

SECTOR
Aerospace & Defence

Case Study

AdaCore

AdaCore

Founded in 1994, AdaCore is the leading provider of commercial software solutions for Ada, a state-of-the-art programming language designed for large, long-lived applications where safety, security, and reliability are critical. AdaCore's flagship product is the GNAT Pro development environment, which comes with expert on-line support and is available on more platforms than any other Ada technology.



European Space Agency

The European Space Agency (ESA) is Europe's gateway to space. Its mission is to shape the development of Europe's space capability and ensure that investment in space continues to deliver benefits to the citizens of Europe and the world.

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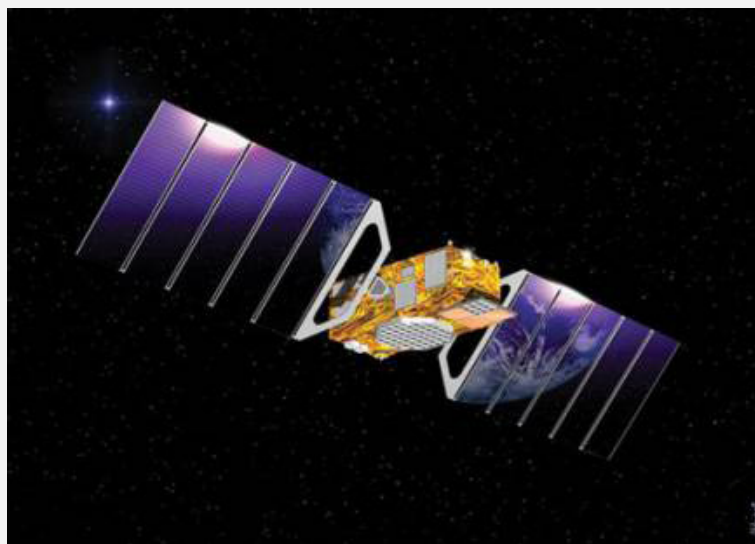
The Business

AdaCore's division in Paris were contracted by the European Space Agency (ESA) to create a high-integrity software development kit that would produce mission- and safety-critical systems for satellites.

The ESA decided early on that the new software development kit would support the Ravenscar profile. Although Ada is regarded as the 'natural' computer language for safety-critical software, refinements to the language, as is the Ravenscar profile, have been made so as to permit the real-time features of Ada to be used in a demonstrably-safe way.

Test Criticality

The most significant feature of the new kit was the run-time environment, located on the target, which controlled every aspect of the application as it ran. To satisfy the ESA's stringent quality needs, AdaCore had to perform thorough testing. The software would only be accepted if evidence of testing, including coverage analysis, could be provided. To meet the 100% statement coverage analysis requirement, AdaCore turned to AdaTEST 95.



Galileo Satellite Impression

Ravenscar Profile Restrictions

According to Jose Ruiz, AdaCore's Senior Software Engineer, the restrictions of the Ravenscar profile made it difficult to deploy the tool initially. *"AdaTEST 95 needs dynamic memory to store raw coverage data - this is analysed at the end of the test. The Ravenscar profile, however, specifies that dynamic memory allocation is not allowed!"*



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A Solution is Found

The tool providers took it upon themselves to find a solution. Richard Miskin, in charge of the project, revealed, *"I had a few ideas that I thought could work, but it took a further 2 months to solve all the technical problems and complete the necessary validations."* Finally, a new and fully-customised version of AdaTEST 95 was delivered to AdaCore.

AdaTEST 95 in Use

According to Ruiz, *"We had a validation suite ready to run, so we rebuilt the run-time using code instrumented by AdaTEST 95. The facility was running smoothly and we developed the optimal solution. The results were very interesting."*

Ruiz continued, *"Coverage showed us two things: firstly that about 8% of our code was not being reached by the original validation suite. **This was surprising because we had thought our validation tests were fairly complete.** AdaTEST 95 also showed us that certain areas of our code were not even reachable! **This was in spite of the fact that the code had been through visual inspection, and certainly 'looked' good.** Despite this, the coverage evidence was conclusive; those parts of the software had to be redesigned and rewritten to ensure that the intended functionality was correctly implemented."*

It took approximately four months to run the tests with coverage, supplement the original tests and refactor the code so that it was all reachable. **The return on investment from AdaTEST 95 was immediately apparent.** According to Ruiz, *"AdaTEST 95 was extremely powerful in what it could do, and exceptionally clear in the way it presented the data. There was never too much or too little information; it always showed just what we wanted to know and no more."*

Conclusion

AdaCore delivered their product to the ESA, with all the supporting evidence that had been requested. Taking a moment to reflect on his experiences with AdaTEST 95 throughout the project, Ruiz noted, *"The vendors of AdaTEST 95 are great to deal with! **You get an honest, accurate response to every query, and you get it quickly. In most cases, the turnaround on problem reports was under 24 hours, in many cases better than this. The vendors were extremely obliging, and went beyond what they were asked in order to give us what we needed.**"*

All case study text has been approved by the customer.

QA Systems acquired the AdaTEST 95 business, taking over all development, support and sales, from IPL in 2012. AdaTEST 95 is the extension of the AdaTEST tool.

MORE ON AEROSPACE & DEFENCE SECTOR:

Our Sector Briefs provide more information on how AdaTEST 95 was successfully used by other customers in various aerospace & defence projects worldwide.

Sector Briefs can be found on the QA Systems website.

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