

Electronics and semiconductor

FEI

High-performance electron microscope firm uses Teamcenter and NX to increase speed of product development cycle

Products

NX, Teamcenter

Business challenges

Reduce costs

Improve collaboration within the organization

Implement a system that can provide an effective single source of data management

Keys to success

Use Teamcenter to enable comprehensive management of items for the approval process and lifecycle management

Expand use of NX to leverage calculation modules for engineering design support

Use connection between NX CAD and Teamcenter to enhance document control and get a thorough overview of projects

Results

Achieved faster product development cycle

Reduced sampling costs

Sped up product launches

Saved time and money

Siemens PLM Software solutions enable FEI to reduce sampling costs and accelerate product launches

Groundbreaking history

The groundbreaking history of Czech electron microscopy started in the 1950s in the Brno region in what was then Czechoslovakia. An important role was played by the establishment of the Institute of Instrument Engineering of the Czechoslovak Academy of Sciences and Tesla, the state enterprise, and the subsequent close cooperation between these two entities. In the 1960s, the Brno electron microscopy cluster was the largest one in the world. The industry enjoyed international success.

The Czech branch was established in the 1990s when, after the breakup of Tesla, a group of its former employees, including the current chief executive officer (CEO) of FEI, Jiří Očadlík, founded an independent company that focused on electron microscopy. A majority share in this company was acquired by Philips Electron Optics, which became a part of FEI in 1997.

FEI is the world's largest manufacturer of microscopes and currently has three main production plants in the United States, the Netherlands and the Czech Republic. The group's largest factory, and perhaps the largest in the world, is located in Brno and employs 600 people.

Microscopes for biologists and forensic scientists

Electron microscopes developed by FEI in the Czech Republic are used in many different applications. For example, they are used for analysis of the cell nucleus and for characterization of its proteins. They are essential in the production of semiconductors for chip producers Intel and Samsung. They help scientists in biomedical fields, such as genetics, biochemistry, pharmacology, and also in the mining industry. They are also broadly used in forensic science. Thanks to software, an electron microscope also enables 3D visualization and analysis.



“One of the main benefits of Siemens PLM Software is the realistic virtual environment that we work in. This enables us to discover mistakes before we start to make parts, and thus reduce costs, speed up sampling and get to market faster.”

Michal Patzel
Manager
Mechanical Engineering
FEI Czech Republic

The Brno factory exports more than 800 microscopes a year all over the world. FEI grows by six percent a year, and last year its sales amounted to \$956 million (US), of which approximately \$400 million came from Brno. These figures make FEI the largest exporter in the South Moravian region of the Czech Republic.

Using Siemens PLM Software tools for the entire multinational corporation

Before the merger and complete integration of FEI, each branch used a different computer-aided design (CAD) system. The most widely used CAD software in the company was NX™ software, and, therefore, NX was chosen as the single CAD system. Using NX from product lifecycle management (PLM) specialist Siemens PLM Software enables designers to solve complex problems and deal with complicated geometry or large assemblies.

After the merger there was naturally pressure to implement a single data management system, and Teamcenter® software was chosen. With Teamcenter, the company acquired a system that could be used as a single repository of knowledge about products and processes from various sources.



As a result, users quickly found the information needed, and the time required to search for such information has been dramatically reduced.

“The use of Teamcenter enables the comprehensive management of technical documentation, attributes and structures in direct relation to the approval process and the management of the lifecycle of items.”

Michal Patzel
Manager
Mechanical Engineering
FEI Czech Republic

“On behalf of FEI Czech Republic, we can say that Siemens PLM Software tools enable us to reduce costs, speed up sampling and introduce products to the market faster thanks to the realistic virtual environment,” says Michal Patzel, mechanical engineering manager at FEI in the Czech Republic.

Discovering dead ends in a timely fashion

NX was implemented company-wide in 2000. Teamcenter was implemented in the Netherlands (Eindhoven) and the United States headquarters (Hillsboro, Oregon) in 2000 and in Brno in 2001.

FEI currently uses NX CAD and Teamcenter for PLM. “We are planning further expansion, in particular with NX, where we are starting to use more of the calculation modules designed for engineering design support,” says Patzel. He adds that these calculations are used for primary analysis of the design, and play a critical role in determining the future behavior of the device, in particular, in the area of heat propagation or, if applicable, fluid dynamics.

Another area of significant benefit is structural analysis, particularly natural frequency analysis. “NX helps us uncover weaknesses in an engineering design and determine which frequencies our instrument will be sensitive to,” says Patzel.

“As these calculations are performed very quickly, we can repeat them as necessary with different solutions, thus optimizing our engineering design. Unfortunately, they are still only theoretical calculations, and the role of the subsequent testing and measurement can’t be substituted. The most difficult task is to correctly define the input conditions for the calculation. We still learn, and the consistency between the theoretical calculation and the real value is over 80 percent. With this success rate, we are better at discovering dead ends in time.”

Achieving lower costs and faster product launches

In a large company that develops and produces instruments as complex as electron microscopes, the Teamcenter solution proves invaluable because it provides easy access to data within the company and makes development basically an all-company activity; regardless of whether it involves cooperation among designers, production engineers or storekeepers. Everybody within the company has access to the data they need for their work thanks to different access rights.

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“I believe the seamless connection between product development, NX CAD, and PLM, Teamcenter is significant. Thanks to this connection, the documentation is permanently under control and all changes are controlled. Thanks to the option to create reports, it is easy to get an overview of the degree of completion of a project or the materials used. Every year, we introduce one to two new products. We also work on nonproduction PLM projects. Thanks to this integrated CAD/PLM environment, we execute our projects with speed and agility. The Siemens PLM Software solution is comprehensive.”

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Solutions/Services

NX

www.siemens.com/nx

Teamcenter

www.siemens.com/teamcenter

Customer's primary business

FEI designs, manufactures and supports the broadest range of high-performance microscopy workflows that provide images and answers in the micro-, nano- and picometer scales. With more than 60 years of innovation and leadership, FEI enables customers to find meaningful answers to questions that accelerate breakthrough discoveries, increase productivity and ultimately change the world.

www.fei.com

Customer location

Brno

Czech Republic

direct relation to the approval process and the management of the lifecycle of items," says Patzel. "Another advantage is the ability to customize the software and create functionalities that meet FEI's needs."

FEI uses Teamcenter to manage all data generated in the NX, but it also takes care of other data needs, such as the setup and finalization of procedures, purchasing specifications, etc., which form the traditional mechanical engineering documentation.

"One of the main benefits of Siemens PLM Software is the realistic virtual environment that we work in," says Patzel. "This enables us to discover mistakes before we start to make parts, and thus reduce costs, speed up sampling and get to market faster."

Projects are faster and more comprehensive

Each branch of FEI has its own database and file server with a connection between the branches provided by the company's central ODS server. Implementing Teamcenter in every branch of the company allows FEI to set up a model of cooperation in which one branch owns a certain model and the others automatically receive a copy of it. This also determines the undisputed ownership of the model and the right to a change it. Furthermore, it results in significant time and money savings because, thanks to the extensive database, the

designers can determine whether the part under development has already been produced within the company and, if so, they can simply re-use it.

Patzel describes the main benefits of Siemens PLM Software's technology to FEI's Brno branch: "I believe the seamless connection between product development, NX CAD and PLM, Teamcenter is significant. Thanks to this connection, the documentation is permanently under control and all changes are controlled. Thanks to the option to create reports, it is easy to get an overview of the degree of completion of a project or the materials used. Every year we introduce one to two new products. We also work on nonproduction PLM projects. Thanks to this integrated CAD/PLM environment, we execute our projects with speed and agility. The Siemens PLM Software solution is comprehensive."



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