Division Newsletter

Water & Wastewater Industries

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Winter 2010

Director's Message- Winter 2010

January 1, 2010

Associate WWID Practitioners:

Serving you as Director-Elect of the ISA's Water Waste-Water Division (WWID) has been a pleasure. This month begins my service as WWID Director. Thank you for this opportunity.

We are just coming out of the Society's fall season and I want you to know that the Division is some fifteen hundred Members strong, and that the executive board is engaging in new ideas and moving ahead with items needing attention that will assure your benefit and the health of the WWID. The Business Plan, as submitted, is on schedule.

Our last WWID executive meeting was held during the Fall Leadership Meeting (FLM) in Houston at the Galleria in October and was well attended by executive Members, committee Members and guests. We continued to follow-up on matters that have been in the works and I am pleased that all Division Members who attended contributed to the direction and "value added" being brought to the WWID.

We now have a LinkedIn group accessible from our website, thanks to Jon DiPietro, webmaster. Jon has given us access to the WWID LinkedIn group from a couple locations: The newsletter and a link on our website. Once you have signed up, LinkedIn is also accessible by invitation from one member to another, which is a good way to propagate the site's usage. At present, the LinkedIn group is growing by word of mouth, and we are planning a major effort next season to increase participation. If you are wondering, the WWID LinkedIn group is primarily a social media type of forum comprised of a community of water and waste-water industry workers who can network, or communicate, on various industry topics and issues by creating "threads" of questions regarding the latest in technology, or process problems, and await others to respond with potential solutions or technique.

As we update the WWID website, I would encourage all Division Members to consider authoring an article or forward something noteworthy to be published here. Simply send it along to Jon DiPietro at **jon.dipietro@bridge-soft.com**.

The WWID Symposium in Orlando last August was again both an ISA and industry success, thanks to Joe Provenzano, chairman general, and his team. Look to the near future for breaking news of the WWID 2010 Symposium.

After many seasons of discussions, a scholarship award is now available to ISA student Members who are WWID Members, and student children of the WWID membership. The award funding is secure and the award is intended to continue through the future. The value of the distribution and award selection method is open to all disciplines of study, and we encourage your children to apply. Hank Hegner, scholarship chairman, and others under his guidance have worked notably for you on this. Links related to the award can be found in this newsletter.

Many of you are aware that current economic trends have made it necessary for ISA HQ to bring staff levels down to meet current budgets. In the process, we have assured that the service our Division relies upon will not be lost, hindered or diminished. Personally I am delighted that our staff contact, Rodney Jones, will continue with us, and remains absolutely committed to the future of the WWID.

In addition to those already mentioned, allow me to recognize Paul Lanzillotta, Bill Balascio, and Steve Valdez for their service on the executive committee this past year.

Being director-elect has been a privilege, and I look forward to beginning the position of director beginning January 2010. It is my goal to bring additional executive members and committee chairpersons to the table and to continue the growth of our Division in usefulness and purpose. Jon DiPietro will begin serving alongside me in his newly elected position as WWID director-elect. Jon is enthusiastic, a visionary, and brings to our group much experience from the water and waste-water industries.

In closing, thank you for your support. I look forward to your input and thoughts.

Respectfully,

Michael B. Fedenyszen
Division Director-Elect

Jon DiPietro is WWID's New Director-Elect

The ISA Waster & Wastewater Division is proud to announce Jon DiPietro, Boston Section president and WWID Division webmaster, as WWID director-elect beginning 1 January 2010.

Jon has been instrumental in improving the Division and makes his employment in the water-wastewater industry. He is an ISA volunteer to be counted on, and has participated at WWID events and ISA Leadership Training. He has a great reputation and many contacts in the industry, which makes him the perfect candidate.

Together our goal would be to continue refreshing the WWID. Congratulations to Jon on his newest ISA assignment.

ISA's 4th Annual Water & Wastewater and Automatic Control Division Symposium Was a Success

ISA is pleased to announce its 4th Annual Water & Wastewater and Automatic Controls Symposium, held from 4-8 August 2009 at the Doubletree-Castle Hotel in Orlando, was a success. The event consisted of two days of technical sessions plus a keynote speaker, Bill Hurley. Mr. Hurley spoke on technology changes and their effect on operating a water plant. ISA President Gerald Cockrell gave a 15 minute presentation titled "ISA today."

Each day offered eight speakers who spoke on various technologies that are used in measuring, level, plant flow, DO, pressure, and temperature. Papers were presented on plant SCADA applications, process modeling software, and a case study using this software to predict plant performance under certain flow conditions, and more. Our speakers were well prepared and our audience showed its appreciation by their questions and applause at the end of each session. One attendee stated that it was his first experience in attending a symposium like ours where each session presented technology rather than a product pitch. Jon DiPietro, Boston section president, gave a presentation on social media and its effect on the water & wastewater industry.

We had five vendors who were kept extremely busy, especially on the first day. In all, we had 60 attendees who gave the symposium a "solid thumbs" up.

The next Water and Wastewater and Automatic Controls Symposium will be held in Orlando, Florida, at the Doubletree Castle Hotel on 3-5 August 2010. Joe Provenzano is the symposium chair. He is accepting abstracts for presentation consideration. You may e-mail your abstracts to Joe at **provenzano2@comcast.net**

ISA EXPO 2009 Attracts Thousands, Features Dozens of Special Events

Research Triangle Park, NC (22 October 2009) –ISA EXPO 2009, held at the Reliant Center in Houston, Texas, USA, on 6-8 October, attracted 8,500 attendees and included a 61,500 square foot exhibition showcasing 364 companies. The ISA Fall Training Institute ran 13 courses and trained 113 students at the event. ISA EXPO 2009 featured seven co-locating organizations, including ARC Advisory Group, Industry2Grid (I2G), MCAA, OpenO&M, Microsoft and the Microsoft Manufacturing User Group (MSMUG), Houston SmartPlant Instrumentation (LTUF), and WBF.

The co-location of these organizations' events with the ISA Fall Training Institute, Industry Standards Forum, six technical conferences, and the exhibition brought an abundance of technical content, professional development, and networking opportunities to attendees. New technologies were a focus of both conference sessions and presentations on the exhibit floor, with attendees anxious to see the latest trends in the field. "I'm always looking for new technology. That's what I'm here to see. I'm a control systems engineer, and anything that can make our processes work better, whether that's software, wireless, or fieldbus, I want to have a look," said James Pitts of Goodyear Tire and Rubber in Beaumont, Texas.

The ISA EXPO 2009 technical conference featured six Exchange Conference Tracks centered on key issues facing instrumentation, automation, and control professionals, including safety, security, process automation and control, energy and environment, wireless and networking, and enterprise integration. The conference program also included several events open to all attendees, including keynote addresses from key leaders. John Hofmeister, CEO and Founder of Citizens for Affordable Energy, and retired President of Shell Oil Company presented the opening keynote address on Tuesday, 6 October. Hofmeister's presentation, entitled "Energy Security and Affordability in the 21st Century," tackled these two critical concerns for industrial operations.

Wednesday's keynote address, "Securing the Nation's Industrial Control Systems Infrastructure," was delivered by Marty Edwards, U.S. Department of Homeland Security Program Manager of the Control Systems Security Program (CSSP). Edward's address discussed the current threat landscape, common vulnerabilities and security issues facing critical infrastructure control systems, and mitigation strategies being developed to address these challenges.

Lisa Long, Safety Engineer with the U.S. Department of Labor-OSHA (U.S. DOL-OSHA), presented the final keynote address on 8 October, titled, "Overview and Findings from OSHA's Refinery and Chemical National Emphasis Programs." Long's address described the Petroleum Refinery National Emphasis Program's inspection protocol and procedures, and reviewed preliminary findings from the program, including data on the most frequently cited paragraphs of the process safety management standards and example citation language.

The event also featured activities for young automation professionals and students. YAPFEST, in its fourth year, attracted 200 automation professionals in the under-30 category to interact with sponsoring companies, learn more about careers in automation, and discuss how they might make a difference in the automation world. Students from several local colleges attended the event

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Special Events *(continued from p. 2)*

to learn about real-world applications of the automation and engineering concepts they're learning about in school, and young professionals already working in the field attended to network and build their knowledge of the industry. Tamara Freasier, a graduate of LIT, works as a commissioning admin for Chicago Bridge and Iron. "We're building a liquid natural gas plant in Sabine Pass, Texas," she said. "I came to EXPO to get exposed to instruments and what they do."

Members from all Divisions enjoyed the Joint I&S and A&T awards luncheon.at ISA EXPO 2009.

The second annual iAU2M8 event, designed for middle and high school students, attracted over 600 students from the Houston area. Students had a chance to walk through the ISA EXPO exhibit, see automation technology in action through an interactive demonstration area, and learn about career opportunities from real-world automation professionals. Sponsored by Shell, the event attracted several participating organizations and schools, including Citizens for Affordable Energy, FIRST Robotics, Houston Community College, the Houston Museum of Natural Science, Lee College, the Offshore Energy Center, Texas State Technical College, and the University of Houston.

The students attended a keynote address entitled "Deadliest Innovation," given by Greg Crouch, Embedded Systems Business

Alex Habib, Don Frey, and Joe Provenzano at the Joint I&S and A&T awards luncheon at ISA EXPO 2009.

Joe Provenzano receives Department VP Award for the I&S Department.

Development Director at National Instruments. Crouch is active in National Instrument's academic STEM (Science Technology Engineering and Math) program efforts, helping to expand excitement of engineering among youth.

During ISA EXPO 2009, ISA announced its plans for a new event in 2010. ISA Automation Week 2010 will be held 4-7 October 2010 at the Westin Galleria Complex in Houston, Texas, USA. ISA Automation Week is a new, knowledge-focused event that will feature educational and applications-based technical conference sessions delivered by subject matter experts. Discrete and process automation professionals will have a chance to learn techniques and solutions for creating more efficient, productive, and economical manufacturing processes. ISA training courses and standards meetings will also be held concurrently, making ISA Automation Week a one-stop shop for automation and control knowledge and networking opportunities.

The awards luncheon was a great time for all Division Members to network.

ISA Automation Week will attract management, engineering, production, IT, and R&D professionals responsible for automation, control systems, plant-wide communications/networks, plant operations and maintenance, and systems integration in continuous and batch manufacturing environments.
For more information about ISA Automation Week 2010, visit **www.isa.org** or call +1 (919) 549-8411.

ISA Unveils Plans for ISA Automation Week 2010 in Houston, Texas

Research Triangle Park, NC (23 October 2009) –The International Society of Automation recently unveiled plans for its new event, ISA Automation Week: Technology and Solutions Event, to be held 4-7 October 2010 at the Westin Galleria Complex in Houston, Texas, USA.

ISA Automation Week will feature intensive educational and applications-based technical conference sessions delivered by subject matter experts. Discrete and process automation professionals will have a chance to learn techniques and solutions for creating more efficient, productive, and economical manufacturing processes. ISA training courses and standards meetings will also be held concurrently, making ISA Automation Week a one-stop shop for automation and control knowledge and networking opportunities.

The ISA Automation Week conference program will focus on the latest industry developments and standards in key manufacturing disciplines like automation, energy and power, green manufacturing, instrumentation and process control, safety and security, systems and enterprise integration, and wireless, networking, and industrial communications. Conference sessions will include both theory-based and applications-based presentations to appeal to a wide variety of automation and control professionals. The event will feature a focused exhibition area for a limited number of companies to showcase products and services during scheduled networking and exhibit sessions. Currently, 65% of the space available for the exhibit has been sold.

"ISA Automation Week is organized around a different model than ISA has used in the past. The new model focuses on the conference as the center of the event, because we believe that automation and control professionals at every level seek knowledge above all else. By centering the event on the conference, we can help exhibitors create more successful interactions with serious and focused attendees at all levels," said ISA Executive Director and CEO Patrick Gouhin.

"ISA is all about knowledge. The conference focus of this event will help us deliver a top-notch technical curriculum to our attendees, and it will benefit our partners and exhibitors as well," said ISA Automation Week Program Committee co-chair and 2009 ISA President Jerry Cockrell of Indiana State University. "By drawing on our connections to the academic community to develop presentations in addition to our strong applications-based technical network, we can create a well-rounded program that attracts all levels of automation professionals."

The increased focus on the conference aspect of the event is a positive development for automation suppliers as well, said 2010 ISA President Nelson Ninin, who is the President of Yokogawa America Do Sul SA. "We believe that an educated prospect is a qualified prospect. Our attendees will spend three intensive days learning about the latest technologies and solutions in the world of automation and control, and they'll be ready to see the products that our partner companies have to offer in those areas. This is a great opportunity for a company to showcase its products as solutions to the technical challenges and developments presented in the conference sessions."

An Exhibitor Advisory Committee and other feedback mechanisms are being created to solicit input at various stages of the development process for the 2010 event and events in future years. Companies or individuals interested in learning more, or providing input toward the development of ISA Automation Week, should contact ISA at **feedback@isa.org**, or call +1 (919) 549-8411.

Calendar of Events

55th Analysis Division Symposium
25-29 April 2010
Crown Plaza Astor
New Orleans, LA, USA

2010 ISA Safety and Security Symposium
28-29 April 2010
Crown Plaza Astor
New Orleans, LA, USA

56th International Instrumentation Symposium
10–14 May 2010
Rochester Marriott Airport Hotel
Rochester, New York, USA

10th ISA Fugitive Emissions-LDAR Symposium
18-20 May 2010
Location TBD
San Antonio, TX, USA

53rd ISA POWID Division Symposium
7-11 June 2010
J.W. Marriott
Summerlin, NV, USA

ISA Spring Leaders Meeting
12-14 June 2010
J.W. Marriott
Summerlin, NV, USA

5th ISA Water & Wastewater and Automatic Control Symposium
3-5 August 2010
Location TBD
Orlando, FL, USA

5th ISA Marketing & Sales Summit
1-3 September 2010
Location TBD
Atlanta, GA USA

ISA Automation Week: Technology and Solutions Event
4-7 October 2010
Westin Galleria Complex
Houston, Texas, USA

2009–2010 Business Plan

April 26, 2009

- The **Leadership Officers** slate will be filled with active members.
- The **Newsletter** will be produced two times this season and distributed to our membership electronically.
- **Meetings** will be held twice yearly in conjunction with the *ISA Spring Leadership Meeting and ISA Fall Leadership Meeting.* The officers will regularly communicate via e-mail, and teleconference accordingly in order to affirm events and that responsibility is being fulfilled to the society and WWID Members.
- The Division will host a ***Membership Luncheon*** during the *ISA October EXPO 2010.*
- In **support of EXPO 2010** the Division will *solicit papers, develop a session and provide moderators* as required.
- The **Website** is planned to be maintained during the year, refreshing its content quarterly: 5/31, 8/31, 11/30 and 2/28.
- A **Symposia and Exhibit** will be planned during 2009. The staff and our membership will be advised by the Fall Leaders Meeting. A notification announcing sections interested in receiving information on hosting the fall event will be entered on both the website and newsletter.
- **Membership** drives will be conduced throughout the year. A booth will be maintained at the WWAC/WWID Symposium, and the Division will make itself available to be present at District Leadership Conferences for said purpose.
- **Sponsorship** criteria will be developed where the Division can select a student or college/university to be selected for a cash award.
- The **Budget** will be submitted by the WWID in conformance with ISA guidelines and the associated timetable.

Respectfully submitted,
WWID
Michael B. Fedenyszen
Division Director-Elect

Hey, do you qualify for ISA Senior Member grade?

Have you been in the business for 10 years? Or have a degree and six years of work experience? If so, you may qualify for ISA Senior Member grade.

Senior Member grade is ISA's way of recognizing your advanced educational preparation and professional work experience. It's a great way to show your success! Senior Member grade is also the prerequisite Member grade for candidacy for "ISA Fellow," one of ISA's highest honors, and for holding elective office at the Society level. Any ISA Member who meets the requirements may apply for Senior Member grade at ay time.

Requirements:

- Applicant must have graduated from a baccalaureate engineering or science curriculum, with at least six years of active work experience in the instrumentation, systems, and automation field (two of which shall have been in a position of responsible charge*).
- If not a graduate, the applicant must have ten years of active work experience in the instrumentation, systems, and automation field (two of which shall have been in a position of responsible charge*).

*Responsible charge includes directing others in instrumentation, systems, and automation work, and/or individual responsibility for instrumentation, systems, and automation development, application or operation at a professional level, and/or teaching instrumentation, systems, and automation or associated engineering and sciences at a professional level.

You can find all the details and an application form at **www.isa.org/seniormember** or by calling (919) 549-8411.

"Becoming a Senior Member of ISA is a great way for your company to see your professional growth in action."

Marcus Rasco
Senior ECT Professor
DeVry University
Irving, TX

ISA Gives You the Leadership Training You Need—for FREE!

Would you like to become a more effective leader? Or begin developing your leadership skills?

As a Member of ISA, you have unparalleled access to professional development resources designed to help build your leadership skills. ISA's Leadership Development Certificate Program offers you a unique opportunity for professional growth through on-line courses. This is a $195 value, free to you as a Member!

You can enjoy a combination of training in three key areas: general leadership training, ISA-specific leadership training, and active leadership roles and activities. In addition, ISA offers lots of opportunities for hands-on, active leadership roles to sharpen your skills as you learn—such as involvement in your local Section, in Technical Divisions, and in our 30,000-member Society.

Be sure to take advantage of this valuable, free Member benefit that can help you advance your career and marketability!

Visit **www.isa.org/leadershipadvantage** for more information and to enroll.

Let's Welcome New WWID Members

Ms. Saranya

Dr. Sitalekhshmi Amma B
NSS College of Engineering

Mr. Yesid Felipe Arevalo Caicedo

Mr. Ronald P. Arns, Jr.

Mr. Dale F. Aulenbach

Mr. Jonathan Baker
Allied Control Ltd

Mr. Frank Balazs, Jr.

Mr. Timothy W. Barefoot
The York Water Co

Stephano Bastiani
Berlie-Falco Technologies

Mr. Scott Becker
Bonita Springs Utilities

Mr. Zeljko Begovic, CCST
City of Newport News Waterworks

Mr. David B. Bell, CCST
PWCSA

Mr. Terry J. Bender

James R. Bercik, CCST
M/R Systems Inc

Mr. Daniel Berlow

Mr. Richard Blease
Genzyme Corp

Mr. Jeffery S. Blue, CAP
Southern Nevada Water System

Dr. Moses N. Bogere

Mr. Julius M. Boongaling
Mohawk College

Mr. Warren Everett Bown
Pinellas County Utilities

Mr. Mundi Braunstein
MBI Engineering Ltd

Mr. Gregory K. Brock
King Cty Dept of Natural Resources

Mr. Gene Brownlow
Trinity River Authority of Texas

Ms. Rebecca Buhner
Flow Controls Inc

Mr. Don C. Bush
Easier Level Measurement

Mr. Christopher Caglioti, CCST
City of Cape Coral RO Plant

Mr. John W. Callison

Mr. Richard Carbajal

Mr. Chris Carfora
Pinellas County Utilities

Mr. Daniel Chan
Las Vegas Valley Water Dist

Mr. Scott L. Chester
GHD

Mr. Jeremy Clarke
City of Vacaville

Mr. Donald D. Cloud
City of Simi Valley

Mr. Michael A. Cole

Mr. Paulo Roberto Colusso

Mr. Jerry F. Connolly
Siewert Equipment Co

Mr. Peter C. Cook
Control Engineers PA

Mr. Mark A. Copeland

Flor del carmen Corona Morales

Mrs. Amanda Jean Crosswell

Mr. Ron Curr
City of Cape Coral

Mr. Doug J. Deslauriers

Mr. William R. Doxsee
City of Calgary

Mr. Lawrence J. Dugan, Jr., CCST
Newport News Waterworks

Mr. Michael Ell

Mr. William F. Ellis
Ellis Engineering

Mr. Kevin Elwell

Mr. Lewis A. Feil, CCST

Mr. Todd M. Ferrie
Sask Power

Mr. Kevin L. Finnan

Mr. Brent Fitzpatrick
ICS Instrumentation

Mr. Kenneth C. Flatt, CCST
Dare County RO Plant

Mr. Glenn A. Flores

Mr. Juan Garcia

Mr. Ivan Dos Santos Garcia

Dr. Melrose Garrett, Jr.
PBS & J

Mrs. R Gautham

Mr. Darrell P. Gentry
Cobb Co Marietta Water Auth

Mr. Shane Gillispie
GE MDS

Mr. Enrique Gimenez

Mr. William H. Girard
Hampton Roads Sanitation District
HRSD

Mr. Phillip A. Gonzalez

Mr. Oskar A. Granquist
OG PAC Corp

Mr. Willie G. Gray
Emerald Coast Utilities Authorities

Mr. Tim R. Greif
Greeley & Hansen LLC

Mr. Melvin L. Gruschow

Mr. Verinder Kumar Gupta
Gupta & Associates Inc

Mr. John G. Hackett

Mr. E. Randall Haley

Mr. James Alan Hall
Portland Water Bureau

Mr. Ross J. Hanson, CCST
Advanced Engrg & Environmental Services

Mr. Paul A. Hargrove

Mr. Andre Harper
FKC CO LTD

Mr. Kevin Dwain Harper
Union Sanitary District

Mr. Charles Harris
Garver

Mr. Joseph V. Hayko
Earth Tech Canada Inc

Mr. Steve Heppler

Mr. Berton F. Herr

Mr. Timothy Heutinck
ICS Instrumentation & Control Solutions Inc

Mr. Russell L. Higgins
American Water Enterprises

Mr. Andrew Hildick-Smith

Mr. Robert A. Hill
Rivanna Water Authority

Mr. Rob Holden
Region of Halton Planning and Public Works

Mr. Christopher H. Huang
Gila River Indian Community - DPW

Mr. Wayne C. Hunte, CCST

Mr. Matthew R. Huth
Mohawk College

Mr. Mark Z. Jablonski
The Spencer Turbine Co

Mr. Mark Jacobs, P.E.
Dmytryka Jacobs Engineers Inc

Mr. Mathew John Jarvi, P.E.
Capital Consultants Inc

Mr. Phil Johnson
SRP Control Systems Ltd

Mr. David M. Kahm
City of Olean

Mr. Arthur J. Kent

Mr. Roger C. Kress
Jordan Jones & Goulding Inc

Mr. Suresh Kumar M

Mr. Richard Michael Landon

Mr. Fabian A. Lara

Ms. Beatriz Latorre
Yokogawa Iberia SA

Mr. Mario Laurin

Mr. David M. Lautner
Control Engineering Inc

Mr. Douglas A. Leath, CCST
Peace River Manasota Reg Water

Mr. David W. Leath, CCST
Union Sanitary District

Mr. Kerry D. Lee, CIMM
North Davis Sewer District

Mr. David A. Lewis, CCST
Pinellas County

Mr. Francis W. Limbacher
MSA

Mr. Jeff S. Lloyd
City of Columbus Ohio

Ms. Kathleen A. Lorentz, P.E.

Mr. Gary Kent Louks, CCST

Mr. John M. MacDonald
Martin Control Services Inc

Mr. Mike A. Mantor
City of Simi Valley

Mr. David G. Marszalec

Mr. David Edward Martin

Mr. Ronald L. Matuszek
City of Simi Valley WCQP

Mr. William L. Maynard
GRW Engineers

Ms. Diane McCord
International Power - Coleto Creek

Mr. Paul R. McIntosh
Huffman Engineering

Mr. Shawn T. McIntyre

Mr. Darryl L. Mendivil
Mid-State Instruments

Mr. Rafael Alberto Mesias Olmedo

Mr. Kevin C. Meyer

Mr. Gary J. Mierzwa
Emerald Coast Utilities Authority

Dr. Alexander G. Mikulin
Camp Dresser & McKee Inc

Mr. Brian A. Miller

Mr. Brian K. Miller, CCST
Martin City Utilities

Mr. Arkady Milyavsky

Mr. Curtis Minor, CCST

Mr. Abd Wahab Ishari Mohd Hashim
Universiti Teknologi Malaysia

Mr. Shawn Eric Montano

Mr. Charles R. Montgomery

Mr. Ryan Moore
Earth Tech

Mr. Greg Mroczek

Mr. William J. Murphy
Two Bridges Sewerage Authority

Mr. Michael T. Navaline
Aqua Pennsylvania Inc

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New Members *(continued from p. 6)*

Mr. James L. Neely, CCST
Cobb County Marietta Water Authority

Mr. John Paul Neumann, CCST

Mr. Jim Nguyen

Ms. Laura A. Nieto

Mr. Daniel T. Niksic

Mr. Afonso Celso ACO Oliveira

Mr. Jay H. Ortman
Nibsco Automation

Mr. Robert J. Osnoe

Mr. Gene R. Palop
Otay Water District

Mr. Bill D. Parker
Bill Parker Sales & Engineering

Mr. Kevin Patel
CDM

Mr. Corey J. Pelletier

Mr. Lawrence J. Pendergast
AECOM Water

Mr. George William Pennell, Jr., CCST

Mr. Mark Peters
North Shore Water Comission

Mr. Brian L. Pozwick, CCST
Northeast Ohio Regional Sewer District

Mr. Oscar J. Quintero C

Mr. Rasheed Rahim
Martin County Utilities

Ms. Ramya Shankar Raman

Prof. Marcus S. Rasco
DeVry University

Mr. Franklin Nevada Redd, CCST

Mr. Thomas A. Ridgik
Ch2M Hill

Mr. Richard Ruddock
Chemline Plastics Limited

Ms. Adela Rydlo
ICS Instrumentation & Control Solutions Inc

Mr. Nabil Saba
City of Santa Ana

Dr. Hassan Saberi

Mr. Edmund J. Sajewski
City of Ann Arbor

Mr. Jitendra Vasantrao Sambare

Mr. Paul J. Sandeen

Carlos Santiago Cruz

Mr. John Schori
Du Page Water Commission

Mr. Larry K. Scott, CCST
Emerald Coast Utilities Authority

Mr. Eric W. Selak, CCST
Control Systems 21

Mr. Donald B. Sexton, CCST

Mr. Tushar K. Shah
Eagle Research Corp

Mr. Leslie P. Shaw

Mr. Joseph Shawihat
Mohawk College

Mr. Joshua Shoemaker

Mr. Eugene S. Siadek, P.E.
Metro Utilities District

Mr. Joaquin Silva
On-Ramp Wireless Inc

Mr. Kenneth Smith
Great Plains Industries Inc

Mr. Bret Soeten
M5 Systems Inc

Mr. Frank John Sommerfield
Chester Engineers Inc

Mr. Thomas N. Sopp, CCST
City of Moorhead

Mr. Darrell M. Stang

Mr. Juan J. Stein

Mr. Charles P. Stout

Mr. Joseph A. Strillchuk

Mr. Joseph Patrick Sullivan

Mr. Tim J. Sutherns
Eramosa Engineering Inc

Mr. Dean A. Taylor
P J Kortens & Co Inc

Mr. Allan L. Throop
Joy Controls

Mr. Wilfred Torres

Mr. David Joseph Tress
Southern Nevada Water Authority

Mr. Steven A. Tripmacker
Stanley Consultants Inc

Mr. John S. Trofatter
Accusonic & Hydra-Stop

Mr. Ming D. Tsat

Mr. Richard E. Tucker

Mr. Cain D. Uranday

Mr. Joaquin Ureta Mesa
WEG Iberia SL

Mr. Pablo A. Valdez

Mr. David R. Van Hoesen

Ms. Leslie M. Vero

Mr. Harold W. Wagner
City of Billings

Mr. Rick Walkemeyer, CAP
Yorba Linda Water District

Mr. Robert S. Walks
Cancoppas Ltd

Mr. Robert Melvin Weber, CCST

Mr. Jason Whitesock
Advanced Engineering

Mr. Terry D. Wierman
City of Vacaville

Mr. Joe E. Wilkerson
Wilkerson Instruments Co Inc

Mr. Jimmy P. Williams
Bonita Springs Utilities Inc

Mr. Dillwyn Williams

Mr. Larry Williams

Mr. Colin B. Wiseman, CCST
DC Water & Sewer Authority

Mr. Albert Wong
City of San Jose

Mr. Marshall Yale Wood
NOVA Water Technologies

Mr. Bradley A. Woodland
Massachusetts Water Resource Authority

Mr. Arthur R. Yeary
Yeary & Associates Inc

Mr. Martin Zimmer, CCST

Mr. Ibrahim Al-jamaan
University of Calgary

Mr. Alfred L. Brown, P.E.

Mr. John R. Buchanan, III
Process Control Concepts Inc

Mr. Craig Alan Carr

Mr. Douglas J. Casterline

Federico Castro

Mr. Mark D. Christianson
Shell Canada

Mr. George Datny
Ozer Solutions

Mr. Ali Dehghan
Stantec

Mr. L. Rodney Doig
Laredo Analytical Specialties

Mr. Md Shaheen Ferdouse

Mr. Oswaldo Jr Fernandes, Sr.
By Pass & Associados

George E. Garcia, CCST

Ms. Denna Gatewood
Alloy Metals and Tubes Intl

Mr. David Harris

Mr. Ron Icayan
REI Consulting

Mr. Scott Abell Johnston
Rockwell Automation

Mr. Karl Wm. Klein
Karl Klein Design

Mr. Jason Lapp
Westech Industrial Ltd

Mr. Carl A. Lippens
NewPage Corporation

Oliver Daniel Lorenzo Contreras

Mr. Brannon McMorris

Hender Alberto Molina
Wonderware of Venezuela Inc

Ms. Andra B. Morris
Alloy Metals & Tubes Intl

Mr. James D. Penrod
ENGlobal Systems Inc

Mr. Stephen G. Phelps

Jesus Reyes Flores

Mr. Christopher John Rollo

Mr. Chuck Saunders, CCST

Dr. John Brian Seeling
Twin Bridges Co Inc

D Grant Shannon
Benchmark Instrumentation & Analytical Svcs

Mr. Rahul Chandramohan Shete
Softcon Systems Pvt Ltd

Mr. Christiano Konder Lins Silva
Santa Glafira

Mr. John Skibinski
American Electric Technology

Mr. Sayouth Sysouphat

Mr. Edward J. Twiss, P.E.

Mr. Juan Carlos Valenzuela
Siemens

Curtis Vila
Cytec Industries Inc

Ms. Natalie Wood, P Eng

Mr. Fakhar Ahmad

Mr. John Azarias
ITT Bell & Gossett

Mr. Mohan S. Badami
N A Water Systems

Mr. Frank Balazs, Jr.

Mr. Timothy W. Barefoot
The York Water Co

Mr. Zeljko Begovic, CCST
City of Newport News Waterworks

Mr. Terry J. Bender

Mr. Jeffery S. Blue, CAP
Southern Nevada Water System

Dr. Moses N. Bogere

Mr. Warren Everett Bown
Pinellas County Utilities

Mr. Christopher Caglioti, CCST
City of Cape Coral RO Plant

Mr. Rick P. Carrasco

Mr. Hilton Marinho De Castro
TS Solucoes

Mr. Jeremy Clarke
City of Vacaville

Mr. Mark A. Copeland

Mr. Michael K. Dean

Continued on p. 8

New Members *(continued from p. 7)*

Mr. Himanshu Jayantkumar Desai
Nish Automation P Ltd

Mr. Brian G. Dickie

Mr. Lawrence J. Dugan, Jr., CCST
Newport News Waterworks

Mr. William F. Ellis
Ellis Engineering

Mr. Kevin Elwell

Mr. Kenneth C. Flatt, CCST
Dare County RO Plant

Mr. Glenn A. Flores

Mr. Darrell P. Gentry
Cobb Co Marietta Water Auth

Mr. Enrique Gimenez

Mr. Tim R. Greif
Greeley & Hansen LLC

Mr. E. Randall Haley

Mr. Paul A. Hargrove

Mr. Joseph V. Hayko
Earth Tech Canada Inc

Mr. Henry R. Hegner

Mr. Berton F. Herr

Mr. Rob Holden
Region of Halton Planning and Public Works

Mr. Wayne C. Hunte, CCST

Mr. Mark Jacobs, P.E.
Dmytryka Jacobs Engineers Inc

Mr. Mathew John Jarvi, P.E.
Capital Consultants Inc

Mr. Christopher Jeffrey
ABB

Mr. Oh Sung Kwon
Korea District Heating Engineering

Mr. Richard Michael Landon

Mr. Mario Laurin

Mr. David M. Lautner
Control Engineering Inc

Mr. Douglas A. Leath, CCST
Peace River Manasota Reg Water

Mr. David W. Leath, CCST
Union Sanitary District

Mr. David A. Lewis, CCST
Pinellas County

Mr. Francis W. Limbacher
MSA

Mr. Jeff S. Lloyd
City of Columbus Ohio

Mr. John M. MacDonald
Martin Control Services Inc

Mr. Norman Andrew Magiera

Mr. David Edward Martin

Mr. Paul R. McIntosh
Huffman Engineering

Mr. Brian A. Miller

Mr. Brian K. Miller, CCST
Martin City Utilities

Mr. Arkady Milyavsky

Mr. Curtis Minor, CCST

Mr. Michel Muller
Siemens SAS

Mr. William J. Murphy
Two Bridges Sewerage Authority

Mr. James L. Neely, CCST
Cobb County Marietta Water Authority

Mr. John Paul Neumann, CCST

Mr. Jim Nguyen

Mr. Jay H. Ortman
Nibsco Automation

Mr. David M. Osborn
Greeley & Hansen

Mr. Robert J. Osnoe

Mr. Gene R. Palop
Otay Water District

Mr. George William Pennell, Jr., CCST

Mr. Brian L. Pozwick, CCST
Northeast Ohio Regional Sewer District

Mr. Franklin Nevada Redd, CCST

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City of Santa Ana

Mr. Edmund J. Sajewski
City of Ann Arbor

Mr. Lawrence Oliver Sawicki

Mr. Rick Scholten

Mr. John Schori
Du Page Water Commission

Mr. Larry K. Scott, CCST
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Mr. Donald B. Sexton, CCST

Mr. Leslie P. Shaw

Mr. Eugene S. Siadek, P.E.
Metro Utilities District

Mr. Bret Soeten
M5 Systems Inc

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Mr. Juan J. Stein

Mr. Terrance Thomas Stevens
City of St John

Mr. Arthur George Stokes
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Mr. Joseph Patrick Sullivan

Mr. Tim J. Sutherns
Eramosa Engineering Inc

Mr. Venkataramani T

Mr. Dean A. Taylor
P J Kortens & Co Inc

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Accusonic & Hydra-Stop

Mr. Richard E. Tucker

Mr. Rick Walkemeyer, CAP
Yorba Linda Water District

Mr. Terry D. Wierman
City of Vacaville

Mr. Joe E. Wilkerson
Wilkerson Instruments Co Inc

Mr. Colin B. Wiseman, CCST
DC Water & Sewer Authority

The WWID Group Is LinkedIn

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 Industries Division has created 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

About LinkedIn

For those who may not be familiar, LinkedIn is a free social networking web site for professionals:

LinkedIn is an interconnected network of over 42 million experienced professionals from around the world, representing 170 industries and 200 countries. You can find, be introduced to, and collaborate with qualified professionals that you need to work with to accomplish your goals.

When you join, you create a profile that summarizes your professional accomplishments. Your profile helps you find and be found by former colleagues, clients, and partners. You can add more connections by inviting trusted contacts to join LinkedIn and connect to you.

Your network consists of your connections, your connections' connections, and the people they know, linking you to thousands of qualified professionals.

There are already many ISA members and automation professionals on LinkedIn, as well as several other ISA-related groups. If you'd like to learn more about LinkedIn, the article "100+ Ways to Use LinkedIn" provides many different perspectives on how the site can be leveraged. We hope you'll join us there and network with other ISA, water, and wastewater professionals.

Regards,
Jon DiPietro
Principal

ISA Issues Call for Papers for 5th Annual ISA Water/Wastewater Automatic Controls Division Symposium

ISA announced that the 5th ISA Water/Wastewater Automatic Controls Division Symposium (WWAC) will be held 3-5 August 2010 at the Doubletree Castle Hotel in Orlando, FL and has issued a Call for Papers.

The WWAC Symposium is sponsored by the ISA Water & Wastewater and Automatic Controls Divisions and will help professionals in the water and waste water industry understand how automatic control applications affect processing and distribution of water treatment.

Attendees will review the latest controls equipment as well as instrumentation to fit today's industry needs. A technology-focused, one-day training seminar plus two days of technical sessions will provide the latest in applications, networking, communications, and instrumentation technology associated with the water treatment industry. Attendees will also enjoy working luncheons, vendor exhibits that showcase the latest technologies, and an evening reception.

Call for Papers:

Interested professionals may submit an abstract for a paper to be presented at the symposium. Topics include:

- Water & Wastewater Treatment Process Solutions
- Automatic Controls Affecting the Process
- Water Collection and Treatment
- Water Instrumentation
- Instrumentation and Aeration
- Vermicomposting
- Supervisory Control and Data Acquisition
- Fiber Optic Network
- Distributed Control Systems
- PC Based Control Systems
- Programmable I/O
- Generator Control Systems
- Primary Treatment Technology
- Implant Distributed Technology

To view the 5th ISA Water/Wastewater Automatic Controls Division Symposium Call for Papers, visit **www.isa.org/wwac**. Abstracts for presentation consideration may be sent to Symposium Chair Joe Provenzano at **provenzano2@comcast.net**.

Abstracts due date: 16 April
Draft papers or presentations due date: 1 June
Final papers or presentations due date: 1 July
PowerPoint Presentations due date: 16 July

Exhibits and sponsorship opportunities are available. Contact Carol Schafer at **cschafer@isa.org** or +1 (919) 990-9406 for more information.

For more information or to register, visit **www.isa.org/wwwac** or contact Rodney Jones at **rjones@isa.org** or +1 (919) 990-1418.

Membership Extension for Unemployed ISA Members Continues into 2010

To support loyal ISA Members during these difficult economic times, ISA is once again granting an extension of membership benefits to unemployed Members. This extension was created in 2009 and has been renewed for 2010. It will last for a period of up to 12 months from membership renewal date.

During the extension, all Member benefits will continue, including Division memberships, except that delivery of InTech and any Division newsletters will be in digital form.

This program is available to Members entering active grace status on or after 1 January 2010 and who apply for the extension. Any Member, other than Student Members, may request this extension.

How to Apply for Membership Extension

ISA Members who become unemployed may contact ISA by e-mail (**info@isa.org**) or phone (+1 (919) 549-8411) to request a one-time, one-year extension of the current membership term. These Members need to advise ISA within the first three months of their renewal period.

Don't forget! WWID sponsors a $1000 scholarship each year

This spring, WWID will award its first annual $1000 Water and Wastewater Industries Division Scholarship Award to a WWID student Member or to the son or daughter of a WWID Member. The winning applicant will be selected at the ISA WWID Board of Directors meeting at the 2010 ISA Spring Leaders Meeting by lottery (chance) selection. We will notify you of the winner in the next newsletter.

WWID is pleased to be offering this award to help students interested in automation careers in the water and wastewater industries. The scholarship was approved, and application requirements set, by the WWID Executive Committee at the Fall Leaders Meeting in October 2009 in Houston, TX.

Although the February application deadline for the 2010 award has been met, (we have lots of great applicants), 2011 still beckons! Tell your students to get an early start.

Applicants must meet the following requirements

1. Applicant must have a parent who is an ISA WWID active Member, or the applicant must be an ISA WWID Student Member. The WWID member must be in good standing, with ISA dues paid to date.
2. The candidate must be enrolled as a full-time student in a spring semester at a two- or four-year college or university, and he or she must have already completed one semester as a full-time student.
3. To be considered for the ISA WWID Scholarship Award, the application form must be filled out completely and mailed to:
   Henry (Hank) R. Hegner
   ISA WWID Scholarship Chairman
   812 Lakemount Drive
   Moneta, VA 24121-5776
4. All application forms must be received by the WWID Scholarship Chair no later than 10 February 2011.

See the next page for the application form.

Water and Wastewater Industries Division
Scholarship Award Application Form

College Student or
WWID Student Member Name: _____

Address: _____
Home Phone: _____
Student E-mail: _____

College Name: _____
College Address: _____
College Phone: _____

Parent Name: _____
Parent Address: _____

Parent Phone: _____
Parent E-mail: _____
ISA Membership Number: _____
(Parent or Student)
Parent information above may be omitted if the applicant is an ISA WWID Student member.

International Society of Automation
67 Alexander Drive
P.O. Box 12277
Research Triangle Park, NC 27709
PHONE (919) 549-8411
FAX (919) 549-8288
E-MAIL info@isa.org
www.isa.org

A Few Words about the Article That Follows

By Leo Staples

While attending the Fall Leaders meeting, I met the new Division Director for the Pulp and Paper Industry Division (PUPID), Paul Burnett. Paul asked if I had time to write an article for his upcoming newsletter. Of course, I accepted Paul's offer, since one of my goals as the 2010 ISA President-elect Secretary is to provide better communications to our Division members.

I have been a member of the Power Industry and Test & Measurement Divisions since joining ISA in 1989. However, I have only been an active member since 2003 when I attended my first Division symposium. I was impressed by the quality of the technical presentations at those events and found several new ideas that we were able to use at my company, Oklahoma Gas & Electric. Since then, I have written and reviewed papers and served as the General Chair for the 2009 POWID symposium. I would therefore encourage each of you to consider how you can contribute to the success of your own Division.

During my tenure in the presidential chain (2010-2012), I intend to provide articles for Division newsletters that present my thoughts on the Society and our Divisions. In coming weeks, I will launch a Facebook page so members can track my activities with ISA and the Automation Federation. Again, I want to say thanks to Paul for giving me this opportunity to share my thoughts with Division members. Please feel free to drop me a note at **staplehl@oge.com**.

ISA Division Members: Top Three Opportunities to Contribute to ISA's Success in 2010

Like most companies and organizations, ISA has faced economic challenges in the recent months. Our 2009 President, Jerry Cockrell, and our 2010 President, Nelson Ninin, have worked with the Society's leaders to create a more sustainable business model for ISA's long term success. I have been part of this process as the 2010 President-elect Secretary, and I am looking forward to all of the opportunities that these changes will bring to our Society.

ISA has made great strides in 2009 with our leadership role in the development of industry critical standards like ISA99 and ISA100; in our support of the development of the Automation Competency model; and in our outreach to young automation professionals through workforce development initiatives such as YAPFEST, iAU2M8.09, and the Automation Avengers campaign.

As Division Members, each of us has a unique role in ISA's success. We are the technical arm of the Society, and we have much to offer in that regard. In fact, many of the changes we're making call for an increased focus on technical content, and Division Members will be critical resources in this effort.

During my twenty years of membership I have been involved in many worthwhile activities. From a Society-wide perspective, I think there are several key roles for Division Members to play in our development. Here are my "top three" ways that you can make a real difference in 2010:

Help ISA enhance the development and delivery of technical information. In the new Automation Week model, the technical conference is the center of the event and will be a great opportunity for our Division Members to present papers and presentations to a broad audience. In addition to submitting an abstract for the conference, you might also consider becoming a part of the conference programming committee. 2009 Industries & Sciences Department Vice President and Former Division Director Joe Provenzano (Water and Wastewater Division) and 2009 ISA President Jerry Cockrell will serve as co-chairs of the committee. Email (Jerry at gcockrell12@msn.com or Joe joe_provenzano@hotmail.com) to volunteer or to learn more about the committee's work. In addition to Automation Week's technical content, Members will also be more involved in creating technical content for ISA's flagship magazine, InTech. Stay tuned for details on how you can share your expertise as we develop our plans.

Do your part to promote the profession and tell the great stories that are out there. ISA organizes all kinds of events for young professionals and students, including YAPFEST and iAU2M8. Learn more about these events online and volunteer to help develop them through our workforce development committee, led by David Adler (davidadler@comcast.net).

Help spread the word about ISA's education and training opportunities. ISA's certification programs, regional courses, distance learning programs, and onsite training classes increase the competence of automation professionals around the world. We need your help to market these great programs to the companies and individuals that you work with everyday, and we need your input to help us develop the next generation of training courses. We look to you, the professionals in the field, to help us determine the best subjects and topics to develop training courses around, and we want to hear your thoughts. Download a training catalog online at www.isa.org/training to learn more about these programs.

The common theme among these three opportunities is for us as Division Members to bring all of our collective value to the table to move ISA forward. We are a tremendous resource and strength within the Society, and I want to help each and every Division Member find the best way to make a difference within ISA. I look forward to continuing this dialogue in the months and years to come.

H. Leo Staples, Jr.
Power Industry Division and Test Measurement Division Member
POWID Executive Committee Member & 2009 POWID Symposia General Chair
2010 ISA President-elect Secretary

OUTSTANDING PAPER PRESENTED AT THE 4TH ISA Water & Wastewater and Automatic Controls Systems Symposium

Unique Flow Measurement Challenges for Large UV Systems

Authors: Phil Sanders, Clark County Water Reclamation District
Guy Miller, P.E., Engineering Manager – Accusonic Technologies
John Trofatter, General Manager – Accusonic Technologies

Date: July 17, 2009

A key element in successful implementation of an ultraviolet (UV) disinfection system is proper control and operation of the UV lamps. The intensity and operational period of a lamp bank is typically a function of the specified disinfection requirements and flowrate. Meeting the disinfection requirements while maximizing the efficiency of the UV system is predicated upon accurate and repeatable flow measurement. The complex piping of a large UV system (large being defined herein as 30 inches or greater in pipe diameter or channel width) provides very challenging hydraulic conditions that can impact the accuracy and repeatability of a flowmeter. It is critical to install a flow measurement technology that can operate as specified under these difficult hydraulic conditions in order to achieve the desired UV system performance.

Increased Popularity of UV Disinfection Systems

UV disinfection systems are becoming more prevalent in the water and wastewater industries for a variety of reasons. Chlorine gas disinfection had been a popular method, but safety concerns and regulatory changes have led to a decrease in chlorine gas use. For example, new regulatory requirements regarding allowable concentrations of residual chlorine present in a wastewater treatment plant's effluent required the implementation of dechlorination methods which usually involved the introduction of sulfur dioxide. As populations grew and homes were built closer and closer to wastewater treatment plants, the hazards, and associated liabilities, of storing chlorine and sulfur dioxide in bulk became increasingly unacceptable.

Chlorine, in the form of sodium hypochlorite, is far less hazardous to handle and store, effectively addressing the safety concerns associated with chlorine gas. The same discharge regulatory requirements, however, still define that a wastewater treatment plant's effluent must be dechlorinated before being discharged into the receiving water. Sodium bisulfite is typically used in this application. Both sodium hypochlorite and sodium bisulfite add to the Total Dissolved Solids (TDS) of the plant discharge. Most National Pollutant Discharge Elimination System (NPDES) permits impose a TDS goal or limit on the plant discharge. In some areas, where the background TDS (the TDS that is found in the drinking water supply) is already high, adding more to the discharged effluent could cause that goal or limit to be exceeded.

Ozone can be used as an effective disinfectant that does not add TDS and leaves no residual in the effluent stream. It is a superior oxidant to chlorine. It has advantages for use in the destruction of endocrine disrupting compounds such as pharmaceuticals and

personal care products that are typically found in domestic wastewater. There are some disadvantages to ozone disinfection systems, such as on-site generation and potential higher costs that may make that choice unappealing to some wastewater plants.

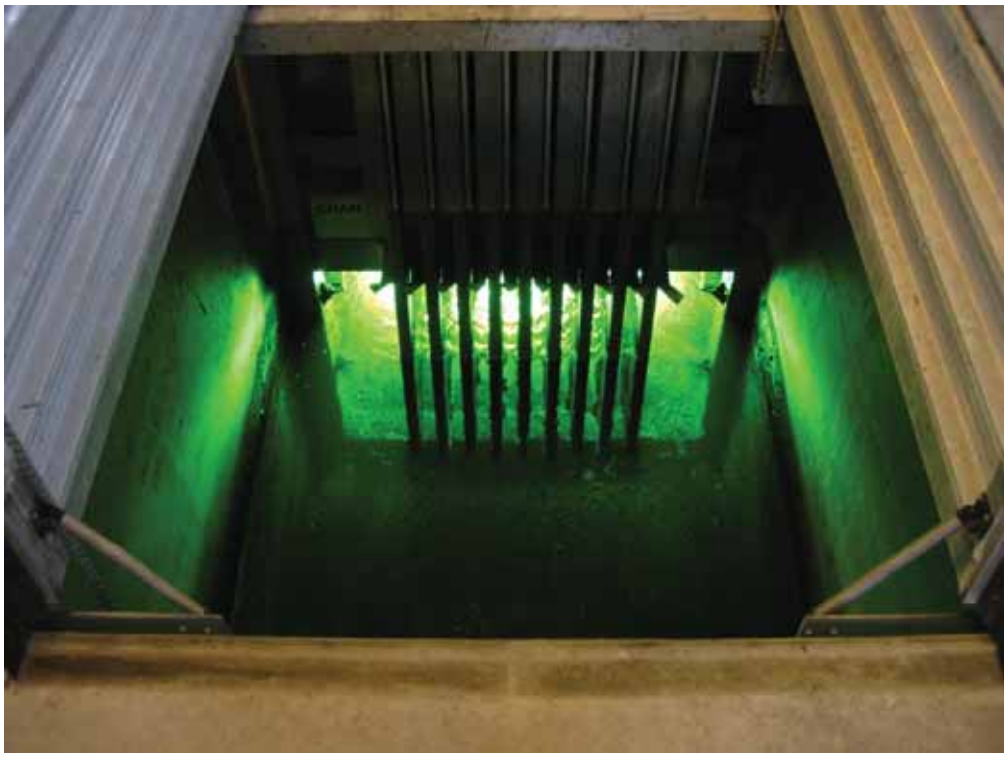


Photo 1. UV Installation at Clark County Water Reclamation District

Given the considerations mentioned above, many water and wastewater treatment plants are choosing UV as a disinfection method. UV systems have only minor chemical hazards (chemicals used for cleaning) associated with them, leave no residual, and add no TDS to the wastewater. UV systems disinfect by exposing the stream to intense UV light for a specified period of time. The UV spectrum is from 100 to 400 nanometers. The wavelength effective for disinfection is from 200 to 300 nm, 254 nm is most ideal. UV dose is expressed in milliwatt seconds per square centimeter (mWs/cm^2). For wastewater discharge, a dose in the area of $25mWs/cm^2$ is usually adequate to meet NPDES disinfection requirements. As the water passes across the UV lamps, which are oriented parallel to the flow, it must be exposed to UV radiation for the time specified to achieve adequate dosing.

The challenge in using a UV system for disinfection is to always achieve adequate dosing without overdosing. Overdosing does not hurt the water in any way, but it uses more electricity than necessary and wears out the components of the UV system prematurely. This challenge is complicated by constantly changing flow rates. Typical municipal wastewater treatment plants receive flow in a diurnal pattern. The diurnal flowrate is

typically low in the early hours of the morning while most of the population is sleeping, peaks in the late morning as the flows from morning showers and toilet use arrive, tapers off during the afternoon as water use decreases, increases to a lesser peak in the evening after people arrive home, and slowly declines to a low rate in the early hours, again. Typical potable water systems also exhibit a similar flow diurnal pattern. This variation in flowrate makes it more difficult for the optimization of a UV system without accurate and repeatable flow measurement.

Difficulties for Traditional Flowmeters on Large UV Systems

Traditional flow measurement technologies are generally not suitable for the unique challenges presented by large UV disinfection systems. Beyond the requirement of an accurate and repeatable measurement in the presence of severely distorted flow profiles due to the complex piping of the system, the limited available space to install a flowmeter becomes the overriding factor. The end-to-end laying length of traditional flowmeters, such as magnetic and venturi flowmeters for full pipe installations and flumes for open channel installations, can exceed the limited space available for the flowmeter installation.

UV systems require highly accurate and repeatable flow measurement in the presence of complex hydraulic conditions. For such critical installations, it is essential to evaluate a potential flowmeter technology on the performance the flowmeter will provide under the actual installation conditions and not the accuracy such a flowmeter will provide in the benign conditions of a flow calibration facility. The stated accuracy for most flow measurement technologies is based on testing performed in flow calibration laboratories under ideal, or close to ideal, conditions. Those ideal conditions are rarely present in the real world environment most water or wastewater treatment plants operate in. The ultimate performance for any flowmeter is far more dependent on the actual installation conditions than on the flowmeter's inherent accuracy. All potential uncertainties should be evaluated, chief among them being the negative effect of the flow profile distortion present at the installation location, when deciding on the proper flow measurement technology for a given requirement.

Ultimately, the accuracy (uncertainty) of a flowmeter is dependent upon all the potential uncertainties throughout its flow measurement process. For critical applications, such as large UV disinfection systems, a thorough uncertainty analysis should be performed based on the final installation dimensions as defined by the actual as-built drawings. An uncertainty analysis should be performed for each installed flowmeter, not just one as a "typical" for similar installations as too many installations aspects may vary from one installation to the next for a "typical" to be valid.

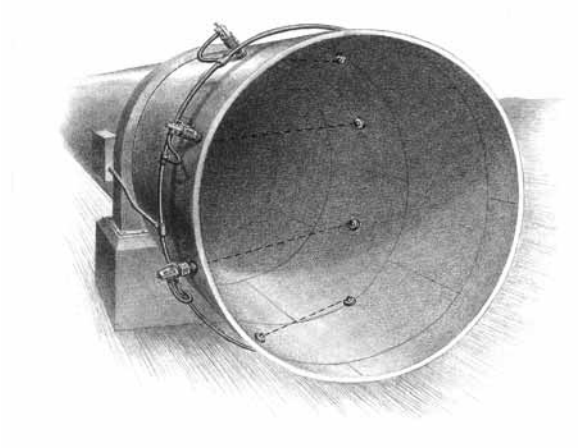
A Viable Flowmeter Solution for Large UV Systems

Multiple ***chordal-path*** transit-time flowmeters are generally not well known to flowmeter users in the water and wastewater industries. While this type of transit-time flowmeter

has been in use in these industries for many years, the application range is generally limited to the most difficult installations with complex hydraulics and the need for high performance. ***Diametrical-path*** transit-time flowmeters (clamp-on or wetted transducers) are more commonly known in the water and wastewater industries but possess certain limiting factors precluding them from consideration for many UV disinfection system installations. These limiting factors include the inability to measure flow in open-channel and partially full pipe installations, and limited performance capability in the presence of highly distorted flow profiles.

The transducer path arrangement and the numerical integration techniques utilized by multiple ***chordal-path*** transit-time flowmeters allow for much greater velocity profile resolution and is neither Reynolds Number (Rn) nor sonic velocity dependent, which are the primary performance limiting factors of the diametrical-path transit-time flowmeters. Unlike magnetic and venturi flowmeters, chordal-path transit-time flowmeters require relatively short end-to-end distance for installation addressing a critical issue for large UV systems. The chordal-path method also allows the flowmeter to measure flows in open channels as well as full pipes making it well suited for the various installation requirements of UV systems.

Multiple chordal-path transit-time flowmeter installations can include both internally mounted and feedthrough (through-wall) transducers depending on the access to the measurement section. A typical multiple chordal-path transit-time flowmeter consists of two or four chordal elevations depending on the accuracy that is required. A typical two elevation chordal transit-time flowmeter flowing full will have a system uncertainty of ± 1.5-2.0% and a typical four elevation chordal transit-time flowmeter flowing full will have a system uncertainty of ± 0.5-1.0%. It is important to note that these are anticipated ***installed accuracies***, not accuracies achieved in a laboratory under ideal flow conditions. Figure 1 shows the general configuration of a multiple chordal-path transit-time flowmeter in both a closed full pipe installation and a variable depth open channel installation.



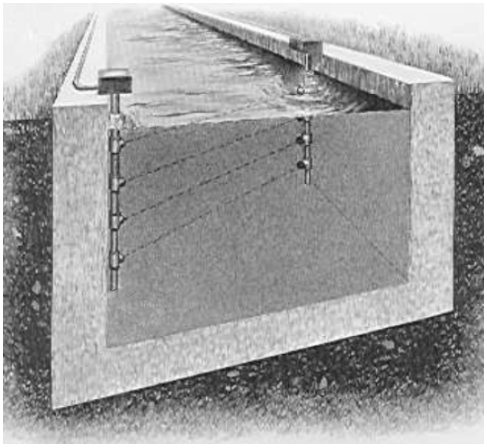


Figure 1. Typical Multiple Chordal-Path Transit-Time Installation

Photo 2. UV - Open Channel Multiple Path Transit-Time Flowmeter Installation

Multiple Chordal-Path Transit-Time Flow Measurement Theory

In Figure 1, the upstream transducer is offset at a 45 degree angle across the pipe or channel to its downstream mating transducer. This angle can be changed to 65 degrees if external access is limited (reducing the overall end-to-end distance even further). In an installation where there is a limited upstream straight approach to the flow measurement section, crossed-paths can be installed at each elevation to correct for the effects of cross-flow. Cross-flow occurs due to an upstream disturbance in the piping configuration (elbow, bifurcation, etc.) where the main flow component is no longer axial (not parallel to the pipe wall). When cross paths are installed in the presence of cross-flow, one plane will be bias high and the opposite plane will bias low by the same magnitude of its crossed plane. The two acoustic paths installed at the same chordal elevation are averaged with a resulting net bias of zero.

$$Tdown = \frac{L}{C - (V \times \cos\theta)} \qquad Tup = \frac{L}{C + (V \times \cos\theta)}$$

$$V = \frac{(Tdown - Tup)}{(Tdown \times Tup)} X \frac{L}{(2 \times \cos\theta)}$$

Where:

Tdown =	Travel-time of the acoustic pulse from upstream transducer to downstream transducer
Tup =	Travel-time of the acoustic pulse from downstream transducer to upstream transducer
C =	Sonic velocity of the liquid
V =	Velocity of liquid along pipe or channel axis
θ =	Acoustic path angle with respect axial flow

Figure 2. Transit-Time Velocity Equation

The transit-time principle measures an average velocity across the pipe at a given chordal elevation. Figure 2 shows the velocity calculation based on the travel time of the sound pulse, the liquid sonic velocity, the acoustic path length, and the acoustic path angle. As shown in Figure 2, when the upstream and downstream travel times are combined to solve for the average velocity at a particular elevation; the sonic velocity variable cancels. This is important to note because a multiple chordal-path transit-time flowmeter is not dependant on the liquid sonic velocity and can be applied to applications with drastic changes in the temperature.

As previously mentioned, there are a number of variables that determine a flowmeter's overall system uncertainty (or accuracy). In a multiple chordal-path transit-time flowmeter system, these uncertainties are defined by four major components: the individual velocity measurements, cross-section area measurement, velocity integration (average velocity calculation), and random error. Typically the uncertainty of the velocity measurement and random error components are second order effects. The area measurement uncertainty is typically a fixed value and is based on the pipe diameter measurements taken during the installation. The largest contributor and most variable component to the overall uncertainty of a multiple path-chordal transit time flowmeter is the flow profile integration uncertainty.

In a four chordal-path elevation transit-time flowmeter, the acoustic chords are placed at ± 18 and 54 degrees with respect to the horizontal centerline of a pipe in full pipe applications. The integration technique used is called the Jacobi-Gauss Integration Method (or Chebyshev Method). Computational fluid dynamics (CFD) analysis has been used to estimate the integration uncertainty of this method over a wide range of velocity profiles (from fully developed symmetrical profiles to highly disturbed velocity profiles). These analyses and previous field experiences have shown that the uncertainty of the

Jacobi-Gauss integration is in a range of ± 0.2% to 1.2%. As such, when a multiple chordal-path transit-time flowmeter is installed in a worst-case hydraulic location, its maximum overall uncertainty will be better than ± 1.5% for a four elevation chordal transit-time flowmeter. Therefore, even in the presence of highly disturbed velocity profiles, a multiple chordal-path transit-time flowmeter can perform accurately.

Site Certification Method and Uncertainty Analysis

A multiple chordal-path transit-time flowmeter is "Site Certified" during the installation. This "Site Certification Method" consists of physically measuring all of the parameters noted in the velocity equation in Figure 2. The travel times are measured in the flowmeter electronics using a high precision oscillator. The acoustic path length and acoustic angles are measured for each acoustic chordal path after the transducers have been installed. These measurements are defined as "as-built measurements" and are critical to the installed accuracy of a multiple chordal-path transit-time flowmeter. The area of the pipe or channel and verification of the acoustic chordal path placement are also checked during the installation of the transducers. Since these as-built measurements are verified during the installation, there is no need for future calibration if the system is fully functional. These measurement uncertainties are fixed and the measurement of a multiple chordal-path transit-time flowmeter will not drift over time. If there is a bias in the flow reading, it will be linear over the entire range of flow rates. This makes a multiple chordal-path transit-time flowmeter very repeatable as well as accurate and remains so over time.

In order to evaluate the uncertainty of a multiple chordal-path transit-time flowmeter, all uncertainties associated with the flow equation (Q = V x A) must be evaluated. The velocity component has a number of independent measurements that have their own uncertainties. The velocity component is comprised of the following parameters: Path Length; Path Angle; Travel Time Measurement; Protrusion Uncertainty; and Integration Uncertainty (which is used to determine the volumetric average velocity). The final flowrate uncertainty must include the wetted area uncertainty and random error. Random Error and Integration Uncertainty are determined after the multiple chordal-path transit-time flowmeter has been installed. Typical uncertainties for the individual measurements in a large UV installation are listed below:

- Path Length = 0.1%
- Path Angle = 0.2%
- Travel Time = 0.05%
- Protrusion Effect = 0.1%
- Area = 0.4%
- Integration Uncertainty = 0.2% to 1.2%
- Random Error = 0.1%

Using the root sum squares method (or quadratic sum) to combine independent uncertainties, a typical four elevation multiple chordal-path transit-time flowmeter

uncertainty (flowing full) can fall in the range of ±0.5% (with an Integration Uncertainty of 0.2%) to ±1.3% (with an Integration Uncertainty of 1.2%).

Multiple chordal-path transit-time flowmeter performance has been verified numerous times over the last 30 years by NIST traceable independent laboratories. In 2006, two 48" multiple chordal-path transit-time flowmeters were tested at the Utah State Water Research Laboratory. Both 48" multiple chordal-path transit-time flowmeters were tested in both the forward and reverse direction (a multiple chordal-path transit-time flowmeter can measure bi-directional flowrate). The testing configuration at the lab had optimal flow conditions and both 48" multiple chordal-path transit-time flowmeters tested within ±0.4% (the best test results during this period showed the multiple chordal-path transit-time flowmeter to be within ±0.12%). A number of tests have also been performed under difficult hydraulic conditions and have proven a multiple chordal-path transit-time flowmeter performance to be better than ±1.0% in these cases. This is important because large UV disinfection systems are rarely designed so that ideal flowmeter conditions can be achieved due to cost and spacing constraints.

Experience at Clark County Water Reclamation District

At the Clark County Water Reclamation District (CCWRD) located in the Las Vegas area, the flow rate will typically be as low as 45 million gallons per day (MGD) and as high as 130 MGD within the same week. The arrival of tourists on the weekend can magnify the peaks of the diurnal flow pattern by 30 to 40 percent. In order to have a UV system that can efficiently disinfect the low flows and adequately disinfect the high flows, the system for CCWRD was designed with five channels, each with 2 – 3 UV reactors and each with a flow capacity of 35 MGD. The system can be run with one channel in service with one reactor on at minimum power level for the lowest flow rate. As flow increases, reactor power output is increased until another reactor is required. Once the capacity of the first channel is reached, a second channel is opened and so on as the UV system reacts to increasing flows.

Photo 3. UV Installation at Clark County Water Reclamation District

This process is fully automated, but can be adjusted by the operator based upon the results of laboratory analysis of the water quality. Having installed an accurate multiple chordal-path transit-time flowmeter in each of the five channels leading into the UV reactors enables the system operator to reduce electrical and maintenance costs by operating the system at optimum levels for the current flow rate while still achieving adequate disinfection to meet the NPDES permit requirements.

Conclusion

As the application of large UV disinfection systems continues to grow, the need for a viable flow measurement technology to address the challenges presented by these systems becomes more critical. The unique characteristics of the multiple chordal-path transit-time flow measurement technology enable a UV system to achieve the goal of assured continuous disinfection while maximizing the system's throughput and efficiency.