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# Technology

## Bluetooth Sinks In

BY KIM KOMANDO

Wireless communication has huge potential. In a world where science fiction and reality are beginning to merge at an alarming rate, the future of wireless may be truly fantastical.



We've had cellular phones for years and cellular modems for nearly as long, and now a number of companies are pushing wireless Internet access via cellular technology or PCS. But when it comes down to it, all this is just the tip of a giant, multimillion-dollar, psychedelic iceberg.

### The Way We Are

In its current state, wireless communication is primarily used to connect remote devices—such as your Windows CE handheld—to some larger computer or network. But what about exchanging data directly between two remote devices?

And furthermore, how about interoperability? Sure, you can exchange information between two Windows CE handhelds using their infrared (IR) ports (which have their own limitations), but what if you need to exchange information between Windows CE handhelds and Apple/iBook

### Introducing Bluetooth

Cut to May 1998. That month, five telecommunications giants—Ericsson, IBM, Intel, Nokia and Toshiba—got together to form the Bluetooth Special Interest Group (SIG). The original goal of Bluetooth was to provide easier connections between mobile computers and

mobile phones. In the short time since, more than 850 companies have joined the group, and the scope of the project has broadened considerably. Today, the Bluetooth specification is poised to become a global standard for wireless communication.

The basic concept behind Bluetooth is simple: Provide short-range wireless communications using the 2.4-GHz RF (radio frequency) band. The group released version 1.0 of its specification, with enough information

for manufacturers to develop real products, last July, and two amendments to the specification were put into effect in October. Other amendments and modifications are expected before any products hit the market.

Although the specification is close to being finalized, don't expect products to be released any time soon. Like many good—and complicated—high-tech products, it'll take some time. One obstacle to Bluetooth-enabled products is that each one must be independently certified as Bluetooth compliant. This means testing programs will have to be developed by independent labs after a final specification is published and before products are released. This was all expected to take place early this year. Remember, "expected" is the key word here.

### Connecting People

One of the most obvious benefits of Bluetooth is that information can be shared between wireless devices. In this respect, Bluetooth offers several important advantages over

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their infrared (IR) ports (which have their own limitations), but what

of sight" between the two devices, and also requires them to be relatively close. With Bluetooth, two people could conceivably exchange data from across the room. Imagine the benefits this could have in a conference or even a courtroom setting. And for fun's sake, think about a high school classroom. No more messy, origami-like folded notes being thrown back and forth.

Of course, this does raise some security concerns. If I can send data to you on the other side of the room, what's to keep some third party from intercepting that data? Fortunately, Bluetooth has this situation covered. The technology is designed to switch among 79 different channels at the rate of 1600 hops per second. That means intercepting the data would be fairly difficult. Beyond that, the Bluetooth specification also calls for 40-bit or 64-bit data encryption. While this level of encryption can hardly be called industrial strength, I believe it's more than adequate for the types of situations you're likely to encounter in these settings.

Finally, Bluetooth devices can automatically adjust their transmission ranges to the appropriate levels. That means that if you're communicating with another device that's 10 ft. away, you can't be intercepted by a device that's, say, 15 ft. away.

### Fast, No-Hassle Connections

Perhaps you've seen Internet-enabled pay phones in an airport. They look like regular pay phones, except they have a phone jack where you can plug in your modem. These things are great—until you find yourself stuck behind somebody who wants to research prices, availability and colors for every SUV on the market.

But what if you only had to get near the Internet access point instead of actually plugging into it? With a Bluetooth-enabled Internet station at the airport, a large number of people could jack into the Net at the same time, with no waiting required.

With data transfer rates of 1Mbps, Bluetooth is considerably slower than the 10Mbps of even the slowest Ethernet network. However, it's substantially faster than both wireless and standard modem connections.

This translates to less time online at the airport. If you've used one of those home-networking packages that connects two computers through existing phone wiring, you've already experienced a 1Mbps data connection. It's not great, but it's not horrid either.

### Pay Up, Buddy

Few people would argue with the notion

"Micropayment" typically refers to e-transactions of \$10 or less—transactions that don't make much economic sense in the current "bill my credit card" state of e-commerce. However, once a viable micropayment solution is developed, Bluetooth could become the enabling technology that makes it all come together.

For example, picture yourself in a busy downtown area. You pull into a metered parking space, but you don't have any change handy. If that happened today, you'd have to give up the space and plunk down \$5 or more at a private lot.

On the other hand, a year or two from now, that parking meter could be Bluetooth-enabled. All you'd have to do is whip out your Bluetooth-enabled Palm VII filled with e-cash and wirelessly "insert" some cybercoins.

### Not The Only Game In Town

The Bluetooth SIG isn't the only group working on ways to link us all together digitally.

For example, earlier this year, The Massachusetts Institute of Technology unveiled a \$40 million research project called Oxygen.

The Oxygen project has three major hardware components. The first is a portable unit called a Handy21 that has a high-contrast screen, a digital camera, a GPS module and more. Handy21 can be used as a phone, a two-way radio, a television, a pager, a handheld computer or a pointing device—it's the ultimate PDA.

The Enviro21 is the nonportable big brother of the Handy21. It can do many of the same things as the Handy21, plus it can be used for more complex tasks, such as home automation. The final hardware piece is N21, a proposed network for connecting all these Oxygen devices.

Another key component of the Oxygen project is its focus on speech technology. In the perfect Oxygen-enabled world, you talk to your Handy21, for example, just like you were talking to a human assistant. The only difference is that the Handy21 carries out your requests without ever asking for a day off or whining about raises.

Remember, though, to take all this with a grain of salt. It's cool, yes, but it's not just



Bluetooth had its own pavilion at Comdex '99.