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Note to editors: Link to high-res photo and picture caption follow news release text.

Beckhoff Celebrates 30 years of TwinCAT Automation Software

A single software platform for all automation functions marks three decades of success in the field

SAVAGE, Minnesota, May 21, 2026 – Beckhoff's introduction of TwinCAT automation software in 1996 marked a decisive evolutionary step forward in the successful model of PC-based control technology. With the switch from DOS to Windows operating system, PLC programming in accordance with IEC 61131-3, and an integrated engineering environment, Beckhoff created a future-proof solution based on the principle of abstracting hardware and software. Today, the TwinCAT platform combines all automation functions in a strictly deterministic, real-time environment – from PLC and motion control to CNC and advanced measurement technology, as well as machine vision, robotics, and pioneering AI tools.

By separating the control function from proprietary hardware devices, Beckhoff achieved a paradigm shift in automation as early as 1986. Building on this, the market launch of The Windows Control and Automation Technology (TwinCAT for short) 30 years ago completed the basis for the success of PC-based control today. TwinCAT provides a means of transferring IT standards for use in automation and building them into an integrated, high-performance, and deterministic control platform with real-time extensions.

Initially with a focus on Windows, TwinCAT has expanded to support other operating systems such as TwinCAT/BSD and Linux®. In addition, Beckhoff combined all the engineering tools into a single software concept and supported globally established PLC programming standards according to IEC 61131-3, as well as popular IT programming languages and tools including C, C++, MATLAB®, and Simulink®.

From the start, TwinCAT has been characterized by 100 µs performance, and main memory was suddenly available in almost unlimited quantities. TwinCAT also offered extremely powerful motion control functions right from the outset, from simple standard axes to electronic gearing, and cam plates to 5-axis CNCs. The number of axes that TwinCAT could control grew every year, from 10 to 50 to 100 to over 1,000 axes today — with the cost per axis sinking simultaneously. With the concept of the all-electric machine, more powerful, precise, and efficient solutions could be implemented early on. Even back then, this visionary software-centric approach liberated machine builders from the narrow performance limits of conventional control hardware in a way that has stood the test of time.

Built on openness and flexibility

A key source of value in the TwinCAT architecture lies in its openness, which consolidates the full spectrum of automation in a single software concept. While the focus was initially on PLCs, motion control, and I/Os, the platform now comprises well over 100 highly specialized functions, including functions for high-performance measurement technology, control technology, and communication. All machine functions are calculated deterministically on a central industrial PC and transferred to the I/O level with exact clocking via the high-speed EtherCAT fieldbus. This allows processes to be controlled and regulated with top temporal resolution and accuracy. In practical terms, the installation work, space required in the control cabinet, and overall costs are all reduced.

The performance capability of advanced industrial PCs also facilitates seamless integration of many other high-end technologies. Machine vision with TwinCAT Vision and the system-integrated robot controller are anchored in the software as native runtime modules. The implementation of artificial intelligence is also rapidly increasing in importance. TwinCAT Machine Learning Creator enables the generation of AI models for outstanding performance data: shortening PLC cycles to as little as analyzing image data, time series, and process data without any previous experience or prior knowledge. It also makes local monitoring solutions and anomaly detection possible directly in the control environment. The new TwinCAT CoAgent tool for AI-assisted automation programming supports users throughout the entire lifecycle – from engineering to live machine operation.

Fit for the future

The software-centric design of the TwinCAT architecture continues to evolve based on the core principles of scalability and convergence with IT standards. Even three decades after its market launch, users are well equipped for future challenges with TwinCAT. PC-based control provides the ideal foundation for deep IT/OT integration and seamless connectivity into cloud or edge infrastructures. Whether dealing with physical AI, new communication standards, or stringent cybersecurity concepts – TwinCAT adapts to all new market requirements as a powerful and modular framework. At the same time, machine builders are safeguarding their ability to innovate in the long term through the combination of high computing power, availability, and openness.

www.beckhoff.com/twincat

Link to high-res photo:

https://www.beckhoff.com/media/downloads/press/2026/pr102026_beckhoff_us.zip

Press picture:



Picture caption:

For 30 years, TwinCAT from Beckhoff has provided an integrated software foundation for future-proof PC-based control technology across all industries and automation functions.

At Beckhoff, automation is our calling. We empower engineers to differentiate and succeed as industry leaders – to harness new technologies, embrace open standards, and solve the world’s most complex problems. Founded and led by engineers, we organically create advanced controls, communication, IoT, and motion technologies that become unique tools for your one-of-a-kind challenges in an age of digital transformation.

As a global partner with U.S. headquarters in Minneapolis, we remain committed to sustainability, inclusivity, and support for the people behind the automation. So whether you’re powering the EV revolution, dazzling on Broadway, launching satellites, or developing fusion energy solutions – you can reach new heights for your business, industry, and humankind.

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