapi**Cover** into Cobham's development toolchain at their site in Marlow, Buckinghamshire, UK.

RapiCover

Challenge

Cobham needed to provide evidence of statement coverage for DO-178C DAL C certification. The coverage needed to be measured while the software was tested on the target 8-bit microcontroller.

The challenges of the project were typical of those of obtaining structural coverage of software deployed on a low power microcontroller optimized for SWAP. Of the 2kB of RAM on the target, only the first 128 bytes of which were directly addressable – with program data occupying 64 bytes, Rapita Systems needed to implement a method of collecting coverage results that used no more than the remaining 64 bytes of RAM.

Summary

The challenge

- Implement efficient DO-178C DAL C structural coverage analysis on a small low power microcontroller optimized for SWaP (2kB RAM, 8-bit microcontroller).

The solution

- Delivery of a compact coverage map that uses minimal RAM storage on the target.
- Coverage collection using RS232 serial port.

The benefits

- A method for measuring statement coverage for C code running on a small low power microcontroller optimized for SWaP.
- Lowest-overhead code coverage tool on the market with advanced features and a reduced number of builds needed to collect coverage.
- Easier tool qualification through use of a DO-178C tool qualification kit and target integration service.

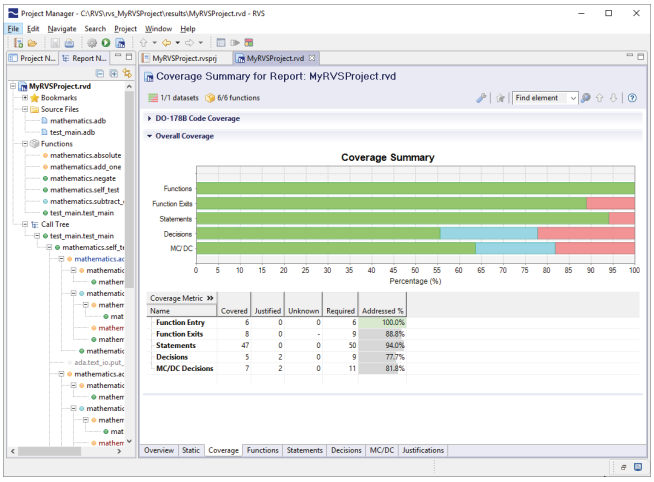

Figure 1 – Example Rapi**Cover** report

Solution

To implement a method of collecting coverage results via the RS232 serial port that only used 64 bytes of RAM, we engineered an integration that uses an extremely low overhead bit-packed coverage map array where each instrumentation point is represented by a single bit. This involved generating a custom map template and custom scripts to send and decompress map data specifically for this integration. Another script then processes the map to create the coverage report RVD file.

This integration allowed Cobham to collect statement coverage for their system and analyze the report. Rapi**Cover** offered the customer advanced GUI features such as migratable justifications and coverage merging, which enabled Cobham to explore detailed coverage metrics and generate artifacts to support certification.

The final part of the solution was tool qualification through use of a DO-178C tool qualification kit and qualified target integration service.

Figure 2 – Cobham Aerospace Connectivity is a world leader in the design and manufacture of airborne communications and navigation antennas.

Benefits

Rapita's flexible software tools and on-target expertise once again delivered on a challenging customer project, enabling Cobham to obtain statement coverage on an extremely constrained system.

- A method for extracting statement coverage of C code running on a small low power microcontroller optimized for SWaP.
- Lowest-overhead code coverage tool on the market with advanced features and a reduced number of builds needed to collect coverage.
- Easier tool qualification through use of a DO-178C tool qualification kit and target integration service.

> "Cobham Aerospace Connectivity selected Rapita's structural coverage tool Rapi**Cover** for the high degree of flexibility it provides when instrumenting code for on target execution and coverage data capture. Rapita provided Cobham with first class assistance in setting up the integration, as well as supporting the qualification of the tool to comply with DO-330"
>
> **Dr. Neil Tisdale**
>
> Software Group Manager
> **Cobham Aerospace Connectivity**

Next steps

To learn how Rapi**Cover** can help reduce the cost and effort of code coverage analysis, see our product page at rapitasystems.com/products/rapicover.

To enquire 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	

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