

# Neurotech industry puts its mind to video games

May 27 2013, by Chris O'brien

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Fly toy helicopters with your mind. Be a DJ and shift musical tracks based on how you feel. Wiggle robotic cat ears by increasing your state of calm.

Astonishing advances in the ability to harness brain waves have made the fantastic notion of moving and controlling objects with the mind possible. Now neuroscientists are grappling with another challenge: Find a "killer app" that will demonstrate the true potential of tapping into brain waves and ignite the neurotechnology revolution.

Medicine, perhaps? Education? Try video games.

In the past decade, video games have helped push cutting-edge technologies such as sensor-based computing - [Nintendo's Wii](#) - and [gesture](#)-based computing - [Microsoft's Kinect](#) - into the mainstream. Neurotech boosters hope video games can do the same for their budding industry.

In a sign of how serious they are about courting the video gaming industry, the two camps staged the NeuroGaming Conference & Expo earlier this month in San Francisco, the first event of its kind, according to organizers.

"Now is the time to bring these communities together," said Zack Lynch, the conference organizer and founder of the Neurotech Industry Organization. "We want to start the conversation to see where we could

actually take these technologies and to begin to create new experiences that really push the boundaries of reality."

The event drew 300 people, including entrepreneurs, neuroscientists and venture capitalists, anyone organizers believe could help spark the ideas that could create a full-blown neurotech industry.

The ability to read brain waves has been around at least since the 1920s through a technique for capturing the brain's electrical impulses called electroencephalography, or EEG, by attaching sensors to the head. Now, brain waves can be read by small sensors that continue to become more powerful and less expensive.

At the same time, sensors of various kinds are being built into all sorts of gadgets such as smartphones and health monitoring wristbands such as those made by Jawbone. Observers say this is making people more comfortable with the idea of wearing technology that includes sensors that collect tremendous amounts of the most intimate data.

"I think it's a really exciting time right now," said Anders Grunnet-Jepsen, director of advanced technology and perceptual computing at Intel Corp. "I think the public is ready for exploring other types of sensors."

Displays at the exhibition hall, where 18 companies showed off their latest applications, gave a glimpse of how far neurotech has come.

In one corner, San Jose, Calif.-based NeuroSky let people use one of its brain wave reading headsets (some of which cost less than \$100) to fly the Puzzlebox Orbit, a small helicopter developed by a partner, that goes up and down based on the level of the person's focus and level of relaxation. Another NeuroSky partner, Neurowear, has used the company's technology to create Necomimi, a set of cat ears that wiggle

based on the person's emotional state.

One booth over, Richard Warp, a composer, brought in his NeuroDisco system, which used a headset made by Emotiv of San Francisco. A person straps on the headset and then controls the mix of music based on shifting his or her levels of excitement, frustration or calm.

The closest thing to an actual video game on display in the exhibit hall was NeuroStorm, a demonstration game built by Intific, a company based in Peckville, Pa. In this game, a player still uses a regular handheld controller to aim and fire at objects. A headset measures the player's brain waves to detect levels of calm and focus, which are rewarded with higher scores. Achieving a calm state of mind amid chaos improves accuracy.

"We need a couple of clever developers to come up with some killer apps," said Chris Berka, chief executive of Advanced Brain Monitoring of Carlsbad, Calif., whose brain wave reading headsets have been popular for diagnosing and treating people with sleep apnea.

The timing for a partnership, in many ways, is ideal because the gaming industry is struggling with sales and wants to find ways to make games more immersive by tapping into people's nervous and sensory systems, including elements of touch, smell, emotional responses, heart rate and moisture levels on the skin.

"One thing we are very interested in is the notion of biofeedback and how it can be applied to game design," said Mike Ambinder, an experimental psychologist who works for Bellevue, Wash.-based [video game](#) company Valve.

Brain waves seem like the next logical step.

Indeed, there are some early, promising signs, said Sana Choudary, chief executive of YetiZen, a co-working and education game community hub and accelerator for game startups in San Francisco. Choudary cited statistics from investment bank Raymond James that 24 neurogaming companies have raised close to \$87 million in venture capital in recent years.

Earlier this year, Lat Ware of Mountain View, Calif., raised \$40,000 on the crowd-funding platform Kickstarter to finish his game "Throw Trucks With Your Mind!" Users wear an \$80 NeuroSky headset that lets them move objects on the screen by concentrating and relaxing.

But for the most part, the gaming industry is just beginning to grapple with the larger challenges of incorporating [brain waves](#) and biofeedback into the gaming experience. Just how can all these new types of data and input be used to leverage new gaming experiences?

And the neurotech industry still has plenty of its own hurdles. Even as the hardware has become more powerful and less expensive, some headgear requires users to apply gel to their head for the sensors to collect the brain's signal. And there remains the question of whether most people would be willing to wear headgear of any kind, no matter how lightweight or elegant the design.

Lynch is realistic about the prospects for neurotech, and how far it still needs to go.

"It really comes down to designing great games and amazing experiences," Lynch said. "You can have all the technology in the world. But unless you have an experience people want and need and desire and have fun with, then all that technology will just sit off by the wayside."

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