MedicalXpress

No hands required -- scientists achieve precise control of virtual flight

October 26 2011

Scientists have designed a novel, noninvasive system that allows users to control a virtual helicopter using only their minds, as reported in the online journal *PLoS ONE* on Oct. 26. The researchers, led by Dr. Bin He of University of Minnesota, created an EEG-based, noninvasive brain-computer interface that allowed users to accurately and continually navigate a virtual helicopter simply by thinking about where they wanted to craft to go.

The task required users to direct their helicopter through randomly positioned rings in three-dimensional space (videos of the task available); these targets were reached successfully 85% of the time.

Much of the previous work in this field required invasive treatments that allowed for measurement of intracranial activity, but this new approach employs EEG in the form of a cap on the user's head. This noninvasive technique records a particular brain wave called the sensorimotor rhythm, which in turn can be characterized and calibrated to control the movements of the on-screen helicopter.

According to lead research Dr. He, "this work demonstrates for the first time that one can accomplish real-time, continuous 3-dimensional control of a flying object in a virtual world from noninvasive EEG-based brain-computer interface. Such ability used to be limited in cases where invasive recordings are used, thus the work opens avenues to noninvasive bio-navigation, or neuroprosthetics."

More information: Doud AJ, Lucas JP, Pisansky MT, He B (2011) Continuous Three-Dimensional Control of a Virtual Helicopter Using a Motor Imagery Based Brain-Computer Interface. PLoS ONE 6(10): e26322. doi:10.1371/journal.pone.0026322