



A compact 'through the wall' radar sensing device from Cambridge Consultants allows security and emergency service personnel to evaluate the position and movement of people in rooms and buildings.

Prism 200, which is the size of a briefcase and can be carried and used with one hand, features three advances that make through wall radar technology a practical proposition: a battery powered portable radar device; smart radar signal processing that senses human movement and position – even in environments with many reflecting surfaces; and meaningful data presentation in forms to suit the user, including plan, elevation or 3d views.

“To commercialise this technology, we’ve talked to the spectrum of potential

Compact radar sensing device allows the position and movement of people in rooms and buildings to be determined. By **Graham Pitcher**.

the angle of arrival of echo signal returns accurately, yielding information that provides both horizontal and vertical data so that 3d positions can be determined. UWB technology is also said to make the system good at resolving the distance of objects.

Fast digital signal processing is performed on the echo results to distinguish between objects which are static, such as furniture, and objects that move. The


system achieves this by maintaining a memory of background signals and observing changes above and beyond that database.

Prism 200 will monitor several subjects and track movement, even in difficult environments such as offices, with their angular surfaces and metal objects which can act like a ‘hall of mirrors’ to a normal radar. Cambridge Consultants’ advanced signal processing software is designed to distinguish moving people from these reflections, distilling vital information that can help observers to determine the real situation inside a building, and what is the best position and time for a tactical entry.

The position of each subject is clearly indicated on the screen and people can be tracked as they move, to build information on behaviour and room layout. Users can choose to see this information in plan, side elevation or 3d views, or all three simultaneously. When using the 3d view, the user’s viewpoint can also be rotated.

The radar antennas inside are arranged in such a way that prism 200 has a wide field of view: 120° horizontally and 90° vertically. The radar also has four user selectable ranges of up to 20m.

prism 200 can be held against a wall or mounted on a tripod in a ‘stand off’ position. The radar uses ultra-wide band (UWB) radar pulses that pass easily through standard building materials including bricks, blocks, concrete, timber, plaster and tiles. The radiated power is very low and the unit is inherently safe to use.

The ergonomics of the finished radar unit have been a key focus of the development process. The packaged system, which measures 210 x 300 x 450mm and weighs 5.4 kg, includes a lithium-ion battery pack that provides power for more than three hours of continuous use. It can be used almost instantly: the embedded system displays results within two seconds of the device being powered up. 

Who's there?

users and spent more than a year refining the hardware and creating a man machine interface that provides critical intelligence in an intuitive form”, says Alan Wiltshire, product manager. “The result is a ‘switch on and go’ unit that can deliver high level location information that helps tip the balance in favour of security operatives in a broad range of dangerous or time critical situations.”

Prism is an ‘impulse radar’, which operates by transmitting a very short pulse and then listening for echoes from objects that the pulse bounces off. The system operates at 100Hz using ultra wide band principles, in the 2GHz region of the spectrum.

An array of antennas allows the system to measure

