Water/Wastewater Industry Division

Setting the Standard for Automation™

Calendar of WWID Events

Aug 7-9, 2018 — **2018 ISA Water/Wastewater and Automatic Controls Symposium**
Hyatt Regency Bethesda
Bethesda, Maryland, USA
(15 minutes from Washington DC)

Fri, Oct 12, 2018 — **ISA112 SCADA Standards Meeting**
Full Day Meeting at ISA Annual Meeting

Oct 13-17, 2018 — **ISA Annual Leadership Meeting**
(also known as the Fall Leaders Meeting)
Hyatt Regency Montreal
Montreal, Quebec, Canada

In this Issue

PLUS:
Program Booklet for the 2018 WWAC Symposium (20 pages)

Newsletter Spring/Summer 2018

Director's Welcome

Pavol Segedy, HDR Inc.

Welcome to the ISA water/wastewater industry division mid-year newsletter. In this issue you will find a great deal of information about our upcoming 2018 water / wastewater symposium. Our symposium chair Don Dickinson and program chair Joe Provenzano, along with the rest of the symposium committee, have been hard at work putting together this year's technical program. Included in these pages you will find information about our training courses and the upcoming local plant tour. I highly recommend attending this one.

A large part of the success of our water/wastewater division and our symposium is due to our relationships with other associations in our sector, such as the Water Environment Federation (WEF) and the American Water Works Association (AWWA). I would like to particularly thank our friends in the Chesapeake Section of AWWA and the Chesapeake Section of Water Environment Association (WEA), for their help with promoting our 2018 symposium.

As you read this newsletter, I encourage you to check out our symposium website at www.isawwsymposium.com, Thank you for being a member of our division!

Pavol Segedy, PE
psegedy@nc.rr.com

Newsletter Editor's Welcome

Graham Nasby, City of Guelph Water Services

Thank you for reading the Spring/Summer 2018 issue of our WWID newsletter. In these pages you will find a full description of our upcoming 2018 ISA Water/Wastewater and Automatic Controls Symposium.

After holding this event in Florida for the past five years, we are hosting this year's at the beautiful Hyatt Regency Bethesda hotel in Bethesda, Maryland, USA. If you have not visited the US capital before this is your chance – our hotel is only a 15 minute metro ride from the Capitol Building and White House. Holding the event in Bethesda, also allows our members in the North East USA easier access to our symposium. We also look forward to trying the new venue, before we return to Orlando Florida for our 2019 offering.

In this newsletter you will find an article about using the DNP3 communications protocol to implement store/forward datalogging. The DNP3 protocol is notable as it implements a locally-time-stampped store/forward datalogging feature right in the protocol, without any custom programming required. This will be of particular interest for water utilities in jurisdictions that require require chlorine residual logging every 5 minutes.

Graham Nasby, P.Eng, PMP, CAP
graham.nasby@guelph.ca …

WWAC SYMPOSIUM

2018 Symposium Planning Update

By Don Dickinson, 2018 General Symposium Chair

Hard to believe that we are so close to our 2018 ISA Water/Wastewater and Automatic Controls (WWAC) Symposium that will be held August 7-9 in Bethesda, Maryland only a few miles from the heart of the capital of the United States. If you're an automation or technology professional involved in the municipal water market the symposium is a can't-miss event.

The symposium will be held at the Hyatt Regency Hotel which is centered in the Bethesda Arts and Entertainment district with over 200 restaurants, theaters and galleries adjacent to the hotel. Additionally, there is direct metro subway access below the hotel to Washington DC's monuments, museums and attractions.

Plant Tour

The WWAC Symposium is a three-day event that kicks off Tuesday, August 7th with a tour of DC Water's Blue Plains Advanced Wastewater Treatment Plant – the largest plant of its kind in the world. On average 384 million gallons of wastewater are processed daily and more than one billion gallons per day at peak flow! There is a limit for the number of people taking the tour so don't wait to get signed up for the symposium and the tour.

Symposium Program

The symposium program features two days of guest speakers who are influential in our industry, and more than 30 technical presentations. The program starts Wednesday morning, August 8th with the keynote address by Dr. Charles Bott, Director of Water Technology and Research for the Hampton Roads Sanitation District (HRSD). Dr. Bott has been instrumental in the development and implementation of HRSD's Sustainable Water Initiative for Tomorrow (SWIFT) project. SWIFT is an innovative water purifications project being implemented to ensure a sustainable source of groundwater for eastern Virginia while addressing other challenges in the region such as sea level rise and saltwater intrusion. Dr. Bott's keynote address will emphasize the vital role that automation and technology play in addressing the significant challenges facing our industry.

As noted there will be more than 30 technical presentations in two tracks covering a wide range of topics that include: Cybersecurity, Instrumentation, Process Optimization, System Integration, Data Management, and the Future of Automation.

The highlight of the technical program is a special session on the IEEE *Smart Cities Technical Community* initiative, followed by an open panel discussion on the water sector's place in the smart city movement. Given the accelerating trend of urbanization, "smart" solutions are essential for dealing with the significant challenges cities will face in the future. This special session will provide useful information on the role of automation and technology in meeting these growing challenges.

In addition to the valuable information from the guest speakers and the technical sessions, attendees will receive CEU/PDH's from the Chesapeake AWWA Section, a symposium Technical Co-Sponsor.

Optional ISA Training Classes

To get even more value from your time while at the symposium, sign up for one of the two optional training classes being offered by ISA. There is a one-day class on electrical noise effects on instrumentation control equipment, and a two-day class on industrial automation and control system cybersecurity operations & maintenance. Look for additional information on these classes in this newsletter.

Online Registration

Registration for the 2018 ISA WWAC Symposium is open. Register online at http://isawwsymposium.com/register . Full conference registration is $500 but special discounts apply for ISA members, AWWA/WEF members and for students. Also, don't forget to book your room at our conference hotel, Hyatt Regency Bethesda. You can reserve your room online at http://isawwsymposium.com/venue.

About the Symposium

The ISA Water/Wastewater and Automatic Controls (WWAC) Symposium is presented by the ISA Water and Wastewater Industries Division in collaboration with the Chesapeake AWWA Section, the Chesapeake Water Environmental Association, the WEF Intelligent Water Technology Committee, and the ISA Baltimore/Washington DC Section. The WWAC Symposium is offered to broaden the knowledge and understanding of professionals working in the water and wastewater industries on the application of automation and technology to ensure the availability and reliability of critical water systems.

Visit the symposium web site for updates:
http://isawwsymposium.com/

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WWAC SYMPOSIUM

Symposium moves to Washington for 2018!

A message from your symposium committee

So we know our attendees like the Orlando Florida area – it's got great people, the Nightlife, Universal Studios, Disney World, Sea World, and tons of other stuff to do….. But, boy oh boy, it's been six years! Looking back we have had our symposium in the Orlando area for all of these years: 2012, 2013, 2014, 2015, 2016 and 2017. We really like Orlando, but was time to make a change!

So we did it! Our 2018 symposium is going to be in Washington, DC. But we realized that hotel rooms in Washington are crazy expensive, so we found a much more reasonable, but still very nice, hotel that is only a 15 minute drive from the capital.

Our 2018 ISA Water/Wastewater and Automatic Controls Symposium will be held at the Hyatt Regency Bethesda hotel in Bethesda Maryland…which is only a 15 minute ride down the Washington Metro "red line" from the Capital. We thought you'd appreciate the change in scenery!

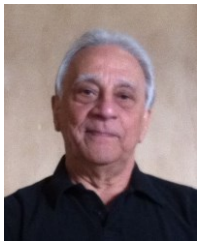
(Don't worry: We return to Orlando in 2019)

2018 Symposium Hotel: Hyatt Regency Bethesda

WWAC SYMPOSIUM

Greetings from Symposium Program Chair

By Joe Provenzano



On behalf of the entire program committee, I would like to formally welcome you to this year's 2018 WWAC Symposium. Our focus is to help professionals in the water and wastewater industries gain a greater understanding of how automatic control applications, utilizing the latest in instrumentation and intelligent controls technology, can be applied to improve both process measurement water and wastewater processing, collection, treatment, and distribution.

Our symposium is a three day event where attendees will experience a breath of learning and continuing education opportunities. Our symposium starts with two optional training courses. This is followed by early-bird symposium badge-pick up and a plant tour. Then we have two full days dedicated to technical presentations. In addition to our 30+ technical speakers, we have an informative keynote opening, invited speakers, and guest speakers are part of our program.

I also encourage you to visit our exhibit hall, talk with our sponsors, and network with your fellow attendees. From these interactions you will find out about new techniques, products and approaches to your daily automation challenges.

We are pleased to welcome the full range of automation professionals in our sector to our symposium. This includes both plant people, including operations, maintenance, engineering and management, as well as plant designers, instrumentation specialists, and system integration firms. Please take advantage of the professional development opportunities afforded to you by our symposium.

If you have a water or wastewater operator license, make sure to fill out the paperwork to get your Maryland DE-approved CEUs/PDHs from the Chesapeake AWWA. Out of state operators can get their CEUs recognized thanks to reciprocity agreements between the various sections of the AWWA and members associations of WEF. If you have your ISA CCST or CAP certification, don't forget to request your ISA training certificate.

Come join us!

Joe Provenzano
Program Committee Chair
2018 ISA Water/Wastewater and Automatic Controls Symposium

WWAC SYMPOSIUM

2018 WWAC Symposium Overview

From the Symposium Committee

Register today for the 2018 ISA Water/Wastewater and Automatic Controls (WWAC) Symposium. Prominent industry speakers, 34 technical presentations, updates from industry groups, a facility tour, a vendor showcase, and certified ISA training opportunities highlight the agenda

Leading experts and thought leaders—including six distinguished opening session speakers—will address the critical issues and challenges in automation facing the water/wastewater industry at the 2018 ISA Water/Wastewater and Automatic Controls (WWAC) Symposium, 7-9 August 2018 in Bethesda, Maryland, USA.

Attendees at the 15th annual event will receive the latest news and learn about the latest advances in effective utility management, automation and control systems, engineering best practices, instrumentation, cybersecurity, alarm management, and emerging technologies across the water/wastewater industry. In all, 34 technical presentations by prominent experts will be delivered. Between 200 and 250 industry professionals are projected to attend.

Being held at the Hyatt Regency in Bethesda, just outside of Washington, D.C., the event also will include informative briefings by American Water Works Association (AWWA) and Water Environment Federation (WEF) officials, high-value training opportunities, and a vendor exhibition that will showcase new and innovative products and services. Daily networking luncheons and an evening reception will set the stage for mingling, meeting new people and reconnecting with old friends.

Attendees can earn continuing education units (CEU) and professional development hours (PDH) for attending the sessions and ISA training courses.

Six outstanding opening session speakers and presentations

Charles Bott, Ph.D.,
Director of Water Technology and Research, HRSD

Charles B. Bott, Ph.D., is the Director of Water Technology and Research at HRSD, which provides regional wastewater treatment to 18 cities and counties in southeast Virginia. Dr. Bott's presentation, "HRSD's Vision for Advanced Water Treatment and Managed Aquifer Recharge in Eastern Virginia, USA: Sustainable Water Initiative for Tomorrow (SWIFT)," will kick off the symposium.

Dr. Bott manages technology innovation and research and development for HRSD's 16 wastewater treatment plants (249 MGD combined capacity). He serves as an Adjunct Professor in the departments of Civil and Environmental Engineering at Virginia Tech and Old Dominion University. Dr. Bott is a fellow of WEF, a Board Certified Environmental Engineer, a licensed Wastewater Treatment Plant Operator – Virginia Class I, and a two-time winner of the WEF Harrison Prescott Eddy Medal for outstanding contribution to wastewater principles/processes research.

Matt Barrett,
Cybersecurity Framework Lead,
National Institute of Standards and Technology

In leading Cybersecurity Framework activities at NIST, Matt Barrett directs planning, team oversight and coordination, and collaborates with the public and private sectors. He works through these relationships to provide perspective and guidance, as well as to gather input on the use and evolution of the Framework.

In his presentation, Barrett will discuss the recently revised Framework (Version 1.1) and its connection to the sector-specific cybersecurity guidance developed by AWWA and the ISA/IEC 62443 series of industrial automation and control systems cybersecurity standards.

Patricia Lamb,
Critical Infrastructure Protection Program Manager, District of Columbia Water and Sewer Authority

As Critical Infrastructure Protection Program Manager at the District of Columbia Water and Sewer Authority, Patricia Lamb is responsible for planning, monitoring, and coordinating all functions relating to the distribution of drinking water, sewage collection and sewage treatment in Washington, D.C. This includes ensuring the safety and security of all operations.

In May of this year, Lamb completed the DC Water and Sewer Authority's first, enterprise-wide AWWA J100 Risk and Resilience Assessment. In her presentation, she will explain how the J100 risk assessment methodology relates to other key resources that utilities can employ to assess and manage risks, including cyber risks.

Ting Lu, Ph.D.,
Principal Engineer, Clean Water Services; |
Barry Liner, Ph.D.,
Chief Technical Officer and Director, Water Science & Engineering Center, WEF

Ting Lu is Principal Engineer at Clean Water Services, a water resources management utility located near Portland, Oregon. Barry Liner, Chief Technical Officer and Director at WEF's Water Science & Engineering Center in Washington DC

Both experts will discuss the Leaders Innovation Forum for Technology (LIFT) Intelligent Water Challenge, a joint effort of The Water Research Foundation and WEF to demonstrate the value of intelligent water systems to utilities and foster the adoption of smart water technologies. The Challenge, which is supported by ISA's Water and Wastewater Division, AWWA and the Smart Water Networks Forum (SWAN), leverages

data to help utilities better understand the dynamics of complex systems and make better decisions.

In a separate presentation, Dr. Liner will cover how WEF is addressing various industry concerns, including water conservation monitoring and performance, and the growing need for intelligent water systems. Since joining WEF in 2010, he has been responsible for leading WEF's innovation initiative, including the Innovation Pavilion at WEFTEC, the world's largest water quality conference. He also represents the water sector on the development of ISA's Certified Mission Critical Professional (CMCP) certification.

Kevin M. Morley, Ph.D.,
Manager, Federal Relations, AWWA

Kevin M. Morley, Ph.D., Manager of Federal Relations at AWWA, will update attendees on important AWWA news and trends, particularly in the area of industrial cybersecurity. Dr. Morley, is tasked with advancing the security and preparedness of the nation's critical infrastructure, facilitating the expansion of mutual aid and assistance via the Water/Wastewater Agency Response Network (WARN) initiative, and supporting the development of water sector standards and guidance for security and preparedness. Most recently, he helped develop a resource guide, Process Control System Security Guidance for the Water Sector, and a use-case tool that provides a water sector-specific approach to the NIST Cybersecurity Framework.

The symposium also includes two optional training courses:

IACS Cybersecurity Operations & Maintenance: Secure Your Control System (IC37S)

This course will provide students with the information and skills to detect and troubleshoot potential cybersecurity events as well as the skills to maintain the security level of an operating system throughout its lifecycle despite the challenges of an ever-changing threat environment.

- Length: Two days
- CEU Credits: 1.4
- Course Hours: 8 a.m. - 4 p.m.

Overview of Electrical Noise Effects on Instrumentation Control Equipment (TI21C)

This course provides an understanding of grounding, both from an electrical systems relationship and from an instrument loops relationship. The purpose of grounding and electrical systems, grounding for safety, signal noise, signal wiring systems, and methods used to reduce noise will be covered.

- Length: One day
- CEU Credits: 0.7
- Course Hours: 8 a.m. - 4 p.m.

Registration is now open

To register for the symposium and/or read more about it, visit www.isawwsymposium.com. Note that discounts are available for AWWA and WEF members. To gain answers to any questions, contact Don Dickinson, the General Chair, at ddickinson@phoenixcon.com or Joe Provenzano, the Program Chair, at provenzano2@comcast.net.

About the Symposium
Presented by the ISA Water/Wastewater Industries Division (WWID), in collaboration with the WEF Intelligent Water Technology Committee, Chesapeake AWWA Section, Chesapeake Water Environment Association, the ISA Baltimore/Washington DC Section, the WEF Automation and Info Tech Committee, and the Instrumentation Testing Association (ITA), the ISA WWAC Symposium helps professionals in the water and wastewater industries understand how instrumentation, SCADA (supervisory control and data acquisition), and automatic control applications are vital to the treatment and distribution of water, and the collection and treatment of wastewater. The symposium also provides an excellent opportunity to gain valuable technical information, networking, professional development, and continuing education credits (CEUs and PDHs).

"*I continue to receive feedback that this event is truly one of the best of its kind due to the fact that the attendees and exhibitors are focused on solutions to real-world challenges and what's actually experienced in on-the-job settings*," emphasizes **Kevin Patel**, a former symposium director of the event. "*Adding to its value are the training opportunities, and the networking, professional development and continuing education credits (CEUs and PDHs).*"

"*As an automation professional, it has been extremely beneficial to learn more about the automation profession as a whole, better understand the value and importance of ISA, and develop my career through leadership opportunities. I have been able to pick other very experienced automation engineer's minds and tap into so much subject matter expertise driving our industry today and well into the future. This involvement helped me expand my horizons and become a subject matter expert in many fields within our industry, which includes PLCs, HMIs, alarm management, control system design, and troubleshooting—to name a few. In addition to enhancing my automation skills, I've also gained a lot of soft skills, such as presenting in front of audiences, communicating with others, and managing groups of people, organizations, and my own time*."

2018 ISA Water/Wastewater and Automatic Controls Symposium
August 7-9, 2018 – Bethesda, Maryland, USA

WWAC SYMPOSIUM

2018 WWAC Symposium Program Schedule at a Glance

Presented by the Water and Wastewater Division of ISA, our symposium helps in the water and wastewater industry understand how instrumentation, SCADA (supervisory control and data acquisition), and automatic control applications are vital to the treatment and distribution of water; the collection and treatment of wastewater; and the management of storm water. The program schedule is as follows:

Monday – Tuesday, August 6-7, 2018

- Optional 2-day course: **IACS Cybersecurity Operations & Maintenance: Secure Your Control System (IC37)**, Separate Registration
- Optional 1-day course (Monday): **Electrical Noise Effects on Instrumentation Control Equipment (TI21C)**, Separate Registration
- Symposium Registration
- DC Water Blue Plains Wastewater Treatment Plant Tour (Tuesday afternoon), RSVP required

Wednesday, August 8, 2018

- Keynote speaker
- Guest Speaker
- Presentations and Papers
- Light Breakfast, Coffee Breaks and Buffet Lunch Provided
- Supplier Showcase & Vendor Presentations
- Evening Reception

Thursday, August 9, 2018

- Invited & Guest Speakers
- Presentations and Papers
- Light Breakfast, Coffee Breaks and Buffet Lunch Provided
- Supplier Showcase

Attendees at the symposium can earn up to 20 PDHs (professional development hours).

Provider #1001262

ISA has been approved as an Authorized Provider by the International Association for Continuing Education and Training (IACET), 1760 Old Meadow Road, Suite 500, McLean, VA 22102; (703) 506-3275. In obtaining this approval, ISA has demonstrated that it complies with the ANSI/IACET 1-2007 Standard which is widely recognized as a standard of good practice internationally. As a result of their Authorized Provider membership status, ISA is authorized to offer IACET CEUs for its programs that qualify under the ANSI/IACET 1-2007 Standard.

WWAC SYMPOSIUM

Earning CEUs and PDHs

Continuing Education Credits at the Symposium

At the 2018 WWAC Symposium, attendees can earn Continuing Education Units (CEUs) and Professional Development Hours (PDHs) for attending the sessions and ISA training courses. Engaging in continuing education and professional development is an ongoing requirement for many professional designations, certifications and licenses. By attending the WWAC Symposium, you can help satisfy your personal professional development and continuing education requirements.

The numbers of PDHs and CEUs for this year are:

- **Symposium attendees will receive 20 PDHs / 2.0 CEUs**
- **IACS Cybersecurity Operations & Maintenance: Secure Your Control System (IC37) - 1.4 CEUs**
- **Electrical Noise Effects on Instrumentation Control Equipment (TI21C) - 0.7 CEUs**

As an IACET authorized education provider, the ISA can issue PDHs/CEUs for symposium and training course participation.

Additionally, the ISA has also partnered with the Chesapeake Section of the AWWA and the Water Environment Federation (WEF) to certify training credits for use for state-licensed water and wastewater operators, and for state-registered professional engineers.

As part of the 2018 symposium, all attendees will have the benefit of receiving approved CEUs/PDHs for the hours spent in the training course and symposium towards their water/wastewater operator license renewals.

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WWAC SYMPOSIUM

Training Course #1 at 2018 Symposium

By Manoj Yegnaraman, Assistant Symposium Chair

We are pleased to offer two optional SCADA training courses in conjunction with the 2018 WWAC Symposium:

Monday, August 6, 2018 (1 day course)

Overview of Electrical Noise Effects on Instrumentation Control Equipment (TI21C)

Instructor: Gerald Thomas – bio
Credits: 0.7 CEUs / 7 PDHs
Course Fee: $650 ISA Members, $815 List Price

Description:

This course provides an understanding of grounding, both from an electrical systems relationship and from an instrument loops relationship. The purpose of grounding and electrical systems, grounding for safety, signal noise, signal wiring systems, and methods used to reduce noise will be covered.

You will be able to:

- Discuss the relationship between earth ground to electricity and electrical shock
- Explain why some electrical systems are connected to earth ground
- Use the National Electric Code (NEC) as standard for grounding instrument systems
- Illustrate how people become part of an electrical circuit and how to avoid it
- Define what a ground loop is
- Compare noise and interference and how they are transmitted
- Identify instrument signal wiring and conductors
- Use methods to reduce instrument noise
- Identify the effects of harmonics on power systems, control systems, and computers

You will cover:

- Grounding: NEC definitions | Earth Ground
- Considerations Relevant to Grounding and Protection from Electrical Shock
- Techniques of Grounding Wye and Delta Transformers
- Methods of Grounding Electrical Systems
- Isolated Grounding and Resistance (Impedance)
- Ground Loops in Instrumentation Systems
- Noise: What is Electrical Noise |What is Interference
- How is Noise/Interference Transmitted
- Methods of Shielding and Grounding of Instrument Systems to Reduce Noise/Interference
- Power Quality for Electronic Equipment: Need for Power Conditioners | UPS Systems, and Surge Suppression Devices
- Power System Harmonics: Their Cause and Effects | Measuring Total Harmonic Distortion and
- Pinpointing Various Sources of Harmonics

Classroom/Laboratory Exercises:

- Check body resistance and compare results
- Measuring Total Harmonic Distortion

Course Format:

The 1 day course is broken up into a morning and afternoon. Lunch is provided.

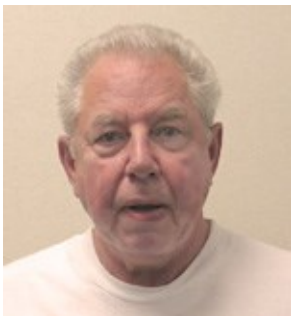
Day 1 morning:

- Course Introductions
- Pre Instructional Survey
- Section 1: Definitions
- Demonstration 1 Magnetic Lines Surround Us
- Section 2: Electrical Noise VS Safety
- Lab Exercise 1 Body Resistance
- Section 3:Anatomy of Electrical Noise
- Section 4: Power Source Grounding
- Section 5: Ground Loops
- Lab Exercise 2: Temperature Loop Problems
-

Day 1 Afternoon

- Section 6: Hazardous Area Grounding
- Section 7: Radiated Electrical Noise
- Section 8: Interference (Noise) Control
- Section 9: Power Quality
- Video – Fluke Power Quality
- Video – Fluke Harmonics
- Optional Lab 3
- Post Instructional Survey
- Final Course Evaluation

About the Instructor



Gerald Thomas is a professor emeritus of Corning Community College and is the owner of Technical Training Services, a consulting firm based in New York. He has developed and taught courses in microprocessor systems, digital electronics, and industrial control systems to engineers and technicians from industry. His engineering experience includes working for Hewlett-Packard and IBM. He presently works as a training consultant to a variety of industries. He started teaching for ISA in 1983.

For both courses, attendees can pre-register and pay via credit card at www.isawwsymposium.com/register/

WWAC SYMPOSIUM

Training Course #2 at 2018 Symposium

By Manoj Yegnaraman, Assistant Symposium Chair

Mon-Tues, August 6-7, 2018 (2 day course)

IACS Cybersecurity Operations & Maintenance: Secure Your Control System (IC37S)

Instructor: Wally Magda – bio

Credits: 1.4 CEUs /14 PDHs

Course Fee: $1,440 ISA Members, $1,800 List Price

Description:

The third phase in the IACS (industrial automation control system) Cybersecurity Lifecycle (defined in ISA 62443-1-1) focuses on the activities associated with the ongoing operations and maintenance of IACS cybersecurity. This involves network diagnostics and troubleshooting, security monitoring and incident response, and maintenance of cybersecurity countermeasures implemented in the Design & Implementation phase. This phase also includes security management of change, backup and recovery procedures and periodic cybersecurity audits. This course will provide students with the information and skills to detect and troubleshoot potential cybersecurity events as well as the skills to maintain the security level of an operating system throughout its lifecycle despite the challenges of an every changing threat environment.

You will be able to:

- Perform basic network diagnostics and troubleshooting
- Interpret the results of IACS device diagnostic alarms and event logs
- Implement IACS backup and restoration procedures
- Describe the IACS patch management life cycle and procedure
- Apply an antivirus management procedure
- Define the basics of application control and white listing tools
- Define the basics of network and host intrusion detection
- Define the basics of security incident and event monitoring tools
- Implement an incident response plan
- Implement an IACS management of change procedure
- Conduct a basic IACS cyber security audit

You will cover:

- Introduction to the ICS Cybersecurity Lifecycle
- Identification & Assessment phase
- Design & Implementation phase
- Operations & Maintenance phase
- Network Diagnostics and Troubleshooting
  - Interpreting device alarms and event logs
  - Early indicators
  - Network intrusion detection systems
  - Network management tools
- Application Diagnostics and Troubleshooting
  - Interpreting OS and application alarms and event logs
  - Early indicators
  - Application management and whitelisting tools
  - Antivirus and endpoint protection tools
  - Security incident and event monitoring (SIEM) tools
- IACS Cybersecurity Operating Procedures & Tools
- Developing and following an IACS management of change procedure
- Developing and following an IACS backup procedure
- IACS configuration management tools
- Developing and following an IACS patch management procedure
- Patch management tools
- Developing and following an IACS antivirus management procedure
- Antivirus and whitelisting tools
- Developing/following IACS cybersecurity audit methods
- Auditing tools
- IACS incident response
  - Developing/following IACS incident response plan
  - Incident investigation
  - System recovery

Classroom/Laboratory Exercises:

- Asset Inventory
- ICS Device Hardening
- Disabling USB Storage Devices
- Restrict access to USB drives
- Application Control / Whitelisting
- Microsoft Windows Software Update Services (WSUS)
- PLC backup and configuration management
- Change Management (MOC form)
- Event Detection Tracking and Log Monitoring
- Vulnerability Scanning
- Network Packet Capture Analysis
- Troubleshooting and Forensics

Course Format:

Day 1 - morning

- Welcome and Pre-Instructional Survey
- Introduction to the ICS Cybersecurity Lifecycle
- Section 1: Review of the Assess Phase
- Section 2: Review of the Design Phase
- Section 3: IACS Asset Management
- Exercise #1: Asset Inventory
- Section 3: System Hardening
- Exercise #2: ICS Device Hardening
- Exercise #3: Disabling USB Storage Devices

Day 1 - afternoon

- Exercise #4: Whitelisting
- Section 3: Access Control & Remote Access
- Section 3: Patch Management
- Exercise #5: WSUS demo
- Section 3: Malware Management
- Exercise #6: PLC backup and configuration management
- Exercise #7: Complete a MOC form

- Section 3: Information & Documentation Management

WWAC SYMPOSIUM

Training Course #2 (continued)

Day 2 - morning

- Daily Progress Reviews & Overview of Day 2 Objectives
- Section 3: Change Management
- Section 3: Physical Security
- Exercise #8: What's wrong with this picture
- Section 4: Detecting Abnormal Activity
- Section 4: Network and Host Intrusion Detection
- Section 4: Monitoring Logs
- Exercise #9: Event Detection, Tracking, and Log Monitoring
- Section 4: Periodic testing / auditing
- Exercise #10: Vulnerability scanning

Day 2 – afternoon

- Section 5: Incident Response Lifecycle
- Section 5: Incident Response Planning
- Section 5: Incident Management
- Section 5: Post Incident Analysis & Forensics
- Exercise #11: Network packet capture analysis
- Exercise #12: Troubleshooting and Forensics
- Review of Overall Course Objectives
- Post-Instructional Survey

About the Instructor

Wally Magda is an internationally recognized cyber and physical security expert for Industrial Control Systems (ICS) with over 35 years of experience. His deep security experience spans military nuclear missile command and control systems, intelligence agencies and enterprise cyber security.

Wally has been involved with the NERC CIP standards from the early days of UA 1200. As a regional NERC CIP compliance auditor he has performed over 100 NERC CIP on and off site audits in the roles of Audit Team Lead and team member. He recently retired from the Western Electricity Coordinating Council (WECC) and now conducts Industrial Control System (ICS) basic and advanced cyber and physical security training courses.

Wally's utility career began as an Instrumentation, Control and Electrical (ICE) Tech. He then progressed to managing ICS as a process control engineer. Seeing the need for cyber security professionals to assist the industrial control vertical business units he stepped into the enterprise level cyber security realm. Wally has conducted numerous cyber and physical security assessments for electric, natural gas, chemical, LNG and manufacturing facilities. Wally has presented at conferences and events such as the ICSJWG, IEEE, FBI InfraGard, UTC Telecom, WECC CIPUG and ISSA-COS. He is an ISSA Senior Member recognized for his contributions to the security community such as voluntarily teaching CISSP and Security+ prep courses at a local technical university.

Instructor Education and Certifications:

- Bachelor of Science (BSc) in Management Information Systems (MIS)
- CAP – Certified Automation Professional (ISA)
- GICSP – Global Industrial Cyber Security Professional (SANS GIAC)
- GSEC – GIAC Security Essentials (SANS GIAC)
- PSP – Physical Security Professional (ASIS)
- CISSP – Certified Information Systems Security Professional (ISC2)
- CISA – Certified Information Systems Auditor (ISACA)
- ISA99/IEC 62443 Cybersecurity Certificate (ISA)
- IAM & IEM (NSA)
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)

WWAC SYMPOSIUM

Symposium Plant Tour

From Pat Cooke, Symposium Tour coordinator

Symposium attendees to the 2018 Symposium will have the opportunity to attend a tour at **DC Water's Blue Plains Advanced Wastewater Treatment Plant**. Registered symposium attendees will receive an invitation email 3 weeks prior to the symposium. Only registered symposium attendees are able to attend the tour, and an RSVP is required.

The DC Water's Blue Plains Advanced Wastewater Treatment Plant is the largest plant of its kind in the world. On an average day, the facility treats close to 300 million gallons of wastewater and has the ability to treat over 1 billion gallons a day at peak flow. Wastewater flows in from the District of Columbia and from Montgomery and Prince George's Counties in Maryland and Fairfax and Loudoun counties in Virginia.

The plant opened as a primary treatment facility in 1937. Since that time, new processes and technologies have been added to provide advanced wastewater treatment. The Blue Plains facility now uses both primary and secondary treatment as well as denitrification, multimedia filtration and chlorination/dechlorination during the treatment process.

Note: The EMA sponsored bus will depart the Hyatt Regency at 1:00 pm and is expected to return to the hotel before 5:00 pm. Space is limited to 50 participants and attendees must sign-up beforehand. RSVP is required.

Our tour host will be Jaimie Alba PE of DC Water.

Jaime Alba is a Senior Process Control Engineer at DC Water with 15 years of experience in project management, business development, design, implementation, commissioning, start-up, and maintenance of Supervisory Control and Data Acquisition (SCADA) systems and Distributed Control Systems (DCS), in the Water/Wastewater industry, both within the USA and overseas. Additionally, with experience in the development, enhancement, and implementation of the plant-wide reliability program (criticality, PMO, ODR, and RCM, amongst others). Mr. Alba holds a Bachelor's degree in Mechanical engineering as well as a Master of Science's degree in Aerospace Engineering where he specialized in control theory.

Tour Host: DC Water

Tour Bus Sponsor: EMA Inc.


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ISA WWAC Symposium 2018
Join us for Chris Grove's presentation:
Don't Let Cyber Attacks Leave You "Dead in the Water"
August 9th, 10:30 AM

WWAC SYMPOSIUM

Full 2018 Symposium Program

The symposium program committee is pleased to announce this year's WWAC2018 program:

Monday, August 6, 2018

8:00am-4:00pm	IACS Cybersecurity Operations & Maintenance: Secure Your Control System (day 1 of 2)*
8:00am-4:00pm	Overview of Grounding and Noise Reduction for Control Equipment (1 day)*

Tuesday, August 7, 2018

8:00am-4:00pm	IACS Cybersecurity Operations & Maintenance: Secure Your Control System (day 2 of 2)*
8:00am-1:00pm	**Early Symposium Registration & Badge Pick-Up**
1:00pm-5:00pm	Tour of Treatment Plant (transportation provided)**

** Short courses are optional. Separate course registration required.*

*** Limited capacity on tour. Tour bus leaves from hotel lobby. Invitations sent out 3 weeks prior to registered symposium attendees. RSVP required.*

Wednesday, August 8, 2018

7:00am	**Registration, Badge Pick-up, & Breakfast**	
8:00am	**Opening Remarks**	
8:15am	Keynote Speaker **HRSD's Vision for Advanced Water Treatment and Managed Aquifer Recharge in Eastern Virginia, USA: Sustainable Water Initiative for Tomorrow (SWIFT)** Charles B. Bott, PhD, PE, BCEE – Director of Water Technology and Research, Hampton Roads Sanitation District (HRSD) – view abstract	
9:00am	Invited Speaker **NIST Cybersecurity Framework** Matt Barrett – Program Manager, Cybersecurity Framework, National Institute of Standards and Technology (NIST)	
9:45am	**Coffee Break & Exhibits**	
	Track 1	**Track 2**
10:30am	**Improve Plant Efficiencies & Reduce Energy Costs with Reliable and Consistent Online Nutrient Monitoring for Biological Wastewater Processes** Jay Mershon – Endress+Hauser Kelvin Hurdle – Rockwell Automation – view abstract	**Incorporating CyberSecurity into Water Utility Master Planning** Umair T. Masud – Rockwell Automation Kevin M. Morley, PhD – AWWA – view abstract
11:00am	**Keep Those Bioreactor's Bugs Happy at Night: WWTP Flow Equalization Using Existing CSO Sites** Maxym Lachance, P.Eng. – Tetra Tech Abhishek Bhargava, M.Sc., P.Eng. – EPCOR Water Services – view abstract	**Cybersecurity Before the Budget** Scott Reynolds, PE, CAP – Johns Manville – view abstract
11:30am	**Online Organics Monitoring for Rapid Process Control of Drinking Water and Wastewater Treatment Operations** Amanda Scott – Suez Water Technologies & Solutions, Analytical Instruments – view abstract	**Cybersecurity Certification Programs have Matured** Ted Stewart – exida Michael Medoff – exida – view abstract
12:00pm	**Lunch & Exhibits**	

WWAC SYMPOSIUM

Wednesday, August 8, 2018 (continued)

	Track 1	Track 2
1:00pm	**Ultra-Low-Level Turbidity Meters for Determining Continuous Membrane Integrity** Dave N. Commons – Hach Melody Whiter – Hach Bob Dabkowski – Hach- view abstract	**Leading water utilities who've successfully navigated the digital journey to true smart water** Gary Wong, PE, MBA, CPA – OSIsoft – view abstract
1:30pm	**Pressure Instrumentation Installation Tips for Challenging Applications** David Dlugos – Ashcroft Inc. – view abstract	**Where Do Intelligent Water Systems Fit in the Smart City Movement? Insights From The IEEE Smart Cities Technical Community** Amro M. Farid, Ph.D. – Thayer School of Engineering at Dartmouth Barry Liner, Ph.D., P.E., BCEE – Water Environment Federation Amymarie R. Corriveau, CBAP – CDM Smith – view abstract
2:00pm	**Taking Calibration to the Next Level: Using Documenting Calibrators** Joel Gregory, CCST-III – DC Water Robert Hopkins, CCST-II – DC Water Francisco Morales, CCST-II – DC Water – view abstract	**Where Do Intelligent Water Systems Fit in the Smart City Movement? Insights From The IEEE Smart Cities Technical Community** Smart Cities Panel Discussion
2:30pm	**Coffee Break & Exhibits**	
3:30pm	**Industrial Internet of Things (IIoT)** Jennifer M. Mansfield, PMP – Rockwell Automation – view abstract	**SCADA: Your Most Critical Asset** Dean Ford, CAP, PE – Westin Technology Solutions, LLC – view abstract
4:00pm	**Crossing the chasm with information integration interoperability and the industrial internet-of-things leveraging the strategic industry standards** Thomas Burke – OPC Foundation – view abstract	**Cloud-Based SCADA Solution to Monitor Storm Water Pumping** G. Mike Stoup, PE – McKim & Creed Mark Jones, PE – Department of Public Works, City of Virginia Beach Jason Davis, PE – McKim & Creed – view abstract
4:30pm	**Advancing national water systems with safe and secure Industrial IoT applications** Goran Novkovic, MSc, ITIL, CQA, CSQE, PEng, APM, PMP – PwC Canada – view abstract	Surge Protection Devices: Feeling lonely, please think about me! **Kalyani Ganesan – Carollo Engineers, Inc** **Manoj Yegnaraman, PE – Carollo Engineers, Inc – view abstract**
5:00pm	**General Reception and Cash Bar**	

WWAC SYMPOSIUM

Thursday, August 9, 2018

7:00am	**Breakfast**	
8:00am	**Opening Remarks**	
8:10am	Preview of next year's 2019 ISA Water/Wastewater and Automatic Controls Symposium	
8:15am	AWWA Guest Speaker Kevin Morley, PhD – Manager, Federal Relations, AWWA	
8:25am	WEF Guest Speaker Barry Liner, Ph.D., P.E., BCEE – Director of WEF's Water Science & Engineering Center	
8:35am	Guest Speakers **The 2018 LIFT Intelligent Water Challenge: Using a Challenge Prize to Drive Adoption of Intelligent Water Technology** Tad Slawecki – LimnoTech Barry Liner, Ph.D., P.E., BCEE – Director of WEF's Water Science & Engineering Center – view abstract	
9:00am	Invited Speaker **AWWA-J100 Risk Assessments in the Water Sector** Patricia Lamb – Program Manager, Office of Emergency Management, DC Water – view abstract	
9:30am	2017 Water/Wastewater Automatic Control Symposium / Water Wastewater Industry Division Awards	
9:45am	**Coffee Break & Exhibits**	
	Track 1	**Track 2**
10:30am	**DC Water's SCADA Infrastructure Standardization Program – Paving the Way into the Future** Mark Cusac, PE – CDM Smith Samant Garg, PE – DC Water Duncan Mukira, PE – DC Water Matt Lick – CDM Smith Josh Gelman, PE – CDM Smith – view abstract	**Don't Let Cyber Attacks Leave You "Dead in the Water"** Chris Grove – Indegy – view abstract
11:00am	**Facility P&ID Drawings: What they are and Why you need them!** Graham Nasby, P.Eng, PMP, CAP – City of Guelph Water Services – view abstract	**Secure PHA Review for Managing ICS Risks** Jim Gilsinn – Kenexis – view abstract
11:30am	**SCADA + Integrated Asset Management = Cost Savings** Alan Hudson – Trihedral Engineering – view abstract	**The need to monitor process sensors for security & safety** Joe Weiss – Applied Control Solutions Andy Pascoe – SIGA OT Solutions
12:00pm	**Lunch & Exhibits**	

ISA Water/Wastewater Industry Division

WWAC SYMPOSIUM

Thursday, August 9, 2018 (continued)

1:00pm	**Using DNP3 to Solve Water & Wastewater Remote SCADA Challenges** Philip Aubin – Schneider Electric – Process Automation, SCADA & Telemetry – view abstract	**Why Operational Technology (OT) Deep Packet Inspection is Necessary for Comprehensive SCADA Security** Ken Frische – Ultra Electronics, 3eTI – view abstract
1:30pm	**Beyond Modbus: Designing SCADA with Other Open SCADA Protocols** Jacob Brodsky, PE – Jacobs, National Security Solutions – view abstract	**Cyber Secure & More!** Jason Hamlin – Lynchburg Regional Wastewater Treatment Plant Carter Farley, PE – InstruLogic LLC – view abstract
2:00pm	**Need more data for asset management & process improvements? Look in your own back yard** Jason Norris – Phoenix Contact Dave Eifert – Phoenix Contact – view abstract	**Strathcona County Utilities SCADA system upgrade** Mark A Williams, CCST – Strathcona County Utilities – view abstract
2:30pm	**Coffee Break & Exhibits**	
3:00pm	**Machine Learning for Optimized Plant Operations** James Ruiz – ITG Technologies Yandy Perez-Ramos – ITG Technologies – view abstract	**Implementing E-Logging at Thames Water Utilities** David Dollar – j5 North America Anthony Tyler – Thames Water Utilities Jeremy Westwood – j5 International Ltd. – view abstract
3:30pm	**Extracting Value from Data in Real-time** Christian Hübner – ifak e.V. Nico Suchold – ifak e.V. Leiv Rieger, PhD, P.Eng. – inCTRL Solutions Inc. Oliver Schraa – inCTRL Solutions Inc. Ivan Milette – inCTRL Solutions Inc. – view abstract	**Summary of the King County, Washington, West Point WWTP Flood of 2017** Brian Lee Mast, PE – Copper Bell Consulting LLC – view abstract
4:05pm -4:20pm	**Closing Remarks**	

Download the ISA WWAC Symposium App

ISA has created an app for this year's symposium. The WWAC mobile app features a wide range of interactive features to enhance your event experience. This mobile event technology platform will allow attendees, speakers, exhibitors, and sponsors to navigate the event program and location, communicate and connect with other event participants, gather critical industry supplier information, share attendee experiences compete with fellow attendess for leaderboard statues, virutal drawings for prizes, AND MUCH MORE!

How to download the app:

- Download the Socio App on your iPhone or Android
- After the app is installed, you will need to sign up and setup you attendee profile
- Go to the Events Tab and select **Search for an Event**
- **Enter (Search)**: 2018 Water/wastewater and Automatic Controls Symposium
- Select **Join Now** and enter the passphrase: **WWAC2018**

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WWAC SYMPOSIUM

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WWAC SYMPOSIUM

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Kimberly Belinsky, ISA

Symposium Registration

Registration for the symposium is now open! Attendees can register online or via telephone with a credit card.

www.isawwsymposium.com/register

Symposium Registration (Aug 7-9, 2018) includes:

- 2 full days of papers and presentations
- networking events
- tour of a local water/wastewater afternoon of Tues, Aug 7
- admission to supplier showcase
- light breakfasts on Aug 8 and Aug 9
- full buffet lunches on Aug 8 and Aug 8
- evening reception on Wednesday, Aug 8 with cash bar and 2 free drink tickets
- name badge
- list of attendees with contact information
- copy of symposium proceedings
- There are also two optional training courses (additional course fees applies)

Full Symposium registration

List Price	$500
ISA Members:	$375
AWWA / FSAWWA members	$425
WEF / FWEA / ITA members:	$425
Students:	$175
Authors/Speakers:	$175

Note: Add $50 to above fees after July 1, 2018

Optional Training Courses (Aug 6-7, 2018):

Overview of Electrical Noise Effects on Instrumentation Control Equipment (TI21C) – Mon, Aug 6 (1 day)
Instructor: Gerald Thomas – bio
Credits: 0.7 CEUs / 7 PDHs
Course Fee: $650 ISA Members, $815 List Price

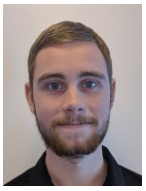
IACS Cybersecurity Operations & Maintenance: Secure Your Control System (IC37S) – Mon-Tues Aug 6-7 (2 days)
Instructor: Wally Magda – bio
Credits: 1.4 CEUs /14 PDHs
Course Fee: $1,440 ISA Members, $1,800 List Price

WWID SCHOLARSHIPS

2018 Scholarship Winners Announced

The ISA Water & Wastewater Industries Division (WWID) is pleased to announce the winners of the 2018 WWID Student Scholarships. This year's recipients are Ben Plucinski and Zain Jawad. Each received a $1000 USD scholarship prize to help with their school costs. Congratulations!

Ben Plucinski
University of Massachusetts Amherst
Amherst, Massachusetts, USA



"*Thank you ISA WWID for your generosity! This scholarship will help me continue my passion for engineering as I progress with my major. I am incredibly grateful for this award and would once again like to thank you for your generosity.*"

Biography: Benjamin Plucinski is pursuing a Mechanical Engineering at the University of Massachusetts Amherst. He is originally from Hudson, MA and has always had a passion for engineering. He has just begun his search for summer internships and planning his semester abroad for the upcoming year. His greatest accomplishment is designing a 3D-printed prosthetic hand that allowed a girl in his local community to play softball, and then later revising the design to also function for golf.

Zain Jawad
University of Michigan – Dearborn)
Dearborn, Michigan, USA

"*Thank you very much for taking the time to consider my application. I am extremely grateful and humbled that my application was selected to receive this award. I am extremely motivated to continue pursing my professional aspirations with consistent levels of high achievement.*"

Biography: I am a junior at the University of Michigan – Dearborn, pursuing a degree in biochemistry. Apart from my studies, I have a leading role in a few student organizations on campus which engage in the local community. During my free time I am an avid soccer fan and enjoy reading sci-fi fiction novels.

Information about the 2019 ISA Water/Wastewater Industry Division scholarship will be made available this fall.

ISA STANDARDS

New ISA99 international standard on developing products that are cybersecurity by design

The ISA/IEC 62443 series of standards, developed by the ISA99 committee as American National Standards and adopted globally by the International Electrotechnical Commission (IEC), is designed to provide a flexible framework to address and mitigate current and future security vulnerabilities in industrial automation and control systems (IACS).

A newly published standard in the series, ISA/IEC 62443-4-1-2018, *Security for Industrial Automation and Control Systems Part 4-1: Product Security Development Life-Cycle Requirements*, specifies process requirements for the secure development of products used in an IACS. It defines a secure development life-cycle for developing and maintaining secure products. This life-cycle includes security requirements definition, secure design, secure implementation (including coding guidelines), verification and validation, defect management, patch management and product end-of-life.

These requirements can be applied to new or existing processes for developing, maintaining and retiring hardware, software or firmware for new or existing products. The requirements apply to the developer and maintainer of a product, but not to the integrator or user of the product.

"Designing security into products from the beginning of the development lifecycle is critical because it can help eliminate vulnerabilities from products before they ever reach the field," emphasizes Michael Medoff of exida, who led the ISA99 development group for the standard. "We all know how difficult and expensive it can be to constantly have to patch software in the field. The new standard gives us a real opportunity to break the cycle of frequent security patches and to produce products that are secure by design."

The ISA99 standards committee draws on the input and knowledge of IACS security experts from across the globe to develop consensus standards that are applicable to all industry sectors and critical infrastructure. Previous documents in the ISA/IEC 62443 series cover terminology, concepts, and models; establishment of an IACS security program; patch management; and system security requirements and security levels. All may be accessed at www.isa.org/findstandards .

For more information on ISA99 and the ISA/IEC 62443 series of standards, contact Eliana Brazda, ISA Standards, ebrazda@isa.org or +1-919-990-9200.

View the entire ISA Standards Catalog at www.isa.org/standards/

ISA STANDARDS

ISA Publishes ISA106: Procedural Automation for Continuous Process Operations

The retirement of experienced engineers has long been of concern across the industrial sectors as companies have tried to find effective ways to capture and transmit vital knowledge to new generations of automation professionals.

The work of the ISA106 standards committee, Procedure Automation for Continuous Process Operations, is intended to provide a framework for building some of that knowledge into automated procedures. This is especially important for such plant procedures as start-up, shutdown, product grade change and the like - as studies have shown that plants are particularly vulnerable to safety incidents caused by inexperienced operators performing unfamiliar manual functions during such key operations.

ISA106 has completed a new technical report that describes work processes involved with automating procedures that monitor and control continuous processes. ISA-TR106.00.02-2017, *Procedure Automation for Continuous Process Operations - Work Processes*, applies to new process facilities as well as to control upgrades to existing facilities.

The technical report is not intended to instruct organizations on how to identify and justify projects or to provide the details of work processes, but rather to set forth a generic set of work processes that provides guidance for procedure automation project execution phases.

"The work processes used by end users are critical for the successful completion of capital projects and projects funded out of operating expenses," points out Dave Emerson of Yokogawa, who serves as ISA106 editor. "The new technical report provides a guide to how end users' work processes can be designed to account for the automation of continuous process operations.

"The report reflects the combined knowledge and foresight of engineers from many different end users, automation suppliers, and consultants," Emerson adds. "That knowledge can and should be used by owner-operators to improve their own work processes, by automation suppliers to improve products and services, and by consultants to help improve end users and automation suppliers to make the process industries safer and more efficient."

To date, ISA106 has focused on the current state of the continuous process industries. The committee will now begin work on a requirements-based standard that will draw on the information developed it its earlier work.

Visit www.isa.org/findstandards for information on viewing or obtaining the ISA106 technical report. For information about ISA106, contact Charley Robinson, ISA Standards, crobinson@isa.org.

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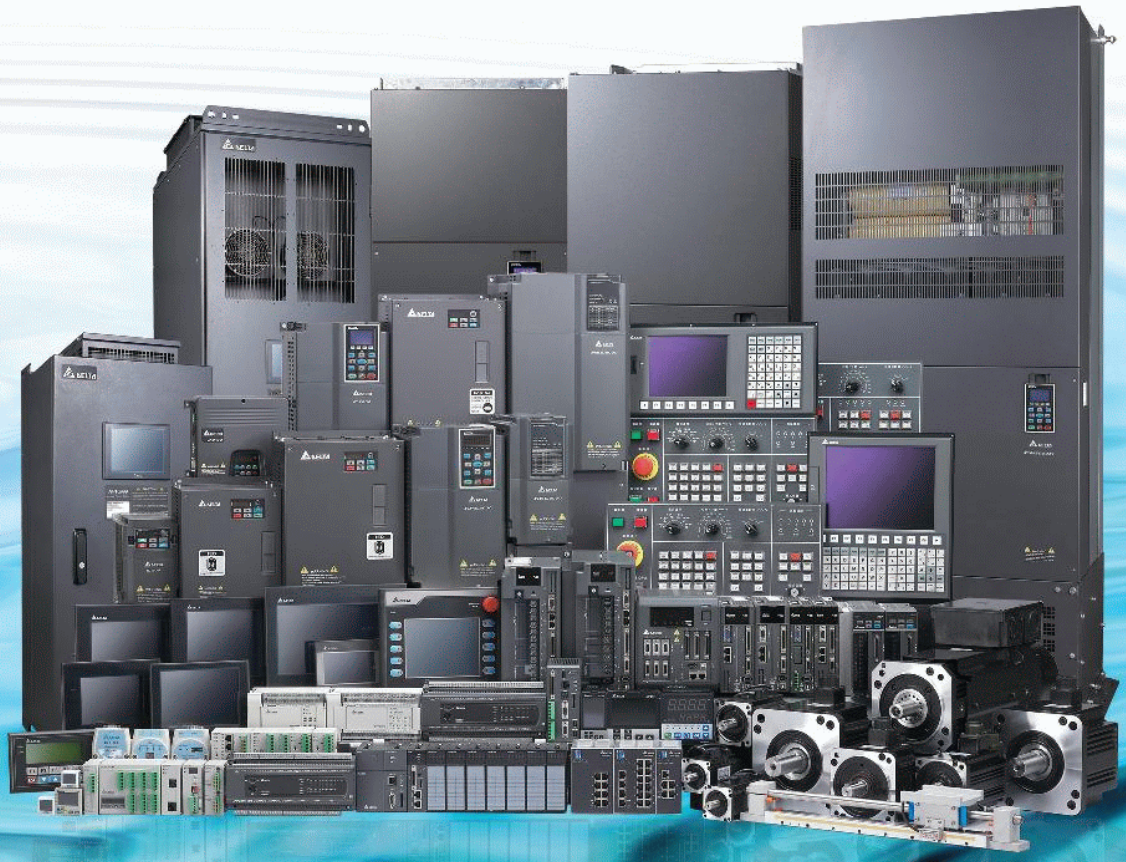

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TECHNICAL ARTICLE: APPLICATIONS

Using DNP3 Protocol for Backup Store and Forward Data-Logging at Guelph Water

By Kelly Gribbons, Graham Nasby, and Daniel Leskovec

In modern water utilities, SCADA (supervisory control and data acquisition) systems play a central role within operations. SCADA systems enable operations staff to monitor and interact with process equipment, run automatic control programs, and log critical compliance data. For example, it is now very common for pumping stations and treatment plants to run under fully automatic SCADA control, with the operators making periodic setpoint adjustments rather than the traditional role of turning valves or starting/stopping pumps.

SCADA systems are complex, with many layers of equipment and software contributing to their overall operation. In a typical SCADA system these layers include: field devices (pumps, valves, and instrumentation), field wiring, controllers (PLC, PAC, RTU, etc.), a control system network, servers, view terminals/workstations, process historian, and reporting servers. All of these layers must work together, on a 24/7 basis, to enable a SCADA system to function correctly. These layers are shown in Figure 1.

However, no technology is perfect and failures are possible in any SCADA system, no matter the quality of the components are used. Thus, it is important that SCADA systems are designed so they have built-in redundancy so that a component failure does not take the system offline or interrupt the logging of critical compliance data.

Importance of Data Logging

The data logging of compliance data by SCADA systems is particularly important for water utilities. For example, in Ontario Canada, Regulation 170 of the Safe Drinking Water Act requires that chlorine residual concentrations for drinking water be logged every 5 minutes at water treatment facilities. It is through the logging of chlorine residuals (expressed in mg/L) that the effective secondary disinfection of water can be proven to be within regulatory compliance. Thus, to prove regulatory compliance, a SCADA system's data logging feature must always be functioning.

Backup Logging with DNP3

Guelph Water, like most utilities, has had a SCADA system for many years. In 2017, a risk assessment by the SCADA department identified that the SCADA process historian was a potential single point of failure. A process historian is the server that records process data, including regulatory compliance data, for the SCADA system. Thus in 2017-2018, Guelph Water undertook a project to add a backup data-logging system to its SCADA system using the DNP3 protocol. DNP3 stands for Distributed Network Protocol Version 3.

Designed to supplement the primary SCADA system, the DNP3 backup data logging solution consists of a backup historian and DNP3-enabled datalogger PLCs (programmable logic controllers) that use the DNP3 protocol to push critical process data up to the backup historian. So, if there was ever an outage in the main SCADA system, the fully-independent

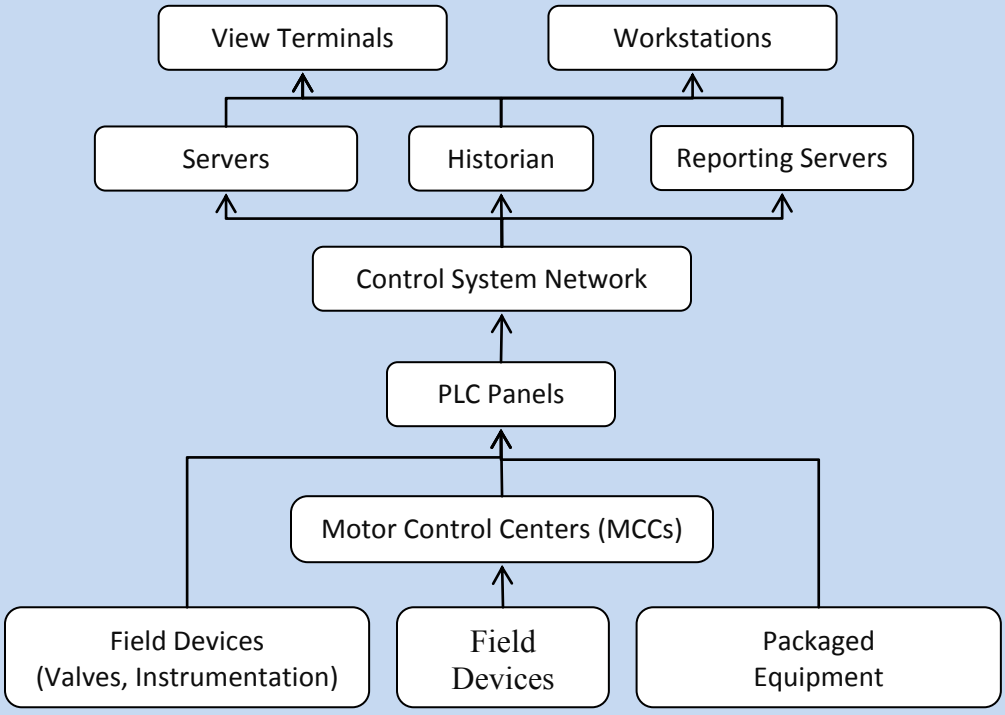

Figure 1- Layers in a Typical SCADA System

DNP3 data logging system will continue logging data to its centralized backup historian.

The DNP3 protocol was chosen for several reasons. These included automatic timestamping of process data at the PLC, built-in store/forward data-logging, automatic time synchronization, and minimal configuration needed to setup data points. Since DNP3 is built on the concept of time-stamped events (stored process value readings that each have a date/time stamp associated with them), DNP3 can easily tolerate communication outages unlike other real-time SCADA protocols such as MODBUS, ProfiNet, DeviceNet, ControlNet, CIP, Ethernet/IP, and BSAP. Unlike other real-time protocols, in the event of a communications disruption, DNP3 data events are simply stored in a time-stamped memory buffer and then forwarded when communications resume.

The DNP3 protocol originated from the electric power industry where it is used for communications between electrical substations. DNP3 was first developed in 1990 by Westronic Inc. (now GE Harris) and was published as an open standard in 1993. Since then, it has become widely used for electrical substations across North America, along with its successor protocol IEC-61850. In 2000, DNP3 was standardized as IEEE communications standard 1379-2000 and uses IEC-62351-5 for authentication.

DNP3 Primer

DNP3 (Distributed Network Protocol version 3.0) is a set of conventions by which devices can talk with each other, typically within automatic control systems. Developed primarily for SCADA systems with remote sites that communicate back to a central computer, DNP3 is an ideal protocol for SCADA data logging.

DNP3 protocol has the flexibility to log data on set intervals (say every 5 minutes) or to only log values when a number changed more than a set threshold amount. In the implementation at Guelph Water, we only used the feature of logging data on set time intervals. The fixed time interval was chosen so that data logged could be used to meet the 5 minute regulatory logging interval requirement.

The major strength of DNP3 is its ability to do automatic/store forward datalogging as part of the protocol – with no special programming required. In other non-DNP3 systems, complex scripting and custom data buffers are often needed on both the PLC and Historian sides to implement store/forward datalogging. DNP3 avoids all of this complexity. **As part of the DNP3 protocol, the store/forward datalogging feature is simply part of the protocol**.

DNP3 is also versatile in the way it can communicate, including Ethernet, serial wire connections, fibre optic systems, as well as cellular and radio-based systems. DNP3 protocol also can be setup to communicate to multiple master stations. DNP3 has four levels of implementation, from the simplest (Level 0) to the most feature-rich (Level 4). For example, automatic store and forward data-logging is part of the DNP3 Level 2 and above feature sets.

DNP3 is not the first technology to implement "part-of-the-protocol" automatic store and forward data-logging, but it is unique in that it is an established and publicly-available published standard. Thus, DNP3, due to its dominance and availability in the electric power industry, has wide range of controllers and SCADA software packages available that support it. Many of the other non-DNP3 store/forward data-logger technologies in the market place are vendor-specific, proprietary, and/or require extensive custom scripting to implement.

DNP3 System Components

The DNP3 data-logging system at Guelph Water was designed with the goal of avoiding single points of failure. Thus, to gather data from the field, the existing SCADA PLCs were not used (as the existing PLCs could be considered a single point of failure). Instead, the DNP3 system has its own dedicated data-logger PLCs that collect process data by being "wired-into-the-loop" of key analog 4-20mA signals. These dedicated data-logger PLCs, which natively support DNP3 protocol, then push data up to the DNP3-enabled backup historian.

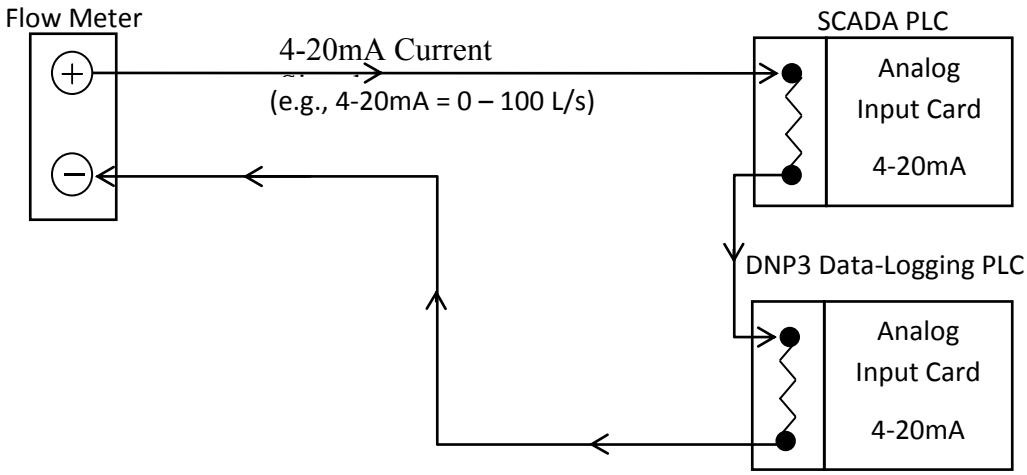

Figure 2 – Wiring a Datalogger into a 4-20mA Loop

For the DNP3 data-logger PLCs, several hardware options were considered. For Guelph Water, the Allen-Bradley Micrologix 1400 PLC was selected for its low cost and the ability to program it with existing programming software that

Guelph Water already had licenses for. As a key feature, the Micrologix 1400 natively supports the DNP3 protocol through its Ethernet port, including DNP3's automatic store/forward data-logging feature. The Micrologix 1400 also has a large enough onboard memory buffer to store at least a week of logged data in its store/forward buffer. With an appropriately-sized buffer, DNP3 store/forward feature works automatically with no operator or programmer intervention required.

The Micrologix 1400 also offers an inexpensive 4 channel isolated analog input card, which can be used to read existing 4-20mA signals by "wiring-into-the-loop". To keep costs down, only signals of key regulatory importance at well sites are logged by Guelph Water's DNP3 system: well flow rate, point-of-entry chlorine residual, point-of-entry flow rate, and contact chamber level. How the 4-20mA signals are read by the system by "wiring-into-the-loop" is shown in Figure 2.

Selecting a backup historian (and associated communications driver) that supports the full DNP3 store/forward data-logging feature proved to be challenging, as there were many products in the market place that only supported DNP3 Level 0, but not the required DNP3 Level 2. (DNP3 Level 0 does not include the store/forward data-logging feature.) It was found that several software packages also required various add-on modules to support DNP3 which were both expensive and difficult to configure. In the end, Schneider Electric's ClearSCADA software was selected as it has both native DNP3 store/forward data-logging support and a built-in process historian. Guelph Water also had previous experience using ClearSCADA for its district metered area (DMA) flowmeters, so there was familiarity with the software.

For communications between the Micrologix 1400 PLCs and the ClearSCADA software, the existing Ethernet-based Guelph Water SCADA wide-area network was used. Each data-logging PLC, as well as the ClearSCADA server, was assigned a unique static IP address. Each data-logging PLC was then configured to communicate with the server directly using the DNP3 protocol on Ethernet port 20000.

Micrologix 1400 Configuration

Setting up the Micrologix 1400 to communicate via DNP3 required some special configuration that was unique to this specific PLC. From the RSLogix 500 programing software, this was accomplished by using two configuration windows. The first step was to Enable DNP3 over Ethernet communications (Figure3), after which the two tabs for DNP3 communications appeared: The "DNP3 Slave" tab was used to setup the DNP3 data points using the Micrologix 1400 memory registers. The "Chan 1- DNP3" tab was not used; it is for configuring pass-through comms with DNP3 serial devices, which we were not using.

The "DNP3 Slave" tab was used to configure how the DNP3 data types are mapped to the Micrologix 1400 registers, including which registers to use for the data and configuration of individual data points (Figure 4). A thorough understanding of how the DNP3 protocol works was needed to configure this tab. For Guelph Water, the only features we used were store/forward data-logging and a single DNP3 class (Class 1) to set the logging interval. Fortunately, Rockwell Automation provided an extensive PowerPoint presentation that explained how to do this. The Micrologix 1400 manual was also a good resource. The actual setup took about 15 minutes once the correct configuration values were determined.

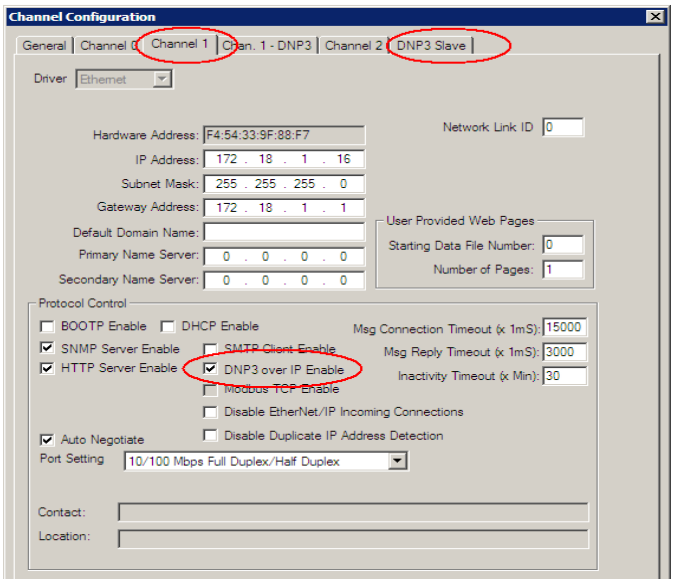

Figure 3 - Enabling DNP3 comms in the Micrologix 1400

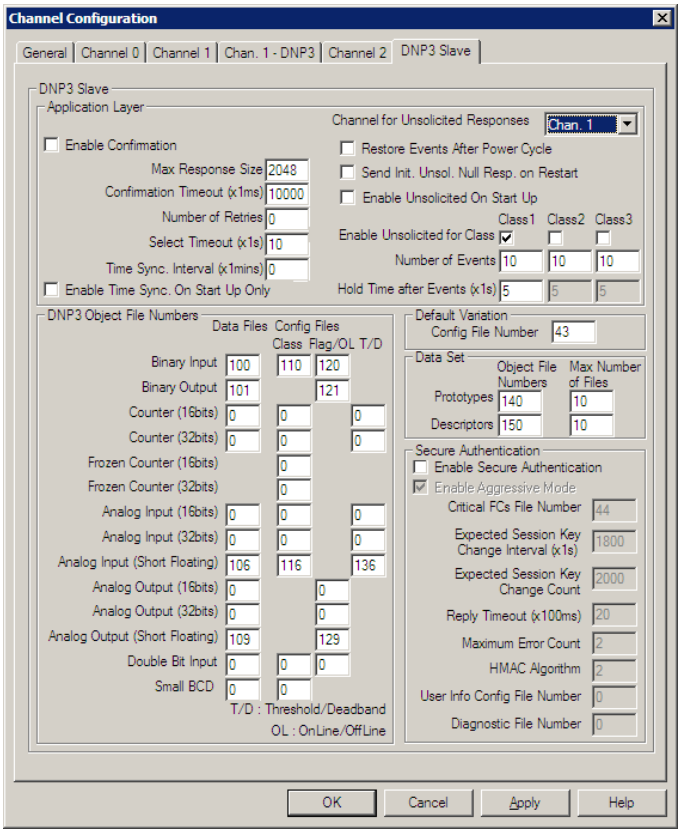

Figure 4 - Config of DNP3 data points on Micrologix 1400

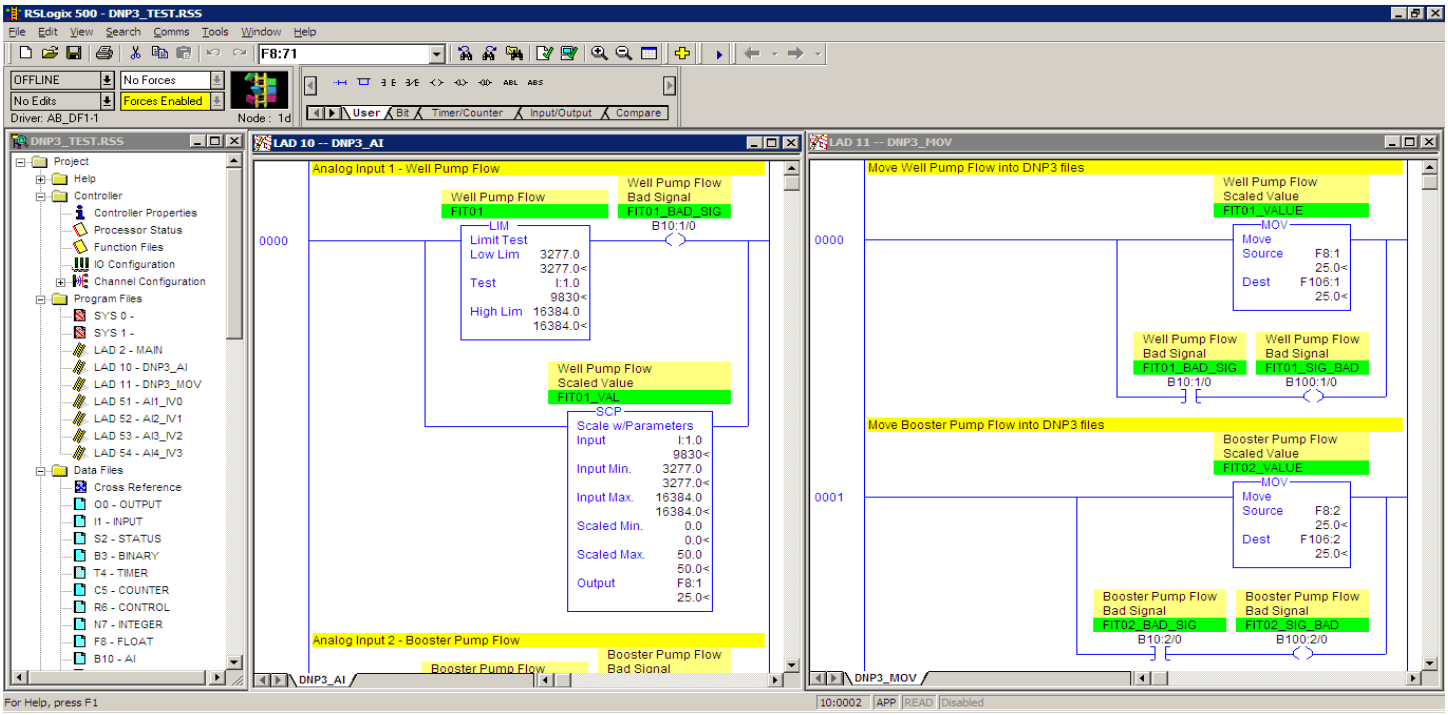

Figure 5 - Screenshot from Micrologix 1400 showing code to prepare DNP3 data points

The native memory model of the Micrologix 1400 consists of numeric data files that each consist of 1 to 255 elements in an array. The data files themselves are numbered from 3 to 255, and each data file can be defined as one of the native "SLC500" data types, namely Float, Bit, Integer, Counter, or other types.

The DNP3 native datatypes are based on object groups, which are, in order: Binary Input, Binary Output, Counter (16 bits), Counter (32 bits), Frozen Counter (16 bits), Frozen Counter (32 bits), Analog Input (16 bits), Analog Input (32 bits), Analog Input (Short Floating), etc.

For our application, the Micrologix 1400 was set up with data file F106 (with 20 elements) to map to the DNP3 "Analog Input (Short Floating)" registers (on indices 0-19) for our process values.

Within the Micrologix 1400 itself, a subroutine was added to scale the PLC's raw 4-20mA inputs to Engineering Units (e.g., 4-20mA = 0-100 L/s) and then another subroutine was added to copy the scaled engineering value to the appropriate DNP3 register in F106. Similar code was put in place to detect signal failures and map these "error bits" to the DNP3 "Binary Input" registers. Some sample code from the Micrologix 1400 can be seen in Figure 5.

Lastly each Micrologix 1400 was assigned a static IP address, so the ClearSCADA server would know where to find it on the SCADA network.

ClearSCADA Configuration

Configuring the ClearSCADA configuration was straight-forward. Within the ClearSCADA interface, a series of DNP3 outstation objects were added to talk to each of the Micrologix 1400s. Within each DNP3 outstation object, a grouping of DNP3 "Analog Input (Short Floating)" objects were then added – one for each DNP3 address configured on that particular Micrologix 1400. DNP3 "Binary Input" objects were then added for the binary points as defined on each of the PLCs. A screenshot of the ClearSCADA configuration can be seen in Figure 6.

Putting it all together

Rolling out the DNP3-based data-logging system is taking place in several stages. First a bench-test was done to ensure the ClearSCADA software and Micrologix 1400 would communicate with each other. ClearSCADA was installed onto a Virtual Machine running on a laptop and it was tested with a single Micrologix 1400.

Next a Phase 1 test was started where Micrologix 1400s were installed at 5 sites and a ClearSCADA virtual machine was installed on a production SCADA server.

After the Phase 1 test is completed, the system will be rolled out to the remaining 30 facilities at Guelph Water. In each case, the Micrologix 1400 will be installed into the existing PLC panel where it could be powered from the existing UPS (uninterruptable power supply) and spliced into the existing 4-20mA analog signals.

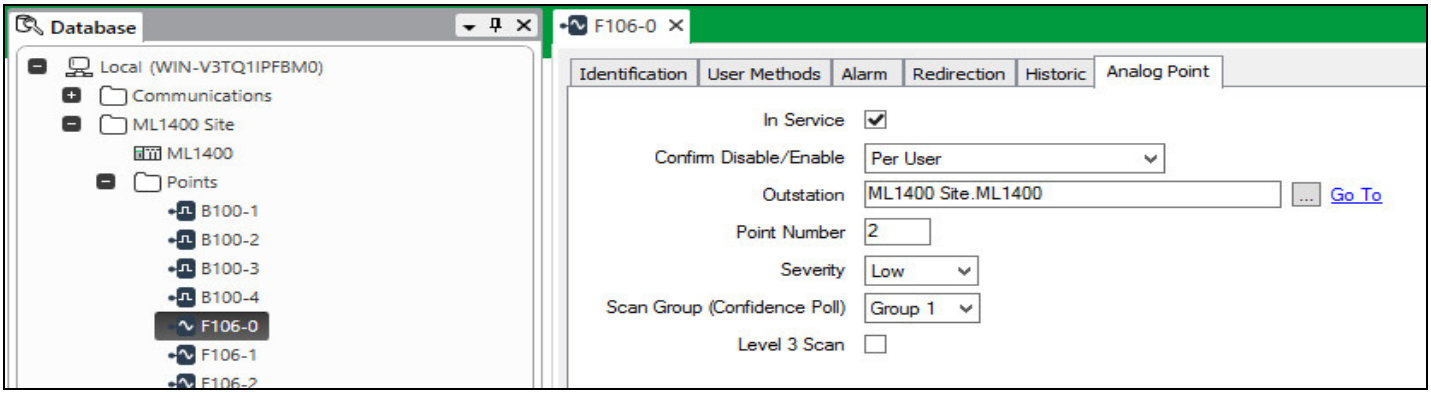

Figure 6 - ClearSCADA configuration for DNP3 communications to Micrologix 1400s

Making the Backup Datalogger Data Accessible

In the past, the main issue with most backup data-logger systems was how to get access to the data. The new DNP3-based system at Guelph Water has been specifically designed so the backup data is accessible at all times by operators and compliance staff. All data gathered by the DNP3 system is stored on the centralized ClearSCADA backup historian. This in turn is accessible via the web-based e.RIS reporting software that Guelph Water users. Inside the e.RIS reporting software, the ClearSCADA backup historian is configured as a selectable data source that can be queried just like the SCADA systems' main process historian. Gone are the days when someone has to go to a data-logger to manually extract data!

Summary

By using the DNP3 protocol to implement a backup data-logging system, Guelph Water is able to enjoy the benefits of using a publicly-available standardized communications protocol that natively supports store/forward data-logging. By utilizing a technology that has a strong track record from the electric power industry, Guelph Water has been able to implement a reliable and cost-effective solution that enhances the robustness of its overall mission-critical and compliance-critical SCADA system.

References:

- DNP3 Protocol Association website: www.dnp3.org
- DNP3 Q&A with Schneider Electric. http://www.remotemagazine.com/main/articles/dnp3-qa-with-schneider-electric/ Remote Magazine. Sept 16, 2013.
- "Configuring Ethernet DNP3 Slave on the Micrologix 1400." PowerPoint slide deck. Mark Tabler. Rockwell Automation.
- User Manual: Micrologix 1400 Programmable controllers. March 2017. Allen-Bradley. Rockwell Automation.

About the Authors

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The Chesapeake Section, American Water Works Association is honored to be a technical sponsor for the ISA Water/Wastewater and Automatic Controls Symposium.

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Our own conferences are quickly approaching too, and we welcome you to join us in these diverse and important learning and networking opportunities!

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WWID is on LinkedIn

LinkedIn is a social media site that is geared towards professionals and business people. Located at **www.LinkedIn.com**, the site features online profiles, discussion groups and tools for identifying and keeping track of contacts. As of this year, LinkedIn has over 500 million members in more than 200 countries and territories.

In an effort to provide the latest news and information relating to instrumentation and control systems in water and wastewater management, the Water and Wastewater Industry Division has a LinkedIn group. We invite anyone affiliated with or interested in the water and/or wastewater industries to join the group and participate in the dialog.

You may use the following link to join the group **http://www.linkedin.com/groupRegistration?gid=2031271**

SOCIETY NEWS

Engage in important ISA activities, events and opportunities during the summer

By Brian Curtis, 2018 ISA Society President

In my column for this month, I want to draw attention to some important governance activities as well as highlight some upcoming section and division events and training opportunities.

First of all, voting for Society leaders begins 15 June 2018. An experienced and qualified slate of candidates is vying for ISA leadership roles. It's essential that all eligible members exercise their right and privilege to determine ISA's leader profile and composition for 2019, and help shape the future direction of the association. The voting period ends 20 July so vote early.

In addition, many ISA's District Council Meetings are taking place over the summer and fall. These meetings help districts map out their section priorities and activities for the next 12 months and also serve as vital starting points for developing potential ISA leaders.

Below is a schedule of upcoming District Council Meetings.

- District 4 DLC: 16 - 17 June (Brazil)
- District 5: 16 June (US)
- District 9 DLC: 7 - 8 July (El Salvador)
- District 14 DLC: 30 August (India)
- District 11 DLC: 15 - 16 September (US)
- District 1 & 2: 12 October (Canada)

Also, please put ISA's Annual Leadership Conference-to take place 15-19 October in Montreal-on your schedule. It is important that every section nominate a delegate to represent it at the Council of Society Delegates meeting, which also will convene at this time. Attendees will vote on any proposed changes to ISA bylaws.

ISA's season of technical symposia is in full swing. Don't let these outstanding learning, training, professional development and networking opportunities pass you by. You'll meet face to face with renowned experts and presenters, hear first-hand about the latest technologies and trends, and gain the high-value, peer-reviewed technical content that will keep you and your skills on the cutting edge.

I also want to highlight ISA's advances in the area of industrial cybersecurity.

For the third year in a row, ISA provided advanced industrial cybersecurity training and on-site technical assistance in support of the US National Guard's national cyber-operations exercise, Cyber Shield. More than 800 soldiers, airmen and civilians from across 40 US states and territories participated in the event, which was held 6-18 May at Camp Atterbury in Indiana.

ISA was selected as a Mission Partner of the National Guard due to its leadership and experience in developing the world's only consensus-based series of industrial cybersecurity standards, ISA/IEC 62443. These standards, which serve as the basis for ISA cybersecurity training, protect the industrial automation and control systems (IACS) and networks that operate OT (operational technology) machinery and associated devices within critical infrastructure.

We're also noticing growing demand for ISA's advanced cybersecurity courses throughout the globe, particularly in Europe. We met our cybersecurity training goals during the second quarter of the year and expect the positive sales trends to continue throughout the year.

As you likely know, ISA offers the most comprehensive set of industrial cybersecurity certificate programming and aligned training courses available-covering the complete lifecycle of IACS assessment, design, implementation, operations, and maintenance.

As a reminder, all ISA sections that sponsor an ISA cybersecurity course (or any other type of ISA training) in their area receive a portion of the training revenue. This is a great opportunity for sections to gain visibility, attract potential new members, and accrue funding for section activities and programs.

In closing, for those that are soon to depart for vacation-what we refer to as "holiday" in Europe-I hope you will have a restful and enjoyable break. For those who will be taking a break later in the year, remind yourselves that each day brings you closer to some well-deserved leisure time.

Best wishes to all for a great and rewarding summer.

Brian Curtis
2018 ISA Society President

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For more information please visit us in our table No. 25 at ISA WWAC Symposium, Hyatt Regency Bethesda, August 8-9 2018 or contact us by Email ran.kedem@RealiteQ.com

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AUTO-QUIZ: BACK TO BASICS

Review of EMI Best Practices

Question: To minimize electrical interference when AC power and DC signal wiring meet in a control panel, it is best to:

a) use different size wire

b) cross the wires at 90 degrees

c) run the wires in parallel to each other

d) twist the AC wires around the DC wires

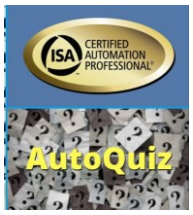
e) none of the above

Answer:
Using different size wire will have no effect on the electrical interference. Running the wires in parallel to each other will increase the effects of interference. Twisting the AC wires around the DC wires will also increase the effects of interference.

The correct answer is B, crossing the wires at 90 degrees is the best practice. This minimizes the exposure of the wires to each other, and therefore minimizes the effects of interference.

Reference: Programmable Controllers, Fourth Edition. Available for purchase at www.isa.org/books/

This automation industry quiz question came from the ISA Certified Control Systems Technician Program.



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. Click this link for information about the CAP program. The following question comes from the CAP study guide, Performance Domain VI, Operations and Maintenance. Long-term support of the system.

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.

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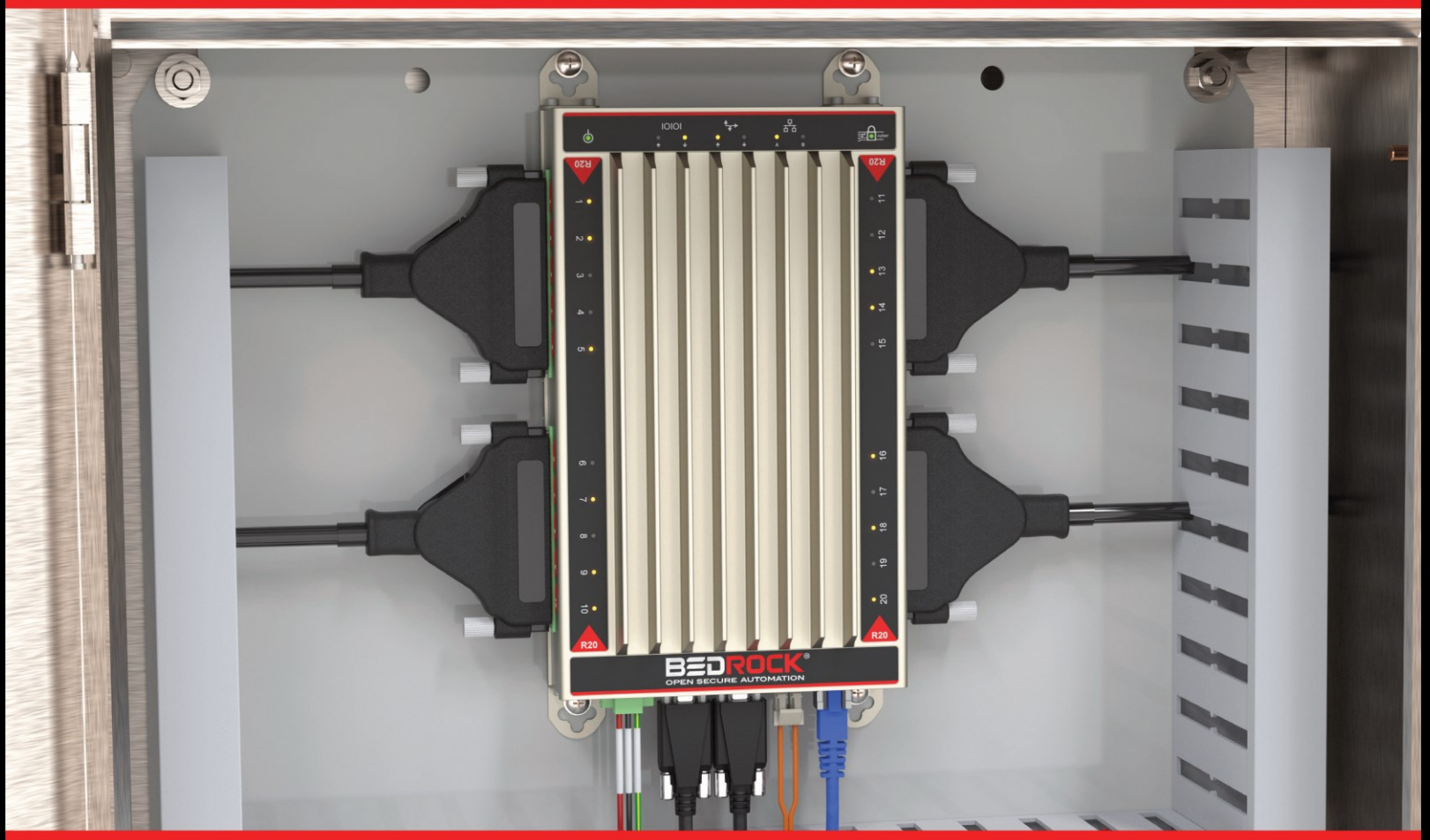

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2018 Symposium Details
Date: Tues-Thurs, August 7-9, 2018
Location: Bethesda, Maryland, USA (near Washington DC)
Venue: Hyatt Regency Bethesda
General Symposium Chair: Don Dickinson
Assistant Symposium Chair: Manoj Yegnaraman
Website: www.isawwsymposium.com

Future Symposium Dates – Save the Date
2019: August 6-8, 2019 – we return to Orlando, Florida, USA
2020: August 4-6, 2020 – California, USA (City TBD)
2021: August 3-5, 2021 – we return to Orlando, Florida, USA

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 holds the annual ISA Water/Wastewater and Automatic Controls Symposium each summer, which features presentations by industry practitioners and published proceedings. 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 and Automatic Controls

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- Go to the Events Tab and select **Search for an Event**
- **Enter (Search)**: 2018 Water/wastewater and Automatic Controls Symposium
- Select **Join Now** and enter the passphrase: **WWAC2018**

Welcome Messages

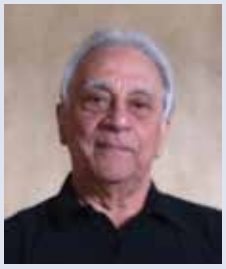
Don Dickinson

General Symposium Chair

It is my pleasure to welcome you to our 2018 ISA Water/Wastewater and Automatic Controls Symposium. Now in its fifteenth year, we again anticipate record attendance numbers. Thanks to our strong partnerships with the WEF Intelligent Water Technology Committee and the Chesapeake Section of the AWWA, we have tailored this year's conference specifically to the needs of automation professionals in the water and wastewater sectors. I would also like to thank our many sponsors, exhibitors, and committee volunteers for being instrumental to our success this year.

We have a strong program planned this year, with over 30 technical speakers, a keynote address, two invited speakers, and two guest speakers. We also expect to have a packed exhibit hall, a great general reception, and top notch catering lined up. Don't forget to also check out our plant tour and the optional training courses. I look forward to meeting all of you at this year's symposium.

Joe Provenzano



Program Committee Chair

On behalf of the entire program committee, I would like to formally welcome you to this year's 2018 WWAC Symposium. Our focus is to help professionals in the water and wastewater industries gain a greater understanding of how automatic control applications, utilizing the latest in instrumentation and intelligent controls technology, can be applied to improve both process measurement water and wastewater processing, collection, treatment, and distribution. If you are a Maryland resident, make sure to fill out the paperwork to get your MDE-approved CEUs/PDHs. If you are from out of state, or have an ISA CCST or CAP certification, don't forget to request your ISA training certificate.

Pavol Segedy, PE

ISA Water/Wastewater Industry Division Director

As director of the ISA water/wastewater division, it is my pleasure to welcome attendees to this year's 2018 WWAC Symposium. At our annual symposium, now in its 15th year, attendees have the opportunity to see over 30 technical presentations, learn from high quality training courses, and browse our exhibit hall. The symposium, along with the division's quarterly newsletter, website, and student scholarship program form part of the key service offers provided by the ISA water/wastewater division to our members and the automation community at large. I look forward to seeing you at this year's symposium!

Barry Liner, Ph.D., P.E.

WEF Director, Water Science & Engineering Center

On behalf of the Water Environment Federation (WEF), it is with great pleasure that I welcome you to the 2018 ISA Water/Wastewater and Automatic Controls Symposium. We believe that the Symposium has an extraordinary technical program thanks to the efforts the symposium's program and organizing committees. We are pleased to be a technical co-sponsor of this year's symposium, and promoting stronger ties between the ISA and WEF. We also welcome you to attend WEFTEC 2018 this fall in New Orleans, where several of the WWAC symposium presentations will be showcased at a special WEFTEC session along with several other automation presentations. We encourage all members of the water community to participate in both larger vertical-events like WEFTEC and in focused niche events like the ISA WWAC symposium as together they have a lot of offer.

Rachel Ellis

Executive Director, Chesapeake Section of the AWWA

The Chesapeake Section, American Water Works Association (CSAWWA) is pleased to co-sponsor the 2018 Water / Wastewater and Automatic Control Symposium which will be held at the Hyatt Regency in Bethesda, Maryland from August 6-9, 2018. There are few community water systems today that do not employ some form of automation to distribute, collect, and treat water for their customers. Virtually every operator and engineer in the industry encounters these rapidly evolving technologies, and this three-day symposium will take a deep dive into the current and future of trends in automation. We are applying for continuing education credits for both operators and PE's, so make plans now to join us in August, to learn more about the state of automation for water utilities!

Jennifer Kaberline

President, Chesapeake WEA

The Chesapeake Water Environment Association (CWEA) is pleased to welcome you to the 2018 ISA WWAC Symposium. As a member association of the Water Environment Federation (WEF), CWEA is committed to providing educational opportunities for our members. Considering the continuous evolution of water resource recovery treatment technologies, stormwater management, and collections systems monitoring, reliance on automation and controls is emerging to the forefront of our industry. The ISA WWAC Symposium provides a valuable educational opportunity for our members to stay up to speed on the latest trends and technologies, and we greatly appreciate the opportunity to participate in the 2018 Symposium.

Have an **idea** for an ISA standard, book, training course, conference topic, or other product or service?

Send it to: **ideas@isa.org**.

2018 Symposium Committee

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Asst. Symposium Chair.....Manoj Yegnaraman PE, CP, CE, Carollo Engineers
Program Committee Chair.....Joe Provenzano, KPRO Engineering Services
Past Symposium Chair.....Pavol Segedy PE, HDR, Inc
WEF, CSAWWA, CWEA Liaison....Kevin Patel PE, Signature Automation
Plant Tour Coordinator.....Pat Cooke, Trihedral Engineering
ISA Staff Coordinator .....Kimberly Belinsky, ISA

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Carter Farley, InstruLogic, LLC
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Jon Grant, Woodard & Curran, Inc.
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David Wilcoxson PE, LEED AP, ENV SP, MWH part of Stantec
Manoj Yegnaraman PE, CP, CE, Carollo Engineers

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For more information please visit us in our table No. 25 at
ISA WWAC Symposium, Hyatt Regency Bethesda, August 8-9 2018
or contact us by Email ran.kedem@RealiteQ.com

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About the Symposium

The WWAC Symposium helps professionals in the water and wastewater industries understand how instrumentation, SCADA (supervisory control and data acquisition), and automatic control applications are vital to the treatment and distribution of water; the collection and treatment of wastewater; and the management of stormwater. The symposium also provides an excellent opportunity to gain valuable technical information, networking, professional development, and continuing education credits (CEUs and PDHs).

Keynote Speaker

Charles B. Bott, PhD, PE, BCEE
Director of Water Technology and Research
Hampton Roads Sanitation District (HRSD)
HRSD's Vision for Advanced Water Treatment and Managed Aquifer Recharge in Eastern Virginia, USA: Sustainable Water Initiative for Tomorrow (SWIFT)

Dr. Charles B. Bott joined HRSD in 2009 and is the Director of Water Technology and Research. He manages technology innovation and research and development for HRSD's sixteen wastewater treatment plants (249 MGD combined capacity). Dr. Bott has a BS in Civil Engineering from the Virginia Military Institute, a MS in Environmental Engineering from the Johns Hopkins University, and a Ph.D. in Civil and Environmental Engineering from Virginia Tech. He is a fellow of the Water Environment Federation (WEF) and a member of the Science and Technology Advisory Committee to the Chesapeake Bay Program Executive Council.

Invited Speakers

Matt Barrett
Program Manager, Cybersecurity Framework
National Institute of Standards and Technology (NIST)
NIST Cybersecurity Framework

Matt Barrett leads Cybersecurity Framework activities at the NIST. Not only do Matt and his team manage awareness and education of Framework, but also the on-going collaboration between public and private sectors to evolve Framework. Matt will discuss the recently revised Framework and its connection to the sector-specific cybersecurity guidance developed by AWWA, and the ISA 62443 multi-part standard for Industrial Automation and Control System Cybersecurity.

Patricia Lamb
Critical Infrastructure Protection Program Manager
DC Water
AWWA-J100 Risk Assessments in the Water Sector

Patricia is responsible for planning, monitoring, and coordination all DC Water critical infrastructure protection functions. She acts as the primary interface with the National Capital Region and other regional entities for all DC Water critical infrastructure protection activities. Patricia completed DC Water and Sewer Authority's first, enterprise-wide AWWA J100 Risk and Resilience Assessment in May 2018. In her presentation Patrica will discuss how the J100 risk assessment methodology relates to other key resources utilities can employ to assess and manage risks – including cyber risks!

Guest Speakers

Barry Liner, Ph.D., P.E., BCEE
Director, WEF's Water Science & Engineering Center

Kevin Morley, PhD
Manager, Federal Relations, American Water Works Association (AWWA)

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Monday, August 6, 2018

8:00am - 4:00pm	IACS Cybersecurity Operations & Maintenance: Secure Your Control System (day 1 of 2)*
8:00am - 4:00pm	Overview of Grounding and Noise Reduction for Control Equipment (1 day)*

Tuesday, August 7, 2018

8:00am - 4:00pm	IACS Cybersecurity Operations & Maintenance: Secure Your Control System (day 2 of 2)*
12:00pm - 3:30pm	Early Symposium Registration & Badge Pick-Up
1:00pm - 5:00pm	Tour of Treatment Plant (transportation provided)**

* Short courses are optional. Separate course registration required.

** Limited capacity on tour. Tour leaves from hotel lobby at 1:00 pm Invitations sent out 3 weeks prior to tour via e-mail to registered symposium attendees. RSVP required.

Optional Local Facility Tour

As part of the symposium, attendees will have the option of attending a Tour of DC Water's Blue Plains Advanced Wastewater Treatment Plant. The tour takes place the afternoon of Tuesday, Aug 7, 2018 and requires prior-sign-up. Transportation to/from the hotel is provided by our tour sponsor, EMA. The bus will leave and return from the hotel lobby.

ISA symposium attendees are invited to attend the tour of DC Water's Blue Plains Advanced Wastewater Treatment Plant, the largest plant of its kind in the world. On an average day, the facility treats close to 300 million gallons of wastewater and has the ability to treat over 1 billion gallons a day at peak flow. Wastewater flows in from the District of Columbia and from Montgomery and Prince George's Counties in Maryland and Fairfax and Loudoun counties in Virginia.

The plant opened as a primary treatment facility in 1937. Since that time, new processes and technologies have been added to provide advanced wastewater treatment. The Blue Plains facility now uses both primary and secondary treatment as well as denitrification, multimedia filtration and chlorination/dechlorination during the treatment process.

About Our Tour Sponsor: EMA, Inc.
Starting in 1975, EMA focused on automation technology for water and wastewater utilities. Today EMA works with utilities and municipalities to improve business processes and work practices, enabled by technology and organizational change. They deliver innovative solutions to help their clients lower costs, increase productivity, improve customer service, and maximize return on investment.

Wednesday, August 8, 2018

7:00am	**Registration, Badge Pick-up & Breakfast**	
8:00am	**Opening Remarks (Technical Session Room 1)**	
8:15am	Keynote Speaker **HRSD's Vision for Advanced Water Treatment and Managed Aquifer Recharge in Eastern Virginia, USA: Sustainable Water Initiative for Tomorrow (SWIFT)** Charles B. Bott, PhD, PE, BCEE – Director of Water Technology and Research, Hampton Roads Sanitation District (HRSD)	
9:00am	Invited Speaker **NIST Cybersecurity Framework** Matt Barrett – Program Manager, Cybersecurity Framework, National Institute of Standards and Technology (NIST)	
9:45am	**Coffee Break & Exhibits (Exhibit Hall)**	
	Track 1 (Technical Session Room 1)	**Track 2 (Technical Session Room 2)**
10:30am	**Improve Plant Efficiencies & Reduce Energy Costs with Reliable and Consistent Online Nutrient Monitoring for Biological Wastewater Processes** Jay Mershon – Endress+Hauser Kelvin Hurdle – Rockwell Automation	**Incorporating CyberSecurity into Water Utility Master Planning** Umair T. Masud – Rockwell Automation Kevin M. Morley, PhD – AWWA
11:00am	**Keep Those Bioreactor's Bugs Happy at Night: WWTP Flow Equalization Using Existing CSO Sites** Maxym Lachance, P.Eng. – Tetra Tech Abhishek Bhargava, M.Sc., P.Eng. – EPCOR Water Services	**Cybersecurity Before the Budget** Scott Reynolds, PE, CAP – Johns Manville
11:30am	**Online Organics Monitoring for Rapid Process Control of Drinking Water and Wastewater Treatment Operations** Amanda Scott – Suez Water Technologies & Solutions, Analytical Instruments	**Cybersecurity Certification Programs have Matured** Ted Stewart – exida Michael Medoff – exida
12:00pm	**Lunch & Exhibits (Exhibit Hall)**	
1:00pm	**Ultra-Low-Level Turbidity Meters for Determining Continuous Membrane Integrity** Dave N. Commons – Hach Melody Whiter – Hach Bob Dabkowski – Hach	**Leading water utilities who've successfully navigated the digital journey to true smart water** Gary Wong, PE, MBA, CPA – OSIsoft
1:30pm	**Pressure Instrumentation Installation Tips for Challenging Applications** David Dlugos – Ashcroft Inc.	**Where Do Intelligent Water Systems Fit in the Smart City Movement? Insights From The IEEE Smart Cities Technical Community** Amro M. Farid, Ph.D. – Thayer School of Engineering at Dartmouth Barry Liner, Ph.D., P.E., BCEE – Water Environment Federation Amymarie R. Corriveau, CBAP – CDM Smith
2:00pm	**Taking Calibration to the Next Level: Using Documenting Calibrators** Joel Gregory, CCST-III – DC Water Robert Hopkins, CCST-II – DC Water Francisco Morales, CCST-II – DC Water	**Where Do Intelligent Water Systems Fit in the Smart City Movement? Insights From The IEEE Smart Cities Technical Community** Smart Cities Panel Discussion
2:30pm	**Coffee & Exhibits (Exhibit Hall)**	
3:30pm	**Industrial Internet of Things (IIoT)** Jennifer M. Mansfield, PMP – Rockwell Automation	**SCADA: Your Most Critical Asset** Dean Ford, CAP, PE – Westin Technology Solutions, LLC
4:00pm	**Crossing the chasm with information integration interoperability and the industrial internet-of-things leveraging the strategic industry standards** Thomas Burke – OPC Foundation	**Cloud-Based SCADA Solution to Monitor Storm Water Pumping** G. Mike Stoup, PE – McKim & Creed Mark Jones, PE – Department of Public Works, City of Virginia Beach Jason Davis, PE – McKim & Creed
4:30pm	**Advancing national water systems with safe and secure Industrial IoT applications** Goran Novkovic, MSc, ITIL, CQA, CSQE, PEng, APM, PMP – PwC Canada	**Surge Protection Devices: Feeling lonely, please think about me!** Kalyani Ganesan – Carollo Engineers, Inc Manoj Yegnaraman, PE – Carollo Engineers, Inc
5:00pm	**General Reception and Cash Bar (Exhibit Hall)**	

Thursday, August 9, 2018

7:00am	**Breakfast**	
8:00am	**Opening Remarks (Technical Session Room 1)**	
8:10am	**Preview of next year's 2019 ISA Water/Wastewater and Automatic Controls Symposium**	
8:15am	AWWA Guest Speaker Kevin Morley, PhD – Manager, Federal Relations, AWWA	
8:25am	WEF Guest Speaker Barry Liner, Ph.D., P.E., BCEE – Director of WEF's Water Science & Engineering Center	
8:35am	Guest Speakers **The 2018 LIFT Intelligent Water Challenge: Using a Challenge Prize to Drive Adoption of Intelligent Water Technology** Tad Slawecki – LimnoTech Barry Liner, Ph.D., P.E., BCEE – Director of WEF's Water Science & Engineering Center	
9:00am	Invited Speaker **AWWA-J100 Risk Assessments in the Water Sector** Patricia Lamb – Program Manager, Office of Emergency Management, DC Water	
9:30am	**2017 Water Wastewater Automatic Control Symposium / Water Wastewater Industry Division Awards Presentation**	
9:45am	**Coffee Break & Exhibits (Exhibit Hall)**	
	Track 1 (Technical Session Room 1)	**Track 2 (Technical Session Room 2)**
10:30am	**DC Water's SCADA Infrastructure Standardization Program – Paving the Way into the Future** Mark Cusac, PE – CDM Smith Samant Garg, PE – DC Water Duncan Mukira, PE – DC Water Matt Lick – CDM Smith Josh Gelman, PE – CDM Smith	**Don't Let Cyber Attacks Leave You "Dead in the Water"** Chris Grove – Indegy
11:00am	**Facility P&ID Drawings: What they are and Why you need them!** Graham Nasby, P.Eng, PMP, CAP – City of Guelph Water Services	**Secure PHA Review for Managing ICS Risks** Jim Gilsinn – Kenexis
11:30am	**SCADA + Integrated Asset Management = Cost Savings** Alan Hudson – Trihedral Engineering	**The need to monitor process sensors for security & safety** Joe Weiss – Applied Control Solutions Andy Pascoe – SIGA OT Solutions
12:00pm	**Lunch & Exhibits (Exhibit Hall)**	
1:00pm	**Using DNP3 to Solve Water & Wastewater Remote SCADA Challenges** Philip Aubin – Schneider Electric – Process Automation, SCADA & Telemetry	**Why Operational Technology (OT) Deep Packet Inspection is Necessary for Comprehensive SCADA Security** Ken Frische – Ultra Electronics, 3eTI
1:30pm	**Beyond Modbus: Designing SCADA with Other Open SCADA Protocols** Jacob Brodsky, PE – Jacobs, National Security Solutions	**Cyber Secure & More!** Jason Hamlin – Lynchburg Regional Wastewater Treatment Plant Carter Farley, PE – InstruLogic LLC
2:00pm	**Need more data for asset management & process improvements? Look in your own back yard** Jason Norris – Phoenix Contact Dave Eifert – Phoenix Contact	**Strathcona County Utilities SCADA system upgrade** Mark A Williams, CCST – Strathcona County Utilities
2:30pm	**Coffee Break & Exhibits (Exhibit Hall)**	
3:00pm	**Machine Learning for Optimized Plant Operations** James Ruiz – ITG Technologies Yandy Perez-Ramos – ITG Technologies	**Implementing E-Logging at Thames Water Utilities** David Dollar – j5 North America Anthony Tyler – Thames Water Utilities Jeremy Westwood – j5 International Ltd.
3:30pm	**Extracting Value from Data in Real-time** Christian Hübner – ifak e.V. Nico Suchold – ifak e.V. Leiv Rieger, PhD, P.Eng. – inCTRL Solutions Inc. Oliver Schraa – inCTRL Solutions Inc. Ivan Milette – inCTRL Solutions Inc.	**Summary of the King County, Washington, West Point WWTP Flood of 2017** Brian Lee Mast, PE – Copper Bell Consulting LLC
4:05pm	**Closing Remarks (Technical Session Room 1)**	

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We are pleased to announce that this year's WWAC symposium has the following technical co-sponsors.

The American Water Works Association Chesapeake Section is dedicated to the promotion of public health and welfare by assuring drinking water of unquestionable quality and sufficient quantity in the Chesapeake Section region. The Chesapeake Section provides its members a regional forum to advance the technology, science, and government policies of the drinking water industry's role in stewardship of water resources. For more information see www.csawwa.org

Founded in 1928, the Water Environment Federation (WEF) is a not-for-profit technical and educational organization of 36,000 individual members and 75 affiliated Member Associations representing water quality professionals around the world. WEF members, Member Associations, and staff proudly work to achieve our mission to provide bold leadership, champion innovation, connect water professionals, and leverage knowledge to support clean and safe water worldwide. For more information see www.wef.org

The membership is composed of professionals who operate and maintain wastewater treatment plants and collection systems; educators; engineers; scientists; designers, manufactures and representative of wastewater treatment equipment; and members of local, state and federal governments. Student memberships are available to those in college who plan to follow a career in water pollution control. For more information see www.chesapeakewea.org

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Travel Information

Venue & Accomodations

The 2018 ISA Water/Wastewater Symposium will be held at **Hyatt Regency Bethesda Hotel**, near Washington D.C. in Bethesda, Maryland. This recently renovated hotel offers luxury accommodations and located 15 minutes from the U.S. capital, Washington D.C.

Hyatt Regency Bethesda Hotel
One Bethesda Metro Center (7400 Wisconsin Ave)
Bethesda, Maryland, USA, 20814
1 301-657-1234
https://bethesda.regency.hyatt.com/en/hotel/home.html

Hotel Registration

We have arranged a discounted hotel rate of $129/night for symposium attendees for the Mon, Tues, Wed, and Thurs nights. Please mention "ISA WWAC Symposium" when booking. If registering on-line use the registration link on the symposium website.

Hyatt Regency Bethesda Hotel
One Bethesda Metro Center (7400 Wisconsin Ave), Bethesda, Maryland, USA, 20814
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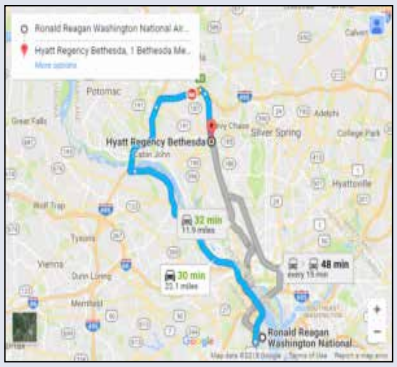

Map & Directions

Flying: The hotel is approximately 12 miles from Ronald Reagan Washington National Airport (airport code: DCA), 26 miles from Washington Dulles International Airport (airport code: IAD), and 35 miles from Baltimore–Washington International Airport (airport code: BWI). The airports have the convenient DC Metro available, taxis, or shuttles.

DC Metro: Located right beneath Hyatt Regency Bethesda, the Metro Station is where you'll find the Red Line train to Washington, DC. Planning your trip via Metro is easy. Go to https://www.wmata.com/ to plan your trip.

Local Attractions

The Washington D.C. area provides a wealth of visitor experiences. Explore attractions and things to do near Washington, DC from Hyatt Regency Bethesda. Access the National Institutes of Health, just one stop away on the Red metro line. Catch events at Capital One Arena, visit landmarks and museums, or stop by upscale restaurants and shops in downtown DC, easily accessible by metro. Additionally, with more than 600 retailers and businesses, Bethesda offers a wide variety of recreation for sightseeing, shopping and entertainment. Relish the multicultural cuisine in more than 200 restaurants or shop in 80 home fashion shops, hair salons, boutiques, and art galleries. For more information on local attractions visit *https://washington.org/*.

Distances to Washington D.C. Attractions

The White House	7.7 miles
Capitol Hill	10.7 miles
Downtown Bethesda	0.3 miles
Bethesda Row	0.4 miles
National Mall	9.3 miles
Lincoln Memorial	9.3 miles
Smithsonian National Museum	9.5 miles
International Spy Museum	8.4 miles
Six Flags Great America	26 miles
Nationals Park	10.7 miles
Navy Museum	12.1 miles
Arlington National Cemetery	8.9 miles

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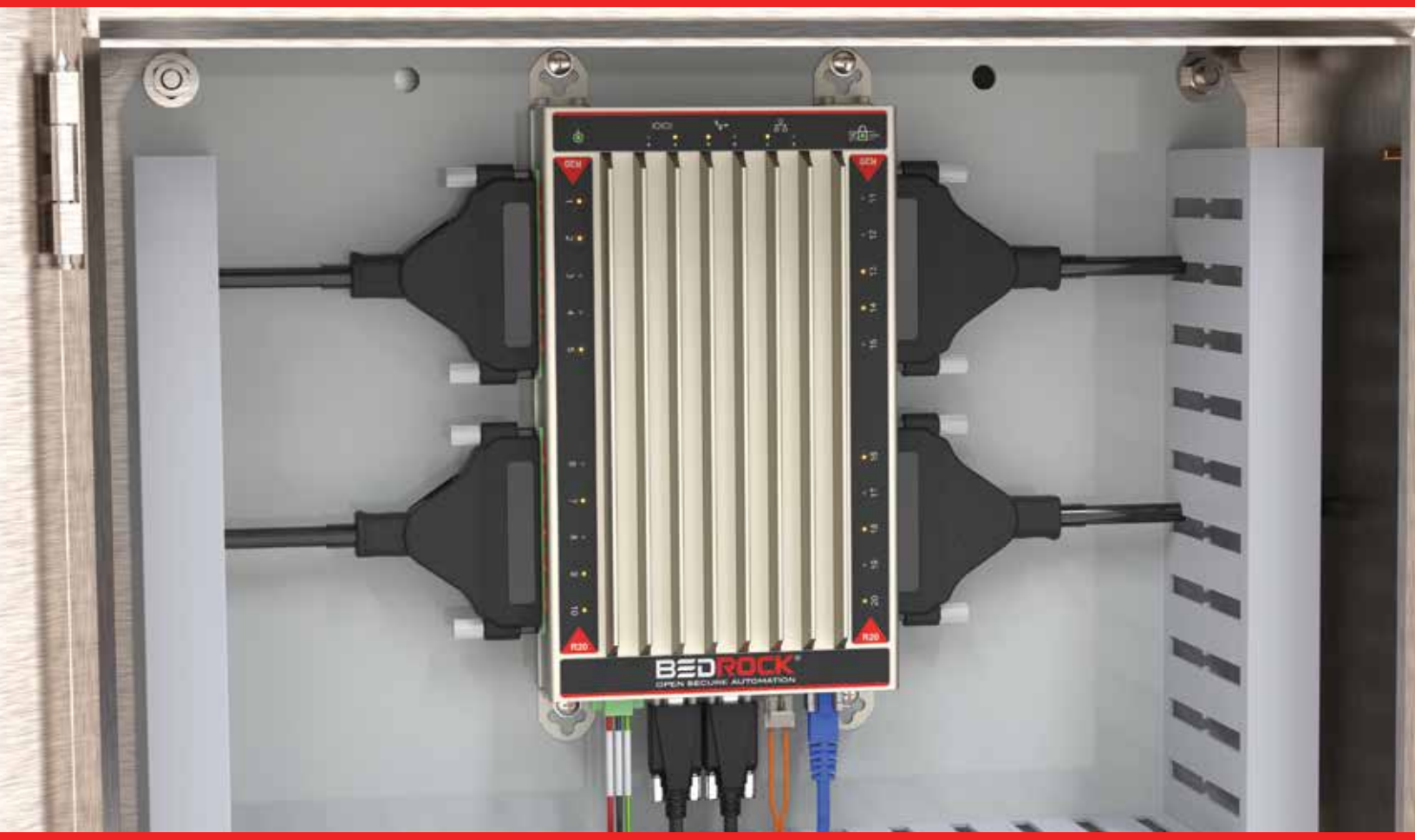

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Jason Hamlin, Process Automation Manager
Lynchburg Regional Wastewater Treatment Plant, Lynchburg, VA

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Continuing Education Credits - CEUs & PDHs

Symposium participants will earn valuable Continuing Education Units (CEUs) and Professional Development Hours (PDHs) by attending the symposium.

Participants will receive their choice of CEUs or PDHs from one of the following organizations:

<table>
<tr><td colspan="2">1.3 CEUs or 13 PDHs
water operators
wastewater operators
engineers</td><td>Maryland state licensed water operators and wastewater operators can earn up to 1.3 Maryland Department of the Environment approved CEUs by attending the symposium. Maryland state licensed engineers can also earn up to 13 Maryland Department of the Environment-approved PDHs by attending the symposium, where 11.5 hours are from the 2 day program and 1.5 hours are from the plant tour.

As part of the partnership between the ISA and the Chesapeake Section of the AWWA, official certificates for these CEUs and PDHs will be issued by the CSAWWA.

These CEU credits can be used by both water operators and wastewater operators.

Maryland statutes require anyone who operates a drinking water treatment plant or a domestic wastewater treatment plant to be licensed by MDE. CEUs and PDHs that attendees receive at the symposium can be used to satisfy the continuing education requirements for their licenses.</td></tr>
<tr><td>Symposium
13 PDHs</td><td></td><td>Symposium attendees also have the option of receiving a certificate for 13 Professional Development Hours (PDHs) from the ISA.

These PDHs can be used towards your ISA CAP or CCST certification or towards continuing education requirements in other jurisdictions, as applicable.</td></tr>
<tr><td>1.4 CEUs</td><td>1.4 CEUs</td><td>For the optional two-day training course on IACS Cybersecurity Operations & Maintenance: Secure Your Control System (IC37S), attendees can receive their choice of:
1.4 CEUs certified by the Maryland Department of the Environment (issued by CSAWWA)
1.4 CEUs certified by IACET (issued by the ISA)</td></tr>
<tr><td>0.7 CEUs</td><td>0.7 CEUs</td><td>For the optional full-day training course on Electrical Noise Effects on Instrumentation Control Equipment (TI21C), attendees can receive their choice of:
0.7 CEUs certified by the Maryland Department of the Environment (issued by CSAWWA)
0.7 CEUs certified by IACET (issued by the ISA)</td></tr>
</table>

About the ISA Water and Wastewater Industry Division

The ISA Water and Wastewater Industries 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 this Division 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. WWID is invaluable to professionals interested in sanitary technology and engineering, and the operation and maintenance of wastewater facilities. The Division holds an annual symposium that features presentations by industry practitioners and published proceedings. Read more at www.isa.org/wwid

Benefits of WWID Membership

- **Quarterly Newsletter** - The division publishes a quarterly electronic newsletter. Members also have the opportunity to write articles for the newsletter.
- **Annual Symposium** - Attend and participate in the annual WWAC symposium which spans all automation aspects of water and wastewater
- **Networking Opportunities** - A chance to meet, and form relationships with, peers involved with automation in your industry
- **Online Resources** - Gain access to papers and presentations from prior division symposia via the division and ISA websites
- **Industry Knowledge** - Be part of an active group that enhances your knowledge and professionalism on Water and Wastewater topics by obtaining valuable technical information and training in the traditional areas of measurements/sensors, instrumentation systems, data and advanced system/sensor technology.
- **Targeted Training** - At its annual symposium, the WWID offers ISA training courses which are targeted towards areas of specific interest for the water/wastewater automation professional.
- **Technical Writing & Presentation Opportunities** - An opportunity to present your work to your automation peers at the annual WWAC symposium, newsletter and/or ISA Automation Week by way of papers, posters, and Power Point presentations
- **Leadership Opportunities** - Opportunities to take on leadership roles in the division, to help with planning the symposium, writing for the newsletter, updating the website, and moderating the discussion lists.
- **LinkedIn Discussion List & Email Discussion List** - The WWID maintains a LinkedIn Group and Listserv Email mailing list for its members.

More information about the ISA and member benefits can be found at www.isa.org

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American Water Works Association

The Chesapeake Section, American Water Works Association is honored to be a technical sponsor for the ISA Water/Wastewater and Automatic Controls Symposium.

Nearly 1,000 AWWA members in Maryland, Delaware, and the District of Columbia work hard every day to keep waters flowing for public and environmental health. With the rapid deployment of, and advances in automation and instrumentation within our industry, we are pleased to support this important learning opportunity for our members, to help them keep up with the latest developments.

Our own conferences are quickly approaching too, and we welcome you to join us in these diverse and important learning and networking opportunities!

Finally, if you are not a member of AWWA, please consider this – you will be connected with over 50,000 people around the globe who are passionate about safe drinking water. www.awwa.org/membership

2018 Tri-Association Conference

August 28 - 31 * Ocean City, Maryland

Chesapeake AWWA
American Water Works Association

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Water is Life

The Tri-Association Conference will bring together some 1,200 professionals from the region's water industry for three days of learning and networking. Partnering with the Chesapeake Water Environment Association, and the Water and Waste Operators Association of MD, DE, and DC, we are planning over 150 technical sessions, 165 exhibits, lots of networking and even a bit of beachy fun!

Register online at www.ChesapeakeTricon.org

2018 Mid-Atlantic Utility conference

October 23-24, 2018
Turf Valley Resort, Ellicott City, Maryland

CSAWWA is pleased to host the 2018 Mid-Atlantic Utility Conference, featuring utility leaders from across the area, discussing today's most important topics.

A mix of presentations and panel discussions will focus attendees on solutions and best practices to issues with affordability, energy costs, project delivery, and more. And did we mention golf?

Register online at www.csawwa.org

2018 ISA Water / Wastewater and Automatic Controls Symposium

Founded in 1945, the International Society of Automation is a leading, global, nonprofit organization that is setting the standard for automation by helping over 30,000 worldwide members and other professionals solve difficult technical problems, while enhancing their leadership and personal career capabilities. Based in Research Triangle Park, North Carolina, ISA develops standards; certifies industry professionals; provides education and training; publishes books and technical articles; and hosts conferences and exhibitions for automation professionals.

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Manoj Yegnaraman, PE, CP, CE
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