TwinCAT as a basis for Manufacturing Management Systems

**Fastems is a leading supplier of industry automation systems in Europe. The products offered by the company range from metal working machines and accessories via industrial robots and production cells to highly automated flexible manufacturing systems (FMS). In 2001, Fastems had an annual turnover of EUR 58.3 million. The company has 240 employees.**

# Manufacturing systems from Fastems promise better results

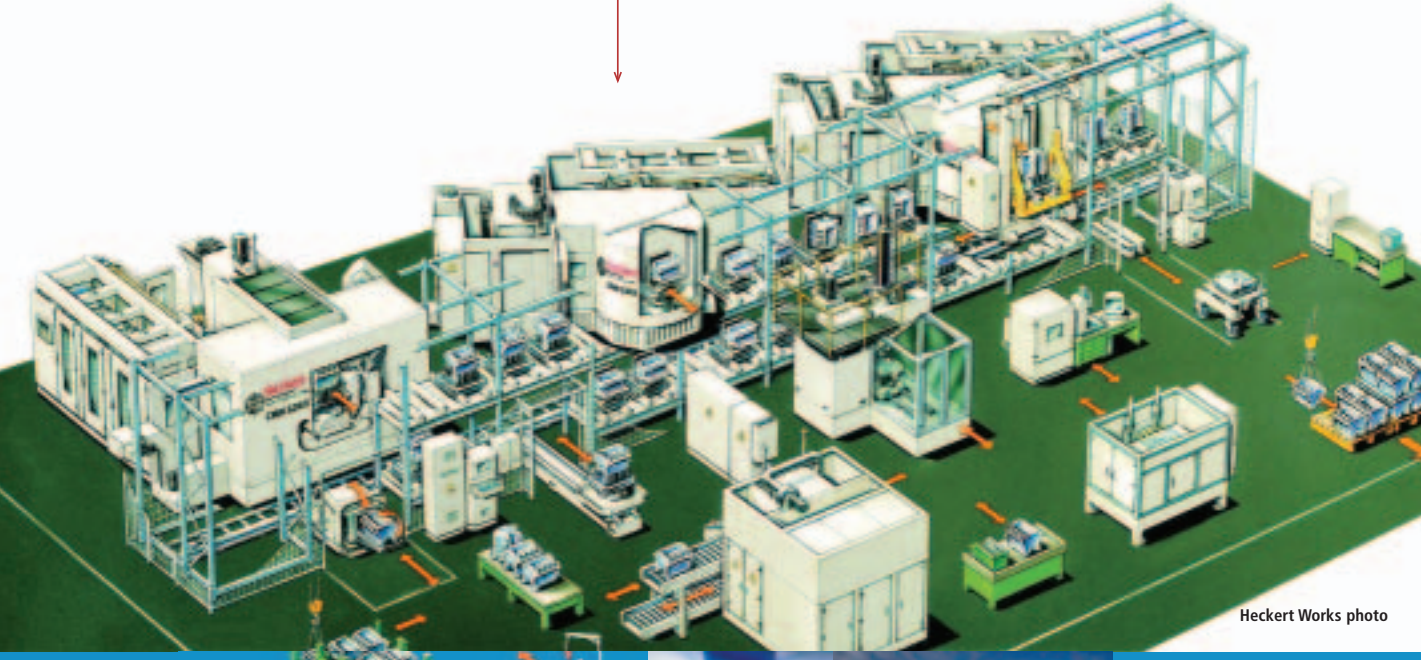
With more than 260 flexible manufacturing systems supplied in Europe and North America since 1982, Fastems is the worldwide leader in FMS technology. These extremely flexible systems enable both standard and customized solutions in the shape of individual machine cells or factory-wide systems. As an integrator of open systems, the FMS from Fastems is compatible with the machine tools of more than 40 different manufacturers.

**Control power within the FM system**

MMS (Manufacturing Management System) is a control system for flexible manufacturing systems that enables production to start directly after commissioning. This is made possible by the fact that no predefined data structures or other preparation are required in the basic configuration of the system. In the long term, the MMS can be used as an advanced manufacturing executive system (MES), dealing with a variety of production planning operations as well as resource management within the FM system.

In order to continue to be successful against the competition, Fastems continuously works on the further development of its control systems. The cooperation of Fastems with the company headquarters in Tampere (Finland) and with Beckhoff started five years ago. "Early 1998 we were looking for options to use the software PLC/NC from Beckhoff in our MMS control units," reports Matti Nurminen, Director Research and Development. "We looked at numerous alternatives and found that TwinCAT is particularly flexible and communicates very well with the outside world. The software appeared to be reliable. Its use in practice has proven that this assessment had been correct," continued Nurminen.

"Beckhoff was able to produce first-class references and to supply the best solution for our requirements,"



Heckert Works photo

explains Jari Tikkala, Director Automation Design. "In June 1998 we decided to use Beckhoff as our supplier. In early 1999, the first prototypes of the MMS control system were already being tested". Soon afterwards, the first systems with TwinCAT were presented at the EMO in Paris in 1999. The first delivery to customers went out not much later in the same year.

The cooperation between Beckhoff and Fastems continues today. At the end of 1999, fieldbus modules from Beckhoff were used for the first time. To date, Fastems has supplied more than 100 systems with TwinCAT and Bus Terminals with Profibus interface. Visualization is realized with Visual Basic and integrated in the control via TwinCAT ADS. Since the flexible manufacturing systems from Fastems are always tailor-made solutions, the modular design and the wide range of I/Os and Bus Terminals are ideally suited for this application.

→ www.fastems.com

## Producing flexibly and in mixed mode: DaimlerChrysler uses FMS from Fastems

Even a mass-producer such as DaimlerChrysler regularly produces individual pieces or small series. Prototypes, components for powerful engines in small quantities or spare parts have to be produced: High quality for smallest quantities requires modern, flexible manufacturing equipment that the qualified staff must be able to rely on. At its Sirnau site in Germany, DaimlerChrysler has just commissioned a new flexible manufacturing system from Fastems with control technology from Beckhoff as well as processing centers from Heckert.

"The new system leads to a tremendous reduction in production throughput times." Wolfgang Hanger, production manager for cubical parts at DaimlerChrysler in Sirnau, considers the decision to install a new production plant to be vindicated even after only a few months of operation. The aim to produce more productively and efficiently has been achieved. That the quality is right is taken for granted. The additional capacities had become necessary predominantly due to a new housing for powerful V-engines. The new manufacturing island consists of two CWK 630 D processing centers from Heckert, one CWK 630/5 and the flexible manufacturing system FMS from Fastems.

Currently, DaimlerChrysler uses the system for producing crank cases. The raw parts delivered from Untertürkheim are mechanically processed in four production steps and completed via intermediate manual manufacturing stages. However, the system is designed for a much wider product range. In principle, the plant can also deal with complete gearboxes or cylinder heads. Wolfgang Hanger explains his requirements: "The flexibility of the system is a result of the machines themselves and their machine environment as well as the tool magazines." With the combination of machines and FMS, even a product mix with a lot size of 1 is no problem.

An important element contributing to the flexibility of the plant is the flexible manufacturing system from Fastems that links the three machines. Originally, two alternatives were discussed: The simple solution would have consisted of stand-alone machines. With such a system, the staff would have had to deal with transporting the parts to be machined from machine to machine. However, we decided in favor of a linked system. The crucial factor was no doubt the gain in flexibility. Moreover, it was reassuring to know that Fastems, in combination with machine tool manufacturers, has plenty of experience in the realization of FMS in a wide range of variants. According to Hanger, further selection criteria were the compact design and the resulting simple installation.

A storage shelf with 28 spaces for machine pallets is located between the processing centers and the assembly stations, at which manual tasks are carried out between the individual manufacturing steps. On this side, a tiltable and a linearly driven fitting station are provided. That process safety was a high priority almost goes without saying at DaimlerChrysler. The easily accessible fitting stations that can simply be loaded from above contribute to making the process safe.

The complete control software, Manufacturing Management System (MMS) with integrated TwinCAT system, runs on a PC. It controls not only the process planning but also manages NC programs and tools including the preset data. The machining data required for the next job are transferred part-related to the machine control as a background process. Depending on the size of the clamping equipment, several different parts can be processed on one pallet. The MMS control deals with tasks according to the FIFO principle (first in, first out). Urgent jobs can be given priority as required. An already specified job sequence can thus be changed subsequently.

The plant has been officially in operation since October 2001. The first good parts could be produced only a few weeks after the installation of the machines and of the FMS – another argument for such a flexible manufacturing system. In the meantime, the system has been equipped with a 5-axis processing center, an innovation from Heckert. The integration of the processing center into the plant and its connection with the MMS took only just under four days. In retrospect, Hanger praises the speedy integration with largely continuous production: "It all worked out very well."

Of course the system should be used to capacity. Wolfgang Hanger: "Once the run-in phase of the 5-axis machine is complete and the staff has been trained in parallel, we will run the plant in 3-shift operation." The Fastems aim - 8760 productive hours per year - has thus come a step closer.

The Beckhoff Team in Finland: Managing Director Mikko Uuskoski

Sales/Finance Outi Wallgren

# Beckhoff technology for Finnish automation customers

Established in 2000, Beckhoff's Finnish subsidiary started out with one employee. In two years, the number of the Beckhoff Automation Oy employees in Finland has quadrupled, the company has achieved a solid position on the Finnish market, and its business is growing.

The Finns are often in the lead when it comes to adopting the latest technological solutions. A good example of this is the fact that the per capita density of mobile phones and Internet connections in Finland is among the highest in the world.

Finland also has many high-tech companies that can benefit from the top-notch technical solutions found in Beckhoff products.

Beckhoff Finland has customers in different industrial segments: Some of its clients specialize in materials handling and NC machines, and some are from the paper and process industry, and the electronics, plastics and energy industries. More and more often, sales of Fieldbus I/O systems evolve to the delivery of total PC-based systems customized to meet the customer's needs.

Key Account Manager Matti Korhonen

Support Manager Antti Airto

Beckhoff Finland facilities are located at the Techvilla business park in Hyvinkää, approximately 50 km north of Helsinki. This site handles sales, technical support and training, and having the warehouse in the same facilities as the offices guarantees fast customer service if a problem arises. The location is ideal for business because it is only a 30-minute trip to the Helsinki-Vantaa international airport, and the majority of the Finnish customers are not based in Helsinki. Beckhoff works in close cooperation with the German headquarters as well as with Finnish universities and colleges.

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## Automation in Motion seminar attracts over 70 participants

Beckhoff in Finland held its second Automation in Motion seminar for its customers in late January. This year the very popular event brought in more than 70 participants.

The purpose of the Automation in Motion seminar is to bring customers information about new Beckhoff products and to provide a forum for industry professionals. Held in the historic Vanajanlinna castle, the day-long seminar hosted guests from the process, sawmill, electronics and plastics industries as well as representatives from production automation and machine engineering companies. Additionally, participants from Finnish colleges and universities were also present.

Beckhoff Finland's Managing Director Mikko Uuskoski opened the seminar with an overview of the company's operations in Finland. The Beckhoff products were introduced by Technical Support Manager Antti Airto and Key Account Manager Matti Korhonen.

Over the course of the day, some Finnish Beckhoff customers reported on projects they have implemented using Beckhoff products, and the future of automation was touched upon in a presentation by Kari Koskinen, Professor of Information and Computer Systems in Automation at the Helsinki University of Technology.