Providing Computers Controlled by Brain Signals to Paralyzed Individuals

**Outcome:** Researchers in Boston within CELEST, an NSF-funded Science of Learning Center, have started the non-profit Unlock Project, whose aim is to deliver ‘brain-computer interface” technology to paralyzed individuals so they can control a laptop computer in their home or while they are in a wheelchair.

**Impact/Benefits:** This system will provide severely paralyzed patients who cannot move or speak with the ability to communicate with those around them, as well as the ability to browse the internet, send and receive email, and play computer games.

**Explanation/background:** The brain-computer interface, which was developed in earlier years of CELEST, involves the presentation of flashing checkerboards to the user. Each checkerboard indicates a different computer command (for example, left, right, up, or down movements of the computer cursor), and the checkerboards flash at different rates. When the user focuses attention on one of the checkerboards to indicate his chosen command, neurons in the visual cortex start firing at that rate. This is detected by electrodes attached to the scalp over the visual cortex, and the associated command is executed by the computer.

*Caption:* Flashing checkerboard patterns lead to brain signals indicating the user’s intention.