Water/Wastewater Industry Division

Setting the Standard for Automation™

Calendar of WWID Events

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

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

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Newsletter December 2018

Director's Welcome

Pavol Segedy, HDR Inc.

Welcome to our December 2018 newsletter! It has been a pleasure to work with everyone within our volunteer team and ISA staff to put on the many activities that our Water / Wastewater Industry Division is known for.

Our general symposium chair Don Dickinson and program committee chair Joe Provenzano have done an outstanding job with our 2018 ISA Water/Wastewater and Automatic Controls Symposium. I invite you to read all about how we successfully took the 2018 ISA Water/Wastewater and Automatic Controls symposium to Washington DC this year!

Thanks are also due to many of our long-time division volunteers. Running our division is a team effort, and it would not be possible without the contributions of our many volunteers. The symposium is the end product of over 30 volunteers, along with some great help we get from our vendor and association partners. Thanks to everyone for making our 2018 symposium a great event.

I am looking forward to another fantastic year in 2019!

Respectfully,
Pavol Segedy, PE
WWID Director 2018-2019
psegedy@nc.rr.com

Newsletter Editor's Welcome

Graham Nasby, City of Guelph Water Services

This past year has been a busy one, so it is my pleasure to report in this newsletter some of the many things that your ISA Water/Wastewater Division has been up to.

WWID programs this year included: our student scholarship program, our annual ISA Water/Wastewater and Automatic Controls Symposium, our technical session at the WEFTEC, collaboration with WEF and AWWA on a number of issues, local involvement with the Chesapeake CWEA and CAWWA, multiple newsletters, and being active on various ISA standards committees.

In this issue you will find a full report of our recently held 2018 symposium, an update on WWID's involvement with the WEFTEC 2018 conference, and a technical article from the Automation Committee of the Ontario Water Works Association. Our SCADA friends in the OWWA have taken a look at the Master Format specifications and provided some guidance on how to use it for SCADA projects.

As always, thanks for being involved with the WWID!

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

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WWAC SYMPOSIUM

2018 Symposium Report

By Don Dickinson, 2018 General Symposium Chair

Greetings from Bethesda, Maryland! As I write this I'm overlooking the heart of downtown Bethesda from my room at the Hyatt Regency, the site for the 2018 ISA Water/Wastewater and Automatic Controls (WWAC) Symposium. Last year, the WWAC Executive Committee made the bold decision to move from our traditional location of Orlando to the Washington D.C. area for 2018. I think it was an excellent decision. The new location greatly increased accessibility to the WWAC for members of the Water and Wastewater Industry Division (WWID) who have not been able to travel to Orlando, and for those who should be members of the WWID. Additionally, this year's location greatly increased the list of potential attendees in the DC region who are influential in our industry while providing beneficial exposure for ISA.

The 15th annual ISA Water/Wastewater & Automatic Controls (WWAC) Symposium was held August 7-9, 2018 at the Hyatt Regency in Bethesda Maryland USA, just a few miles from the heart of our nation's capital. Highlights from the three-day event included a plant tour, presentations from industry leaders, more than thirty technical sessions, a forum on Smart Cities initiatives, and an exhibitor showcase featuring automation solutions for the water sector.

The symposium kicked off on Tuesday with a tour of the DC Water 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 capacity to treat over 1 billion gallons a day at peak flow. Many thanks to our hosts at DC Water for the tour.

The Speakers Dinner was held Tuesday evening. The gathering is a means to organize the many symposium speakers but more importantly, it helps to establish the great camaraderie that is an important ingredient of the symposium.

Our symposium officially kicked off Wednesday with keynote speaker, Dr. Charles Bott, Director of Water Technology and Research for Hampton Roads Sanitation District (HRSD). Dr. Bott energized the symposium with his passionate account of HRSD's vision for advanced water treatment and managed aquifer recharge in eastern Virginia known as SWITF - Sustainable Water Initiative for Tomorrow.

The invited speaker for Wednesday was Matt Barrett, Program Manager for NIST Cybersecurity Framework who provided context for the recently updated Framework and how it connects with cybersecurity guidance from ISA and AWWA.

The engaging presentations by Charles and Matt were a perfect set up for the first of more than thirty technical sessions on Wednesday and Thursday. The technical sessions covered a wide range of topics relating to the application of technology and automation in the water sector.

A highlight of the technical sessions on Wednesday was a presentation on insights gained from the IEEE Smart Cities Technical Community and the role intelligent water systems play in the Smart City movement. The presentation was followed by a forum discussion on Smart Cities initiatives led by Barry Liner with Water Environment Federation (WEF).

An additional benefit for symposium attendees was CEUs/PDHs offered by symposium Technical Co-sponsor, the Chesapeake section of AWWA (CAWWA). The Chesapeake Water Environment Association (CWEA) and the Water Environment Federation (WEF) were also Technical Co-sponsors for the symposium.

Wednesday was capped off with a reception in the exhibitor showcase area that provided the opportunity to continue discussions spurred by the day's presentations and to further engage the event's 29 exhibitors. Special thanks to our many sponsors.

On Thursday morning Barry Liner, Director of WEF's Water Science & Engineering Center, returned to give an industry update and to introduce attendees to the LIFT Challenge. The LIFT (Leaders Innovation Forum for Technology) *Intelligent Water Challenge* is a joint effort of The Water Research Foundation and the Water Environment Federation (WEF). The purpose of the Challenge is to demonstrate the value of intelligent water systems to utilities and thereby foster the adoption of smart water technologies. The Challenge is supported by American Water Works Association (AWWA), Smart Water Networks Forum (SWAN), and the ISA Water and Wastewater Division (WWID). The winner of the LIFT Challenge was announced in October at WEFTEC 2018.

Kevin Morley, AWWA Manager of Federal Relations, provided an industry update from the perspective of AWWA and then adroitly filled in for invited speaker Patricia Lamb, DC Water Program Manager for Critical Infrastructure Protection, who unfortunately was unable to attend the symposium as planned. Kevin shared Patricia's presentation that provided an overview of the DC Water and Sewer Authority's first, enterprise-wide AWWA J100 Risk and Resilience Assessment completed earlier this year.

Before starting the second day of technical sessions, Pavol Segedy, ISA WWID Industry Director presented awards for the best paper and presentation from the 2017 WWAC Symposium, along with awards for WWID Member of the Year and Exceptional Service to WWID.

After another day of informative technical sessions, the WWAC Symposium concluded Thursday afternoon with a wrap up session and a sneak preview of plans for 2019. We hope to see you there!

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WWAC SYMPOSIUM

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WWAC Symposium

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WWAC Symposium

Thanks to our 2018 Exhibitors (cont'd)

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American Water Works Association

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Chesapeake Water Environment Association

ISA Water & Wastewater Industries Division

ISA Baltimore/Washington DC Section

WWAC Symposium

Thanks to our 2018 Media Partners

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InTech

WaterWorld

AutomationWorld

Industrial WaterWorld

WE&T
water environment and technology

ISA Transactions

WEF Highlights

Global Water Intelligence

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Automation.com

WWAC SYMPOSIUM

Photos from the 2018 Symposium

Yes, WWAC finally went to Washington DC!

Symposium Chair Don Dickinson giving opening remarks.

And the people came!

We had 29 exhibitors in the supplier showcase room.

Attendees enjoyed buffet lunches and a general reception.

Many of the attendees went into downtown Washington DC to see the many USA national monuments at night.

Division Director Pavol Segedy (left) with Don Dickinson.

DC Water giving a talk about their most recent SCADA upgrades program and how it impacts their various plants

Part of the symposium included a panel discussion about what Smart Cities of the Future could look like.

AWWA's Kevin Morley talking about cyber threats and how ISA plays an important role by defining core industrial cyber security best practices and standards.

One of the excellent banners that greeted attendees.

WEF's Barry Liner giving an update on WEF's initiatives to build the next generation of water professionals. This is now Barry's seventh (!) year of being involved with the ISA-WEF partnership. Thanks Barry for all your hard work since 2012!

Graham Nasby talking about P&ID drawing best practices to support plant operations and maintenance activities.

One of our many guest speakers talking about new technology and opportunities for automation professionals to make a difference.

Program chair Joe Provenzano giving introductions.

Attendees enjoyed having the opportunity to ask presenters questions and discuss new ideas with fellow attendees.

No, Maxym Lachance, your name is not Don and you are not the symposium chair yet! How about in 2022?

General Symposium Chair Don Dickinson giving the closing remarks the symposium's over 200 attendees. Thanks to all and have a good night!

WWAC SYMPOSIUM

Photos from the 2018 Symposium Tour

On the day before the symposium, registered attendees could sign up to tour DC Water's Blue Plains Advanced Wastewater Treatment Plant. The tour was hosted by Jaime Alba of DC Water. The tour bus was kindly provided by EMA Inc.

The DC Water Blue Plains Plant is the second largest wastewater plant in the United States, and the largest Advanced Wastewater Treatment plant in the world.

Longtime volunteer Paul Lanzilotta taking a closer look at the process. Yes, Mr. Lanzilotta, everything is tagged properly.

Pavol Segedy (left) with one of our tour hosts.

Checking out the main plant control room. The large view screens showing the entire plant overview were a major feature of the room. Attendees got to hear from the plant operations team about how the large view screens are used to maintain situational awareness.

Learning about the CAMBI process from one of the engineers who is responsible for the care and feeding of the system. By using the CAMBI process, DC Water was able to eliminate the need for four enormous sludge digesters.

Tour group in front of the CAMBI process. Notice the cool blue hard hats – Thanks DC Water!

WWAC SYMPOSIUM

2018 Best Papers & Best Presentations

By The Symposium Program Committee

The symposium program committee is pleased to announce the winners for best presentation and best paper awards for the 2018 ISA Water/Wastewater and Automatic Controls Symposium.

2018 WWAC Symposium – Best Presentation Awards:

1st	**Summary of the King County, Washington, West Point WWTP Flood of 2017** Brian Lee Mast, PE – Copper Bell Consulting LLC, – view abstract, – view slides
2nd	**Leading water utilities who've successfully navigated the digital journey to true smart water** Gary Wong, PE, MBA, CPA – OSIsoft – view abstract – view slides
3rd	**Keep Those Bioreactor's Bugs Happy at Night: WWTP Flow Equalization Using Existing CSO Sites** Maxyme Lachance, P.Eng. – Tetra Tech Abhishek Bhargava, M.Sc., P.Eng. – EPCOR Water Services – view abstract – view slides
Honorable Mention	**SCADA + Integrated Asset Management = Cost Savings** Alan Hudson – Trihedral Engineering – view abstract – view slides

2018 WWAC Symposium – Best Paper Awards

1st	**Summary of the King County, Washington, West Point WWTP Flood of 2017** Brian Lee Mast, PE – Copper Bell Consulting LLC, – view abstract, – view slides – view paper
2nd	**Implementing E-Logging at Thames Water Utilities** David Dollar – j5 North America Anthony Tyler – Thames Water Utilities Jeremy Westwood – j5 International Ltd. – view abstract – view slides – view paper
3rd	**Pressure Instrumentation Installation Tips for Challenging Applications** David Dlugos – Ashcroft Inc. – view abstract – view slides – view paper
Honorable Mention	**Beyond Modbus: Designing SCADA with Other Open SCADA Protocols** Jacob Brodsky, PE – Jacobs, National Security Solutions – view abstract – view slides – view paper

WWAC SYMPOSIUM

2018 Symposium Committees

A big thank you to our 2018 ISA Water/Wastewater and Automatic Controls Symposium committee members whose many efforts led to our successful 2018 symposium.

2018 Symposium Organizing Committee

General Symposium Chair
Don Dickinson, Phoenix Contact USA

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

2018 Symposium Program Committee

Every year our symposium features carefully peer-reviewed papers and presentations. All papers and slides presented were vetted by the below program committee:

Joe Provenzano, KPRO Engineering Services (Chair)
Don Dickinson, Phoenix Contact USA
Bob Dusza, City of Manchester Water and Sewer Dept.
Carter Farley, InstruLogic, LLC
Joshua Gelman PE, CDM Smith
Jon Grant, Woodard & Curran, Inc.
Jason Hamlin, Lynchburg Regional WWTP
David Hobart PEng CAP, Hobart Automation Engineering
Lucas Jordan PE, MR Systems
Maxym Lachance PEng, Tetra Tech
Paul Lanzillotta, Consultant
Paul McGuire PE, NE Ohio Regional Sewer District
Tony Morelli PE, Publix Super Markets
Graham Nasby PEng, PMP, CAP, Guelph Water Services
Vickie Olson, Honeywell Process Solutions
Kevin Patel PE, Signature Automation
Matt Phillips PEng, Guelph Water Services.
Pavol Segedy PE, HDR Inc.
David Wilcoxson PE, LEED AP, ENV SP, Stantec
Manoj Yegnaraman PE, CP, CE, Carollo Engineers

WWAC SYMPOSIUM

2018 Symposium Statistics at a Glance

The symposium committee is pleased to release the following statistics about our recently held 2018 ISA Water/Wastewater and Automatic Controls Symposium.

Dates: August 8-9, 2018
Location: Bethesda, Maryland, USA (Washington DC)
Hosted by: ISA Water/Wastewater Industry Division
Technical Co-sponsors: WEF, CAWWA, CWEA

Number of Attendees: 197
Number of Exhibitors: 29 (sold-out!)
Number of Sponsors: 14
Number of Media Partners: 14

Plant Tour Attendees: 48 (tour hosted by DC Water)

Number of Presentations: 40
Number of Written Papers: 5
Number of Parallel Speaking Tracks: 2 tracks
Number of Days: 2 days

Cost of Registration: $500 full price, $375 discounted
Cost of Exhibit: $950
Cost of Sponsorship: $900 to $3500

Total Revenue: $94,157
Total Expenses: $81,367
Net Surplus to ISA: $12,790 (supports ISA programs)

Number of ISA Training courses: 2
Number of Training Course Attendees: 12
Training Net Surplus to ISA: $14,840 (supports ISA programs)

About ISA
The International Society of Automation (www.isa.org) is a nonprofit professional association that sets the standard for those who apply engineering and technology to improve the management, safety, and cybersecurity of modern automation and control systems used across industry and critical infrastructure. Founded in 1945, ISA develops widely used global standards; certifies industry professionals; provides education and training; publishes books and technical articles; hosts conferences and exhibits; and provides networking and career development programs for its 40,000 members and 400,000 customers around the world.

ISA owns Automation.com, a leading online publisher of automation-related content, and is the founding sponsor of The Automation Federation (www.automationfederation.org), an association of non-profit organizations serving as "The Voice of Automation." Through a wholly owned subsidiary, ISA bridges the gap between standards and their implementation with the ISA Security Compliance Institute (www.isasecure.org) and the ISA Wireless Compliance Institute (www.isa100wci.org).

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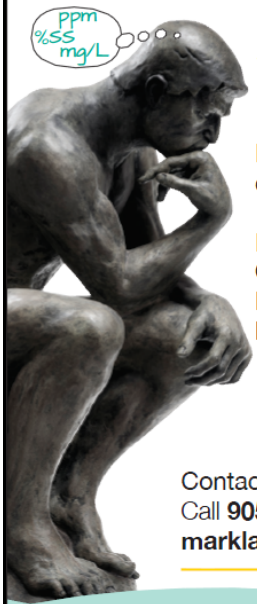

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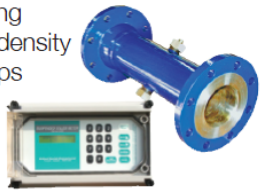

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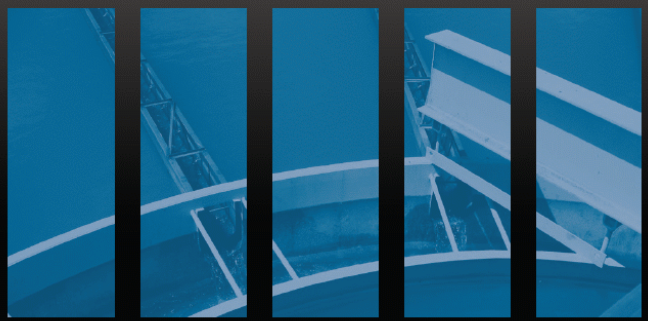

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WWID SCHOLARSHIPS

2018 WWID Scholarship Applications Due!

By Kevin Patel 2018 Scholarship Chair

The ISA water/wastewater industry division (WWID) is pleased to announce there is still time to apply for the 2019 ISA WWID Michael Fedenyszen Memorial Student Scholarships. The annual scholarship is named to honor the contributions of long-time volunteer Michael Fedenyszen who passed away in 2017.

Eligible students can win up to $2000 USD in scholarship money to help them pursue higher education.

Students can apply by filling out the application form, accompanied by:

- 200-word essay on why they should win
- a copy of their academic transcript
- confirmation of enrollment form/letter

The application deadline is January 31, 2019.

The division is pleased to continue to provide up to $2000 of scholarship money to encourage WWID members and their sons/daughters to pursue higher education. In addition, winners will receive a complementary 2-year student ISA membership.

Applications are due by email by January 31, 2019. Winners will be notified by February 28, 2019 via telephone and email, and will be required to provide a photo and short biography that can be used for publicity reasons. Scholarship money will be distributed by check and mailed after the winner is contacted and has supplied the required photo/bio.

Scholarships will be awarded at the sole discretion of the WWID scholarship committee, with preference being given to students enrolled in technical programs that lead to careers in the water/wastewater sector.

Download and view the student scholarship application form at www.isa.org/wwid .

Please email completed application form, along with 200 word essay, confirmation of enrollment and copy of academic transcript to:

scholarship@isawwsymposium.com
AND
knpatel@sig-auto.com

All applications must be submitted by email (PDF scans of documents). We do not accept submissions by postal mail.

Water/Wastewater Industry Division

Setting the Standard for Automation™

Water & Wastewater Division

2019 WWID Michael Fedenyszen Memorial Scholarship

APPLICATION FORM

The ISA Water & Wastewater Division (WWID) is pleased to award up to $2000 of scholarship money to encourage WWID members and their sons/daughters to pursue higher education. Students recommended by a WWID member may also apply. Winners will also receive a complementary 2-year student ISA membership, which includes a print subscription to ISA *InTech* magazine. Applications will be accepted via email through January 31, 2019. Winners will be notified by February 28, 2019 via telephone and email, and will be required to provide a digital photo, a 3-4 sentence biography, and a 1-2 sentence "thank you note" that can be quoted for publicity purposes. Scholarships will be dispersed by check and mailed after the winners are selected and the required documentation is received. Scholarships will be awarded at the sole discretion of the WWID scholarship committee with preference being given to students enrolled in technical programs that lead to careers in the water/wastewater industry.

Eligibility (check one)

- ☐ WWID member, ISA Member # _____
- ☐ WWID student member, ISA Member # _____
- ☐ Parent/Guardian is a WWID member, Parent Name: _____ & ISA Member # _____
- ☐ WWID member recommendation (letter attached), Member Name: _____ & ISA Member # _____

Other criteria (check off each one)

- ☐ Currently attending 2-4 year university/college curriculum
- ☐ Confirmation of enrollment letter (or scan of student card) attached
- ☐ 200 word essay about "Why I should win the scholarship" attached
- ☐ Copy of previous year's academic transcript attached

Applicant's Name: _____
Program of Study: _____
Institute Name: _____
Institute Address: _____
Dean of Admissions Name: _____
Institute Phone: _____

Address While At School

Street: _____Apt. _____
City: _____
State: _____
Zip Code: _____ Country:_____
Phone: _____
eMail: _____

Home Address

Street: _____Apt. _____
City: _____
State: _____
Zip Code: _____ Country:_____
Phone: _____
eMail: _____

Applications must be submitted as scanned PDFs and emailed to the scholarship committee at:
scholarship@isawwsymposium.com AND knpatel@sig-auto.com

APPLICATIONS MUST BE RECEIVED BY JANUARY 31, 2019

www.isa.org/wwid

WWID & WEF PARTNERSHIP

WWID was at WEFTEC 2018

By Pavol Segedy, WWID Director

As part of our partnership with WEF (Water Environment Federation), the WWID and WEF hold a joint ISA-WEF technical session at WEFTEC each year. This past year's WEFTEC 2018, held in New Orleans Louisiana USA from Oct 1 to 3, 2018.

Our 2018 the joint ISA-WEF automation technical session took place on Monday, October 1 from 1:30pm-5:00pm. Entitled "Best of ISA: Operational Improvements through Automation and Technology", it was held in room 339. Moderated by Pavol Segedy and Don Dickinson the session was a hit, and the three speakers gave talks to a packed room. Here is a summary of the session and the speakers:

Best of ISA: Operational Improvements through Automation and Technology

Monday, Oct 1, 2018 from 1:30-5:00pm

A special session focused on operational improvements through automation and technology. The session highlights top papers and presentations from the ISA Water/Wastewater and Automatic Controls Symposium, which was held in August. The WEF Automation and Information Technology Committee has partnered with ISA to present this niche ISA symposium, which takes place during the first week of August each year. This WEFTEC feature session provides WEFTEC attendees the opportunity to listen to our top speakers from this joint ISA-WEF event.

This year's joint ISA-WEF technical session speakers were as follows:

Extracting Value from Data in Real-time

Oliver Schraa – inCTRL Solutions Inc.
Christian Hübner – ifak e.V.
Nico Suchold – ifak e.V.
Leiv Rieger, PhD, P.Eng. – inCTRL Solutions Inc.
Ivan Miletic – inCTRL Solutions Inc.

SCADA + Integrated Asset Management = Cost Savings

Alan Hudson – Trihedral Engineering

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

As a joint effort, the ISA Water/Wastewater Industry Division and the WEF Automation & Information Technology committee are pleased to have been doing this joint event since 2012. Each year the session has had a different focus, and we look forward to doing it again in 2019.

ISA SOCIETY

WWID was at the Fall Leaders Meeting

By the WWID committee

The WWID was at the ISA's Fall Leaders Meeting (FLM), aka ISA's Annual Leadership Conference, in October 2018. Representing the WWID was past-director Kevin Patel, current director Pavol Segedy and several members of the WWID committee. This year's meeting was in Montreal Quebec Canada.

At the FLM, attendees were treated to several leadership development workshops, and society-level updates from both 2018 ISA President Brian Curtis and ISA Executive Director Mary Ramsey. Other meetings included the WWID's semi-annual face-to-face meetings, various ISA governance committees, and several ISA standards committee meetings.

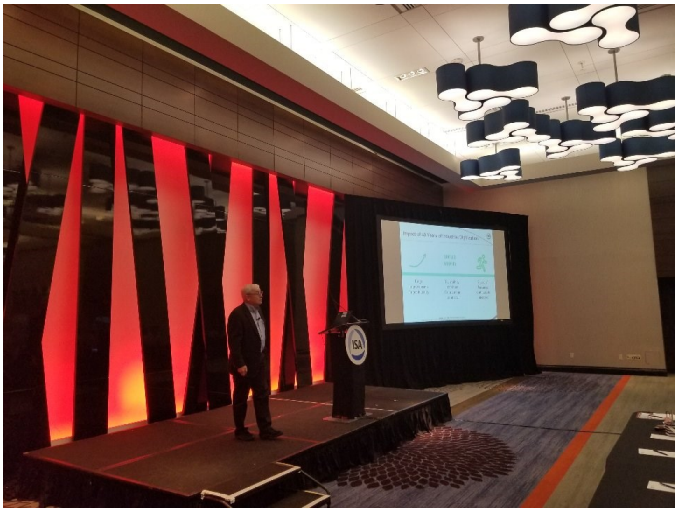
The FLM also included a face-to-face meeting of the ISA112 SCADA System standards committee. The ISA112 committee, which has a large number of municipal water/wastewater members, is currently working on a new set of SCADA system standards and technical reports with the goal of making SCADA systems easier to design, specify, implement, and operate. An update on the progress of the ISA112 committee will appear in the next issue of the ISA WWID newsletter.

2018 ISA Society President Brian Curtis (left), and ISA Executive Director Mary Ramsey (right) welcoming attendees.

One of the many committee meetings at the FLM.

Members from ISA18 alarm management committee taking a break for lunch Pictured are (left to right) Graham Nasby, Nick Sands, David Visnich, Donald Dunn and Dale Reed.

Steak tar tar – a local specialty in Montreal, Quebec, Canada.



Schneider Electric's Peter Martin speaking at the 2018 ISA @Montreal technical conference that was held after the FLM.

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Visit Indegy at:
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

ISA STANDARDS

UN to adopt ISA Standards into cybersecurity regulatory framework

From news release on www.isa.org

The United Nations Economic Commission for Europe (UNECE) has confirmed it will integrate the widely used ISA/IEC 62443 series of standards into its forthcoming Common Regulatory Framework on Cybersecurity (CRF). The CRF will serve as an official UN policy position statement for Europe.

At its recent annual meeting in Geneva, UNECE's Working Party on Regulatory Cooperation and Standardization Policies recognized the ISA99 standards development committee for its leading role in conceiving and developing the widely used standards, while formally accepting review input presented on behalf of ISA99 by committee member Pierre Kobes of Siemens.

The ISA/IEC 62443 standards are developed primarily by the ISA99 committee of the International Society of Automation (ISA), with simultaneous review and adoption by the Geneva-based International Electrotechnical Commission. ISA99 draws on the input of cybersecurity experts across the globe in developing consensus standards that are applicable to all industry sectors and critical infrastructure, providing a flexible and comprehensive framework to address and mitigate current and future security vulnerabilities in industrial automation and control systems.

"The Common Regulatory Framework will serve to establish a common legislative basis for cybersecurity practices within the massive EU trade markets," points out Glenn Merrell of Industrial Control System Security. "This formal recognition is greatly valued and appreciated as another important validation of the industry-leading work of the experts on ISA99 who have contributed their knowledge and time in developing the ISA/IEC 62443 series," adds Merrell, an ISA Certified Automation Professional® (CAP®) who was instrumental in representing ISA99 to UNECE.

"This recognition reflects the growing and widespread adoption of ISA/IEC 62443 by government organizations and manufacturing sectors throughout the world," emphasizes ISA Executive Director Mary Ramsey. "Beyond our role as a global standards developer, ISA is fully cognizant of and has prioritized our responsibility as an international nonprofit association of automation professionals to support and advance the understanding and application of these critical standards through our supplier-neutral cybersecurity education and training programs, developed with guidance from leading ISA99 experts."

More information about ISA standards can be found at www.isa.org/standards/

ISA SOCIETY NEWS

Automation Federation Complete Third Review and Update of the Original Automation Competency Model

From a November 2018 news release on www.isa.org

A review team of automation experts recently convened in Research Triangle Park, North Carolina to perform the third critical review of the Automation Competency Model (ACM) since its inception in 2008.

The Automation Federation (AF) was invited by the US Department of Labor (USDOL) in 2007 to be the first industry-related technical society to create a competency model using the US National Institute of Standards and Technology (NIST) pyramid framework for advanced manufacturing. To this day, ACM remains one of the most downloaded models from the USDOL site, www.careeronestop.gov.

In this third review, as in the original and two other previous reviews, USDOL representatives were on hand to assist in facilitation, scribe duties, and guidance on intent regarding certain definitions. Team leader Steve Huffman, AF Chairman of Government Relations and the driving force within AF behind the original creation of the model, remarked that this activity "was the best review of this important work yet thanks to the passion, attention to the details, respectful deliberation, and diversity of professional perspective in the way the team will view the application of the ACM finished product."

The review team consisted of Steve Pflantz, P.E., AF Chair and Associate at CRB Engineers; Dean Ford, CAP®, P.E., Executive Vice President at Westin Technology Solutions; Steve Mustard, CAP®, P.E., AF Cybersecurity Chair and President of National Automation; Nick Sands, CAP®, P.E., Manufacturing Technology Fellow at DuPont and International Society of Automation (ISA) Fellow; Paul Gruhn, P.E., 2019 ISA President, Safety Systems SME at aeSolutions, and ISA Fellow; Greg McMillan, retired Senior Fellow in Process Control Improvement at Solutia, ISA Fellow, and 2010 ISA Life Achievement Award recipient; Scott Ralls, Ph.D., President of Northern Virginia Community College (NOVA); Phil Mintz, Executive Director of Industry Expansion Solutions IES, the NIST Manufacturing Extension Partnership (MEP) for North Carolina; Michael Marlowe, former Managing Director of AF; and Huffman, Vice President of Marketing at Mead O'Brien, Inc., and ISA Fellow.

Within this group are five professional engineers, three Certified Automation Professionals® (CAP®), two technology fellows, a doctoral degree holder, two senior educators, and four ISA Fellows. All team members expressed confidence that the improvements made to the ACM are consistent with the latest trends in the automation industry.

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TECHNICAL ARTICLE

Using Master Format Construction Specifications for SCADA Projects

By Graham Nasby, OWWA Automation Committee

In the United States and Canada, Master Format is a commonly-used standard for organizing construction specifications. As a mature documentation standard that has evolved over the past 60 years, Master Format can be used for a wide range of construction projects.

It does, however, have some challenges due to its sheer size. With its hundreds of possible numbered specification sections, Master Format can be tough to navigate for some types of specialized projects. This is especially the case with SCADA projects, which need to include a lot of detail but usually don't fit into the traditional classifications associated with civil construction projects.

In 2016, the Automation Committee of the Ontario Water Works Association (OWWA) proposed the idea of writing a guideline that could be used in Ontario Canada about how best to apply the Master Format standard to projects that have a SCADA (supervisory control and data acquisition) component. This article provides an overview of what the committee came up with during this 2016-2017 initiative.

Introduction to Master Format

Master Format is a documentation standard that is used to organize specifications and contract documents for construction projects, particularly in the United States and Canada. Provided as a set of templates, Master Format is a product of the Construction Specifications Institute (CSI, www.csiresources.org) and Construction Specifications Canada (CSC, www.csc-dcc.ca). Both the CSI and CSC are non-profit organizations, and the Master Format documentation standard is provided by them on a cost-recovery basis as a service to the construction community.

In a nutshell, Master Format consists of two parts: The first is a set of specification titles – each with a unique number – (which can be downloaded as a list of titles at no cost). The second is a set of accompanying draft body text, with customized template text for each numbered specification (available for a nominal fee, currently $199 USD).

Viewed as a package, Master Format consists of a set of specifications, organized into numbered chapters (called divisions), and the specifications themselves (called sections), which are used to specify the general conditions, acceptable products, and execution details for the various aspects of a construction project. A designer will select the Master Format sections that they need for their particular project, and then edit those sections as required to clearly define what they want to have a contractor to build.

In practice, most design consultants will order a base set of Master Format specifications, and then customize them for use on each construction project. It is common practice for most design consultants to have their own customized base set of Master Format specifications, which they have spent years adapting into a set of templates, which they in turn use as a starting point for all their design projects.

Since it was first published in 1963, as a set of construction specifications organized into 16 divisions of work, the Master Format has undergone several revisions. Looked at as a whole, Master Format can be divided into two main styles: 16-division format (often referred to as Master Format 1995) and 50-division format (usually referred to as Master Format 2004). Several other editions do exist, but each is essentially a revision of either 16-division or 50-division format. In general, the Master Format templates that were published prior to 2004 consist of 16-divisions, and those published from 2004 onwards have 50-divisions. At the time of writing, the current version of the base 50-division style Master Format specifications template is the May 2018 edition.

Master Format 1995 (16 Divisions)

For the first forty years that Master Format existed (from 1963 to 2004), it was divided into 16 divisions based on the type of work. This 16-division format is still frequently used to this day, and is as follows:

- Division 1 — General Requirements
- Division 2 — Site Construction
- Division 3 — Concrete
- Division 4 — Masonry
- Division 5 — Metals
- Division 6 — Wood and Plastics
- Division 7 — Thermal and Moisture Protection
- Division 8 — Doors and Windows
- Division 9 — Finishes
- Division 10 — Specialties
- Division 11 — Equipment
- Division 12 — Furnishings
- Division 13 — Special Construction
- Division 14 — Conveying Systems
- Division 15 — Mechanical (including Plumbing/HVAC)
- Division 16 — Electrical

Master Format 1995 is the most recent edition of 16-division format. The difference between the original Master Format published in 1963 and this one in 1995 is

not the organization of the main division titles, but instead it is due to minor revisions to the assignment of the 5-digit numbered specifications that reside under each division. Within each division, specifications are then broken down into numbered chapters called sections, each with a 5 digit number. The first two digits identify the division, and the rest identify the individual section. Suffixes are sometimes also used to further break out specifications.

For example, Electrical specifications reside under Division 16, and are broken out into the following sections:

Section #16010 - Electrical General Requirements
Section #16051 - Installation of Cables in Trenches and in Ducts
Section #16053 - Metering and Switchboard Instruments
Section #16061 - Grounding – Primary
Section #16062 - Grounding - Secondary

Section #16071 - Fastenings and Supports
Section #16113 - Underfloor Distribution System
Section #16121 - Power Cable and Overhead Conductors
Section #16122 - Wires and Cables (0 - 1000V)
Section #16124 - Communication Cables - Inside Buildings

Section #16126 - Modular Wiring System
Section #16131 - Splitters, Junction Pull Boxes and Cabinets
Section #16132 - Outlet Boxes, Conduit Boxes and Fittings (13 KB)
Section #16133 - Conduits, Conduit Fastenings and Conduit Fittings
Section #16134 - Surface and Lighting Fixture Raceways

Etc.

For people who frequently work on SCADA projects, the specification section 16901 has traditionally been used as the location for specifying instrumentation and automation.

One of the drawbacks of the Division-16 format is that it does not have a good place to put all the details needed to specifying a SCADA system. SCADA systems require a myriad of details such as: instrumentation, field wiring, PLC panels, network equipment, servers, server configuration software, programming, templates/guidelines, screen designs, datalogging, alarm systems, etc. Trying to jam all of this into a single spec section – 16901 – is often very challenging.

What often results is a bit of the Wild West when it comes to SCADA specifications. One designer may create a very long 16901 specification. Another may attempt to subdivide the 16901 section into subsections, using suffixes, but this is non-standard and will vary from firm to firm. Others may create their own custom numbers 16xxx sections within division 16. Some will create a special division called division 17 for SCADA, or will create custom sections within Division 13 (special construction). Some firms will do a combination of these five approaches. Other firms will just leave the details up to the contractor (and we all know what happens then!)

The result is that when the traditional 16-division format is used to specify the SCADA aspects of projects, how the specifications are organized from project to project can vary widely – and this makes construction more difficult for everyone involved. Non-standard specifications make jobs harder to understand, harder to price, harder to build, harder to check, harder to enforce, and as a result drive up costs.

Master Format 2004 (50 Divisions)

When it was released in 2004, Master Format 2004 signaled a major change, as it reorganized the traditional 16 divisions into a new set of 50 divisions. The motivation for this change was to make it easier to subdivide construction work into more clearly delineated specification sections. The result was a mass renumbering of all specification sections that would make the Master Format easier to use for everyone.

Since 2004, there have been a several updated editions of Master Format, including the most recent version in May 2018. However, this format is still referred to as Master Format 2004 because it continues to retain the 50-division structure. The updated editions since 2004 mostly incorporate small refinements and corrections to how individual 6-digit specification sections within the new 50-divisions are individually numbered. For example, the individual specification sections within division 7 “thermal and moisture protection” have been updated slightly due to new product/techniques being available.

Looked at as a whole, the new 50-division breakdown of Master Format 2004 does offer significant advantages over the old 16-division format. In the new format there are over a hundred individual specification sections that can be used to more clearly organize the details of the SCADA aspects of a construction project. The titles of the specification sections are also a lot clearer to both the designer and the contractor.

However, not all design firms have transitioned to the new 50-division format yet. For a firm to adapt their already highly customized 16-division specification templates to the new 50-division format represents a lot of work. This work could easily represent hundreds, if not thousands, of hours of labor, and depending on the type/complexity of projects they undertake, it may mean that updating the specifications for a project won’t be feasible within a project’s budget. Thus only some firms have taken the time to update their specification templates to the new 50-division format. As construction specifications act as contract documents, any updating of specifications must be done very carefully, and there are real costs for a firm to make the conversion.

What we are seeing in Ontario, Canada is that about a third of design firms have moved to the new 50-division format, while about two thirds continue to use the traditional 16-division format (at least until their clients force them to upgrade!)

A listing of the 50 new divisions that are used in Master Format 2004 specifications are as follows:

Procurement and contracting requirements group

- Division 00 — Procurement and Contracting Requirements

Specifications group

General Requirements Subgroup

- Division 01 — General Requirements

Facility Construction Subgroup

- Division 02 — Existing Conditions
- Division 03 — Concrete
- Division 04 — Masonry
- Division 05 — Metals
- Division 06 — Wood, Plastics, and Composites
- Division 07 — Thermal and Moisture Protection
- Division 08 — Openings
- Division 09 — Finishes
- Division 10 — Specialties
- Division 11 — Equipment
- Division 12 — Furnishings
- Division 13 — Special Construction
- Division 14 — Conveying Equipment
- Division 15 — RESERVED FOR FUTURE EXPANSION
- Division 16 — RESERVED FOR FUTURE EXPANSION
- Division 17 — RESERVED FOR FUTURE EXPANSION
- Division 18 — RESERVED FOR FUTURE EXPANSION
- Division 19 — RESERVED FOR FUTURE EXPANSION

Facility Services Subgroup:

- Division 20 — RESERVED FOR FUTURE EXPANSION
- Division 21 — Fire Suppression
- Division 22 — Plumbing
- Division 23 — Heating, Ventilating, and Air Conditioning (HVAC)
- Division 24 — RESERVED FOR FUTURE EXPANSION
- Division 25 — Integrated Automation
- Division 26 — Electrical
- Division 27 — Communications
- Division 28 — Electronic Safety and Security
- Division 29 — RESERVED FOR FUTURE EXPANSION

Site and Infrastructure Subgroup:

- Division 30 — RESERVED FOR FUTURE EXPANSION
- Division 31 — Earthwork
- Division 32 — Exterior Improvements
- Division 33 — Utilities
- Division 34 — Transportation
- Division 35 — Waterway and Marine Construction
- Division 36 — RESERVED FOR FUTURE EXPANSION
- Division 37 — RESERVED FOR FUTURE EXPANSION
- Division 38 — RESERVED FOR FUTURE EXPANSION
- Division 39 — RESERVED FOR FUTURE EXPANSION

Process Equipment Subgroup:

- Division 40 — Process Interconnections
- Division 41 — Material Processing and Handling Equipment
- Division 42 — Process Heating, Cooling, and Drying Equip.
- Division 43 — Process Gas and Liquid Handling, Purification and Storage Equipment
- Division 44 — Pollution and Waste Control Equipment
- Division 45 — Industry-Specific Manufacturing Equipment
- Division 46 — Water and Wastewater Equipment
- Division 47 — *RESERVED FOR FUTURE EXPANSION*
- Division 48 — Electrical Power Generation
- Division 49 — *RESERVED FOR FUTURE EXPANSION*

Just like the old 16-division format, the new 50-division format divisions are subdivided into individual numbered specifications. However, unlike the 5 digit numbering of 16-division format, 50-division format uses 6 digits to number individual specifications. In 50-division format, suffix numbers are also used more frequently than the older 16-division organization.

For example, Master Format 2004 provides the following standardized specification numbers under Division 26: Electrical for the electrical details of a project:

Section #26 05 00 - Common Work Results – Electrical
Section #26 05 14 - Power Cable and Overhead Conductors (1001V)
Section #26 05 20 - Wire and Box Connectors (0 - 1000V)
Section #26 05 21 - Wires and Cables (0 - 1000V)
Section #26 05 22 - Connectors and Terminations

Section #26 05 27 - Grounding – Primary
Section #26 05 28 - Grounding – Secondary
Section #26 05 29 - Hangers and Supports for Electrical Systems
Section #26 05 31 - Splitters, Junction, Pull Boxes and Cabinets
Section #26 05 32 - Outlet Boxes, Conduit Boxes and Fittings

Section #26 05 33.01 - Surface and Lighting Fixture Raceways
Section #26 05 34 - Conduits, Conduit Fastenings & Conduit Fittings
Section #26 05 36 - Cable Trays for Electrical Systems
Section #26 05 37 - Wireways and Auxiliary Gutters
Section #26 05 38 - Cellular Metal Floor Raceway Fittings

Etc.

Unlike the old 16-division format, the new 50-division format offers a dedicated place for the SCADA aspects of construction projects to be located. This is in a new division called Division 40 Process Interconnections.

However, using the new Division 40 Process Interconnections grouping presents a new and different problem. Within the Master Format 2004 standard, there were now several hundred possible specification sections in division 40 which can be used for specifying the SCADA aspects of a project. It soon became clear that for a municipal water/wastewater project, not all of these sections would be needed. But which ones should be used? Could there be a standardized subset of sections be defined in a recommendation document?

OWWA Automation Committee Project

Seeing a need to provide some guidance and clarity on how to apply the new Division 40 Process Interconnection specifications to the SCADA aspects of municipal water/wastewater construction projects, the OWWA Automation Committee took on a project in mid-2016 to develop a set of best practices and guidelines.

The OWWA Automation Committee is a technical committee of the Ontario Water Works Association, a section of the American Water Works Association. Its members consist of automation professionals who work for water/wastewater utilities, engineering consultants, general contractors, vendors, and system integrators. The purpose of the committee is to provide a venue to discuss common automation/SCADA issues that are unique to the municipal water/wastewater sector in Ontario Canada, and to provide SCADA-specific training opportunities for automation professionals in the municipal water/wastewater sector.

During its monthly meetings in 2016 and 2017, a working group of the OWWA Automation Committee went through the various standardized specification sections of Division 40 as defined in Master Format 2004, to create a recommended subset that could be used for the SCADA aspects of projects.

In addition to selecting a recommended subset of the Master Format 2004 specification sections, the committee also modified some sections, and added in some additional sections with the goal of providing a place within the numbered specifications for as many aspects of SCADA projects as possible. The result is the following list, which is now being used a number of municipal water/wastewater departments and engineering firms in Ontario Canada.

Suggested Specification Sections for SCADA Projects

When using Master Format 2004, the following specification sections are recommended when specifying SCADA projects:

40 60 00 Process Control and Enterprise Management Systems

40 61 00 Process Control and Enterprise Management Systems General Provisions
40 61 13 Process Control System General Provisions
40 61 16 Enterprise Management System General Provisions
40 61 21 Process Control System Testing
40 61 26 Process Control System Training
40 61 93 Process Control System Input/Output List
40 61 96 Process Control Descriptions

40 62 00 Computer System Hardware and Ancillaries
40 62 13 Server Computers
40 62 13.1 SAN
40 62 13.2 NAS
40 62 13.3 Server Hosts
40 62 16 Operator Workstation Computers
40 62 19 Industrial Computers
40 62 21 Desktop Computers
40 62 26 Laptop Computers
40 62 29 Tablet Computers and Mobile Devices
40 62 33 Printers
40 62 43 Large Display Screens
40 62 43.1 Display Controllers/Video
40 62 43.2 Projectors
40 62 63 Operator Interface Terminals (OIT)

40 63 00 Control System Equipment
40 63 13 Distributed Process Control Systems
40 63 43 Programmable Logic Controllers
40 63 53 Programmable Automation Controllers
40 63 53.1 Redundant Processors
40 63 53.2 Processors
40 63 53.3 I/O
40 63 53.4 Remote I/O
40 63 53.5 Communications
40 63 53.6 Specialty Modules (only if required)
40 63 63 Safety Controllers (only if required)
40 63 83 Remote Terminal Units

40 66 00 Network and Communication Equipment

40 66 13 Switches and Routers
40 66 13.1 Panel Switches
40 66 13.2 Distribution/Zone Switches
40 66 13.3 Server Room Switches
40 66 13.4 Distribution Zone Router
40 66 13.5 WAN Router
40 66 13.6 Third Party Equipment

40 66 16 Firewall
40 66 16.1 Edge Firewall
40 66 16.2 Zone Firewall
40 66 16.3 DMZ Firewall
40 66 16.4 VPN

40 66 19 Media Converters
40 66 19.1 Optical Pass-through Modules
40 66 19.2 Copper-to-Fibre
40 66 19.3 Protocol Convertor/Gateway

40 66 20 Modems
40 66 21 Gateways
40 66 23 Frame Relay Equipment

40 66 26 Device Network Equipment

40 66 33 Metallic and Fiber-Optic Communication Cabling and Connectors
(coordinate with 27 10 00 Building Telecommunications Cabling Systems)

40 66 36 Process Instrumentation Networks
40 66 36.1 HART
40 66 36.2 Foundation Fieldbus
40 66 36.3 AS-Interface
40 66 36.4 Device Net
40 66 36.5 ControlNet
40 66 36.6 Modbus
40 66 36.7 Profibus
40 66 36.8 EtherNet/IP
40 66 36.9 DNP3
40 66 36.10 CAN-bus
40 66 36.11 Lonworks
40 66 36.12 Z-Wave
40 66 36.13 ZigBee

40 66 43 Wireless Network Systems
40 66 43.1 Cellular
40 66 43.2 Point-to-Point
40 66 43.3 Point-to-Multi-Point
40 66 43.4 Antennas
40 66 53 Multiple Address Radio Equipment (seldom used)
40 66 56 Point-to-Point Radio Equipment (seldom used)

40 66 63 Antennas (seldom used)

40 66 66 Monopoles and Towers
40 66 73 Satellite Communications Equipment

40 67 00 Control System Equipment Panels and Racks
40 67 13 Computer/Communication Equipment Racks
40 67 16 Free-Standing Panels
40 67 19 Wall-Mounted Panels
40 67 23 Control System Consoles
40 67 33 Panel Wiring
40 67 43 Panel components ** Include 40 78 00 Reference**

40 68 00 Process Control Software
40 68 13 Process Control (HMI) Software [procurement of license only]
40 68 15 PLC Logic Programming Software [procurement of license only]
40 68 17 Data Historian Software [procurement of license only]
40 68 19 Alarm Management Software [procurement of license only]
40 68 23 Reporting Software [procurement of license only]
40 68 26 Online Performance Monitoring Systems Software
40 68 33 Maintenance Management Software
40 68 36 Laboratory Information System Software
40 68 39 Energy Management Software
40 68 43 Load Management Software

40 68 63 Configuration of Control Software
40 68 63.1 FAT Template
40 68 63.2 FIT Template
40 68 63.3 I/O Check Template
40 68 63.4 SAT Template
40 68 63.5 SIT Template
40 68 63.2.1 HMI
40 68 63.2.2 Historian
40 68 63.2.3 CWMS
40 68 63.2.4 Controller
40 68 63.2.5 Reporting
40 68 63.2.6Performanxce
40 68 63.2.7 Energy

40 69 00 Packaged Control Systems
40 69 13 Control System Simulators (seldom used)
40 69 23 Burner Management Systems (only in sludge incinerators)
40 69 26 Safety Instrumented Control Systems (seldom used)
40 69 33 Fire and Gas Monitoring/Protection Systems (seldom used)
40 69 36 Package Process Control System

40 70 00 Instrumentation for Process Systems

40 71 00 Flow Measurement
40 71 13 Magnetic Flow Meters
40 71 13.13 Inline Magnetic Flow Meters
40 71 13.23 Insertion-Type Magnetic Flow Meters
40 71 23 Differential Pressure-Type Flow Meters
40 71 23.13 Venturi Flow Meters
40 71 23.16 Flow Tubes (seldom used)
40 71 23.19 Flow Nozzle-Type Flow Meters (seldom used)
40 71 23.23 Orifice Plate Flow Meters
40 71 23.26 Integral Orifice Flow Meters (seldom used)
40 71 23.29 Orifice Meter Runs (seldom used)
40 71 23.33 Elbow Flow Meters (seldom used)
40 71 23.36 Pitot Tube and Averaging Pitot Flow Meters
40 71 23.39 V-Cone Flow Meters (seldom used)
40 71 23.43 Differential Pressure-Type Flow Transmitters
40 71 23.46 Flow Computers (seldom used)
40 71 33 Propeller Flow Meters
40 71 36 Turbine Flow Meters
40 71 43 Variable Area Flow Meters
40 71 46 Target Flow Meters
40 71 49 Vortex-Shedding Flow Meters
40 71 53 Positive Displacement Flow Meters
40 71 63 Doppler Flow Meters
40 71 66 Transit Time Flow Meters
40 71 69 Open Channel Flow Meters
40 71 73 Coriolis Flow Meters
40 71 76 Thermal Flow Meters
40 71 79 Flow Switches
40 71 83 Sight Flow Indicators

40 72 00 Level Measurement
40 72 13 Ultrasonic Level Meters (Continuous and Point-Type)
40 72 23 Radar Level Meters
40 72 33 Capacitance Type Level Meters (Continuous and Point Type)
40 72 36 RF Admittance Level Meters (Continuous and Point Type)
40 72 43 Pressure and Differential Pressure Type Level Meters
40 72 46 Bubbler Systems
40 72 53 Magnetic and Magnetostrictive Level Meters
40 72 73 Sight Level Gauges
40 72 76 Level Switches
40 72 83 Leak Detection Systems

40 73 00 Pressure, Strain, and Force Measurement
40 73 13 Pressure and Differential Pressure Gauges
40 73 16 Manometers
40 73 23 Absolute-Pressure Transmitters
40 73 26 Gauge-Pressure Transmitters
40 73 29 Differential Pressure Transmitters
40 73 33 Multi-Variable Pressure/Temperature Transmitters
40 73 36 Pressure and Differential Pressure Switches
40 73 46 Load Cells
40 73 53 Torque Measurement Devices
40 73 63 Diaphragm Seals

40 74 00 Temperature Measurement
40 74 13 Resistance Temperature Devices
40 74 16 Thermocouples
40 74 23 Radiation Pyrometers
40 74 33 Thermistors
40 74 36 Diode Temperature Measurement Devices (seldom used)
40 74 43 Bimetallic Thermometers
40 74 46 Fluid Expansion Thermometers (seldom used)
40 74 49 Change-of-State Temperature Measurement Devices (seldom used)
40 74 53 Cryogenic Temperature Sensors (seldom used)
40 74 63 Temperature Transmitters
40 74 66 Temperature Switches
40 74 69 Thermowells, Protection Tubes, and Test Thermowells

40 75 00 Process Liquid Analytical Measurement
40 75 05 Multi-Parameter Analyzer Systems
40 75 13 pH/ORP Analyzers
40 75 16 Conductivity Analyzers
40 75 19 Moisture Analyzers
40 75 21 Chlorine Analyzers
40 75 29 Dissolved Ammonia Analyzers
40 75 33 Fluoride Analyzers
40 75 43 Dissolved Oxygen Analyzers
40 75 46 Dissolved Ozone Analyzers
40 75 53 Turbidity Analyzers
40 75 56 Suspended Solids/Sludge Density Analyzers
40 75 66 Nitrogen Analyzers nitrate analyzer]
40 75 69 Phosphorous Analyzers [phosphate analyzer]
40 75 73 Particle Counters
40 75 76 Total Organic Carbon Analyzers
40 75 79 UV Analyzer
40 75 81 UV Absorbance
40 75 83 Hardness Analyzers
40 75 86 Alkalinity Analyzer

40 76 00 Process Gas Analytical Measurement
40 76 05 Continuous Emissions Monitoring Systems
40 76 13 Oxygen Gas Analyzers
40 76 16 Ozone Analyzers
40 76 23 Combustible Gas Monitors
40 76 26 Chlorine Gas Analyzers
40 76 29 Ammonia Gas Analyzers
40 76 33 Hydrogen Sulfide Monitors
40 76 36 Sulfur Dioxide Analyzers
40 76 39 Carbon Dioxide Analyzers
40 76 43 Carbon Monoxide Analyzers
40 76 53 Dewpoint/Moisture Analyzers
40 76 56 Gas Density Analyzers (seldom used)
40 76 63 Flue Gas Analyzers
40 76 66 NO/NOX Analyzers
40 76 73 Hydrocarbon Analyzers
40 76 76 Gas Chromatograph Analyzers
40 76 79 Vapor Pressure Analyzers (seldom used)
40 76 83 Mass Spectrometers (seldom used)

40 77 00 Position and Motion Measurement
40 77 13 Acceleration Measurement Devices
40 77 16 Proximity Measurement Devices
40 77 19 Vibration Velocity Measurement Devices
40 77 23 Vibration Monitoring Systems
40 77 26 Position, Speed, and Motion Measurement Devices

40 78 00 Panel Mounted Instruments
40 78 13 Indicators and Meters
40 78 16 Indicating Lights
40 78 19 Switches and Push Buttons
40 78 23 Potentiometers and Manual Controllers
40 78 26 Chart Recorders Paperless
40 78 33 Annunciators
40 78 43 Single-Loop Controllers
40 78 53 Relays
40 78 56 Isolators, Intrinsically-Safe Barriers, and Surge Suppressors
40 78 59 Power Supplies
40 78 63 Alarm Dialers

40 79 00 Miscellaneous Instruments, Calibration Equipment, Instrument Valves, and Fittings
40 79 23 Instrument Calibration Equipment
40 79 26 Instrument Programming Equipment
40 79 39 Signal Conditioners and Converters
40 79 43 Deadweight Testers
40 79 46 Flame Scanners
40 79 63 Instrument Tubing
40 79 66 Instrument Valve Manifolds, Valves, and Fittings

Applying Specification Sections to 16-Division Format

Though the above specification sections are designed to be used with the 50-division format of Master Format 2004, it is also possible to apply them to the older 16-division format. To do so, the above grouping can be used in one of two possible ways: first to create a new custom Division 17 in which to put them, or the second way is to use this as a set of specification subdivisions within the older 16901 instrumentation section.

With that said, to properly define the scope of a construction project requires both a high quality set of a specifications and an equally high quality set of drawings, which have been both carefully coordinated to ensure they work together to clearly define the contractor's scope and the owner's expectations.

Master Format, whether it be the traditional 16-division format or the new 50-division format, has proved itself to be a reliable method of organizing construction specifications.

Summary

Because of the size of the Master Format 2004 specification standard, the OWWA Automation Committee felt it was worth taking the time to select a set of standardized specification sections that could be used for specifying the SCADA aspects of municipal water/wastewater projects in Ontario Canada. The result was the list that is in this article.

This listing of standardized Master Format specification sections is now being actively used by several consultants and municipal water/wastewater departments in the Ontario, Canada area. The consultants, end-users and contractors who have been using this new set of standardized specification sections have noted that the process of designing, specifying, bidding, and building projects has been much easier and cost effective. The committee looks forward to continuing to facilitate the use of standardized best practices and guidelines that can be used for specifying the SCADA aspects of construction projects.

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Graham Nasby — City of Guelph
Kevin Nyman — City of Toronto
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Brian Sudic — CIMA+
Eric Zhang – OCWA, Ontario Clean Water Agency
Shawn Xiong — ETO Engineering

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SOCIETY NEWS

To Sustain Growth in 2019 and beyond, ISA must capitalize on its strengths and opportunities

By Brian Curtis, 2018 ISA Society President

Since this will be my last column as Society President, I would like to thank you for all of your contributions to our profession and to ISA as well as for your support over the past year.

My experience as 2018 ISA president has made me deeply aware of the importance and relevance of the Society-particularly in light of the many changes and challenges that we faced over the last 18 months-and of the outstanding contributions and efforts that have been asked of ISA leadership, members, and staff during this time.

It is immensely gratifying and inspiring to see how much has been accomplished over these many months and recognize how these accomplishments have positioned the Society for much greater success in the months and years ahead. ISA has put in place the strategic foundation and plans needed to sustain a bright and prosperous future for the automation profession. We must never lose sight of the fact that automation makes our world a better and safer place for everyone.

In the New Year and beyond, ISA must look both inward and outward to: develop new growth opportunities, increase awareness of its value proposition, strengthen its brand, tap into new revenue streams, boost membership, and develop a proactive plan for engaging the next generation of leaders. To do so, ISA must be successful in three vital areas: operations, collaboration, and innovation.

We need to closely examine the operations at all levels of the Society to optimize systems and resources. Secondly, we need to seek out opportunities to collaborate, both within the Society (across geographic, technical, and operational boundaries) and with external entities (including government, academia, the Automation Federation, other professional organizations and members of the automation industry) where synergy either already exists or can be created. Strategic partnerships are key to collaboration and operational excellence.

We entered 2018 with new and emerging technologies that allowed us to better engage with automation professionals in new and exciting ways and across the global playing field. New and emerging technologies are creating new opportunities for automation around the world, and are changing the roles, responsibilities, and needs of automation professionals. All of these developments are impacting ISA and its products, services, and *customers.*

ISA's success depends on its ability to seize these opportunities while continuing to deliver value-both to individual members and to the global automation community.

In responding to its challenges, ISA has clearly defined its mission, vision, and goals in 2018, and the products and services to be delivered, the partnerships to be secured, and marketplace opportunities to be explored. We will continue to engage members, volunteers, and staff in the ongoing conversations in the weeks and months ahead.

ISA needs your help; you are already contributing by virtue of your ISA membership. In 2019, I challenge you to do even more. Seek out ways in which you can use your experience and expertise to serve. Introduce your colleagues and company to ISA. Make them aware of what ISA offers. Get more involved in your ISA section or division. Join an ISA LinkedIn group. Reach out to local, national, or global ISA leadership to inquire how you can help. ***Get involved!***

Every generation of ISA membership has the opportunity and, I believe, the responsibility to move the Society forward in the world of automation. This is our time. The automation profession continues to make the world a better place. We should all be proud to be a part of the positive change automation has created. ISA plays a pivotal role in this process - helping members and other automation professionals improve their technical skills and knowledge, and enabling companies increase throughput, reduce waste, and improve productivity and profitability-both safely and securely.

ISA has an obligation to help industry leaders as well as the public better recognize the value and benefits of automation. Through our collaboration with the Automation Federation, we're just beginning to scratch the surface in leveraging our capabilities in industrial cybersecurity. While there is growing awareness among industry leaders of the risks of industrial cyberattack, we need to work harder to foster recognition in the marketplace that ISA offers real solutions to mitigate these risks. It's also important to note that conversations about cybersecurity can serve as the door opener to educate those about other important ISA offerings and capabilities.

ISA also has benefited greatly over these past many months from the support and involvement of our corporate partners and sponsors. These relationships inspire new and collaborative ways of solving common challenges, make our members and customers aware of additional resources and capabilities that could benefit them, and foster best-practice approaches that advance the automation and control profession.

Section Engagement

Given their geographically based structure, ISA sections offer a convenient way for members to take part in ISA initiatives and events. Here are just a few ways you can get involved and contribute at the section level:

- Team up with other ISA members to explore common professional interests.
- Invite guest speakers to section meetings, creating a learning environment.

- Arrange section tours of local plants and facilities.
- Develop new networking, social and recreational events.
- Speak at local technical colleges and universities to generate student interest in automation careers.
- Encourage local students to attend section events and become ISA student members.

Division Involvement

As an ISA member, you should take full advantage of your two free technical division memberships: one from the Automation and Technology Department and one from the Industries and Sciences Department. Division memberships enable automation professionals the opportunity to:

- Attend, help plan, and conduct technical division symposia and events.
- Stay up to date on current technical trends and news by reading division newsletters and web sites.
- Write, review, or present technical papers for ISA publications.
- Network with colleagues across the globe.
- Explore professional development opportunities and gain leadership skills.
- Develop workshops and short courses for division members.
- Exchange ideas and insights through email discussions.

ISA Training Programs

ISA, through its leading automation and control training programs, can better prepare technicians and engineers-from those new to the job market to the highly experienced-for the workplace demands and advanced manufacturing jobs of the future.

ISA's worldwide leadership in automation and control training begins with its subject matter experts. ISA's instructors and consultants are at the forefront in their field; their unrivaled knowledge and marketplace experience provide practical, real-world solutions. Why don't you organize a training course for your section members or discuss ISA training courses with your employer?

As I reach the twilight of my year as 2018 Society President, I am gladly handing over the helm to President-Elect Paul Gruhn, who will steer the Society along the next leg of its voyage. I have full confidence that Paul-with the assistance of ISA Executive Director Mary Ramsey and ISA staff manning the engines-will guide ISA through the dawn of a new day and onto a brighter and prosperous future in 2019.

In closing, I want to express how grateful I am to have learned so much from previous ISA leaders with whom I have served, and to have gained and benefited from the experience of our current ISA leadership team that are now so many valuable friends. These relationships have been vital to me during my year as President and instrumental to my success on a professional and personal level.

My sincere thanks to all and best wishes for the New Year.

Brian Curtis
2018 ISA President

About Brian Curtis:

Brian Curtis, I. Eng., LCGI, is the Operations Manager for Veolia Energy Ireland, providing services to Novartis Ringaskiddy Ltd. in Cork, Ireland. He has more than 35 years of experience in petrochemical, biotech, and bulk pharmaceutical industries, specializing in design, construction management, and commissioning of electrical, instrumentation, and automation control systems. He has managed complex engineering projects in Ireland, England, Belgium, the Netherlands, Italy, and Germany.

A long-time ISA member, Curtis has served on the ISA Executive Board since 2013, the Geographic Assembly Board (2012 – 2015), and the Finance Committee (2013 – 2017.) He was Ireland Section President and Vice President of District 12, which includes Europe, the Middle East, and Africa. Curtis has also been active on several Society task forces, including Cybersecurity, Governance, and Globalization-related committees. He received the ISA Distinguished Society Service Award in 2010. He is the Former President of Cobh & Harbor Chamber of Commerce (2013-2015) and Former Chairman of the Ireland Southern Region Chambers (2015-2016) and is an active member of the Ireland National Standards Body, ETCI.

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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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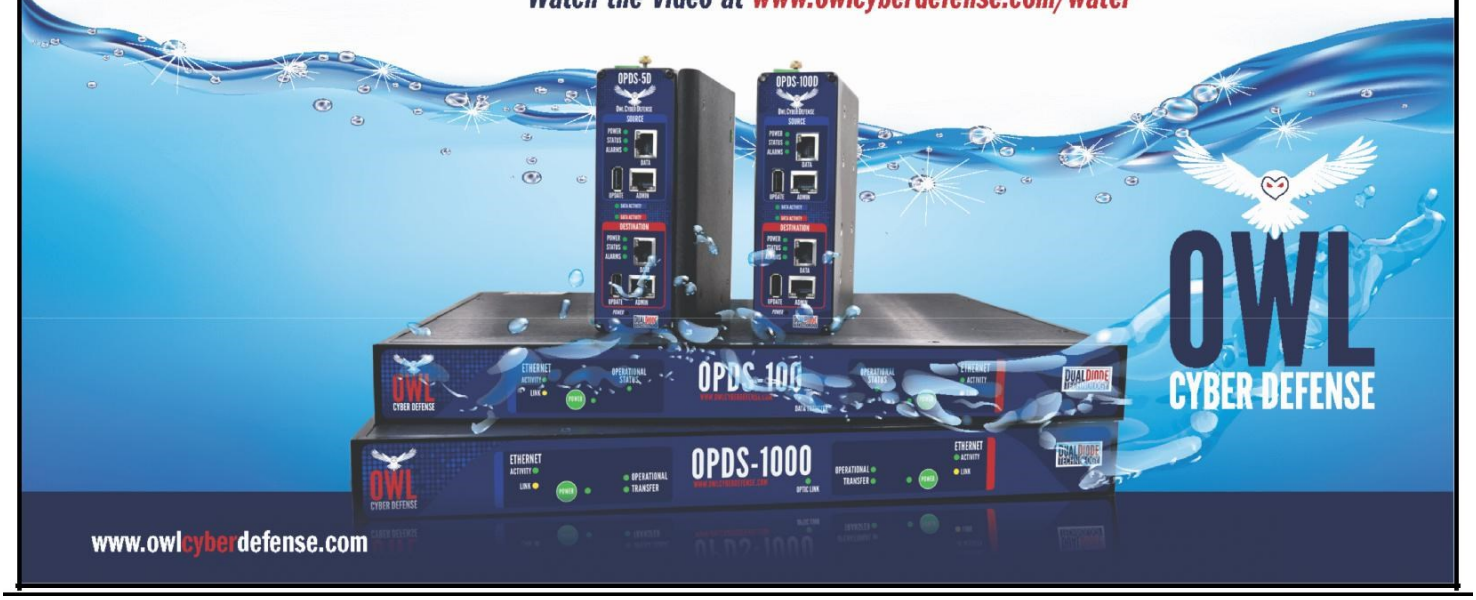

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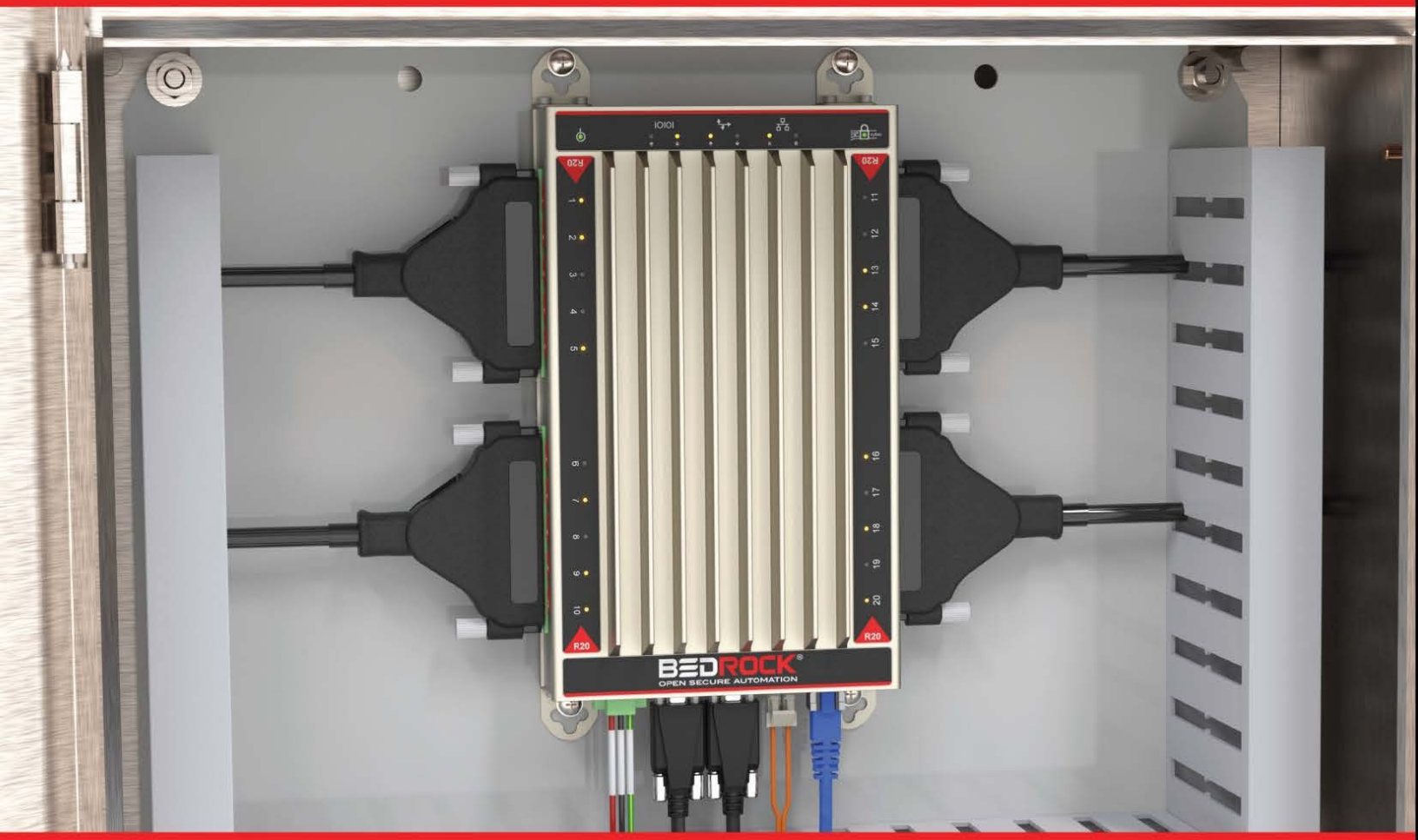

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AUTO-QUIZ: BACK TO BASICS

Model Predictive Control Review

Using forward decoupling, the objective is to:

a) Accumulate the interaction between two process variables and their outputs

b) Cancel out the interaction between two process variables and their outputs

c) Use feedback to eliminate the gain of one process variable and its output

d) Use a decoupling algorithm to eliminate all gain between outputs

e) None of the above

Answer:
Answer A is not correct; accumulation of the interactions would be counterproductive to the loop performance, and would simply magnify the coupling between inputs and outputs.

Answer C is not correct. Simple feedback can be used to make adjustments to the output based on a measured or calculated quantity, but simple feedback cannot be used to eliminate the process gain between a process variable and its own output.

Answer D is not correct. Similar to Answer C, a decoupling algorithm does not eliminate "all gains between outputs," but rather, when used in a forward decoupling method, can be used to cancel the interactions between multiple inputs and their outputs.

The correct answer is **B**, "Cancel out the interaction between two process variables and their outputs." In MIMO (multiple input, multiple output) systems, often the process variables and outputs interact with one another, which makes control of the independent variables difficult. A forward decoupling algorithm can be used to cancel out these interactions, making more traditional control methods applicable to these complex systems.

Reference: Greg McMillan and Robert Cameron, *Models Unleashed: Virtual Plant and Model Predictive Control Applications,* Book, ISA Publishing, 2003.

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

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

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

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

ISA Water/Wastewater Industries Division Quarterly Newsletter

ADVERTISING SPECIFICATIONS

The ISA Water/Wastewater Industry Division (WWID) publishes a quarterly newsletter, which is distributed to approximately 2500 ISA members who work in the municipal water/wastewater sector. The newsletter is published as a high quality 8.5x11 PDF file, which is available for free download on www.isa.org/wwid and www.isawwsymposium.com. The WWID is a technical division within the International Society of Automation.

When the newsletter is published each quarter, an announcement email is set out to all ISA WWID members, plus past and present participants in the ISA Water/Wastewater and Automatic Controls Symposium. The newsletter is also widely read by non-ISA members, as it is freely available.

Each issue is approximately 24-36 pages, with the following regular sections:

- Director's Welcome
- Newsletter Editor's Message
- Personal Interest Story
- Water/Wastewater Industry News
- WWID News
- ISA Water/Wastewater Symposium Update
- One or more Technical Articles
- Book reviews
- ISA Society News
- Column by the ISA Society President
- WWID Leadership Corner
- WWID Contacts

Publication Schedule:

The WWID newsletter is typically published as per the following schedule:

- Winter Issue – January/February (ad artwork due December 15)
- Spring Issue – April/May (ad artwork due March 15)
- Summer Issue – June/July (ad artwork due May 15)
- Fall Issue – September/October (ad artwork due August 15)

Note: Occasionally the spring and summer issues are combined into a single spring/summer issue depending on scheduling. If this happens, advertisers will be notified and any ads scheduled to go into the summer issue will be published in the fall issue instead.

Advertising:

The WWID newsletter accepts advertising in the following formats:

- Full page with bleed: 8.5" W x 11"H
- Full Page without bleed: 7" W x 9" H
- Half page vertical: 3.5" W x 9" H
- Half page horizontal: 7" W x 4.5" H
- Quarter page: 3.5" W x 4.5" H

Ads can be accepted in: EPS, PDF, PNG, JPG or TIF formats. 150 dpi minimum. Either RBG or CYMK colour is permitted, but CYMK is preferred. Do not use spot colours. Ads are priced as full colour only. Grayscale ads will be printed as full colour. Advertising insertion orders and artwork can be submitted via email to newsletter@isawwsymposium.com. Please do not email files larger than 2mb. Large files must be sent via Dropbox or FTP.

Ad Pricing:

Advertising for the ISA WWID newsletter can be purchased individually, as part of a full-year 4 ad pack, or as part of a symposium sponsorship. All prices are in US Dollars. Advertisers will be invoiced by International Society of Automation, with payment via check or wire transfer accepted.

Option A – purchase ads individually	**Option B** – purchase 4 ads at a time	**Option C** – purchase ads as part of Symposium Sponsorship
Full page with bleed: $600 Full Page without bleed: $500 Half page vertical: $350 Half page horizontal: $350 Quarter page: $250	Full page with bleed: $1920 Full Page without bleed: $1600 Half page vertical: $1120 Half page horizontal: $1120 Quarter page: $800 The above prices reflect a 20% discount.	Platinum Sponsorship: $3500 – come with 3 full page with bleed ads Gold Sponsorship: $1800 – comes with 3 half page ads Silver Sponsorship: $900 - comes with 3 quarter page ads Includes 2 ads in issues leading up to the symposium and 1 issue afterwards. The above pricing is current for the 2018 symposium – see website for details. See Symposium Exhibitor/Sponsor Brochure for full list of sponsor benefits.

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 info, visit **www.isa.org/wwid/** or the ISA Water/Wastewater and Automatic Controls symposium website at **www.isawwsymposium.com**

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ISA Water/Wastewater Division Links:
Website: www.isa.org/wwid/
LinkedIn: https://www.linkedin.com/groups/2031271/

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
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