Where we've come in 25 years in Automation

By Ian Verhappen

Twenty-five years represents a significant milestone of ongoing cooperation between the ISA Edmonton and Calgary Sections supporting the needs of the people working in this industry in Alberta. Not all this happens in a void since as automation practitioners are part of the larger Alberta economy, our industry and of course the Society to which we belong. I will strive to summarize how these factors have changed our industry and ISA has strived to evolve to meet these changes during this time.

Digitization of Industry

The biggest change in the past 25 years has been the digitization of our lives. In 1993 microprocessors were still relatively new in field devices. HART was starting to make headway and the fieldbuses were about to introduce their first products. Today we are talking about IIOT and the ability, some argue need to be able to connect everything to everything else all the time. So how did we get from a few microprocessors to end-to-end IP based communications and what did that do to our industry?

As many of you know, I began my 'adventures' in digital communications in 1993 and in particular with Foundation Fieldbus, leading many efforts to promote its development and adoption. This included being the founding chairperson of the Fieldbus Foundation's End User Advisor Council, with its associated Forums and regional User Groups that helped develop and promote the traveling seminars in the first decade of this century.

One of the side consequences of this role was being able to observe the approximately 5-year "Fieldbus Wars" predominantly between Profibus led by Siemens and Foundation Fieldbus (Emerson) that concluded in 1998 with a Canadian led solution. This was known as the 8-headed monster that included eight different fieldbus protocols in IEC-61158. Since 1998, this document has expanded to include 20+ protocols and still works. As a result, I believe the fieldbus standard is the largest single IEC published standard at present numbering in the thousands of pages. There is another IEC standard, in which I am only slightly involved, that forms part of the IIOT standards which being a database that is no longer physically published at all because it would be difficult to follow on paper. This series of standards aiming to support the documentation of the life cycle of any device was one of the first of many now under development under the auspices of Industrie 4.0, Industrial Internet Consortium and the IEC, particularly IEC TC65, to support the digital factory of the future commonly known as IIOT.

Industry repeated the same market domination exercise through standards of the fieldbus wars again with the "Industrial Wireless War" a little over a decade later with WirelessHART (Emerson) versus ISA-100.11a (Honeywell & Yokogawa). This time the resolution was two separate standards, letting the market decide as was done in the case of BETAMAX / VHS and HD DVD and Blu-ray.

Coincidentally, the IEC meeting in Houston in 1998 was also my first opportunity to participate in an IEC meeting as part of the Canadian contingent. Since then, I have gradually migrated most of my standards development efforts from ISA to IEC and ironically have now agreed to co-chair on behalf of ISA an ISA Standards & Practices Committee with the goal of encouraging joint development of standards, in parallel between IEC and ISA. It appears that the organizations developing the standards at least have realized that with the limited number of experts available and willing to develop standards we should let them do what they do best with minimal interference and 'fighting' over their time.

Another example of a far-reaching international standard is IEC 61131, the International Standard for Programmable Controllers, originally published in 1993. IEC 61131-3, the part that covers programming, is the most widely used but the IEC 61131 series now has 10 parts covering various aspects of factory automation controllers. Having the ability to program with a consistent set of 'rules' increases the portability and usability of the programs immensely. It also makes documentation of systems more consistent and therefore increases reliability.

It is the microprocessor that drives all these changes. Microprocessors also make it possible to provide more accurate and increasingly sensitive measurements. Many of you know that I started my instrumentation career working with process analyzers, which can be thought of as mini-processes because of the associated sample conditioning systems and therefore provide exposure to all the different instrumentation principles of flow, pressure, level, temperature, etc.

Ironically, these same microprocessors are also affecting sample systems since more and more analytical measurements can be done using sensors that can be inserted directly into the process pipe. Conversely, the microprocessor has made it possible to build analyzers that previously could only be installed and maintained in a laboratory clean environment into a rugged enclosure the size of a bread box.

Combining all the intelligence in these devices with digital communications is changing the way we run our plants as we are already starting to see how control loops now use the

device health to determine how the associated algorithm from basic regulatory control to safety shutdowns should be executed. I am presently working on a joint ISA/IEC standard series to help industry determine which of the hundreds of parameters in an intelligent device should be used by what system to improve overall system performance.

As can be implied from the above, my experience has shown that international standards are great indications of upcoming trends. This is because manufacturers want to have international standards to support the adoption of the technology in the global market, thus giving them the economy of scale for the resulting products.

Looking at where the efforts are focused in international standards developments, we will continue to see:

- Increasing digitalization, IIOT is simply the marketing term for these efforts;
- Increasing development of compliance and how to certify a device is compliant / providing reliable measurements;

Along with the associated cybersecurity and interfaces to other machines and humans, who will soon be the arbiters of last resort.

ISA as international standards developing organization has and will continue to play a key role in the development of standards driving our industry forward. However, like standards, the Society itself also continues to evolve.

Evolution of ISA

When I began my volunteer role with ISA at the international level in 1992, as Analysis Division newsletter editor, e-mail was just beginning to be used for communication. All volunteers of Division Director and 'above' had a mail slot in the central hall of ISA where anything that needed to be shared was placed, and then every Friday would be stuffed in an envelope and mailed. Two weeks later, it would arrive in Fort McMurray to be reviewed on the bus rides to/from Syncrude site. Society leaders could at that time comment via e-mail or starting around 1997 use dedicated list servers to share ideas and begin reaching consensus before the 3 times per year Leader Meetings which at that time were known as President's Meetings.

Though revenue streams are now more diverse, training now represents the majority of ISA revenues From the mid-1980's until approximately 2010, the revenue of ISA was closely linked to its annual conference and exhibition. During the late 1980's and 1990's the ISA Annual conference and exhibition was the largest North American industrial automation trade show and thanks to the foresight of leaders at that time formed the basis for the cash reserves the Society continues to rely on today. Large companies such as Honeywell, Emerson, etc. would spend several million dollars on the event with large booths as well as customer appreciation events. In the late 1990's ISA tried to take advantage of their market position by having two shows per year; a spring show that was technology focused – effectively replacing all the Division spring symposia with one centralized event. Unfortunately, this was too much for the market, and damaged the strength of Division events. As a result, the Society reverted to an annual event alternating between one year being a technical focus and second year the traditional exhibition focus. Unfortunately, it was around this time that the major exhibitors starting sponsoring their own User Groups. User Groups had the advantage of not having to share their customers with other potential competitors, and so the redirection of trade show money began to move from horizontal all-encompassing shows like ISA, to vertical specific events such as User Groups and niche conferences such as Analysis Division had developed.

Then in 2001 during the ISA show in Houston, 911 happened. This had a HUGE impact on ISA since that was effectively the last year of the annual large conference and exhibition. By 2009, the event had decreased to being able to fit in a hotel ballroom and was abandoned shortly thereafter to be replaced by multi-division Fall symposia independent of the Society Fall Leader Meeting and Annual Member Meeting that continues today in Houston as the PCSS event.

The 'double whammy' of the reduction in the Annual Show was a corresponding loss in publications revenue by exhibitors advertising their attendance at the event in the Society publication InTech. Though I am not 100% confident, it was also around the time of the end of the show that ISA decided to change InTech from a member-only benefit to a qualified subscriber publication as a way to keep subscription numbers at a high enough level to make it favourable to advertisers.

One event that has grown and expanded during this same time period is the annual ISA Analysis Division symposium which was revived in 1996 by Dale Merriman and myself while we were the Division Director and Director-elect. This event has the advantage of meeting the requirement of being a niche conference with a dedicated target audience, well organized, and focused on ALL the Division members – suppliers and end users. Pricing has always been to encourage suppliers to participate and share their advances with everyone in the Division. A key indicator of success is that there is always a waiting list of exhibitors and presenters – and of course a financial surplus to the Society.

Though revenue streams are now more diverse, and obviously decoupled from conference and exhibition revenues, training now represents the majority of ISA revenues with publications.

As a way to increase awareness of automation as a profession ISA developed and supports the CCST (Certified Control System Technician), which is similar to our Instrumentation trade certification in Canada, and CAP (Certified Auto-

mation Professional) programs. CAP was launched in 2004 and I became certified in 2006, but since the certification is not broadly recognized the benefit is largely personal in being able to state I have a broad understanding of the profession. Both certifications have a 3-year renewal period with professional development requirements similar to what we have here for ASET and APEGA.

Though most members are unaware of changes that have happened to the Society because the impact at the Section level is minimal, one other area that has seen significant change over this period is how ISA itself has been structured at the Society level.

The first such change occurred in 2003. The governance structure was revised to balance membership on the Executive Board to a total smaller number with equal representation from Districts and the 'Business unit' Vice Presidents of the Society, while also as a way to improve communications across and between the different parts of ISA giving each group of VP's representation on the Society Executive Committee. The other intent of this change was to empower VP's to be able to make decisions affecting their constituents provided the net budget impact was less than $25k. Unfortunately, the respective Boards did not take advantage of this empowerment and as a result, a second restructuring was done approximately 10 years later with the new model resulting in a larger Executive Board that is supposed to focus on strategic issues and three independent operational boards to focus on their respective constituencies. This model does not have any direct means of communications between any of the boards other than through ISA staff.

There have been few changes at the Section level, other than how District Vice President funding is provided. For at least the first 10 years in this period Sections allocated a minimum of $1 or at their discretion $2 of their Section rebate to the District Vice President fund to support them in their role of representing the Members at the Society level and visiting each Section in the District at least once during their term. Because Districts like Divisions are ISA entities, approximately 15 years ago it was decided that any funds these entities had were to be incorporated into the Society budgeting process as a whole. The consequence of this is that District 10 as well as the ISA Analysis Division through prudent use of funds had significant funds in their 'accounts. These funds have been used to endow awards and scholarships with the District 10 monies supporting the award of two US$750 annual scholarships each Fall to students from Western Canada.

In addition to restructuring its governance, the Society changed its name in the fall of 2000, from the Instrument Society of America, which it had been known as since its formation to ISA--The Instrumentation, Systems, and Automation Society. A number of members did not believe this name properly represented the Society's goals so discussion on the topic continued until 2008 when the name was again changed to the present designation "International Society of Automation" and associated tag line of "Setting the Standard for Automation".

The other changes during this time have been in the types of membership in the Society. The two significant changes were the addition of the 'reduced rate' membership for members in countries with lower GDP to make their membership rates commensurate with their income and a corresponding reduction in member benefits such as digital only copies of InTech. Then in 2012 the Society created the "Community Member" free membership grade as a way to track customer leads and past customers with the hope that as a result of seeing these benefits and with the pursuit by Section Membership chairs these Community Members will convert to full dues paying members. One result of the Community Member grade is that the Society is able to show steady and marginal membership growth, while in actuality the full dues paying members continue to decline. Another reason for the dues paying member decline is that more and more members like myself are now eligible for free life membership and no longer have to pay dues.

Like our industry and ISA itself, the ISA Alberta Directory has gone through several iterations of its digital version but the core content/concept remains the same – providing information to practitioners in Alberta in particular on where to get instrumentation and controls products. Thanks to Lorne Brackenbury and Marietta Miller who have been the guiding hands behind the Directory for many-many years, the added benefit to ISA Edmonton and Calgary has been the financial contribution to provide members services thanks to regular sponsors of both Sections.

Even though we continue to move increasingly into the digital world, and I do have the Alberta Directory in my favorite's bookmarks, I still like the paper copy and keep it handy on my bookshelf.

Lastly, as many ISA members have said the biggest benefit of ISA membership has been the large number of friends I have been able to make around the world. Much like the good deed being rewarded, I have always received more than I have provided and encourage each of you to become engaged with others in your field through ISA or other technical societies. Doing so will not only advance your knowledge, your profession, and your network for solving those tough problems; it also simply feels right.