

SECTOR Aerospace & Defence
STANDARD DO-178B

Case Study



MEGGITT

MEGGITT

(Vibor-Meter was acquired by MEGGITT)



Engine Interface and Power Monitoring (EIPM) unit for the Airbus A380 Aircraft

ABOUT THE COMPANY

Headquartered in the UK, Meggitt PLC is a global engineering group specialising in extreme environment components and smart sub-systems for aerospace, defence and energy markets.

Some 10,000 people are employed across manufacturing facilities in Asia, Europe and North America and regional bases in Brazil, India and the Middle East.

Meggitt businesses are supported by an evolving group infrastructure with strong functional leadership.

<http://www.meggitt.com/>

*“Great efficiency
in terms of cost”*

Critical Software Testing Requirements

Meggitt was in charge of the development of two major projects, namely, the Engine Interface and Power Monitoring (EIPM) unit for the Airbus A380 aircraft, and the Engine Monitoring Unit (EMU) for Rolls Royce's Trent 900 engine. A key challenge of this project was to deliver reliable software, that had been fully tested to meet the stringent safety demands of the civil avionics industry standard known as **DO-178B**.

DO-178B

DO-178B describes the techniques and methods needed to ensure the integrity and reliability of relevant software. Several levels exist for this standard, each of which is defined by the level of safety required. The standard mandates the use of dynamic testing, at both unit and integration levels, in addition to test coverage analysis and static analysis. Meggitt's engineers started putting together a development kit to support the projects. A high priority for the engineers was to find tools that would support the testing techniques required by this stringent standard. Due to previous successful experiences with Cantata's sister tool for the Ada language, AdaTEST 95, Meggitt quickly identified Cantata as the strongest candidate.



Airbus A380 Aircraft

Evaluation

Following a detailed technical evaluation, it became evident that **Cantata was the optimal choice for a DO-178B development**. Cantata was not only fully effective for this standard, particularly in terms of supporting all forms of coverage analysis required, but was also **complete in terms of automation, usability and integration** within Meggitt's environment. An initial order for Cantata was placed, and a three-day training program for 20 engineers followed soon after.

A380 - Program EIPM

The function of the A380 EIPM system is to supply and monitor power to engine-mounted systems (Electronic Engine Control, Engine Monitoring Unit, Igniters, etc.) and to provide Electronic Engine Control parameters to the aircraft systems.



DO-178B

Carl Burton, Director of the Electronic Department, and Philippe Lomazzi, Head of Software Development, were in charge of the project. The software was produced entirely in C, by Meggitt, using a team of six software engineers. The processing unit was based on a Motorola/Freescale chip and the software development environment was the GreenHills Multi IDE. The software integrity level assigned was Level B. Cantata was used to perform the unit tests and provide evidence of 100% coverage at statement and decision levels.

Meggitt was required to perform the unit tests and coverage analysis, both on a target simulator, as well as on the real target. Accordingly, Cantata was customized for the Meggitt environment and, furthermore, supplied and installed without any significant difficulty. *"Cantata can be used, after purchase of the related libraries, for different targets without problem. We have done this for both our A380 EMU and EIPM systems,"* asserted Lomazzi. This requirement was facilitated by Cantata's target features, as the test script can be run unchanged in the target environment.

Trent 900 - Rolls Royce

Meggitt spent over four years developing the Engine Monitoring Unit (EMU) for the Trent 900 engine. The EMU monitors several advanced parameters such as engine vibrations, pressure and temperature, and implements advanced algorithms for engine maintenance purposes. It also acquires engine vibrations for an on-board engine balancing process. The software integrity level assigned was Level C.

For this project, Meggitt decided to use the TI TMS320C33 and Freescale PowerPC chips. The Green Hills Multi IDE and the TI Code Composer environments were used, and the application was coded in C. Cantata was used in order to comply fully with the DO-178B standard and **Meggitt's engineers particularly praised the easy use of the tool** and its technical solutions to enable straightforward module testing.

Conclusion

Both projects have been a real success and Cantata has proved itself in a mission critical environment. Meggitt's confidence in Cantata for the last seven years has been justified by the tool's successful deployment on both programs. In the words of Lomazzi, *"The systematic use of Cantata has enabled us to have the shortest unit test phase possible with great efficiency in terms of cost."*

"Cantata enables us to have the shortest unit test phase possible!"

CLASSIFICATION

Cantata has been successfully qualified many times to DO-178B (levels A and B) avionics projects

For information on tool qualification, please visit:
www.qa-systems.com/cantata

MORE ON AEROSPACE & DEFENCE SECTOR:

Our Sector Briefs provide more information on how Cantata was successfully used by relevant customers in various aerospace & defence projects worldwide.

Sector Briefs can be found on the QA Systems website

AEROSPACE & DEFENCE CANTATA USERS INCLUDE:

BAE SYSTEMS



All case study text has been approved by the relevant customer.

QA Systems acquired the Cantata business taking over all development, support and sales from IPL in March 2012. Cantata is the extension of the Cantata++ tool.