



Developing high-quality software is tough. ECLAIR is designed to help development, QA, and safety teams reach their quality goals

## ECLAIR Qualification Kits

ECLAIR qualification kits provide crucial help to safety teams in charge of qualifying the tool following the prescriptions of functional safety standards. The kits contain documents, test suites, procedures and automation facilities that can be used by the customer to obtain all the confidence-building evidence that is required to make a solid argument justifying the use of ECLAIR in safety-related projects.

### 1 Highlights

- Direct, explicit support for several functional safety standards: CENELEC EN 50128, EN 50657 and EN 50716 (railway), ECSS-Q-ST-80C (space), IEC 61508 (industrial), IEC 62304 (medical), ISO 26262 (automotive), ISO 19014 (earth-moving machinery), ISO 25119 (agriculture and forestry), RTCA DO-178C/DO-330 (aerospace), ISO/SAE 21434 (cybersecurity).
- Support for MISRA coding standards: MISRA-C:2004, MISRA C:2012, MISRA C:2023, MISRA C:2025, MISRA C++:2008, MISRA C++:2023.
- Support for HIS and other source code metrics.
- Validated BUGSENG test suites allow for thorough validation of ECLAIR textual output formats.
- Validated BUGSENG test suites take into account the implementation-defined aspects of C/C++.
- Built-in antitampering features.
- Users can add their own test cases.
- Users can easily customize the documentation provided.
- *Test Automation Unit* supplied in source form to allow for inspection.
- Detailed reports allow running any test outside and completely independently from the qualification kit.
- Licensed for single projects or for multiple projects.
- **No stress:** generous number of hours of consultancy services are included to facilitate the qualification process.

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## 2 Documents Provided

The following documents, which are explicitly mapped to the requirements of EN 50128, EN 50657, EN 50716, ECSS-Q-ST-80C, IEC 61508, IEC 62304, ISO 26262, ISO 25119, ISO 19014, ISO/SAE 21434, and DO-178C/DO-330, are part of the qualification kits:

**ECLAIR Qualification Kit User’s Manual** Provides the project-independent qualification framework and mapping to the supported functional safety and cybersecurity standards, including standard-dependent guidance on tool confidence.

**ECLAIR Software Tool Qualification Plan — Template** Defines the project-specific objectives for establishing confidence in ECLAIR. It provides a ready-to-use structure for planning tool use, evidence collection, and acceptance criteria across all supported standards. Project tailoring is limited to the yellow highlighted sections.

**ECLAIR Software Tool Criteria Evaluation Report — Template** Supports the evaluation of whether ECLAIR’s usage requires qualification by assessing tool impact and confidence expectations in the selected standard. This document enables a defensible and standard-aligned decision on qualification needs.

**ECLAIR Software Tool Qualification Report — Template** Captures the project’s final qualification justification, including the achieved confidence argument, validation evidence, and acceptance record. This document is ready to be used directly in audits.

**ECLAIR Safety and Security Manual** Contains all you need to know on the use of ECLAIR for the development of safety-related and/or security-related systems, including operating constraints, assumptions of use, and ready-to-use checklists.

**ECLAIR Test Automation Unit Manual** Contains detailed information on the installation, verification and use of the Test Automation Unit for independent and repeatable validation of ECLAIR behavior in qualified configurations.

**ECLAIR Development Process** Provides a high-level description of the development processes used at BUGSENG for ECLAIR, supporting confidence arguments based on systematic development and configuration management practices.

**ECLAIR Release Notes** Information on ECLAIR releases since ECLAIR 2.3 along with matching releases of the ECLAIR Qualification Kits, where available.

**ECLAIR Defect Report** Contains information about known ECLAIR defects that may impact functional safety or security, along with instructions on how to obtain updates and post-release disclosures when needed.

## 3 BUGSENG Test Suites

BUGSENG test suites for MISRA-C:2004, MISRA C:2012, MISRA C:2023, MISRA C:2025, MISRA C++:2008 and MISRA C++:2023 contain thousands of test cases developed by BUGSENG over more than 15 years. They have been designed to cover ordinary as well as corner cases and cases where the presence/absence of MISRA guideline violations depends on particular combination of the implementation-defined aspects of the language.

## 4 Test Automation Unit

The *Test Automation Unit* (TAU) is written in *Lua*, a scripting language whose interpreter is characterized by small memory footprint and high speed. The TAU is supplied in source code, thereby allowing for

easy inspection and independent assessment. Nonetheless, the TAU produces, along with the results obtained for each test case, the exact sequence of commands that allow reproducing the test without using any component of the qualification kit apart from the test case source code. Among the data produced by the TAU is a summary that can be directly included in the *ECLAIR Qualification Report*.

## 5 The Bigger Picture

ECLAIR is very flexible and highly configurable: it supports all kinds of software development workflows and environments.

ECLAIR is fit for use in mission- and safety-critical software projects: it has been designed from the outset to exclude configuration errors that would undermine the significance of the obtained results.

ECLAIR is developed in a rigorous way and carefully checked with extensive internal test suites (tens of thousands of test cases) and industry-standard validation suites.

ECLAIR is based on solid scientific research results and on the best practices of software development.

ECLAIR's unique features and BUGSENG's strong commitment to the customer, allow for a smooth transition to ECLAIR from any other tool.

BUGSENG's quality system has been certified by TÜV Italia (TÜV SÜD Group) to comply with the requirements of UNI EN ISO 9001:2015 for the "Design, development, maintenance and support of tools for software verification and validation" (IAF 33).

BUGSENG is an *Arm's Functional Safety Partner*, and is thus recognized as a partner who can reliably support their customers with industry leading functional safety products and services.

## For More Information

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