

## **Technology Radar: BusinessLab's review of technologies that are making the news, July 2010**

*An ActiveAge Report*

### **SleepWave**

According to the NHS nearly a third of the UK population suffer from bouts of insomnia at some point in their life.

Some of the most common problems arise in young people who have difficulties falling asleep (Sleep-onset insomnia) and in older people where medical conditions such as arthritis, osteoporosis, Parkinson's disease, incontinence, indigestion & heart disease etc. can cause sleep problems. Mental illnesses such as Dementia or Alzheimer's can also significantly disrupt sleep in old age.

Although there are a variety of medicines available to help with sleep disorders these medicines can cause side effects, and people don't generally want to take medication for long periods of time if they can avoid it.

As a result of this problem Philips Respironics, a global leader in sleep therapy innovations has introduced a non-pharmacologic treatment that may be useful to patients with chronic or acute insomnia.

The device known as SleepWave is the size on an MP3 player and is designed to non-invasively stimulate the vestibular nerve by mimicking a swaying sensation that could lead to earlier onset and more relaxing sleep.

To use the device, two ear spirals are attached (one behind each ear) and these connect to the device in the same way a set of headphones would connect to an MP3 player. The system is set to stimulate the vestibular system for about an hour and after that it automatically switches off. However, SleepWave can be adjusted to different time scales and can be turned off and on as required.

Clinical trials indicate there was a 67% decrease in participants classified as having moderate to severe insomnia after four weeks of using SleepWave.

This device is currently only available in Australia.

For more information please visit:

<http://sleepwave.respironics.com.au/about.asp>

## Smart Walker

Nowadays there are a variety of devices available to assist with mobility problems commonly encountered as we age. However, many of these devices have features that inhibit, rather than enhance mobility. For example, the bicycle-style squeeze brakes on walkers. For low-strength users, being able to squeeze the brakes and control the speed of their walker is more difficult than walking without it.

The problem highlighted above, with the braking system on certain mobility walkers, has led to users with limited mobility falling when they use the breaks on their walker.

However, this may now be a problem of the past as a team of biomedical engineering students at Cornell University have designed an electronic braking system for walkers, with buttons replacing bicycle-style squeeze brakes.

The electronic braking system, which is called "Smart Walker", relies on hand grip sensors. The walker starts in the brake position and low-strength users need only touch a button to electronically disengage the brake and begin moving. Once a user removes his/her hands from the handle bar, the walker automatically resets to the braked position. The added stability and ease of operation for users with reduced hand strength promises to dramatically reduce accidental falls.

The students worked alongside Weill Cornell Medical College-affiliated psychiatrist Dr. Eli Einbinder who just received a patent for his solution. Einbinder was a tennis player and skier before 1993, when he injured his back.

*"I'm sitting in my office looking for another hobby," Einbinder recalled, "and I start noticing people with walkers - how difficult they are, how not user-friendly. I'm also an inventor, so I decided to design a mechanical walker that works better. I soon realized that an electrical model with a button for braking is much simpler and easier for really anyone to use."*

The team hope the newly designed walker will reduce the incidence of falls among older people.

For more information please visit:

<http://www.news.cornell.edu/stories/June10/SmartWalkers.html>

## The Danger-Sensing Driver's Seat

Today the inside of a car is probably the most monitored situation most people encounter in their daily lives. Flashing lights and sounds are used to alert you to put your seatbelt on or to top up your oil or close your door properly. And now Yale University engineers have developed a new tactile system to warn you of cars in your blind spot.

The blind spot is blamed for sideswipe accidents that occur by the hundreds of thousands every year. Today's blind-spot monitors warn you by flashing a signal in the rear view mirror or on the car's dashboard. But according to John Morrell, a former Segway engineer and now an assistant professor of mechanical engineering at Yale, a visual signal is the wrong one to send. The visual sense is already overloaded in a car and can take time to interpret.

The Yale engineers have designed a car seat that acts as a tactile interface

between the driver and the environment. It uses vibrating motors that press on the driver's back to signal the location of a following car.

The demonstration prototype includes a modified car seat, a steering wheel, foot pedals, and a computer running an open-source driving simulator called TORCS, short for "The Open Racing Car Simulator." Twenty cellphone-motor factors are arranged in a rectangular array across the back of the seat. A car coming up directly behind the driver in the simulation activates the centre vibrators, while a car to the right or the left will activate the same-side vibrators, giving the driver a directional cue. The closer a car gets, the more intense the vibration.

The new technology is still at a prototype stage but it is easy to see how it could benefit older drivers whose visual senses may have declined with age.

For more information visit:

<http://spectrum.ieee.org/green-tech/advanced-cars/the-dangersensing-drivers-seat>

<http://www.seas.yale.edu/news.php>

## **The Electronic Potential Sensors**

There are many health-monitoring products available in the market that can measure a patient's vital signs. However, most of these devices require direct contact with the person's body i.e. the person has to be linked up to the device in some way to monitor their blood pressure, heart rate etc. This limits where and when the individual can take a reading.

However, a team from the University of Sussex has potentially solved this problem. The team, from the Centre for Physical Electronics and Quantum Technology, has developed the first electronic sensor that can detect the electrical activity of the heart without the need to connect the patient to equipment via pads and wires. A reading can be taken from the tip of the finger or remotely – a heartbeat can be detected from up to a meter away.

Dr Robert Prance who is a Professor of Sensor Technology, and leading the team, is hopeful that in the near future a patient-friendly and self-administered system, which can detect all vital signs, will be developed.

This technology is still at an early stage of development and not yet available in the market but one can see how it could possibly be adapted to work alongside mobile phones, allowing vital sign monitoring on the move (the potential for mobile phones in health monitoring was recently discussed by [Eric Topol](#) during a TED conference).

For more information visit:

[http://www.sinc.co.uk/sinc\\_companies/sussex\\_ep\\_sensors.html](http://www.sinc.co.uk/sinc_companies/sussex_ep_sensors.html)