RAPITA SYSTEMS
A DANLAW COMPANY

*Safety through quality*

CASE STUDY

# RVS

## Supporting automotive software development and verification for Danlaw

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# Case study: R**VS**

***"Using RVS helped us improve our software and meet our customer's Software Risk Assessment requirements faster than other software we've used on previous projects."***

Danlaw is a global leader in the connected cars and automotive electronics space. For over 40 years, it has been providing innovative technological solutions and services for some of the world's largest car manufacturers, and it is one of the largest suppliers of connected gadgets in the world. With offices in the USA, UK, Australia, India and Spain, it serves its solutions globally with optimized regional support.

One of the solutions provided by Danlaw India is the development of software for automotive applications for OEMs and tier-1 suppliers. This software is verified to Danlaw's internal standards and also to meet specific requirements from its customers, which are often based on the ISO 26262 standard.

This case study relates to Danlaw India's development of software for a charging indicator for electric vehicle charging for an OEM automotive company.

## Challenge

Danlaw India were approached by an OEM automotive company to develop software for a charging indicator for electric vehicle charging. For acceptance of Danlaw's software by its customer, the software would need to be verified comprehensively to pass the customer's Software Risk Assessment. This included unit testing of the developed software, as well as a requirement that 95% or higher code coverage was achieved through this testing.


## Summary

*The challenge*

- Unit testing and code coverage analysis for electric car charging status indicator software
- Software needed to comply with end customer's Software Risk Assessment requirements

*The solution*

- Deployment of Rapi**Test** and Rapi**Cover** for continuous testing and reporting in the customer's in-house continuous integration framework

*The benefits*

- Rapita's customer Danlaw delivered their software on time and on budget, faster than previous projects using competitor tools


The software was being developed for a charging status indicator that would use a Melexis Smart LED driver Integrated Circuit. The target processor had limited resources available to support on-target testing.

Danlaw's preferred approach to verification was to run it continuously throughout the software development process, achieving verification for new modules as they were being developed. For optimal efficiency, their verification solution would need to hook into their in-house continuous integration framework, so tests could be run continuously throughout the project, verification results could be kept up to date, and overall progress could be easily tracked.

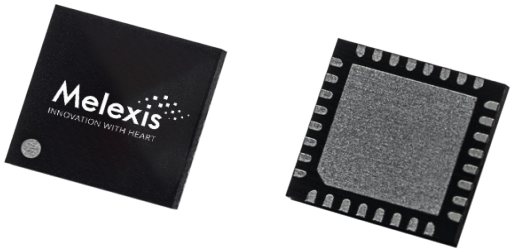
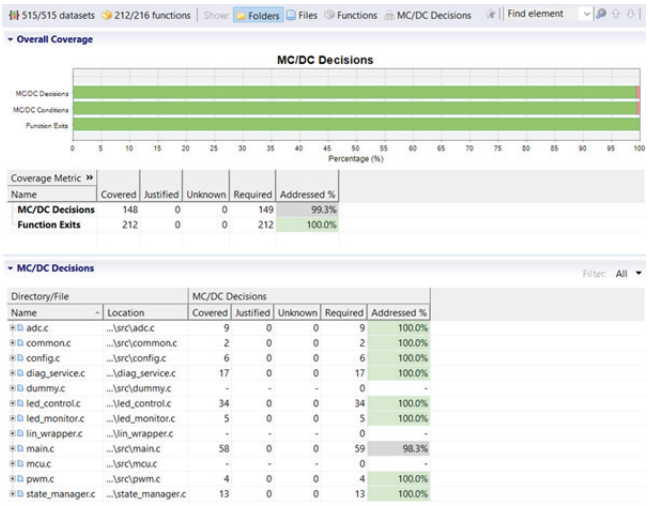



*Photo of Melexis Smart LED Driver Integrated Circuit, courtesy of Melexis*

## Solution

Rapita Systems worked with Danlaw to deploy the Rapita Verification Suite (R**VS**) to support unit testing and code coverage analysis. This included an integration of both Rapi**Test** to write unit tests, and Rapi**Cover** to instrument the code for coverage up to the Modified Condition/ Decision Coverage (MC/DC) level.




Danlaw preferred minimizing testing overheads, and being able to run all tests and coverage analysis in a single build. As the Melexis target had limited resources to support the injection of test harness and instrumentation code, the integration was set up on-host. This ensured fast rework cycles and supported continuous testing with Danlaw's growing suite of unit and regression tests throughout the development process. R**VS** was integrated with Danlaw's in-house continuous integration framework to support this process, automating test runs and result reporting throughout development.

The software being developed by Danlaw needed to pass the end customer's Software Risk Assessment for final acceptance. This included demonstration of unit test results, and a requirement that at least 95% of the code had been covered to the MC/DC level during testing.

R**VS** tools supported this by allowing Danlaw to automatically generate exported results for review by their customer.

## Benefits

Danlaw's use of R**VS** for software verification helped them develop and verify their code efficiently, with the following benefits:

- The use of R**VS** tools helped Danlaw pass their customer's Software Risk Assessment, and deliver their software on time and on budget.
- Flexible integration of the R**VS** tools enabled continuous testing and reporting through Danlaw's in-house continuous integration framework. This helped Danlaw increase the reliability of the code rapidly; areas that would benefit from improvement were quickly highlighted by test and coverage results alongside development.
- Danlaw found that using R**VS** reduced their testing time compared to using competitor tools.
- Results from R**VS** could be trusted – R**VS** tools have been qualified for use in DO-178C and ISO 26262 projects, and the instrumentation applied by R**VS** is qualified.

> "R**VS** tools helped us develop and verify software for our customers on time and on budget. The flexibility of the integration meant we could hook R**VS** up with our continuous integration framework, so we could run tests and collect coverage results throughout our development and minimize later rework.
>
> Using R**VS** helped us improve our software and meet our customer's Software Risk Assessment requirements faster than other software we've used on previous projects."
>
> **Kiran Kumar**
>
> Technical Manager, Automotive Electronics Software
> **Danlaw India**

## Next steps

For more information on R**VS**, see the product page at www.rapitasystems.com/products/rvs.

To enquire about what Rapita can do for you, contact 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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