
Upgrading Your DCS: Why You May Need to Do It Sooner Than You Think

White Paper

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Introduction

As the next generation of distributed control systems (DCS) becomes firmly established in the marketplace, each manufacturer must face the issue of upgrading. DCS vendors already have plans to phase out support of many current platforms, so it's critical that you develop your own plan for moving forward. The most proactive plants already have a plan in place, while others may continue scavenging for spare parts to keep their existing controllers alive for as long as possible. Of course, every control system has a limited lifespan and must be upgraded eventually. The big question is when. While waiting until the system's useful life ends may seem like the sound financial decision, it may actually be better to upgrade sooner than later.

The decision to upgrade a DCS is like the decision to upgrade your laptop or PC. Transferring files and programs is never easy, but using an outdated machine is even more of a chore. Support grows obsolete, old systems prove incompatible with new products, and speed and storage become major problems. Efficiency suffers as a result.

Of course, migrating to a new DCS requires a more extensive plan and process than upgrading a PC. Fortunately, there are many ways to make it easier to justify and accomplish.

Why You Shouldn't Wait Too Long to Upgrade

To put it simply, your business should be in control of your control system, not the other way around. It's important to understand the risks of waiting to upgrade so that you can decide when the time is right for your business. There are five main reasons why you may need to upgrade sooner than later:

Signs That Your DCS Needs Upgrading

- Resources who support the existing DCS are close to retirement.
- The vendor plans to end support for the product.
- Control problems cause unplanned outages and increased downtime.
- The latest technologies are not compatible with your DCS.
- Spare parts and technical support are becoming hard to find.

- 1. Your current resources do not know your legacy DCS product.** Layoffs, retirements and promotions have reduced the number of engineers with expertise in legacy DCS systems. Those who are left know this and demand to be well-compensated for their specific knowledge. The problem will only worsen, so now is the time to pair these experts with younger engineers. By bridging the gap in this way, the older engineers will avoid having to learn new technologies right before they retire, and the younger engineers won't have to learn a dying technology. The younger resources will also benefit from the mentoring experience as they receive a wealth of control knowledge and advice from their predecessors.
- 2. Waiting until product support ends makes migration more challenging.** The absolute worst time to upgrade your DCS is at the last minute, at the end of the product life cycle. An end-of-support deadline impacts all the product users, and your facility may be one of many scrambling to find a new solution. You will have to compete with them to find quality manpower for the transition. Plus, the external deadline reduces your flexibility to adjust to unforeseen problems. Planning and executing a DCS migration project can take years, so by starting early you can complete the migration before the support is completely gone. Any indication that your vendor will cease support should be taken seriously, especially if the vendor's focus will soon shift to a new product line.
- 3. Old systems cannot utilize new technologies.** For example, an outdated DCS that does not allow for open connectivity via open standards cannot communicate effectively with most third-party systems. Workarounds exist but can be expensive because they often require complicated, custom interfacing and unique expertise for configuration and maintenance. But an OPC-compliant DCS opens the door to a wealth of productivity tools and advanced control applications that deliver more return on your DCS investment. The ability to communicate with third-party systems such as SAP, ERP and MES will deliver benefits across your enterprise.
- 4. Old systems only allow for configuration of certain types of controls.** In contrast, today's DCS products do not have fundamental control problems such as those related to initialization, windup protection, override selection and discontinuous control. New systems can also directly incorporate advanced regulatory techniques. One of the newest systems even has the ability to incorporate smaller-scale multivariable and model predictive control, eliminating the need for expensive MVC software and license agreements. Other characteristics of the latest generation of DCS products include:
 - Simplified procedures for the bulk-building and editing of points.
 - Microsoft® Excel or XML formats that allow users to build the control database more easily than with cumbersome text dumps.
 - Graphical function block configuration, which makes configuration easier than text-based forms and allows for easier control application maintenance and self-documentation.

5. The cost of staying with an old system eventually outgrows the cost of migration.

Maintenance of older systems becomes more expensive as support dwindles and spare parts become harder to find. As reliability begins to decline, unplanned shutdowns and the resulting production losses increase your costs as well.

How to Approach Your DCS Upgrade

Once your business decides it's time for a new DCS, you must decide how you will approach the transition. The upgrade can be a monumental and expensive task, depending on the size of your system. Sometimes it makes sense to do it all at once, and sometimes it's better to take a phased approach.

New Unit, New DCS

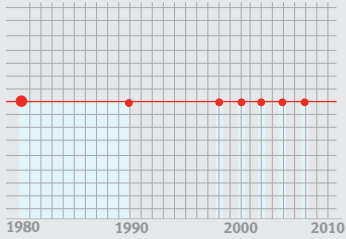
One of the best ways to introduce a new DCS into your plant is to specify it as part of a new process unit installation. Operators and engineers can be trained on the new technology that will make future upgrades of your existing facility that much easier. One of the worst things you can do is to try and save money by installing an older DCS on your new unit. It is likely that you will never see a return on investment on this older DCS installation, since an upgrade will have to be done sooner than normal.

Phased Upgrade

Most of the latest DCS products support some kind of phased or partial approach to the upgrade. While these approaches may actually cost more in the long run, the costs can be spread out over a longer period of time. These approaches are also inherently less risky and allow for less downtime than replacing the entire DCS as a turn-key project. Two common ways to perform a phased upgrade:

- 1. Update the HMIs first.** Most newer DCS HMI packages can be configured on top of legacy control systems. This upgrade can be done on a running plant with little impact to production during the conversion. By upgrading the HMI first, you ensure that the operators know the new technology before the complete system is installed. Changes in presentation and interaction with the new control system are some of the biggest hurdles that operators face. Many new HMI packages also support extra connectivity, such as OPC. The HMI software can serve as an interface that allows for the development of MES and ERP projects without the need for a full DCS revamp.
- 2. Replace the controllers and HMI, but leave the existing I/O modules.** Most of the latest DCS products have the ability to connect to I/O devices at the backplane of the old DCS controllers. Most of the I/O and field wiring can be left in place and upgraded as needed in the future. This approach allows for easier hot cutovers and the ability to change out I/O as plant shutdown schedules permit. It also reduces the labor costs for electrical and wiring work and the associated documentation updates, such as wiring diagrams.

Successful Migration Timeline



1980–1990

Company converts to TDC 2000 / PMX

1998

Honeywell announces that support for PMX will end in 2008

2000

Company begins plans for migration, chooses Experion PKS

2002

Company chooses partners for migration

2004

Migration work begins

2008

Migration complete before obsolescence

Case Study: Chemical Company's Honeywell DCS Migration

In the 1980s, a major U.S. integrated chemical company converted board-mounted, pneumatic instrumentation and control systems in eight sites worldwide to 18 separate Honeywell TDC 2000 systems with PMX process computer control systems. These systems provided many years of reliable service. While Honeywell DCS platforms continued to evolve and DCS technology advanced throughout this period, this chemical company stuck with its original investment, all the time making small incremental upgrades as needed. For example, the original TDC 4500 computer platform for PMX went through many improvements, as did the original TDC 2000 operator stations. The PMX system was also upgraded to provide integration with business systems.

In the late 1990s, however, Honeywell let its customers know that PMX would not be supported beyond 2008, forcing this company to face the migration issue. The company had to either use a Honeywell migration path or undergo a total replacement with a non-Honeywell DCS. Considering this company's long relationship with Honeywell and its large installation base, the company chose to stay with Honeywell.

Next, the company had to decide which Honeywell migration path to pursue. In the late 1990s, the dominant Honeywell DCS was TDC 3000. However, this was a second-generation, proprietary DCS, and third-generation systems were already in the introduction stage. Foreseeing the evolution to Windows™-based, OPC-compliant, open architecture DCS platforms, the choice to migrate to the new Experion PKS DCS was easy to make.

This company's core technology center then began the arduous task of planning the migration in early 2000. Ultimately, each of the eight worldwide sites managed its own migration program with the help of an independent systems integrator. The program was completed successfully, meeting the target obsolescence date of 2008.

Finding the Right Partner and the Right Solution

Once you know how you'd like to approach your migration, you must make two decisions of equal importance:

- Who will serve as your partner during the transition?
- Which DCS platform should you install?

Of course, if you choose to have a DCS vendor assist with the migration, then this decision is one and the same. Ultimately, your three basic options are:

1. Stay with the same vendor. Most DCS vendors have paths in place to help you plan and execute the migration. But keep in mind that the ultimate goal of the vendor is to sell you new products. So if you are using a phased approach, take care to migrate only what you need at the time. Staying with the same vendor should also simplify the migration of the control strategy. Even though the DCS is a new product, there will most likely be some holdover from the legacy DCS that will make the transition of applications easier.

2. Switch vendors. If you decide to change DCS vendors, make sure not only to evaluate the technology and features, but also the long-term outlook for the company. Vendors who became obsolete over the years are, in many cases, the reason why their DCS products also became obsolete. Also consider how often a vendor rolls out new packages — because once the vendor has a new DCS to sell, support for older systems may diminish and force you to undergo another migration.

3. Consult an independent systems integrator. An experienced contractor or systems integrator can help you make an unbiased, informed decision on which DCS to choose. This type of partner will have practical experience working with a range of products on the market and in applications like yours. This experience is especially beneficial if your plant uses a mix of different technologies; a specific vendor will have expertise in his own products, but an independent partner will know them all. The systems integrator will also then lead you through the migration — and will be supportive of phased approaches without pressuring you to buy more products along the way.

The Importance of Planning

Most of all, remember that DCS migrations take time, so plan accordingly. Plants with older systems may lack good documentation on system configuration and control strategies, requiring everything to be reverse-engineered to ensure that nothing is missed. Application code and control strategies rarely port over directly. Many vendors claim to have automatic tools for conversion, but be wary of their efficiency claims and make sure you allow enough time to adequately convert the system. Also allow room in your budget for inevitable problems. Assembling a strong team of engineers, operators, IT workers and maintenance staff will help throughout the process.

On the bright side, upgrading your DCS is one of the rare opportunities to clean up your system, allowing you to remove all of the dormant files, control strategies and obsolete data points. You should strongly consider taking this opportunity to update and standardize the graphics — as well as to review and update your control strategies across the board.

Conclusion

Migrating your DCS might seem like an impossible task, but it's really no different than any of the other major projects that occur within your plant at any given time. As with any project, the main key to success is the quality of the team that you put together. Once your DCS migration is successfully completed, you can begin to reap the rewards that a new DCS is sure to provide.