DCS MIGRATION STRATEGIES

Everything you need to know about Control System Migrations

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CHAPTER 01

INTRODUCTION

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WHAT'S CONTROLLING YOUR PLANT?

A process manufacturing plant of any size and complexity usually has thousands of field instruments, valves, operator interfaces and other devices working together to make the process run efficiently and reliably. All those parts are connected and controlled by the DCS—the distributed control system, a complex collection of processors and input/output systems capable of making everything work together. Smooth operation of the DCS is absolutely necessary for your plant to operate efficiently.

In spite of its criticality, many companies have old DCS platforms. In computing terms, they're ancient. Various studies suggest the majority of plants have systems more than 20 years old, and 30 year-old systems are rather common. Some parts have been updated over the years, but the basic core processors and much of the I/O hardware could easily date back to the days of floppy disks. Those systems should have been updated long ago.

THE WORLD'S 1ST DCS

In 1975, Yokogawa launched CENTUM to introduce the world's first distributed control system (DCS). While Yokogawa's corporate philosophy remains unchanged, CENTUM has been making progress and expanding its functions along with advances in technology, environmental changes, and changing demands since its release several years ago. CENTUM offers 42 years of progressive compatibility.

Download this technical report to read about the history of the first DCS and how it has evolved over time.

READ MORE - CENTUM HISTORY

IF IT AIN'T BROKE...

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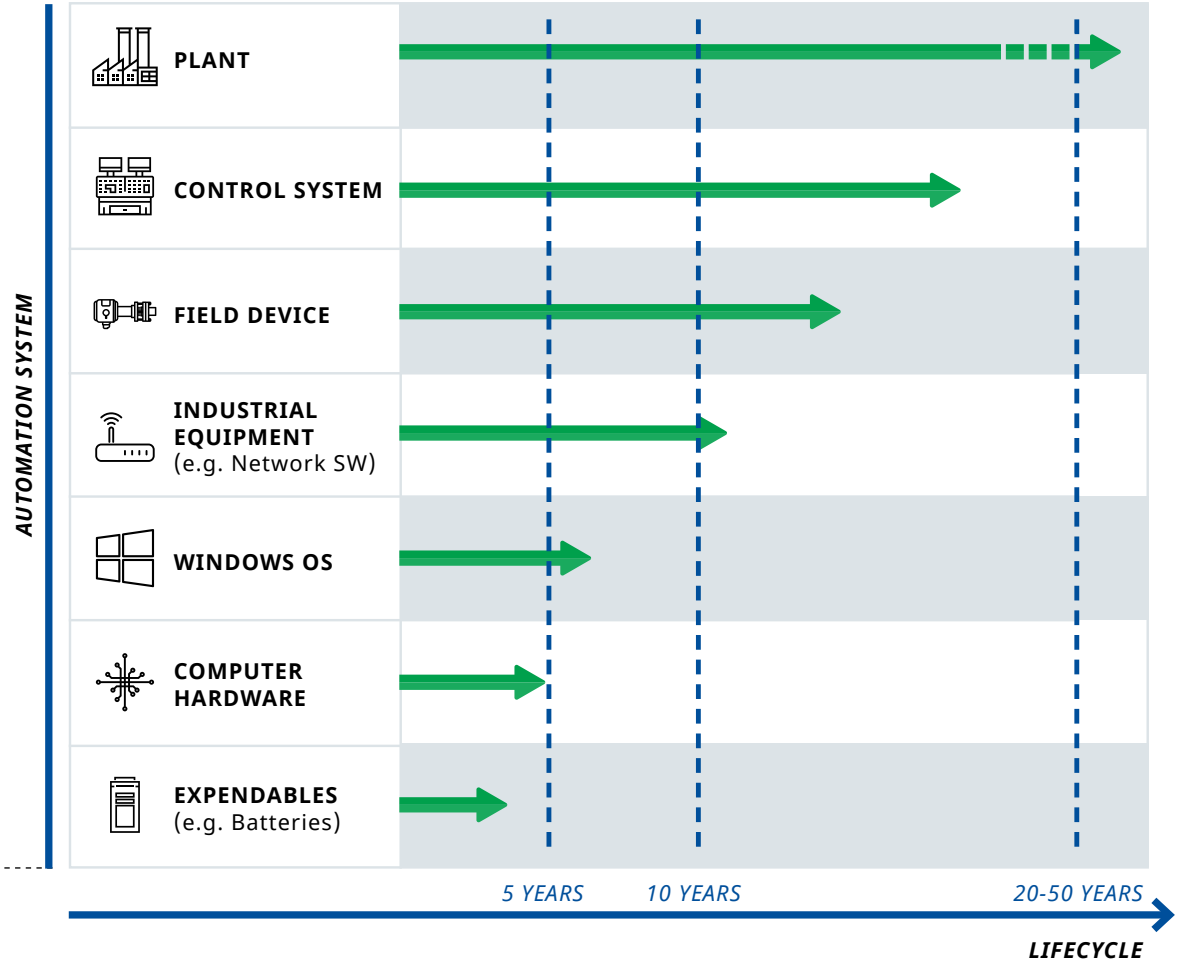
For many companies, the DCS is like the light in a kitchen. It's up on the ceiling and uses the same 100-watt incandescent bulb it's had forever. Yes, it's inefficient—newer bulbs would give more light with far less energy—but it works and so nobody does anything about it. When it finally burns out someone will put in a better bulb, but for now the homeowner simply continues to waste money and lives with the existing substandard performance because making the change is too much trouble.

Because the average lifecycle of a DCS is very long and the system is likely to keep working, it is easy to maintain the "If it Ain't Broke" mentality and keep the old DCS running. But what if something goes wrong?

Staying on an antiquated platform may be preventing you from realizing operational efficiency gains and streamlining business decisions with clear information.

AUTOMATION SYSTEM COMPONENTS LIFECYCLE

The average lifecycle of most components of a process automation system is longer than 15 years. In many cases, systems are maintained by replacing individual components.



RISKS | WHAT JUST HAPPENED?

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Many companies continue to keep old DCS platforms running, until they can't. Over time, electronic components degrade and fail. That's when things get exciting, but in a bad way. Old control system platforms and instrumentation increase the risk of failure and production interruptions, and lack many of the capabilities of newer systems for improving plant performance.

A TYPICAL DAY IN THE PLANT WITH AN OLD CONTROL SYSTEM

WE JUST LOST ALL THE TEMPERATURE READINGS IN THE DISTILLATION COLUMN.

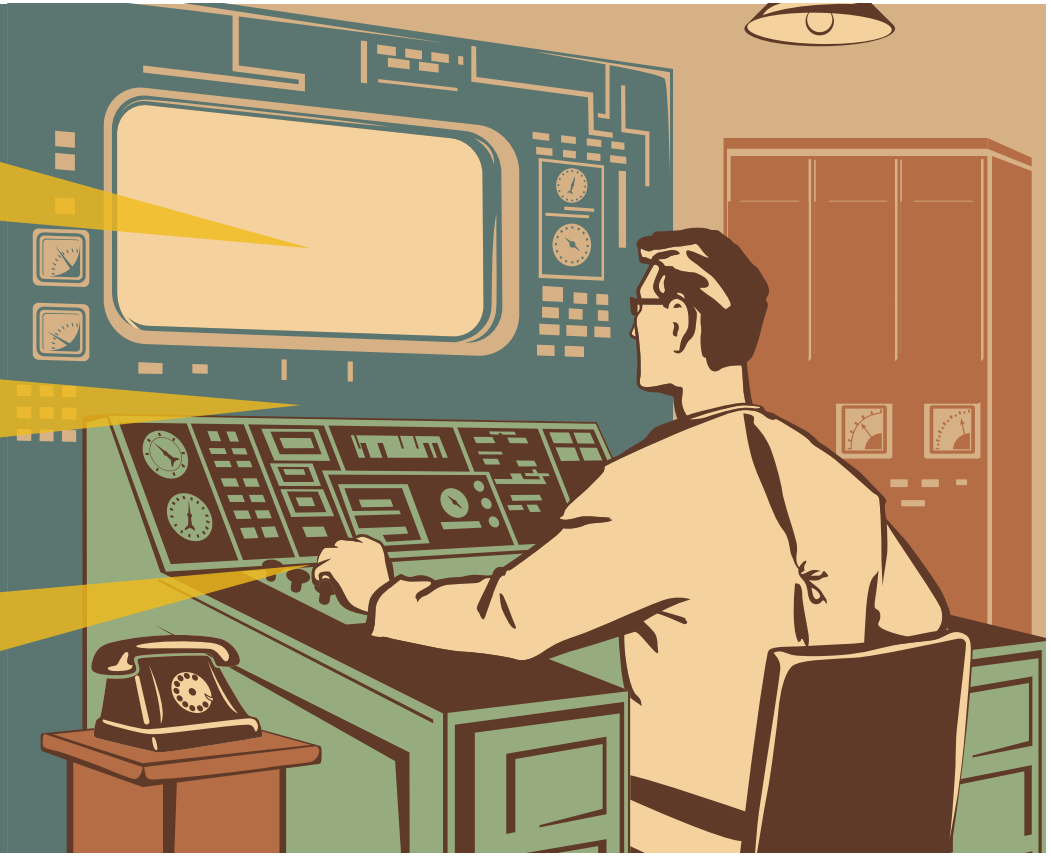
Why? An I/O card just failed and all the readings coming in on that card went dark.

WE HAD AN UPSET IN REACTOR B.

Why? The two variables critical to keeping the reaction balanced are not visible on the same HMI screen. The operator has to toggle back and forth and can't see them side-by-side. It's a throwback to the original system design.

THE FLOW LOOP CONTROLLING FEEDBACK INTO UNIT 3 WENT HAYWIRE.

Why? That part of the controller quit. Put it into manual or see if you can rig up some other workaround.



WHAT ARE YOUR RISKS?

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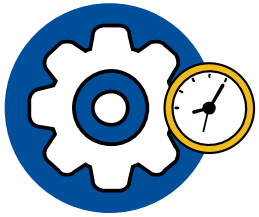
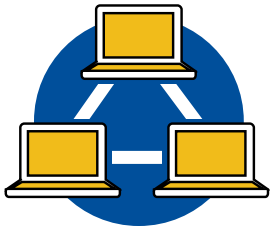
Plant managers and operators often consider plant downtime as the major risk and cost of using an older system, but in fact, plant downtime is only one of many risks to consider. These are the top five risks and costs that are often associated with outdated control systems:

	System Failures	Part Availability	Difficulty Integrating New Applications & Systems	Reduced Support Availability	Operational Inefficiency
Result	• Decreased Reliability • Increased Downtime	• Extended Outages • Lost System Functionality • Increased Maintenance Requirements	• Can't Realize Full Potential of New Application • Key Data Not Easily Available to Decision Makers	• Difficulty Trouble Shooting Maintenance Issues • Extended Schedules for Projects Requiring Engineering	• Inability to Take Advantage of Current Best Practices • Operator Mistakes Contributing to Product Quality Issues and Downtime
Costs	• Lost Production • Unplanned Outages • Product Schedule & Shipment Disruptions	• Increased Maintenance Costs • Lost Production • Impact to Production Quality	• Less Optimized Operational Performance • Slower Business Decisions • Higher Costs Associated with Project Implementations and Ongoing Support	• Increased Maintenance Costs • Increased Engineering Costs • Delays in Realizing Benefits of Projects Involving Control System Configuration	• Reduced Product Quality • Increased Downtime • Operator Stress

Roessler, D. (2013). Control System Migrations A Practical Project Management Handbook. New York: Monument Press.

HOW MUCH RISK IS TOO MUCH?

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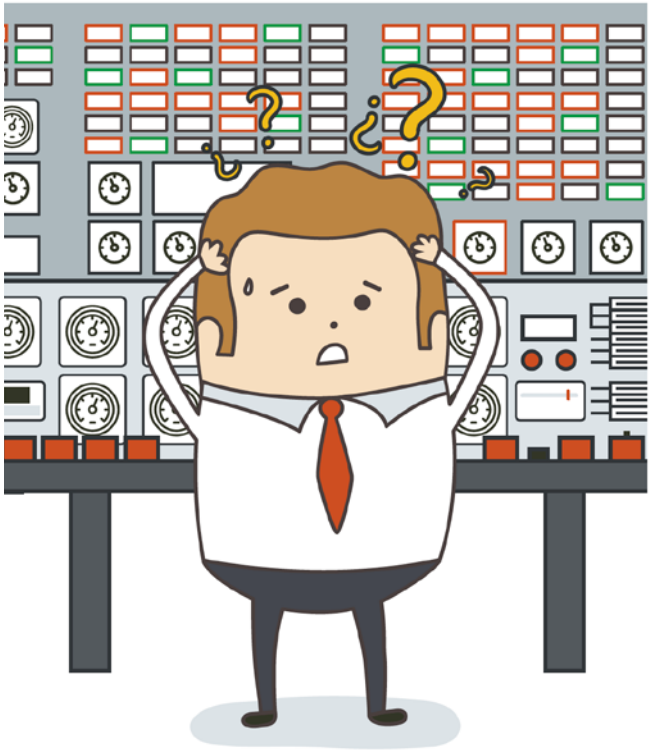
If you've ever encountered a crisis in your plant, you're not alone. Maybe the situation wasn't too extreme. Maybe you were able to find an old processor card, but how long will it last? How much time until you go through this crisis again, but without a spare? When will you get to the point of no return?

As the frequency of these events increases, so do the risks associated in maintaining the system. It's important to complete an analysis of the system risks and benefits to see at what point the risk of doing nothing exceeds the risk of doing a migration.

An unreliable DCS means an unreliable plant. If a plant can't produce, it doesn't make any money. Such events cause high-level people to ask what has to happen to prevent such outages.

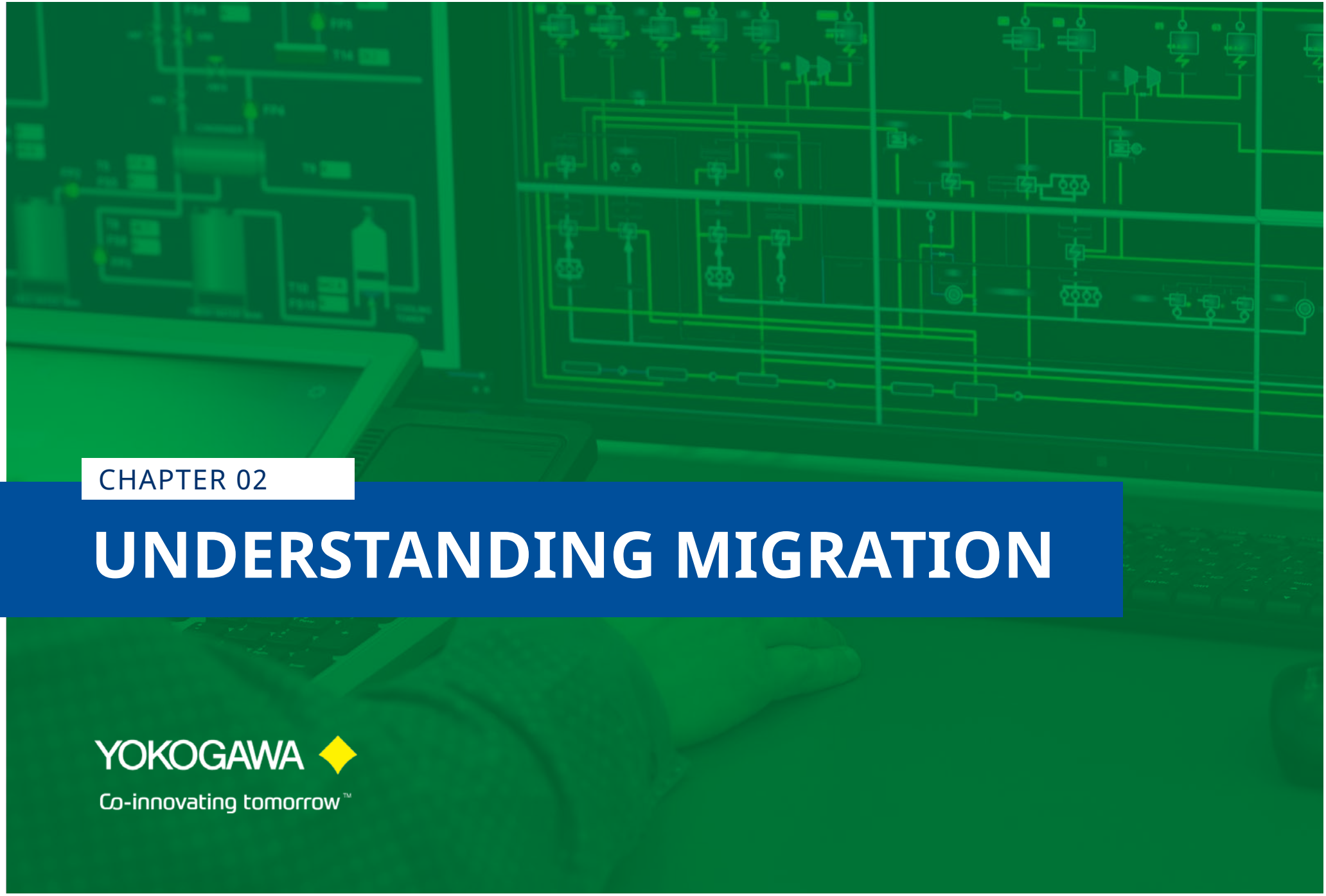
The answer is simple: Look into your DCS capabilities and find out what may be improved.

Category	Comment	Status
System Overview	Overview of system compnents	
Hardware	Lifecycle Phase and HW status	
Software Lifecycle Phase	Lifecycle Phase and SW status	
Operating System	Lifecycle Phase	
Alarm Rate	EMUA 191 and ISA 18.2	
Control Mode	Time in normal mode vs. off mode	
Production KPIs met		
Operating KPIs met		
System Traffic Rating	Throughput per segment	
Network/Cyber Security Rating	Completely islanded and proprietary system	
Node Memory Usage		
Node CPU Processing Rating		



Color	Status	Comment
	Healthy	No issues detected - no action required
	Attention	Some issues have been detected - action may be required
	Critical	Critical issues have been detected - immediate action is required
	N/A	Not available / not applicable

The image on the left represents a "System Health Check," which is a service offered to Yokogawa DCS customers.



CHAPTER 02

UNDERSTANDING MIGRATION

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WHAT IS MIGRATION?

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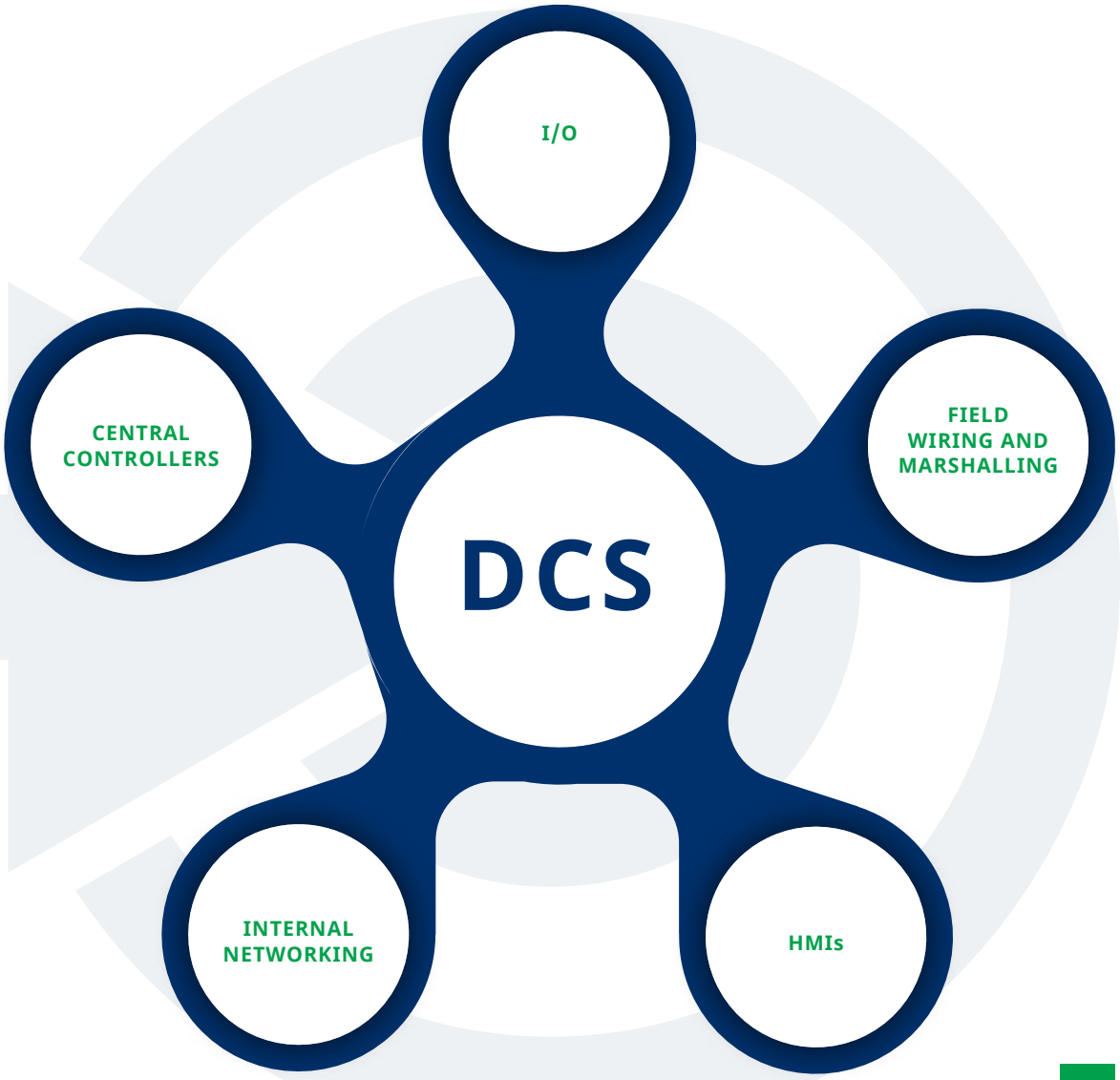
The word migration implies large-scale movement and change. The concept applies when talking about changing to a new DCS platform because these are not small systems. They are complex and launching such a project is not a trivial matter, which is one of the reasons some companies try to keep their old systems running for so long.

A DCS migration is a project where some or all of your automation control equipment gets replaced. Just as no two systems are exactly alike, neither are two migration projects.

A DCS COMPRISES SEVERAL MAIN SECTIONS:



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POSITIVE ASPECTS OF MIGRATION

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To a plant struggling to keep the DCS up and running, a migration is largely a defensive measure. It is driven by an urgent necessity, but there are still opportunities to realize many of the technological advances of the last few decades. Others may know their system is old and its days are numbered, but there is still time to make a rational decision and launch a well-planned migration before things fall apart.

The DCS you install today may never have to be completely replaced because its modularity will allow it to be improved incrementally.

New systems are highly adaptable, built on more open platforms, and are more flexible than those from just a few years ago. In addition to avoiding unplanned shutdowns, a migration offers some additional benefits:

- **Greatly improved price/performance ratios**
- **Easier to integrate with enterprise systems**
- **Better self-diagnostic capabilities**
- **More modular and built on open platforms**
- **More sophisticated HMIs**
- **Less dependent on specialized hardware**
- **Improved networking and interconnectivity**
- **Stronger cyber security**
- **Improve operational performance and decision making**
- **Able to integrate more thoroughly with safety systems**
- **Able to interface with smart field devices**
- **Network-IO (N-IO) offers both hardware-based flexibility and software-based configurability**

HOW MUCH MUST WE CHANGE?

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Once you have identified opportunities for improving your DCS capabilities, it is now time to choose an approach in getting there. Consider the following options:

OPTION #1: RIP & REPLACE

Companies facing serious system failures have little choice but to replace their DCS. When simply keeping the plant running is a struggle, it's time for migration.

OPTION #2: STEPWISE MIGRATION

For less drastic situations, there are two basic approaches:

- **1ST APPROACH: Start in the control room and begin by improving the HMI**
  Primarily driven by functional improvements—we want better visibility for running the process, and more connectivity to integrate with other plant systems.
- **2ND APPROACH: Start with the controllers.**
  Primarily driven by reliability considerations—our controllers are failing too frequently and interrupting production

OPTION #3: I/O

The I/O is somewhere in the middle and may be part of either approach. The existing I/O may be compatible with the new controllers and not require replacement, or the migration may entail replacement of the I/O.

In either case, the actual field instruments are usually left in place unless they are also quite old and subject to frequent failures. Field wiring from the I/O to the field devices also typically stays unless it is in very bad shape. Replacing wiring in an existing plant is hugely expensive.

CHAPTER 03

CRITICAL MIGRATION CHOICES
FIRST STEPS

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FORMING AN INTERNAL TEAM

Arguably the most important people to include are the operators. They will work with the new system more than anybody else. They also know the most about the existing system including its strengths and weaknesses. Other areas engage with the system at various levels and should certainly participate. Some functional areas not listed above are tangential and may not need a member on the team, but should offer suggestions and follow the progress. Ultimately the new solution should reflect the needs of as many stakeholders as possible.

OPERATORS/OPERATIONS

Responsible for the operation of the facilities in the control room and to identify and communicate issues with other members of the team to ensure maximum production quantity and quality

MAINTENANCE

Perform scheduled and unscheduled maintenance on control room equipment as directed by the lead engineer

PLANT MANAGMENT/ CAPITAL BUDGET

Capital budget, safe plant operations, meet production goals, meet regulatory requirements, retain knowledge and expertise as the baby boomers retire, struggle to do more with less

ENGINEERING

Plant turn-arounds, engineering costs, process design, control strategies, system architecture, goals, improve staff productivity, standard operating procedures

The first step of a DCS migration is forming an internal team to oversee the effort. Teams are good because they ensure viewpoints from different areas are heard, create a natural mechanism to spread out the work, and create widespread buy-in for the new system.

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DEFINING SCOPE & CHOOSING A VENDOR/PARTNER

Once a project has been launched and the team formed, the direction turns more specific and technical. Two things happen early in the process, and they should overlap somewhat because they influence each other:

- Defining the project's scope and specifics
- Choosing a vendor/partner

Start with the scope because it will influence vendor selection, but the vendor will also influence the scope. Vendors will approach the project in the different ways. Some will provide extensive assistance with implementation, while others may simply deliver the hardware and software and expect others to do the site work. This results in very different project experiences, so consider the pros and cons of each.

Few companies choose a 100% DIY path for a control system. It might be possible for a small unit, but a plant of any size will need to partner with a DCS vendor, typically making a selection from a list of several candidates. Since the lifespan of most major control systems is measured in decades, the choice of a partner is an important decision.

Going back 20 or 30 years, there were more system choices, and the differences between vendors were more pronounced. Since then, several older platforms were absorbed into larger product lines and then phased out by new vendor owners. In those cases, the vendor will guide users to consider newer platforms.

Several companies still operating under their original name have also phased out their old platforms. Once MS Windows-based systems emerged in the 1990s, architectures changed significantly from the older proprietary systems, even within a given system vendor. Consequently, there is sometimes little reason to remain with the same vendor company.

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CONSIDER A MAIN AUTOMATION CONTRACTOR

DO IT YOURSELF OR PARTNER UP?

The ability to deliver the full scope of project execution in industrial automation projects is more important than ever. However, companies are increasingly constrained by personnel issues, budgets, and shrinking timetables. Companies are also faced with the task of executing multiple projects simultaneously in disparate geographic regions.

The Main Automation Contractor (MAC) owns responsibility over the entire automation related aspects of the project. Many of the world's leading end users are applying the MAC approach to their entire capital project. The MAC approach can result in project cost savings up to 30% against a traditional approach.

BENEFITS OF THE MAC APPROACH

Reduced project risk	**Reduced customer management load**
Total project management	**Single point of responsibility and single window**
Commitment to the customer on a corporate level	**Reduce customer oversight management during execution**
Automation standardization for multi-projects	**Design of automation standards**
Shortened delivery times	**Cost savings by dealing with vendor directly**
Entire automation design and engineering	**Global engineering locations and resources**
	More efficient and consistent engineering using a global engineering resource pool

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IDENTIFYING A VENDOR: NARROWING THE FIELD

In most situations, by asking a set of basic questions, it is relatively easy to split off at least half of the possible candidates and narrow the range down to two or three candidates, like the finalists in a beauty pageant.

The checklist on the right provides practical guidance for your evaluation process.

The last question might be the hardest to answer, but most vendors will say, "yes" based on experience. "System X has been used successfully in these applications and users are very happy with its capabilities, so it can certainly run your plant." Such an answer may be correct and relevant provided the vendor can cite examples meaningful to your company, and provided plant personnel check out references in detail via phone calls, or even plant visits if possible. There is no benefit in being your vendor's first venture into a new industry.

FUTURE PROOF

A helpful approach is to allow customers to "progressively upgrade in place" and not force a rip and replace. This allows for smoother upgrades without forcing an intra-system "migration." Customers can easily incorporate the latest operating technology into their system and reap the efficiency gains of a modern control system (which is part of their critical business infrastructure).

EVALUATION CHECKLIST

- ☑ **Specify process control requirements:** What does your plant do, and what basic control capabilities are necessary to keep it operating effectively.
- ☑ **Specify HMI requirements:** Is a drive to have high-performance HMIs on the list? Walk around control?
- ☑ **Specify performance capabilities:** What availability rate do you expect from the system?
- ☑ **Specify platform capabilities:** How easy is it to add specific functions such as APC strategies? How easy is it to scale up to a larger process unit?
- ☑ **Evaluate the installed base in your specific industry:** How many plants like yours are using this platform? Consider the specific manufacturing process along with size.
- ☑ **Evaluate compatibility with the parts of your system that will remain in place:** Few migrations are total, so will the elements retained integrate easily with the new DCS?
- ☑ **Evaluate compatibility with your intellectual property and control strategy:** How easy will it be to transfer the intellectual property contained in your control code?
- ☑ **Consider accumulated experience of plant personnel:** Do you have people in your plant with experience on a given platform from elsewhere?
- ☑ **Is your system Future Proofed? Does the system have a proven track record and plan that allows it to be upgraded in place with mixed components?** (i.e. does it provide progressive compatibility that allows you to just upgrade the components you need without your entire system and production?)
- ☑ **Can the system do what you need for your process?** Is it possible to know for certain?

EVOLUTION OF YOKOGAWA CONTROL SYSTEMS

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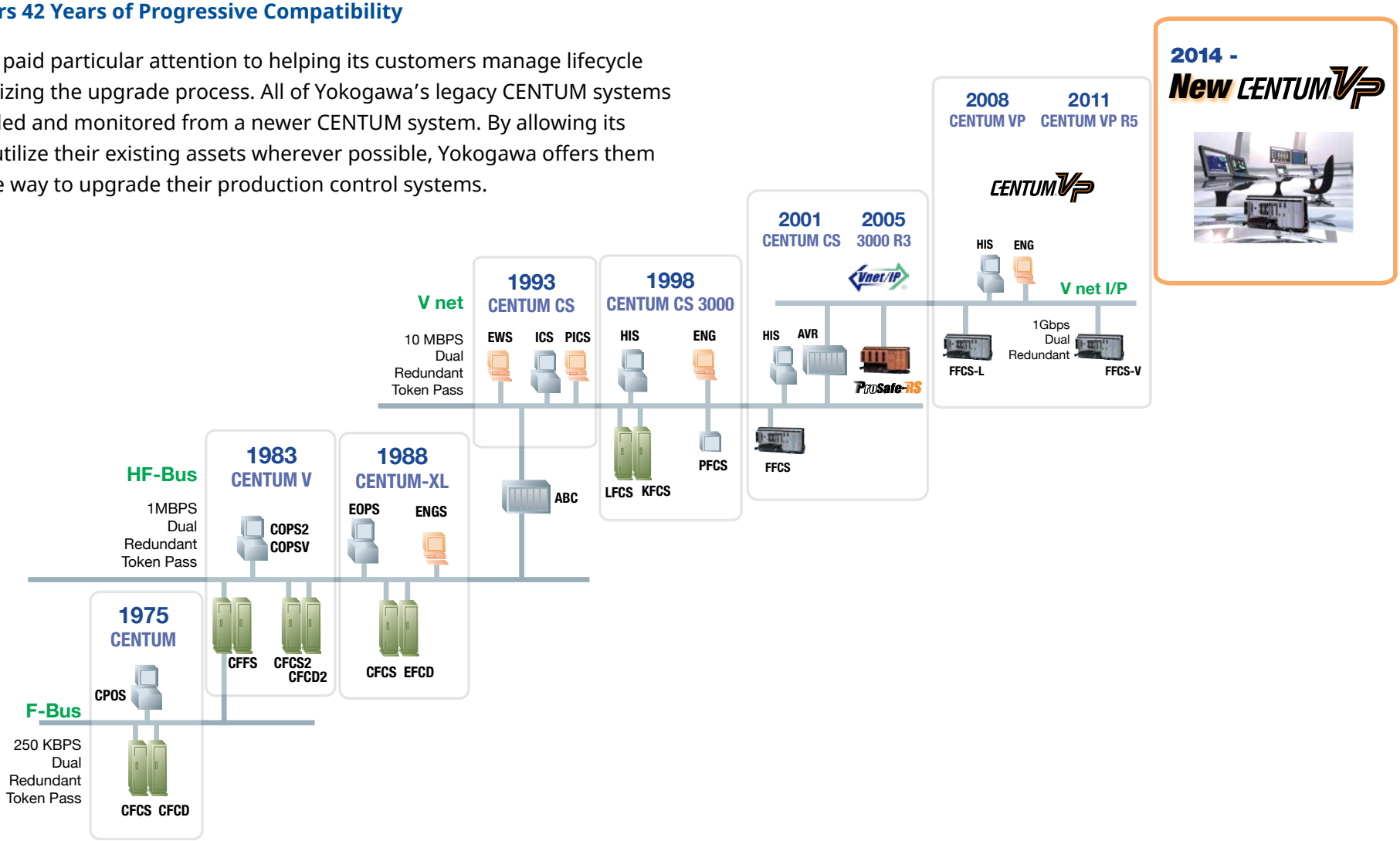
CENTUM Offers 42 Years of Progressive Compatibility

Yokogawa has paid particular attention to helping its customers manage lifecycle costs by optimizing the upgrade process. All of Yokogawa's legacy CENTUM systems can be controlled and monitored from a newer CENTUM system. By allowing its customers to utilize their existing assets wherever possible, Yokogawa offers them a cost-effective way to upgrade their production control systems.



CHAPTER 04

CRITICAL MIGRATION CHOICES
HOW CAN OUR SYSTEM BE BETTER

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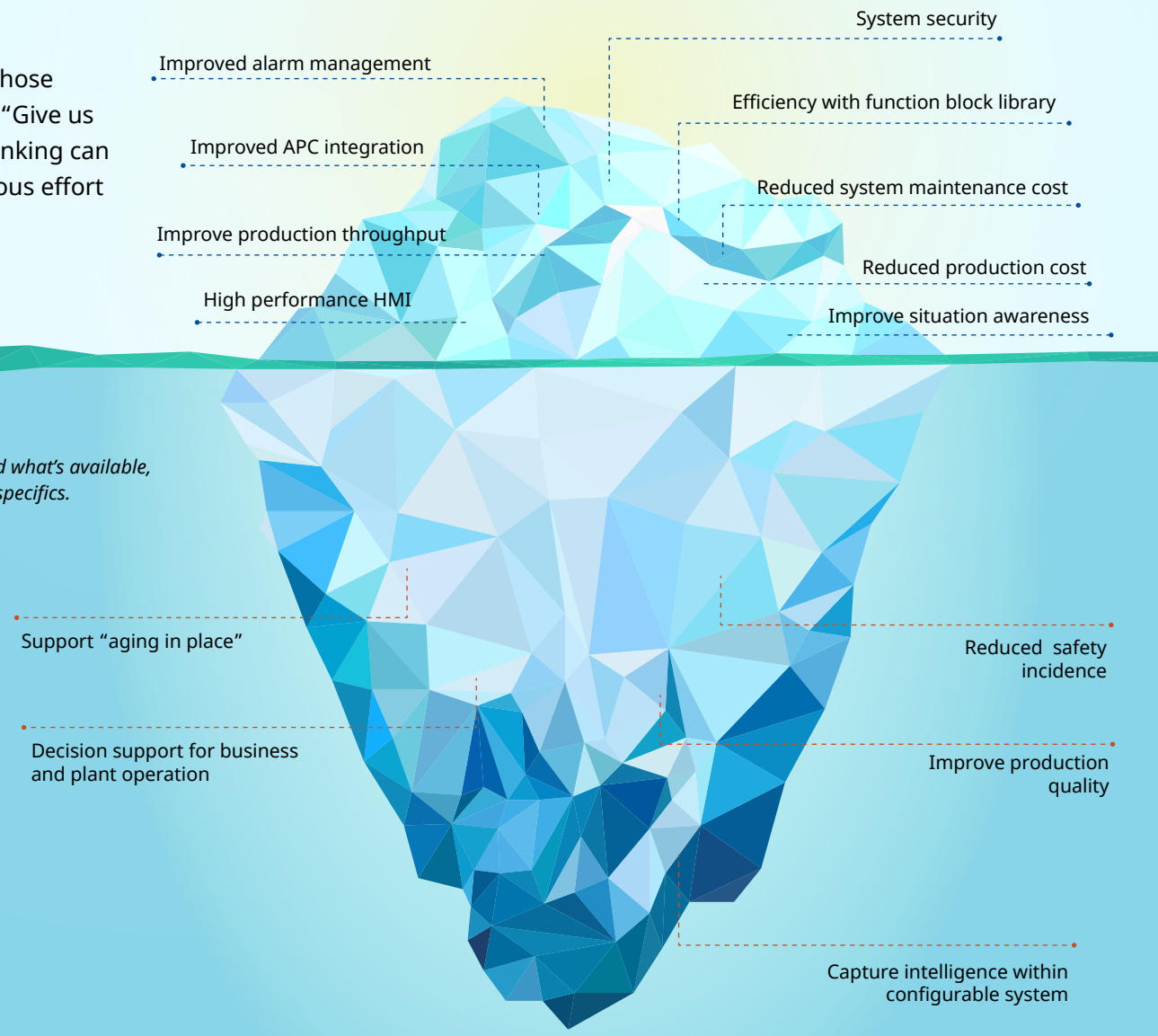
UNDERSTANDING THE POSSIBILITIES

When a company running an old DCS considers something new, the team is often left struggling to get a sense of what's available with current technologies. If you haven't looked at cell phones since 1995, you'll be hard pressed to imagine what they can do now.

Certainly the new system must do what the old one did, but beyond those functions, it's difficult to project. Some companies simply stop there: "Give us the same thing, but on a newer and more reliable platform." Such thinking can turn into a huge lost opportunity if the company doesn't make a serious effort to embrace all the available improvements.

OBVIOUS VS. HIDDEN BENEFITS OF MIGRATING TO A NEW DCS



It is important to do the homework of determining what you might want and what's available, as this will make for better discussions with vendors as you start to get into specifics.

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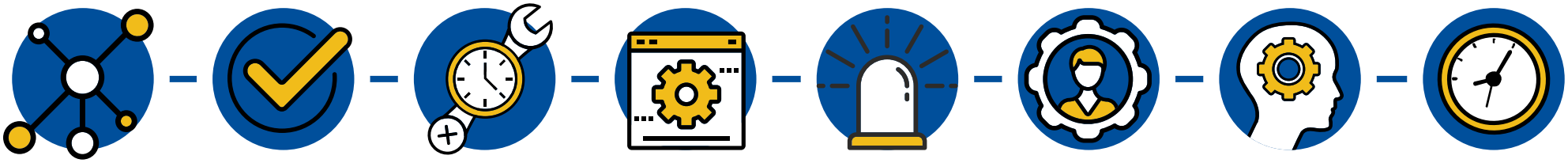
SPECIFYING STRATEGIC OPERATIONAL CAPABILITIES

Part of defining the scope is specifying what you want from your new system and discussing specific points with your short list of vendors. Here are some general ideas worth exploring:



1. **More sophisticated networking capabilities:** These extend connectivity to enterprise-level systems, but also permit implementation of modern technologies such as remote access, walk-around control and wireless field devices.

2. **Greater reliability:** Today's platforms are generally more stable and reliable than older systems, some particularly so.

3. **More sophisticated control strategies:** Many tools are available to help improve control performance, such as loop diagnostics and process optimization.

4. **Improved APC:** Extending beyond traditional regulatory control allows for new techniques tuned to specific manufacturing processes.

5. **Alarm rationalization and management:** More thorough alarm rationalization and analysis can make life easier for operators and help avoid alarm floods, nuisance trips and downtime.

6. **Improved HMIs:** Better strategies built around the ways operators do their jobs improve situational awareness, while better graphics avoid fatigue during long shifts.

7. **Modular procedural automation:** Automating steps for procedures help capture operator knowledge and implement best practices to avoid incidents during transition times.

8. **Future Proof:** DCS migrations or upgrades can be costly and time consuming. Consider how future upgrades can or will take place. Consider platforms that will allow you to update at your own pace, without system shutdowns, and will support mixing node releases.

SPECIFYING CAPABILITIES: SAFE NETWORKING

A DCS designed decades ago had one purpose: control the process. It did its job in isolation. However, as enterprise-level management demanded more detailed production data, connections were made to upper level systems to transfer information back and forth. Naturally, these communication demands put stress on the networks, and sometimes created paths for cyber attacks. Overnight, security became a major concern.

A DCS today has the required secure connectivity built in to make it part of a much larger company ecosystem integrated with historians, asset management platforms, ERP systems and others. Even real-time remote access is now commonplace through the Internet. Every option might not appeal to every user, but having such capabilities from the outset is better than trying to add it later.

SPECIFYING CAPABILITIES: SAFE NETWORKING

VULNERABLE EQUIPMENT

The continuous evolution of the control system enables organizations to protect the investment in equipment and control strategies over long periods of time. However, interfacing decades-old controllers with current technology also makes this equipment indirectly vulnerable to attack.

Old control systems may experience gaps in support, which makes them more vulnerable than contemporary systems.

HOW DOES THIS AFFECT SECURITY?

Remaining secure requires the installation of a continuous flow of new security patches, which contain software fixes for vulnerabilities.

Vendors of operating systems have a limited support window for security fixes; once the product is no longer sold, the support is generally limited to a three-to-five-year period. After this period, no more security patches will become available, resulting in a rapid degradation of the product's security.

Software that protects the process control system, such as anti-virus and whitelisting applications, also has support limitations pertaining to legacy platforms. Therefore, legacy systems can suffer from the unavailability of security patches as well as the unavailability of security protection software.

SPECIFYING CAPABILITIES: RELIABILITY

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A DCS platform has to run reliably, without interruption, 24/7/365 for years at a time. If the DCS hiccups, the process can shut down, piling up costs made worse by lost revenue. Through use of sophisticated code writing combined with strategic redundancies, leading DCS vendors have built exceptionally stable systems capable of seven nines reliability, with 99.99999% uptime.

THE VALUE OF SEVEN 9s SYSTEM AVAILABILITY

	ESTIMATED YEARLY DOWNTIME (1 FCS)	**ESTIMATED YEARLY DOWNTIME** (10 FCS)	**ESTIMATED COST DAMAGE** (10 FCS)	**MTBF** (10 FCS)	**FAILURE COUNT 12 YR**	**SYSTEM SHUTDOWN COST 12 YR**	**COST DAMAGE 12 YR**
SEVEN-9 (99.99999%)	3 Sec	31 Sec	$2.5 **Thousand**	450 years	Negligible	Negligible	Negligible
FOUR-9 (99.99%)	0.86 hrs	8.6 hrs	$2.5 **Million**	0.4 years	24	4 times	more than $85 Million

The seven nines reliability numbers have been verified in tests and actual system performance at installed plant sites, and their value is illustrated in this chart.

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SPECIFYING CAPABILITIES: RELIABILITY

Having a system that is reliably up and running is critical not only for production, but also for brand management, safety to employees, safeguarding the environment and protecting your overall investment (in terms of time, knowledge and equipment). Studies of industrial accidents show that one of the largest contributing factors to an incident is human error. Furthermore, these errors occur at a higher rate when the process is undergoing a transition or rare operating condition such as start-up, shutdown, or upset event with attempted recovery. This is why having a system with seven nines reliability is so important. A five-minute event that requires operator intervention creates an environment of higher risk. Choosing your risk tolerance and supporting that decision with a system that delivers reliability and quality service is critical to your operations.

BP American Refinery Explosion, Texas City, March 2005

"A disproportionate percentage of process safety incidents have occurred during transient operations, which include those conducted infrequently such as startups or shutdowns as well as abnormal or emergency events. A typical refining or petrochemical facility will spend less than 10% of its time in transient operations – yet 50% of process safety incidents occurred during these operations."

Chemical Processing Magazine, 2010

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SPECIFYING CAPABILITIES: CONTROL STRATEGIES AND APC

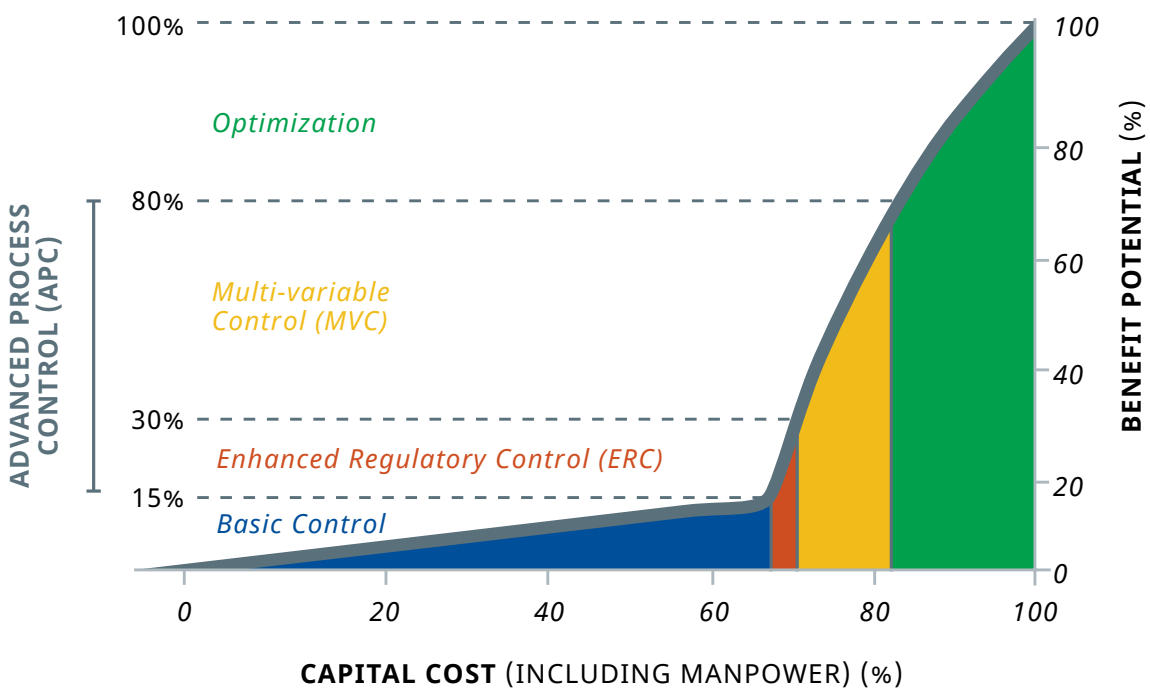
APC capabilities have been around for a long time and many sophisticated plants have used them to great advantage, even with the old control system platforms. But users had to work hard because designing APC systems required custom code writing, or bolting on an external solution. New control systems have many built-in tools available to support a variety of APC strategies without the need to write custom code, making implementation far simpler.

Some of these process optimization approaches use "big data" concepts, performing deep statistical analysis on historical process data, looking for correlations to support improvements. The networking capability of today's systems makes this practical and even easy to perform using a variety of built-in tools.

In addition to fast ROI, advanced systems provide many advantages for the process units, such as:

- Improved process yields
- Increased throughput
- Reduced energy consumption
- Improved process stability

Typical APC Implementation Schedule



Multi-Variable Control (MVC) is the key component of an APC system, that enables optimum process stabilization, resulting in increased productivity. MVC achieves this by predictive control using process dynamic models, which is proving to increase throughput, save energy, and reduce quality giveaway.

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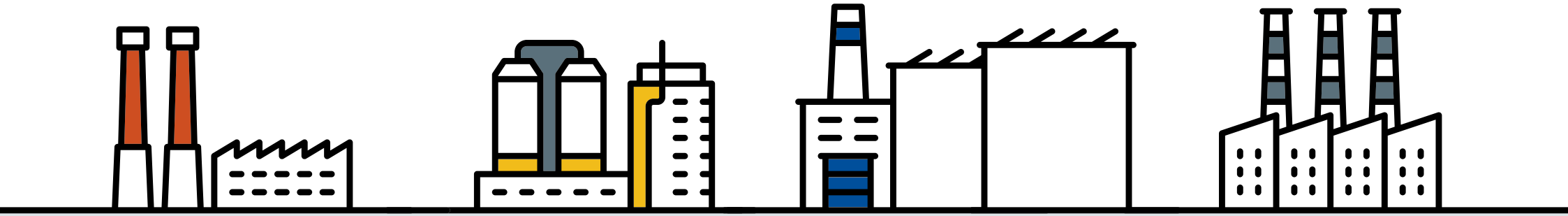
SPECIFYING CAPABILITIES: CONTROL STRATEGIES AND APC

APC RETURN ON INVESTMENT (BENEFITS/YEAR)



PETROCHEMICALS

Ethylene
2-4% increase in production

VCM
3-5% increased capacity / 1-4% yield improvement

Aromatics (50KBPD)
$3.4M-$5.3M

CHEMICALS

Ammonia
2-4% increased capacity / 2-5% less energy/ton

Polyolefin
2-5% increase production / up to 30% faster grade transition

OIL & GAS INDUSTRIAL UTILITIES

Upstream
1-5% increase in production

Cogeneration/Power systems
2-5% decrease in operating costs

PULPING

Bleaching
10-20% reduction in chemical usage

Thermo Mechanical Pulping
$1M-$2M

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SPECIFYING CAPABILITIES: ALARM MANAGEMENT

A migration project is also a good time to perform a thorough alarm management analysis. Plant operators are often faced with a high number of alarms and abnormal situations. They are therefore unable to respond quickly enough to prevent safety related incidents, environmental issues, shutdowns and equipment damage. In addition, a poorly applied alarm management philosophy may result in excessive alarms that can cause operators to routinely ignore these alarms due to the information overload.

Current DCS platforms have sophisticated alarm-processing capabilities, but this does not reduce the importance of performing a thorough hazard analysis and alarm rationalization project. This part of the process depends on human analysis to create a system capable of protecting the plant while avoiding nuisance alarms and floods, and potentially devastating incidents and outages.

ALARM MANAGEMENT BENEFITS

OVERALL REDUCTION IN:

- alarms, workload,
- operator uncertainty,
- operator errors, operator response time

SUPPORTS A STRUCTURED APPROACH TO ALARM MANAGEMENT THROUGH

- Integrated management of change and rationalization process
- Tighter control of approval workflows
- Enterprise deployment and access

ENHANCES OPERATOR RESPONSE THROUGH

- Identifying nuisance alarms
- Sequence of events aids decision making

PROVIDES A MECHANISM FOR CHANGE CONTROL

- No more unaudited setpoint changes
- Suppressed and disabled alarms are reported
- Automated notification to relevant stakeholders

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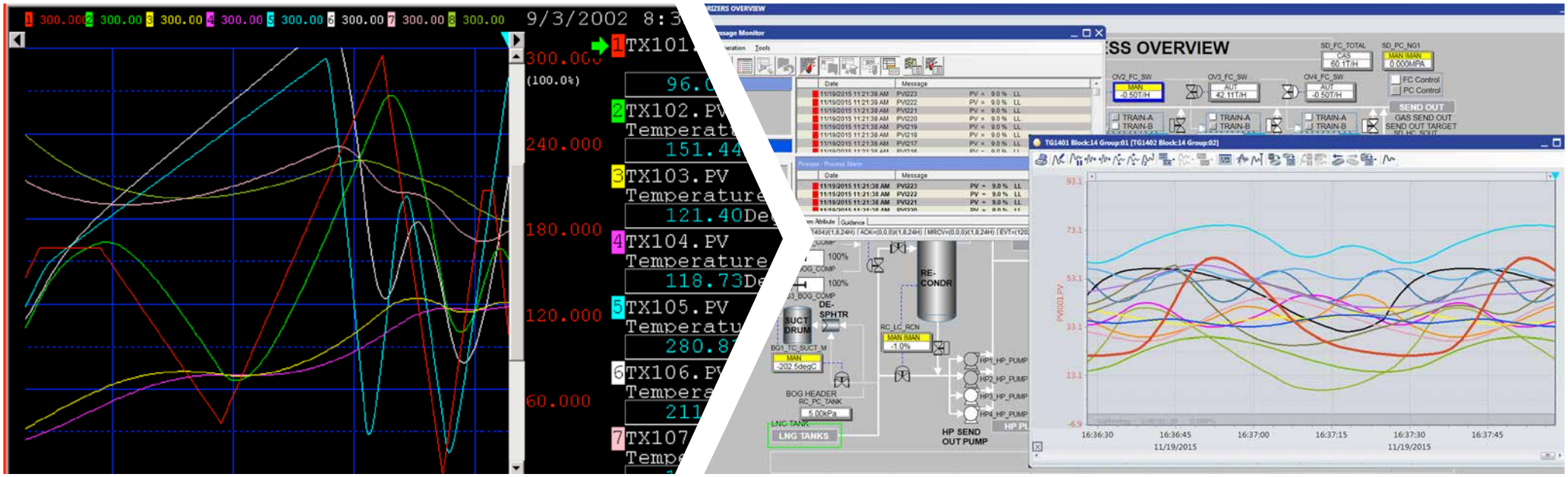
SPECIFYING CAPABILITIES: IMPROVED HMIs

Studies exploring how operators do their jobs and interact with HMIs proved that early HMI design techniques lead to operator fatigue and operator confusion during process upsets. The result of these studies has been an improvement in situational awareness, allowing operators to understand what's happening in the process more quickly and accurately, and showing them how to react.

Implementing high-performance HMIs is not an automated process. Studying how operators work and designing the graphics and screens to support them is a significant undertaking. There are advantages to doing it during the migration project, but it can be done later on provided the new platform has the required basic capabilities.

Old HMI vs New HMI



With old DCS platforms, the basic approach to an HMI was drawing a PID and inserting process variables around the screens with a heavy use of colored text, lines, and objects on a black background.

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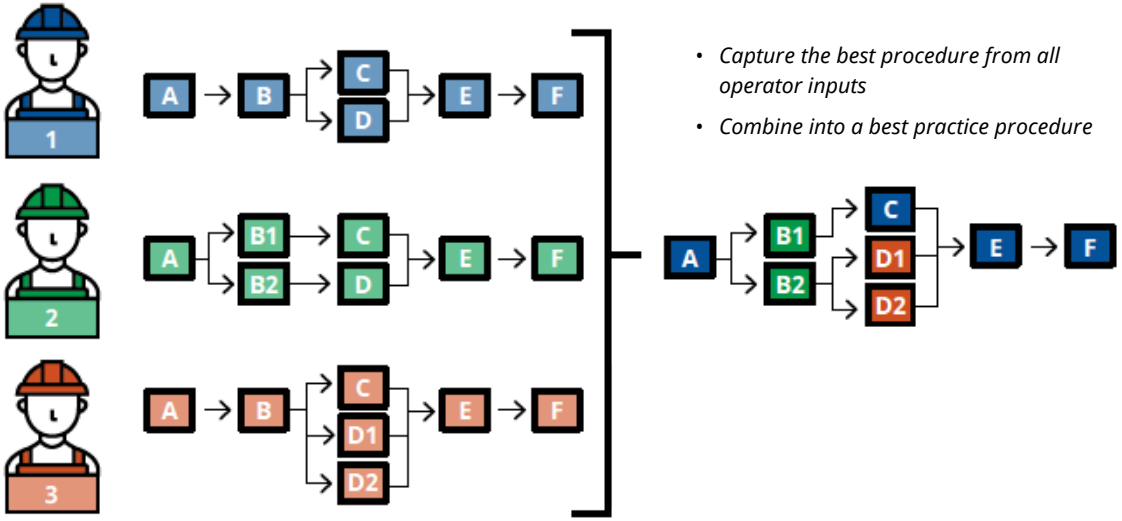
SPECIFYING CAPABILITIES: MODULAR PROCEDURAL AUTOMATION

Modular procedural automation (MPA) is a method to deal with changes in the workforce, and to improve operations in general.

As baby-boomer workers retire and are replaced by inexperienced millennials, tribal knowledge is being lost. Companies realize this most clearly during start ups, shutdowns or when making major process changes. These abnormal situations don't happen frequently, and they depend on the ability of experienced operators to carry them off correctly. When executing these abnormal procedures, plants are at their most vulnerable.

MPA provides a mechanism to capture tribal knowledge and bake it into the automation. The procedure used by the most skilled operators can be documented and written into the automated process, so when it is time to start up the plant or perform some other abnormal operation, it's as if the best operator is there at the controls, and it's done the same way every time. MPC implementation isn't practical on many older DCS platforms.

The remaining skilled operators can also run larger sections of the plant because the greater sophistication possible with a new DCS expands a given individual's span of control. One person can watch and control more loops and units because the control system does more of the work, and because of other DCS improvements such as automated process optimization.

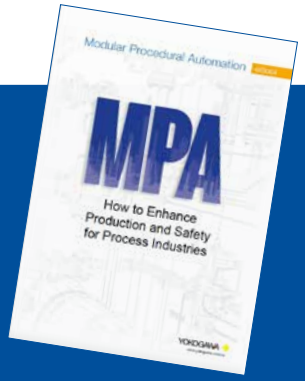


- *Capture the best procedure from all operator inputs*
- *Combine into a best practice procedure*

FREE YOKOGAWA EBOOK!

MODULAR PROCEDURAL AUTOMATION EBOOK

Download this eBook and learn how to enhance production and safety through modular procedural automation



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FUTURE PROOFING: PROTECT YOUR INVESTMENT

Equally as important as selecting a system is considering how to protect your investment. Intellectual property and know-how is stored in the DCS in how it is configured to run your process. You need a platform that can be updated over time, allowing you to take advantage of new technology and other benefits like improved safety and efficient operations. You should also look for a system that allows you to update at your own pace and fully supports mixing node releases in a single system without forcing a full update all at once.

For example, you may have a historian, advanced alarm management, safety management, operator training simulator, or other advanced solution nodes. When selecting a system, consider solutions that do not require you to upgrade all of these advanced nodes at once, but instead allow you to upgrade only your DCS system to a future version.

Known as "Future Proofing," this process provides a path forward without ripping out and replacing nodes and having to manually re-write code and re-configure the control strategies. Future proofing protects the customer's investment and allows them to better manage cost – no need to conduct a major capital project just to benefit from a few high value features. At the same time, the customer knows they have a path to the future and can always keep their system "fresh."

CHAPTER 05

MANAGING A MIGRATION

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COMPRESSING THE PROJECT SCHEDULE

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The traditional approach for a migration or other large automation project is to lay out the steps in a linear fashion on a timeline. When step two is finished, step three begins and when the last step is done, everything gets tested. This approach works, but it takes a long time and allows problems created early in the process to remain undiscovered until much later. With more aggressive project management, it is possible to break up the linear timeline and have multiple steps occur simultaneously. Steps two, three and four can overlap—with each part tested as it's completed.

The main benefit is having the plant back in full production with its new DCS sooner, so financial gains begin more quickly. This project management methodology is often referred to as Agile Project Management, and it is becoming a common element of migration projects.

FREE YOKOGAWA EBOOK

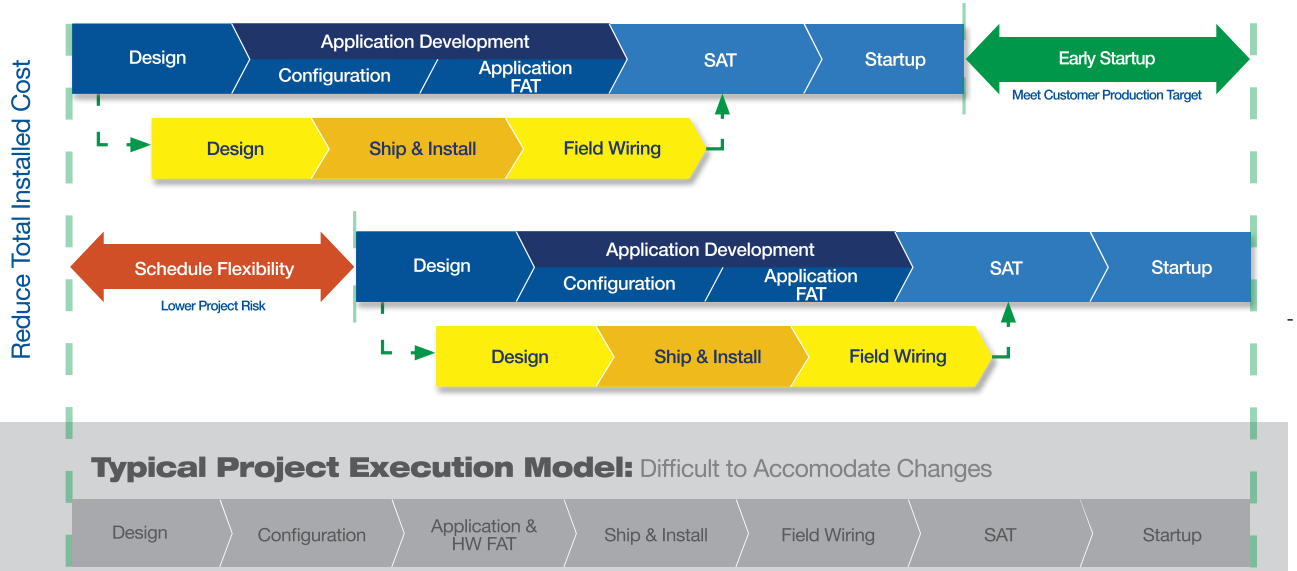
A new approach to Industrial Automation Project Execution Agile Project Execution

AGILE PROJECT EXECUTION EBOOK

Download this eBook and learn how to decrease industrial automation project times

Agile Project Execution:

The Future of Automation Engineering for Today's Customer



Such an approach shortens the timeline significantly, but it demands greater resources at critical times.

CHAPTER 06

REALIZING THE BENEFITS

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COMPANY-WIDE IMPROVEMENTS

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Improvements of the new DCS are not limited to the plant and control room. There will be many valuable but less obvious effects and benefits felt throughout the company. Use this worksheet to identify the places where you can find cost savings.

As uptime increases, schedulers can design more efficient production programs.
Cost Savings: _____

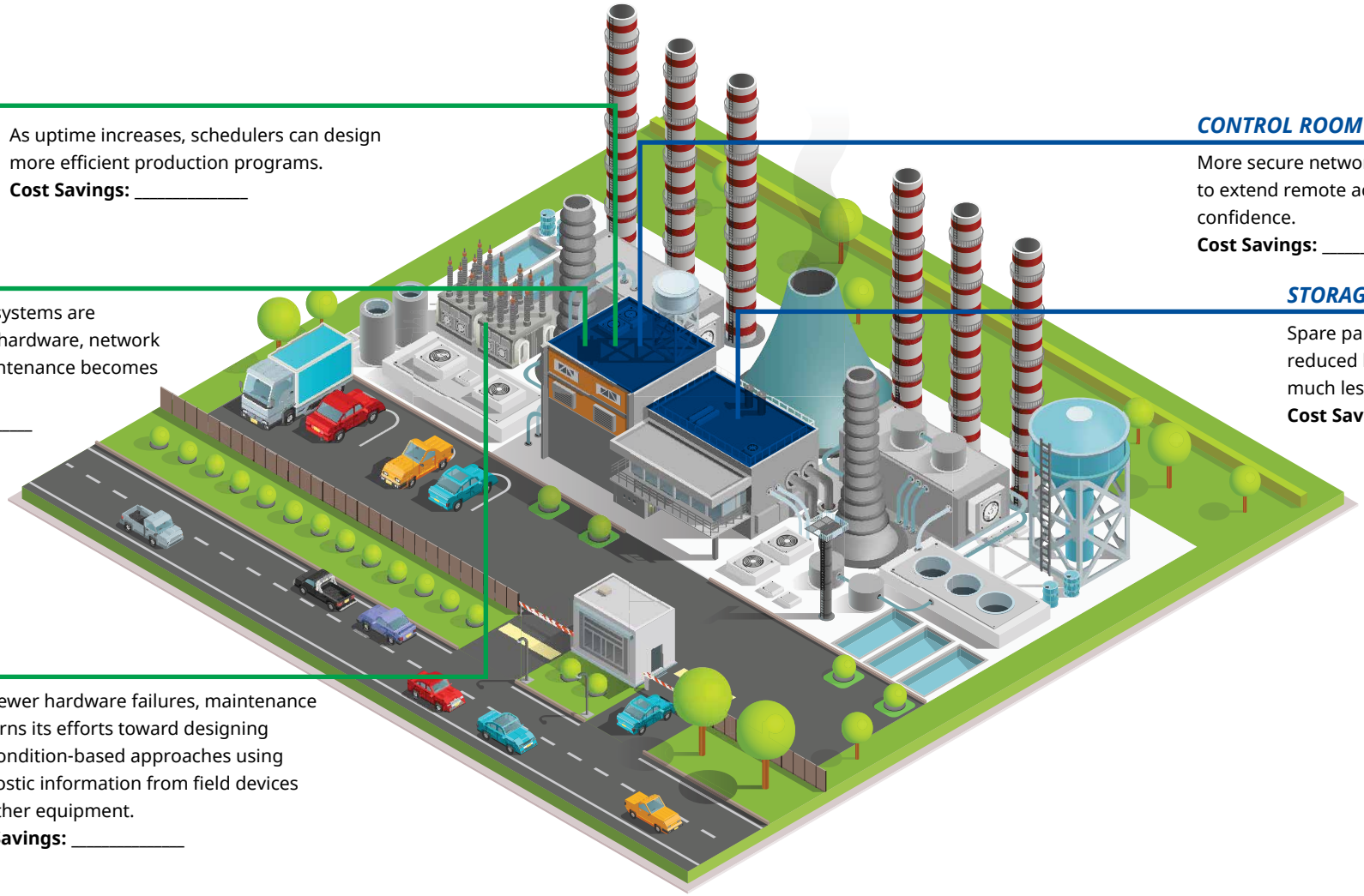
CONTROL ROOM

More secure networks allowing users to extend remote access with greater confidence.
Cost Savings: _____

As many old operating systems are eliminated with the old hardware, network and other software maintenance becomes far simpler.
Cost Savings: _____

STORAGE

Spare parts inventory can be reduced because failures are much less frequent.
Cost Savings: _____



With fewer hardware failures, maintenance can turns its efforts toward designing new condition-based approaches using diagnostic information from field devices and other equipment.
Cost Savings: _____

YOKOGAWA DCS MIGRATIONS

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Yokogawa's system design, project execution methodologies, and track record delivers the most reliable, lowest risk solution. Since introducing the world's first DCS in 1975, Yokogawa has helped thousands of migration projects, offering expert consulting and flexible services to meet unique customer requirements.

Yokogawa has a migration solution and methodology that can help you safely and efficiently move up from your existing process control system to our latest CENTUM series production control system that has Future-Proofing built into the design. This will help maximize operational excellence and give you a competitive edge over the entire lifecycle of your plant facilities.

Yokogawa's capabilities are well proven: Look no further than the thousands of brownfield projects where we have migrated third party systems to a Yokogawa process control solution.

WORKING WITH YOKOGAWA

Yokogawa works with you in the following ways to ensure a safe, cost-effective and value-added migration process:

- Assessing risk and advising on how to best address them
- Optimizing existing assets
- Maintaining quality
- Minimizing production loss
- Providing long-term support

WHY YOKOGAWA?

Owners of Honeywell systems can certainly stay with the company and select an appropriate migration strategy from those available. However, many of those users have chosen to move to Yokogawa for a variety of reasons. CENTUM and Yokogawa's methodology offer many ways to improve operational excellence while minimizing the cost of migrating to a new DCS platform. While users considering a migration project might get caught up in technical details, it is important to keep sight of the potential improvements possible with a newer and better DCS.

READ MORE - MIGRATION METHODOLOGY

GET MORE OUT YOUR DCS SYSTEM

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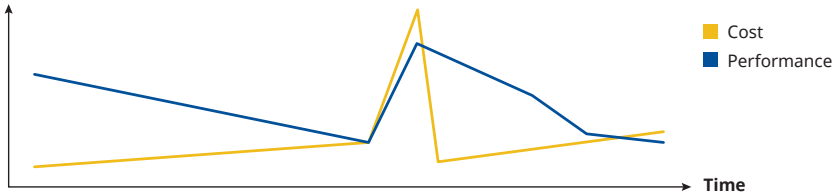
Is your DCS meeting your production, operational, and risk targets? Contact Yokogawa for a DCS Health Check and Migration assessment where we'll cover:

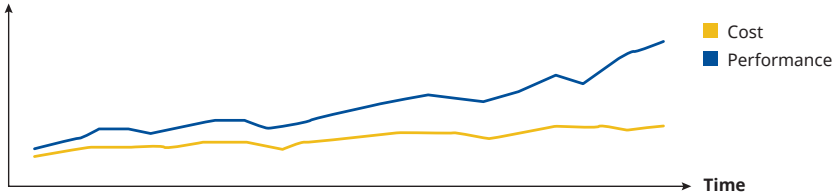
- DCS Release and Support within its Lifecycle
- Alarm Management Practice and Philosophy
- Alarm Rates
- Alarm: Operator Action Ratio
- OS Release and associated Security Risk
- Process Operator Graphic Design Performance Assessment
- Loop Mode and Manual Changes
- Procedure Use Assessment

REQUEST A DCS HEALTH CHECK AND MIGRATION ASSESMENT

Conventional Investment Pattern and System Performance



New Approach:
Progressive Compatibility and Lifecycle Performance Care Service



OTHER PUBLICATIONS

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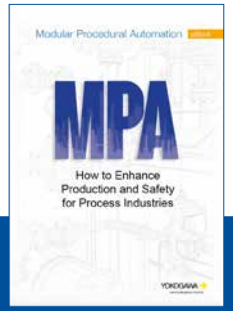
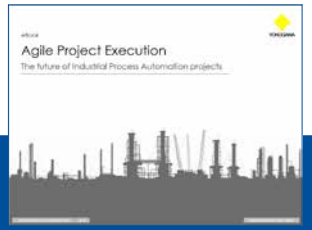


MODULAR PROCEDURAL AUTOMATION

Download this eBook and learn how to identify MPA opportunities at your plant.

DOWNLOAD



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Download this eBook and learn why conventional project execution no longer works.

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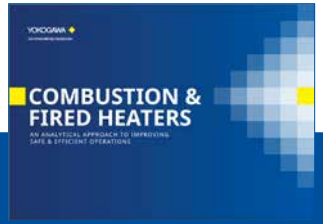

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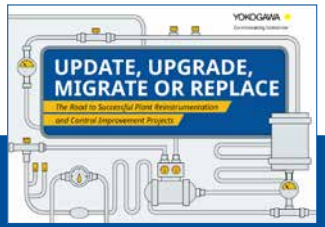

UPDATE, UPGRADE, MIGRATE OR REPLACE

Download this eBook and learn how to plan for and achieve a successful project.

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ABOUT YOKOGAWA

Yokogawa's global network of 114 companies spans 59 countries. Founded in 1915, the US $3.7 billion company conducts cutting-edge research and innovation. Yokogawa is engaged in the industrial automation and control (IA), test and measurement, and other business segments.

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