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Maths provides answer to airport security puzzle

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High flyers will enjoy faster and safer travel in the future, thanks to mathematicians at The University of Manchester and airport security specialists Rapiscan Systems.

The two parties are joining forces for a £750,000 research project to provide fast, accurate 3D x-ray images of suitcases and baggage.

The project is being funded jointly by the UK-based Rapiscan Systems and the British government's Engineering and Physical Sciences Research Council.

The aim is to maximise the effectiveness of an innovative new 3D scanner developed by Rapiscan Systems' research subsidiary CXR Ltd.

The current breed of airport scanning machines give security staff a flat, one-dimensional view of the contents of a bag, where as the CXR machine uses multiple x-ray sources to provide a more comprehensive and probing 3D image.

Although hospital-style CT scanners have been adapted on a small-scale for baggage scanning, the system is too slow to be widely used in airports.

Academics from The University's School of Mathematics will apply complex maths to ensure data gathered by the CXR scanner is translated quickly and accurately into a dynamic 3D image.

Professor Bill Lionheart of The University Manchester's School of Mathematics said: "CXR is at the cutting edge technologically in a fast-moving field. I am always excited about working on projects like this, where I can tackle a theoretical challenge and see the results being practically employed."

"Hospital-style CT scanners have been used on a small scale for 3D baggage screening, but they are simply too slow for routine use," said Rapiscan Systems' UK Managing Director, Frank Baldwin. "The CXR machine is faster because it uses multiple x-ray sources that are switched, rather than the traditional source on a rotating gantry."

He added that the project represents a perfect partnership of academic expertise and advanced industrial engineering. "Airport security has never been a more critical issue, and we are delighted to have this opportunity to work with Professor Lionheart and his team towards developing this ground-breaking innovation."

According to CXR Director Ed Morton, translating data from multiple sources to provide a 3D image on a monitor screen presents some interesting mathematical challenges.

"We have developed specialised computer hardware and software to process the information, but we need to achieve the fastest, most accurate results possible. We called in experts from the University of Manchester's School of Mathematics to help us develop the novel maths and computer algorithms required."

Professor Lionheart specialises in inverse problems, which typically means working out what is going on inside something from measurements taken outside. He has worked on image reconstruction problems in medical scanning as well as imaging industrial processes such as the flow of molten metal within pipes in a steel mill.

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Weitere Informationen: www.manchester.ac.uk

www.rapiscansystems.com