

Flying High with the LDRA tool suite

IHI Japan achieves DO-178B Level A certification 14 times quicker on their jet engine projects using LDRA tools versus a manual coverage analysis process. The time saving resulted from using the *LDRA tool suite* is of major significance to project success.



IHI

The Client



IHI Head Office, Tokyo, Japan

IHI is the premier manufacturer of jet engines in Japan with approximately 70% share of the market.

The company is the primary contractor for aircraft engines used by the Ministry of Defence, and participates in international co-operative projects that develop large-to-small scale engines for civilian aircraft.

The Projects

IHI has utilised the *LDRA tool suite* on a number of projects, of which the Jet Engines project forms the focus of this article.

A key requirement for the software development team working on this project was to achieve DO-178B certification. After studying the available tools in the market place IHI concluded that the *LDRA tool suite* provided the best fit for their requirements due to the depth and diversity of tool facilities. IHI were also keen to leverage LDRA's many years of experience of DO-178B certification.

IHI selected the *LDRA tool suite* for the verification of both C and Ada source code to DO-178B certification Level A, the most rigorous testing standard for avionics software.



Mr. Osamu Kanmoto, Manager,
Control Systems Engineering Group, IHI Corporation, commented:

"From the software design the engineers carried out a thorough unit and module test process, utilising T-VEC Tester for Simulink to generate the test vectors from the design model and *LDRA Testbed* to measure code coverage."

"We had to meet the requirements of DO-178B Level A meaning testing to Modified Condition Decision Coverage - not an easy task."

LDRA's tools are classified as software verification tools under the DO-178B standard and as such are required to be qualified on a project-by-project basis.

This means that when assessing the merits of such tools it is essential to consider the level of vendor assistance for tool qualification. LDRA offer assistance with this process and agree to enable clients and the FAA to audit the *LDRA tool suite* for project use.



ESPR Experimental Engine promoted by NEDO*

The Benefits

IHI have configured and adapted both the *LDRA tool suite* and their overall development processes to accommodate the requirements and rigours of DO-178B certification for their embedded system. To assist in this process, they have introduced high levels of automation through the use of tools and other techniques, all of which are designed to provide an efficient and repeatable process.

LDRA tool suite was 14 times quicker than previous processes

IHI reported that the *LDRA tool suite* was 14 times quicker than manual coverage analysis processes and, given their extremely tight development schedule, this alone was of major significance to the success of the project as a whole.

IHI now have the ability to prove, with confidence, the test coverage outcomes associated with their embedded software development processes. The benefits to the company are that they have an automated test coverage process that supports the unit, module system and integration levels, while being both meaningful and productive. This provides a significant improvement in their ability to satisfy, audit and review.

The Future

IHI has future plans to leverage the powerful static analysis capabilities of the *LDRA tool suite* in order to support an objective and quantifiable view of the quality of their source code.

*NEDO, The Japanese Governments R&D management organisation support the development of environment-friendly Aircraft Engines. (www.nedo.go.jp/english/index.html)

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w: www.ldra.com e: info@ldra.com