



Water/Wastewater Industry Division

Setting the Standard for Automation™

Calendar of WWID Events

Fri, May 17, 2019 **ISA112 SCADA Standards Meeting**
Full Day Meeting at ISA Spring Meeting
Hilton University Place Charlotte Hotel

May 18-20, 2019 **ISA Spring Leaders Meeting**
Hilton University Place Charlotte Hotel
Charlotte, North Carolina, USA

Aug 7-8, 2019 **2019 ISA Energy and Water Automation Conference**
Omni Championsgate Resort
Orlando, Florida USA

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Newsletter Winter 2019

Director's Welcome

Pavol Segedy, HDR Inc.



Welcome to our winter 2019 newsletter! A new year always brings many new challenges and opportunities. This year is no exception.

The year 2019 marks several changes for our division. The ISA has made some significant changes in the number and types of conferences it now runs. Please read in this newsletter about the new EWAC conference that the ISA recently announced for 2019.

I would like to thank Don Dickinson and the 2018 program committee for ending our ISA Water/Wastewater & Automatic Controls Symposium on a high note last year. We had 7 great years from 2012 to 2018. I look forward to seeing what the new conference format will bring for our members.

We continue to collaborate with AWWA, WEF and other organizations, on a number of projects. We are currently in the planning stages for some joint ISA-WEF webinars on various automation topics. We are also again planning a joint ISA-WEF automation session at WEFTEC this fall. Lastly, we are again pleased to be supporting WEF's 2019 LIFT Intelligent Water Systems Challenge!

Pavol Segedy, PE
WWID Director 2018-2019
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Newsletter Editor's Welcome

Graham Nasby, City of Guelph Water Services



Change is something that we all experience throughout our lives, and the ISA is no exception. In late-2018 the ISA decided to review several of its operating areas, and try some new programs for 2019.

Under the leadership of the ISA's new Executive Director Mary Ramsey, the ISA has decided to change the type of conferences/events it puts on each year. There is a desire to move away from smaller niche events, and embrace a new model that encourages multi-industry events that encourage more cross-industry collaboration.

Part of this is an all-new 2019 ISA Energy and Water Automation Conference. This is a direct replacement for our traditional ISA Water/Wastewater and Automatic Controls Symposium. The new event is designed to encourage cross-industry idea sharing between the water, electric power, and industrial water sectors. I encourage you to read more about it in the event announcement article in this newsletter.

As always, thank you for being involved with the WWID – the success of our division is truly a team effort.

Graham Nasby, P.Eng.
Newsletter Editor
graham.nasby@guelph.ca

ISA CONFERENCES

New 2019 ISA Energy and Water Automation Conference Announced by ISA

From March 2019 ISA news release

The ISA is pleased to announce the launch of a new flagship automation conference: The 2019 ISA Energy and Water Automation Conference (EWAC). It will be held on August 7-8, 2019 in Orlando, Florida, USA at the OMNI Championsgate Resort hotel.

As part of its new initiative to promote cross-industry collaboration, the ISA has launched this new conference as a replacement for the former ISA Water/Wastewater and Automatic Controls Symposium and the former ISA Power Industry Symposium.

The ISA Energy & Water Automation Conference, slated for 7-8 August 2019 at the Omni Championsgate Resort in Orlando Florida USA, will feature interactive sessions led by ISA's power generation, alternative energy, municipal water, and industrial water experts.

The conference program will feature technologies and best practices that apply to multiple infrastructure sectors. Today's challenges include leveraging data analytics in a meaningful way, navigating the new world of IIoT with safety and cybersecurity in mind, and applying the insights of recent Smart Cities Initiatives to improve operations. These challenges – and many promising best practices – are relevant for several industry sectors, and this unique event will bring people together to move everyone forward.

“Part of ISA's mission is to increase technical competency by connecting automation professionals, and this event is a perfect example of how that can benefit our industries,” said ISA Executive Director Mary Ramsey. *“Technology applications that are working in one sector can often translate to another, but users and solution providers have to engage in meaningful dialogue to find those synergies. ISA can be a*

venue for those discussions in multiple ways, from standards development to content creation to in-person events.”

ISA's Water Wastewater Industries Division (WWID) will bring expertise and content focused on effective utility management, water/wastewater operations and maintenance, IT/OT coordination, engineering best practices, integration / programming, SCADA, PLCs, instrumentation, cybersecurity, and asset management related to the treatment and distribution of water and the collection and treatment of wastewater.

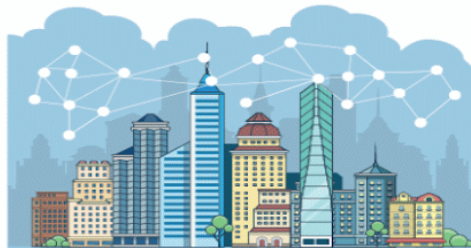
ISA's Power Industries Division (POWID) plans to host sessions covering automation and control solutions for oil and gas exploration, processing, and refining with a focus on power generation methodologies, including harnessing wind and solar energy.

Many industries rely on sourcing, transporting, handling, recycling, and disposing industrial water as a core element of their power generation strategies. Infrastructure that supports both power and water are also at the heart of the "Smart Cities" initiatives. Automated solutions offer promising results for safety and efficiency, but every connected device is also a potential cybersecurity vulnerability, so a comprehensive risk mitigation strategy is imperative for companies and facilities.

“We're excited to offer attendees a meaningful and comprehensive technical program that brings expertise from multiple industries to bear on today's most pressing challenges,” said ISA Energy & Water Automation Conference Chair Manoj Yegnaraman, Associate Vice President and Principal Instrumentation & Control Engineer at Carollo Engineers. *“This approach gives us an opportunity to identify and discuss new solutions from a holistic perspective, learning from each other and widening our professional networks.”*

For more information about the event, or to register, visit www.isa.org/ewac2019/

ABOUT | SPEAKERS | VENUE | **REGISTRATION**



EWAC



ISA Energy & Water Automation Conference

Conference: 7–8 August 2019 Training: 5–6 August 2019

Venue: OMNI Championsgate, Orlando, Florida



CALL FOR ABSTRACTS

Introducing the ISA Energy and Water Automation Conference!

Submit Abstracts by 1 April

This new hybrid event will provide an outstanding forum for discussions on challenges faced by the energy sector, and by municipal and industrial water/wastewater industries.

For the first time ever, ISA is combining its popular power and municipal water symposia into a single, two-day conference with additional content on industrial water applications.

A worldwide array of speakers and attendees alike will have the distinct opportunity to participate in expert discussions and networking activities to acquire the latest information in the energy and water industries. Abstracts are currently being accepted for consideration.

Who will benefit?

- Management
- IT/OT Professionals
- Operators/Instrument Technicians
- Maintenance Personnel
- Engineers/Integrators/Consultants
- Automation Suppliers/Service Providers
- Students



Proposed Topics

Automation Approaches: Case Studies & Common Solutions

- Control System Strategies
- Advanced Control Technologies—Protocols/Sensors/Remote Monitoring
- Project Management and System Integration Best Practices

Implementing Industrial Automation Standards

- Industrial Cybersecurity, Risk Assessment/Mitigation
- Alarm Management Philosophy & Rationalization
- Human Machine Interface & Operator Effectiveness
- SCADA Systems Design & Execution
- Other Industry Plant Safety Standards, Codes & Regulations

Innovative Technologies & Product Solutions

- Data Analytics & Work Order Reporting
- Instrumentation Application/Process Measurements
- Smart Cities Initiatives/Intelligent + Expert Systems
- Cybersecurity Strategies
- Renewables/Green Infrastructure

Imminent Industry Challenges

- Effective Plant Management
- Operational Efficiency
- People & Process Optimization

Additional relevant topics welcome for consideration

Important Deadlines

- Abstracts Due **1 April**
- Acceptance to Authors **1 May**
- Draft Presentations Due **1 June**
- Reviewer Comments to Author **15 June**
- Rights and Responsibilities Form **1 July**
- Speaker Registration **1 July**
- Final Presentations Due **1 July**

Submission Guidelines

- Abstracts should be 200 words or less and describe what the non-commercial presentation will cover.
- Slide presentation materials must be provided in electronic format (MS PowerPoint) prior to the conference for review and approval.
- A publication release form will be required.
- If your abstract is accepted and you agree to submit a presentation, you are also agreeing to register and present at the 2019 ISA Energy & Water Automation Conference.
- **Submit your abstract at <https://www.xcdsystem.com/ewac>**
- You will be notified via email that your abstract has been reviewed, accepted, or rejected by our technical committee.
- **Abstract due date is 1 April 2019.** Once accepted, a discount speaker registration fee is required in order to participate and present.

2019 ISA Energy and Water Automation Conference

Orlando, FL USA

Training: 5–6 August

Conference: 7–8 August

For details visit www.isa.org/ewac2019

Setting the Standard for Automation™



ISA-WEF COLLABORATION

ISA WWID supporting the 2019 LIFT Intelligent Water Systems Challenge

From February 2019 ISA news release

For the second year in a row, the International Society of Automation (ISA) – through its Water and Wastewater Industries Division (WWID) – is supporting an initiative designed to demonstrate the value of intelligent water systems, smart water technologies, and leveraging data for improved decision-making.

The 2019 LIFT Intelligent Water Systems Challenge is a competition that encourages students, professionals, and technology enthusiasts to develop innovative solutions, particularly those using advanced sensing and/or data technology, which can be applied to water and wastewater collection, treatment, and distribution.

The Challenge is a joint effort of The Water Research Foundation (WRF) and the Water Environment Federation (WEF). Serving as supporting organizations are: ISA, the American Water Works Association (AWWA), the Cleveland Water Alliance, the Water Council, the WaterTap Technology Acceleration Project, and the Smart Water Networks Forum (SWAN).

“We’re pleased to again welcome ISA, a technical association that works to advance the use of automation and technology in the water and wastewater treatment industry, as a supporting organization of the LIFT Intelligent Water Systems Challenge,” states Lisa McFadden, Director of Integrated Technical Programs and the Associate Director of the Water Science & Engineering Center at WEF. *“Last year’s Challenge prompted a lot of interest and ideas around intelligent water systems and we’re expecting great things this year as well.”*

The Challenge kicked off earlier this month and will run through 23 September 2019. Teams will have until 22 April 2019 to submit a Challenge Plan and until 2 August 2019 to submit a Challenge Solution. Judges will award a top prize of \$10,000. Recognition will also be given to innovative approaches and to outstanding contributions from students or young professionals. Get more details by visiting the Challenge website.

“ISA’s Water and Wastewater Industries Division is pleased to be a supporter of the 2019 LIFT Intelligent Water Systems Challenge, as it is a flagship program that brings out the best of what people and automation technology can do in the municipal water/wastewater sector,” emphasizes Graham Nasby, a long-time leader within ISA’s WWID and a widely recognized expert within the water/wastewater community. *“ISA is committed to helping professionals in the water and wastewater industries improve safety, efficiency, and operational performance through automated controls, instrumentation, and other advanced technologies.”*

Nasby says that for well over a decade ISA’s WWID has collaborated with WEF and other professional associations to conduct an annual symposium to showcase the value of

automatic control applications, sensors and instrumentation, supervisory control and data acquisition (SCADA), and engineering best practices to the treatment and distribution of water, and the collection and treatment of wastewater.

In 2019, ISA as part of its goals to serve the needs of municipal water/wastewater community, will be rolling out an all-new event, the ISA Energy and Water Automation Conference, which will be held 7-8 August 2019 at the Omni Championsgate Resort in Orlando, Florida, USA. The conference will combine ISA’s popular power and municipal water programs into a single, two-day gathering with additional content on industrial water applications. Topics of emphasis include data analytics, IIOT, Smart Cities Initiative, and cybersecurity.

“ISA has a strong history of supporting the needs of automation professionals in a wide variety of industries, including the municipal water/wastewater sector,” Nasby says. *“With its new ISA Energy and Water Automation Conference in 2019, ISA hopes to further advance its goals of creating a better world through automation, by encouraging the sharing of information and ideas between the electric power and water/wastewater sectors. I encourage you to find out more about this event as details are released in the coming months.”*

For more information on this compelling new event, visit the conference website. More details as well as online registration will be available soon.

More Information:

2019 LIFT Intelligent Water Systems Challenge
http://www.werf.org/lift/docs/IWS_Challenge/LIFT_IWS_Challenge_2019.aspx

About WRF

The Water Research Foundation is a US-based 501(c)3 non-profit organization that was officially formed in January 2018 after the merger of the Water Environment & Reuse Foundation and Water Research Foundation. The merged Foundation is the leading water research organization, funding research, pilot projects, and technology demonstrations that maximize the value of all water, including wastewater, stormwater, drinking water, and recycled water. Learn more at www.werf.org or www.waterrf.org.

About WEF

The Water Environment Federation (WEF) is a not-for-profit technical and educational organization of 35,000 individual members and 75 affiliated Member Associations representing water quality professionals around the world. Since 1928, WEF and its members have protected public health and the environment. As a global water sector leader, our mission is to connect water professionals; enrich the expertise of water professionals; increase the awareness of the impact and value of water; and provide a platform for water sector innovation. To learn more, visit www.wef.org.

TECHNICAL ARTICLE

Training Your Staff on a Limited Budget*By Kevin Patel, PE, Signature Automation*

Regrettably, in a depressed economy, an organization's training budget is often the first thing that is cut. Although this may be the easiest cut to make during the tough times, the long-term impact can far outweigh the immediate money saved. Eventually, a reduction in training may lead to lower motivational levels and inefficiencies and, most deleteriously, result in staff turnover – which in itself can be costly.

There are several methods of minimizing training costs, but one in particular that will be discussed in greater detail is video based training developed using screen capturing software. Trinity River Authority's (TRA) Ten Mile Creek Regional Wastewater System personnel were seeking an improved methodology to reference key features of their control system. Internally, the utility had used open source screen and voice recording software to record instructional videos on the use of their metering software. This resulted in a desire to develop several training videos regarding topics associated with their existing control system. The goal was to have a library of lessons for individual topics to assist plant personnel in navigating through the use and configuration of the system.

Although budgets may be tight, reducing your training outlay doesn't have to mean reducing your training and development of your staff. This article will discuss the innovative approaches TRA has taken for training. Combined with the advancements in computer and instructional technology it has made it possible to train staff at a lower cost which can also be sustainable and reused well into the future. Technology will not completely replace traditional training methods but it can reduce cost without reducing the quantity/quality of training.

Introduction

According to a 2008 article in HR Management, replacing a worker costs on average of 100 to 125 percent of an employee's annual salary in lost productivity, recruitment costs, and new hire training. From this statistic alone, all organizations should strive to not only decrease employee turnover, but also to increase opportunities to capture valuable knowledge in the event that turnover does occur to help minimize future training costs.

So, how can you maintain a well trained staff that is informed and knowledgeable about what's new: products, technologies, business practices, legislation, industry trends and more without spending a lot? What are some cost effective ways to upgrade skills and provide technical training to keep your facilities operating at their optimum without spending excessively on travel, course fees, or outside vendors?

There are several methods to help capture and transfer knowledge to individuals. Based on individual personalities, some methods may work better than others. Therefore, more than one training method on the same subject can be beneficial. Training methods can include, but are not limited

to, in-house training, cross-training, mentoring, a learning management system (LMS), e-learning, brown bags, webinars, and screen capturing software. This article will discuss each training method and expand further on screen capturing software, which has helped TRA recently teach their new staff the in's and out's of their control system.

In-House Training

In-house training is low cost but provides employers and employees advantages not found with an external training program or seminar. Knowledge transfer occurs more naturally and employees reinforce learning through training other employees. On-the-job training that enhances an employee's skills and prepares them for the next promotion is generally far superior to a public seminar. Internal training and development leaps the huge barriers that encumber external training.

Internal training is developed around equipment, problems and challenges that trainees face every day at work. Successful internal training recognizes the exact skills and knowledge that participants need to succeed in their jobs. It also prepares employees for success in their next job. Internal training is presented in the language and terminology that participants understand and can relate to. Internal training develops the skills of employees and reinforces their training and knowledge of the topic. Certainly, everyone is familiar with the maxim that the best way to ensure that an employee thoroughly understands a subject is to have the individual train others.

If you are interested in developing some in-house training, there are several strategies that may meet your needs. These methods are also low-cost, requiring only staff time and some creativity. Your organization may find these programs lead to enhanced learning as well as employee skill development. The facilitator can be an employee or a trainer or consultant with whom the organization has developed a relationship over time. This ensures that the trainer is familiar with the organization goals and needs.

Require employees to train other employees when they attend an external training seminar or conference; they can share the information learned at a seminar or training session.

Cross Training

Cross-training individuals involves having employees train one another to do different aspects of related jobs. This provides greater flexibility in assigning tasks, and also challenges employees to learn new skills and diversify their tasks. It can also be highly motivating to employees seeking career development, particularly young workers just beginning to establish a career path.

Mentoring

Consider teaming new employees with more experienced staff to enhance training. Mentoring aids developing leadership of current employees and encourages them to support the productivity and success of new employees. It also increases

satisfaction and retention of new employees, who feel more confident and adapt more quickly in their new jobs.

Mentoring, coaching, and field trips, both inside and outside the organization, help employees develop their skills and knowledge. Employees who "teach others" most effectively incorporate the knowledge and skills themselves.

Assign the employee a formal mentor from within his or her work group. The more experienced employee has the responsibility to help the employee learn the skills necessary to succeed in their job.

Encourage employees to seek out informal mentors on their own in areas of needed development and interest. Especially if they offer employees new skills and ideas, internal training, reading, and meeting can replace most external training in organizations. Mentoring is also cost effective and the mentee or resource remains available daily to participants following the training session.

Learning Management System (LMS)

Consider subscribing to a LMS service. A LMS provider can offer web based student registration, tracking and reporting features including the ability to manage a fully blended learning environment consisting of asynchronous online courses, live synchronous events and instructor-led classroom training. In terms of content development and delivery flexibility an organization can simultaneously launch and track more than 10,000 off-the-shelf AICC and SCORM compliant courseware titles, develop custom online content, and convert familiar Word, PowerPoint and PDF files for online delivery.

E-Learning

Web-based training provides organizations the ability to take training courses at their own pace without the cost associated with traditional instructor led classes. Plus, online training is more convenient, less expensive and easier to manage.

Water and wastewater utilities can save a significant amount of money by using online training systems offered by trade associations like TWUA and TRWA versus having employees travel great distances in order to attend instructor-led classroom training. Significant time and money can be saved by not having the expense of a hotel, meals and lost productivity of an employee's time. With the convenience of anytime, anywhere training, students can log onto on-line courses at home or office, day or night. Students move through the on-line courses at their own pace.

Most On-line courses have a quiz at the end of each training module which reinforces the student's knowledge of the subject matter and students must score 70 percent in each module to advance to the next module. The on-line training allows a student to exit and return to the course at any time. Students usually have 6 to 12 months from the date of enrollment to complete and pass an on-line course. Most on-line training is user-friendly and is designed to keep the attention of the student through the use of charts, graphs, video clips, audio clips and other interactive media.

Some E-Learning courses have interaction with an instructor unlike some Web-based programs. This feature allows students to ask questions of the instructor via e-mail.

E-Learning systems also include course tracking of student progress and completion of classes is easy to access and manage. Information is readily available to the student or employer and customized reports can be created for printout.

Brown Bag

Provide training by either knowledgeable employees or an outside expert in a brown bag lunch format. Employees eat lunch and gain knowledge about a valuable topic. Many vendors are eager to provide brown bag lunches to demonstrate their product or service.

Webinars

Webinars are more cost-effective than having in-person presentations or training sessions at any time. Webinars can be interactive allowing participants to stay connected to the presenter and each other, even though they may not be in the same room or country.

Screen Capturing Software

It is very expensive to send staff to specialized technical training for such things as PLC and HMI programming software. Consider either having internal staff or an outside trainer that is knowledgeable and skilled in using the software develop instructional training using screen capturing software. TRA has been involved with producing such training material with great results. The cost of producing the training material is quickly recovered through eliminating the expense associated with sending staff to vendor provided training.

Screen capturing software allows you to save anything visible on a screen in a wide variety of image file formats to create a screenshot. These, however, are still images. Screen capture utilities may come with built-in image editors as to be able to add annotations to the saved images and enable you to create a printable or online tutorial. If you need to add more interactivity, though, you would go for screen recording. Screen recording is full-motion real-time recorded activity from your Windows desktop. With such applications an instructor can move through successive steps in using an application and have all those steps recorded in a movie of the screen, usually AVI format.

The utility captures the screen, or window (even if you drag it around the screen), or a region with fixed location, or cursor area. When capturing cursor area, the capture area's size is defined by the user but it always follows the cursor. The output to AVI files usually offers choices of video codec with quality setting, including Cinepak, Indeo 3, 4, 5, Microsoft Video 1, MS RLE, or Motion JPEG. The option to capture audio with customizable audio codec settings makes these products the ideal tool for making demonstration, tutorial and training videos. The recording runs in the background and is almost undetectable on modern PCs.

Summary

Reducing your training outlay doesn't have to mean reducing training and development of your staff. Employing some innovative approaches to training combined with the advancements in computer and instructional technology have made it possible to train staff at a lower cost.

Technology will not completely replace traditional training methods but it can reduce the cost without reducing the quantity and quality of training.

About the Author



Kevin Patel, PE is Vice-President and Founder of Signature Automation, an automation and electrical engineering firm based out of Dallas Texas. He is a voting member of ISA101 and actively involved in ISA18 and ISA112.

Kevin is the past-Director of ISA Water/Wastewater Division.

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TECHNICAL ARTICLE

ISA112 SCADA Standards Committee Releases draft SCADA System Workflows & Architecture Diagrams

By Graham Nasby, ISA112 Committee Co-chair

When designing/building, updating, or operating supervisory control and data acquisition (SCADA) systems, the use of end-user facility SCADA standards is an essential tool. It is through the use of common SCADA standards that the inner working parts of SCADA systems are able to function. For example, inside a water facility, SCADA standards are used to define how equipment/instrumentation is wired, how signals are named, how PLCs are programmed, how servers are configured, how data is logged, and how information is presented to operators on computer screens.

But where do the end-user SCADA standards come from? And what defines a good set of SCADA standards? Furthermore, how do I get a copy?

These are all good questions that come up when working with SCADA systems. The answers to these questions can vary considerably, depending on who you talk to.

When working with a large water utility, internal SCADA standards are usually overseen by the organization's PCS (process control systems) group. Usually developed in-house, created by a consultant, or a combination of the two, it is a lot of work to develop a set of facility SCADA standards and keep them up to date. In fact, the work to keep a set of internal SCADA standards current for a large utility is a never-ending task. For smaller utilities, dealing with SCADA standards is also challenging due to limited staff resources, limited budgets, and few publicly available SCADA guidelines. A shortage of qualified staff that have the skills to use and update the standards can also be an issue. Furthermore, in any utility, capital project work can also be challenging SCADA-wise, especially when a utility does not have a full set of SCADA internal standards, or when a utility's internal SCADA standards have not kept up with the times and/or are incomplete.

It seems that whenever Automation Professionals get together, the discussion topic of SCADA standards is a frequent one. Regardless of whether one is with a utility, consultant, vendor, contractor, or system integrator, having a good set of SCADA standards makes working with SCADA systems easier. Being able to use common terminology, techniques and templates has the potential for significant cost savings for everyone involved with SCADA systems.

In any SCADA installation, being able to apply a good set of SCADA standards can go a long way to reducing complexity and/or eliminating the need for custom code. Being able to avoid complexity and reducing the need for custom solutions are sure-fire ways to save costs and increase robustness. Thus, promoting the use of good end-user SCADA standards is something we should be all doing.

For the past year, the ISA's Water/Wastewater Industry Division has been keeping a close eye on a recent initiative by the ISA Standards & Practices department with respect to SCADA systems. Through its role as an international SDO (standards developing organization), the ISA has formed the ISA112 SCADA Systems Standards Committee. The ISA112 committee has been charged with developing an international SCADA standard that provides a set of minimum requirements for the planning, design, construction, and operation of SCADA systems.

Headed by two Canadian co-chairs, Ian Verhappen from CIMA+ and Graham Nasby from Guelph Water Services, the ISA112 committee now has over 150 members from a wide cross-section of industries that use SCADA technology. These include municipal water/wastewater, mining, oil/gas production, pipelines, environmental monitoring, electricity transmission, and telecommunications. One of the benefits of having so many industries involved is that good ideas from one industry can cross-pollenate into others. There are actually more similarities between SCADA applications between industries than there are differences. We are also fortunate that the ISA112 committee has a strong representation from the municipal water sector, including several members of our ISA Water/Wastewater Industry Division (WWID).

The ISA112 committee received its charter from the ISA's Standards & Practices board in 2016. Since that time the committee has continued to grow, with many members from around the world. Currently the committee has members from Canada, USA, England, Chile, Brazil, Germany, Australia, and numerous other countries. The committee also has a good cross-section of end-users, utilities, vendors, consultants, contractors, and system integrators. The committee has also made a point of ensuring that the major SCADA software vendors are involved, so that all viewpoints are considered.

Membership of the ISA112 committee is open to anyone with a SCADA background who is interested in contributing. More information on joining the ISA112 committee can be found at www.isa.org/isa112. Most committee members contribute by writing content, commenting on current drafts by suggesting revisions, providing examples to illustrate best practices, or assisting with the resolution of submitted comments and proposed revisions. The committee itself holds monthly conference calls, which are supplemented by face-to-face meetings twice per year. Much of the writing/editing work is done offline by committee members.

A major goal of the committee has been to develop a standardized workflow, or SCADA lifecycle, that provides an organized way to apply best practices in the design, development, testing and operation SCADA systems. A major part of this workflow is providing a consistent way in which internal SCADA systems standards can be organized. The ISA112 SCADA workflow has also been developed so that it can be easily applied to SCADA systems ranging from only a few nodes (say, a town water system) to the very large systems that can be found in metropolitan sewage district.

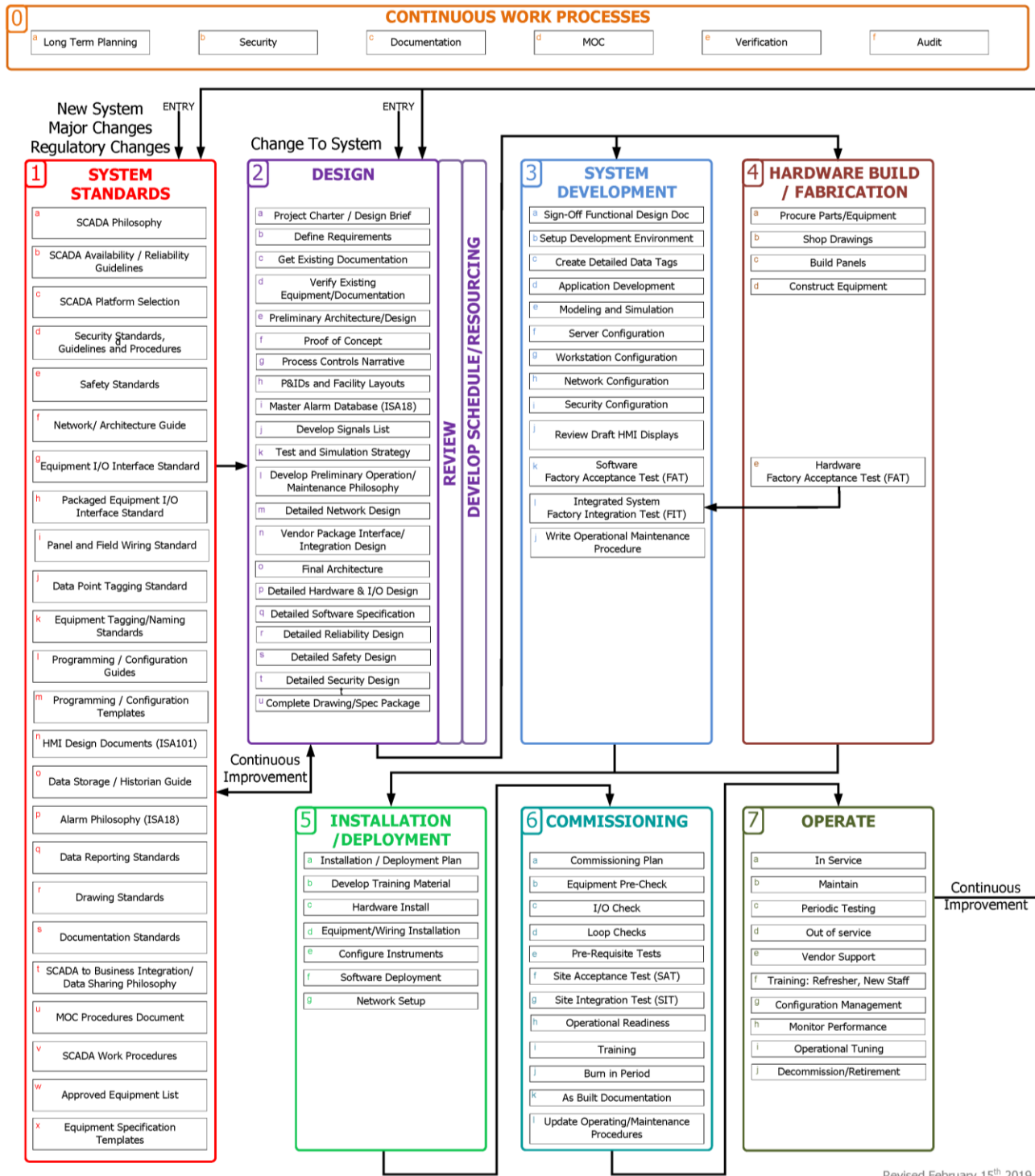
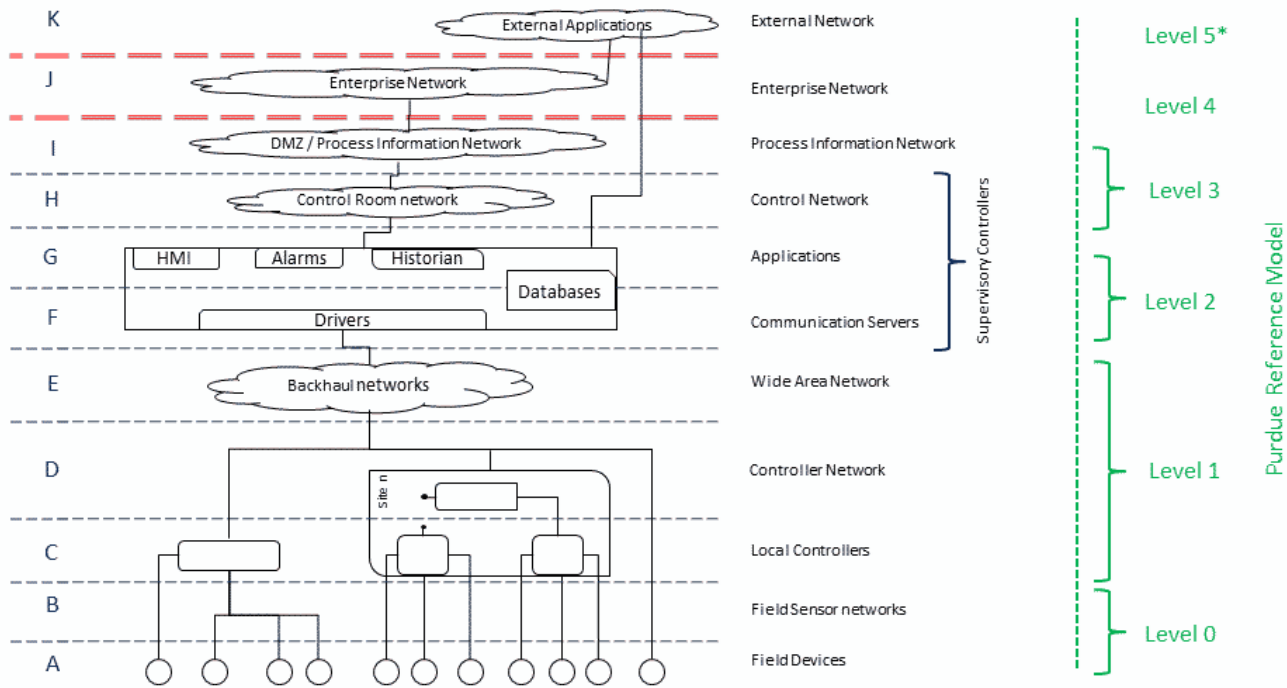


Figure 1 – ISA112 SCADA Systems Lifecycle

Drawing on a technique used in other ISA standards, the ISA112 has created a standardized workflow, or “lifecycle” for the long-term management of SCADA systems. This includes continuous work processes, facility SCADA standards, project-based workflows, and work processes for operating/maintaining the system. The current version of the ISA112 SCADA Systems Lifecycle can be found in Figure 1.

Even though it is in draft form, the ISA112 SCADA lifecycle is currently already being used by several water utilities and other end-users who belong to the committee, as well as by several engineering consultants, system integrators and contractors. The draft that is shown in Figure 1 represents the end product of over a dozen drafts that have undergone full committee review and refinement. The diagram will continue



Notes:

- 1 Letters are used avoid potential conflict with ISA-95 and other 'Layer' models.
- 2 Routers and Firewalls between layers are not shown.
- 3 Other system-specific servers, applications, and workstations are not shown.
- 4 Remote-hosted external applications (Cloud) could be configured to attach to devices at any level, with appropriate firewalls, tunneling and routing.
- * We show a Purdue Level 5. The true Purdue Model only has levels 0-4 because it did not anticipate external applications.

Revision June 22, 2018

Figure 2 – ISA112 SCADA System Architecture Model

to be developed as the committee completes its work by writing the text of the ISA112 SCADA Systems Standard.

Another goal of the ISA112 committee has been to establish a set of common SCADA terminology, architecture models, and workflows to enable the design, construction and operation of SCADA systems to be done more efficiently, consistently, and robustly.

Many of the capital-project-oriented members of the committee are looking forward to defining a robust set of standardized SCADA terminology that can be used to more clearly define requested features in SCADA specifications – to the benefit of both purchasers of SCADA systems and to those who supply/develop them.

The current draft of the ISA112 SCADA architecture model can be seen in Figure 2. This diagram is soon to be accompanied by a list of standardized SCADA terminology that will form the definitions section of the ISA112 document.

The ISA112 SCADA systems standards committee has now been active just over two years. In that time it has developed a SCADA lifecycle model, reference architectures, and a draft table of contents for the upcoming ISA112 SCADA standard.

The committee is now engaged in the process of writing the first drafts of the text that will form the core of the ISA112 SCADA Systems Standard. This writing and editing phase is expected to be very active for the next two years, then to be

followed by several comment rounds where all committee members will have a chance to further refine/contribute to the document as it takes shape.

The ISA112 committee actively welcomes additional members to help with the writing and development of the document text. If you are interested, please contact the committee co-chairs Ian Verhappen and Graham Nasby via the ISA112 committee website at www.isa.org/isa112/

As the ISA112 SCADA systems standard develops, the ISA Water/Wastewater Division will continue keeping a close eye on the ISA112 committee and its draft documents, both to contribute our water/wastewater division know-how and to ensure that our municipal water community can make the best use of this soon to be available SCADA resource document.

About the Author



Graham Nasby, P.Eng, PMP, CAP holds the position of Water SCADA & Security Specialist at City of Guelph Water Services, a publicly owned and operated water utility located in Guelph, Ontario, Canada. Graham is the co-chair of the ISA112 SCADA Systems standards committee, and a voting member of the ISA18 and ISA101 committees. He is also a member of the Automation Committee of the Ontario Water Works Association (OWWA). Contact: graham.nasby@guelph.ca

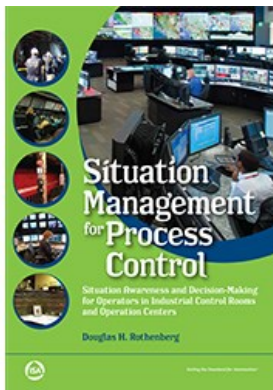
ISA PUBLISHING

New Book on Control Room Management

From ISA Publications

ISA Books is pleased to announce the publication of **Situation Management for Process Control**, a new book that is intended to unify industry understanding of how to deliver real value to control room operations.

Written by Douglas H. Rothenberg, Ph.D., – a globally recognized expert in alarm management and operator support technology – the book explores control room management as a discipline, focusing on the applicable tools, technology, and methodologies that foster safer, more effective control room functioning and improved industrial production.



Situation Management for Process Control

Author: Douglas H. Rothenberg
 Length: 700 pages
 ISBN: 978-1-945541-65-0
 Copyright: 2019

Publisher: ISA

Available Formats: Hardback, ePub, Kindle

Situation management is the sum total of the real-time decisions and actions that the operator makes that determine whether or not the enterprise operates safely and productively. These include accurately and appropriately assessing the current operating environment, transforming that assessment into needed action for proper management of abnormal situations, and validating the effectiveness of the action.

“Properly understood and executed, it is a game changer in safe and effective operation of industrial plants and operations,” states Rothenberg. *“It advances a firm technical framework that ties together all of the traditional individual aspects (e.g., procedures, the human machine interface, control room design, and more) into a technology to understand and design effective control room management operations. This is a unified approach with explicit tools to deliver situation management to control room operators. The tools to see problems are followed by the tools to manage them.”*

New contributions, Rothenberg points out, are the concepts and technology of weak signals and their use to supplement the alarm system and cover situations that alarms are not intended or able to manage.

“Weak signals are small indicators of things that don't appear quite right,” he explains. *“They can be discovered everywhere; understanding and exploiting them will lead to valuable clues and the ability to confirm something likely going amiss.”*

Rothenberg emphasizes the importance and relevance of the book to managers, supervisors, operators, human factors engineers, safety personnel, and technicians in industrial enterprises and operation centers as well as to regulators, specialists, engineers, system designers, and trainers at commercial firms (controls equipment manufacturers, A&E firms, systems integrators) who provide

monitoring and controls hardware, software and technology for end users.

Below are two notable comments about the book.

“The book provides a valuable look into the mission-critical world of control room operators. I recommend reading this book as it furnishes essential insights into the dynamics of control room operations and the unique concerns and important responsibilities of control room operators. It also provides a best-practice approach to managing abnormal operating conditions and avoiding common pitfalls. Many of us have had to learn how to deal with these things the hard way.” -- Dan Scarberry, former Manager of Gas Supply Planning and Control Room Operations at Dominion East Ohio Gas in Cleveland, Ohio

“This book is shaping out to become one of those once-in-a-decade seminal texts.”

-- Walt Boyes, former editor-in-chief of *Control Magazine*

Interview with the Author

ISA recently published *Situation Management for Process Control: Decision Making for Operators in Industrial Control Rooms and Operation Centers* by Douglas H. Rothenberg, Ph.D., a leading expert in alarm management and operator support technology for enterprise-wide industrial automation and control. In this Q&A feature, Rothenberg highlights the focus, importance, and differentiating qualities of the book.

Q. Could you first define “situation management”?

Situation management is the competency, ability, and willingness of the human operator to properly and successfully manage the enterprise or activity under his or her charge. It is the end-game role for all operators responsible for effective real-time management. Success requires the ability to recognize the current environment of operation, the ability to develop appropriate and accurate assessment of that environment, the ability to transform that assessment into needed action for proper management of abnormal situations, and the ability to validate the effectiveness of the action. Situation management is the sum total of the decisions and actions that the operator makes that determine whether or not the enterprise operates safely and productively.

Q. Please briefly explain the objective of the book as it relates to situation management?

A. The book explains how to deliver real value to control room operations in industrial plants, specifically in improving safety and effectiveness. It advances a firm technical framework that ties together all of the traditional individual aspects (e.g., procedures, the human machine interface, control room design, and more) into a technology to understand and design effective control room management operations for enterprises. It’s a unified approach with explicit tools to deliver situation management to control room operators. An important new contribution is the concepts and technology of “weak signals” and their use to supplement alarm systems and cover situations that alarms are not intended or able to manage.

Q. Why do you believe the book is so beneficial and valuable to read?

A. The book builds on strong concepts and best practices to weave a comprehensive understanding of situation management. It covers the entire discipline, filling in gaps, extending understandings, and describing new competencies. It leverages an extensive body of knowledge in an informed narrative. Taken as a whole, it enables both novice and seasoned practitioners to grasp the big picture and at the same time acquire core concepts and practical tools. Every segment of the book is rooted in existing practice and experience. This is clearly evident in the extensive references and explanations of published material.

The content of the book can be categorized into two broad areas:

- Concepts and technology that should be used and properly integrated into the appropriate enterprise infrastructure (specifications and design, implementation, MOC, training, and all the rest).
- Concepts and tools that are consistent with existing enterprise infrastructure and could be used better to be make things more effective.

Q. Could you shed some light on the concept of “weak signals”?

A. *Weak signals* is a very new concept. This book introduces it. They provide a tool for operators to detect early or subtle problems in the making. Each weak signal is what we might call a small indicator of something that doesn't appear quite right. Treating them as weak signals offers an important methodology operators can use to understand and decide what they mean. They are part of a planned activity operators use to see if something odd might bear fruit if explored more carefully. They can be discovered everywhere; processing them will lead to valuable clues and then confirmation of something going amiss. The technology is an important way to ‘fill in the cracks’ of every operator's tool kit.

Q. Who could benefit most by reading the book?

A. The book is an important read for managers, supervisors, operators, engineers, safety personnel, and technicians in industrial enterprises and operation centers. It's also highly pertinent for regulators, specialists, engineers, system designers, and trainers at commercial firms (controls equipment manufacturers, A&E firms, systems integrators) who provide monitoring and controls hardware, software, and technology to end-users. These professionals have a unique understanding of the needs and requirements of the control room. Without their care and innovation and attention to purpose, effective operator situation management wouldn't be possible. They are the enablers, champions, providers, and deliverers of the technology.

Q. How does your book differ from other books written on the topic of situation management?

A. The unique value of this book is how it weaves the myriad of individual components of control room design, operator interface design, operational protocols, and operator support technology into a coherent and useable methodology. The book makes all the tools and processes explicit where before they were either implicit, missing from the control room operator tool kit, or not included in the operating culture (qualifications, procedures, training, and the like). The book enables readers to clearly recognize what the operator is responsible for and how it can be provided to assist in meeting the responsibility for successful operation.

Many of the individual tools and methodologies are currently in use in one industry or another. But their use might be haphazard and fragmented. Until now, it was difficult to fully understand how each might be used to bolster the other. This comprehensive treatment exposes a better basic understanding of each tool and methodology. And, more importantly, it demonstrates how they fit together in ways that significantly improve the ability of operators to successfully manage and execute their responsibilities.

Obtain your copy of *Situation Management for Process Control: Decision Making for Operators in Industrial Control Rooms and Operation Centers* today.

To get your copy of this informative new book, take a look at www.isa.org/books/

Meet the Author



Douglas H. Rothenberg, Ph.D., is a leading expert in alarm management and operator support technology, possessing in-depth experience in developing innovative solutions, technologies, and concepts for enterprise-wide industrial automation and control.

As a globally recognized consultant and trainer in state-of-the-art alarm management technology, Rothenberg was one of the pioneers of design for industrial Distributed Control System (DCS) alarm management technology now accepted as international best practice.

He has been awarded patents in alarm management, process control, and instrumentation, and his works have been published and presented broadly in the field. He is the author of *Alarm Management for Process Control*, a best-practice resource for the design, implementation, and operation of industrial alarm systems.

Since 1999, he has served as President of D-RoTH, Inc., a consulting firm serving leading industrial manufacturing and technology providers in the areas of alarm management, design innovation, process safety management, process control technology, plant operability, and smart field actuators.

Rothenberg earned a Bachelor of Science degree in electrical engineering from Virginia Tech, a Master of Science degree in electrical engineering from Case Institute of Technology, and a doctorate degree in systems engineering from Case Western Reserve University.

He has been an active ISA member and contributor for many years. He currently serves as a member of the ISA 18.2 Alarm Management Standards Committee, and is a former president, vice president and secretary of ISA's Cleveland Section.

AUTO-QUIZ: BACK TO BASICS

PLC Analog Input Card Scaling Review

This automation industry quiz question comes from the ISA Certified Control Systems Technician (CCST) program. CCSTs calibrate, document, troubleshoot, and repair/replace instrumentation for systems that measure and control level, temperature, pressure, flow, and other process variables

When looking at the raw input value of a single channel on an analog input card in a PLC, you see that the raw input is expressed in “counts” and is an integer value that varies between 0 and 8092. You learned from the PLC manual that 0 counts occur when the input signal is 0 mA, and 8192 counts is obtained for an input signal of 20mA. If a 4-20mA pressure transmitter is connected to this analog input channel, and if the pressure sensor has a range of 0-100psig, approximately how many counts should you see for a sensed pressure of 25psig?

- a) 2048 counts
- b) 4096 counts
- c) 3277 counts
- d) 6144 counts
- e) none of the above

Answer:

So now all you need to do is determine how many milliamps are outputted by the transmitter. This will be

$$[(25\text{psig}/100\text{psig}) \times (20\text{mA} - 4\text{mA})] + 4\text{mA} = 8\text{mA}.$$

Then:

$$8\text{mA} \times (409.6 \text{ counts/mA}) = 3277 \text{ counts (approx.)}$$

The correct answer is C, 3277 counts. First, you must realize that the counts at the analog input card are based on 0-20mA range and the transmitter is based on a 4-20mA range. If you divide (8192-0) counts (full range of counts for the analog channel) by the range of corresponding current in milliamps (20-0), you will get 409.6 counts/mA.

Reference: Goettsche, L.D. (Editor), Maintenance of Instruments and Systems, 2nd Edition

ISA CAP and CCST certification programs provide a non-biased, third-party, objective assessment and confirmation of an automation professional’s skills.

The CAP exam is focused on direction, definition, design, development/application, deployment, documentation, and support of systems, software, and equipment used in control systems, manufacturing information systems, systems integration, and operational consulting.

Certified Control System Technicians (CCSTs) calibrate, document, troubleshoot, and repair/replace instrumentation for systems that measure and control level, temperature, pressure, flow, and other process variables.

Question originally appeared in the AutoQuiz column of <http://automation.isa.org>. Reprinted with permission.



Modicon: Future Ready PLCs & PACs

Modicon is the first name in programmable logic controllers (PLCs).

The inventor of the PLC, Modicon introduced the first PLC — the Modicon 048 — in 1968. Today, the Modicon Family continues to push boundaries and define the technology that enables and connects modern machines and processes. The Modicon Family of PLCs and programmable automation controllers (PACs) still stands for innovation, offering a full range of solutions to meet your automation needs.

From small lift stations to treatment plant processes to advanced supervisory process automation, our robust offer of trusted automation solutions enhances machines and processes across industries.



Modicon M580 ePAC:
The world’s first ePAC for high performance industrial process control

www.modicon.com



SOCIETY NEWS

What Can ISA Do For You?

By Paul Gruhn, 2019 ISA Society President

ISA has both led and participated in a number of surveys over the last few years. One thing that really stood out for me is the significant differences between "active" versus "passive" (and non-) members. Their perceptions and desires from ISA differ.

Active members have a *strong* relationship with the Society; one driven by *perceived value*. They rate the Society's products *highly* and perceive their membership to be a *good* value, and *use* many of our products and services. Their most preferred products are a) annual conferences, b) local meetings, and c) accreditation programs. ISA naturally offers all three, and much more.

Passive members (and non-members), on the other hand, have a *weak* relationship with the Society. They do *not* perceive membership to be a good value. They have *low* familiarity with our product range, do *not* see a benefit to it, and therefore have a *low* usage rate.

I find that intriguing; some in the automation industry *do* see the value of what we offer and use our products, yet other members of the very same industry *don't*, with many not even being *aware* of what we actually offer.

But here's the *really* interesting part: passive members state that they have unfulfilled needs. They seek a competitive advantage and want support in achieving both their and their employers' objectives. That's *exactly* what ISA offers, yet they don't seem to *realize* that!!

Here's another similar example. An Executive Board member recently posed a question on the LinkedIn ISA forum. (It's interesting to note the group has 57,000 members, which is many more members than ISA actually has. So apparently non-members *do* want to be associated with the Society in *some* manner!) That board member asked what people "want" from ISA. The vast majority of responses were asking for what the Society *already* offers, and has for a *long* time! How is it that these people are either *unaware* of what we offer, or are aware of what we offer, but don't perceive any *benefit*?

All the promotional material we've produced over the years lists *what* we offer (i.e., training, certifications, standards, publications, and conferences). Active members are able to connect the "what" to the "benefit" it offers both to them, as well as to their employer. They use our products and services as a result. Simply put, passive and non-members *don't* make the connection, and therefore they *don't* use our products and services. Yet our products and services are *exactly* what they're asking for to make them and their employers more successful! We simply need to make the connection more obvious.

As an employee, are you looking to increase your technical knowledge and make yourself more valuable and competitive in the marketplace? Are you looking for a way to advance your career more quickly? Are you looking for ways to make your employer more successful? If so, ISA has *just* what you're looking for!

As an employer, are you looking for a competitive advantage? Are you looking for a way to increase the competency of your employees, or a place to find competent prospects? Are you looking for a way to increase your operational excellence (e.g., safety, security, efficiency, profitability)? If so, ISA has *just* what you're looking for!

And all this fits in perfectly with our new mission statement: **Advance technical competence by connecting the automation community to achieve operational excellence.** We're advancing the technical competence of everyone in the industry (not just members) through publications, training, certifications, standards, and conferences. (We give our members *extra* benefits!) We do it to make people and their employers more successful. Who *wouldn't* want to be a part of that!?

Oh, and, like all my predecessors, I'm honored to be your new Society President. I've been an active volunteer for 30 years and have served in essentially every area of the Society. I naturally would like to see the Society achieve certain goals over the next year, but those goals will need to be discussed and approved by the Executive Board at our first meeting in January, so I won't announce them yet. Stay tuned!

Paul Gruhn
2019 ISA President

About Paul Gruhn

Paul Gruhn PE, CFSE, and ISA Life Fellow, is a Global Functional Safety Consultant with aeSolutions, a process safety, cybersecurity and automation consulting firm. As a globally recognized expert in process safety and safety instrumented systems, Gruhn has played a pivotal role in developing ISA safety standards, training courses and publications. He serves as a Co-Chair and long-time member of the ISA 84 standard committee (on safety instrumented systems), and continues to develop and teach ISA courses on safety systems. He also developed the first commercial safety system modeling program. Gruhn has written two ISA textbooks, numerous chapters in other books and dozens of published articles. He earned a bachelor of science degree in mechanical engineering from Illinois Institute of Technology, is a licensed Professional Engineer (PE) in Texas, and both a Certified Functional Safety Expert (CFSE) and an ISA 84 Safety Instrumented Systems Expert.

Call for Newsletter Articles

The WWID newsletter is published four times a year (winter, spring, summer, and fall) and reaches the WWID's over 1,600 members. Each issue is approximately 16-32 pages long, and is electronically printed in color PDF format. A notification email goes out to all WWID members and it is available for public download at www.isa.org/wwid/.

We are always on the lookout for good articles, and we welcome both solicited and unsolicited submissions.

Article submissions should be 500-2000 words in length and be written for a general audience. While it is understood that the articles are technical in nature, the use of technical jargon and/or unexplained acronyms should be avoided. We actively encourage authors to include several photos and/or figures to go along with their article.

We actively welcome articles from all of our members. However, we do ask that articles be non-commercial in nature wherever possible. One or two mentions of company and/or product names for the purposes of identification are acceptable, but the focus of the article should be technical content and not just sales literature. If you are unsure of whether your article idea is workable, please contact our newsletter editor for more information – we are here to help.

Some examples of the types of articles we are looking for include:

- Explanatory/teaching articles that are meant to introduce or explain a technical aspect of automation and/or instrumentation in the water/wastewater sector.
- Biographical stories about personalities and/or leaders in the water/wastewater sector.
- Case Studies about plant upgrades and/or the application of new technologies and techniques. This type of article must include at least two photos along with the article text.
- Pictorial Case Studies about a plant upgrade consisting of 4-6 photos plus a brief 200-500 word description of the project undertaken. The article should ideally include one to two paragraphs about lessons learned and/or advice for other automation professionals.
- Historical reflections on changes in technology pertaining to specific aspects of instrumentation or automation, and how these changes point to the future.
- Discussions about changes in the water/wastewater sector and how these affect automation professionals.

Once we receive a submission, we will work with you to edit it so it is suitable for publication in the newsletter.

Article submissions can be sent to the WWID newsletter editor Graham Nasby at graham.nasby@grahamnasby.com.

WWID Newsletter Advertising

The WWID newsletter is an excellent way to announce new products and services to the water/wastewater automation community. With a distribution of 2,000+ professionals in the automation, instrumentation and SCADA fields, the WWID newsletter is an effective targeted advertising tool.

The WWID newsletter is published quarterly, on the following approximate publication schedule:

- Winter Issue – published in January/February
- Spring Issue – published in May/June
- Summer Issue – published in August/September
- Fall Issue – published in October/November

Advertising in the newsletter is offered in full page and quarter page formats. Advertisements can be purchased on a per issue basis or for four issues at a time. The newsletter itself is distributed as a full-color PDF, so both color and black/white artwork is acceptable.

The current advertising rates are as follows:

Per Issue:

- Full page, full color (7" x 9"): \$500
- Full page, full color, (8.5x11") , with bleed \$600
- Half page horizontal, full color (7"x4.5"): \$350
- Half page vertical, full color (3.5"x9"): \$350
- Quarter page, full color (3.5" W x 4.5" H): \$250

Per Year: Apply 20% discount if purchasing 4 ads at a time

Other sizes of advertisements are available, but are priced on an individual basis. Contact us for more information.

Please book advertising space as early as possible before the intended publication date. Artwork for advertisements should be submitted a minimum of two weeks prior to the publication date; earlier is always better than later. Artwork for advertisements can be submitted in EPS, PDF, PNG, JPG or GIF formats. EPS, PDF and PNG formats are preferred. Images should be at least 300dpi resolution if possible.

The ISA Water/Wastewater Industry Division is run on a non-profit basis for the benefit of its members. Monies raised from the sale of advertising in the newsletter are used to help offset the cost of division programming and events. Like its parent organization, the ISA, the WWID is a non-profit member-driven organization.

For more information, or to discuss other advertisement sizes not outlined above, please contact the WWID newsletter editor Graham Nasby at graham.nasby@grahamnasby.com.



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2019 ISA Conferences

2019 ISA Analysis Division Symposium
May 6-8 – Galveston, Texas, USA

2019 ISA Energy and Water Automation Conference Aug 7-8 – Orlando, Florida, USA

2019 ISA Process Industry Conference(PIC)
Nov 4-6 – Houston, Texas, USA

2019 ISA IIOT & Smart Manufacturing Conference
Fall 2019 – Location TBD

About the ISA Water/Wastewater Division

The ISA Water / Wastewater Industry Division (WWID) is concerned with all aspects of instrumentation and automated-control related to commercial and public systems associated with water and wastewater management. Membership in the WWID provides the latest news and information relating to instrumentation and control systems in water and wastewater management, including water processing and distribution, as well as wastewater collection and treatment. The division actively supports ISA conferences and events that provide presentations and published proceedings of interest to the municipal water/wastewater sector. The division also publishes a quarterly newsletter, and has a scholarship program to encourage young people to pursue careers in the water/wastewater automation, instrumentation and SCADA field. For more information see www.isa.org/wwid/



**Water/Wastewater
Industry Division**