

25 years of TwinCAT – bold decisions and a drive for innovation pay off

With every birthday you feel that you're getting older. At the same time, however, it's an opportunity to look back and, of course, also a little into the future.

In 2020, Beckhoff Automation celebrated its 40th anniversary. PC-based control technology is closely linked to our success story. The PC-based approach has been around since 1986 – in other words, for 35 years now – certainly making Beckhoff one of the pioneers of PC-based control technology and also the manufacturer with the highest unit sales in this field. After initial software products based on the DOS operating system and programming in the IL/C languages, TwinCAT was launched 25 years ago. Windows served as the operating system and the programming was changed according to the requirements of the IEC 61131-3 standard. At that time – again – a sign in the market. It was now possible to implement a control system on a 'regular' PC with a standard operating system. At the beginning, the TwinCAT 2 software generation was used for this purpose. This version is still available and continues to be maintained, which is proof of continuity and compatibility. By the way, does everyone still remember exactly what TwinCAT means? Here's the answer: The Windows Control and Automation Technology.

Not quite as long ago, the decision was made to align the TwinCAT programming environment with the dominant programming environment used in the IT domain. Microsoft Visual Studio® is used for all major IT software developments, and Beckhoff also used this tool to develop TwinCAT 2. So why not develop PLC software applications with Visual Studio® as well? The corresponding TwinCAT 3 software generation was introduced in 2010 and delivered to customers from 2011 on – which makes for another 10-year anniversary and another track record.

The integration of the TwinCAT tools in Visual Studio® created a completely new development environment. With additional 'programming languages' such as C/C++ and MATLAB®/Simulink® becoming available, further possibilities opened up to more efficiently generate code for machines and plants. This was again a bold corporate decision, and it was also spot on! Many Beckhoff customers are now using TwinCAT 3 and with it, the extensive possibilities for ensuring software



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quality through numerous new features, such as object-oriented programming concepts in the PLC and through integration with source code control tools. Microsoft Windows is still set as the standard operating system. Today, however, this is supplemented by TwinCAT/BSD and TwinCAT/RTOS. In the field of operating systems, the world is becoming more colorful, and Beckhoff is responding to this trend.

In addition to programming, TwinCAT offers an I/O configuration interface for different fieldbus systems – first and foremost EtherCAT. Motion control applications from simple movements to sophisticated CNC and robotics are just as much part of this evolution as safety functions, image processing for machine vision and machine learning. Much has also been developed around the underlying TwinCAT system. Prime example: TwinCAT HMI follows a responsive web browser-based approach, which is future-proof, platform-independent and often copied.

With the advent of Industrie 4.0 and the Internet of Things (IoT), it quickly became clear that the cloud, long known in IT, would also become important in the automation market. Beckhoff therefore already presented solutions for IoT and cloud connectivity in 2015. Enormous customer interest shows us that this bold step in a new direction is also being honored this time. Cloud-based control will strongly influence automation technology in the coming years, and once again Beckhoff is leading the way with TwinCAT.

This short editorial certainly cannot come close to reflecting the comprehensive functionality and history of TwinCAT. Therefore, we dedicate this issue of PC Control to our automation software with the extensive special coverage on "25 years of TwinCAT". Starting on page 14 you will find all the latest technological highlights and the outlook on numerous further TwinCAT developments. I hope you enjoy reading!