

Interview with Hans Beckhoff on new technologies and product innovations at the SPS/IPC/DRIVES trade show

Automation bears social responsibility

The basis for greater prosperity within industrialized nations today is highly dependent on higher production efficiency and at the same time lower energy consumption. This is made possible by increasingly more powerful automation technology, which as a result, bears great social responsibility. Hans Beckhoff backed this up firmly in an interview with Ronald Heinze, editor-in-chief of open automation.

Modern automation technology ensures higher efficiency of machines and reduced energy consumption in manufacturing – all with decreasing costs in relation to performance. “These advantages take effect also, and especially, in the overall economic crisis,” says Hans Beckhoff, managing director of Beckhoff Automation.

The entire automation industry has been affected by the downturn: “We typically go through an economic crisis of large magnitude every five to ten years. Although the present downturn is significantly worse, it is not drastically different to previous events in terms of structure. Such crises usually last for about three years. Since the first signs of the current crisis appeared at the end of 2007, one can project that we will be well on the way up again by the end of 2010,” explains Hans Beckhoff. “The crisis has also affected us. Whereas turnover still increased by 20 percent to € 278 million in 2008, it will likely fall this year by around 20 percent.”

The managing director believes that his company will once again ‘grow properly’ in 2010. Beckhoff has been able to win new projects across the globe, especially in these difficult times. Hans Beckhoff says that this is due to pressures on the machine engineering and plant construction companies to look for more economical and powerful control alternatives. “We have the right approach here: system design decisions are made in our favor on account of our flexible technologies, such as PC-based control, EtherCAT and eXtreme Fast Control (XFC),” says the entrepreneur. Beckhoff technology has a high value reputation in the marketplace. “Technological capabilities coupled with consistency and intensive marketing have made us well known,” states Hans Beckhoff. “We are continuing and even expanding this strategy regardless of these difficult times.”


Hans Beckhoff: “Certainly, we won’t be able to continue without a lull, even after the crisis. But in the mid-term we expect to continue to grow, on the one hand, in parallel to the growth of our existing customers and, on the other, from new business. We will compensate during the next two years for any lack of growth among our existing customers with the acquisition of new customers.”

The managing director's optimism is based in large part on the fact that economies in the world are continuing to grow: “This increases prosperity, which in turn necessitates an increase in production and services,” is Hans Beckhoff's conviction. And this is precisely where automation is required in order to do justice to its social responsibility. “Automation must ensure high product quality, more security and preserve resources,” the entrepreneur emphasizes. “Thus, it occupies a key position.” Automation bears a heavy responsibility for ‘meaningful work,’ promoting global prosperity and development.

Successes in the wind power industry

As far as Beckhoff's global development is concerned, China in particular should be highlighted. “Beckhoff China now has the second largest turnover in the world after Germany, overtaking the United States,” affirms the managing director. “This is mainly due to wind power, although machine engineering is also developing well.” Beckhoff also intensified its foreign investments in 2009 and can boast corresponding growth in the field of wind power.

Beckhoff offers the complete automation solution for wind turbines: this includes pitch control, operational management and wind park technology. The



"We expect the SPS/IPC/DRIVES to breathe new life into the business. Hanover Fair already helped a positive mood this year. This will apply even more so to the trade show in Nuremberg. We expect many visitors and customers that need new technologies to succeed. Increased business contacts will ensure a positive mood. Therefore, we expect an exciting, vibrant trade show, driven by a great deal of new business."

automation company's Embedded PCs and I/O terminals as well as Ethernet and EtherCAT components are utilized in many wind turbines operating all over the world. According to Hans Beckhoff, plant builders are increasingly making use of the Scientific Automation concept along with the system's powerful hardware and software, for example, in conjunction with energy monitoring or Condition Monitoring terminals. "We have extensive industry know-how in the wind power sector," he continues. "And that doesn't mean

just in our wind power center in Lübeck, Germany, where six technology engineers now work, but also in China, with eight employees experienced in the field of wind power, and in other parts of the world. Orders come not only from Germany and China, but also from Korea. Furthermore, we are quite successful in Spain and the United States in this segment," says Hans Beckhoff. "The alternative energy markets now account for 15 to 20 percent of company turnover."



Automation promotes greater efficiency

"All automation technologies are now taking up the cause of energy efficiency," says Hans Beckhoff. He is convinced that the efficiency of production determines the ecological footprint. "This efficiency is determined by energy consumption, machine utilization and the amount of raw material used per workpiece," he explains further. "With automation technology, we increase this efficiency." Specifically, automation technology ensures that less energy is used. This includes, for example, the energy-saving design of the drive equipment and the measurement of energy consumption using appropriate techniques. The graduate physicist considers improving the efficiency of machines to be an even more important aspect: "Our XFC technology increases machine efficiency by several percentage points." With cycle times of 100 μ s, significant resources can be saved, because fast cycle times can lead to a direct reduction in the use of energy and materials. – If the same machine can manufacture more products, then the energy consumption per workpiece is reduced as a result. At Beckhoff we are working intensively to shorten the 100 μ s cycle time attained with XFC technology even further.

A significant factor in advancing XFC will be version 3 of the universal TwinCAT PC-based control software, which will be presented to the engineering world at this year's SPS/IPC/DRIVES trade show. According to the company, TwinCAT is the market leader in control software with a large number of licenses. Intelligence can be distributed to different Industrial PC processor cores with the new TwinCAT version 3. "The ability to assign any real-time task to different processor cores is an important prerequisite in order to capitalize on the increasing performance of modern processors for automation technology," explains Hans Beckhoff.

In addition to supporting multicore and 64-bit operating systems with regard to runtime, the use of different programming languages represents a major innovation. In accordance with the "all-in-one" concept, TwinCAT software includes all major programming languages from the world of automation and IT, making software engineering much simpler as a result. In addition to classic programming standards according to IEC 61131-3, object-oriented extensions in TwinCAT can now also be used along with the programming lan-

guages C and C++. The Matlab/Simulink interface is also integrated via the real-time workshop. As a result of the consistent development of the preceding version, existing programs can be converted easily to the "new TwinCAT 3 world."

A particular highlight is the integration of the standard PLC and IT programming worlds in a common automation suite: "TwinCAT 3 is embedded in an engineering workbench," explains Hans Beckhoff. "With our PC Control philosophy, which has 'toughened up' the PC for control tasks, along with the development of the fast Ethernet-based EtherCAT communication system, our framework for software development now represents yet another decisive step towards the successful adaptation of mainstream IT technologies for automation technology," the graduate physicist goes on.

An additional new item at the SPS/IPC/DRIVES show with regard to TwinCAT is the concept of applying additional robot kinematics for Delta, SCARA and scissor applications. "A growing library of kinematics is available for non-Cartesian fields of application," Hans Beckhoff adds.

Reduction of control cabinet space requirements

The demands for greater efficiency and lower energy consumption also require smaller control cabinets. Beckhoff has been proactive here with a new generation of IP 20 Bus Terminals that require only half the space of previous I/O terminal designs. The 'High Density' Bus Terminals feature 16 connection points, for example for 16 digital channels, in the space-saving housing of a 12 mm electronic terminal block. "The compact design and high packing density not only reduce the space required in control cabinets; the price per channel is also significantly reduced," says the managing director. Miniaturization in the field of control technology allows designers to build their machines and systems even smaller and reduce footprint size. "The 16-channel terminals are available for both Bus Terminals and EtherCAT Terminals," he continues. The HD Bus Terminals with 16 connection points have identical external dimensions to existing Bus Terminals and are compatible with them. The doubling of the number of channels is achieved thanks to modern contact technology and electronics. The terminals with 16 connection points are available



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in various versions, such as 16-channel terminals for digital inputs or outputs, as 8-channel terminals for digital inputs or outputs with 2-wire connection or as flexible combination terminals with eight digital inputs and eight digital outputs. “We will bring many functions for our HD terminal system onto the market, including for Scientific Automation to include new impressive measurement functionality,” promises Hans Beckhoff. Tool-free assembly simplifies wiring, despite the higher channel density. Wire connection is accomplished via solid wire conductors and the time-saving direct insertion technique; the wire is simply inserted in the contact point.

“The Bus Terminal system that has been successful for 15 years is constantly being developed further,” says Hans Beckhoff. All in all, the company exhibits remarkable product stability: for example, I/O modules that were introduced as far back as 1989 are still supplied and maintained today. Another highlight of this year’s SPS/IPC/DRIVES show with regard to Scientific Automation is an I/O terminal with an individual calibration certificate. In addition, the IP 67 EtherCAT Box range has been expanded for both digital and analog I/O channels.

Industrial PCs: more power equals more functionality

The SPS/IPC/DRIVES show will also be an innovation showcase as far as Industrial PCs (IPCs) are concerned: one of the main features is the broadened range of Intel® Atom™-based products. Also new is an extension of the interfaces for compact IPCs. In order to design new IPCs that are ever more compact, the company relies on a modified PCI Express standard, which, as a modular extension of the IPC architecture, is now used in Beckhoff PCs with a 3 1/2-inch motherboard. The mechanical side of the PCI Express standard is thereby significantly reduced in size while the electrical capabilities are retained. “The goal is to build PCI Express solutions that are even more compact and more fitting for industry,” Hans Beckhoff emphasizes. The modified PCI Express standard helps facilitate modularity throughout the entire IPC range, from Panel PCs to control cabinet IPCs. “For example, we can also make six Ethernet ports available for compact series now,” he adds. In addition, the C69xx series with quad-core processors will be presented at the



Ronald Heinze,
editor-in-chief of openautomation

trade show in Nuremberg. “Multi-core processor technology and TwinCAT 3 – this compelling combination opens up a completely new realm of possibilities,” adds the company owner.

For IPC storage, optional solid-state disks (SSD) are now available instead of hard disks. “This increases operational reliability and speed,” explains Hans Beckhoff. “Furthermore, small capacitor-buffered UPSs are integrated as standard in our Industrial PCs, for example in the C6915 control cabinet Industrial PC and in our CX Embedded PC device series.”

Hans Beckhoff is convinced: “Together with the high-density I/O terminals, the present controller innovations, such as the Windows CE-based CX8000 and CX5000 controllers make a new performance and accessible price levels possible. Our CX5000 is an x86 PC in the smallest possible package. The CX8000, which is based on Windows CE, is dropping the price level considerably.”

According to Hans Beckhoff, the prices for automation technology solutions have fallen by around 40 to 50 percent over the last decade in relation to the same level of functionality. He expects this trend to continue and is gearing himself up for it with new product lines: “Our HD Bus Terminals and our Industrial PCs are important building blocks in this development. Production efficiency as a whole will benefit greatly from that.”