LDRA Tool Suite Gives Edge to Esprit Lean Product Development

Static Analysis Proves IEC 62304 Compliance

Who are Esprit Lean?
Esprit Lean of Portet sur Garonne, France is a specialist company that provides custom electronic and software systems guiding production from concept and design through to market. With expertise in both hardware and software, Esprit Lean has developed systems used in satellites, automotive, medical and industrial control applications. As a company Esprit Lean is committed to implementing and applying the most stringent quality techniques and practices to its development processes. As part of this commitment, in addition to implementing an internal software control process, Esprit Lean is also ISO 9001 certified.

What was the challenge?
In working on a medical project to assist with cancer treatment, Esprit Lean was required to comply with the IEC 62304 standard. Although the Esprit Lean team was trained in the medical standard, they knew that a verification tool capable of implementing coding rule compliance would boost efficiency, provide a standardised style and a way to comment the code, and eliminate errors at the programming level.

“Knowledge of a standard isn’t enough when software complexity is high and people’s health and safety will be affected,” noted Frédéric Rabouin, embedded software developer at Esprit Lean. “A tool enforcing IEC 62304 mitigates risk and provides extra security and confidence that the software developed will meet standard requirements and be error free.”

How did LDRA provide a solution?
To maximise efficiency, tool configurability is essential. “We configured the LDRA tool suite to meet the company’s specific standard requirements as well as those of IEC 62304,” Rabouin confirmed. “LDRA's standard-specific templates streamlines configuration, detailing the steps for process workflow and standards compliance.”

Working interactively, the development team applies the configured LDRA tool suite to the code. “When evaluating our code, we found that it was easier to use the LDRA’s graphical interface than that of our IDE,” noted Rabouin. “LDRA displayed all of the subfunctions it used in analysis as well as graphically representing the standard. A thorough analysis only took five minutes time, so it was easy for us to work iteratively with the tool.”

What edge did you gain?
The clarity of the LDRA tool suite eased team communication and offered tangible proof-of-process for Esprit Lean.

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What’s next?
The LDRA tool suite has changed the way Esprit Lean does business. “We now have a sales quality argument that we can present for new contracts,” confirmed Rabouin. “The LDRA tool suite ensures that our products are compliant and that security is worth a premium for customers. They can rest assured that any code we provide has been rigorously reviewed, achieves standards’ compliance, and will be easier to maintain, reuse and add functionality to.”

Contact LDRA and discover how you too can harness the power of the LDRA tool suite and develop better, more reliable software.

“LDRA tool suite ensures that our products are compliant and that security is worth a premium for customers”
The V9 release implements a common GUI and repository, and delivers traceability from requirements through target testing and standards verification.

Embedded engineering teams now have the flexibility of using the LDRA tool suite® as an integrated solution or as separate point tools where the focus is on software developers, quality analysts or development managers. A consistent user interface coupled with central reporting repositories supports much simplified tool suite integration and organisation. As a result, it is much easier and quicker to implement complex capabilities, such as bidirectional traceability, where certification objectives and artefacts are mapped to requirements, code and tests.

With an additional feature of quality review metrics, users can also identify whether their code satisfies required clarity criteria. Code coverage is also an important reporting facility of the tool which is generated through Dynamic Analysis and provides the ability to filter on the source code and results.

In conjunction with TBvision, the plug-in TBevolve® enables project teams to accurately monitor the impact of code changes on their testing process. As the source code changes TBevolve will compare a baseline copy of a system with new versions and will highlight changed source code lines and report on untested source code which affects the overall code coverage analysis.

**Track the status and manage artefacts associated with each objective as well as assets (documents) associated with tests.**

TBmanager® now merges all coverage results from system, module/unit test and test generation from multiple users, post mortem tests, target and host.

TBmanager manages and tracks all artefacts, mapping them to project and standards certification objectives to achieve complete bidirectional traceability, including object code and target testing.

**Regress all test sequences with multiple files.**

TBrun® lets you view and regress all test sequences with multiple files or sets using common GUI features such as tabs, group nodes, filters and highlights. TBmanager-driven access offers simplified actions with bidirectional requirement flow and access to all artefacts and assets via a more intuitive and dynamic interface.

**Create transparency in your code.**

TBvision® is the LDRA Code Quality Reporting tool. It provides the ability to review; programming standards violations against a selected standards model, code quality metrics and code coverage results generated by the LDRA tool suite.

Users can significantly reduce costs, time and effort by using TBvision's reporting capabilities. With a simple click of a button, programming standard violations are displayed together with attached references and identified reasons for why violations have occurred.

**Save time, shorten your schedule, improve the quality and reduce costs.**

TBrun also utilises sophisticated control flow and data flow analysis techniques to fully document the interface to the unit under test. This level of information then enables TBrun to automatically generate test drivers removing the need for manual scripting. There are no limitations to the automatically generated driver. It is pure C/C++, Ada 83/95 or Java depending on the application code and can be executed in the host or target environment.

**Centralise all of your reports.**

TBpublish® centralises all reports into one location, allowing sets and individual file reports to be examined from one interface. Call graphs can be invoked in different modes, such as programming standards, dynamic coverage and filter graphs with interactive options that highlight specific procedures for viewing analysis.

**Improved user experience and simplified certification.**

The overall effect of the extensive range of additional features implemented in the latest LDRA tool suite release is to further enhance the user's experience and simplify the path to certification.
LDRA Certification Services (LCS) – A division devoted to ensure customers develop certification-ready products

LDRA Certification Services (LCS), is a separate division devoted to helping customers develop certification-ready products. The LCS team includes Federal Aviation Administration (FAA) Designated Engineering Representatives (DERs) and safety engineering experts, who offer product certification solutions at a fixed price. They are able to offer this client-centered, risk-free approach, based on their vast experience.

The LCS team is also aligned with world-class product development and verification specialists, who use the LDRA tool suite and other tools to address critical project requirements at the highest design assurance levels. By guiding certification applicants through the compliance process, the comprehensive LCS solution provides company management confidence that their certification efforts are accurate, complete and fully compliant.

LCS verification and certification services can be applied across industry standards in various vertical markets. Certification services include: avionics (DO-178B/C, DO-278A & DO-254), industrial safety (IEC 61508), automotive (ISO 26262), medical (IEC 62304), nuclear power (IEC 60880) and transportation (EN 50128) systems.

3 Easy Steps to Get Started:

1. **Step 1**
   Receive a free consultation with Todd R. White, LCS team lead.

2. **Step 2**
   Review your free Certification Roadmap prepared by the LCS team.

3. **Step 3**
   Implement the Certification Roadmap.

“LDRA Certification Services has proved invaluable for a cargo handling and aerial delivery system on the Embraer KC-390 that DRS Defense Solutions must certify to Levels A and C. The delivery system provides troop and cargo transport, aerial delivery, in-flight refuelling and medical evacuations. LCS has helped us establish the correct process and methodology to ensure that our delivery system, which can involve complex parachute delivery and extraction, correctly complies with the structural specifications custom configured to meet stringent weight limitations.”

Devin Mosley, Software Engineer, DRS Training & Control Systems
**Tool Integration News**

LDRA and MathWorks Tool Integration Moves Unit Testing Upstream to the Model

The integration enables joint customers to benefit from full test reuse and bidirectional traceability throughout the software development lifecycle. By bringing all components of the development cycle into one workflow, project teams save time by reusing tests, and more easily track progress toward requirements fulfilment and certification readiness.

With automotive, medical and industrial markets following the gold-standard of the avionics community, industry trends suggest that all industries will soon formalise certification procedures for model-driven design similar to those outlined by DO-178C or ISO 26262. The integration enables verification and validation engineers to prove that the executable code meets design criteria, and that the underlying code is sufficiently exercised to the relevant standard.

**LDRA Newsroom**

**LDRA Webinars**

LDRA have created a series of web seminars to help current and future customers learn more about the LDRA tool suite and how it can assist in developing software quality and security through test, analysis and requirements traceability.

These web seminars can be viewed at: [www.ldra.com/webinars](http://www.ldra.com/webinars)

**Events**

LDRA will be participating in a number of trade events throughout the year. Come and talk to us. Existing customers are always welcome. Potential customers - find out how, by working together, we can substantially improve software safety and efficiency and achieve financial benefits.

These events can be viewed at: [www.ldra.com/events](http://www.ldra.com/events)

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