Now That's Using Your Brain

By Rachel Metz ✎| 🗐Also by this reporter
02:00 AM Apr, 03, 2006

Typing an e-mail with your fingers is a snap. But what if you could do it with your brain?

Brain-wave typing could become reality in just a few years. It would open up a world of communication with caregivers and loved ones for people disabled by ALS, cerebral palsy or high-level spinal-cord injuries. With little or no muscle control, communicating clearly, or even at all is difficult, if not impossible.

Researchers in the brain-computer interface, or BCI, Group at New York State Public Health Department's Wadsworth Center are enrolling patients in trials of a system that could enable them to send e-mail and communicate using their brain waves. They hope to have five to 10 people testing the interface by June.

Worldwide, 170,000 people could potentially be helped by such a device, according to a recent study by Arthur D. Little, a consulting company working with product-development group Cambridge Consultants to create a business plan for the technology.

Mark Manasas, a group manager for Cambridge Consultants, describes the setup: A caregiver uses a laptop to start up the system. An electrode-laden skull cap tracks brain activity with an EEG and relays it to an amplifier. Brain waves are then translated into computer activity. The patient has an additional screen to use for communication.

Patients will start with the P300 model, which shows them a matrix of images or letters that flash rapidly in a random sequence. When users focus on the letters or pictures they want to select, a spike occurs in the brain's electrical activity, and after several cycles with the same result, the system selects that letter or image. Communication is slow -- users create two to four words per minute.

Scientists also developed the sensory motor rhythm, or SMR, system, which allows users to concentrate on moving various body parts to manipulate a cursor on a screen.

A scientist with late-stage ALS is already using the P300. He had previously

used an eye-gaze system, in which a camera tracked his eye movements -- not a very satisfactory system for him. Now, he's using the BCI to send e-mail and do other tasks four to six hours a day, said Wadsworth BCI project head Jonathan Wolpaw.

"He's really happy with it," Wolpaw said.

James Heywood, CEO and founder of the ALS Therapy Development Foundation, said while many BCI products work in the lab, they don't function so well in the real world. A system is only useful if patients can integrate the device into their lives and use it to communicate effectively, he said.

For that to happen successfully, the product will have to get cheaper for one thing. The amplifiers used in the lab cost from $10,000 to $13,000, Manasas said. Eventually, they'd like to get the cost down to under $5,000, he said.

They'd like to shrink its size, too. "One day it would be great if this were a handheld pocket-PC device connected to a cap," Manasas said.

Pedro Irazoqui, an assistant professor at Purdue University who designs BCIs and neural prosthetics and consults for Cyberkinetics, a BCI company, said the product could be useful but will eventually be eclipsed by products that use brain implants. Those give users better control over what they're trying to do, he said.

Still, "giving (people with conditions like ALS) any kinds of means to connect with the outside world is a big step forward," Irazoqui said.