

Leaps and Bounds for Controls

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Where is controls technology headed?

Tomorrow's typical building automation system (BAS), judging by comments from leading building designers and manufacturers, will be unlike anything seen before.

Many of the advances are driven by breakthroughs in software broadly affecting the high-tech world, such as artificial intelligence and advanced networking. Others are so simple they've become instant hits, like self-powered wireless devices and the use of computer wiring to carry controls signals for building equipment.

Taken together, changes - both large and small - promise to radically alter how buildings work. The following are some of the areas in which we can expect to see these changes

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Fuller Integration

Expect the original focus of BAS - connecting HVAC systems to such systems as lighting (architectural and theatrical), as well as to access control, fire/life safety, and more - to produce more practical ways to get those jobs done. "In addition to savings in installation and training, a single integrated system offers synergies leading to increased energy savings," says Bill Swan, former chair of ASHRAE's BACnet committee, which focuses on the use of the BAS protocol by the same name.

"The classic example is where a person's card swipe, while entering a building, turns on required lights to his/her office, and related HVAC systems are activated for occupied mode of operation," says Jeffrey W. Czarniecki, PE, CEM, an engineer at Troy, MI-based Peter Basso Associates.

This trend will benefit from the use of more sophisticated communications networks, adds Carlos Petty, a vice president with the New York City engineering firm Syska Hennessy Group. "Future controls systems will be capable of communicating between controllers, using a dual-ring, self-healing topology," he explains, thus enabling buildings to work like advanced networks based on programmable logic controllers (or PLCs).

Peel-and-Stick Wireless

Engineers like Czarniecki expect wireless devices and applications for sensing and communications to be another focus for the next few years. Swan notes that wireless systems can add more sensing capabilities, too. For example, several CO2 sensors located around a room could ensure adequate ventilation. (Currently, only one or two wired points are generally used to measure demand.)

Sustainable design will drive the use of self-powered wireless field devices, adds Petty. "User awareness and national energy policy will promote the manufacturing of devices fitted with miniature energy harvesters, along with very low-power-consuming RF transmitting/receiving equipment," he explains. Petty predicts an impending age of "peel-and-stick" temperature transmitters that produce energy and are automatically recognized by nearby BAS networks.

In this way, devices like temperature controls will be more "relocatable": Building occupants or owners will be able to move them around as needed to reflect changes in building use or layout, or simply to improve performance.

Networks Power Change - Literally

Similarly driven by energy concerns, building controls will likely gravitate toward "power over Ethernet" technology, known in the industry as PoE. The advance has led to the invention of new products for smart devices that have IP-network connectivity, but need low-voltage power for operation. Instead of requiring separate electrical wiring, PoE devices get power through data cables.

"Applications include wireless CCTV cameras, security access control, lighting control, and the control and monitoring of HVAC equipment," says Petty, adding that the applications will grow as more wattage comes through the network lines. The Institute of Electrical and Electronics Engineers (IEEE) is now working on a standard that would allow up to as much as 50 watts to smart devices, enhancing interoperability and system integration. More information can be accessed at www.ieee.org.

Open Systems

Integration drives much of today's thinking about building controls. While a 15-year-old tussle persists between ASHRAE's BACnet protocol and the competing LonWorks technology owned by San Jose, CA-based Echelon Corp., experts see this divide closing fast. This means more integrated BAS and devices that are easier to mix and match.

What's driving this? Czarniecki answers, "Tomorrow's BAS will most likely trend to higher percentages of open protocols and use of the building's IT infrastructure," rather than dedicated BAS networks. To make this happen, software makers will create more "middleware" communication products. "Those will reduce the problems of the past by helping to bridge different building-related systems together," Petty predicts.

Rugged, Reliable, and Friendly

Other changes will help bridge equipment and end-users, say experts. One area that's advancing quickly is the system interface, which is easier for novices to understand simply by investigating through mouse-clicks - or by tapping a PDA keypad. "Like most computer programs, only about 15 to 30 percent of the system's capabilities are used by most typical users," says Czarniecki. "Tutorials and help menus are available on some systems that may lead to greater use."

Petty also heralds the arrival of "smart AV equipment" in the future, which he says will seamlessly integrate security equipment and temperature controls, for example, on a "graphic dashboard," rather than today's typical BAS interfaces.

Other operability improvements include new packaged, configurable systems that are quicker to set up and troubleshoot. Web-based access to BAS - password-protected and with assigned privileges for varied end-users - will make controls feel ubiquitous and possibly more democratic. Swan adds, "Remote access capabilities will make life much easier for system operators, too."

Not only will building controls work better, but in coming years we'll be able to enjoy their powerful presence as well - even when we're on the go.