



CMC News Analysis and Forecast

Is There A Wireless Future In Automation Systems?

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There is something almost magical in wireless communications that has already swept through telephone service and is progressing rapidly through the office LAN. So far, wireless data communications has had little impact on automation applications, although wireless telephony seems to be finding its way into the factory. Voice service (telephony) seems to be the way that all wireless finds its way to the mass market, but data communications has always used the telephony infrastructure to make its way into the home and business. Will this be the way that wireless data communications invades the factory?

A very strange thing happened in 1996 – the traffic volume for data communications passed the volume for voice communications and has grown exponentially ever since. About the same time, sales volume of cordless telephones passed wired telephones. Up until the end of the year 2000, data communications traffic was doubling every four months, mostly due to the rapid rise of the Internet. Then, the digital bubble burst and the rapid rise of data communications traffic slowed considerably, but did not shrink. Since data communications now greatly exceeds voice communications, it seems likely that future networks will be biased toward data service. However, voice traffic is far more demanding than data by requiring end-to-end delivery in less than 20 milliseconds. These latency problems are being addressed with revolutions in data communications architecture and the standards that are so necessary to enable both voice and data traffic. Wireless is only viewed as the last link in delivery of both voice and data in this architecture.

It's an old problem with wireless – there are too many standards, probably because the technology is still embryonic and standards tend to freeze technology prematurely. We can see this in both the voice and data architectures. GSM (Global Systems Mobile) was the wireless voice protocol adopted by all of Europe, the Middle East, and most of Asia as well. It has served well to greatly expand the use of wireless telephony, but now in 2002 it seems to have its own retirement in sight as 2.5 and 3G (Third Generation) wireless solutions are being implemented to serve the wireless data communications markets as well as voice. Many have criticized the US wireless telephony policy allowing competing technologies to contend for a share of the US wireless voice market, but it worked and produced the dominant technology for 3G CDMA (Code Division Multiple Access) a form of spread spectrum protocol. While the progress to full 3G wireless is being slowed for economic reasons and will still have some frequency assignment

problems preventing a single international standard, it will allow a single worldwide technology to be used for wireless voice and data.

Data communications is even more fractured than voice. While roaming access via 3G wireless will offer a messaging and handheld web connection, it will not be good enough for high speed computing. In fact, today's standard WiFi or IEEE 802.11b at 11 Mbps is showing its limits fueling interest in WiFi5 or IEEE 802.11a at 54 Mbps. A competing technology 802.11g at 22 Mbps with maybe up to 54 Mbps is probably too little, and too late in arrival, but should be watched. HomeRF appears to be too late as well and does not have any compatibility with other 802-based protocols.

This article would not be complete without mentioning wireless Personal Area Networks (PAN) such as Bluetooth and IEEE 802.15. These are intended to connect devices rather than to be true LANs, but they offer piconetworks as well. Bluetooth is just now emerging, but its limitations are still being discovered. The 802.15 networks were developed to resolve some of the problems of Bluetooth, but are not yet scheduled for market.

Where can we expect to find wireless in industrial automation? As prices for components fall due to volume in commercial applications, we can expect to find wireless connectivity in two primary application classes: highly mobile equipment and connection to remote I/O devices in retrofit installations where the cost of wired connections is very high. Mobile applications include overhead cranes, forklift trucks, rotating machinery, AGV (automated guided vehicle), and voice. Connection to remote I/O equipment will still need a source of power at the remote device, cannot travel long distances, but can greatly reduce installation cost in older factories or process plants.

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