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X-ray vision –

Christchurch researchers see $400m-a-year market for the CT scanners they are developing

A CHRISTCHURCH company is developing an x-ray machine that promises to bring the Holy Grail of radiology closer.

By making colour x-rays possible for the first time, MARS Bioimaging expects to be able to deliver radiologists greater detail than monochrome images can provide. That should allow them to make more accurate diagnoses.

Better tissue characterisation — being able to tell, for instance, whether a tumour consists of vascular or fatty tissue — has been a long time coming, says Wellington radiologist Mark Leadbitter, New Zealand chairman of the Royal Australian and New Zealand College of Radiologists.

"Tissue characterisation is something radiologists have always been keen to be better at," says Leadbitter.

While he is unfamiliar with the technology being developed by MARS Bioimaging, he says the claims made for it would be a breakthrough.

"Tumours and areas of inflammation in the body tend to be more vascular so if you can be more accurate about saying this tissue is more vascular than the bit next to it, then you're further down the track in knowing where the problem is. This is radiology's Holy Grail."

MARS Bioimaging's breakthrough is the result of collaboration between the University of Canterbury and CERN, the Geneva-based European particle physics research body.

The Medipix x-ray detector at the heart of the Christchurch company's CT scanner was developed for CERN's Large Hadron Collider experiment, which made international headlines last year when it went live for the first time.

> 'THE CHALLENGE IS TO IMPROVE ... TO THE POINT WHERE THE ENTIRE PACKAGE IS COMMERCIALLY VIABLE.'
>
> **Phil Butler, MARS Bioimaging**

Canterbury physics professor Phil Butler and others saw the Medipix chip's x-ray potential, and secured worldwide exclusive rights to its use in biomedical small animal and medical imaging.

"We're very pleased with that," Butler says.

As well he might be. He and the fellow directors of MARS Bioimaging — his son and radiologist Anthony Butler, and brother and commercialisation specialist Hugh Butler — see a potential $400 million market for the colour CT scanners.

"That equates to [sales of] a thousand small units a year, which is our estimate of the current market size."

How did such a potentially lucrative

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NEW DIMENSION: Researchers aim to take x-rays beyond black and white. Picture / Getty Images

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in living colour

opportunity fall into their laps? Phil Butler says it was a matter of convincing CERN that they could tap into the necessary radiology and medical research expertise and that they had a viable commercialisation plan.

Having done so, MARS Bioimaging was spun out of the university last year, with the Butlers holding about 65 per cent of the shares, the university 19 per cent and most of the rest in the hands of the company's research team.

In May last year a prototype scanner was put through its paces, producing images that were good enough for radiologists Anthony Butler and Nigel Anderson to see tiny blood vessels in mouse tissue.

But before the company has a first scanner ready for sale, there are numerous refinements to be made.

"The challenge is to improve all the necessary steps to the point where the entire package is commercially viable," Phil Butler says.

That includes developing interface and control systems.

"Then it's a matter of processing this new kind of data, which nobody has ever got before, and seeing that it does match the predictions of various models."

Presenting the data in a way that is useful for diagnosis is another challenge.

"All along this research and development chain there are lots of fascinating research problems."

The notion of coloured x-rays, however, is nothing new. What was lacking until development of the Medipix chip was a detector with enough processing capacity to record the different x-ray colours, or wavelengths, which are absorbed to differing degrees by different tissue types.

Unlike the sensor of a digital camera, which could have 10 million or more pixels, the 14mm by 14mm Medipix chip has just 65,000. But the chip itself, which is being made by IBM, has the computing power of a Pentium PC processor.

Since exposure to x-rays is not actually good for you, a key issue with CT scanners is how big a radiation dose the patient gets while being x-rayed.

Phil Butler

Phil Butler says the MARS CT scanner's detailed images will not require a higher dose than other scanners, the literature actually suggesting it will be significantly lower.

"We're quite sure we'll get more information for the same dose — we certainly won't need more dose."

MARS Bioimaging doesn't intend tackling the big boys of the scanner market — the likes of Siemens, General Electric and Philips — head on, but is starting small, with capacity for samples from 5cm to whole-body size.

The first step is to get one into use at a research lab or medical school, Phil Butler says.

"We have several potential customers we're working on. When you're starting up something like this, the first thing to do is to get someone to use it."

Anthony Doesburg is an Auckland-based technology journalist.