# SURVEY IN MOTION

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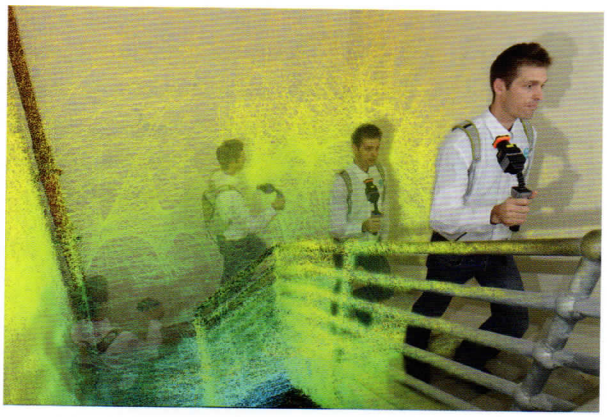
Handheld 3D scanners are a game changer in the 3D scanning industry. They provide a lot of exciting opportunities for spatial professionals in this rapidly changing industry. Handheld 3D scanning has traditionally been used in manufacturing, movie industry and university research organisations. Accuracies of up to 50 microns or 0.05 millimetres are achievable with top of the range 3D scanners. Objects measured vary in size from a one dollar coin to an entire car.

Spatial professionals have been using tripod based terrestrial 3D laser scanners for many years, allowing complex work areas to be surveyed in detail quickly. However several issues have held back terrestrial 3D scanners being adopted by many spatial professionals even though they have been commercially available for more than fifteen years. The large initial capital investment combined with annual service and calibration fees has been a big constraining factor. Working on congested sites requires many tripod setups pushing up the survey fee quickly, often making the service cost prohibitive. During the site survey, placing targets around the work area can be very time consuming for geo-referencing the point clouds and the position of the terrestrial 3D scanner. And finally the learning curve is considerable and can take several months or more to master.

The ZEB1 3D laser scanner from GeoSLAM in the United Kingdom is a handheld 3D laser scanner suitable for indoor and outdoor applications involving rapid 3D scanning of large areas for spatial professionals. It uses simultaneous localisation and mapping, or otherwise known as SLAM, to position itself while you walk around the site undertaking the survey. In addition to the 3D laser scanner component there is also an inbuilt inertial motion unit, otherwise known as IMU, to measure all the horizontal, vertical and rotational movements of the 3D scanner head.

The Learning curve is minimal and involves turning on the unit using the power button. The operator then walks around the survey area carrying the unit in his hand which weighs 665 grams. Everything around the operator within line of sight and within a measurement envelope of 270 degrees horizontally and +100 degrees vertically is



measured. As the unit is handheld and truly mobile the operator can walk into the tightest of spaces and obtain complete coverage of the work area quickly. At the end of the survey the unit is powered down and turned off. During the survey no targets are required.

After the site survey is completed the data is downloaded to the office computer via a USB memory stick. Processing of the data is completed automatically in the Cloud once the data is uploaded. The Cloud processing saves on having to purchase expensive 3D scanning software with the huge learning curve and costly yearly maintenance and update issues.

The investment cost is less than an entry level budget robotic total station. In addition annual maintenance and calibration is not required. Having a cost effective solution opens up a huge range of new business opportunities.

To date there are several ZEB1 3D laser scanners in New Zealand and the applications are varied. The most common application is for measured building and BOMA surveys to generate 2D drawings such as floor plans and cross sections. Other applications include topographical surveys in forestry areas and stock pile/volume surveys in the mining sector.

An example of the productivity gains of using ZEB1 is a recent survey of an existing commercial building with more than 100 rooms spread over a 150 metre long building. Every room in the building was 3D scanned internally using ZEB1 in six hours – that's 4-times faster than a terrestrial 3D scanner.

The use of handheld 3D scanners is very new to spatial professionals but is game changing technology. Over the next few years there will be an increasing number of new handheld 3D scanner products suitable for the applications of spatial professionals. It will be the early adopters of such technology who will reap the most benefit.