SIListra Systems Press Release / Dresden, October 1, 2026

# Next-Generation Safety Controllers: Standard Hardware with Floating-Point Capability, Ready for IEC 61508 Edition 3

## SIListra Systems will showcase its award-winning, world-first support for safe floating-point calculations on non-safety-rated standard hardware at SPS 2026, Hall 7, Booth 677


**Summary**

At SPS 2026, SIListra Systems GmbH will present the brand-new TÜV SÜD-certified SIListra Safety Transformer 3.0.0. Readers of Computer & Automation have selected the SIListra Safety Transformer 3.0.0 as the 2026 Product of the Year in the Safety category.

The reasons for this award are numerous new features anticipated by users. For example, the SIListra Safety Transformer 3.0.0 provides **floating-point support** for the first time worldwide. Version 3.0.0 also enables **modular safety applications** composed of various pre-certified software components. In addition, the SIListra Safety Transformer can now be integrated directly into the **toolchains of controller manufacturers** for the first time.

The latest version has already been assessed against the Committee Draft for Vote (CDV) for the planned third edition of IEC 61508. This means users are prepared for the latest edition of the standard from the outset.

SIListra Systems will also present additional new products at SPS 2026. The SIListra Safety Math Library (SML) complements the floating-point support of the SIListra Safety Transformer with high-performance, pre-certified implementations of mathematical functions. These enable safe algorithms on single-channel hardware, for example in robotics, motion control, and sensing applications. SIListra Systems will also unveil the world-first SIListra Unit Testing Library. It enables unit tests developed once for safety-critical components to be reused—without any modifications—for the code generated by the SIListra Safety Transformer.


**Full Release**

Machines, robots, and sensors now perform many safety-related tasks. For example, a robot must stop immediately if a person comes too close. Such safety functions must operate reliably even if, for instance, the electronics themselves develop a fault. These faults must be detected and handled in a way that prevents them from causing a dangerous malfunction. This is why safety standards, such as IEC 61508, require measures for diagnosing and managing such faults.

In practice, two approaches have become particularly well established for diagnosing random faults: hardware redundancy and coded-processing. As the name suggests, hardware redundancy involves replicating hardware, which entails substantial hardware development and integration effort. Coded-processing takes a different approach: the required redundancy and fault detection are implemented selectively in software through encoding. This makes it possible

to implement safety applications on so-called commercial off-the-shelf (COTS) hardware. With the SIListra Safety Transformer®, developers can incorporate this approach into their software development and implement safety-related applications on COTS hardware.

A new feature of version 3.0.0 of the SIListra Safety Transformer is the powerful floating-point support, enabling applications with demanding requirements for accuracy and dynamic range, for example in control engineering, robotics, and sensor-data processing. This eliminates the need for the time-consuming emulation of floating-point operations. The solution supports the widely used `float` (32-bit) and `double` (64-bit) floating-point data types, as well as IEEE 754-based calculations in C and C++.

In addition, the SIListra Safety Math Library provides high-performance, safety-related implementations of mathematical functions, including trigonometric functions that are indispensable for applications such as robot motion calculations. The library provides defined numerical accuracy and reproducible results. Combined with the floating-point support of the SIListra Safety Transformer 3.0.0, this enables sophisticated safety algorithms to be implemented on single-channel COTS hardware.

Two further innovations also make it easier for developers to use the SIListra Safety Tools®. First, the SIListra Safety Transformer 3.0.0 supports modular safety applications: an application can be assembled from multiple software components that have already been pre-verified or certified for a defined context of use. This can significantly reduce the certification effort required for new applications.

Second, the SIListra Safety Transformer can now be integrated directly into the existing development tools of safe controller system manufacturers for the first time. This enables entirely new embedded software/hardware architectures for safety-critical controllers.

Even when coded-processing is used, safety-critical software still requires thorough testing. Until now, testing the coded-processing variant involved additional effort for developers. The SIListra Unit Testing Library now significantly reduces this effort by extending the SIListra Safety Transformer with a test approach tailored to coded-processing. In most cases, it allows existing unit tests to be used for the coded channel without modification. At the same time, the library follows widely used GoogleTest concepts and supports numerous common test and assertion macros. To integrate with existing development and CI environments, the SIListra Unit Testing Library also offers CMake integration with automatic test discovery and detailed test reports. The new library therefore helps teams to implement a consistent, automated, and safety-oriented testing strategy for both native and coded software.

In addition, the SIListra Safety Transformer 3.0.0 is already being certified on the basis of the Committee Draft for Vote (CDV) for the third edition of IEC 61508. This allows users to align their developments with the upcoming edition of the standard today.

The foundations for the new floating-point product solution were developed as part of the SafeFloat ZIM project, in collaboration with the Institute for Control Engineering of Machine Tools and Manufacturing Units (ISW) at the University of Stuttgart, from January 1, 2023, to June 30, 2025. The ZIM project was funded by the German Federal Ministry for Economic Affairs and Climate Action (BMWK) pursuant to a resolution of the German Bundestag.

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The foundations for the new product solution for modular safety applications were developed as part of the KoSiNuS TP1 ERDF project from April 1, 2025, to December 31, 2026. The ERDF project was funded by the European Regional Development Fund (ERDF).

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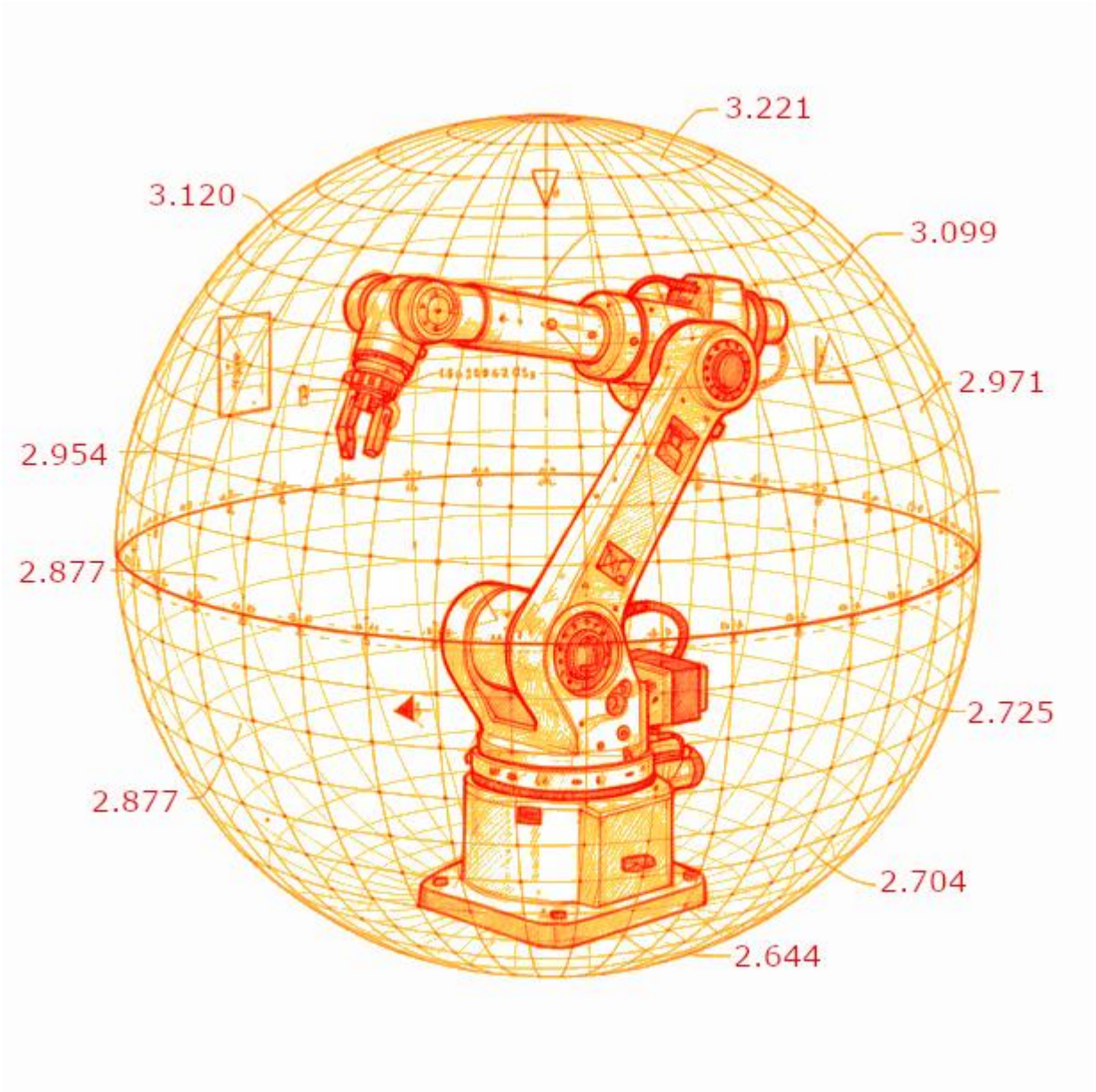



Image 1: For the first time, the SIListra Safety Transformer 3.0.0 supports floating-point arithmetic, making it particularly well suited for safeguarding robotic control systems.

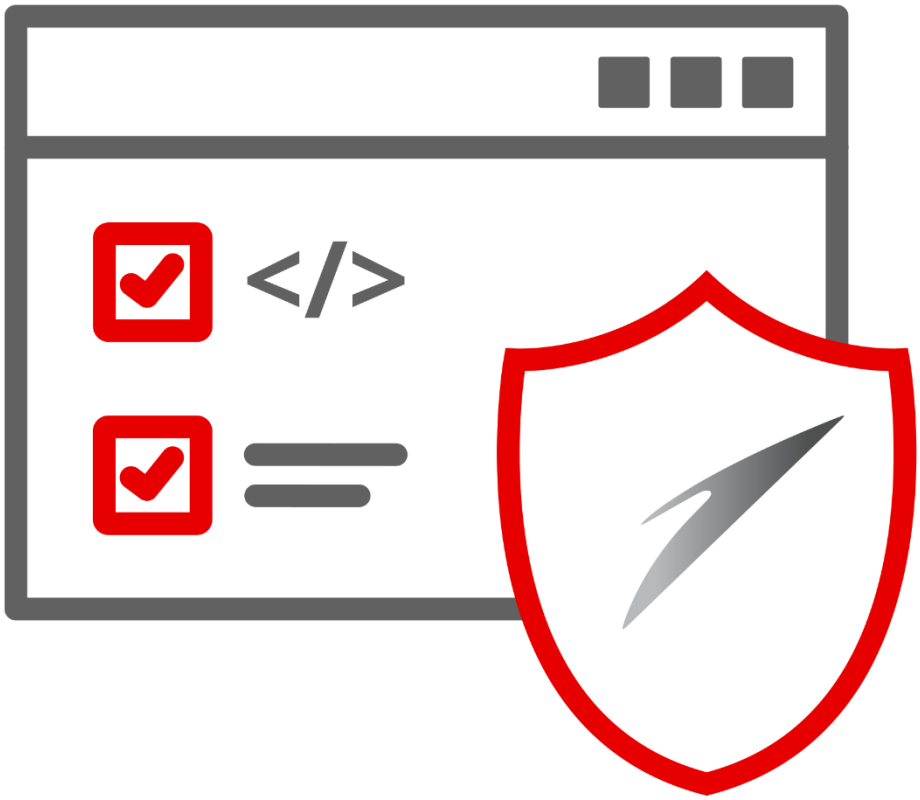


Image 2: The SIListra Unit Testing Library dramatically simplifies testing of safety-related applications: tests written once can be used unchanged for both the native and coded channels.

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*About SIListra Systems:*

*SIListra Systems GmbH is a highly specialized technology company spun out of TU Dresden in 2012. Its software-based solutions enable safety-critical applications to be implemented on standard hardware. Manufacturers in automation, robotics, and sensor technology use SIListra Systems' technologies and software tools. More information about the company, its TÜV SÜD-certified development tool, and engineering services is available at [silistra-systems.com](silistra-systems.com).*

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