

# SCADA Users Gather for Joint ISA-WEF Conference in Orlando

## Attendees Enjoyed 35 Technical Presentations and Got a Sneak Preview of ISA101 HMI Design Standard

By Graham Nasby, P.Eng., PMP, CAP, City of Guelph Water Services

**This past August**, Supervisory Control and Data Acquisition (SCADA) system users gathered in Orlando, Florida for the annual International Society of Automation (ISA) Water/Wastewater and Automatic Controls (WWAC) symposium. Organized as a joint effort between the Water Environment Federation (WEF) Automation and Information Technology Committee and the ISA Water/Wastewater Division, this annual conference continues to attract upwards of 200 attendees per year.

This year was no exception, with 187 attendees coming from across North America to the WWAC symposium to network, to learn about new SCADA technology, and to share ideas. Now in its fourth year, the symposium has proved to be a mecca for the folks who design, build, use, and maintain SCADA systems as part of their careers. At this year's symposium, attendees heard 35 speakers on a variety of SCADA-related topics, attended a plant tour, and enjoyed an evening reception in the exhibits area. A total of 34 exhibitors and 10 symposium sponsors were also on hand to showcase their newest products and services.

The symposium kicked off with a keynote address from John S. Young, a recently retired executive from American Water, who gave the keynote talk, *The Water Industry – A Utility Perspective*. In his remarks, Young talked about the changing priorities and challenges faced by many water/wastewater utilities over the past five years, including deteriorating infrastructure, funding challenges, and an aging workforce. Part of his talk also highlighted the increasing role that SCADA needs to play, providing



General symposium chair Kevin Patel, of Signature Automation, kicks off the 2015 ISA Water/Wastewater and Automatic Controls Symposium held August 4-6, 2015 in Orlando, Florida.

process data which can be used to help utilities make better decisions, and how SCADA-provided automation can assist operations in more effectively operating their facilities.

The importance of cyber security was also a major topic at the symposium. Invited speaker Bryan Singer spoke about the differences between OT (operational technology) and IT (information technology) networks, and how this impacts the techniques we use to secure networks. Singer talked about how securing SCADA networks, an operational technology, can often be challenging due to the high-uptime and low-latency requirements for water treatment plant control systems. Several business cases justifying investments in SCADA cyber security were also presented by other speakers at the symposium, ranging from security practitioners to utility managers.

However it was the subject of High Performance HMIs, or more

importantly the newly-published ISA101 HMI Design Standard, that proved to be the major focus of the symposium. An example of a High Performance HMI screen, designed in accordance with the principals outlined in ISA101, is shown in **Figure 1**.

First introduced at the 2012 WWAC symposium by invited speaker Bill Hollifield, high performance HMIs (HP-HMIs) have become a growing topic at the symposium. At the time, Hollifield had co-written a book called the High Performance HMI Handbook, which provided an overview of the new HMI design ideas that had been coming out of a number of organizations, including the Abnormal Situation Management Consortium (ASM), the European Equipment and Materials Users Association (EEUMA), the Electric Power Research Institute (EPRI), the Human Factors and Ergonomics Society (HFES), and the ISA.



Figure 1 – Example of a high performance HMI for an aeration chamber

Presented as a novel concept when Hollifield's book was published in 2008, the high performance HMI (HP-HMI) has started to gain significant traction with leading SCADA software vendors. Moving forward in 2015, many SCADA vendors now have modules within their software packages that make it easier to implement HP-HMIs.

So what is a high performance HMI? In a nutshell, an HP-HMI consists of a set of SCADA screens that have been developed to enhance the operator's situational awareness and to reduce their fatigue. Other characteristics include: having a hierarchy of displays, starting with a large overview display and decreasing down to detail screens; using grey backgrounds and muted colours to show plant status; reserving colours/animations for alarms only; and having a dedicated alarms screen. These characteristics are coupled with concepts such as designing screens so operators can gain situational awareness at a glance, avoiding unnecessary graphical details, showing normal operating ranges besides process values, and the extensive use of embedded trend graphs. A more complex example of an HP-HMI for a pipeline is shown in Figure 2 (courtesy of Bill Hollifield and PAS Inc.).

At this year's WWAC symposium there were a number of speakers who talked about HP-HMIs. Their talks showcased software package capabilities to support the creation of HP-HMIs, shared best practices for HP-HMIs design, and gave examples of several case studies of plants where HP-HMIs have been deployed.

Invited speaker John Krajewski from Schneider-Electric/Invensys gave a tour of several projects where high performance HMIs have been used. He talked about how HP-HMI projects can be approached in several ways, ranging from full-scale HMI replacements to just adding a few HP-HMI overview screens to an existing system. John also showed how having a number of pre-built standardized screen modules in a SCADA software package or an HMI toolkit can often make building HP-HMIs easier.

This was followed by a talk by Jason Hamlin, the SCADA manager

for the City of Lychburg VA, who gave the audience a tour of the new high performance HMI he has just built for his wastewater treatment plant. One of the SCADA screens from his system can be seen in Figure 1. Jason gave an interesting talk about how to introduce the concept of HP-HMIs to plant operators, and how to work with the operations team to ensure the HP-HMI screens are crafted around their task-based operational needs. Jason's talk was entitled *Achieving Operator Buy-In of High Performance Graphics*. Full papers and presentations for all of the talks presented at this year's symposium are available in the proceedings, which are available as part of the ISA's technical paper archive at [www.isa.org](http://www.isa.org).

Throughout the talks about High Performance HMIs, the recently published ISA standard on HMI Design, *ISA101*, was a common theme in many of the presentations. Released in August 2015, this *ISA101* standard provides a structure for managing High Performance HMIs and a set of key guidelines governing their design. The standard itself is focused around what it calls 'The HMI Design Lifecycle,' which is shown in Figure 3. This lifecycle creates a framework to ensure that HP-HMI screens are developed in accordance with a steering document

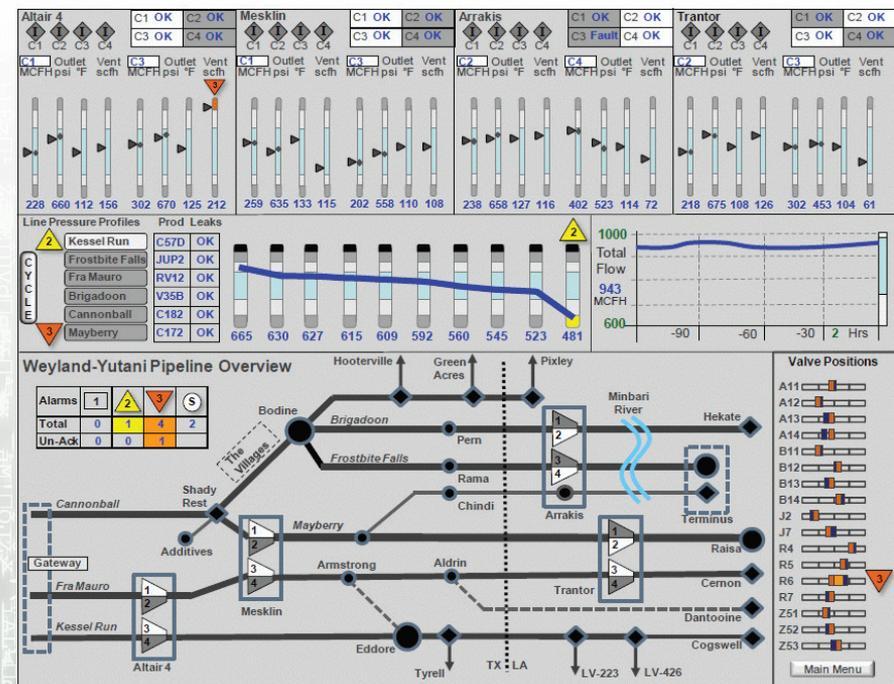


Figure 2 – Example of a HP-HMI Level 1 – Overview Screen

called an ‘HMI Philosophy.’ This document is then coupled with a utility-specific HMI design guide and software toolkits (HMI software templates), which are then used to guide the design of HMI screens. Together these form the utility-specific HMI standards to be used for creating high performance HMIs.

In addition to the HMI design lifecycle, the ISA101 standard also provides a strong framework of design requirements centred on how to develop effective high performance HMIs. Topics covered by the standard include: menu hierarchies, screen navigation techniques, graphics and color guidance, dynamic elements, alarming conventions, security methods and electronic signature attributes, interfaces with background programming and historical databases, pop-up windows, help screens and methods used to work with alarms, program object interfaces, and configuration interfaces to other systems. It is expected that the ISA will be publishing of a number of technical reports, which will provide further guidance on how to implement the frameworks introduced in the ISA101 standard.

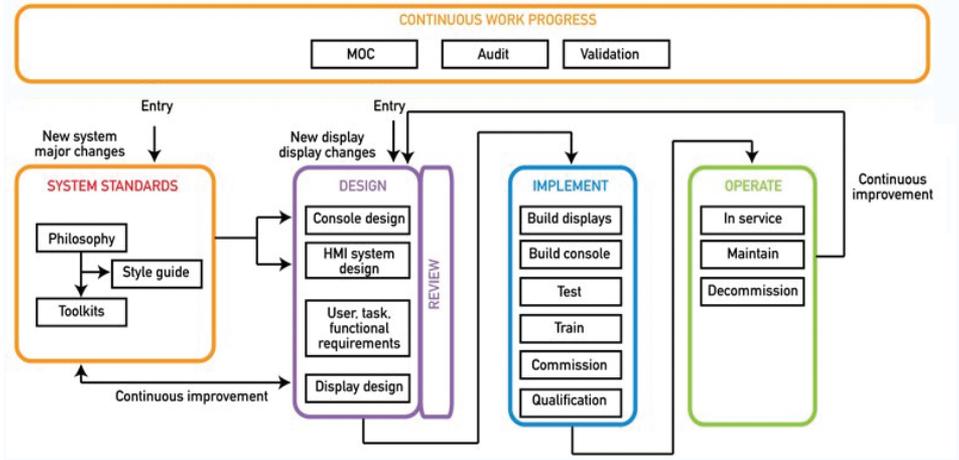


Figure 3 – The ISA-101 HMI Design Lifecycle (Source: ISA101)

Copies of the newly released ISA101 HMI Design Standard can be found on the ISA website at [www.isa.org/standards/](http://www.isa.org/standards/).

The next ISA Water/Wastewater and Automatic Controls Symposium is scheduled to take place August 2 – 4, 2016 in Orlando, Florida. More information, including the 2016

call for abstracts, can be found at [www.isawwsymposium.com](http://www.isawwsymposium.com).

### About the Author

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