In May 2014, the word was “ready for take-off” at Hamad International Airport in Doha. Each year, some 30 million passengers arrive in or depart from Qatar by air – a logistical challenge that also encompasses catering services. Every day, around 82,000 meals are loaded onto specially prepared trolleys that convey them to the aircraft and have to be cleaned on return. The whole system runs smoothly, thanks to sophisticated technology and logistics based on German engineering. Eisenmann SE – a global supplier of industrial systems headquartered in Böblingen, Germany – was commissioned to provide a fully automated electrified monorail system that enables the trolleys to be transported within the airport’s huge logistics center. The engineers from southern Germany relied on industry software from Siemens that allowed them to plan, test and optimize the entire system in a virtual environment before it was actually installed.
20,000 deliveries a day

1.6 km
Total length of electrified monorail system
Intelligent planning is the key | Machine and system suppliers such as Eisenmann SE are now faced with enormous complexities as well as growing time and cost pressures. The key to mastering these challenges is intelligent planning and meticulous preparation from the very beginning – with the help of innovative software. “Just a few years ago, we would’ve had to send a team of engineers to Qatar for on-site testing of the system in order to spot and eliminate weaknesses in the software,” says Dr. Monika Schneider, simulation expert at Eisenmann. Today, everything is simpler: “Thanks to Siemens’ Tecnomatix Plant Simulation software, we were able to test the entire system right here in Böblingen – even though the airport itself was still under construction.”
It’s best to spot errors before they’re made | Eisenmann opted for Siemens’ Tecnomatix software solution, which enables engineers to fully visualize, simulate and analyze a system using a “digital twin” model. Potential faults or weaknesses can be detected early on and corrected before the system is actually installed. For the Hamad International Airport project, the engineers conducted a detailed analysis of all the parameters for the electrified monorail system on the computer before virtually simulating all its processes. And the processes are numerous: 130 carts move independently along the 1.6-kilometer electrified monorail system, making around 20,000 deliveries every day. There’s no room here for error.
Energy application

Entering uncharted territory

For the Hamad International Airport project, engineers working at computers in Böblingen, Germany, pushed fully loaded flight-service carts onto waiting trolleys, transported them to the supply station, unloaded them, cleaned them in the designated area and then conveyed them to the appropriate terminals – all in a virtual environment and up to 20,000 times a day.

“The programmers had to foresee every scenario with the potential to cause problems,” says Monika Schneider – for example, when a trolley fails to reach its station or the storage area for empty trolleys is too small. “When we used the real electrified monorail system for the first time, everything worked just as we’d planned in the virtual world.”
Errors cost hard cash | “How does an increase in flight operations affect catering? How can items of different sizes be transported? What can be done to ensure that system processes don’t interfere with one another?” By answering questions like these before a system goes into actual operation, Tecnomatix offers decisive advantages for mid-sized Eisenmann. “Development times were shortened. There was no need for tedious, labor-intensive on-site work, and we were able to quantify our business risks, because the possibility of project delays could be completely eliminated,” explains Monika Schneider. This approach will enable Eisenmann to continue shortening its delivery times in the future – a key competitive edge.
In a world full of questions, software provides the answers | In a globalized world, the question is always the same: How can companies boost their productivity and flexibility while cutting costs? Tecnomatix software adds a new dimension to planning. Thanks to 3D simulations, users can obtain a networked overview of a nearly limitless abundance of variables that are nevertheless clearly visualized – even in the case of large and complex systems. Scenarios and problems can be tested interactively: Does the system still run smoothly when operating at full capacity? Where do bottlenecks arise, and how can they be prevented? What’s more, every euro invested in the Tecnomatix simulation solution results in savings of up to 12 euros by the time the system is completed.

“Our software solutions enable us to connect productivity and efficiency across the entire product and production lifecycle – from product design to services.”

Magnus Edholm, Siemens software developer
Integration as a success factor | In the future, Eisenmann will standardize its various processes – everything from sales to service – worldwide. For example, the cross-border exchange of data within the company’s international project teams will be significantly simplified. Product developers and system designers are now using Siemens software solutions: Teamcenter (PLM) as a shared engineering data platform and NX software (MCad), from which data can be effortlessly transferred to Tecnomatix. Gerd Schneider, Corporate Vice President at Eisenmann, sums it all up: “This integration is bringing our worldwide project teams even closer together. So its advantages extend far beyond the benefits of the individual software solutions.”
As the development and commissioning of the electrified monorail system for Hamad International Airport in Doha impressively demonstrates, industrial production is now inconceivable without integrated software solutions. Thanks to industry software, product development is now digitalized and production systems and processes are networked – making efficient, flexibly reacting production environments possible. With our comprehensive offerings in the areas of automation technology, industrial switchgear, industrial drive systems, industry software and services, we supply and support customers along the entire value chain – from product design, production planning and engineering to actual production and service.

The future of industry – Linking the virtual and real worlds
New competitors, global value chains and highly transparent markets are all increasing competitive pressures. Industrial companies have to boost their productivity – using innovative technologies that make production more cost-effective and flexible while cutting time-to-market.

On the way to the Fourth Industrial Revolution
Scenarios that sounded like science fiction just a few years ago are increasingly becoming a reality. Machines are largely organizing themselves, supply chains are automatically coordinating themselves, and products are supplying all their production data to the machines on which they’ll be manufactured. A new kind of industrial production – sometimes referred to as the Fourth Industrial Revolution or Industry 4.0 – is now blazing its own trail.

Whether revolution or evolution, one thing is certain: the growing demands being placed on industrial production and the introduction of new technologies have ushered in irreversible change. And we’ll play a key role in shaping this change – because we’re better equipped for the job than virtually any of our competitors. As a world-leading provider of automation technology and industry software, we not only boast decades of experience in industrial production; we’re also one of Europe’s biggest software companies, with some 17,500 software engineers. We offer a complete portfolio of industry software, encompassing everything from the automotive, shipping and aviation industries to the production of chemicals, pharmaceuticals and food. We’re shaping the future of industry – today.

1 – Hamad International Airport is one of the world’s newest aviation hubs.
2, 3 – The design of the passenger terminal complex is inspired by the waves of the Arabian Gulf. Planned to handle some 30 million passengers a year, the building includes over 40,000 square meters of shops, cafés and restaurants.
4 – At the end of 2015, 19 Siemens trams will begin operation in Qatar’s Education City, linking 25 stations along 11.5 kilometers of track without any overhead contact lines – thanks to an innovative energy storage system.

Eisenmann is a leading international supplier of systems and services for surface finishing and paint technologies, material flow automation, thermal process engineering and environmental technology. Located in southern Germany, the company’s been building highly flexible, energy- and resource-efficient manufacturing, assembly and logistics facilities for over 60 years.

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As the first company in the world to bundle all offerings for the digital factory under one roof, we’re ideally positioned to reinforce and expand our leading role in turning the digitalized company into reality.

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