

Wireless in Industrial Automation

In the last decade, while mobile technologies deployment rose exponentially in India, leveraging wireless technology for industrial applications has just about picked up but its significance has not been lost. Even as the wireless industrial solutions continue to evolve globally for the process, discrete and hybrid industries, Indian industry automation professionals have started evincing interest in appreciating the opportunities and challenges.

Keeping this in perspective, ISA Bangalore section, organized a technical seminar – *Wireless in Industrial Automation* on November 12, 2011 in Bangalore. The daylong technical seminar received an overwhelming response from across industry verticals with over 180 delegates attending. From end users, OEMs, engineering consultants, and automation suppliers have come to recognize the independent non-partisan platform that ISA Bangalore has been able to offer for such discussions.

The Seminar's format facilitated talks sessions from expert speakers from research institutions, manufacturing industry, and automation supplier representatives. The seminar concluding session also included a *panel discussion* that not only summarized the "take-away" from the proceedings but also provided an opportunity for the delegates and experts to take a critical review of the current state of technology, challenges, and possible solutions. Aside of the seminar, the key sponsors also exhibited their products and solutions facilitating attendees to browse and interact during the breakouts.

...was very impressed and felt lucky to have participated in such an event. I wish to express my sincere gratitude for being there in such a wonderful environment, where nothing but knowledge radiated and we were (there) just have to feel its presence and grab it ... Delegate

Key takeaways from the conference

Mr. Thomas Varghese, Director of system engineering at **Health Micro** and a former scientist of **DRDO** provided perhaps the most appropriate keynote address, kick starting the technical seminar. With hands-on experiences in the field of development of wireless products and solutions, he provided a comprehensive overview of common concerns, perceived and real challenges, and more importantly, aspects that could be currently exploited.

Aside of lucidly bringing out the historical development of wireless solutions, Thomas also touched upon future growth prospects, applications to benefit from, volumes that could impact the costs, and the need for improving reliability, security, and data integrity challenges that currently occupy the minds of those desiring to deploy wireless solutions in automation. Unlike typical keynote deliverance, he also showcased several case studies as reference across industry verticals.

Wireless HART

It is common knowledge that HART protocol based transmitters (and sensors) dominate the process industry globally. Current installations are of the order of thirty million plus pieces and the solution is a value proposition for the process industry. Wireless HART already incorporates IEEE radio standard 802.15.4 and has become

an IEC Standard IEC 62591. Two sessions focused on this subject with **Pepperl & Fuchs (P+F)** and **ABB** process automation (PA) representatives taking the initiative.



Mr. Unnikrishan, Manager PA from P+F was for exploiting the existing base of HART, derive benefits from speedier ways of setting up components and communication systems, and extending current installations' functionalities. Mr. Neil Shah, Product Manager PA, from ABB stressed the advantages of process plants to protect existing asset investments by leveraging use of Wireless HART technology, particularly for asset maintenance and diagnostics. Neil also brought out the reliability and interoperability (vendor agnostic) aspects. Eliminating hardwired multiplexer technology, currently the practice, would make for a distinctive advantage.

Ethernet Powerlink

Mr. P V Sivaram, Managing Director **B&R Automation**, eloquently communicated the pros and cons of wireless implementations in an industrial environment. He laid emphasis on the *communication backbone* requirements in an industrial environment while using wireless solutions. Drawing analogy of the advantages in ease of usage of Ethernet in the Office IT domain, Sivaram explained how *Ethernet-Powerlink* could be adopted and exploited in industrial processes. While stressing the importance of open-source protocols (and freedom associated with its usage), *Ethernet-Powerlink* he opined was ideal for industrial users as a communication backbone.

Intelligent Cables

RFIDs have been in use for several decades and it is only appropriate that it finds a key application in gathering useful information from cables and wires used in industry. Mr. Sanjeev Lakhota, Regional sales Manager of global cable major **Lapp**, delighted the audience by saying that wireless could also mean "less wire" and not the total elimination of wires. He described an innovative trend in wired systems, which utilize low cost, RFIDs embedded in cables that could be a bargain for obtaining data on temperature, humidity, and such other parameters from cables. This could be of significant advantage when deployed in cable systems in harsh environments, marine, and inaccessible terrains for pro-active and preventive maintenance programs.

Wireless in Electric Power Distribution Management

Smart-Grid is no more just a concept. Countries such as India have embarked on massive programs to manage transmission and distribution losses and adoption of wireless communications technologies undermines its success. This is true in the transmission and distribution of power domains. Bringing an understanding to the gathering was Mr. Ramesh Patil, Engineering Officer from the **Central Power Research Institute** that has done yeoman service in this country. A comprehensive evaluation of the data communication needs in the power distribution scenario was the essence of Ramesh's presentation. Extending from distribution transformers to sub-stations to load dispatch centers, he covered aspects such as reliability, cost, data-capacity constraints, power outages, operation ease, maintenance, and security.

The Networks

Phoenix Contact India through Mr. Ashish Manchanda, Country Head for Marketing and Technology succinctly introduced several of the wireless technology options that the typical industry end-user would want to evaluate. Ashish deliberated on wireless options such as Trusted Wireless, Bluetooth, WLAN 802.11, GSM, GPRS, and EDGE essential for industry users to appreciate. Among the parameters, he discussed included robustness, coexistence, distance, data volume, diagnostics, ease of use, and speed. The niche areas that the individual options cater to made for a better understanding. Furthermore, he presented as to how standard wired connections like discrete I/O, multiple industrial buses, and Ethernet can be implemented in the wireless format.

Wireless LAN 802.11

Quoting from IMS Research, Mr. Arpit Sharma, an experienced designer of industrial wireless applications for **Belden** India, struck a chord informing of the growth potential of Wireless LAN market globally (a CAGR of 28 percent between now and 2013). Arpit also gave an excellent insight into, Wi Fi LAN applications with the use of *Ethernet 802.11* series of standards. Not stopping at explanations related to topologies in use, he went on to discuss security related issues as well. Dwelling on a large installation case study, Arpit sought to demonstrate how Wireless is now a credible alternative to cables in an industrial environment when designed with care and implemented compliant to standards.

WISA

Discrete industry, perhaps has taken the lead in adopting industrial wireless solutions. This is particularly true where the transmission range is limited (order of meters) and data volumes are relatively high. One crucial challenge that is common to wireless solutions in automation is powering the sensor devices. Here, Mr. Naveen Pandita, Manager Sales and Mktg-PLC from **ABB** showcased a video presentation of WISA based technology wherein transmission of energy to field devices in the discrete automation environment was feasible, albeit for distances not more than 50 meters. He further showcased a high node density, high movement application which eliminated cables.

ISA Standard 100.11a

ISA is essentially a body setting standards in instrumentation. Mr. Bejoy Jose, Senior Manager from **Yokogawa** introduced this recent standard formulated essentially by end-users globally. This standard for industrial wireless applications, that is still evolving, is aimed at addressing several perceived lacunae of other approaches in wireless technologies. Bejoy's lucid explanation of the key features of ISA 100.11a focusing on field to control room Integration, high level of security aspects, closed loop control (and not just monitoring), star topology, and response time frames that cater to even critical applications in process industry made for compelling attention. Enabling plant wide scalability and integrity even as it embraces vendor agnostic interoperability functions were other features he sought to drive across.

Panel Discussion

It was left to the eminent personality of Mr. HA Balasubramanya, Head of Electrical and Instrumentation from the Department of Atomic Energy, BARC to moderate an open discussion forum as the concluding session to this gripping technical seminar of

ISA Bangalore. SR Venkatapathy, the Education Chair of the section aided the interactions between the speakers of the day and the audience. Mr. Balasubramanya summarized the challenges thus:

- (a) The concerns about security and reliability of wireless transmission
- (b) Capital Costs verses lifecycle costs
- (c) Battery life

Overwhelming inference drawn by the audience was that while near parity with current wired solutions in automation will see traction over a period of time, there is enough traction in the technologies for the end-user to consider usage in select applications already. As with any new technology that ushers in, wireless in industrial automation will find acceptance gradually overcoming fear of failure driven inertias. However, a good beginning with available solutions can be made in the plant monitoring and asset management areas.

Overall, a thought provoking technical seminar with several takeaways to boot.