Costs Shrink for Conrad Gargett When Using ZEB1 for Measured Building Surveys of Heritage Assets

Scan-to-BIM with ZEB1 and Autodesk Revit

Conrad Gargett is at the forefront of architecture in Australia and is a progressive firm with a vibrant legacy of prominent and enduring designs. Since 1890, the practice has continuously evolved and grown both organically and through acquisition. Today Conrad Gargett operates from offices in Brisbane, Sydney, and Townsville to deliver projects across a diverse range of sectors including health, heritage, research, defence, education and commercial.

"When we survey buildings we aim to minimise the time we spend on-site," explained Luke Blake an Associate and Technology 'Guru' at Conrad Gargett. *"We find clients prefer to spend the majority of their budget on design time to realise the very best architecture possible."*

"We were all immediately impressed with the survey speed and the accuracy of the measurement data."

Using traditional tape and Disto survey techniques, Conrad Gargett found that survey teams necessarily spent a long time on-site recording hundreds of measurements as they tried to capture every detail; increasing the cost of measured building surveys. Luke continued, *"We even took photos as a memory-jogger but still on occasion we missed bits; forcing us to return to site a second time to fill in the blanks."*

This 'analogue' approach wastes time and increases the financial costs associated with on-site survey; a common problem for all architects and building survey teams. In response, UK-based GeoSLAM developed its 'digital' game-changing survey solutions for the measurement and mapping of multi-level three-dimensional environments.

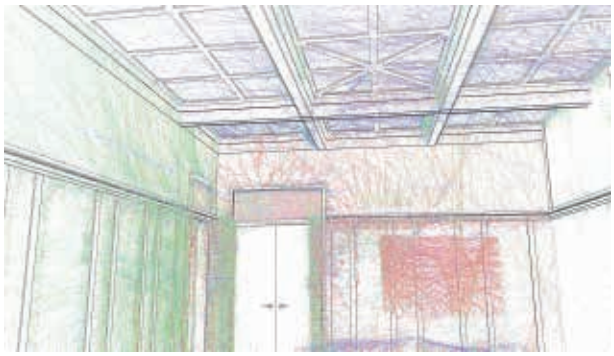
Now, with the GeoSLAM ZEB1, an individual can dynamically collect measurement data while walking through the target survey environment; eliminating the need to return later to pick-up missed details.

Luke first saw ZEB1 (GeoSLAM's hand-held laser scanner) when representatives from the University of Queensland and CSIRO (Australia's National Science Agency) visited Conrad Gargett in Brisbane.

"We were all immediately impressed with the survey speed and the accuracy of the measurement data." he enthused. *"We could clearly see that with ZEB1 we would spend far less time on site and could more easily measure inside hard to reach places such as manholes and crawl spaces under houses."*

The Conrad Gargett team resolved to test the GeoSLAM solution on a trial project. After comparing the ZEB1 with 'fixed-point' laser scanners mounted on tripods the team found that the ZEB1 was easier to use, offered greater mobility and enabled survey teams to complete measured building surveys in a fraction of the usual time. *"We recently spent three months measuring 12 heritage buildings using a tape and Disto,"* explained Luke *"With ZEB1 we could have completed all 12 in just one week."*

During their trial, the survey team learned a number of valuable lessons which have informed their approach since. *"To achieve a high-level of accuracy we break up our scans into logical groups and we close the loop on every scan."* explained Luke. *"For example, we completed the survey of a 3-story house using four separate scans: ground floor, first floor, second floor, and external envelope."* Back in the drawing office, the team then aggregated the scan data to reconstruct the building inside their BIM software environment. *"We bring the various scans into Autodesk® Revit® as "Links" and we align each scan so that we can accurately build our virtual model."*



Revit BIM model constructed from GeoSLAM ZEB1 point cloud survey data.

With this scan-to-BIM workflow, Conrad Gargett is able to omit the usual scan registration phase most common when using multiple fixed-point scan locations; saving the practice time and money.

The team is also achieving accuracy levels of +/- 10mm in some places which according to Luke *"Compares favourably with a Disto in real world conditions."*

The levels of accuracy achieved by Conrad Gargett while using the GeoSLAM ZEB1 could be aligned with International Property Measurement Standards (IPMS) and the new RICS guidance for Property Measurement 1st Edition, May 2015. Relative accuracy tolerances of +/- 25mm can be achieved in compact buildings and ongoing industry testing of this cutting edge technology compares it favourably with 'traditional' laser scanning when dealing with large areas although best practice procedures such as the inclusion of 'survey control' will help to reduce absolute control errors.

"It is a wonderful technology with a great future ahead of it. Early days in many senses but the possible applications are myriad and it could be a perfect solution for valuation and agency measured surveys when medium accuracy requirements (1:100 – 1:500 scale) are needed. Definitely a tech to watch." Commented James Kavanagh MRICS, RICS Land Director.

But the ZEB1 advantage realised by Conrad Gargett is even greater. Luke continued, *"Unlike a measuring tape or Disto which takes a single measurement between two walls, the ZEB1 takes 1,000's of measurements between the same two walls. Our Revit users can then pick the average of all measurements as a reliable distance when constructing their BIM models."*

Key facts

- Australian architect uses ZEB1 for heritage surveys
- Records survey time savings of approximately 12x
- Produces BIM model using Autodesk Revit
- Claims ZEB1 is the perfect survey tool 95% of time

Of course, there are situations where greater levels of accuracy may be required; perhaps where steelwork will need to be fabricated off site before being bolted together on-site. In such a scenario Luke's survey team may return to site to check-measure those areas with a steel tape or a hand laser.

"We have enjoyed great success with ZEB1 because we set expectations honestly within the practice; we are clear with all stakeholders that ZEB1 is not a fixed-point scanner and as a result you will not get a beautiful, dense, colourful point cloud. What you do get is a very fast way to measure a building far more comprehensively than you might with a tape measure and at a fraction of the cost associated with a fixed-point scanner." summarised Luke. *"For our needs the ZEB1 is perfect 95% of the time."*

About ZEB1

The ZEB1 is the first truly mobile lightweight hand-held laser scanner which is suitable for use in a number of applications including: mining, forensics, architecture, forestry, stock piles and for rapid visualisation.

ZEB1 Data Logger with Hand-Held Laser Scanner

"Survey in Motion" ZEB1 'Nodding' Laser Scanner

High-Quality Product Assembled in UK

With ZEB1 in hand the user can simply walk through the target survey environment while rapidly recording more than 40,000 measurement points per second without the need for external positioning data such as GNSS. The ZEB1 works best in feature-rich environments while on the move, so there is typically no need for targets and absolutely no need for a tripod. Once the data has been collected, it can be uploaded to the GeoSLAM Cloud, where SLAM software transforms the survey measurements into a fully registered point cloud. Thereafter, the data can be downloaded (on a pay-as-you-go basis) for use inside all major CAD software. With this finance-friendly business model, the GeoSLAM solution eliminates the need for upfront software costs and annual maintenance charges.

About GeoSLAM

GeoSLAM develops game-changing survey solutions including ZEB1, for the measurement and mapping of multi-level three-dimensional environments. Backed by winners with a track record for innovation, GeoSLAM is a joint venture between CSIRO (Australia's national science agency and the inventor of WiFi) and 3D Laser Mapping (the UK's leading provider of LiDAR solutions to the mining industry and the inventor of 'Street Mapper' – the world's most accurate mobile laser mapping system).

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