

## ***USAToday***

### **Wearing your computer on your sleeve**

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By Leslie Miller

MCLEAN, Va. - To the visionaries in the fringe field of wearable computers, the future's so bright, you gotta wear shades — preferably customized with tiny PC screens and miniature video cameras.

Wearable computers may sound like science fiction. But in a world where more and more of us carry laptops and cellphones, the next logical step is outfitting ourselves to be connected constantly. That means PCs small and light enough to wear like clothes or accessories.

That's the promise of wearable PCs, as well as the vision that inspires proponents who exhibited a range of products last week at the Fifth International Conference on Wearable Computing here.

Interest appears to be skyrocketing. At the first conference four years ago, about 80 people attended, but this year 700 came from 34 countries, says Edward Newman, president of Xybernaut, a 10-year-old Fairfax, Va., company that has become an industry leader.

Now the big boys are getting interested: Xybernaut just announced partnerships with IBM and Texas Instruments for its next products, due in September. "Now we have notebooks; this is something that's even more portable," IBM's George Tatomyr says.

Xybernaut's current model is a \$5,000-\$6,000 system called the Mobile Assistant IV, mostly sold for workplace uses such as aircraft maintenance, manufacturing and other industries in which workers need access to information like repair manuals but also need their hands free. The unit comes with a battery-powered central computer weighing less than 2 pounds; it clips onto a vest or belt and has a choice of displays. There's a voice-controlled, 1.1-inch head-mount display with an optional miniature video camera or a palm-size color touch-screen that straps onto the arm. A mini-keyboard also is available.

Conference attendees - entrepreneurs, engineers, academics and a few would-be cyborgs - came to listen to 70 speakers and get a glimpse of a future in which many believe computers will be perpetually before our eyes, mediating our view of the world.

"The notion of being disconnected is foreign to me," says Steve Mann, 37, a computer engineering professor at the University of Toronto and a one-man

demonstration project for wearable computers - he has been living in prototypes for 20 years. (When his wife met him, he already was "a cyborg," he notes; now she advises him remotely when he buys groceries.)

Mann, who inspired the Wearable Computer Project at MIT, wears his computer almost everywhere - "to weddings, dinners, shopping and just standing in line," he says. "Twenty years ago, people crossed the street to avoid me. Now I can't even get to a meeting on time because I'm swarmed" with people who want a look.

These days, his system is relatively unobtrusive; his miniaturized headset is built into glasses or sunglasses, and wires are hidden by his hair. But that wasn't always the case: A 1980 photo on his Web site shows Mann sporting a helmet with a huge antenna like something out of an episode of *My Favorite Martian*.

He's often asked if his inventions were inspired by pop-culture icons like the cybernetic Borg of *Star Trek*. But Mann seems somewhat offended; he is inspired by science, not sci-fi, he says. "Too much of our generation watches too much science-fiction fluff on TV. I think they should be reading philosophy and science."

The computer he wore at the conference had a processor in a small fanny pack at his waist and ordinary-looking, if somewhat geeky, eyeglasses sprouting a quizzical lump of duct tape above one eye. The glasses are far from ordinary, however: They're customized with a miniature laser light source that shines into the eye, allowing it to function as both a video display and a camera. He says this EyeTap technology has many uses, from helping the visually impaired to newsgathering. Students in his "Personal Cybernetics" course (known as a "school for cyborgs") use both wearable computers and EyeTap technology.

Broadcast journalism is one area in which wearable computers hold great promise, says Kevin Sites of California Polytechnic State University, San Luis Obispo, a former ABC and NBC news producer who has had to transport cameras, lights, sound equipment and crews across the globe to cover news. "It's ludicrous in a war zone or disaster" and costs \$10,000 to \$50,000 a day, he says. "We must be able to travel faster and lighter."

Wearable computers would allow a TV correspondent to write, shoot and edit stories from the field unassisted. TV reporters can "be freed by technology, rather than handicapped by it."

Other uses abound. Language translation software from Munich-based Linguattec can turn a wearable PC into a *Star Trek*-like universal translator, and medical software from Nasiff Associates of Syracuse, N.Y., "can transform any PC into a multidagnostic workstation" for doctors, Roger Nasiff says. It's Food and Drug Administration-approved for PCs, including Xybernaut's.

Corinna Lathan, a biomedical engineering professor at Catholic University in Washington, D.C., has started AnthroTronix, which makes wearables controlled by "gestural interfaces," so those with disabilities (or Marines in trenches) can wirelessly control a computer, robot or other device. "To make Super Mario jump, you must raise your arm," she says. Wearable units can help "whatever is causing the performance gap."

Mann takes issue with the industry's emphasis on workplace uses of wearable computers. "There's more to life than working," he says. "If you think of this as a machine for work, I think it will fail."

But others say a viable consumer market for wearable computers is only "a siren song" and a distraction.

"Get a grip, boys," chided David Mizell, who's in research and development at Boeing. "John Q. Consumer has already voted — he wants a cellphone and a Palm, not some geek gear hanging down his nose."

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