

OPTIMISM, IF NOT EVIDENCE, SURROUNDS THE FUTURE OF WIRELESS
TECHNOLOGY FOR FACTORY-FLOOR APPLICATIONS

Slow Inroads for Factory Wireless

PHILIP BURGERT

DESPITE ROSY FORECASTS THAT CONTINUE TO PROJECT MAJOR investments in wireless industrial applications, recent months have shown only incremental growth in wireless installations in factories, according to analysts and industry experts who work in the sector.

It appears that some forecasters have been overzealous, as project budgets remain unspent because of economic uncertainty, and questions remain about the stability of wireless standards.

Wired networks are doing far better, by comparison. "There is still significant growth happening in wired networks for factories when you get down to machine controls and the technologies of that type," says Jim Taylor, industrial automation group practice director for Venture Development Corp. (www.vdc-corp.com). "There is still a lot of hard wiring in the factory and there is a trend away from hard wiring to wired networks. The first trend, which continues, is to wired net-

work and the next trend will be to wireless. But wireless is never going to take over the factory, in my opinion. Wireless will become a significant market, but it won't take over."

FORECAST FOR 2006 BY MARKET SEGMENT

NORTH AMERICAN WIRELESS PRODUCTS FOR INDUSTRIAL MONITORING AND CONTROL

	2001	2006
Total Shipments (\$ in Millions):	\$109	\$752
Percent by Market Segment:	2001	2006
Utilities	17%	22%
Chemical/Petrochemical	16%	18%
Automotive	14%	12%
Food & Beverage	10%	12%
Other	43%	36%

VDC

NICHED INTEREST

Current market intelligence supports the notion that wireless use inside factories is still limited. "There are experimental kinds of uses," says Harry Forbes, senior analyst with ARC Advisory Group. (www.arcweb.com). "When you get into warehousing and logistics, it gets to be more common to

have a wireless network infrastructure all over the place, because you are doing a lot of material inventory tracking, reads and those kinds of things."

Wireless can't measure every type of process parameter, but it is a capital cost savings, says Forbes, adding that you're mostly trading capital for a maintenance expense. He notes that interviews conducted by ARC last summer found a lot of interest by manufacturers in messaging, especially among metalworkers who don't have central control rooms.

Applications with process response or required-action time constraints at specific times—times when personnel aren't necessarily around—generated interest in a wireless solution. "Messaging was getting pretty important to these people in terms of integrating process messages with various kinds of devices—either handhelds or cellphones or whatever—inside the facility," says Forbes.

VDC's Taylor, currently completing an update of a two-year-old study of the markets for wireless monitoring and control in discrete and process industry applications, says there is a "strong reluctance" to use wireless technology in control applications. "You see it more in monitoring applications," he states. "I think it's going to remain a small percentage in control for some time."

WAREHOUSES LOSE WIRES

Dave Hrivnak, associate analyst at Eastman Chemical, Kingsport, Tenn., says his company has installed wireless networks in eight warehouses and expects to complete wireless networking in four remaining facilities by the end of the year.

"The interesting thing for me is the lower cost, speed of implementation and flexibility," Hrivnak says of wireless networks. "Wireless is so much easier for me to do. When you are running a facility, the wiring of all these Ethernet lines is not a trivial expense and wireless has the ability to produce some cost savings. And it's not only cost, it also allows you to network the plants faster."

Continued interest in installing more wireless systems is also cited by Judith Byerley, electrical/controls engineer at the Cryovac Div. of Sealed Air Corp., Simpson, S.C., although no new systems have been added in the last 18 months. Information

technology staff members there identified worries about resolving interface conflicts as the source of the holdup.

Nevertheless, Byerley is sold on the technology by the success of a wireless DeviceNet solution for a contact sensor that was installed to monitor rotating machinery used to manufacture packaging materials.

"I haven't been paged in the middle of the night to come in and fix something since we set it up," she says. "We haven't done anything with wireless since then, but may in the near future." The next project in the works at Cryovac involves a plant-wide data-logging system for collecting data that simply is too difficult to gather with wired networks.

So far, says Hrivnak, Eastman has installed one factory-floor pilot project using wireless hardware, but budgetary restraints have held up installing more. That project involved adding a few extra sensors to a process line for compliance monitoring. "We've been pleased with how stable it is, but we haven't the need for more installations," he adds.

The hardware used in Eastman's process-line pilot project incorporates proprietary networking technologies and runs on the public 900-MHz radio band. "For industrial equipment, I'm not sure I disagree with that, because technically it's not that hard to jam a radio signal," he says. "If someone knew a plant was running a lot of equipment on, say 802.11b, it wouldn't be that hard to sabotage if someone really wanted to jam those frequencies. This can cause headaches if you want to keep everything running smoothly. It's much harder for somebody to jam proprietary radio frequencies."

In its warehousing facilities, wherever possible, Eastman plans to use off-the-shelf components. But when it comes to temperature, pressure or flow sensors, most aren't off the shelf. "If you've got a Honeywell system, you want to get a Honeywell sensor to connect to it," Hrivnak says.

DO STANDARDS MATTER?

Hrivnak says most of the access-point hardware in factory wireless networks of the future will support either 802.11b or 802.11g standards or both. "That's kind of the trend in the IT world," he says. "But wireless devices that have special purposes are not constrained to that. A lot of them will operate on 900 MHz. When you talk about networking, you're constrained to work with what the IT world has standardized. Whereas these other devices are just special-purpose gizmos that get rid of wires and cables, and they can use any unlicensed RF band."

At Eastman there has been no effort to find a single standard for industrial networks. "We need to make sure it works and we need a vendor that stands behind it," Hrivnak says. "As long as the company adheres to its own standards, I don't think we're going to insist on 802.11b-compliance." Hrivnak points out that Ethernet was out a good 15 years before the standard control systems went to it.

Ian McPherson, research director of Wireless Data Research Group (www.wdrg.com), believes the advancement of standards, however, continues to drive wireless products to market and reduce the cost for users. "The users see wireless as a way to automate their processes more inexpensively," he says. "But they are being thorough. They need to know through customer experiences that the technology is mature, safe and secure. The vendors are the ones having to address that skepticism."

In terms of interaction of wireless industrial networks with other parts of the enterprise, Hrivnak and other experts say they don't expect significant challenges. "It's very similar to how many people have a cordless phone in their house," Hrivnak says. "Just like the cordless phone hasn't eliminated the telephone jack in your house or running the wire, with a cordless handset you can now roam over a little bit larger distance than you could with a corded phone."

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	2001	2006
Total Shipments (\$ in Millions):	\$109	\$752
Percent of Volume by Application:		
Remote Crane/Hoist Controls	20%	4%
Tank Level Monitoring*	18%	24%
Material Handling Monitoring & Control	16%	18%
Programming, Maintenance & Repair	15%	20%
Other	31%	34%

*Includes process and inventory tank monitoring in plants

The current wired networks at Cryovac are a mixture of Ethernet, ControlNet and direct-access remote systems. The one used is based on which one the company thinks will provide the best communications for the kinds of data collected and the connection distance, Byerley says.

A major part of the enterprise information/interface conflict at Cryovac involves wireless inventory devices already in operation at the plant and on roving lift trucks. "We don't have those problems when we put in wired devices," she says. "It's only a problem for the wireless devices."

Byerley says she expects to continue to standardize on DeviceNet for wireless sensor and machine control systems to prevent conflicts with wireless Ethernet connections in the plant. "I would love to do wireless on everything I could. But the plant engineers are not up to speed yet," she adds. "There is a lot of training involved."

Forbes says the IEEE and WiFi continue to drive wireless local area networks standards, but current work by the ZigBee Alliance (www.zigbee.org) for wireless sensors is expected to create a network protocol for low-power, low-data-rate monitoring and control products in the next year.

This, he says, is crucial for the development of many industrial devices that operate wirelessly on battery power. "If you want to have something that is active all the time, you've got to have some level of power activity all the time, and some level of radio transmission," he says.

Koninklijke Philips Electronics N.V. and several semiconductor manufacturers are among the companies driving the development of ZigBee standards, which are expected to be used in a number of industrial, consumer and home wire replacement areas, Forbes says.

Philip Burgert is an Oak Park, Ill., freelance writer who specializes in automation subjects. E-mail him at pburgert@pipeline.com.