2015 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 verses 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