

Research packs a punch

High-tech revenge helps train boxers

BEING RUMBLING BY A GROUP of thugs on a suburban beach isn't everyone's cue to a future career ... but it put 15-year-old Warren Proctor on track for a university course in electronics and a passion for martial arts and boxing.

It also took him to this year's finals of the Institution of Engineering and Technology of Australia (IET) Technical Presentation Prize where he was runner-up for the design and presentation of one of Australia's best electronics projects.

Earlier, he won the Institute of Electrical and Electronic Engineers' Hooper Memorial Prize for technical merit and engineering achievement, and its prize for the best electronics project at a Victorian University.

One of the 'don't get mad get even' school, Mr Proctor, now a final year electronics engineering student, recovered from his traumatic assault by learning how to throw a few punches himself, taking up martial arts, boxing, and Thai boxing. Combining his love for his sport with his career choice led to a State junior boxing title and national recognition of his aptitude for electronics.

The IET national award recognises his final year electronics project: a small electronic black box enclosing a wireless device powered by a mobile phone battery that will help boxing coaches monitor the force and acceleration of their boxers' punches, and their heart rates – in real time, on a remote, hand-held LCD screen.

The device has the potential to revolutionise the way boxing is taught in Australia, and is already being tested as a prototype for other industry uses by manufacturers in Australia, New Zealand and the United States.

Some might call it a boxer's revenge, but Warren Proctor calls his device X-SPAR – for Sports Performance Analysis Recorder.

The black box, strapped to a boxer's body, interprets, translates and transmits the physiology of every punch as graphic data to

a palm-pilot sized display on the second device held by the coach.

On this second device, computer-coded graphics incorporating electrocardiographs and other information allow the coach to plot his boxer's next move in full control of real-time performance data.

'The coach can use that data to map the position of the boxer's hands, see what kind of punch they're throwing – whether it's a left hook or an upper cut – and how much effort they've put in. This can be compared with earlier sessions to see how much they've improved,' says Mr Proctor.

Better still, he can compare the performance of two boxers in training simultaneously, with a box strapped to each. For example, this might reveal one boxer has thrown 112 punches this round, and the other 84; one boxer's heart rate was only 115, and the another's was up to 117

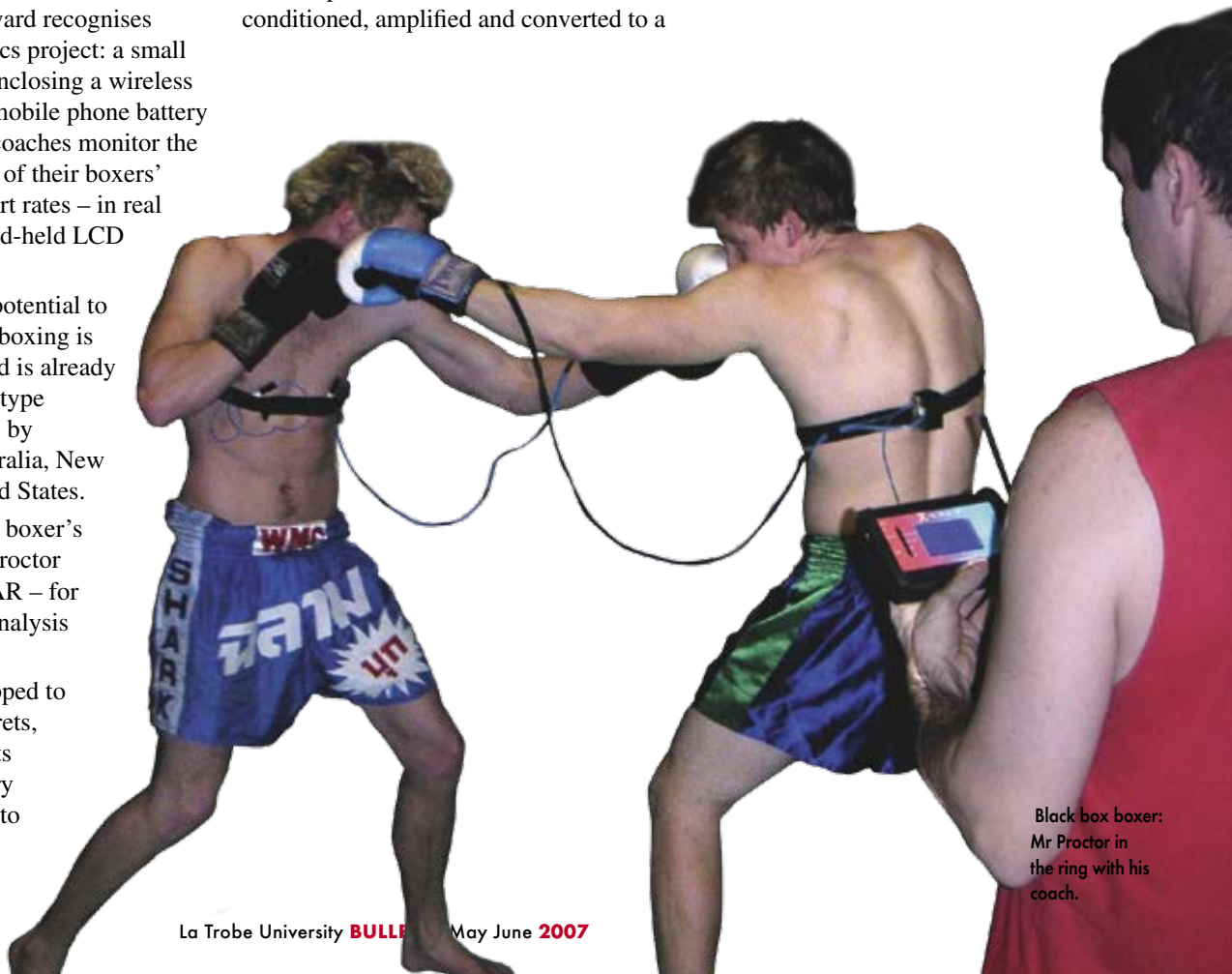
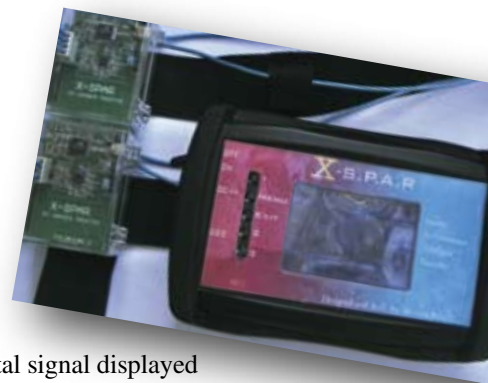
The equipment measures the acceleration of the boxer's movements through microscopic parts that move back and forth as punches are thrown. These are linked to sense capacitors, where the information is conditioned, amplified and converted to a

digital signal displayed as a ratio of acceleration.

Mr Proctor says the prototype has been 'road-tested' by his own boxing coaches and is already being picked up for industry trials in other applications by international systems-engineering designers impressed by its potential.

For example, he says it is being trialed as a sensor-activated tracking mechanism in automatic car parks to allow operators to check how many parking spaces are occupied; as a remote control mechanism for small cranes to lift tilt slabs on building sites; and as a remote timing system for slalom kayaking racing.

Mr Proctor says the project presented many engineering and design challenges. And like all inventors, he is still refining. 'It could definitely be smaller,' he says. ●



Black box boxer: Mr Proctor in the ring with his coach.