

Air Products Orlando Plant Migrates to Siemens PCS 7 HMI

As the Control Systems Group leader of Air Products and Chemicals' Global Support Services Group responsible for the Americas and Asia, Frank Berry and his team of engineers are charged with maintaining and upgrading more than 200 Air Products plants.

Operating in more than 30 countries, Air Products is based in eastern Pennsylvania's Lehigh Valley, near Allentown. The company is a leading global supplier of gases, chemicals, and equipment to high growth markets, including electronics, performance materials, refinery hydrogen and energy, and healthcare.

Two years ago, Air Products adopted a company-wide human machine interface (HMI) replacement strategy. In his role with the Global Support Services Group, Berry was charged to establish a clear migration path that would minimize the number of different operating platforms, reduce re-engineering costs, provide a robust HMI system that would enhance operator confidence, and maximize HMI commonality plant-to-plant.



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Berry had much to consider as he and the Air Products team put the strategy into practice. The small staff of engineers support a diverse service area with many different cultures, and business demands. They weighed the costs to migrate to a new HMI system, the lifecycle costs to sustain it, and the expenses to replicate it. Berry said he did not want to change for change sake, but to gain new capabilities through upgrading that will pay back the investment.

SIMATIC Solution

The solution for many sites was Siemens Energy & Automation's SIMATIC® PCS 7 Operator Station (OS) technology.

In late 2004, a beta test site installation was completed at the Air Products' cryogenic air separation plant in Orlando, Florida, where three legacy operator consoles were replaced with Siemens PCS 7/90 OS HMI terminals. Berry said the Legacy HMI consoles dated back to the early 80s.

"Air Products has several hundred plants operating on different legacy platforms and HMI systems" Berry said. "Our beta site at the Orlando plant proved we have established a solid HMI migration path for multiple platforms by standardizing on Siemens PCS 7 HMI technology."

The migration was carried out in phases without interrupting the operation of the plant. For the first six months of the installation, the three existing legacy consoles and the PCS 7/90 OS system ran in parallel to help the operators become familiar with the new system.

The Orlando plant migration kept intact the existing legacy distributed control system, including controller hardware, input/output modules, and field wiring. This strategy allowed replacement of only the most difficult to sustain components, while maximizing the value of Air Products existing investment in hardware and application software. The PCS 7/90 OS servers connect to the legacy controllers via OPC using standard legacy interface cards.

Configured with Siemens SIMATIC PCS 7 OS software, the new Siemens HMI consoles have predefined faceplates and graphic symbols for interaction with the function block-based controller code. Operators retain the consistent look and feel of the legacy system, thus minimizing the impact of change on them.

In addition, the new operator stations provide diagnostic capabilities, display controller alarms and messages, and provide the engineering tools required to update/maintain the configuration in the legacy controllers.

Remote Connectivity Important

The Orlando air separation plant is run 24 hours a day, seven days a week. Because the plant is unmanned during certain periods, Berry said secure remote operator connectivity to the HMI system is critical.

"The connectivity is much better than we had before," Berry said. "We used to have to dial into the system because the platform was not Windows-based. We also had to have the same graphical interface as the antiquated machine on the other end. Now operators and engineers can access the PCS 7 system from their own personal computers and enjoy faster speeds and a higher level of security than before."

The alarm configuration of the PCS 7/90 OS HMI system notifies operators of critical events by dialing directly to their cell phones. When alerted, operators can view the exact same screens remotely on laptop PCs, as those that are displayed on the HMI consoles at the plant.

Berry expects migrating to the new HMI system will ease the maintenance burden by minimizing the number of obsolete systems to be managed. In the past Berry and his team often stockpiled used computers to accommodate maintenance of the aging fleet of computers used for HMI.

"One of the biggest benefits of moving from the legacy consoles to Windows-based PCs is not having to work with older generation machines," Berry said. "Our previous vendor's control system software is not compatible with today's standard desktop computers. Now we benefit from the higher speeds, Windows-based security, and report generation. In a pinch we could go to the local store to acquire a replacement PC, rather than searching to find old compatible machines."

Re-Engineering Costs Minimized, Commonality Maximized

Berry said that because this was a test site, and the Siemens PCS 7/90 OS HMI was in the prototype stage, both companies took the time to work together to develop a solution that could be easily replicated with low risk at any of the 100 Air Products plants with this particular legacy control system.

"Siemens invested a lot of time to develop the product in collaboration with us," Berry said. "They did a lot of the engineering. The development exercises produced libraries, faceplates, and templates. Now there is an existing library of elements from which we can pull information. Future upgrades will take advantage of this work and enjoy minimal re-engineering."

Ghent, Belgium, Plant Upgrade

Halfway through the Orlando Air Products plant HMI upgrade, a similar large air separation unit in Ghent, Belgium, was beginning a comparable transition from the legacy HMI operating system to Siemens PCS 7/90 OS HMIs. While one of the main drivers for the Orlando plant



was remote connectivity, the Ghent plant had another priority, adding production capacity. At the time, a second large air separation unit was being built at an adjacent site utilizing a full PCS 7 architecture including control and I/O. The goal for Ghent was to introduce a platform that would run both the old and new units from one control room using a common HMI system. Berry said much of the information gathered at the Orlando beta site was shared with engineers working on the Ghent installation.

"Ghent learned from Orlando and Orlando learned from Ghent," Berry said. "We kept the controller hardware, input/output modules, and field wiring from the legacy system. A common terminal bus for HMI connectivity allowed us to share everything else between the legacy system and the new PCS 7 system – including clients and remote access."

Now that both the Orlando and Ghent installations are complete and running, Berry said the robustness of the systems has improved. The systems have been running for months with no HMI related outage. He said diagnostics are clean. Parameters are good.

Berry said he now has the commonality in the HMI hardware, software, and tool sets he was looking for to perform plant upgrades in the Americas and Asia.

"One of the unique things about the Siemens architecture for migration is that the core engineering tools and everything above it (the HMI layer) are the same for each different control platform." Berry said. "DCS-specific software plug-ins enable this and should make our workforce more productive as we won't have to rely on as many specialists."

Berry said the Air Products controls team can work with a variety of HMI tools that they can carry over from one site to another. He said Air Products seeks productivity as they add new plants every year. Berry now feels Air Products is better poised to handle the large number of plants more effectively.

"As a group, the Air Products Global Support Services Group is sustaining a couple of hundred plants," Berry continued. "We have a fixed number of resources in the group. Everybody has an HMI for sale. To choose one to standardize on is a difficult task. Each one has benefits and a role in the marketplace. We had a lot of choices. The PCS 7/90 OS appears to be the best cost value and gives us the connectivity, commonality, and robustness we were looking for in a HMI migration solution."

