



Accelerate Finding All Runtime Errors & Data Races in C/C++ With Sound Static Analysis



Driving embedded software quality





Sound static analysis of C/C++

Key Benefits

Seamless integration with QA-MISRA®

Scalable analysis from individual modules to 10 million lines of code

Sound analysis based on a mathematically rigorous formal method

Sound data and control coupling analysis / software component interference analysis

Interactive visualization of call graphs & classes

Automatic OS-aware analysis (ARINC-653, OSEK, and AUTOSAR)

Taint analysis to detect SPECTRE vulnerabilities, and user-defined cybersecurity analyses

Full traceability of reported code issues

Interactive traceable results & classification

Configurable report file generation

Tracking and visualization of project progress and analysis revisions

Stand-alone tool with open interfaces and open file formats

Automatic tool qualification for all major software safety standards

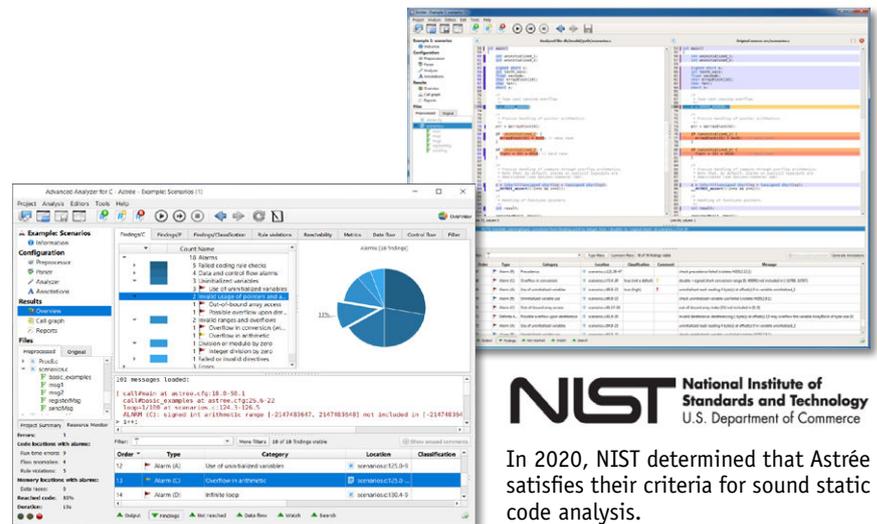
The challenge

Runtime errors and data races can provoke erroneous program behaviour and may even cause the software to crash. Software testing can be used to detect errors, but not to prove their absence, since usually no complete test coverage is possible. Static analysis based on Abstract Interpretation can be used to prove the absence of runtime errors and data races. A small number of false alarms is important to enable an efficient verification process.

The safe static analysis solution

Astrée is a parametric static analyzer designed to prove the absence of runtime errors and data races.

Astrée is sound, i.e., if no errors are signalled, this means there are no errors from the class of errors under investigation, the absence of errors has been proven. It reports program defects caused by unspecified and undefined behaviours according to the C and C++ language standards, program defects caused by invalid concurrent behaviour, and computes program properties relevant for functional safety.



In 2020, NIST determined that Astrée satisfies their criteria for sound static code analysis.

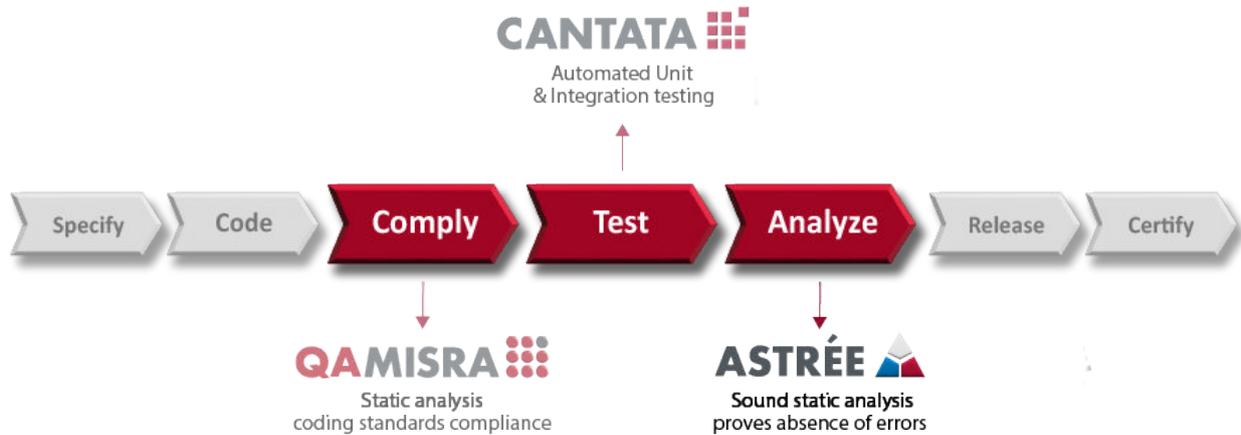
All the standards for C and C++ in one tool

With Astrée there are no hidden extras, coding language variants, or compliance module add-ons. It provides a single solution to automatically prove the absence of runtime errors, data races and further critical program defects in C/C++ code for the following language versions:

- › ISO/IEC9899:1990 (C90)
- › ISO/IEC9899:1999 (C99)
- › ISO/IEC9899:2011 (C11)
- › ISO/IEC9899:2018 (C18)
- › ISO/IEC 14882:2003 (C++03)
- › ISO/IEC 14882:2011 (C++11)
- › ISO/IEC 14882:2014 (C++14)
- › ISO/IEC 14882:2017 (C++17)

Verification Centric Tools

QA Systems static analysis and software testing tools support verification in the linear flow of software development below. We recommend applying sequential approach to these verification stages with tools that are designed and targeted for each purpose.



Comply Test Analyze

Use **QA-MISRA** for fast coding standard compliance at the developer's desktop first.
Use **Cantata** for automated dynamic execution of the standard compliant software.
Use **Astrée** for proving absence of run-time errors on whole application.

NB: Astrée uses the same configuration as QA-MISRA, so the effort to apply it later to a QA-MISRA project is low.

Platforms & Integrations

Astrée is available on Linux and Windows platforms. Pre-processing and parsing knowledge of the compilation environment is captured in project set-up and used in the analysis to support embedded software. In addition to the GUI client and full command line interfaces, Astrée is integrated with the following:

- › Eclipse® (including integration with Cantata)
- › ARM Keil μ Vision IDE / Debugger®
- › Jenkins®
- › dSPACE TargetLink®
- › MATLAB /SIMULINK®

Start free trial

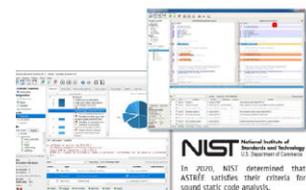
Take Astrée for a test drive with your own code and development environment.

Get in touch with our team at sales@qa-systems.com

What to expect

- › A bespoke demo kick-start and Q&A session
- › Very simple installation
- › Simple configuration for your compiler
- › Unrestricted use, time-limited trial license

Learn more



qa-systems.com/tools/astree



QA Systems Group | sales@qa-systems.com | www.qa-systems.com
With offices in **Stuttgart, Germany** | Bath, UK | Milan, Italy |
Boston, United States | Da Nang, Vietnam | Bengaluru, India