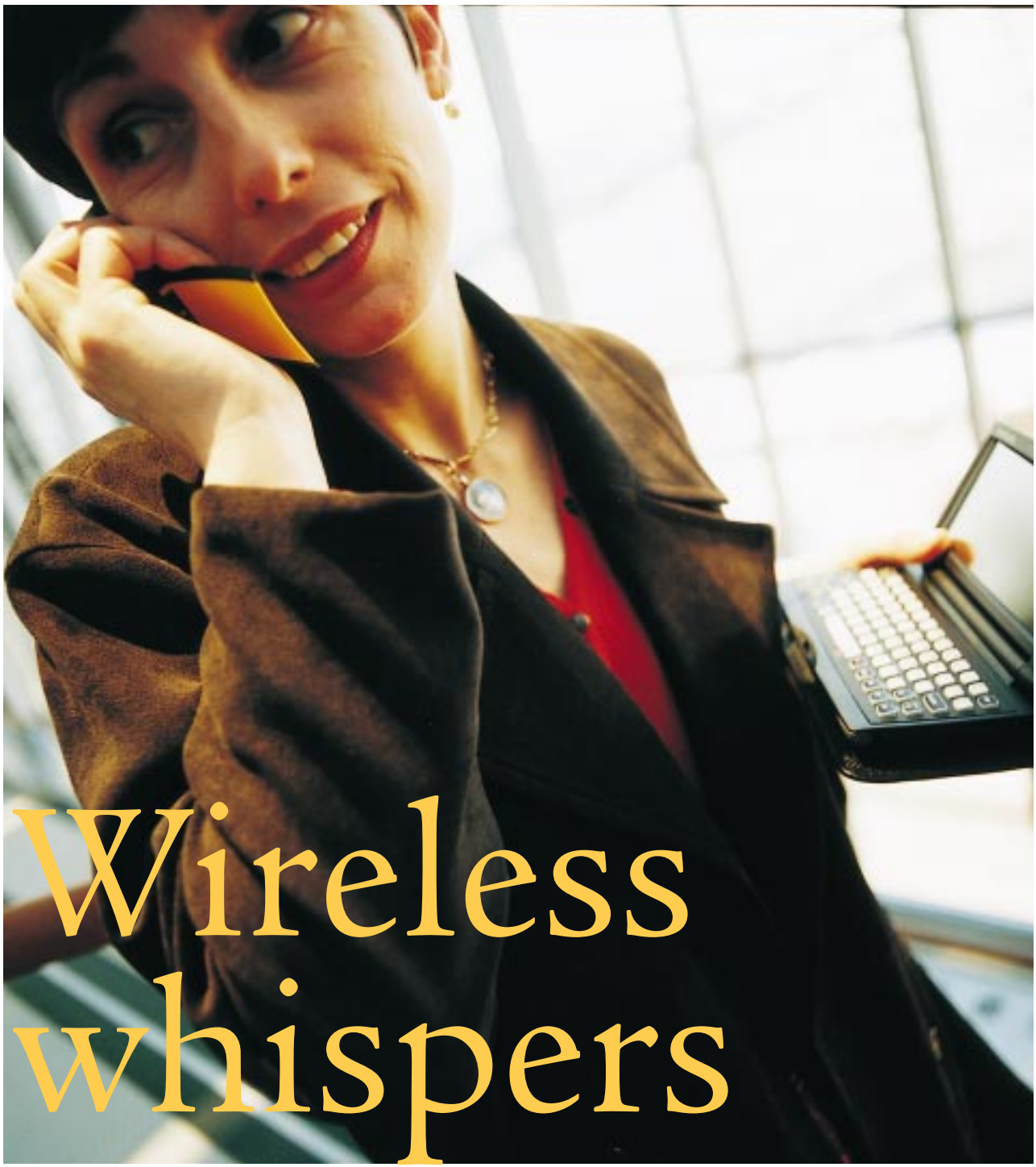

Wireless whispers

WIRELESS COMMUNICATION HAS, IN THE PAST, EXCLUDED THE TRANSFER OF DATA. TONY DENNIS LOOKS AT DEVELOPMENTS IN WIRELESS DATA TECHNOLOGY AND AT HOW TODAY'S PRODUCTS COULD BE AFFECTED.

Using wireless technology to provide data connectivity has long been a dream in the IT industry. Now, almost 20 years after 3Com shipped the first Ethernet NIC (network interface card), the PC world is at last treating wireless data seriously. Initially, it was infra-red technology which enjoyed a groundswell of support as the wireless technology of choice. More recently, though, it has been radio-based products

(for device-to-device, LAN and WAN links) which have begun to grab the headlines. Crucially, it is the not the IT world but the mobile telecomms industry which is taking the lead here. A new wireless data interface standard called Bluetooth has garnered support not only from IT stalwarts like IBM, Toshiba and Intel but also from handset manufacturers Ericsson, Motorola and Nokia. Infra-red could be in imminent danger of becoming a has-been technology.

The history of wireless data

When it comes to providing publicly accessible data over wireless services, there are two schools of thought: one believes that data is entirely separate from the provision of voice telephony and therefore merits its own standalone wireless network; the other questions the need to build a separate, data-only, wireless network. With the arrival of third-generation mobile phone networks, the distinction between voice and data will have blurred completely.

IMT 2000 (International Mobile Telecommunications 2000) is the ITU's (International Telecommunications Union) standard which should provide such integrated networks by 2002. Or even sooner, as the Japanese are rapidly running out of conventional airspace with their networks and are fast approaching fully commercial services.

The catch is that there are at least three proposed technologies for IMT 2000: W-CDMA; cdgmaOne 2000; and UWC-2000 (*see panel, right*). The differences between today's second generation digital mobile networks and IMT-2000 are similar to the difference between the ISDN and fixed analogue networks. With IMT-2000 there will be improvements in coverage, capacity and voice quality, but the biggest change is that IMT-2000 is designed from the bottom up to support data. In fact, IMT-2000 will offer no fewer than three data rates: 144Kbit/sec (for those travelling in cars and trains), 384Kbit/sec (for those walking around) and 2Mbit/sec (for those who are stationary).

In Europe, the most obvious body to set the pace for IMT-2000 is the ETSI (European Telecommunication Standardisation Institute), the same organisation which gave us GSM (Global System for Mobile communications) in all its current guises. In the UK, Orange and One2One offer GSM 1800MHz, while Cellnet and Vodafone currently offer GSM 900MHz but will soon also offer 1800MHz. The ETSI has its own set of third generation proposals which are defined in the UMTS (Universal Mobile Telecommunications System). And, the ETSI has picked a technology known as Wideband CDMA (W-CDMA) for UMTS which has become its candidate for IMT-2000.

At present, commercial data-only networks still thrive in the UK. For example, there's Cognito, a British firm whose network uses proprietary protocols and its own bespoke wireless terminals rather than portable PCs. Then there's RAM Mobile Data, which is built around the Mobitex protocol from Ericsson. Additionally there is Paknet, which is effectively an X.25 wireless packet network run by Vodafone. Alternatively, a police force or utility company, say, could build its own data network using PMR (Private Mobile Radio) but it would be restricted to a given geographical area.

As the original UK mobile phone networks operated by Cellnet and Vodafone were analogue, it was feasible to use existing modem technology. The drawback is that while travelling you move from one cell into another. The technical term for successfully swapping over from cell to cell is a "hand-off" — something which plays havoc with a traditional modem's carrier signal. The picture improved enormously with the introduction of digital wireless networks in 1994 which conformed to a GSM standard set by ETSI.

The differences were enormous. With GSM mobile, manufacturers were faced with one network which originally encompassed the EC but quickly became a global standard. Not only did this mean you could "roam" with your mobile phone, but it also meant that the number of data-compatible handsets rose sharply. Outside of GSM, only the Japanese have a substantial market for data over digital networks. To date, the USA has stuck with CDPD (Cellular Digital Packet Data) over analogue.

The Japanese are RAPIDLY RUNNING OUT OF CONVENTIONAL AIRSPACE with their networks and are fast approaching fully commercial services

GSM data adapters

The existence of a global market for GSM created a new product; the PC Card GSM data adapter, as launched initially by Nokia. Competition in this area soon heated up with the main manufacturers being modem suppliers such as ComOne (France), Option (Belgium), Psion Dacom (UK) and TDK Grey Cell (UK/Japan) plus new entrants like Smart Modular and Xircom of

IMT 2000

The ITU's standard for mobile networks for the year 2000 and beyond. The current favourites for adoption are W-CDMA (Wideband CDMA) favoured by Europe and the Japanese; cdmaOne 2000 (a variant of CDMA) used mainly in North America and Korea; and UWC-2000 (a variant of TDMA) used mainly in the Americas.

the USA. Then, of course, there's Motorola Communicate, Ericsson and Nokia. Rivalry has resulted in each supplier trying to squeeze more functionality on to a single PC Card, so in addition to GSM data, these PC Cards offer ISDN, modem, fax and ethernet (100 or 10Mbit/sec) interfaces in various combinations.

As soon as a mobile call comes in, THE MUSIC IS CUT AND THE CALLER IS HEARD OVER THE CAR'S SPEAKERS, regardless of the type of mobile network

Currently, each new data-enabled handset requires a different connecting cable. For example, there are four different cables for the Nokia handsets alone. A pain in the proverbial for manufacturer and user alike.

Wireless connections

A solution to the connecting-cable problem is to go wireless. In fact, the longest established wireless data interface was agreed in June 1994 by the Infrared Data Association (IrDA). What IrDA gave the IT world was the serial IR (infra-red) protocol which is a half-duplex protocol running at a maximum of 115.2Kbit/sec. One of its chief backers is Hewlett-Packard so, in effect, serial IR works much like a wireless printer cable! Except, of course, that IrDA now has a very impressive installed base and claims more than 40 million IrDA-enabled devices including LAN adapters, PDAs, cameras and laser printers. Another advantage is that IrDA is implemented in virtually all of the leading operating systems like Windows 95/98, CE, Mac and Geoworks. Consequently, handset manufacturers such as Ericsson and Nokia have begun to build an IrDA-compatible infra-red interface into their handsets. Initially, the infra-red link was used only to access the handset's address book, but Ericsson in particular, with its latest SH888 model, has built a GSM data modem into the handset, which is accessible via infra-red. This was one reason why Ericsson launched its MC12 CE-compatible handheld as a companion to such handsets.

▼POSTCARDS FROM THE CUTTING EDGE CAN BE PRODUCED USING BLUETOOTH-ENABLED TECHNOLOGY

The Bluetooth initiative

There are disadvantages to infra-red, however, one of which being that there are incompatible "flavours" of IrDA caused by the way manufacturers have implemented the standard. Which is why a new (May '98) initiative called Bluetooth, backed by Motorola, Nokia and Ericsson, has been greeted so warmly. It provides for radio-based wireless connections between mobile computers and mobile phones.

Bluetooth will operate in the unlicensed ISM (Industrial Scientific and Medical) 2.45GHz region. Essentially, it is the same kind of radio technology that has given us wireless door chimes and automatic garage door openers. Bluetooth draws heavily on existing wireless LAN technology since it is based around the IEEE's 802.11 (the existing standard for wireless ethernet). The main differences are that in order to consume less power, Bluetooth is restricted to just 10m (40ft) and presently runs at approximately 1Mbit/sec but plans to offer 2Mbit/sec, like 802.11. Its chief advantage over infra-red is that Bluetooth does not require line of sight, so you can have your Bluetooth-enabled handset in your jacket pocket happily communicating with the Bluetooth-enabled PDA in your briefcase.

The technology will work much like cordless home phone handsets where there are transceivers (portable devices) and base stations. You will be able to operate between eight and ten devices within the same cell, with seven offering data services and three offering voice comms. The catch is that an individual Bluetooth device

▶BLUETOOTH ENABLES CORDLESS COMMUNICATION ON THE MOVE, WHEREVER YOU MAY BE

will actually enjoy an asymmetric data connection, totally 721Kbit/sec with the "up" channel running at 56Kbit/sec.

The most unusual aspect to Bluetooth is that immediately two compliant devices recognise each other, they will try to synchronise their databases. But how will Bluetooth manifest itself in product form? The most likely application for it is in a combined car music centre and hands-free kit. Such devices are already available to fit luxury cars such as Porsches and link to popular GSM handsets from the likes of Nokia and Motorola. As soon as a mobile call comes in, the music is cut and the caller is heard over the car's stereo speakers. The massive difference Bluetooth will make is that such products can be sold into all markets (the type of mobile telephone network involved will be irrelevant) and Bluetooth will enable the same car centre to function with all leading handset brands rather than one specific model, as is presently the case.

From an IT perspective, the unit's LCD screen can be employed to display mobile data which can take a number of forms. One benefit is that the LCD will utilise CLI (Calling Line Identity) to show the caller's name. But it can also be used to show short text messages, as with GSM's short message service facility. These messages could take the form of traffic updates, email messages or even advertisements. For example, as you travel along the M4, a little message could pop up with the welcome news that there's a burger restaurant available at the next exit.

This LCD approach has already been taken by Italtel. It makes a GSM handset which looks like a car radio, with a big difference being that you have to take your SIM (subscriber identity module) card out of your existing handset and pop it into the unit, just as if you were inserting a music CD. Bluetooth proponents view the standard's main advantage as being its automatic synchronisation facility. As soon as two Bluetooth devices detect each other's presence, they attempt to swap data. At a basic level this would take the form of a wireless exchange of personal details between two business users. However, Ericsson has shown a product demonstration whereby the synchronisation is used to swap PIM-style information between two intelligent devices.

The most likely application for Bluetooth is in a combined CAR MUSIC CENTRE AND HANDS-FREE KIT. Such devices are already available for luxury cars

In Ericsson's case, the demonstration involved swapping data between its MC12-based CE handheld and a custom watch. Although a fairly chunky device, it closely resembled a Rolodex Rex (the PC Card PDA) but in watch style. The important point here is that manufacturers could take advantage of Bluetooth's

IrMC

Believe it or not, IrDA has a direct equivalent to Bluetooth in the shape of IrMC (Infra-red Mobile Communications standard). This is designed to provide the means to synchronise a number of portable applications such as business cards, calendars, telephone address books, etc. And, IrDA's backers include 150 companies such as Ericsson, Motorola, Nokia, IBM and Toshiba. The drawback is that serial IR is relatively slow for today's requirements — it was designed before the IT world went "internet-for-all-purposes".

Wireless data technology

▶ THE MOTOROLA CELLECT PROVIDES LANDLINE PSTN AND GSM CELLULAR CAPABILITY WHEN USED WITH MOTOROLA CELLULAR HANDSETS

synchronisation capabilities to ensure that the user only has to alter a telephone number once, and that change will be made in both the user's mobile handset and in the PDA or, alternatively, desktop PC.

There have also been suggestions that Bluetooth might be deployed to provide internet access in the home. At present, DECT (Digital European Cordless Telecommunication) is rapidly becoming the established standard for cordless handsets in the home, but its data carrying capability (about 115.2Kbit/sec) is viewed as too slow to provide high-speed net access. By contrast, with a potential of at least 721Kbit/sec, Bluetooth seems to offer greater potential in this area. All it would require is a Bluetooth-enabled base station to be attached to a fixed line (ISDN, cable, or ADSL modem) and the user could surf the net wirelessly.

Bluetooth

Bluetooth will operate in the unlicensed ISM (Industrial Scientific and Medical) 2.45GHz region and is based around the IEEE's 802.11 standard for wireless ethernet. It is limited in range to 10m (40ft) and presently runs at approximately 1Mbit/sec but plans to offer 2Mbit/sec soon.

Symbian

Another intriguing development in this whole wireless data area is Symbian, a joint venture between Psion Software, Nokia, Ericsson and Motorola (expected to buy-in soon). The aim is to push Psion's EPOC32 as the operating system for future data-capable mobile devices. As EPOC32 requires low power and is compatible with RISC chips like the StrongARM, it will mean one processor can handle all the functionality of a GSM handset plus a PDA, in sharp contrast to Nokia's 9000 Communicator which at present uses two separate chips. Symbian anticipates that intelligent mobile devices will be like present-generation handsets with touchscreens, or clamshell handsets like the Samsung SCS200 or the Nokia Communicator. The alternative will be PDAs based on Windows CE or the 3Com Pilot with GSM/IMT 2000 capabilities added.

Conclusion

By mid-1999, Bluetooth should be readily available. Its backers hope the component costs will be so low that Bluetooth will have the capability to replace infra-red. It certainly has clear advantages. One possibility is that just as USB is only gradually replacing serial and parallel ports, infra-red will continue to be supported for purposes of backwards compatibility. Toshiba, for instance, has admitted that there should be sufficient "real-estate" on a portable's motherboard for Bluetooth and IrDA ports to happily co-exist.

The real struggle centres around the user's lifestyle. The market will probably split in two. There will be those whose desire is basically for a swish mobile phone and who will only acquire a product with modest computing power such as a built-in web browser: these people will be perfectly happy with Symbian-style mobile phones. However, those whose main preference is for a portable computer and who want to be in touch while in transit will almost certainly go for a PDA with a mobile phone built in. You can, in fact, almost achieve this objective today. Nokia, Motorola Communicate and Compaq offer a GSM handset in PC Card format which slots inside your PDA. The only trouble is that it drains the battery fast!

PCW CONTACTS

Bluetooth **www.bluetooth.com**
Com One **www.com1.fr**
Compaq **www.compaq.co.uk**
Ericsson **www.ericsson.se**
Geofox **www.geofox.com**
Infra-red Association **www.irda.org**
Motorola Communicate **www.communicate.co.uk**
Motorola **www.motorola.com**
Nokia **www.nokia.com**
Option International **www.option.com**
Psion Dacom **www.psiondacom.com**
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