

Cutting the Cord

Going wireless offers many benefits

We have seen many ways wireless can improve and make our lives easier. As we look around we surround ourselves with TV remotes, cordless phones for home, and cell phones when we are traveling about. Unfortunately, though, it seems that most chemical plants have turned a blind eye to this technology. Fortunately Eastman Chemical Company has not, as we have been applying wireless technology where it makes sense to cut costs and to make our employees more productive.

Wireless LANs

A wireless Local Area Network (LAN) using the IEEE standards is a very popular technology for providing Ethernet connectivity without the cost and hassle of wires. There are several variations of 802.11 technologies. The pervasive “B” standard gives 11 mbs of speed over a range of about 150 ft. in an office area or 500 ft. in a typical warehouse or outdoor rail yard area. There is an “A” standard that is faster, at 54 mbs, but rarely is the Ethernet link the bottleneck in overall system performance. The range of 802.11a is about half that of 802.11b, and it costs more, so there is little reason in my opinion to use this version of the technology. There is a “G” version of the standard that is also 54 mbs and has the same range and frequency of 802.11b. While there can be some benefit in an office area in which there are many mobile users, there is little need for the extra speed in a control room or warehousing area. Because most 802.1g systems interoperate with 802.11b if the costs are close, you could hedge your bets with this technology. But if you do, check for 802.11b interoperability as more than 90% of several million wireless LAN cards are 802.11b.

I use wireless at home. With prices typically less than \$80 for a combination four-port hub, router, and wireless access point, it is rarely worth the trouble to run Ethernet wires. While the home access points are inexpensive, the range is only about 50 ft., and can be less if you are trying to transmit through a block wall or have metal lathing in your home. For me, wireless has made working at home tolerable. Now I can sit with my family without stringing wires across the floor or outside on the patio. With my set-up, I can quickly go from home to work to my local Internet café and enjoy a high-speed connection without a reboot. My laptop automatically detects the wireless access point and all I need to do when I’m away from work is start Eastman’s VPN (Virtual Private Network) software for a secure connection to the office.

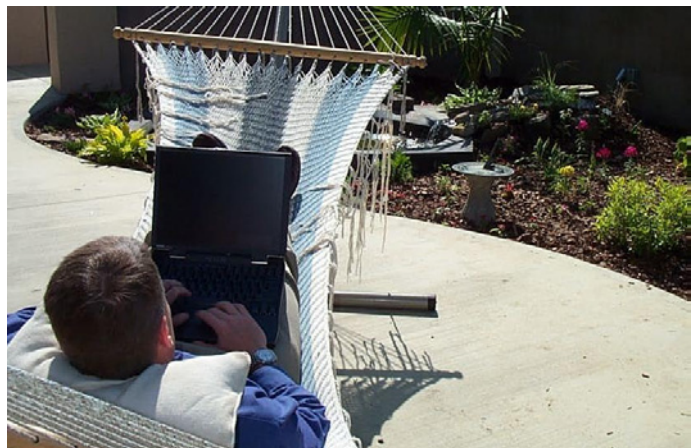


Figure 1- Wireless LAN makes working at home better.

When traveling, wireless is big help in staying connected. Our local airport has free wireless access, so in the “unlikely” event your plane is delayed, you can boot up your laptop and have a high-speed connection from anywhere in the terminal. Many airports have free or low-cost wireless access available. Nationwide there are more than 40,000 wireless hotspots that all give 10 times the speed of a dialup connection.

Eastman has installed hundreds of wireless access points in office areas around the world. When I visit another plant site, all I need is an empty cubicle or office. With my wireless laptop and cell phone, the new office is ready for business in less than a minute. By installing wireless in most offices, we have seen additional benefits, such as improved collaboration. It is so easy to pick up your laptop and move to a co-worker’s office to work on a problem. With so many files and data on the network, the instant access allows us to quickly show and share our findings. Wireless access is also very handy on days you spend much of your time going from one meeting to another. On those days wireless helps greatly as a meeting frequently ends a little early and I will open my laptop for a few minutes of additional work.

Eastman has applied the benefits of wireless LAN technology in our warehouses. Eastman partnered with Symbol Technologies to bring an iSafe version of their popular PDT8146 to market. This handheld terminal (HHT) runs Microsoft’s Pocket PC OS and has a built-in bar code scanner and wireless LAN. We have written an interface directly into SAP so operators on the warehouse floor can perform inventory movements, receipts and shipments real time. This has improved accuracy and timeliness and has reduced labor as we no longer track changes on log sheets to be retyped into SAP.



A final area in which we have seen savings with wireless LANs is in our rotational analysis group. If a large piece of equipment is out of balance, it can really drive up maintenance costs. Eastman has a test machine that mechanics take to the field that connects many accelerometers on a piece of problem equipment to measure and pinpoint vibrations. This test equipment needs an Ethernet connection, and there is rarely one nearby in the plant. It would take weeks and a lot of labor to run Ethernet for this test instrument, greatly adding to the cost. We plug in a temporary wireless access point and a wireless bridge and can put the instrument in most any location in a matter of hours, rather than weeks. The wireless setup of off-the-shelf parts paid for itself in the first installation.

Security

One area of wireless technology that has seen a lot of misinformation is in security. The majority of security breaches are due to people installing a wireless LAN and never turning on security. If you enable WEP (Wired Equivalent Privacy) security, it is very difficult to break. Even basic home systems now allow you to use WEP and to turn off the broadcast of the SSID (Server Set ID or name you give your access point). Just look under the security section of the manual or online help. Technically WEP can be broken, but it is not easy to do. You need a server with 4 GB of main memory running on Lynx and need to collect 500,000 packets between one laptop and one access point. To collect this in the real world is next to impossible. Those companies that want a higher level of security can run something like Cisco’s LEAP or place their wireless LAN outside the base network and use VPN software to gain access.

Wireless WAN

I used to say that cellular wide area networks (WANs) did not work for chemical companies because the cellular companies placed their towers and new technology in the population centers, while chemical companies tend to build their plants away from the population centers. Fortunately, we have found that is no longer the case. The major cellular companies have now built out their networks so they reach most everywhere in the United States, including most chemical plant sites.

I take advantage of this in two ways. The new Treo 600 PDA/Phone gives me one small convenient device that is not only a great phone but will wirelessly synchronize e-mail, calendar, contacts, notes, and tasks. This summer when I took the Scouts on a traveling summer camp, I got up a few minutes before it was time to wake the boys. During that time, I was able to address any critical needs at work. When I arrived at the office after my week off, 85% of my e-mail was already answered and deleted, making the return far less hectic. We use Pylon software from iAnywhere to synchronize with MS Exchange at Eastman.

For more serious work with a laptop, we use Sprint's wireless data cards to give dial-up performance from almost anywhere your cell phone works. This is great for our sales force or managers on the road because they can look up customer information just prior to a meeting. Data can be synchronized while they travel, saving considerable amounts of time. Within two years the wireless networks will probably approach DSL speeds, providing both great coverage and speed from nearly anywhere in the United States.



Figure 2 - Wireless e-mail on the go.

Wireless Sensors

Another promising area for wireless is in plant automation, starting with sensors. Honeywell has just released a new line of wireless sensors. The XYR 5000 line enables automated monitoring of variables in areas where traditional hard-wired transmitters are too costly, difficult, or time-consuming to implement.

The wireless sensors include monitoring gauge pressure, absolute pressure, temperature, and ultrasonic noise (for detecting steam and gas leaks). The devices also include an analog input interface for transmitting standard 4-20 mA devices. These devices completely cut the cord as they are battery operated and are designed to last three years or more on a battery.

The instruments wirelessly transmit measurements up to 2000 ft. to a base radio connected to a control system or data acquisition device. Each base radio accepts the signals of up to 50 transmitters. The base radio provides Modbus or 4-20 mA analog signal output for flexible communications.

Eastman has begun field trials of wireless sensors, and so far they have worked well. They reduce the installation cost and time compared to traditional wired sensors.

Wireless technology is all around us and offers us many benefits. The prices for most wireless technologies have dropped so much that it pays to keep an eye on the technology, if not for work then at least at home with an inexpensive wireless access point. But if you go wireless, spend a few extra minutes to turn on basic security to ensure your system is safe and secure.

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