

2016 ISA Water/Wastewater and Automatic Controls Symposium



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Technical co-sponsors: Florida AWWA Section, the WEF Automation and Info Tech Committee,
Florida Water Environment Association, Instrumentation Testing Association, and ISA Tampa Bay Section

Some Possible Presentation, Paper and Poster Ideas

Plant Case Studies

- Plant Upgrades: Opportunities, ROI, Pay Back Periods, and Cost Savings
- New Facilities: Overview of Technologies Used in a New Facilities
- Control System Upgrades: Highlights, Photos and Lessons Learned
- Control System Replacements: Highlights, Photos and Lessons Learned
- Implementing industrial networks for instrumentation in a water plant
- Talking to Old-Timers: Lessons from a Seasoned Operator
- Lessons Learned from the Plant

Instrumentation

- New Analyzer Technologies and Applications
- Using Instrumentation to Save Money in Operations
- Auto-samplers, process analyzers, and advanced instrumentation
- Opportunities for Dissolved Solids Analyzers in Wastewater Plants
- The Art and Science of Sludge Blanket Interface Analyzers in wastewater plants
- A comparison of Dissolved Oxygen Probe and Analyzer Technologies
- Applications for Radar-based Level Instrumentation in water and wastewater plants
- From the paddle wheel to Coriolis: An overview of flow measuring technologies
- Weirs, Plumes and Channels: An older but reliable flow measuring technology
- A comparison of level transmitter technologies used in water plants
- Strategies for Deploying Redundant Instrumentation
- Level Measurement in Challenging Environments: Sludge Digesters
- Using instrumentation for effective chlorination control
- How to use air blasts, wipers and flushing systems to reduce maintenance costs

Control System Design

- Techniques for Automating Existing Plants
- Centralized vs. Distributed Control – Considerations when doing software design
- Who Drives the Bus? Coordinating Control Between Different Unit Controllers in a Wastewater plant
- The decision to automate vs. semi-automate: When does it make sense
- Managing Control System Complexity
- Control System Redundancy and Robust Design
- PLCs, RTUs, and DCS: Are they really that different anymore?
- Moving from DCS-based control to PLC-based control: Challenges and Opportunities
- Moving from PLC-based control to DCS-based control: Challenges and Opportunities
- Hardwired Interlocks for pumps and valves: Best Practices
- Hybrid Control Systems: How to identify them and when to use them
- Vendor-provided Control Systems: Dealing with Delegated Control without going Crazy
- Techniques for segmenting control system networks to prevent congestion and latency problems
- New Trends and Techniques in Control System Design
- What does the color red mean? The motivations and use of color for buttons, pilot lights and status indicators



Project Management

- How System Integration Projects are Different
- Capturing and Evaluating Stakeholder Wants/Needs for SCADA Projects
- Lessons learned from scheduling/staging a control system replacement at an operating plant
- How to Hire and Manage a System Integrator
- Effective Tendering Techniques for System Integrators
- The Start-up Schedule: Lessons from the Field
- Sole Source and Performance-Based Bidding: A comparison of system integrator hiring methods
- Strategies when doing System Integration as a subcontractor
- Wiring Instrumentation Specifications for Vendors to Bid On – Important Aspects to Consider
- Tips for working with Multiple System Integrators on Large Projects
- Managing the System Integrator and Process Consulting Firm Relationship
- The Role of the System Integrator on Large Projects

System Integration

- The Process Control Narrative – How to develop and use it
- Why the P&ID is your best friend
- How ISA Standards can help with system integration projects
- Dos and Don'ts for Control System Standardization
- System Integration Lessons from the Field
- When to start Programming: It's not as easy as it seems
- How to Avoid Getting Squeezed: Tips for working with other contractors and trades on the construction site
- The Trials and Tribulations of Interfacing with Vendor-provided control systems
- How to Effectively Specify Interfaces for Vendor-provided control systems
- Common System Integration Gotchas and Pitfalls, and how to avoid them
- Ladder Logic, Function Block, Structured Text, Instruction List and SFCs: How to Choose which Programming Technique to Use

Pumps, Valves, Blowers and other Final Control Elements

- An overview of how valves are sized
- Common techniques for controlling valves from a system integrator perspective
- Key characteristics to look for when specifying and integrating VFDs
- Common I/O interfaces for motor controllers, blowers and fans
- Gotchas for pre-packaged motor control circuits, and the integration challenges they can present
- Best Practices for the control of standby generators and automatic transfer switches
- Power outages, UPSs, and standby generators: Best Practices for handling power outages and automatic plant re-starts
- Effective surge protection for equipment, instrumentation and field wiring: Best Practices

Field Wiring / Instrumentation Networks

- Addressing misconceptions about Wired vs. Industrial Network connection methods
- Industrial Networks and the 4-20mA Loop: A Comparison of Connection Methods
- An overview of Profibus and Fieldbus
- An overview of the 4-20mA HART communication protocol
- A comparison between different industrial network technologies
- Specifying Wire Colours: How to Develop a workable facility standard
- How to effectively specify field wiring: available wire types vs. applications
- Using Intrinsically Safe Relays (ISRs) for Classified Environments: Best Practices
- Failsafe vs. Normally Open: When failsafe wiring makes sense and the potential drawbacks



Wireless Technologies

- An Overview of the ISA100 Wireless Instrumentation Standard
- A Comparison between ISA100 and WirelessHART: Are they really that different?
- Opportunities for wireless instrumentation in SCADA networks
- A case study on using wireless instrumentation in a water plant
- Using wireless sensors on a moving bridge on an aeration cell: a case study
- Implementing redundancy in wireless networks
- Ultra-low-power wireless: A new technology with new opportunities
- Techniques for powering wireless instrumentation: There are more options than batteries

SCADA Networks

- SCADA Network Design: Best Practices and Lessons Learned
- SCADA Network Design and Redundancy Options
- A comparison of long-range SCADA network technologies
- Leased Line & Cellular Technologies Application Notes
- Remote locations and minimal infrastructure: opportunities for low power radios and instrumentation
- Considerations when deploying solar-powered out stations
- Implementation of a Mesh Radio SCADA Networks
- Separating SCADA networks to avoid network congestion and bandwidth issues
- Best practices for deploying Ethernet-based fiber optic networks
- The role of the RTU in SCADA Networks

Start-up / Commissioning

- Managing the Start-up Schedule: Tips on this Art Form
- Tips for Successful Start-ups
- Effective Loop Checks (and the other activities that go with them)
- Using Factory Acceptance Tests (FATs) to cut down on-site commissioning time: A comparison of techniques
- What to test formally: Tips for writing effective Site Acceptance Tests (SATs)
- Start-up: Informal Automation System Tests that Every System Integrator should do
- Surviving the Start-up from Hell: Lessons from the Field
- So you've inherited the Start-up from Hell: Where do you start?
- Common problems and solutions when commissioning VFDs (variable frequency drives)
- Using Check Sheets, Test Outlines, and Documentation to help you during start-up

Automation Strategy

- Finding and Communicating the ROI of Automation Investments
- Purchasing Automation Hardware/Software in Public Utilities – Making the Purchasing Department Your Ally and not your Foe
- Leveraging GIS as part of the Automation System
- Implementing Workable Revision Control Solutions for PLC, HMI, and SCADA system Code
- Disaster Recovery Planning from an Automation Perspective
- Control System Failure Survival Strategies
- Automated Start-up vs. Manual Start-up Procedures: Doing an Analysis based on ROI and Risk
- Using Automation to Realize Gains in Energy Efficiency
- Electrical sub-metering, power analyzers, and the role of SCADA
- How to set up an effective calibration program to save time and money
- The economic argument for automating small wastewater plants



Wastewater Automation

- Cost effective redundant backup control strategies for sewage pumping stations
- Real-time control of equalization tanks to prevent bypass events
- Using Automation to Proactively Handle Rain Events
- Automating distribution box outlet gates for splitting flow between process trains in real-time
- Automated Control of Decanting: A comparison of batch-based and continuous approaches
- Aeration Blower Control for Wastewater Plants: A Comparison of Control Strategies
- Techniques for Automating Grit Removal, Bar Screens, and Cyclones
- Automated Control Strategies for UV Disinfection
- Process Optimization in the Wastewater Plant
- How to Reduce Wastewater Plant Energy Costs using SCADA

Water Automation

- Advantages of monitoring pressures and flows in distribution networks
- New control strategies for booster pumping stations
- Using Automation to Control Multiple Water Towers in a Pressure District
- Automation Challenges for Small Water Systems
- Techniques for maintaining chlorination in large water networks
- Effective strategies for automating the backwashing for filters
- Control Strategies to minimize water aging in water towers
- Effective pH control: instrumentation and dosing techniques
- Instrumentation/Analyzer challenges when moving from Chlorine to Chloramine-based Secondary Disinfection
- Mechanical control valves vs. PLC-driven control valves: Benefits and Drawbacks of each
- VFDs versus Pump Control Valves: How to realize energy and maintenance savings while reducing costs
- Process Optimization in the Water Plant
- The Lights are on but no one is home: Automation Techniques for un-manned stations

Leveraging SCADA

- Intelligent and Expert Systems
- Process Modelling in the Automation System
- Tracking Energy Usage Using SCADA
- Load Balancing, Tuning and Optimization using Automation Tools
- PID Tuning Techniques for very large and slow processes
- Model-based alarming for regulatory compliance
- Key Performance Indicators and Dashboards in water plants
- Process Tracking and Optimization using SCADA
- The power of the DCS when it comes to plant optimization and tracking
- The convergence of the PLC and DCS Technologies in Automation Systems

Operations & Maintenance

- Using Automation to increase operator effectiveness
- Using Automation to Help Solve Staffing Challenges
- Tying Automation Systems into the Maintenance Management System
- Enterprise Integration and ISA95
- How to implement Revision Control for PLC, HMI and Configuration Management Across the Enterprise
- SCADA and the Current Regulatory Environment
- How to talk to operators: Finding out how automation can make their jobs easier
- Workflow support software and computerized log books



Data Management

- Data logging, retention, and redundancy: Lessons from the field
- Strategies for Managing Very Large Process Data Sets
- Techniques for logging process data, alarms, alerts and events
- Leveraging OPC for automation and data logging
- Databases, Historians and Files: How to avoid information overload
- Backup strategies for process data
- Managing data redundancy in a strict regulatory environment
- The challenge of managing process data across an entire water district

Data Presentation & Reporting

- Designing Effective Trend Screens
- Getting the data out: Tips on how to get usable process data into people's hands
- SCADA Reporting: Tips on Trying to Figure out what Users Want/Need
- Data Reporting/Presentation Techniques and Strategies
- Moving Away from Excel-based Reporting to Intelligent Reporting Platforms
- Ad-Hock Reporting: It is feasible to implement and here's how to do it
- So much data and so little time: How to visualize key process data
- How to Effectively filter data to avoid misconceptions from equipment that is offline

HMI Design and Implementation

- HMI Design for Operator Effectiveness
- Techniques for Designing whole-system overview screens
- Evaluating the Use Cases for HMIs: Normal Operation and Abnormal Situations
- Situational Awareness: Keeping Operators in the know in multi-facility control rooms
- Effective Use of Multiple HMI Screens
- Human Factors and Control Room Design
- Everyone uses HMIs Differently: Techniques for Developing HMIs for everyone
- How Many HMI Screens are enough? Providing Operators with the Tools they Need
- Maintaining SCADA Systems with Hundreds of Screens in the face of changing LCD resolutions
- Sneak Preview of the Upcoming ISA101 HMI Standard and other existing HMI standards
- The Use of Colors on HMI Screens: An Ongoing Debate
- How to design a really bad HMI, and how we can learn from it

SCADA Security

- An Overview of ISA99: Security for Automation Networks
- SCADA Security Incidents in the past year: Lessons from the Wild
- Evaluating SCADA Security Risks
- VPNs, Remote Access, and Managing Security Risks
- Security and Usability: They are not opposites
- Recovering from an Intrusion: Do you have a contingency plan?
- How to Segment your Automation Network for Improved Security
- Selecting a Firewall: What to look for
- A Case Study on how to secure your SCADA network
- Commons Risks to SCADA Systems, and what to do about it
- Beyond Stuxnet: Looking for the next Control System Threat



Human Factors

- People watching: What we can learn by observing people in a control room
- Designing an effective Operations Centre and Control Room
- Effective Placement of HMI Screens
- Managing Complexity on the HMI Screen
- Designing Control Interfaces that can be used by both younger/older and novice/experienced operators
- Common Techniques for representing complex processes using simple HMI screens
- How to Win Friends and Influence People: Introducing new SCADA systems to experienced operators
- Identifying the non-obvious users and stakeholders of the Automation System and what they need

Alarm Management

- An overview of ISA18.2 Alarm Management standard in the context of water/wastewater
- Why water/wastewater is so bad at alarm management: and what we can do about it
- How to integrate Alarm Management concepts into the plant design process
- How to integrate Alarm Management concepts into plant operations
- Techniques for Reducing Nuisance Alarms
- Common Nuisance Alarming Mistakes
- What is an official Alarm Rationalization Process: An argument based on Benefits vs. Resources Required
- Addressing Alarming Problems: Low Hanging Fruit that can offer immediate improvements
- What is an Alarm Flood?: Why you should take action, when, and how to do it
- What are these alarms for anyway? Selecting and Applying Alarms that make sense to operators
- Just Because you Can, Maybe you shouldn't: The art of removing unnecessary alarms
- What Accident Reports from other Industries can teach us about alarming
- Tips for using alarms to help, rather than hinder, operators
- When an "alarm" is not an alarm: Using Alerts and Events
- Alarm Management Lessons Learned from Other Industries and how we can use them
- A case study in reducing nuisance alarms and the benefits realized
- Call-out Alarm Strategies and Techniques
- Call-out Alarm Rationalization techniques, and evaluating potential cost savings
- Alarm Rationalization at a Wastewater Plant: A Case Study
- Using model-based alarming to meet complex regulatory requirements
- Alarm Routing: Routing Alarm Messages to the Groups who Need them
- Use Smartphones, Tablets and Pagers for improved alarm response