

Cable on the Run



Industry is going wireless. But how are the various technologies being used? By **Antony Adshead**.

Cable is on the retreat. In almost every data application, one form of wireless networking or another is supplanting copper and fibre, whether in the last few metres with personal area networks or in the 'last mile' with WiMax.

The key technology areas – mobile phone networks, wireless lan and short range, low bandwidth methods of transmission such as Zigbee – are becoming pervasive. So, what levels of adoption are they achieving and what are their chief uses in industry?

Mobile 'phone based remote monitoring and control benefits from wide areas of coverage and bandwidth ranging

from a few kbit/s on GSM networks to a few Mbit/s with 3G. In many applications, sheer bandwidth is not necessary and effective monitoring and control networks have been built which capitalise on mobile networks' ability to cover wide areas of the countryside.

British Waterways, for example, has used Vodafone's GPRS network to monitor flow rates, pumps and water levels on 2000 miles of rivers and canals. Where previously staff had to manually check often remote locations, data is now polled in seconds using sensors connected to modems which transmit to the organisation's SCADA centres where key

details are shown on a geographical information system.

Elsewhere, industrial and medical gases supplier Cryoservice has connected 30 of its delivery and engineering staff to back end applications using O2's GPRS network and XDA II PDAs supplied by Handheld PCs. This allows real time tracking of deliveries and work assignments, proof of delivery and stock control via flyingSpark field services software which is also linked to satnav on the PDA.

Neil Grimshaw, CryoService's financial controller, says: "By automating many of the tasks the engineers previously had to do manually, such as



timesheet recording and reporting back to head office, the solution has created a 20% to 30% time saving."

Wireless lan technologies come into their own when the requirement is for less range, but more bandwidth. And the technology has seen high rates of adoption in warehouse applications.

Angelo Lamme, EMEA wireless product manager for Symbol, points out the benefits of WiFi to industrial users. "Wireless networking can be, and is being, used in any industry where mobility is essential to the business," he says. "Specific industries are suited to the use of wireless. For example, it is much easier to realise the benefits of wireless networking if you operate in the transportation and logistics, manufacturing, or retail sectors, where WiFi can be used to trace goods and maintain control over inventory with a very clear return on investment. These sectors have seen the largest increase in uptake of wireless lan technology."

One user of WiFi in the warehouse is Shrewsbury based pressing manufacturer Stadco, where voice activated warehousing systems are used for a Jaguar contract. Instead of keyboard or barcode driven systems, it uses Voiteq voice control systems in which a wireless control processor is worn on a waist belt, connected to headphone and microphone. Instructions generated by manufacturing and warehousing software direct the operator and ask for a response, for example, telling the operator to go to location X to collect a stillage, then prompting a response to confirm that action.

Group systems manager David Lloyd said the system produced near perfect accuracy and slashed operator working times. "It is amazingly accurate," he says. "It takes 15 to 20 minutes to train operators in the system and it is then 99.9% accurate. In any stock control system, the keyword is accuracy. The only way this can fail is if the operator puts in the wrong information, but even then everything is recorded so there is an audit trail."

Building on WiFi is Wimax, or IEEE 802.16. At the early stages of adoption, it offers the potential to replace copper in the last mile and to support up to 75Mbit/s

over tens of miles. In a few cases, entire cities have achieved WiMax coverage.

Another new kid on the wireless block is Zigbee. Based on the IEEE 802.15.4 standard, access to the specifications is controlled by the Zigbee Alliance. The key benefits are cheapness, simplicity and long battery life when compared with similar personal area network technologies, such as Bluetooth. Transmission range is up to 75m, bandwidth is up to 250kbit/s and nodes can be arranged in star, peer to peer or mesh topologies. The ability for Zigbee units to form mesh networks is seen as a key advantage, because that configuration can reroute should one node go down.



Expectations for Zigbee are high. Market research company Harbor Research says that, by 2008, there will be 100million wireless sensors in use, up from about 200,000 today. The worldwide market for wireless sensor networks, it says, will grow from \$100m in 2005 to more than \$1billion by 2009.

Although expectations are high, we are still at the early stages of adoption, says Tony Lucido, VP of marketing with fabless semiconductor company Jennic, which develops Zigbee microcontrollers.

"Last year was the year of technical evaluation; this is the year of product development," he says. "Zigbee's primary advantage is that it is standards based and

ideally suited to low data rate and long battery life. Bluetooth, for example, has a battery life of 100hr, whilst Zigbee has battery life of one or two years. Installation costs are quite low compared to wired technologies where you are dealing with many units."

Zigbee is particularly suited to building automation and to control and monitoring applications in industrial, medical and residential environments. A lot of attention is being placed on development of Zigbee based wireless light switches, blind and window shade controls, thermostats, home security devices, consumer electronics remote controls and medical sensors.

Although it's early days, there are some industrial Zigbee implementations. In Turkey, for example, a Hugo Boss textiles plant has automated its stock control and production monitoring using RC2200 Zigbee modules from Norwegian Radiocrafts. Zigbee modules – which have a form factor of 16.5 x 35.6mm – are attached to batches of clothing and fixed nodes at sewing and pressing machines register their presence at that stage of production. Management can track order status and productivity, whilst operators can receive instructions

instantly. Plans are afoot to capture maintenance and quality data for display on large panels in production areas.

In general, though, Zigbee has yet to gain traction in the mainstream, says John Corbett, sales director with systems supplier Ember.

"It has been gaining ground in the past year or two, but we are still in the early adoption phase. Many people are still sitting on the fence to see how things go."

Lucido thinks many will be getting off the fence soon. "In one or two years, we'll see a plethora of Zigbee compliant products coming to market and be surprised by the range – from domestic control of heating, lights and burglar alarms to industrial locations with 1000 nodes using the same underlying technology," he says. 