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STMicroelectronics and HighTec EDV-Systeme collaborate for safer software-defined vehicles

Where safety meets safety: ST's Stellar MCUs certified to the highest level of risk management, ISO 26262 ASIL D, are now supported with the same safety level by HighTec's Rust compiler

Geneva, Switzerland and Saarbrücken, Germany, February 4, 2025 – STMicroelectronics (NYSE: STM), a global semiconductor leader serving customers across the spectrum of electronics applications, and HighTec EDV-Systeme GmbH are advancing automotive functional safety with a complete solution that will accelerate the development of safety-critical systems to make software-defined vehicles safer and more affordable.

The solution supports the Rust programming language and combines HighTec's Rust compiler, qualified to ISO 26262 ASIL D, with ST's Stellar, the first 28nm microcontrollers certified to the same safety standard. Rust is gaining significant momentum in the automotive industry for its strong safety and reliability features.

"*Software-defined principles are transforming vehicle design, and ownership experiences, replacing traditional hardwired electronic control units (ECUs) with programmable systems,*" explained Davide Santo, Automotive Microcontroller Business Unit Director, STMicroelectronics. "*This is the future for vehicles with any type of powertrain, letting automakers easily differentiate their product ranges and dynamically update vehicle features. The collaboration with our longstanding partner HighTec, ensures that automotive manufacturers can leverage the power of Rust while meeting the highest safety standards in the industry.*"

"*Here at HighTec, our engineers created the industry's first software compiler to support Rust, the modern safety-ready programming language, and achieve qualification to the highest level of the automotive functional-safety standard, ISO 26262 ASIL D,*" said Mario Cupelli, CTO at HighTec EDV-Systeme. "*On the other hand, ST's Stellar automotive microcontrollers are the first 28nm components certified according to ISO 26262 ASIL D. This makes them a natural fit with our compiler, enabling customers to have a complete solution where safety is assured seamlessly across compiler, hardware, and software.*"

As automakers face intense pressure to shorten development cycles and meet evolving safety standards, this collaboration provides a robust and powerful safety compliant solution for automotive software development. The integration of the ASIL D qualified Rust compiler into the Stellar MCU family accelerates the development of safety-critical systems, reducing time-to-market while maintaining strict compliance with automotive safety requirements.

Rust's safety, performance, and reliability have made it an emerging choice for automotive mission-critical systems, poised to shape the future of the automotive industry. With HighTec's Rust compiler support for Stellar products, ST is offering to its automotive customers an integrated, richly featured, and efficient toolchain that accelerates development cycles while ensuring compliance with ISO 26262.

ST and HighTec are sharing a vision of creating innovative solutions that meet the highest safety standards in the automotive industry. The close cooperation ensures that developers can now integrate Rust along with their valuable C/C++ code base into their safety-critical projects with Stellar and accelerate the development of safety-critical systems, reducing time-to-market while maintaining strict compliance with automotive safety and security requirements.

Further technical information:
Rust contains provisions to protect the safety of memory, process threads, and data types. This ensures superior resilience appropriate for critical automotive systems, while Rust's runtime efficiency is comparable to C/C++ in execution time and memory usage. These characteristics significantly lower costs in software development and maintenance, shorten development cycles, and increase safety and security.

HighTec's C/C++ and Rust automotive grade compiler allows Rust's safety benefits to be integrated alongside legacy C/C++ code to build safe and secure automotive applications for the next-generation of software-defined vehicles.

ST's Stellar automotive MCUs are built on Arm® Cortex®-R52+ cores and a robust safety-focused hardware architecture. They are the first 28nm MCUs to achieve an ISO 26262 ASIL D certification, attained through an accredited assessor early in 2024. Additionally, they adhere to ISO 21434 cybersecurity standards and comply with UN155 requirements, which ensure meeting the latest safety and security standards. The Stellar MCUs offer exceptional performance, scalability, and integration for next-generation automotive vehicles, electrification, and safety-critical systems.

The HighTec Rust compiler complements the already established HighTec C/C++ compiler suite. Both are qualified according to the highest safety level ISO 26262 ASIL D and enable automotive software developers to take full advantage of the high reliability and performance features of ST's Stellar MCUs. The overall toolchain is built on the modern LLVM open-source technology and allows a hybrid development of Rust code along with C/C++, enabling the transition to modern software architectures. ST's Stellar MCUs now benefit from HighTec's Rust compiler, allowing a seamless development of safety-critical applications.

For more information about HighTec's ISO 26262 ASIL D qualified Rust and C/C++ compiler for ST's Stellar automotive MCUs, please visit www.hightec-rt.com/rust

About STMicroelectronics
At ST, we are over 50,000 creators and makers of semiconductor technologies mastering the semiconductor supply chain with state-of-the-art manufacturing facilities. An integrated device manufacturer, we work with more than 200,000 customers and thousands of partners to design and build products, solutions, and ecosystems that address their challenges and opportunities, and the need to support a more sustainable world. Our technologies enable smarter mobility, more efficient power and energy management, and the wide-scale deployment of cloud-connected autonomous things. We are committed to achieving our goal to become carbon neutral on scope 1 and 2 and partially scope 3 by 2027. Further information can be found at www.st.com.

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About HighTec EDV Systeme GmbH
HighTec EDV-Systeme GmbH, Saarbruecken/Germany, is the world's largest commercial provider of compilers using innovative open-source technologies and offers ISO 26262 ASIL D certified tools for embedded software development, the real-time operating system PXROS-HR, and a wide range of design-in services.

HighTec's ASIL D qualified C/C++ compiler for leading multicore microcontrollers in the automotive and industrial sectors such as Arm®, TriCore™/AURIX™/TRAVEO™ families, RISC-V, Power Architecture (PowerPC) and GTM architectures are continuously adapted and optimized to new architectures in close cooperation with the silicon partners.

In addition to the multi-architecture compiler, HighTec offers PXROS-HR, a safety-certified multicore RTOS for applications with safety and multicore requirements. PXROS-HR guarantees robustness, safety, high performance, and data security in real-time environments. PXROS-HR is certified according to ISO 26262 ASIL D / IEC 61508 SIL 3 and is complemented for ASIL D development by a Tool Qualification Kit as a basis for the certification of customer applications. Complementing this portfolio, HighTec offers development, training and consulting services. Founded in 1982, HighTec is a privately held global company with offices in Germany, the Czech Republic, the Netherlands, Hungary and China. For more information about HighTec EDV-Systeme GmbH, visit www.hightec-rt.com.

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