AdaTEST 95

QA SYSTEMS
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SECTOR
Aerospace & Defence

Case Study

ASTRIUM
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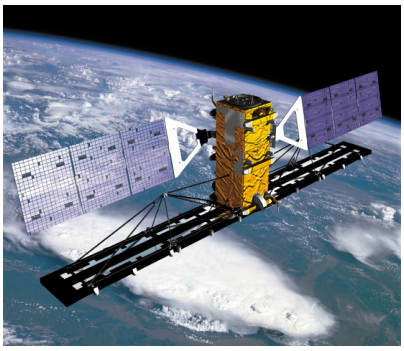
ASTRIUM

Astrium is Europe's major satellite and space vehicles developer. It has operating companies located throughout Europe, and is a successful participant in space work all over the world.

Astrium is committed to producing onboard software to the demanding standards required for deployment in space.



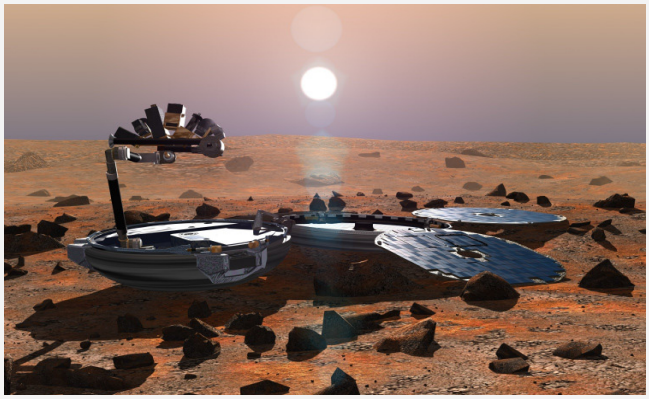
RADARSAT-2

"It was productive from Day 1. AdaTEST 95 has been fantastic for us. It is easy to use, reliable, and gives us exactly what we want!"

The Business

Funded by the Canadian Space Agency, RADARSAT-2 was to carry advanced radar equipment to perform detailed topographic mapping of the Earth's surface. It would use Synthetic Aperture Radar Sensor Electronics, supplied by Astrium and based on equipment and systems originally developed for Europe's Envisat.

A different kind of project altogether, Beagle 2, was a UK-led Mars lander, intended to carry out a range of experiments to investigate whether life has ever existed on Mars. It would be launched as part of the larger European Space Agency Mars Express mission. Beagle 2 was being developed by Astrium on behalf of the Open University, who were leading the academic investigations in the quest.



Beagle 2 on the surface of Mars

Maximising Reliability

Both projects required the production of large amounts of on-board software. The need for the highest level of software reliability was paramount in both cases, though for different reasons. In the case of the RADARSAT-2 project, the need for reliability was driven by customer requirements for high availability of the sensing instruments. A significant proportion of the software could not be changed once the craft was launched, so the highest standards had to be applied. In the case of Beagle 2, the weight constraints on the craft were such that very few of the usual redundant systems could be incorporated in the design. Hence the systems, including the software, just had to work – there was no fallback.

Quite early on in the projects' lifecycle, key decisions were taken to help maximise software reliability. One of these was to use Ada, and in particular the high-reliability 'Ravenscar profile' version. Another decision was to conduct a detailed program of software unit testing. Dave Yetton, Software Project Manager for RADARSAT-2 said, *"As a company, we are 100% committed to the idea of unit testing. We have done it before and believe it is one of the best ways to gain confidence in our code."*

Bill Edwards, Astrium's Software Manager in charge of the Beagle 2 program, noted that, ***"We had previous positive experience of AdaTEST 95, so the decision to use the tool was easily made."***

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Testing Productivity

Dan Mashram, involved with the RADARSAT-2 software development, noted that the ease with which his engineers learnt to use AdaTEST 95 was a crucial factor in making the team productive quickly. ***"In a matter of days, a programmer could be testing code with AdaTEST 95 from a standing start. The tool needs little or no training and is quite intuitive to learn, even for beginners."***

The total size of Beagle 2 code was approximately 950 Kbytes, with about 80 Objects. The original intention had been to test only on the host, but it soon became apparent that a lot of the code could only be run on the target.

Since the initial AdaTEST 95 delivery did not permit coverage on the target (due to the Ravenscar restrictions of the compiler) a minor crisis threatened to develop. According to Edwards however, ***"The vendors of AdaTEST 95 rose to the occasion and offered to look into the problem. They quickly implemented a very capable working solution which did not eat into our limited budget and proved as reliable as the rest of the AdaTEST 95 product."***

New Ways of Testing

The RADARSAT-2 project was keen to explore new ways of testing. Marshman noted some of the innovations introduced: "*The first improvement involved using shared stubs. We avoided many of the recompilation issues introduced previously as code changed. The vital enabling technology was our configuration management system which allowed AdaTEST 95 scripts and stubs to be kept in tight step with each other.*"

Conclusion

Edwards extensively praised AdaTEST 95's contribution to the project: "***It gave no problems in use for the entire duration of the project*** *and we could carry out coverage testing on the target with the updated version, even though the compiler supported the Ravenscar Profile.*" Marshman concurred, ***"It was productive from Day 1. AdaTEST 95 has been fantastic for us. It is easy to use, reliable, and gives us exactly what we want, both from our own point of view as developers, and also looking at the need to give our customers results data which they can understand and depend on."***

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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