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Special Issue 2021 Volume 23
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FLEXIBLE
COLLABORATION
SECURE
OPEN ARCHITECTURE

HTML5

MTP

STEPPING STONE TO THE FUTURE

The latest generation of process control technology opens up new ways of collaboration, including access entirely without local client installations.

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STEPPING STONE TO THE FUTURE



The Simatic PCS neo control system is completely web-based.

Control system modernization at an Evonik plant in Hanau — In the chemical industry, research facilities create the link between laboratory development and industrial-scale production. Flexible plants comprising multiple areas are sites of innovation and testing, acting as stepping stones for subsequent scale-up. When Evonik Industries was looking to modernize such a plant at the Wolfgang Industrial Park in Hanau, Germany, it was the perfect place to use Simatic PCS neo, the completely web-based process control system from Siemens.

VOLKER HIRSCH *

If you want to test newly developed processes for subsequent large-scale production, you do well to design your test setups as modularly as possible: Stirring, heating, mixing are process steps that recur time and again, and can be regarded as functional units. Evonik's Hanau plant is therefore structured above all to ensure flexibility and versatility, with a total of nine modular units that can be combined as required. Six of the modules are similar in design: they allow different reactions to be carried out to test experimental conditions and prepare samples using temperature-controlled reaction vessels with flexible stirring geometry. The remaining three units are used to provide infrastructure and further process steps.

Jürgen Luh, head of the plant at Evonik Operations, summarizes the current use of the facility as follows: "The plant is used both by ourselves and by other companies. For example, we can use this facility to optimize synthesis processes developed in the laboratory for subsequent production in large-scale plants, and also to represent initial quantities for sampling new products up to a scale of one metric ton."

Because individualized products are gaining in importance today — not just in the consumer sector but also for industrial goods — the work in the plant is also changing:

"Generally speaking, we're seeing a clear trend in the market toward shorter innovation cycles and more specific adaptations of product portfolios", says Stefan Handel, project manager at Evonik. "This also applies to our plant. That's why we wanted to implement a plant concept that would allow us to quickly and easily prepare and expand plant sections for a new test." To this end, Evonik implemented an extensive modernization project in the plant in just under four months, from fall 2019 to the beginning of 2020. "Some components were no longer state-of-the-art and had to be replaced — including the supervisory control and data acquisition (Scada) system," the project manager explains.

A New Generation of Control Technology

The new central control system should not only completely replace the old Scada system, Evonik decided, but also clearly express the company's digitalization efforts. "With our plant, we also want to be a pioneer for innovation and further advance the topics of digitalization and Industry 4.0," Handel says, explaining why Evonik chose the newly developed system software from Siemens: "Si-

ematic PCS neo, as a completely web-based system based on HTML5, offers us an ideal basis for this. We were looking for the latest generation of process control technology that would open up new ways of collaboration, allow system access entirely without local client installations, and support efficient work with an optimal overview." Simatic PCS neo is operated exclusively via a web browser, with no need for local software installations: Via secure connections, users can access all information quickly and easily, at any time and from any location. A clear system for managing rights and roles, and a secure session concept, form the basis for collaboration.

The open architecture of the system will also ensure that the MTP (Module Type Package) standard, which is currently being defined step by step by the appropriate international standards committees, is implemented on an ongoing basis. MTP will then facilitate the integration of existing and new plant units into the control system: The information protocol serves as a standardized and manufacturer-neutral interface linking the control and module levels. It enables any higher-level automation system that "speaks" MTP — from individual equipment items to more complex systems — to control the modules properly.

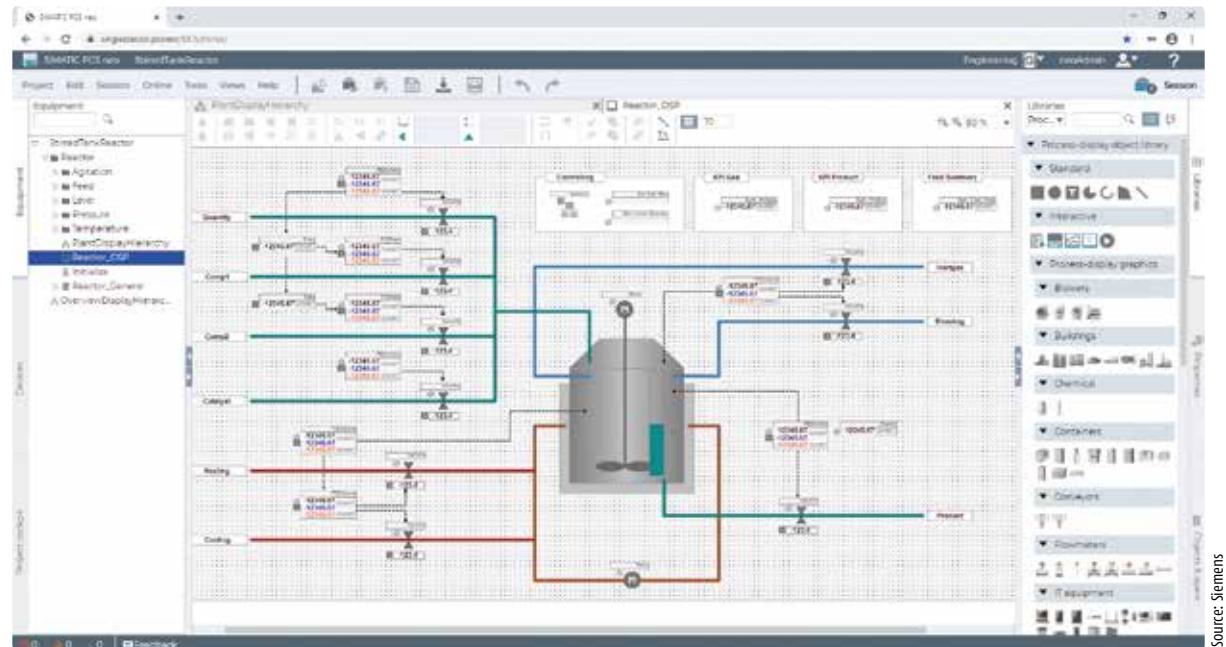


Source: Fotowelt Griepentrog

"Simatic PCS neo has made the 40-year-old pilot plant fit for a flexible future."

STEFAN HANDEL
EVONIK

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**Engineering display
in Simatic PCS neo.**

Source: Siemens

"MTP enables us to structure sections of the plant as modules with their own intelligence. The intelligent modules are combined in an overall process and managed, monitored, and controlled in the central control system, which allows us to configure our processes even more flexibly," says Handel.

Changeover Under Time Pressure

Before the new control system could go into operation, the existing Scada system had to be completely replaced. For this purpose, Siemens not only supplied the Simatic PCS neo process control system, but also revised the plant layouts and optimized the control loops from simple to cascade control. In addition, the plant bus and terminal bus were also renewed with Siemens Scalance switches. The project was under considerable time pressure, recalls Handel: "The specification was that scheduled production had to be running on one of the subsystems three months after the start of the project, and the other subsystems were to be converted just over a month later. Therefore, parallel to the engineering in Karlsruhe, Siemens already carried out the first factory acceptance and site acceptance tests in Hanau, which worked without any problems

thanks to the Simatic PCS neo multiuser concept."

The system's ability to provide smooth multi-user access is due to the central data storage and, in particular, the way session management is implemented. Each project opening is assigned to a specific session, all activities are recorded in their own change context, and changed object sets are then brought into the central project in a consistent and controlled manner. If changes in engineering lead to undesired effects, the status of the last session can be restored immediately. The object orientation allows the user to divide up tasks in the way that is most efficient for the current project situation. In multi-user engineering, for instance, work packages can be distributed among several people, and each task can be assigned to an appropriate person.

As a result, many engineering steps no longer have to be completed in the classic sequential order. For example, continuous function chart (CFC) engineering can be carried out in parallel with project planning for the hardware and control panels. This enabled the engineering team in Karlsruhe to organize the work according to logical units, rather than having to divide it rigidly according to a traditional hardware and software

project planning schedule. In parallel, Evonik set up the computers and IO systems. As a system platform, Simatic PCS neo uses the Simatic AS410 central processing unit (CPU) and nine industrial PCs (IPCs) from Siemens, of which three clients were installed on virtual machines. Setting up the "zero-installation clients" was done without much effort. "Multi-user engineering played a major role in enabling us to start on schedule," Handel concludes.

More Efficiency in Plant Operation

The project manager is equally pleased with the actual operation of the new control system. "After the first employee training sessions, we quickly discovered that the clear and intuitive operation helps new employees to shorten the learning curve," he explains. When using the new control system, it is immediately noticeable that the graphical user interface (GUI) provides the same look and feel for all tasks—from engineering, through operation and monitoring, to administration. If a user works with their browser in full-screen mode, they see no difference from the classic desktop application. "Regardless of the end device or monitor resolution, the image size and resolution always

adapt perfectly to the screen size, thanks to HTML5," Handel says.

Also impressive are the logically structured interface and easy access to all relevant information, with nothing more than two mouse clicks away. "The clear and intuitive operation and the guided navigation through process panels and alarms enable highly efficient work," Handel says. "Thanks to the object-oriented approach and smart use of drag-and-drop, the team can work much faster and more consistently on all technical tasks." He and his team have had a similar experience with the administration of the process control system: "All user information is stored centrally in an Active Directory in the Simatic PCS neo domain. The systems can be maintained centrally via the administration console. We can also ac-

cess the directory of all installed hardware and software components."

Evonik is extremely satisfied with the modernization of the Hanau plant, particularly from the point of view of the control technology. The fact that several users worldwide can now work on a project simultaneously significantly reduces the commissioning time for individual units. Thanks to the open and flexible architecture of the modern control system, the plant is well prepared for upcoming standards, such as the integration of package units and sub-plants via MTP. This experience is leading Evonik to consider expanding Hanau as a central hub for all its local plants and, if necessary, using Simatic PCS neo as the higher-level orchestration control system.



Even before the modernization, the plant at Evonik's Wolfgang Industrial Park was designed for flexibility. With the new control technology, the guiding principle of modular production is gradually being raised to the MTP (Module Type Package) standard.



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