



Hans Beckhoff is interviewed by Open Automation magazine about current and future developments

Focus on user benefits

Based on this philosophy, Beckhoff is extending its automation platform consisting of PC-based Control technology, I/O systems and drive technology, in order to ensure maximum benefit for users. Ronald Heinze, editor-in-chief of Open Automation, spoke to Managing Director Hans Beckhoff about current and future developments.

“Our high-performance, PC-based Control technology with decentralized I/Os and drive technology forms the ideal foundation for covering a wide range of market segments,” said Hans Beckhoff, commenting on the strategy of his high-tech company. He lists application options in different fields such as high-performance machine construction, water treatment and entertainment engineering as examples. “Our customers should be able to generate the maximum benefits and – based on our platform – map their own innovative solutions.”

The company is broadly based in terms of its customers: in addition to alternatives energies such as wind and solar energy, Beckhoff clientele includes companies from the machine construction and building automation sectors. “We are first and foremost a platform provider. For selected industries we also offer special solutions,” said the Managing Director.

The company has grown significantly over recent years and adapted its structure to this growth. More space for staff was made available with the acquisition of additional buildings at the company’s main location in Verl, Germany, thereby strengthening existing infrastructure. “We highly value stability,” said Hans Beckhoff. “Dynamic adaptation combined with steadiness form a good working basis for customers and staff. We don’t regard the principle of constant change as an end in itself as productive.”

Transferring simplicity from IT to automation technology

“Our PC-based machine control systems are characterized by exceptionally high performance, coupled with technological stability and long-term availability of supply,” said the visionary Hans Beckhoff. “In the early years of PC control the performance benefits found immediate acceptance, although to some users the technology appeared to be somewhat fast-moving. However, after 26 years of practical experience we know that long-term availability is in fact one of the advantages of PC control. Long original product service life combined with the principle of functional replacement ensures long-term solution availability with broad-based investment security. This is, of course, aided by the fact that we develop and produce the motherboards for all our Industrial PC products in-house. They are, of course, optimized for long-term availability,” said Hans Beckhoff. “A sensible and balanced life-cycle policy offers many obvious benefits.”

“Simplification of the engineering is one of the core responsibilities of automation engineers.”

A primary intention of Beckhoff is to transfer the increasing simplicity of IT to automation technology. For many applications this makes automation more understandable and easier to work with: the user merely has to adjust a few settings or parameters, and the application can start. Although in high-performance

machine applications the requirements are somewhat more demanding: “In this field the software becomes a distinguishing feature,” said Hans Beckhoff. “Customized automation solutions will always play an important role in machine construction.” But here too, automation will become less complex, since the engineering toolsets will become simpler. “Further refining of automation solutions is crucial for the future technical and commercial development of the industry,” said Beckhoff.

“The ideal automation tool can be used to roughly describe the functionality, refine it step-by-step, and compile the program. Simplification of the engineering is one of the core responsibilities of automation engineers.”

New TwinCAT 3.1 version

The fulfillment of this vision necessitates convergence of IT and automation engineering, which forms the foundation of the entire Beckhoff technology offering. With TwinCAT 3 we take a huge step towards this convergence. Through its modularity TwinCAT 3 supports the reusability of software modules. Building on this, application-specific wizards and frameworks have started to emerge to increase efficiency and functionality.

TwinCAT 3 already offers many features that offer developers of automation technology more options to improve their work. In addition to a consistent object-oriented approach this includes the use of Visual Studio® as an optional framework. Hans Beckhoff: “The fact that we don’t use a special framework for TwinCAT makes access to automation easier for many engineers.” Visual Studio® is familiar and popular as a software development environment around the world. This offers significant savings potential for engineering teams.

“At SPS IPC Drives 2012 we will present the new TwinCAT 3.1 version. It is mainly characterized by its consistent support for 64-bit Windows operating systems.” Hans Beckhoff said and continued: “In addition, version 3.1 includes a wide range of new and enhanced functions.” Hans Beckhoff regards the integration of Matlab®/Simulink® in TwinCAT 3 as a particular success. It means that IEC 61131, C++ and Matlab®/Simulink® can be mixed as required, and part-simulations with real-time and non-real-time components are possible too. Further progress was also made in PC control measurement technology. TwinCAT Scope now enables a wide range of long-term monitoring options and can be integrated into custom HMI projects.

Industry 4.0 right from the start

According to Hans Beckhoff, the current Industry 4.0 trend also refers to the convergence of IT and automation: “Industry 4.0 precisely matches our ideas and is a handy description of what we have been doing for more than 25 years. Our control architectures are designed to enable integrated communication.”

However, Beckhoff is skeptical about a fully decentralized structure: "Fully decentralized intelligence is not a helpful concept for automation architectures. In the 1990s there was a time when fully decentralized intelligent automation configurations were discussed under the notion of 'holonic agents' – without tangible success." Just like nature, automation needs a clear, functional, hierarchical structure, with compaction of information towards the top.

For Beckhoff as a company, the area of functional safety is a key revenue generator. "Today, safety is a must for control equipment suppliers," said Beckhoff. "For us, the need to integrate safety technology was clear right from the introduction of the I/O terminal system in 1995." Meanwhile TwinSAFE, the integrated safety solution, which enables safety-relevant communication in non-safety-related systems and is therefore naturally very suitable for EtherCAT, has met with a high degree of acceptance. TwinSAFE is an open safety protocol, which in principle can be tunnelled via a wide range of communication systems. It is recommended by the EtherCAT Technology Group as a standard EtherCAT safety protocol and can be used by third parties via licenses.

"Incidentally, EtherCAT is also highly suitable for redundancy concepts," said the Managing Director. It is used in a wide range of applications. In addition to the existing solution for cable redundancy, master redundancy for TwinCAT will become available in the foreseeable future.

Right at the front in the Leading-Edge Cluster

Beckhoff is among the driving forces for the "Intelligent Technical Systems Ostwestfalen-Lippe" – in short: "it's OWL." With the "it's OWL" Leading-Edge Cluster competition, a flagship project for the high-tech strategy of the German Government, the Federal Ministry of Education and Research supports the best technology clusters in industry and science. Between 2007 and 2012, 15 Leading-Edge Clusters were selected in three competition rounds, which will each receive funding of up to 40 million euros over five years. The Leading-Edge Cluster concept focuses on technological developments for solving socially relevant areas of future need. The "it's OWL" cluster was awarded Leading-Edge Cluster status during the third competition round in January 2012.

One of the projects initiated by Beckhoff is "ScAut" (Scientific Automation). It is managed by the Heinz Nixdorf Institute at the University of Paderborn and implemented in collaboration with industrial partners. "We want to establish a global knowledge base for automation expertise," said Hans Beckhoff. The goal is to catalog university-based automation science expertise. "We want to implement particularly exciting topics in TwinCAT and make them available in the form of software libraries", said Beckhoff. "We see this as a good opportunity for bridging the often bemoaned gap between practice and science." The project is initially scheduled for four years, with the first two years focusing on

collecting relevant data. "What practical uses can we extract from science?" The graduate physicist, Hans Beckhoff is convinced that the project will provide clear answers to this question.

On the way to becoming an even stronger motion technology company

More good news: according to Hans Beckhoff, the joint-venture company Fertig Motors is growing and thriving, and is currently relocating to larger development and production premises at Marktheidenfeld. The standard AM8000 motor series and the AM88xx stainless steel motors have been available to the market for some time. "Users particularly appreciate the benefits of One Cable Technology," said Beckhoff. One Cable Technology integrates the previously separate power and feedback cables of a servomotor into one integrated cable.

XTS opens up a completely new dimension for simplifying design, for example in conveying equipment, packaging machines and printing equipment.

A more recent addition are servomotors in the smaller and higher performance ranges. In order to meet the demand for higher performance, the AM8000 series is now also available with external ventilation, which increases the motor performance by up to 50 %. For CNC applications in tool and woodworking machines the AM8500 series offers a complete range of motors with increased rotor inertia. The eXtended Transport System (XTS) is a linear transport system also based on cooperation with Fertig Motors. "The joint venture offers fantastic reinforcement for our company," said Hans Beckhoff. Motion applications, consisting of motors and drives, are expected to generate 30 % of the company turnover by 2020.

"XTS is already a real success story," said Hans Beckhoff. "A wide range of machine manufacturers have expressed their serious interest. XTS opens up a completely new dimension for design simplifications, for example, in conveying equipment, packaging machines and printing equipment." Several machine manufacturers have already committed to using the new system. Even a highly innovative company such as Beckhoff can't issue revolutionary technologies such as XTS on a daily basis. "An idea has to reach a critical mass, driven by technical feasibility and concrete customer requirements," said Hans Beckhoff.



Hans Beckhoff on current economic conditions

During 2010 and 2011 Beckhoff experienced cumulative growth of around 100 %, based on the general growth in alternative energies. This year the situation is different: "Since the end of last year, manufacturers of solar equipment and wind turbines have been in a structural crisis," said Hans Beckhoff. "For this reason we expect no growth for this year." Although to some extent this will depend on the development during the last quarter of 2012. Last year the renewable energy sector alone contributed 20 % to Beckhoff's total sales. This has now shrunk to a smaller, single-digit figure. According to the Managing Director, the alternative energy market is currently "in a holding pattern."

"In all other areas we see good growth," Hans Beckhoff continued. "Overall we are satisfied with the development, since the downturn in the renewable energies sector during 2012 was not unexpected."

"Next year is difficult to predict," said Hans Beckhoff, "in view of uncertainties in the macroeconomic development." Due to the effect of replacement investments, developments in automation technology are closely related to the development of the gross national product: if gross national product rises, companies invest more in replacement and therefore more automation is implemented. According to the entrepreneur, overall there is no reason for pessimism: "Alternative energies are set to make a comeback. We have not lost any customers; we merely experienced a pause in turnover due to higher-level developments." The Managing Director wants to see his company grow by 15 % next year, which should be achievable provided the underlying conditions of the world economy remain positive.