PRESS RELEASE

C-rusted: A safe, secure and energy-efficient C dialect for the next 50 years

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Software safety and security issues grow rampant, to a point where regulators and the industry realized this state of affairs cannot continue. There has been a lot of speculation lately about the possible rewriting of everything into Rust or similar languages.

Nobody seems to have done the math, though. In particular:

- **Legacy**: there is too much legacy code written in C; the costs and risks involved in rewriting existing code bases (a good part of which has a more-than-honorable operational history and may be in perfectly good shape) are enormous.
- **Personnel**: retraining millions of developers to Rust would take time and lots of resources.
- **Portability**: for many MCUs used in the development of embedded systems, no implementation of Rust currently exists.
- **Tools**: while all sort of tools, including qualifiable tools for safety-and security-related development are available for C, the same thing cannot be said for Rust.
- **Energy-efficiency**: C is the most efficient language both in terms of energy consumption and in terms of required memory.

In short, the C ecosystem is worth gazillions: it is not something you would throw into the trash unless you are forced to. And, in fact, you aren't:

if industry is ready to embrace a more disciplined approach to programming, such as the one enforced by Rust, then all the benefits or Rust and more can be obtained in standard ISO C.

BUGSENG announces the launch of *C-rusted*, a dialect of C that is 100% compatible with all versions of ISO C. In fact, a C-rusted program is a C program that can be elaborated, as is, by any existing compiler and any other kind of tool capable of processing C code. The difference is that C-rusted programs may contain annotations, similar to the ones of Rust but often simpler and less intrusive. The *C-rusted Analyzer* performs a static analysis that will flag insufficiency and incoherence of the annotations. When the *C-rusted Analyzer* generates no message, that the program is provably exempt from a very large class of safety and security issues: in practice, all the guarantees of Rust, and more, can be obtained in this way.

For more information visit
https://bugseng.com/c-rusted

A defensive publication that prevents patentability of the method has been filed on **arXiv**. *C-rusted* will be presented at **embedded world 2023**. The implementation of the *C-rusted Analyzer* within the **ECLAIR Software Verification Platform** is currently under testing: it will be released with ECLAIR 3.14.0, and it will be certified by TÜV SÜD.

	C	C-rusted	Rust
Standardized	Yes: ISO	Yes: it *is* ISO C	No: moving target
Certifiable translators exist	Yes	Yes: it *is* ISO C	No
Portability	Absolute	Absolute	Limited
Tool availability	Very large	Very large	Scarce
Developers' availability	Large	Large	Scarce
Coding standards for safety and security	Yes	Yes	No
Can reuse C legacy code		Yes	Only in some cases
Strong guarantees on memory resources for annotated programs		Yes	Yes
Strong guarantees on user-defined resources for annotated programs		Yes	Yes
Compatibility with unannotated code		Yes	Yes
Incremental adoption		Yes	No
Cost of retraining C programmers for unannotated code		Zero	Significant
Cost of retraining C programmers for annotated code		Moderate	Significant

C-rusted: The Advantages of Rust, in C, without the Disadvantages

About BUGSENG:

BUGSENG is a leading provider of solutions and services for software verification.

BUGSENG's *ECLAIR Software Verification Platform* has been designed to help engineers develop higher-quality software, effectively, by changing the traditional rules of the game.

BUGSENG consulting services help industry leaders improving their development processes and complying with functional-safety standards.

BUGSENG is also a renowned resource for advanced professional training.

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