

The Power of 3

ISSUE 16
July
2017

Driving the future further

BATTERIES ARE POWERING EMPOWERMENT

“Turn obstacles into opportunities and problems into possibilities”

~ Roy T. Bennett

Go, baby, go! Five years ago Cole Galloway, a professor of physical therapy at the University of Delaware in the United States, saw a gap in the marketplace for mobility devices suitable for very young children, for whom powered wheelchairs are not an option.

Being independently mobile rather than pushed in a pram or carried about gives kids active control over the way they experience the world through movement, and that enhances the development of cognitive, social, motor, language and other skills.

By modifying off-the-shelf, battery-powered ride-on toy cars, Galloway realised he could enhance independence for children with mobility issues in the critical early years of their development – and do it relatively cheaply. ‘Go Baby Go’, a national, community-based design and outreach programme, was born.



The Sit-to-Stand car improves mobility for kids who will probably walk unaided with time.

Today, reports [New Atlas](#), the programme has expanded to Oregon State University with two new additions: the Sit to Stand car, which “encourages late bloomers to rise up and take charge” and the Throw Baby Throw car, which allows “kids with limited upper limb movement to join in during throwing games and activities.”

Overview

Previous issues of *The Power of 3* have considered the rapid development and deployment of lithium-ion battery technology and the relationship of that technology to the evolution of electronic devices and electric vehicles, all of which are extending possibilities in every direction.

For those with a disability – around a billion worldwide, according to the World Health Organisation (WHO) – improvements in battery technology have, directly or indirectly, facilitated accessibility where often there was little or none ... and that equates to a quantum leap in empowerment.

Eye-controlled assistive technologies

Ailments like Parkinson’s, ALS, motor neuron disease, multiple sclerosis, muscular dystrophy and severe spinal-cord injury can leave sufferers with ‘locked-in’ syndrome, trapped in their bodies and speechless, with little other than eye movement possible – and that’s where eye-tracking technologies can prove so useful.

The study of eye tracking dates back to the 19th century, and harnessing it to control computers began as early as the 1980s. Since then, the implementation of eye-controlled assistive technologies and eye-tracking systems allows just about anyone unable to use a computer keyboard, mouse or touch screen to generate speech, write books, even attend school if they so desire.



[Image of Julius Sweetland’s OptiKey, courtesy of [BusinessInsider.com.au](#).]

Ultimately, of course, brain-machine interfaces are destined not just for the disabled but also many innovative applications for the able-bodied.

Remote assistive technologies

Worldwide, says the WHO, 39 million people are blind, 246 million have low vision and 285 million have some form of visual impairment. Right now, for them, things are looking up.

Consider 'Be My Eyes', brainchild of a Danish not-for-profit tech start-up. A free app, it connects those with little or no vision to sighted volunteers via their smartphones.

Steve O'Hear of TechCrunch explains.

If you're a sighted person you register with the service and wait for the app to send you a notification that a visually-impaired person who has also signed up requires help. Once a match is found, the two of you are connected via an audio/video call, essentially enabling you to 'lend' your eyes to the visually-impaired person, who points their phone's rear-facing camera at whatever it is they want to see. The two of you then collaborate over the call to solve the problem.

US-based [Aira](#), meanwhile, is a subscription-only 'visual interpreter' service that "empowers the blind to experience their world and surroundings like never before" with instant access to information.



[Photo of smart glasses courtesy of [Engadget.com](#).]

Aira's platform works on wearable devices (smart glasses) that can be paired with smartphones. The tiny camera on the smart glasses allows trained company agents to 'see' what the blind or vision-impaired person 'sees' in real time; simultaneously, the agents can locate that client via Google Maps and also access their personal profile, so they're able to talk the person through whatever it is they need.

Mobility-enhancing exoskeletons

Until recently, the term 'exoskeleton' was used to describe the natural, protective outer structure of creatures like beetles, crabs and lobsters. Now, though, a number of commercial and experimental powered exoskeleton suits for humans (metal frameworks with motorised 'muscles') are in operation globally, albeit without the capabilities of Tony Stark's in *Iron Man*. Even so, they're a godsend for the disabled and infirm.

Take, for example, Tony Sanchez, a paraplegic since 2004 and now test-pilot-in-chief for [suitX](#). Here he's pictured in the Phoenix, an 'investigational device' said to be:

... the world's lightest and most advanced exoskeleton, designed to help people with mobility disorders be upright and mobile.



[Photo courtesy of [suitX](#).]

As well as making for greater independence and quality of life, it allow users "to break out of the wheelchair bubble," as Sanchez describes the interactions that disabled individuals have with others. "Just being able to walk up to people really changes how they react to you."

But it's not just adults who can benefit from a 'power suit'. Currently undergoing clinical trials is an exoskeleton for children, designed by engineers at the Spanish National Research Council. According to [New Atlas](#), the 12-kilogram battery-charged suit is for use by kids aged 3 to 14 who suffer from spinal muscular atrophy. By helping these children walk upright, the device keeps their muscles active and trained, potentially saving them from the onset of osteoporosis and other, sometimes fatal, complications.



[Photo courtesy of the Spanish National Research Council, via [New Atlas](#).]

And, while lower-body exoskeletons for rehabilitation and/or to improve quality of life are available right now (albeit they're expensive and constrained at this stage by a limited power supply), workplace systems for the able-bodied that augment on-the-job performance and enhance safety are sure to follow.

Soft exosuits

In today's world, the aged population is increasing at a rate greater than that of the rest of society, so empowering the elderly is imperative.

On the drawing board right now at Superflex Powered Clothing™ are stylish, sensor-activated garments equipped with 'electric muscles' to provide core support and strength to senior citizens with incipient or actual mobility issues. The company aims to release its first consumer products by mid-2018.



[The Aura soft exosuit for people with mobility issues. Photo courtesy of [nbcnews.com](#).]



And finally ... Imagine a toothbrush that cleans teeth in as little as 10 seconds.

Successfully crowd-funded, the GlareSmile smart toothbrush is purported to be 7.5 times more effective than a manual one and, like a fitness tracker, it reports back via a companion app on the user's phone. Ergo, it may well suit children, disabled users and the elderly (who often have less mobility in their hands) – even those so chronically time-poor they would relish cutting several minutes a day from such a routine chore.

Which Perth-based company wants to empower the battery industry worldwide?



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