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The ISA-Niagara Frontier Section is seeking qualified candidates for Board leadership positions.

The International Society of Automation—Niagara Frontier Section continues again this year its incredible growth. As the Section continues to promote education in the areas of instrumentation, controls and automation, we continue to broaden the scope to include the next generation of engineering technicians and professionals.

We are fortunate in that our membership is comprised of those willing to participate and make a difference. If you're a member in good standing, want to step up your networking efforts, want to make a difference in the organization and its membership, then throw your name in the ring.

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Submit nominations to:

Election Committee

ISA Niagara Frontier Section
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5813 Main Street
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Or email:

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Niagara Frontier Section

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For a copy of the application, go to www.isa-niagara.org.

ISA-Niagara Frontier Section
c/o OMARA Engineering PC
5813 Main Street
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716-833-1393





2016-17 Section Calendar

<i>Annual Golf Outing</i>	<i>September 19, 2016</i>	<i>Diamond Hawk Golf Course</i>
<i>Membership Appreciation Family Event</i>		
<i>NEW Niagara Power Vista</i>	<i>October 24, 2016</i>	<i>5777 Lewiston Road, Lewiston NY</i>
<i>Calspan Corporation</i>	<i>November 14, 2016</i>	<i>4455 Genesee St, Buffalo NY</i>
<i>Wind Tunnel & Automotive Testing</i>	<i>5:00pm—6:30pm dinner following at Danny's by the Airport</i>	
<i>Professional Society Holiday Social</i>	<i>December 15, 2016</i>	<i>Gordon Biersch</i>
	<i>5:30pm—8:30pm</i>	<i>Walden Galleria Mall</i>
<i>Praxair</i>	<i>January 23, 2017</i>	<i>175 East Park Drive</i>
<i>Research & Development</i>	<i>5:00pm - 6:60pm</i>	<i>light dinner to follow</i>
<i>NY Beer Project</i>	<i>March 2017</i>	<i>Lockport NY</i>
<i>Tech EXPO 2017</i>	<i>April 4, 2017</i>	<i>Marriott Inn</i>
<i>Expo Educational Seminars</i>	<i>April 4, 2017</i>	<i>Marriott Inn</i>
<i>Calspan Corporation</i>	<i>May 2017</i>	<i>Niagara Falls NY</i>
<i>Col Ward Pumping Station</i>	<i>Sept 2017</i>	<i>Buffalo NY</i>
<i>2017 Annual Golf Outing</i>	<i>September 19, 2017</i>	<i>Diamond Hawk Golf Course</i>

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For more information, contact Joe Cipriani at: Joe.Cipriani@Emerson.com.

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10 Manufacturing Trends to Watch in 2017

By David Brousell, January 06, 2017

Trade Tensions Loom as Global Uncertainty Dominates 2017

Political upheavals during 2016 in both the U.S. and Europe have created unprecedented levels of uncertainty about the freedom of international trade for manufacturing companies over the next decade. The prospects of a major trade deal between the U.S. and 12 Pacific Rim countries, known as the Trans-Pacific Partnership (TPP), now seem dead in the water following statements by the incoming Trump Administration to abandon the deal. A similar Transatlantic Trade and Investment Partnership (TTIP) deal with Europe is stalled. And the U.K.'s Brexit vote last June has thrown the traditional trade relationships between many European companies into disarray and could take up to a decade to resolve. Large corporations may be able to negotiate their way through the minefield of future trade agreements, but small- and medium-sized manufacturing enterprises will need to be vigilant and flexible if they wish to maintain broad and open access to key export markets around the world.

lower unemployment levels, and expected lower taxes on businesses under the new Trump Administration will spell accelerated expansion and an increased need for more manufacturing workers, engineers, and managers. At the same time, the push toward Manufacturing 4.0 will create a growing demand for software engineers in manufacturing. The result: Manufacturers that have already created a Next-Generation Workforce strategy and supply chain will prosper, while others will struggle to attract the human capital needed to take advantage of new opportunities.

M4.0: It Will Resemble a "Digital Wagon Train"

The journey to Manufacturing 4.0, the next wave of industrial progress built on digital technologies that many manufacturers are now beginning to undertake, will come to resemble a "digital wagon train", traveling slowly, at times haltingly as companies come to grips with the fact that M4.0 is much more of a cultural and leadership transformation than a technological challenge, requiring deep changes in leadership orientation and practices to deal with the complex, multi-layered transition to M4.0. Manufacturing leaders will need to make tough decisions about vision, strategy, alignment, execution, and culture to achieve the promise of M4.0. The challenge will come down to whether leaders are personally ready for the epochal transformation in front of them. Spir-

(Continued on page 8)



The Coming Collision Between Jobs and Automation

Faced with a dramatically changing political environment stressing nationalism and protectionism, U.S. manufacturing's profile will rise in 2017 as the debate over how best to expand manufacturing jobs takes place. That debate will become increasingly illuminated by a growing understanding that automation, in contrast to off-shoring, has played a key role in not only job elimination in the past but also in defining what jobs and skills are needed in the future. It will also become increasingly clear to policy makers that automation isn't slowing down, and that the adoption of advanced automation and information technologies will continue to result in not only further low skill level job losses but also fewer mid-level positions, exposing the fragility of the idea of "bringing back" jobs to the U.S. This dichotomy will force a national conversation about how far industry should automate in relation to needed employment, once again pitting those who perceive the emerging digital global economy as a tailwind against those who perceive it as a headwind.

The Skills Shortage Hits Home

Meanwhile, the ongoing debate about whether the manufacturing skills shortage is real will finally come to an end. A growing U.S. economy,

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AutoQuiz:

How to Create a Bill of Materials for a Project Purchase Lead Mean?



Today's automation industry quiz question comes from the [ISA Certified Automation Professional certification program](#). ISA CAP certification provides a non-biased, third-party, objective assessment and confirmation of an automation professional's skills. The CAP exam is focused on direction, definition, design, development/application, deployment, documentation, and support of systems, software, and equipment used in control systems, manufacturing information systems, systems integration, and operational consulting. The following question comes from the CAP study guide, Performance Domain V, Deployment.

A bill of materials for purchase of cable on a project is created by completing a material:

- a) procurement
- b) inspection
- c) take off
- d) requisition
- e) none of the above

See page 7 for answer

AutoQuiz:

Changing the point of origin for input data and the output signal destination is easy with a distributed control system (DCS) because many changes can be implemented by:



Today's automation industry quiz question comes from the [ISA Certified Control Systems Technician \(CCST\) program](#). Certified Control System Technicians calibrate, document, troubleshoot, and repair/replace instrumentation for systems that measure and control level, temperature, pressure, flow, and other process variables. This question comes from the Level I study guide, Domain 2, Loop checking. Level I represents a professional who has a five-year total of education, training, and/or experience

Changing the point of origin for input data and the output signal destination is easy with a distributed control system (DCS) because many changes can be implemented by:

- a) relocating wire jumpers in a junction box
- b) changing the pneumatic tubing connections
- c) reassigning inputs/outputs by changing loop configuration
- d) installing new transmitters and final control elements
- e) none of the above

See page 7 for answer

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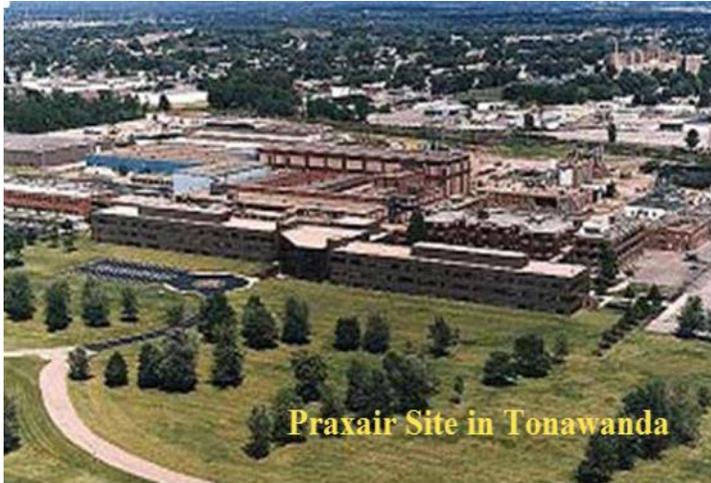
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ISA visits



January's site visit brought us to Praxair. Located in the Town of Tonawanda, New York, the property is comprised of about 135 acres and is. From 1942 to 1946, the former Linde Air Products became a Division of Union Carbide. Today, Praxair employs about 26,000 employees in more than 50 countries, over 1200 at the Tonawanda location.



Praxair Site in Tonawanda

quality, efficiency and environmental benefits to a wide variety of customers in many industries. Industrial gases are produced at Praxair distribution centers via pipeline, on-site production technology, tank trucks or high pressure cylinders.

The Tonawanda location, while not producing a physical product, it is the major research facility of Praxair Technical Center (PTC) and the location of IMPAC (International Monitoring and Production Assistance Center).

IMPAC is the state-of-the-art remote monitoring and control center of Praxair's North America on-site production facilities. IMPAC operates a unique and highly sophisticated computerized communications and plant control network that connects to several hundred on-site production plants around the country. It permits immediate access to those plants and monitors deviating performance and allows taking corrective action, if necessary. Being able to monitor plant performance, unscheduled shutdowns are avoided, providing a very high standard of supply reliability. It was informative to see such a sophisticated monitoring and control system in operation. These stations are in operation 24 hours a day, 365 days a year. It was interesting to see plants in operation without onsite personnel.



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(Continued on page 7)

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(Continued from page 6)

The two Praxair research factions, placed in Tonawanda are Application Research and Production Research.

We were able to take a peek at the PTC's two research sections; Application Research and Production Research. Here is where new and novel applications for use with industrial gases are researched, developed and tested. The section we visited specializes in combustion research. Burners for glass melting, electric arc furnaces, heat treating, steel refining ladles and blast furnaces mounted into test beds. It is impressive to see the effort necessary to assure safe and effective equipment. Different applications require specialized equipment and controls. Production research is involved in the making of gases by applying membrane separation, pressure swing absorption and cryogenic separation processes (distillation). We may be able to also look into these processes at a future visit.

The introduction for the evening was made by Mr. Jim McCarthy, safety manager. He gave us an overview of the site's historic devel-



opment. Our hosts for the plant visit was R&D Director Dr. Stefan Laux.

We want to thank Praxair for allowing us to visit the Technical Center. Companies like Praxair invest heavily in research and development realizing this is the only way to stay ahead in the world of competition. And, of course, it is especially nice to have such a company in our neighborhood.

As always, the Niagara-Frontier Section of the ISA provided supper for the evening to the 34 ISA-Members who attended the site tour. Thanks again.

See you at the next event.

See technology at work: <https://youtu.be/GColtPst-rg>

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AutoQuiz Answer: from page 4

CAP study guide, Performance Domain V, Deployment:

A material takeoff is the process of analyzing the drawings and determining all the materials required to accomplish the design. We then use the material takeoff to create a bill of materials. Inspection does not aid in creating a bill of material. Procurement and requisition are activities that occur after the bill of materials is complete.

The correct answer is C.

Reference: Whitt, *Successful Instrument and Control System Design*.

AutoQuiz Answer: from page 4

CCST Level 1 study guide, Domain 2, Loop Checking:

While one could accomplish changing data input and output by performing a), b) and d) the whole point of beauty in a distributed control system (DCS) is one doesn't have to go into the field to reconfigure the process. Recall that a DCS is that class of instrumentation (input/output devices, control devices, and operator interface devices) that in addition to executing the stated control functions also permits the transmission of control, measurement, and operating information to and from one or many user-specifiable locations, all connected by a communication link. [ISA-5.3-1983]

The best answer is C.



(Continued from page 3)

itual, mental, emotional, and physical energies will need to be harnessed as much as adopting and integrating new technologies.

**M4.0: Manufacturing Leaders
Must Broaden Their Horizons**

As part of that reorientation, manufacturing leaders will also be required to broaden their horizons as Manufacturing 4.0 creates new, digitally-enabled opportunities to enhance operational efficiency by building new workflows that link previously isolated functions such as manufacturing, supply chain, and new product development. Leaders will be forced to gain deeper knowledge of how other, contiguous functions work in order to understand the opportunities for cross-functional collaboration, ultimately resulting greater customer value. And manufacturing leaders will be expected not just to understand how contiguous functions work, they will need to be able to build stronger alliances so that they can influence decisions made across functional boundaries.

Machine Learning and AI Enter the Mainstream

Having spent much of the past decade perfecting the sensing, collection, and organization of data from the plant floor and across the supply chain, manufacturers in 2017 will get serious about leveraging a new generation of deep machine learning, artificial intelligence, and natural language tools that will not only turn all of that data into new, real-time insights about how the business is operating, but also deliver valuable recommendations for improving operations or even heading off problems. Already, for example, manufacturers are applying machine learning protocols to detailed part quality, product testing, and field performance data to quickly isolate and fix the underlying causes of quality problems.

**The Digital Thread Stitches
Together the Supply Chain**

Until now, manufacturers have tended to aim their Manufacturing 4.0 initiatives at cutting costs and improving efficiency of internal processes such as equipment maintenance and quality. Increasingly, however, manufacturers—particularly those that rely on partners for production and assembly—will endeavor to build platforms that securely give external partners access to the “Digital Thread.” These digital platforms will enable visibility into product and design change data and applications that enable collaboration. The result will be reduced part tooling costs, increased design reuse, faster and less expensive prototyping, and much more flexible production.

**Blockchain To Emerge as New “Trust” Platform
for Manufacturing Value Chains**

Originally developed to support the Bitcoin digital cryptocurrency, the ability of the underlying blockchain technology to create deeply-encrypted, immutable records in a highly-secure distributed ledger will become increasingly important as a way to increase trust between collaborating manufacturing enterprises. In 2017, blockchain technology will begin to be developed and adopted by innovative manufacturing companies as a more secure, and ultimately disintermediating approach to creating more agile supply chains that can automatically negotiate and close new financial and supply-side partnership deals, ensure IP protection, provide trusted proof of product provenance and certification, and ratify material traceability and transparency.

**Manufacturing Cybersecurity Threats Demand
Urgent Rethink**

Increased connectivity as part of a Manufacturing 4.0 transformation strategy will inevitably create greater vulnerability to digital disruption, interference, and malicious attack for the world’s manufacturers. One in five manufacturing companies already report that cybersecurity concerns have materially slowed, or prevented, one or more Manufacturing 4.0 projects or initiatives, according to the latest Manufacturing Leadership Council Cybersecurity survey. Over half also believe that in the next five years, cybersecurity concerns could hinder the speed and scope of adoption of M4.0 technologies and approaches in some way. Traditional cybersecurity policies are no longer adequate in this increasingly connected, data-driven world. Manufacturers of all sizes will need to rethink, redesign, or radically improve their cybersecurity strategies to better protect key assets, networks, products, and personnel as they move along their journey to Manufacturing 4.0 in the year ahead.

Use of Advanced Analytical Software to Increase

Manufacturers will strive to hone their skills in using advanced analytical software, already one of the most desired technologies, to not only improve decision-making but also to identify new business models and opportunities. Expect to see many companies extend their expertise with the software from a largely diagnostic activity today to increasingly predictive and even prescriptive undertakings with the technology. Building the capability to travel this maturity curve with the software will determine which companies create new competitive advantages, potentially enabling them to disrupt and even reshape their markets.



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Who is ISA?

The International Society of Automation (www.isa.org) is a nonprofit professional association that sets the standard for those who apply engineering and technology to improve the management, safety, and cybersecurity of modern automation and control systems used across industry and critical infrastructure. Founded in 1945, ISA develops widely used global standards; certifies industry professionals; provides education and training; publishes books and technical articles; hosts conferences and exhibits; and provides networking and career development programs for its 36,000 members and 350,000 customers around the world.

ISA owns Automation.com, a leading online publisher of automation-related content, and is the founding sponsor of The Automation Federation (www.automationfederation.org), an association of non-profit organizations serving as "The Voice of Automation." Through a wholly owned subsidiary, ISA bridges the gap between standards and their implementation with the ISA Security Compliance Institute (www.isasecure.org) and the ISA Wireless Compliance Institute (www.isa100wci.org).

Control Systems

ISA is the home of control systems for process manufacturing and a wellspring of information on every kind of control technology and control system for discrete manufacturing and for infrastructure and utility and building control.

ISA is the best place to find information on control theory, from basic continuous control to mechatronics and discrete control theory. ISA has the most information for you on process control, batch control (ISA wrote the batch standard, ISA88), advanced control-- both model-based and non-model-based, simulation, and control systems and techniques.

ISA has textbooks, training, tutorials and experts available on any control system technology, from programmable controllers, motion control systems, to DCS (distributed control systems) through SCADA (supervisory control and data acquisition) systems, and all the hybrids that are used in manufacturing and process plants of all types, like boiler control systems, safety systems and burner management systems. If you need information on control systems, you can find it here.

ISA is the place for information about human factors in automation, from HMI design and operation and software standards, to alarm management systems. ISA wrote the standards for those, and for cyber security as well.

In addition, ISA has recognized that few places exist where you can get organized training and be certified so you can actually show what you know. ISA has developed certification for control system technicians (CCST), and produces the examination for Control Systems Engineering licensing. Recognizing that automation is as much a multidisciplinary art as anything, ISA developed the unique Certified Automation Professional, or CAP training, examination and certification.

Measurement and Control Devices and Techniques

The original name of ISA was the Instrument Society of America. ISA has expanded to cover all areas of automation in a global fashion, but instruments and control valves form a significant core competency at ISA and on the ISA web site. So does the world of test and measurement systems and sensors. This is the home of textbooks, tutorials, training and expertise on flow, level, pressure, and temperature sensors, transmitters and systems. Here is the home of unbiased, independent material on control valves, sizing, selection, and maintenance. Here is the home of information on variable frequency drives used as final control elements. Here is the home of information on analysis devices used either on-line, or at-line as process control inputs, or off line as quality control systems.

ISA has actionable information and expertise on environmental analysis, gas detection and corrosion protection systems. From enclosures to cable, connectors and wiring, ISA can show you standards, best practices and recommended techniques. ISA can teach you about statistical methods for quality and for both calibration and safety systems. ISA can show you standards for calibration and for process safety systems, and how to meet those standards using recommended best practices.

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Member Update



Celebrating its 150th year in business, this suburban Boston-based distribution giant continues to thrive because it never rests on its laurels.

Celebrating an impressive 150 years in business as a family owned entity, F.W. Webb, ranked #14 on the Supply House Times 2016 Premier 150 distributor rankings. Over the years, Webb has exploded into a Northeast powerhouse that features nearly 90 locations across nine states spanning from Main to New Jersey, not to mention a massive, nearly 1 million sq.-ft. central distribution facility being built in New Hampshire. The company is handling a greater volume of product for a larger number of customers in more locations than ever (close to 90 throughout New England, New York, New Jersey, and Pennsylvania.

Congratulations!

Be sure to visit F. W. Webb at the ISA Tech Expo on April 4th at the Marriott Inn, Buffalo.



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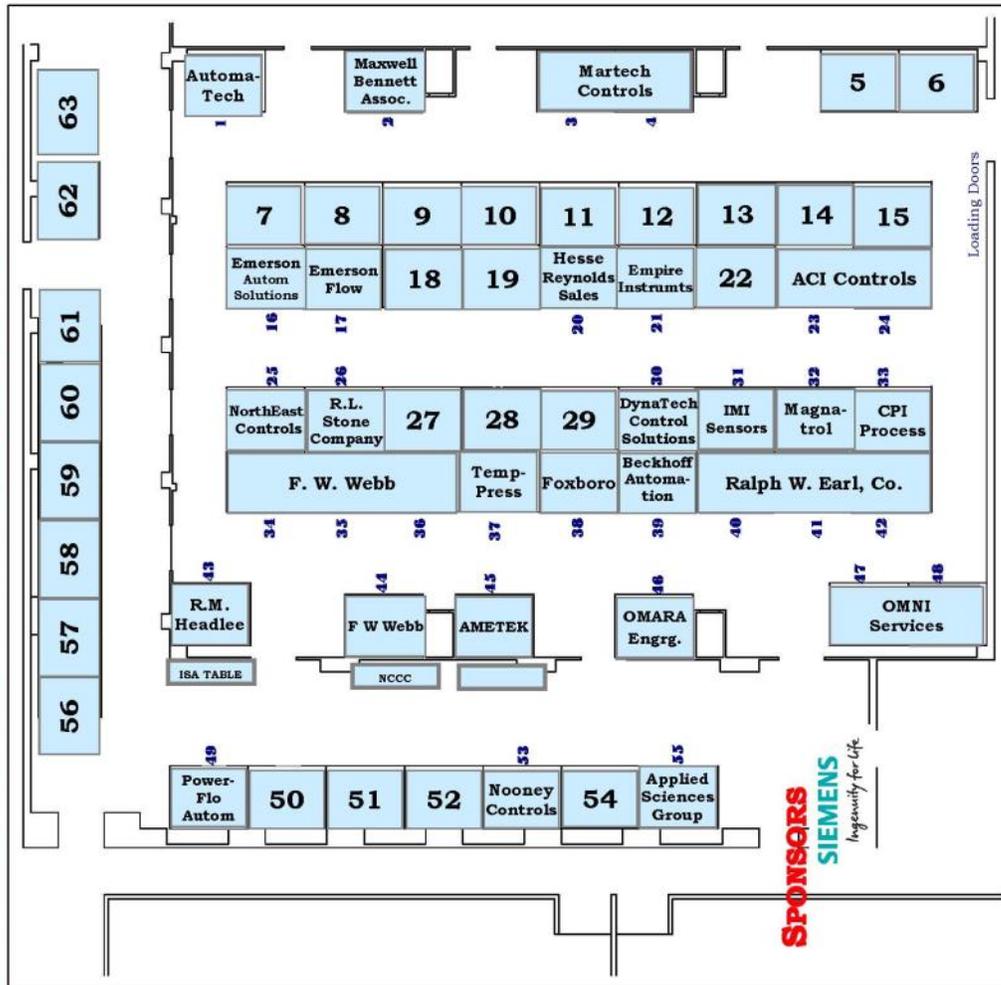
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EXHIBITION 2017
11:00am - 6:00pm



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