A&M team developing lightweight 'smart vest' as navigation guide

By Carol Christian | May 23, 2014

Long used for a variety of purposes from body building to body protection, the simple vest has gone high tech with what's touted as a breakthrough in navigation.

A team from Texas A&M University in College Station has been hard at work on a lightweight vest that can guide its wearer by touch -- so-called "haptic navigation." The word "haptic" refers to the sense of touch.

Leading the project is Tracy Hammond, associate professor of computer science and engineering, who initially developed the smart vest about five years ago for the military. Hammond said they wanted something to help guide paratroopers who sometimes jump at night into unknown territory.

"They initially wanted a phone app or a watch app," Hammond said. "I said, 'Wait a minute. We don't want them looking at anything.' "

As described by Hammond, the vest has three tiny "emitting tactors," electronic devices that vibrate to give the wearer directions. The tactors are behind each shoulder and in the small of the back.

When the wearer is supposed to turn, the vest vibrates behind either the right or left shoulder to indicate which direction to go. A vibration in the small of the back is a signal that the device is still working and the wearer should continue moving forward, Hammond said.

"There's no other feedback because they can't look at a screen," she said.

The components that make the vibrating devices work are a microprocessor, a Bluetooth connection to a digital map system and a 9-volt battery.

Working with Hammond at A&M on the project are recent graduate Manoj Prasad and Daniel W. Goldberg, assistant professor of geography.

They've been working a couple years on versions of the vest that can be used by motorcyclists and pedestrians.

For the motorcycle version, the team developed a version that can be attached by Velcro to the inside of a motorcycle jacket, she said.

In testing, the motorcycle smart vest performed well, allowing riders to make two sharp turns with as little warning as 50 meters (about 55 yards), Hammond said.

The preferred scenario is to have enough time to give the driver a series of signals: at a certain distance, the rider gets one buzz, then two buzzes and finally three buzzes, which means, "Take the next turn you see," Hammond said.

Navigation by touch seems to be the most natural method, she said.

"In these scenarios, your eyes are overloaded," she said. "Sound might seem to be a logical choice, but there's a lot of evidence that sound is distracting more than helping."

Hammond, who rides a motorcycle, said the team is moving forward with plans for commercial production of the vest, starting with a version for motorcyclists.

Hammond recently returned from Gavle, Sweden, a European center in the emerging field of Geographic Information Systems, according to a statement from A&M's Dwight Look College of Engineering.

In Gavle, Hammond gave talks about the vest and met with business and academic leaders. A Swedish newspaper reported that the collaboration will bring new business and jobs to Gavle, the College of Engineering statement said.