

A control solutions approach to minimizing risk and unplanned downtime

Proactively investing in training and services helps to fully leverage your control system and improve operations and maintenance (O&M) ROI.



Executive summary

Two significant shifts are reshaping the industrial sector. The first is a digital transformation driven by technological advances. The second is a changing of the guard from highly skilled Baby Boomers to a younger, less experienced workforce. Though each is distinct and with its own unique set of challenges, these evolutions are deeply intertwined.

The Industrial Internet of Things (IIoT) is at the heart of the current digital transformation. Networked sensors and intelligent devices are being attached to machinery and other assets throughout industrial facilities, collecting data to generate powerful predictive analytics on machine health and performance.

The emergence of unified control systems has elevated IIoT even further by funneling operational data from disparate sources into a single platform. Maintenance and operations teams can now gain a complete plant-wide view and generate powerful insights invisible to the naked eye.

Intelligent control systems are offering much-needed support for an industry that has recently struggled with talent

shortages. It's estimated that one in four multiskilled M&O professionals is currently eligible for retirement and 50% of the entire workforce will retire in the next five to 10 years. Essential insights generated via powerful control system technology can help bridge the skills and efficiency gap created by an aging workforce – but only if that technology is leveraged correctly.

When combined, these technological and personnel shifts equate to the single biggest disruption to industries in recent memory. For most, the changes are happening faster than teams can properly prepare for, or keep up with them. Outsourced training, support, and expertise customized to meet the needs and skills of multiple generations of workers can help teams make the most of emerging technologies, ultimately improving overall plant maintenance and ROI and providing best-in-class operations. For leaders in the oil & gas, power generation and manufacturing industries willing to proactively prepare their teams and operations for both evolutions, the opportunities are endless.

Modern challenges to industrial manufacturing ROI

Despite incredible advances in technology and support resources, many industrial facilities are still operating with an outdated maintenance and operations mindset. Teams that continue to rely on disparate maintenance approaches such as time-based servicing and multiple disconnected control platforms are inefficient at best. Managing a facility “blind” or using a preventative maintenance approach without the benefit of a unified plant-wide view of operations can lead to key maintenance shortcomings such as:

- Under or over-servicing key assets
- Equipment failure
- Environmental hazards
- Personnel safety risks

Operations and maintenance teams are also struggling to boost productivity in the face of a talent shortage. According to Energy API, “One out of four current engineers, geoscientists, multi-skilled maintenance professionals, process and

production operators, and health and safety professionals is currently eligible for retirement.”¹ These highly experienced professionals will be replaced by younger workers who are digitally-savvy but undertrained and under-skilled.

While this presents a remarkable opportunity for job growth in the industry, it is offset by a very real skills and efficiency gap. According to PwC’s Annual CEO Survey, 64 percent of oil & gas CEOs believe that there is a limited supply of talent with the right skills. 52 percent of the CEOs surveyed in this same survey were concerned that the availability of key talent was a potential business threat to their company’s growth prospects².

Technological advances are further compounding the challenges caused by workforce changes. Digitalization and cybersecurity threats require new training and specific skillsets at every level of the organization to properly leverage new technologies and workflows.

“It’s estimated that 23% of unplanned downtime is triggered by user error in the manufacturing sector, the highest of any industry.”

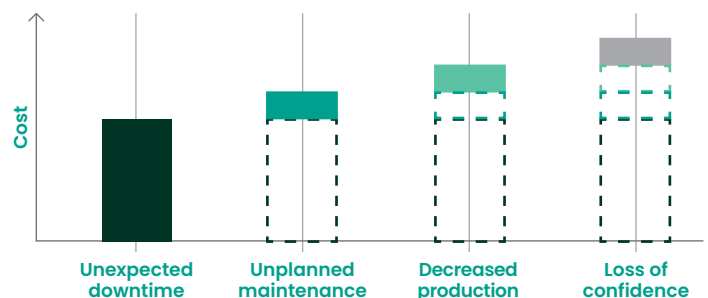
When reactive maintenance is combined with an undertrained workforce, unplanned downtime becomes a serious threat to operational ROI. The inability of teams to proactively prevent and, when needed, respond appropriately to emergencies can result in rapidly rising costs and decreased production. In fact, it’s estimated that 23% of unplanned downtime is triggered by user error in the manufacturing sector, the highest of any industry. And according to a recent ARC Advisory Group survey, companies have been losing between 3-5% of their production to unplanned downtime.

The costs associated with an unprepared workforce can be significant

- **Unexpected downtime** – \$260,000 per hour on average
- **Unplanned maintenance** – 2-5 times more than planned maintenance
- **Decreased production** – 3-5% lost to unplanned downtime

- **Loss of confidence** – 52% of O&G CEOs concerned key talent shortage threatens company’s growth

Since the right technology combined with a properly trained workforce directly correlates with productivity improvements, those who resist change risk losing competitive advantage against peers who are investing in modernization.



¹ Energy API Website; <https://www.api.org/about/industry-careers>

² Womack, Stan; HartEnergy Blog; Citing PwC 14th Annual CEO Survey; <https://www.hartenergy.com/news/talent-retention-oil-and-gas-industry-92395>

³ Vanson Bourne global study, sponsored by ServiceMax from GE Digital; <https://www.businesswire.com/news/home/20171106006370/en/Human-Error-Common-Unplanned-Downtime-Manufacturing-Sector>

⁴ ARC Advisory Group; ARC WhitePaper: “Asset Performance Management Overcomes Challenges in the Oil & Gas Industry”; https://www.ge.com/digital/sites/default/files/download_assets/arc-asset-performance-management-in-oil-and-gas.pdf

⁵ Aberdeen research; <https://www.aberdeen.com/techpro-essentials/stat-of-the-week-the-rising-cost-of-downtime/>

⁶ Womack, Stan; HartEnergy Blog; Citing PwC 14th Annual CEO Survey; <https://www.hartenergy.com/news/talent-retention-oil-and-gas-industry-92395>

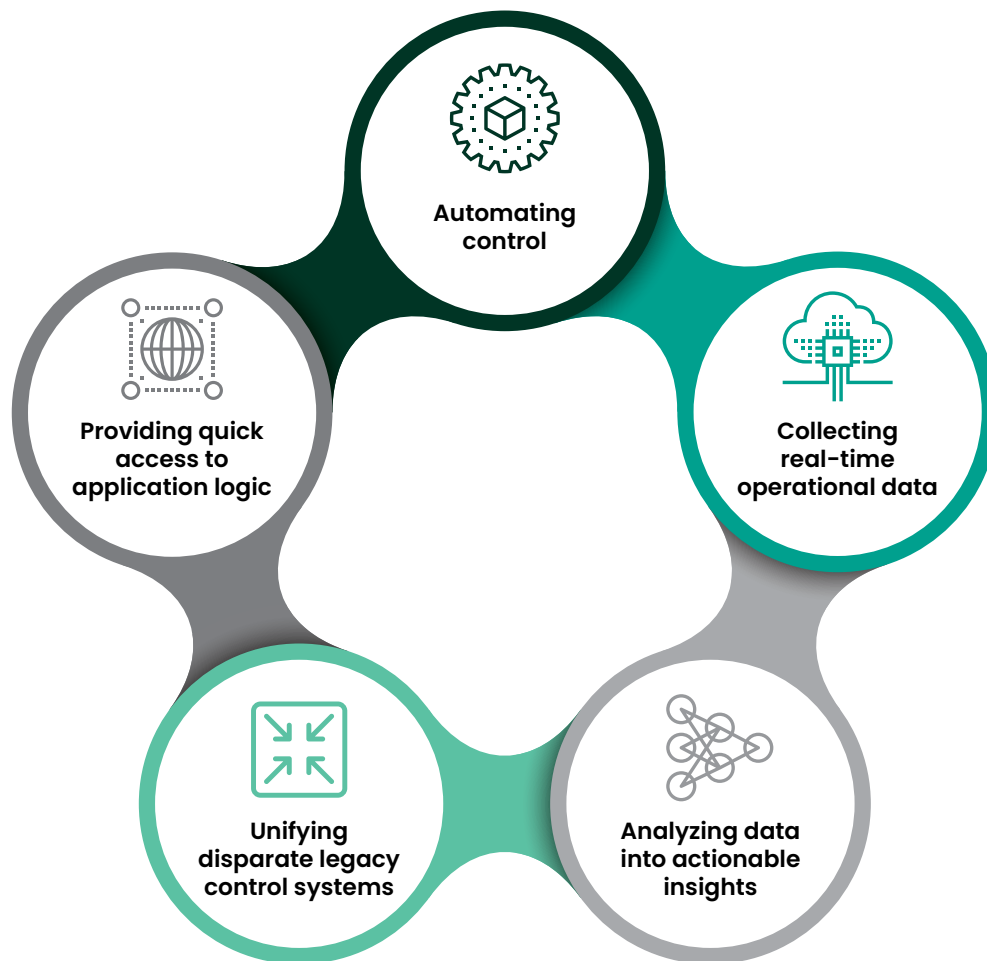
⁷ Research conducted by HayGroup; https://www.rigzone.com/news/oil_gas/a/132581/engaged_oil_gas_employees_is_the_key_to_retaining_talent/?pgNum=1

Continuous data monitoring improves operational insight

One of the most significant innovations in industrial technology has been the introduction of intelligent, automated controls. Next generation Distributed Control Systems (DCS) can help to minimize downtime and mitigate risks by providing overarching control, proactive protection, objective visibility and intelligent insight into business operations.

A powerful control system platform offers a single panel of clarity into operations by:

- Automating control
- Collecting real-time operational data
- Analyzing data into actionable insights
- Unifying disparate legacy control systems
- Providing quick access to application logic



The unified software environment offers the ability to quickly and precisely make online changes to the application system logic that controls the plant's operations. This capability allows operations teams to dynamically optimize production in real-time. It can also reduce the amount of time necessary to correct a potentially costly breakdown without having to rely on the manufacturer. In the case of unplanned downtime, the ability to make critical, data-driven decisions enables accuracy and speed in returning to normal operations.

Expertise gained via initial and ongoing training can help teams fully leverage the diagnostic operational insights offered by their control system platform. Additional support including health and cybersecurity assessments, remote diagnostic services and parts and inventory management can help teams address key vulnerabilities, provide a predictable spend profile and bolster the potential of smart technology by proactively leveraging the deep expertise of external partners.

Getting started with a comprehensive control solution

Advances in the industrial sector are offering crystal clear visibility into operations at every level of the supply chain. Many of these capabilities are being enabled by the power of control solutions. Though powerful, an automated control system is only as effective as the team using it. The key to unlocking potential value is a team that is properly trained and supported via a comprehensive control solution.

Better trained employees are more productive employees

The companies poised to embrace Industry 4.0 are the ones espousing innovation and leading the way with a smarter, better trained workforce. In the oil & gas sector, approximately 25 percent of producers provide internal training and around 20 percent employ external resources for training, according to data from the Society of Petroleum Engineers⁹. These expenses serve as a wise investment to offset the significant cost to replace employees, which increases with the level of the employee. While 40 percent of employees with poor training leave their jobs within the first year, well-trained skilled employees tend to stay put longer⁹.

Furthermore, proper training better equips a workforce to minimize the occurrence of unplanned downtime by monitoring equipment performance and optimizing operational productivity on a control system platform. But when unplanned downtime does occur, an educated employee is able to think critically rather than reactively – thereby minimizing outage time, controlling costs, protecting the safety of the workplace and extending the life of key assets.

Most significantly, investing in employee training has been proven to improve overall operational ROI. Studies show, that “companies rated highly by employees for both engagement and enablement are five times more likely to exceed performance expectations than those merely engaged¹⁰.” In a landmark study conducted by the American Society for Training and Development (ASTD), they found an increase of \$680 in a firm’s training expenditures per employee generates, on average, a six-percentage point improvement in total shareholder return the following year¹¹.

What does a comprehensive control system solution look like?



Training and education



Phone support and emergency callout services



Remote diagnostics



Software patching and support



Parts and inventory management



A custom bundled solution to meet specific needs of your plant

⁹ RedVector, “How Oil and Gas Companies are Modernizing Employee Training”: <https://www.redvector.com/articles/online-training-2/how-oil-and-gas-companies-are-modernizing-employee-training/>

⁹ Go2HR, “Employee Training is Worth the Investment”: <https://www.go2hr.ca/training-development/employee-training-is-worth-the-investment>

¹⁰ Dupre, Robin; RigZone, “Engaged Oil, Gas Employees is the Key to Retaining Talent”: https://www.rigzone.com/news/oil_gas/a/132581/engaged_oil_gas_employees_is_the_key_to_retaining_talent/?pageNum=1

¹¹ Business Training Experts, “Profiting From Learning: Do Firms’ Investments in Education and Training Pay Off?”: <https://businesstrainingexperts.com/knowledge-center/training-roi/profitting-from-learning/>

The smart approach: leverage expertise and training from a trusted control solution partner

Outsourcing training and support services is the smart approach to help teams ladder up skills and expertise and fully unlock the potential of a control system platform. The right control solution partner can provide deep expertise and proven training methods to co-create a powerful custom strategy for optimizing ROI.

Key benefits of training and support services

- **Identify needs** – Health and cybersecurity assessment can help identify what training and other support might be needed
- **Improve focus** – Operational teams become unburdened by certain tasks such as inventory management or cybersecurity and can focus on other critical areas
- **Empower teams** – Maintenance teams are better equipped to think critically during unplanned downtime
- **Control costs** – Service packages reduce Total Cost of Ownership and provide a predictable spend profile
- **Proven expertise** – Access to ongoing training opportunities, emerging industry trends and knowledgeable instructors with proven and relevant experience
- **On-demand support** – Immediate and on-demand expert consulting during critical situations is a competitive advantage
- **Optimize control system** – Help keep your system up to date to extend its useful life, reduce downtime and vulnerabilities, maximize efficiency, and avoid costly system replacements



Choosing the right partner – one who treats you like a team member and not a ticket number – is the key to unlocking the potential of your people, your control system and, ultimately, the ROI of your operations.

There are many control solution “experts” out there so it’s important to do some research and find the right fit for your operations. Some characteristics to consider when choosing a partner include:

- Depth of industry knowledge and expertise
- Flexibility of training options
- Availability of additional services to create a truly comprehensive control solution
- Willingness to customize package to meet needs

Summary

Similar to the connected devices many consumers are now using in their homes (think light switches, appliances, thermostats and televisions that can be controlled remotely), the IIoT was created to improve the overall efficiency of operations. In the industrial sector, IIoT technology has the ability to transform linear supply chains into dynamic, interconnected supply networks that can be accessed from anywhere.

The number of industrial enterprises that are leveraging unified control systems to connect disparate IIoT devices is growing. On-premise adoption of control system platforms is expected to increase by 30% by 2023, according to Gartner's 2019 Magic Quadrant For Industrial IoT (IIoT) market report¹².

These future-focused companies have the opportunity to boost productivity and ROI while simultaneously reducing costs by streamlining operations.

Investing in a robust, high-level training and services solution can equip teams with the skills and support needed to bridge talent gaps, protect against key vulnerabilities and boost ROI. When individuals are provided with problem-solving skills, they become empowered to dynamically optimize production, proactively prevent operational emergencies and, when unplanned downtime does occur, minimize the repercussions of the event by responding critically; saving time, money and lives.

¹² Martin, Dylan; "Gartner's Magic Quadrant For Industrial IoT: The Top 16 Vendors In 2019"; 4 July 2019; <https://www.crn.com/slide-shows/internet-of-things/gartner-s-magic-quadrant-for-industrial-iiot-the-top-16-vendors-in-2019?itc=refresh>



Baker Hughes 