

Maier Werkzeugmaschinen

Virtual commissioning project protects against unwelcome surprises

Michael Maier:

It has concerned me for a long time that we were only able to test the control system in action with the actual machine just at the last stages of delivery.

When it becomes apparent after testing that a spindle is undersized, or the tool holder needs re-designing due to a collision, re-work lasting an additional 3 months is not uncommon.

This is a direct delay for the customer's planned production improvements, and it incurs a considerable expense for us in reworked material and labour costs, not to mention delayed sales.

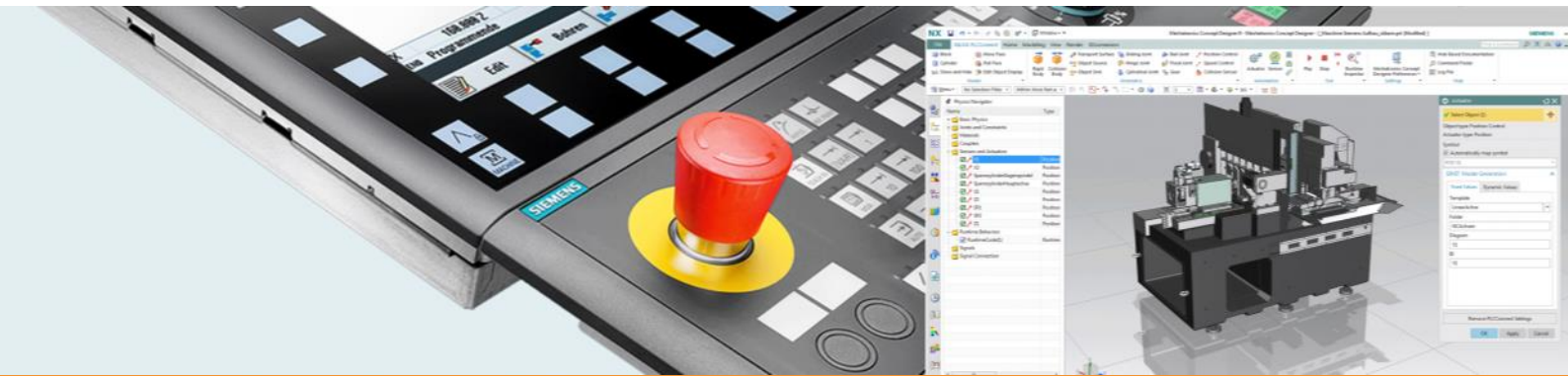
The cost of these changes for all partners can very quickly exceed the million Euro mark,

Maier Machine Tools specializes in the manufacture of custom CNC lathes that are highly adapted to specific customer needs. Almost every machine that leaves the Wehingen company headquarters, is a custom version. The high number of variants from the customization carries a degree of risk during the commissioning phase if a problem is found. Any corrections required to finish the machine at this late stage are expensive to fix and delays the delivery significantly. To avoid major hiccups late in the delivery process, Maier are using "NX Mechatronics Concept Designer" with "PLC Connect" from iSILOG.

Michael Maier the company CEO maintains the company philosophy of practical machines designed by practical engineers and this is evident right throughout the company. Even the production areas reflect a clean, functional no nonsense working environment for the efficient production of their individualised CNC solutions. Maier CNC machines are meticulously hand assembled to the high German quality standard for guaranteed reliability, ultimate precision and the shortest cycle times.

Multiple variants

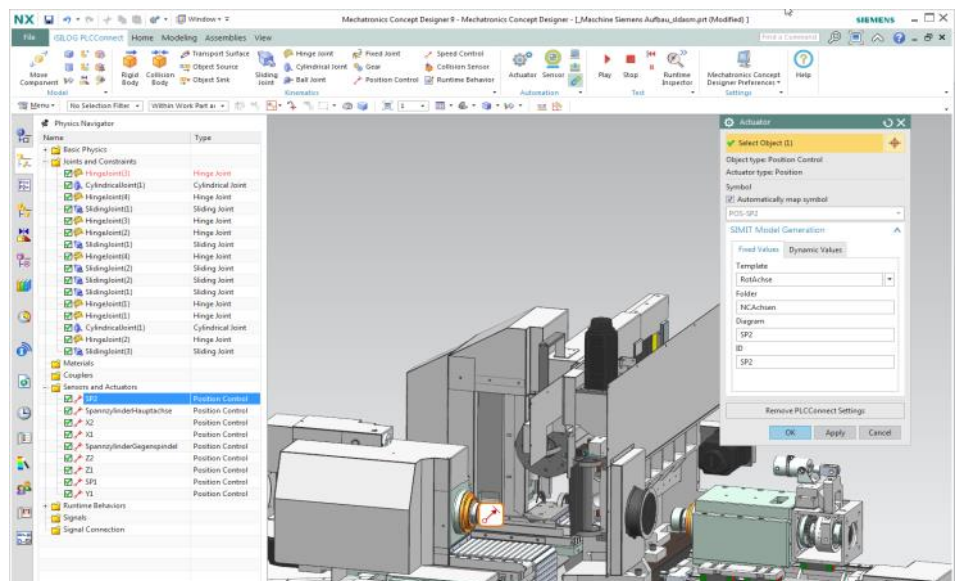
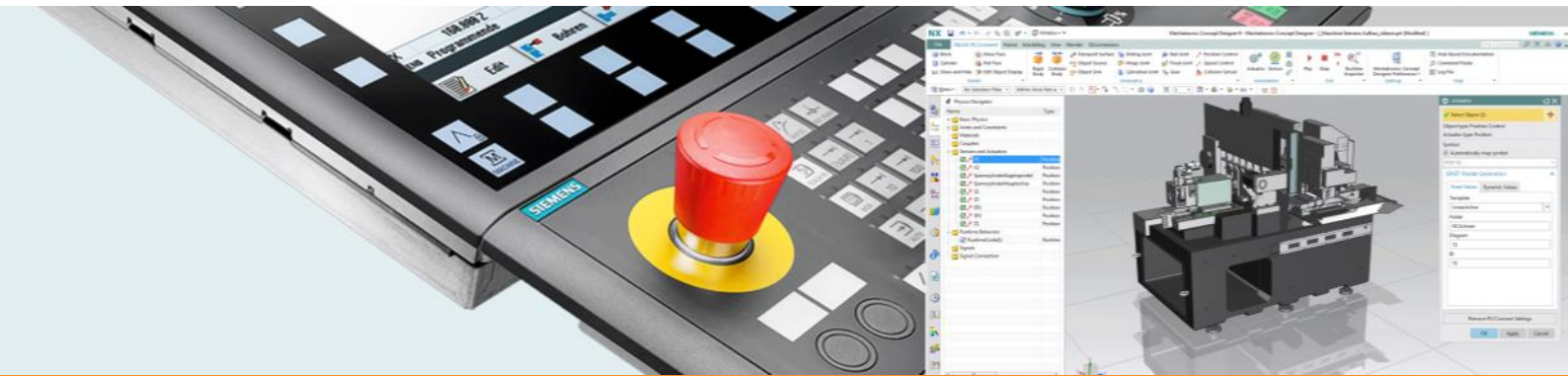




So it is not surprising that customers worldwide, almost without exception, have high expectations from this quality manufacturer. The new product line "MLK linear" (Maier long / short lathe with linear drive) illustrates this particularly well. Thanks to the linear drive the machines have extremely high dynamic functionality. The modular design of the machine makes it versatile and allows utmost precision in the smallest of work spaces. They are particularly suitable for the medical and precision engineering sectors. The MLK linear can be converted in a few steps between the long and short lathe modes to further increase the range of processes possible with these machines.

Thoughtful Details

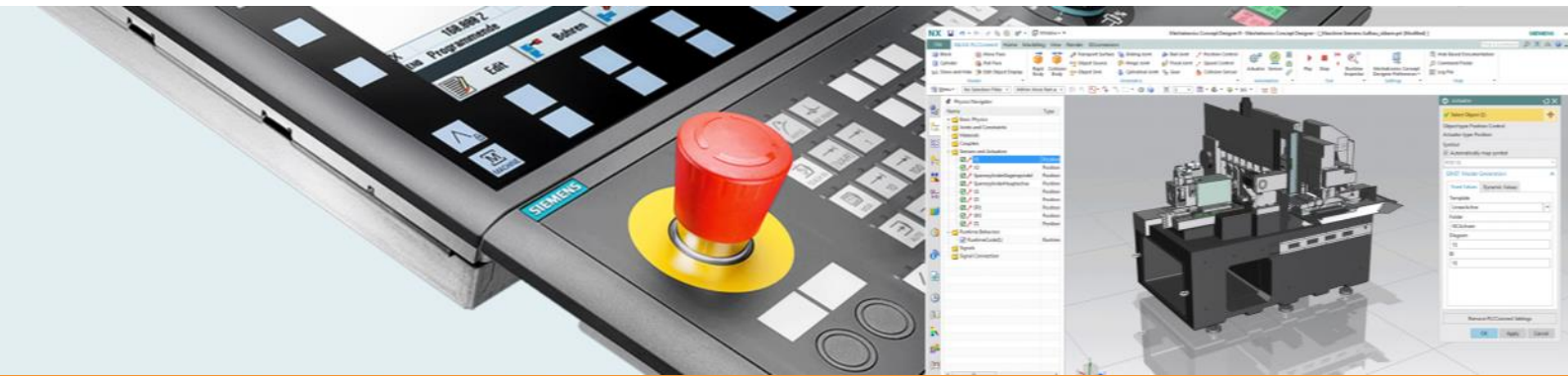
"Our machines are distinguished by the high level of integrated quality assurance that we provide for our customers - all available from once source. Throughout the construction, quality assurance and in particular the CE certification, is available for the customer for sheet metal fabrication, component assemblies, feed technology and as well the documentation. We offer a high level of process reliability and investment security. All machines are based on standards that are then produced in the variant requested by the customer. Our customers appreciate the thoughtful details that have repeatedly hit the nail on the head for our users."



Seeking Industry 4.0

Michael Maier went in search of a system that allowed mechatronic development in the spirit of "Industry 4.0". "To find the best system we presented a typical reference machine together with the corresponding control and sent out a supply request to three providers."

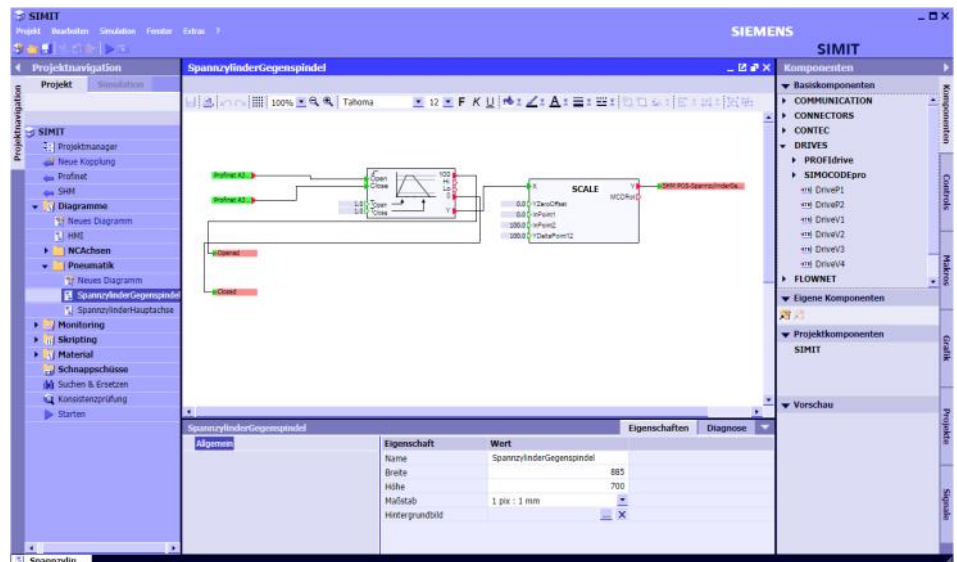
"The time frame for completing the task was two months. The only provider that responded - and within a few hours - with a virtual NC machine model functioning with Maier CAD data, was iSILOG GmbH from Baden-Baden. Without any conditions or excuses, Dr. Thomas Strigl was quickly able to demonstrate their proposal for our solution based on MCD - Mechatronics Concept Designer".

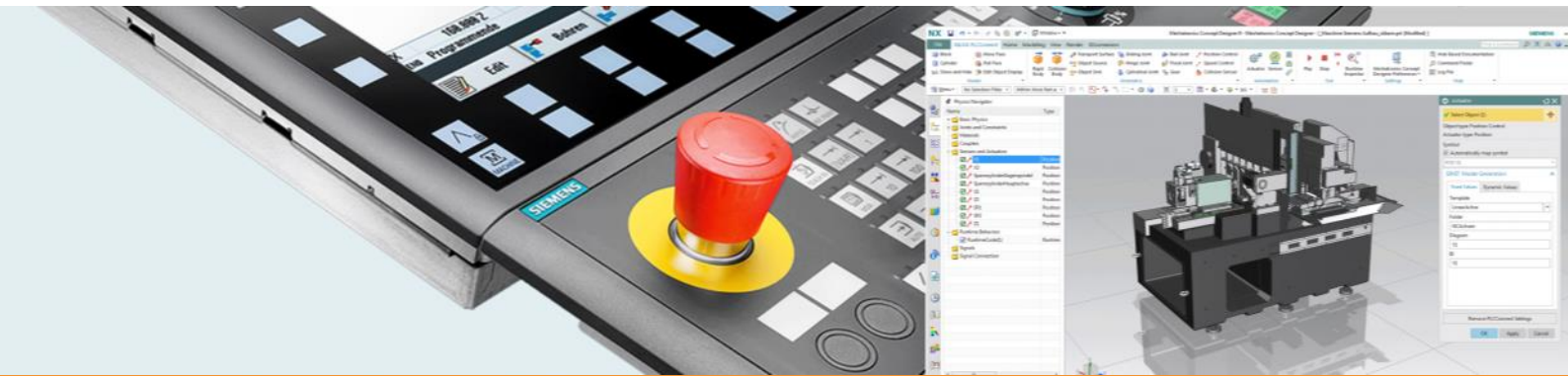


A complete simulation - early on

MCD is based on Siemens' PM 3D NX CAD system. It is used to model the kinematic behavior of machine parts and assemblies so that an automation process can be realistically simulated and evaluated. Data transfer from another 3D CAD system such as SolidWorks works smoothly if needed. With the complementary "PLC Connect" solution from iSILOG the machine kinematics can also be controlled by the real PLC programs and a virtual commissioning study can be completed very early in the development. "Virtual Commissioning" means that the complete control of the machine can be tested and confirmed, even though the actual machine is still on the drawing board – or in the CAD system.

The Maier virtual commissioning facility is located in a lab in the production center and consists of a Siemens PLC and a Fanuc control, as used with the actual machine. Additionally, the Simit simulation framework from Siemens is used to simulate real fieldbus interfaces for control and fieldbus device behavior. A brief summary of the function by Michael Maier is : "The control behaves exactly as if a real machine is attached. But at the same time, I can see the machine as a CAD model that can be quickly modified with very little cost early on in the development process instead of the high cost option during the delivery process.





Benefits

- Improved cooperation between the mechanical, electrical and automation departments
- Faster evaluation of concepts in a virtual environment
- Less prototypes
- Faster, test-driven development
- Better software quality
- Up to 70% reduction in commissioning time during the delivery process
- No risk of damage to the real machine

Access additional benefits

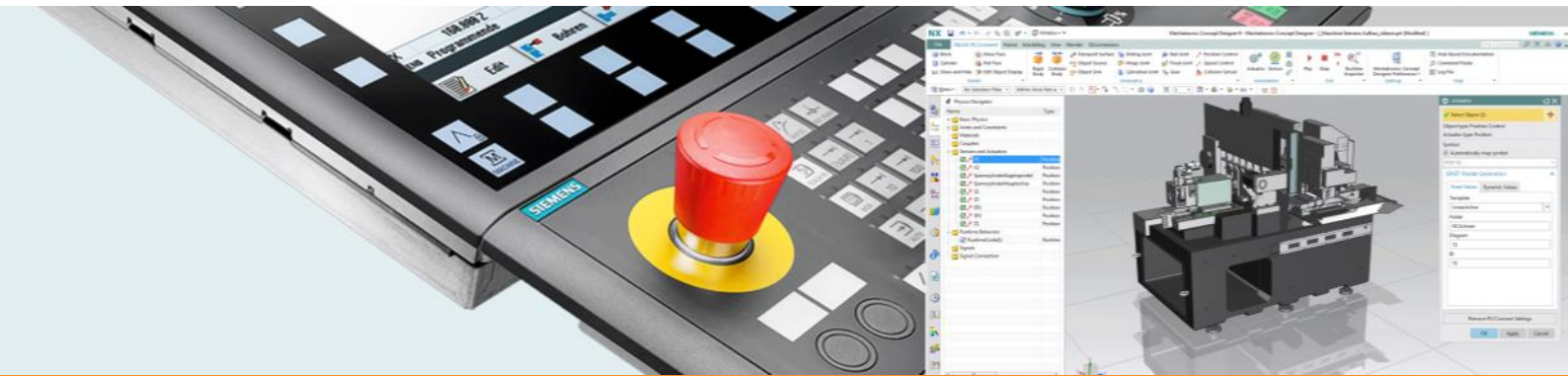
To the controller, the MCD virtual model behavior is the same as if it was connected to an existing fully commissioned machine. The additional advantages are stated by Maier's Managing Director: "Up to now we have mainly been using FANUC controls. But we are seeing a rising demand for Siemens controllers. Our inclusion of the Siemens controller was very smooth, since we were able to fully test the integration on a virtual platform and eliminate any problems and sources of error right from the beginning."



WYSIWYG for Machines

"We are now in a position to discuss new systems with our customers over long distances, virtually, as soon as we have a 3D CAD model available.

All of a sudden we can apply the basic software concept of WYSIWYG (What You See Is What You Get) to our machines operation and control. This makes a good impression and the sales work much easier!" says Michael Maier.



About iSILOG

Mechatronics Concept Designer is a product of Siemens PLM Software. iSILOG is an official Siemens Solution and Development partner.

We support our customers with the introduction of a mechatronic test-driven development process.

You will receive a complete package consisting of the required software modules, specific interface options, software customisation with training services.

The top priority for us is to help customers implement and operate an effective solution as fast as possible. To do so, we offer workshops in which we share knowledge and skills with your mechatronics experts so that you can be more self-sufficient and efficient with future virtual commissioning projects.

Another beneficial aspect was a change to the way we exhibit the machinery at industrial fairs. Normally we have shipped many machines to the fairs at considerable cost. Now we can take just the base model for demonstration and use virtual models to exhibit additional lines and variations.

Ease of implementation

Michael Maier is completely satisfied with his decision for the iSILOG solution based on MCD: "We are implementing Industry 4.0 and so far we are achieving significant savings, even considering the cost of the software. There is still a way to go, but the simple implementation with only one week training, high reliability and the versatility of use, has taken us a big step forward."

