ISA North Texas Section

Setting the Standard for Automation™

Spring 2017 Newsletter

In this Issue

Save the Date

Fri, May 19, 2017 ..... **Model Predictive Controls**, Dr Russel Rhinehart @ 11:30am, Lunch at 12:00pm
Hilton Garden Inn Dallas/Richardson
1001 West President George Bush Turnpike
Richardson, Texas 75080

Fri-Sat, May 19-20, 2017.. **District 7 Leadership Conference**
Charles Vaughn Training Center
3737 Mapleshade Ln
Plano, TX 75075

Thu, May 25, 2017 ..... **ISA North Texas Golf Tournament**
Texas Star Golf Course
1400 Texas Star Parkway
Euless, Texas 76040

Section President
Kevin Patel

Newsletter Editor
Nawaz Akhtar

President's Message

The seasons are changing as the spring rains have begun we prepare to enter our warm summer days. I am actually writing this message as I am on my way home from the ISA Spring Leader's Meeting. There are really amazing things happening at ISA as we speak. There is a large push to advocate more about what the ISA can provide to not only our current members, but to all potential students, leaders, faculty, engineers, and companies. With the ISA's new strategic goals in place, I expect our organization and our industry to see a bigger increase in involvement and recognition in the near future. ISA is also really focused on developing new leaders for our sections, divisions, and departments within the organization.

We are currently finalizing preparations for our annual golf tournament at Texas Star, which has been incredibly successful and has all proceeds going towards our scholarship fund. If you haven't had the chance to join us in the past, now's a great time. Be sure to contact Bobby Brooks with EADS to check on availability for the tournament.

I again want to thank our new membership chair, Kamran Khan. He has taken his leadership role head-on and has already reached out to our many new members of the North Texas section as well as those members that are in their active grace period to remind them or membership renewal time. I also want to thank our new webmaster, Arifuddin Mohammed. He has already begun the process of updating our North Texas section website with content and upcoming events. In the coming year, we should have a website that will be our central hub to keep our members informed with all activities, forms, and past events.

Finally, be sure to make it out to our technical seminar which is being presented by Dr. Russ Rhinehart. During the spring leaders meeting, I ran into a few people that personally know Dr. Rhinehart and commended him on his knowledge and expertise in the automation field. Right after the technical seminar we will be hosting our first District Leader's Conference. This is open to all members and it would be great to have a strong presence.

See you soon, be safe, and enjoy the rest of the newsletter.

Kevin Patel, P.E.
President

ISA North Texas Section

Setting the Standard for Automation™

Call for Job Openings

Job ad submissions are free for members and we can only publish positions that are directly focused on automation, instrumentation and controls. We will include the posting in two issues, and it will remain in the Bulletin archives online once that portion of the website is available. If you are a member and wish to submit a job ad, please send a link to where the job is posted online to knpatel@sig-auto.com.

ISA District 7 Leadership Conference

This year the North Texas section has the privilege of hosting the District 7 Leadership Conference. This event is a gathering of ISA leaders and members from each of the local sections in our district. These sections include:

Louisiana

- Baton Rouge Section
- Greater Lake Charles Section (Lake Charles, LA)
- Lafayette Section
- New Orleans Section

Texas

- Bluebonnet Section (Austin, TX)
- Brazos Section (Freeport, TX)
- Crescent Bend Section (Victoria, TX)
- Houston Section
- North Texas Section (Dallas-Fort Worth, TX)
- Permian Basin Section (Odessa, TX)
- South Texas Section (Corpus Christi, TX)
- Southeast Texas Section (Beaumont, TX)
- Texas Channel Section (Pasadena, TX)
- Texas City Section

This Conference will provide information on the duties of ISA Section Officers, Section Organization, and general information on ISA and its structure. All past and incoming officers are encouraged to attend. Sections are also encouraged to send members who are interested in section leadership. The dress for all meetings will be business casual.

The following is the schedule of events:

Meet and Greet and Dinner on May 19, 2017 at 6:30pm – 9:30pm at the Texas restaurant located at 3609 Shire Boulevard, Richardson, TX 75082. One guest is welcome to attend the dinner.

Conference on May 20, 2017 from 7:00am – 5:00pm at the Charles Vaughn Training Center, 3737 Mapleshade Ln, Plano, TX 75075.

ISA District 7 Leadership Conference Details

Conference Registration: Registration fee for the conference is $75 per conference attendee. Please contact Craig Loncar (clongcor@techstaris.com) or Kevin Patel (knpatel@sig-auto.com) to get registered.

Hotel reservations should be arranged with the Staybridge Suites Plano/Richardson at 972-612-8180 and ask for Kim Tanner. There is a block of 20 rooms being held for our group. You need to tell them you are registering for the "District 7 - ISA District Leaders Conference." The Staybridge Suites is approximately 1 block from the conference building.

Rates: $89 for the Studio Queens and Kings, and $99 for the double/double rooms. The rate includes a full, hot breakfast buffet.

A preliminary conference agenda is attached. Please register as soon as possible so that we can begin planning. If there are any questions, please contact James Young at 979-238-9703 or email jayoung@dow.com.

Additionally, the district has planned a getaway outing for the guests on Saturday during the conference. Details below.

DLC Spouses Event: Saturday, May 20th

Trifecta Museum Outing: Dallas MFA, Nasher Sculpture Center, Crow Center for Asian Art

District 7 DLC is hosting a special museum tour of three of Dallas' most popular museums, Dallas MFA, Nasher Sculpture Garden, Crow Center. All expenses will be covered by District Leadership. The agenda is

10:15 am - Leave for Downtown - Dallas Museum of Art (Park at Dallas Museum of Art parking garage)
11:00 am - Arrive at Dallas Museum of Art - Tour starts at 11:15 -Tour of México 1900–1950: Diego Rivera, Frida Kahlo, José Clemente Orozco, and the Avant-Garde
12:00 PM - Time to see other aspects of DMA
12:30 PM - Leave for Nasher Sculpture - Lunch at Nasher and view of Sculpture Garden
1:15 PM - Tour of Nasher Sculpture Garden
2:00 PM - Leave for Crow Museum - Tour starts at 2:15
3:00 PM - Last minute shopping at Lotus Shop (Crow Museum), DMA Shop, or Nasher shop.
3:30 PM Leave downtown back to Hotel;
4:00 PM Arrive at Hotel

Reservations are required no later than May 15th for event. The DLC will be purchasing all tickets before the event. We will be confirming your attendance the Friday before the event. To make a reservation, please send your name, email and CELL phone number and when you are arriving for DLC Meeting to ardisbartle@apexmeasurement.com. If you have any questions, please don't hesitate to call me at 713 446 1902.

It promises to be a great day!

Setting the Standard for Automation™

District 7
2017 District Leadership Conference Registration

Attendee Name

ISA Section Affiliation

ISA Section Office

Company Name

Mailing Address

Mailing Address City | *State / Province* | *Postal Code* | *Country*

Contact Telephone | *Contact Fax*

Contact Email

Spouse Name (If attending)

District 7 Leadership Conference Registration Fee **$ 75.00 USD**

Friday Night Reception Dinner reservation:

☐**Self only** ☐**Self + One**

Special dietary needs? Please advise.

All registrations must be processed by May 15th or postmarked by May 9th in order to attend the Friday night dinner. No registrations will be accepted at dinner on Friday night May 19th.

Attendees may register Saturday morning May 20th for the DLC Meeting.

☐Invoice me via PayPal at the email address I provided above.

☐I am mailing a check made out to "ISA Houston Section"

PLEASE REMIT TO:
ISA Houston Section
5868 A-1 Westheimer #490
Houston, Texas 77057

Send this completed form to Craig Longcor (cell: 281-520-1602) via email: clongcor@techstaris.com

Technical Presentation

The article below will be presented by the Author himself at:

Location: Hilton Garden Inn Dallas/Richardson
1001 West President George Bush Turnpike
Richardson, Texas 75080

Date: Friday, May 19, 2017

Time: 11:30 AM – 1:00 PM

How to Register: Invites have been sent out to all of our North Texas section members. If you did not receive an invite, please contact me as soon as possible at knpatel@sig-auto.com.

This presentation will introduce the concept of process model based control. Can we use engineers' process models (first-principles models) in process control? The answer is "Yes, we can, and the benefits have been demonstrated." Techniques that combine the functionality and simplicity that make them industrially practicable are process-model based control (PMBC), generic model control (GMC), and predictive functional control (PFC). Unlike, "big model" APC applications, these model-based controllers can be implemented by in-house engineers, within PLC and DCS computers. These simple approaches typically are multi-input single-output (MISO) structures, and are appropriate where process nonlinearity requires continual retuning of PI(D) controllers.

Process-Model-Based Control

By R. Russell Rhinehart

Can we use engineers' process models (first-principles models) in process control? The answer is "Yes, we can, and the benefits have been demonstrated." Techniques that combine the functionality and simplicity that make them industrially practicable are process-model based control (PMBC), generic model control (GMC), and predictive functional control (PFC). There are probably others that I have not explored, yet. Unlike, "big model" APC applications, these model-based controllers can be implemented by in-house engineers, within PLC and DCS computers. These simple approaches typically are multi-input single-output (MISO) structures, and are appropriate where process nonlinearity requires continual retuning of PI(D) controllers.

However, since training to implement simple model-based controllers is about one course in addition to that needed for classic control, and since whoever inherits the controller must acquire the training, the answer should include, "I'm not sure that the process industry will make the training investment for in-house implementation. I think that implementation will come from service providers."

A first-principles model is the basic, undergraduate-level representation of process phenomena. It is not a fully rigorous, most perfect, complete model. The vision is that the same model that is used for process design can be used for on-line performance monitoring, validation of process understanding, training/simulation, real-time process optimization, and multivariable constraint-handling horizon-predictive control. The advantages of using the same one-model for all applications are many:

A. It preserves and promulgates mechanistic process knowledge, as opposed to masking cause-and-effect relations with linearized or empirical relations (such as FOPDT, FIR, ARMA, or NN models). Mechanistic knowledge is essential in rational diagnosis, troubleshooting, safety, and continuous improvement.
B. When a retrofit or new piping configuration changes the process, only one model needs to be changed.
C. All models (such as those in RTO and APC) will be internally consistent with respect to economics and constraints.
D. The nonlinear aspects of the first-principles model keep the model true to the process over a wide operating range. This avoids the continual retuning that is required by linear controllers when the process changes operating conditions.

This article introduces the concept. Visit www.r3eda.com to access a tutorial which provides details and examples on how to implement process-model-based control (PMBC).

Comparing Control Approaches

Don't think in terms of PID control. If you do, those concepts will misdirect understanding the different approach in PMBC. In PID, the actuating error, the difference between the set point and the controlled variable, is the basis for control; and the controller gain multiplies the actuating error to determine the

basic control action. This leads to steady-state offset, and the integral of the actuating error is used to remove offset. However, this leads to several integral-related problems, such as windup. Derivative action can be used to modify the controller, making the proportional term based on an anticipated error. Although the closed loop mathematical procedure called controller synthesis can combine a simple linear model of the process with a simple control objective and generate the PID rules, PID is not a model-based controller.

Early model-based controllers include the Smith Predictor, Dahlin's Algorithm, and Internal model control (IMC). Typically, these are all based on linear FOPDT models.

Today, in the process industry APC (advanced process control) would be termed model-based control. Within the academic community it is usually termed MPC (model-predictive control) or HPC (horizon predictive control). This control approach is typically based on the dynamic matrix, a vector of future responses to a finite impulse influence, and accordingly sometimes called a finite impulse response (FIR) model. Sometimes this is referred to as a "big model" control because it is designed to handle a multi-input multi-output process system.

In the aerospace, electrical, and mechanical fields, there are functionally equivalent controllers termed modern, or ABCD, or state-space controllers. There all are based on linear multivariable models, and the coefficient values are empirically determined by observing the CV response to MV changes. Starting in the refining sector, APC is now accepted in the chemical sector. APC integrates feedforward and feedback control, multivariable, and constraint avoidance. But, these are typically linear models, with little connectivity to the models used in RTO, process analysis, troubleshooting, etc. Being linear, they are only locally valid, and when a process changes throughput or operating state, the model usually needs to be rebuilt from new process testing.

Although those aspects comprise the negatives of linear models, they have the benefits associated with mathematical analysis of stability and other confidence-building proofs. However, nonlinear first-principles models are well accepted in process design, analysis, and economic optimization. So, I believe there is an equivalent level of application confidence, which is superior to idealized mathematical proof.

It does not matter whether the model is derived and coded by the process engineer, or is the object provided by a process simulation/design package, or is a nonlinear surrogate approximation (such as a neural net). All can be used for model-based control.

Process-Model Based Control

Here is the outline of a simple PMBC approach. Start with a dynamic model of a process, and state it as:

$$\frac{d\tilde{y}}{dt} = f(\tilde{y}, u, d, p)$$

The variable $\tilde{y}$ represents the modeled controlled variable, as opposed to y, the process measured value. The variable u is the manipulated variable, the controller output; d represents measureable disturbances, and p represents model coefficient values.

This differential equation can be solved numerically to determine the modeled $\tilde{y}$-value at the next sampling instant, based on the prior values and the influence

$$\tilde{y}_k = \tilde{y}_{k-1} + \Delta t f(\tilde{y}_{k-1}, u_{k-1}, d_{k-1}, p)$$

If the model was a perfect representation of the process then the model-predicted value, $\tilde{y}_k$, would equal the measured CV value, y_k. But, no model is perfect (certainly not an FOPDT model, and not even those attempting to be most rigorous). The process-model mismatch is $pmm_k = y_k - \tilde{y}_k$.

In simple PMBC, bias the set point for the model with the pmm_k, $\widetilde{SP}_k = SP_k + pmm_k$, then when the model is at the biased SP, the process will be at the SP.

Choose a simple control objective: Desire that the modeled value move toward the biased SP at a rate proportional to the deviation. Desire that

$$\frac{d\tilde{y}}{dt}_{desired} = \frac{\widetilde{SP} - \tilde{y}}{\tau}$$

And solve for the MV value that makes the model so behave.

$$u = f^{-1}(\tilde{y}, \frac{d\tilde{y}}{dt}_{desired}, d, p)$$

This controller removes offset, does not have windup, preserves the process knowledge, has only one tuning parameter, τ, and is valid over as wide a range as the model is valid. Tau is the user-desired time-constant for the rate of return to the set point. The value of τ should not be a mystery to any process operator who knows what a reasonable response rate would be. Once tuned, it remains tuned for the entire operating range.

Candidate Applications

Candidate processes for simple PMBC would be those that are:

- nonlinear or nonstationary requiring continual re-tuning of a controller,
- where the first-principles model is understood and accepted,
- which have a single controlled variable,
- which have an explicit inverse, and
- where models are used in other applications (such as process monitoring or RTO).

And certainly, the technique can be extended to MIMO processes that need optimization to compensate for constraints.

I have taught these techniques in my advanced process control class, and one student started a business applying it. I left industry with a vision that process models could have control application benefits, and discovered many practicable approaches. However, I suspect that manufacturing industry will have the view, "We don't invent technology. We use it to manufacture our products." Accordingly, rather than training process engineers to implement model-based control, I think that implementation will be by service providers, as is the common model for MPC applications.

Author's Bio

Russ Rhinehart, has experience in both industry (13 years) and academe (30). He was Head of the School of ChE at OK State U., president of the American Automatic Control Council, and Editor-in-Chief of ISA Transactions. He is a Fellow of ISA, a CONTROL Automation Hall of Fame inductee, and received numerous teaching and innovation recognitions. Russ authored textbooks on engineering statistics and nonlinear regression modeling, and is developing one on optimization. His "retirement" career is professional education; supported by a web site to disseminate best-in-class techniques for modeling, optimization, and control. You are invited to visit www.r3eda.com, or contact him at russ@r3eda.com.

2017 Golf Tournament Save the Date

We are happy to announce the details of this year's golf tournament. Save the Date:

WHEN: Thursday, May 25, 2017 @ 1:00 pm
WHERE: Texas Start Golf Course
1400 Texas Star Parkway
Euless, Texas 76040

The North Texas ISA once again seeks your participation in our annual fund-raising golf tournament. Come individually or with a complete team. Your entry fee will cover green fees, golf cart, range balls, dinner and prizes.

The 2017 golf tournament will be held at the Texas Star Golf Course in Euless. Texas Star is a serene public golf course with a private feel and with 275 acres of plush fairways, magnificent views, stacked rock ponds, waterfalls and natural woodlands.

We would love to have you and any guests for Dinner and Beverages even if you don't plan on playing. $20 will cover dinner and beverages for non-players.

The tournament will be played as a 4-man Florida Scramble and we will utilize a shotgun start beginning at 1:00pm. Registration and free range balls will begin at 11:30am. Following the tournament dinner, beverages and awards will be provided.

Please contact Bobby Brooks via Email at bbrooks@eadslink.com or via phone at (214) 341-3401 or (214) 725-4775 for any questions regarding the event.

ISA Society Leaders Attend Meetings in Washington D.C.

Pat Gouhin (ISA CEO and Executive Director), Robert Lindeman (AAES Board member and former ISA Society President), along with Eric Cosman and Paul Gruhn (two ISA Society Leaders), attended a number of meetings in Washington D.C. in late April. Representation from the ISA presidential chain has traditionally participated in these annual meetings, but being occupied elsewhere this year, we pushed our technical expertise to the forefront by having subject matter expertise present from our standards committees. Eric allowed us to showcase our ICS cybersecurity preeminence with Paul providing the same luxury as it relates to functional safety.

Bob, Eric, Pat and Paul (left to right) pose with Einstein's statue outside the National Academy of Sciences building in Washington D.C.

The first day was a joint AAES (American Association of Engineering Societies) meeting. AAES is a US federation of 17 engineering and engineering-related societies, of which ISA is one. The purpose of the organization is to collectively achieve what the individual societies cannot do alone. (This is obviously reminiscent of why ISA itself was formed in 1945 from a collection of more than a dozen local instrument societies.) These particular meetings focused on artificial intelligence and ethics associated with autonomous vehicles, and were held at the National Academy of Sciences Building. There were presentations from Boeing, Caterpillar, IEEE and various universities. There was a heavy focus on automation and control in all the presentations, including the Internet of things, Industry 4.0 and cybersecurity. ISA's Dennis Coad was instrumental in securing Dr. Kevin Wise from Boeing as one of the panelists. As the International Society of Automation, we have incredible potential to influence and be involved with so much more than what we currently are!

The second morning all four ISA leaders attended the Engineering Public Policy Symposium that is annually put on by the United Engineering Foundation (UEF), held at the Rayburn House Office Building, next to the Capitol Building. At this meeting the Presidents, Presidents-Elect and Executive Directors from 44 national engineering societies, representing more than 2 million engineers, heard presentations on public policy. We heard of the alarming proposed R&D spending cuts in the FY 17 & 18 budgets, divergent viewpoints on federal investments to spur science and innovation, and research and technology within federal agencies. We heard from various agency members, members of Congress, Congressional Staff, and public policy advisors. Trump's proposed initial 'skinny' budget actually has many similarities with Reagan's. Defense spending is up, everything else is down. There are plans to potentially eliminate significant programs that come out of organizations such as the DOE (Department of Energy), CSB (Chemical Safety Board), NIST (National Institute of Standards and Technology), and dramatically cut the budgets of others. NIST and many other federal agencies are involved in basic and applied research. Some believe that industry cannot afford to fund all the basic research we as a country need to be great again, and that without it, our country will never 'recover' and risks being surpassed by China or India as the world leader in innovation. Many of the speakers were in opposition to the proposed budget, especially one Congressman who's also an engineer which is pretty rare in the United States Congress today. However, the President can propose whatever he wants, it's still up to Congress to decide what will actually happen. Trump's full budget will be released within the next few weeks. Then Congress gets to debate it and make their decisions.

The second afternoon was an AAES board meeting. Bob Lindeman serves on the AAES board of seven people. Not all 17 AAES organizations are represented on the board, and none of the board members specifically represent their sponsoring organization; they represent the association as a whole. Organizations don't participate merely to see what they can get out of the organization. Much like being a volunteer leader within ISA, organizations also participate out of obligation for the greater good of the entire group, and in doing so, all will benefit. Based on the results of a survey open to all 17 organizations, AAES will focus on Diversity and Inclusion, Educating the public about engineering, and impacting public policy as each relate to AAES' vision of advancing the engineering profession's impact on the public good and mission to serve as one voice for the U.S. engineering profession.

We all can appreciate that no one person nor any one entity has a lock on all of the good ideas and knowledge that is out there. The week proved this point as several knew connections were made, opportunities identified and new resources uncovered. All of this is less likely to occur without collaboration than it is when the right people come together in pursuit of a common vision. As evidenced this week, ISA is a respected contributor to the conversation and influencer of the overall direction of the larger engineering profession.

Call for Newsletter Articles

The North Texas Section newsletter is published four times a year (winter, spring, summer, fall) and reaches the North Texas section's over 200 members. Each issue is approximately 8-10

pages long, and is electronically printed in color PDF format. A notification email goes out to all section members and it will be available for public download at the North Texas section website.

We are always on the lookout for good articles, and we welcome both solicited and unsolicited submissions. Article submissions should be 500-2000 words in length and be written for a general audience. While it is understood that the articles are technical in nature, the use of technical jargon and/or unexplained acronyms should be avoided. We actively encourage authors to include several photos and/or figures to go along with their article.

We actively welcome articles from all of our members. However, we do ask that articles be non-commercial in nature wherever possible. One or two mentions of company and/or product names for the purposes of identification is acceptable, but the focus of the article should be technical content and not just sales literature. If you are unsure of whether your article idea is workable, please contact our newsletter editor for more information – we are here to help.

Some examples of the types of articles we are looking for include:

- Explanatory/teaching articles that are meant to introduce or explain a technical aspect of automation and/or instrumentation.
- Biographical stories about personalities and/or leaders.
- Case studies about plant upgrades and/or the application of new technologies and techniques. This type of article must include at least two photos along with the article text.

Pictorial case studies about a plant upgrade consisting of 4-6 photos plus a brief 200-500 word description of the project undertaken. The article should ideally include one to two paragraphs about lessons learned and/or advice for other automation professionals.

Newsletter Advertising

The North Texas Section newsletter is an excellent way to announce new products and services to the North Texas members. With a distribution of 200+ professionals in the automation, instrumentation and SCADA fields, the newsletter is an effective targeted advertising tool.

The newsletter is published quarterly, on the following approximate publication schedule:

- Winter Issue – published in December/January
- Spring Issue – published in March/April
- Summer Issue – published in June/July
- Fall Issue – published in September/October

Advertising in the newsletter is offered in full page, half page and quarter page formats. Advertisements can be purchased on a per issue basis or for four issues at a time. The newsletter itself is distributed as a full-color PDF, so both color and black/white artwork is acceptable.

The current advertising rates are as follows:

Per Issue:
- Full page, full color (7" x 9"): $200
- Half page, full color (7"x4.5" or 3.5"x9"): $100
- Quarter page, full color (3.5" W x 4.5" H): $50

Per year (4 issues):
- Full page, full color, 4 issues (37% discount): $500
- Half page, full color, 4 issues (31% discount): $275
- Quarter page, full color, 4 issues (25% discount): $150

Other sizes of advertisements are available, but are priced on an individual basis. Contact us for more information.

Please book advertising space as early as possible before the intended publication date. Artwork for advertisements should be submitted a minimum of two weeks prior to the publication date; earlier is always better than later. Artwork for advertisements can be submitted in EPS, PDF, PNG, JPG or GIF formats. EPS, PDF and PNG formats are preferred. Images should be at least 300dpi resolution if possible.

The ISA North Texas Section is run on a non-profit basis for the benefit of its members. Monies raised from the sale of advertising in the newsletter are used to help offset the cost of section programming and events. Like its parent organization, the ISA, the North Texas Section is a non-profit member-driven organization.

For more information, or to discuss other advertisement sizes not outlined above, please contact the newsletter editor Nawaz Akhtar at nawaz@aftechno.com.

New North Texas Section Members

Recently joined January 2017 to April 2017

January 2017
Robert Crone - Cedar Park, TX
David Macelvaine - Irving, TX
Gus Bustos - Arlington, TX

February 2017
Kyle Hilliard - McKinney, TX
Harry Sowieja - Mead, OK
Andrew Andresen - Ennis, TX
Ray Ralph - El Paso, TX
Glen Lee - Midland, TX
Todd Wainwright - El Paso, TX

March 2017
Phillip Skelly - Wylie, TX
Cameron Jewell - Ardmore, OK

April 2017
Michael McAuley - Mc Gregor, TX
Swanand Kulkarni - Richardson, TX
Nandan Parikh - Arlington, TX
Curtis Biggs - Glen Rose, TX
Clayton Tidwell - Dallas, TX

ISA North Texas Section Contacts

For more information about ISA membership, the ISA North Texas section or the upcoming section events, please do not hesitate to contact any one of us.

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About the ISA North Texas Section

The ISA North Texas Section is the local section of the International Society of Automation for the North Texas area. ISA North Texas Section holds regular meetings, sponsors a variety of educational endeavors, encourages an open exchange of career opportunities, and promotes the goals & objectives of ISA. For more information see **https://www.isa.org/north-texas/**.

About the ISA

Founded in 1945, the International Society of Automation is a leading, global, nonprofit organization that is setting the standard for automation by helping over 40,000 worldwide members and other professionals solve difficult technical problems, while enhancing their leadership and personal career capabilities. Based in Research Triangle Park, North Carolina, ISA develops standards; certifies industry professionals; provides education and training; publishes books and technical articles; and hosts conferences and exhibitions for automation professionals. For more information see **www.isa.org**.