

Hats off to the disc, doctor

James Carey discovers how the quadriplegic kids of Great Ormond Street play games with a little help from PCF



Doctor Nick Pickett is a Music Specialist at Great Ormond Street Children's Hospital. His PhD was based on helping severely paralysed patients gain a greater level of interaction with the world through music and technology. A keen programmer and tinkerer, Nick also designed and manufactured highly sensitive breath switches and software for his patients, the commercially available switches being too reliant on

lung power, which is something many of the children in his ward at Great Ormond Street simply don't have.

It was this love of tech and programming as a student that brought Nick back to reading *PCFormat*. His early programs used a version of BASIC and ran on BBC computers. Dr Pickett saw the free version of *REALbasic* (www.realbasic.com) we ran on the cover of issue 185 and began to rework his old apps into the new, Direct X compatible *REALbasic*. At this point he contacted us and we began discussing his work. It just so happened we'd reviewed Naturalpoint's TrackIR 4 hardware in the previous issue and thought perhaps Nick might be able to use the head-tracking system with his kids, some of whom have no movement below the neck at all. We talked to the team at Naturalpoint, and they very generously agreed to donate one of their top-of-the-range SmartNAV systems to Dr Pickett (essentially an industrial version of the Track IR 4). It turns out this was the start of something rather exciting for Dr Pickett and the wards at Great Ormond Street hospital... www.gosh.nhs.uk/

PCF How did all this come about in the first place?

Dr Pickett I had a lot of programs from my doctorate days that were made using BASIC on a BBC. I wanted to convert some of them over to modern machines and the *REALbasic* software on your coverdisc was perfect. When you mentioned the Naturalpoint hardware I immediately thought of one quadriplegic patient, a three year-old girl who's very smart, very sharp, and the possibilities it could open up for her. Pre-school age is so important in terms of mental

development and normally these kids don't get tutorage in these formative years. Without a means of interaction with the outside world a lot of these children suffer long-term development issues. Some of them may never be able to move below the neck so they need to learn [to interact] fast.

PCF How do the SmartNAV and your own inventions help your patients?

Dr P There are a number of commercially available units that do similar things and the prices vary enormously. The trouble with a lot of [interactivity aides] is they assume you can blow into a switch. Small children, ventilated kids, don't have the breath to activate them. I've developed a switch that replicates clicking the left or right mouse button, but works at extremely low pressures, and is activated by oral cavity vacuum or pressure rather than lung power. The *SmartNAV* has mouse emulation, but the trouble with young kids is a lot of the time they'd have no idea how to use a mouse anyway. So I've written a program in *REALbasic* that lets this patient use the Naturalpoint system alongside my pressure switch in a

more accessible way. Using them together she can now play along with certain tunes by looking at an instrument on screen then 'blowing' the switch to activate the drums or cymbal or whatever she wants.

PCF You say 'this particular patient'. Is there any reason you couldn't use the system with other kids?

Dr P Each patient has to be treated as an individual case. They all have different levels of mobility. Because of a tracheotomy (a hole in the neck for breathing) for example, something that's just sensitive enough for one might be useless or frustrating for another. In principal you could get it working with some of the other kids but it's about resources. I've been putting these programs together in *REALbasic* in the evenings so it takes time.

PCF So how do you see this developing in the future?

Dr P Well, the arrival of the *SmartNAV* system has caused quite a stir here. In fact, having seen the

unit working as I have it configured now, the Friends of Great Ormond Street Charitable Trust, one of the charities that supports the music provision in the hospital, has come up with the cash to buy more *SmartNAV* units for other patients. It's been really exciting getting these systems working for the kids and I'm already working on a second program that will allow the user to flip through the pages of a virtual book and select nursery rhymes to be played. It's made such a difference!"

Helping Dr Pickett with his fantastic work has been a genuine pleasure. We can't thank Naturalpoint enough for its generosity and aid. Naturalpoint has even put Dr Pickett in touch with The Escape Artists Charity (www.escapeartists.co.uk) which, working with the Engineering Department of Cambridge University is also developing different ways to enable severely disabled children to communicate through music. We wish him and his patients the very best of luck.

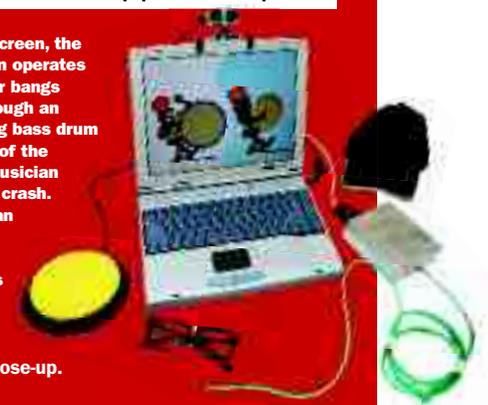
Details on how to make a donation to Great Ormond Street Hospital can be found at www.gosh.org/donate/index.html. **PCF**

How it works

Dr Pickett explains how the app developed

When she looks to the left of the screen, the drum player is highlighted. She then operates a mouth switch and the drum player bangs the drum. This sound is passed through an external amplifier, which gives a big bass drum sound. By looking at the right side of the screen she can make the cymbal musician play instead, and produce a mighty crash. This simple interactive program is an example of how *SmartNAV* can be used to enable disabled children to participate in group music sessions at the hospital. 'Joining in' is vital in these early stages.

Right: The *SmartNav* system in close-up.



Naturalpoint's SmartNAV

This head-tracking hardware is helping the severely disabled kids of Great Ormond Street take part in music classes in ways they've never been able to before.

Dr Nick Pickett

Doctor, inventor, musician and our hero, Dr Pickett is creating his own software for his patients. Here one of his kids looks at different instruments on screen to play along with Nick on his guitar.

The NaturalPoint software lets kids interact with PCs in an exciting and beneficial way.

Games for health

All over the world, games are making us happier and healthier

Games have had a huge impact on modern health care. Back in 2004, doctors at the University of Washington began using games as pain-relief systems for burn victims, resulting in the creation of the VR tool Snow World, where kids could play and escape while their wounds were treated. More recently research has shown that the improvements in hand-eye co-ordination provided by games greatly improved the accuracy of practising surgeons.

But it's as a learning tool that they have had the biggest influence, with games being used to teach youngsters about cancer, diabetes and even schizophrenia. Second Life's schizophrenia simulation has been created in attempt to teach people what sort of problems sufferers of the mental disorder will face. Although not particularly sophisticated, all these

games provide a direct and friendly way for people to learn, and as a result have the potential to be enormously powerful.

Of course games can have more direct therapeutic effects, too. Researchers at Nottingham University expect to soon be able to use games to treat amblyopia, or 'lazy eye.' Meanwhile in the US the attention disorder treatments company East3 is developing game-tech to help treat kids with attention deficit problems.

It's tough for the developers of these games to find the time, money or technology to develop these projects, but tools like Second Life are making it easier. One SecondLife project, for example, is a virtual island designed to make life easier for people with forms of Asperger's Syndrome, plus many others that are currently in progress.