



LANXESS Plant First to Modernize Provox System with Siemens PCS 7 OS HMI

After installing the new SIMATIC® PCS 7/VPX OS HMI, the LANXESS chemicals plant near Charleston, SC, upgraded its batch control processes in phases, avoiding costly downtime and maximizing life-cycle management efficiency. The new HMI enabled the plant to retain existing controllers without modifying the application software. Additionally, the HMI helped the plant adhere to S88 batch management concepts by combining two types of controllers and three batch operations into one system – all without exceeding capital expenditure goals. “This HMI solution is scalable,” says Lanxess Plant Engineer Robert Durscher. “We can keep running during changes and spread our capital requirements out over time.”

Jim Robertson wears two hats. As head of engineering at the LANXESS chemicals plant just outside of Charleston, SC, he is responsible for the day-to-day maintenance at the facility. He also oversees the capital expenditures for process improvements to the plant that was opened in 1978.

While most manufacturers separate engineering and capital work responsibilities, the LANXESS plant has achieved great success by combining these two job functions under one group. Over the years, Robertson and his team have used this unique approach to carefully upgrade the plant’s batch control processes in phases, avoiding downtime and maximizing efficiency.

The company manufactures high-quality chemicals, synthetic rubber, and plastics. Its portfolio comprises basic and fine chemicals, color pigments, plastics, synthetic rubber and rubber chemicals, leather, material protection products, and water treatment products.

In the early 80s, the Bushy Park, Goose Creek plant was controlled entirely with Fisher (now Emerson) PROVOX distributed control system. This system was unchanged until 1999 when Robertson replaced a filter in the VULKANOX® antidegradant chemicals production area. The filter was controlled by a 20-year-old PROVOX DCS. Robertson’s choices were to keep the existing filter system and re-configure it for the new filter, upgrade to a newer version of the PROVOX DCS, or upgrade to another company’s system.

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After comprehensive market and batch application comparisons, Robertson chose the Moore APACS+ system. A key factor in Robertson's decision was his goal to move to a solution that adhered to S88 batch management concepts. He envisioned all three of his production lines eventually following S88 batch concepts.

Upgrade from PROVOX to APACS+

Over the next five years, with the help of system integrator AE Solutions, Greenville, SC, Robertson replaced the remaining two PROVOX controllers on the VULKANOX® line with the Moore APACS+ system, now part of Siemens Energy & Automation, Inc. To minimize downtime, the upgrade was conducted vessel by vessel.

When the upgrade was completed in 2004, the plant was using two automated control systems, APACS+ and PROVOX. The APACS+ system automated the VULKANOX® product line, while five PROVOX controllers and a ProView HMI automated the company's VULKACIT® vulcanization

accelerator and RENACIT® mastication agent production lines. At this point, operators had no choice but to monitor and control the processes with two separate and independent HMIs located in the same control room.

At the same time, Robertson was facing life-cycle management issues with the ProView HMI hardware. For example, replacing a failed ProView keyboard was very costly and required the company had to ship parts to the west coast for repairs. Additionally, Robertson was advised that the ProView HMI components would soon be discontinued, raising concerns about future part replacements or upgrades.

"At that time, I had established myself as a bit of a rebel to move away from PROVOX," Robertson said. "But the whole idea of moving forward was that we didn't want two HMIs any more. We had an APACS+ HMI and a ProView HMI. The ProView HMI was obsolete, so we were on the hook to do something."

Common HMI for Both Systems

In 2002 Robertson began the move towards a common HMI for both the APACS and PROVOX controllers. LANXESS's team with the assistance of AE Solutions began the development of redundant OPC servers collecting PROVOX tag data from the PROVOX Hiway. The tag data was served to Windows-based clients running the HMI software. With the extensive knowledge of the plant's existing PROVOX controller configuration possessed by Robertson's onsite engineering staff and with AE Solutions developing the OPC database and the client HMI graphics, a large step towards the successful migration was achieved.

Engineers at Siemens facility in Spring House, PA, offered to build on the success of this project and the valuable lessons learned in the development of the PROVOX OPC server database to develop a new migration product for its SIMATIC PCS 7 distributed control system. Siemens already offered Moore APACS, TI-505, and

Bailey INFI 90 migration HMI products for PCS 7. Similar to the APACS+ migration product, the PROVOX version would deliver the benefits of S88 batch management without having to change the existing PROVOX controller hardware and configuration on the VULKACIT® and RENACIT® lines.

"We wanted to retain our investments in the existing controllers and we didn't have the funds available to change out everything at that time," Robertson said. "Additionally, the Spring House R&D team worked closely with us, spending a lot of time on site to ensure that the new product met or exceeded our expectations."

Siemens new PCS 7/PVX OS HMI was installed in August 2006. This solution allowed LANXESS to continue to use its PROVOX controllers without making modifications to the application software on the controllers. The new SIMATIC PCS 7/PVX OS HMI could also monitor and supervise the existing PROVOX controllers and the APACS+ controllers, making the entire solution S88 concept-based.

The upgrade also included a change to Siemens S88 Batch Management software that gave LANXESS a consistent and traceable recipe management tool for product quality.

The use of S88 batch concepts has allowed for the repetitive use of tested operations in unit procedures reducing the amount of specialized or individual product code. Additionally, each recipe or order may be time stamped to analyze bottlenecks and energy savings.

The PCS 7/PVX OS HMI automatically generated tags based on the controller configuration and was delivered with standard symbols and faceplates designed specifically for PROVOX tag types. The basic graphics used in the SIMATIC® PCS 7/PVX OS HMI are automatically generated using these symbols and faceplates. LANXESS operators and engineers then personalized these graphics using standard PCS 7 graphics tools to meet their needs. This same HMI also enables the operator to graphically monitor batches, create recipes and modify batch parameters during runtime.

Like Robertson, Plant Engineer Robert Durscher is also responsible for capital expenditures. He said the decision to install the PCS 7/PVX OS HMI is right in line with LANXESS' lean operating philosophy that focuses on maintaining existing plants in the United States, not building new ones.

"Frugal spending is something we have to do," Durscher said. "We are in a very competitive global business, from engineering to janitorial services. This HMI solution is scalable, so we can keep running during changes and spread our capital requirements out over time."

Some of the benefits of the APACS+ and PROVOX controllers communicating through a common Siemens HMI system include a common point and click display, an integrated alarm management system and centralized data collection. Now, the HMI for all the batch lines are identical. Durscher said from a safety prospective the operators no longer need to monitor two different systems while controlling the different processes.

The new Siemens HMI and Batch Manager software gave LANXESS a common S88 recipe procedure structure over both types of controllers using clear and detailed displays. "Now we are structured," Durscher said. "Operators can watch the process progress through the phases now. They have actual batch displays and recipes providing a graphical representation of the batch. In the past, they would manage the process via short cryptic messages at the bottom of the screen to see what was going on."

Configuration Savings

Kent Wolcott, process control systems programmer, said he spends most of his time with the plant's operators. According to Wolcott, the key benefit of the new HMI system is that it eases the load for the lean staff with easy recipe changes and revision control.

"We developed a tag type structure with the standard data base automation tools that come with the migration product," Wolcott said. "Siemens developed the batch tools that automatically maps the PROVOX batch commands and statuses to those used with Siemens SIMATIC BATCH. We didn't have to configure any scripts."





The graphical interface of the batch software has given operators a common communication point for operations, maintenance and engineering. Troubleshooting and analyzing the recipe/order is performed with a functional group using this tool.

"When we created this the first time during the migration to APACS+, each DCD had to be built with an individual display to show those text descriptors," Wolcott said. "As a rough estimate this consisted of about 500 displays. Now, the data base automation

tool provided with PCS 7/PVX OS enables us to enter these text values from a single generic display used by all DCDs, making my job a lot easier."

Next Steps

Robertson said the upgrade to the SIMATIC® PCS 7 / PVX OS HMI has given him many options for future improvements.

"The next priority is to phase out the older controllers," Robertson said. "We'll keep

the APACS for the short term because the migration path right now is to replace all of the old PROVOX controllers. The new HMI system gives a wide range of options, including Siemens SIMATIC controllers, Profibus and new I/O products. Additionally, we now can phase everything in without downtime and without exceeding our capital expenditure goals."

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