Greetings to you all and very happy to connect with you all again through this newsletter.

Leadership Committee of our BAS Division is working on few initiatives. We initiated working on a document “Best Practices in BAS Projects” which we hope will be a guideline document for all BAS projects to sign off successfully. We are working on another document compiling the standards applicable to BAS Projects. Also, we are expecting ISA to release soon a powerful networking tool for its members “ISA Connect”.

Going forward, ISA members can expect exciting networking engagement, professional interaction and knowledge sharing adding more value to your membership.

The focus of the Building Automation Systems Division (BASDIV) of ISA is:
1. To bring together the professionals connected with BAS Technologies like the technologists, service providers, manufacturers, system integrators, building architects and building developers etc.
2. To share the knowledge in this complex and multidisciplinary domain and maximize utilization of this technology for improved energy management, occupants’ comfort & safety.
3. To create more number of certified system designers, engineers and technicians with the required skill set to handle successfully the BAS Projects all over the world.

If you are connected with Building Automation Systems in any capacity as practicing engineers, end users, solution providers, students interested in BAS, Architects, Builders etc. Join ISA and BASDIV for professional networking
https://www.isa.org;
https://www.isa.org/basdiv

For queries email to: rathan@rsbizconsultant.com
Harvesting the power of IIoT in Building Automation Systems

by Graham Nasby, ISA VP of Industries of Sciences

It often seems that our modern world is a sea of acronyms, and even more so for those of who work in the field of Automation. Acronyms such as BMS (building management system), FMS (facility management system), FS (Fire System), LS (life safety system), etc. are commonly used on a daily basis by professionals who work in the building automation space.

However, there has been a fairly new acronym to enter into our vocabulary, and that is IIoT which stands for Industrial Internet of Things. When you cut past the hype, IIoT has the potential to do some really amazing things in all of the automation sectors, including building systems automation.

In a nutshell, IIoT is a family of technologies that are built on the idea of having fast lightweight communication protocols, intelligent edge devices, and ubiquitous networking to tie together a system of smart sensors. These smart – and low cost – sensors can then be used as Lego bricks to build intelligent systems that can be used to tackle monitoring/optimization problems that were previously either too difficult or too expensive to solve.

IIoT also enables a much larger and diverse group of people to get involved in the building automation space. IIoT is built on the technology that runs the Internet and makes heavy use of standardized programming environments that have been traditionally difficult to apply to automation problems. The result is a meeting of minds and technology that has the promise to open up many new opportunities in the building automation world.

In the coming year, I encourage all of you to take a look at IIoT technology and see how it can be applied to building automation systems. Your Building Automation Systems Division leadership is currently working with the ISA’s staff to identify new opportunities for this technology and how the ISA can build IIoT into its market leading content strategy.

Yes, we have a lot of acronyms in our business, but IIoT is one to keep an eye on. Great things are in the pipeline.

FIG. 1 Source: www.semiengineering.com
IIOT platform in Building Automation Industry
By Noorul Hassan

Building accounts about 40% of global energy consumption, limiting energy consumption and enhance building operation has been a major goal of building owner and facilities manager. Building automation with IIOT platform enables the connectivity between facilities personal to the building equipment. IIOT plays a vital role to reduce operating expenditure by providing large amount of data, this data includes condition pattern of the building equipment, HVAC and lighting control parameter trend log and system performance record.

**Equipment condition monitoring:** IIOT enabled sensor offer great visibility of equipment condition for building equipment, such as vibration analysis of rotating equipment, thermal imaging examination of electrical equipment and oil analysis of compressors. This data provides statistic of equipment condition which helps the facilities manager and owner to proactively maintain their equipment and eliminate potential breakdown and service outage.

**HVAC and lighting control parameter trend log:** These are one of the vital data in the building industry which includes zone temperature / humidity, return air CO2, leaving chilled water temperature, ambient temperature and leaving condenser water temperature. The combination of these data can be used to optimize system operation at low load condition. For example, in the variable air volume system if the zone temperature is satisfied the system automatically reset the supply air temperature setpoint from 13°C to 18°C which reduces the mechanical load on the chiller. Another example, in unoccupancy condition the system automatically reduces the lighting intensity to 25%. These strategies drastically reduce the building operating cost.

**System performance record:** This record provides the insight of building equipment and sensor such as Generator, Chiller, pumps and various sensors. The data provides the performance indicator which enables the facilities manager to identify the performance issue. Such as coefficient of performance of the chiller or drift of the sensors.

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**FIG. 1**
Like any other Automatic System, the heart to regulate different variables in a Building Automation System is the Controller and this can be: dedicated, DCS, PLC, PC or a combination of these.

**The main Controller functions are:** monitor, maintain the variables of interest inside the user and/or process requirements and inform about the system status; all this through programs and algorithms in the Controller.

**For this to happen,** the controller needs some basic components to help in fulfilling this task and these elements as a whole will form what we know as the control loop.

**When We talk about control loops,** We recognize two main classifications: Open Control Loops, without automatic feedback and Closed Control Loops with automatic feedback, here We will talk about the second type.

![Control Loop Basic Elements](image)

**FIG. 1 Control Loop Elements**

**In this way** is possible to regulate and/or monitoring variables like: Temperature, flow, Pressure, Velocity, Humidity, Timing, Luminosity, Video and Vision systems, Access Control, Security and Alarm Systems, Gases monitoring and others.

**Between others** the basic elements of a Closed Control Loop are:

- a. Sensors
- b. Transmitters
- c. Wiring
- d. Controllers
- e. Signal/Power Adapter
- f. Actuators
a. **Sensors:** These elements have the function to sense physical or chemical changes in the process/system and deliver instead an electrical variable normally in the range of low voltage, current or pulses or some other electrical characteristic (such as resistance) that is proportional (linear or non-linear) to the controlled variable (measured variable).

Another function is to increase the electromagnetic noise immunity during the transfer through the field toward the Controller. The main standards are: 4 to 20 ma, 10 to 50 ma, 1 to 5 volts, 0 to 10 volts.

c. **Wiring:** the correct wire selection and wiring technics are very important to reduce noise immunity: use of twisted pair wires, shielded wires and correct grounded shield to reduce ground loops, etc. Also is important to consider the correct wire gauge to reduce possible voltage drops.

d. **Controllers:** as mentioned before the controller receive the signal from the sensors through the transmitters and process it according to its program, control algorithms and user or process requirements.

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**FIG. 2 Sensors**

b. **Transmitters:** here is included the signal conditioning modules. Its function is to change the low level electrical values from the sensor to a highest one. This have different purposes: First is to amplify the signal to increase signal/noise ratio. Second is to produce a signal level compatible with the levels of the Controller inputs.
The most used control algorithm is PID and many controllers (virtual or physical) can be connected together, following different control strategies like: Cascade, Feed Forward, Ratio Control with the purpose of optimize the control.

There is also more advanced control tactics like: Fuzzy Logic, Neural Networks, Control Optimum, IA etc. used to improve the control response over more complex system or when is necessary a more precise control over multiples variables.

At the end the main purpose is to maintain the controlled variable or variables in the user or process specification.

e. Signal/Power Adapters: the command from the controllers as a result of the control algorithm is going to vary the handled variable to produce the necessary changes in the process/system to reach the user/process requirements (controlled variable at setpoint).

However the electrical levels and power in the Controllers outputs not always are enough to manipulate directly the actuators, then the signal and/or power adapters function is to amplify and/or adapt the electrical values from the controller to physical values (electrical, pneumatic or other) that can work with the actuators.

Example of these are: Current to pressure devices (I/P) or voltage to pressure devices (E/P) that changes the controller levels from 4 to 20 ma or 0 to 10 volts to pressure signals (3 to 15 psi) to manipulate the valves.

Other example are the speed drives that receive 4 to 20 ma from the controller and produce and output proportional to this signal to vary the motors speed or a Triac to control a heating element.

f. Actuators: this is last but no less important element in the control loop and is the one in charge to modify the handled variable in the System/Process with the goal to get the controlled variable reach the setpoint or User/Process requirements.

Examples are: Motors, Valves, Heating Elements, Luminaries and others.
**New HMI Technical Report Focuses on Usability and Performance**

ISA’s first human-machine interface (HMI) standard, ANSI/ISA-101.01, Human Machine Interfaces for Process Automation Systems, covered the philosophy, design, implementation, operation, and maintenance of HMIs for process automation systems, including multiple work processes throughout the HMI life cycle. It defined the terminology and models to develop an HMI and the work processes recommended to effectively maintain the HMI throughout the HMI lifecycle, including all general concepts until its decommissioning, applying a practical and management approach.

The ISA101 standards committee has now published the first in a series of technical reports to provide further guidance in key areas of HMI. ISA-TR101.02, HMI Usability and Performance, addresses the specification, design, implementation details, and management of an HMI focused on usability and performance. It explains how the ISA-101.01 standard applies in determining the optimal solution in order to achieve the process goals using examples that have been shown to be effective.

HMI enhancements for improved usability and performance are often associated with additional specifications, custom design, implementation, and management considerations, in addition to vendor-provided functionality and features. The new technical report includes examples of these considerations within the HMI lifecycle, including the continuous work processes of audit, validation, and management of change.

The ISA101 committee is currently working on additional technical reports in three areas: HMI philosophy and style guide; mobile devices such as tablets and smart phones; and on-machine applications, focused on developing HMI graphics that effectively convey contextual information for operating and maintaining a machine.

ISA101 is co-chaired by Maurice Wilkins of Yokogawa and Greg Lehmann of AECOM. For information about participating in the ISA101 committee, contact Torry Bailey, ISA Standards, tbailey@isa.org.

For information about viewing or obtaining ISA standards and technical reports, visit www.isa.org/findstandards.

**New Control Valve Terminology Standard**

ISA75, Control Valve Standards, has completed a revision of ISA-75.05.01, Control Valve Terminology. The standard provides a glossary of definitions commonly used in control valve applications across industry.

The standard includes a number of new or significantly revised terms, including backlash, cage guiding, intelligent/smart positioner, quick change trim, globe valve body, hysteresis, port guiding, and post guiding.

For information about viewing or obtaining ISA standards and technical reports, visit www.isa.org/findstandards.

**ISA99 to Develop Report on Industrial IoT Cybersecurity**

ISA99, Industrial Automation and Control Systems (IACS) Security, has begun work on an ISA Technical Report to be titled, “Applying ISA-62443 to the industrial Internet of Things (IIoT).” Coverage will include general categories of IIoT devices within IACS, cybersecurity challenges, and rates of adoption in industry. The report will then serve as a guide in determining if any new and related ISA99 work products are required.

The technical report will be the first work product of Working Group 9, IIoT and Security, which was
established by ISA99 to analyze the specific characteristics of the IIoT in terms of threats, attack surface, and vulnerabilities, and to examine whether the approach developed by ISA99 for securing a conventional IACS is appropriate and sufficient for IIoT. This assessment is vital as the IIoT is a specific case of IACS with a very wide range of objects, an extended surface area and a high scalability, resulting in a very large attack surface and new vulnerabilities. The working group will first examine the specific risks and new forms of attack to which the IIoT may be subject.

This project is one of numerous current development activities within ISA99 to support and advance the widely used ISA/IEC 62443 series of standards on IACS security. The standards are developed primarily by ISA99 as American National Standards, with simultaneous review and adoption by the Geneva-based International Electrotechnical Commission through IEC partner committee TC65, Industrial-Process Measurement, Control and Automation. With over 900 members, ISA99 draws on the input of cybersecurity experts across the globe in developing the standards, which are applicable to all industry sectors and critical infrastructure in providing a flexible and comprehensive framework to address and mitigate current and future security vulnerabilities in IACS.

ISA99 Working Group 9 is chaired by Suzanne Lightman of the US National Institute of Standards and Technology. For information on ISA99, contact Eliana Brazda, ebrazda@isa.org. For information on viewing or obtaining the ISA-62443 standards and technical reports, visit www.isa.org/findstandards.

**New ISA5 Project on Controller Algorithms and Performance**

The time-honored PID (proportional–integral–derivative) algorithm is used in a vast majority of applications for basic control and many for advanced control. However, there appears to be a widespread lack of understanding of the different forms, structure, features and how performance objectives determine appropriate choices. Consequently, most of the capability of the PID is underutilized, reducing process safety, efficiency and capacity, points out ISA Fellow, author and mentor Greg McMillan, a widely recognized expert on process control who received the ISA Lifetime Achievement Award in 2010.

This concern prompted McMillan to propose a new ISA standards project on controller algorithms and performance, which has led to the recent formation of ISA5.9, Controller Algorithms and Performance. The new working group will function under the ISA5 committee, Documentation of Measurement and Control Instruments and Systems.

ISA5.9 will seek to clarify the algorithms used in industrial control systems to aid in their selection and application to improve manufacturing processes. The working group will develop technical reports, recommended practices, and standards documenting the algorithms used in industrial control systems and the measures of performance for those algorithms. The documents may include guidance on algorithm selection.

ISA5, the oversight committee for ISA5.9, is also responsible for the widely used standard ISA-5.1, Instrumentation Symbols and Identification. The committee is chaired by former ISA Standards & Practices Department Vice President Tom McAvinew, co-author of the ISA book Control System Documentation: Applying Symbols and Identification.

The ISA5.9 cochairs are Yamei Chen of Eli Lilly and Company, Indianapolis; and Michel Ruel of BBA, Québec. Those who are interested in participating in the new ISA5.9 are asked to contact Charley Robinson, ISA Standards, crobinson@isa.org.

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**Volunteers for Leadership Roles**

BASDIV of ISA requires more volunteers to be part of Leadership Committee. We also require country wise BASDIV ambassadors Request BASDIV professionals to email rathan@rsbizconsultant.com for more information.
ISA Standards Meetings on Tap for Annual Leadership Conference

Several ISA standards committees will hold meetings in conjunction with the 2019 ISA Annual Leadership Conference in San Diego, CA, in late October. The following committees plan to meet on the days as shown, with specific meeting times and working groups still to be determined:

- ISA18, Management of Alarms: Oct. 28
- ISA84, Instrumented Systems to Achieve Functional Safety in the Process Industries: Oct. 29-31
- ISA101, Human-Machine Interface: Oct. 28
- ISA112, SCADA Systems: Oct. 25
- ISA75, Control Valve Standards: Oct. 28-29
- ISA96, Valve Actuators: Oct. 30-31

For information on the conference, visit: www.isa.org/isa-annual-leadership-conference/.

Have an idea for an ISA standard, book, training course, conference topic, or other product or service? Send it to: crobinson@isa.org

Discounts on training, publications, and event registration

JOIN SME TEAM of BASDIV

We are proposing to form a team of SME (Subject Matter Experts) for various technical domains of Building Automation.

The team will play active role in promoting the technical activities of BASDIV like coordinate & participate in symposiums / seminars / webinars/ document preparation / training materials etc.

Few Examples: IoT in BASDIV, Cybersecurity in BASDIV, HVAC systems, Building Security, Facilities Management, BAS Project Management etc. ISA members can also refer non-members of ISA

Email with your interest & experience to rathan@rsbizconsultant.com

Membership Options

Regular Membership:
- Free unlimited downloads of technical papers
- Free online, prerecorded web seminars
- Free online viewing of ISA Standards
- Two free technical division memberships
- Free subscription to InTech and Automation Weekly e-newsletter.
- Free online access to ISA Transactions
- Networking and leadership opportunities
- Access to ISA’s geographic sections
- Much more

Automation Community Subscriber:

Pricing: 1 Year Membership FREE
- subscription to the digital version of InTech,
- the premier magazine for automation professionals,
- subscription to Automation Weekly e-newsletter;
- online resume listings on ISA Jobs;
- option to purchase ISA Technical Division memberships at nominal fees..

Student Membership:

Pricing: very nominal

Student members receive most of the privileges of Regular Members and have access to student-focused benefits such as scholarships and mentoring program.

In cases where a Student Section or Regular Section isn’t available, students can still enjoy many of the benefits of membership as Virtual Students. This membership grade interacts with the Society by electronic communications

Contact your country ISA Chapter for details or visit: www.isa.org
**Leadership Committee – BASDIV**

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**Country Liaison Representatives**

- **Canada**: Dzhamshid Safin
- **India**: S M Nayak
- **Morocco**: Yassine Salah Eddine
- **Peru**: Fernando Katayama

**Membership Chair – BASDIV : John Lake**

John Lake is the Director of Automation and Controls for DPR Construction, CA. John has 35 years experience in the Process and Building Automation fields. John participates in technical committees of ISA as Subject Matter Expert. He is former CEO, Owner and Managing Director of a BAS Engineering and Control contracting company. Key member of a team that managed three large Biopharmaceutical projects that each earned the ISPE Facility of the Year Awards.

Contact: johnla@dpr.com

**Country Liaison Representative BASDIV**

- **Canada**: Dzhamshid Safin
- **India**: S M Nayak
- **Peru**: Fernando Katayama

**Secretary – BASDIV : Ram Kerur**

Ram Kerur has decades of experience in managing Industrial, Defense and Building Automation Projects and Projects. He has worked at Siemens India Ltd for development of PLC and Drive Products. He has worked at Tata Institute of Fundamental Research and Tata Consultancy Systems and is a consultant in BNI, USA - a business consulting firm specializing in manufacturing, engineering services, digital transformation, technology adaptations & growth strategy.

Contact: ramkerur@gmail.com

**Standards & Practice – BASDIV : Noorul Hassan**

Noorul Hassan, PEM has over 18 year of diverse experience in HVAC, Electrical and Building Automation systems. He involved in wide variety of energy management, system optimization and building automation projects. He previously served as electrical design engineer for SKM equipment, Building Automation System Design Engineer for Sauter Middle East. Currently he is working as Building Automation System Service Engineer for Schneider Electric Vancouver, Canada. He is a Certified Professional Energy Manager (PEM).

Contact: noorulhassanus@yahoo.com

**Director – BASDIV : Rathan Bala**

Rathan Bala has 40 years of experience managing in aerospace, multidisciplinary projects, factory automation projects and Building Automation Systems. His experience includes top management in business enterprises in small and large business units and has worked with internationally known management experts. He was Director – Consultant in BNI, a leading international business referrals organization. He is currently founder and Chief consultant of RS Biz Consultant, LLC, USA - a business consulting firm specializing in manufacturing, engineering services, digital transformation, technology adaptations & growth strategy.

Contact: rathan@rsbizconsultant.com

**Newsletter Editor – BASDIV: Orlando Pezantes**

Orlando Pezantes has an ASS Degree in Electronic and Specialization in Nuclear and Conventional Instrumentation and Control have a background of 30 years of experience in Automation and Control in the Industrial Commercial and Residential sectors like Manufacturing, Nuclear Research, BA and Military and now collaborating with the purpose of supporting the diffusion of technologies related to BAS.