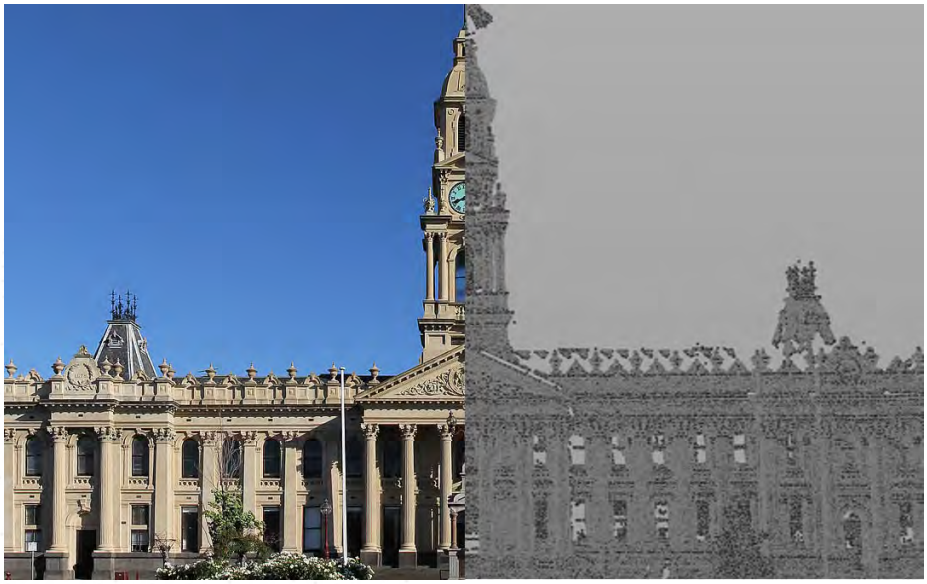
HOLLYWOOD TECHNOLOGY COMES TO SITE SURVEYING IN AUSTRALIA

Erik Birzulis is Managing Director of Landair Surveys, one of the first companies in Australia to adopt the use of 3D laser scanning for quarrying, plant and architectural work. With over 20 years surveying experience, he is able to put modern surveying into perspective and highlight the uses of 3D laser surveying for projects where complexity, size or need for extremely high accuracy are important factors.



In today's age of technology, the Hollywood movie industry provides a constant reminder of how quickly digital science is advancing. With every new release of an action-movie, CGI animators try to further out-do each other, turning fantasy into reality by using 'wire frame' models to create pixel-perfect vision.

This technology has also allowed huge advances in the real world of recording existing shapes, from topography and architecture to the human form. When the gathered data is converted to easily read wire frame modelling, you begin to see that it has enormous repercussions for surveying.

Laser scanning has long been used by the engineering industry and in medical practice. But until recently, all topographical relief mapping was done using the total station – a combined telescope and distance measuring device, or survey accurate GPS. This can be a time-consuming process when recording more complex environments. Today, many organizations that have very high data capture needs will opt for 3D laser scanning. Police forensics use scanners to gather crime and accident scene evidence; historical preservation groups scan data from old buildings; and archeological organizations scan dig sites and surrounding structures both before and during excavation.

The total station still plays a major role with most modern surveyors, including at Landair. However, as one of a few in the industry to take up 3D laser scanning, they can see how it's set to become the industry standard when making very accurate measurements in large or complex locations. It is ideal for measuring the high detail of 'as-built' shapes such as architectural constructions and plant equipment. With an instrument able to collect survey data at a rate of 1 million points per second and an effective range of 100 metres, the data for a complete 3D digital model can be collected in just a few hours, with far more information captured than by using traditional surveying techniques.

Instead of only gathering selected data, as in traditional surveying, 3D laser scanning puts all the information at your fingertips, without the need for additional expense or wasting time doing back-up surveys. By taking several scans from around a site or building, to prevent 'shadowing', a complete 3D model can be made with accuracy down to millimetres. The stored data can then be used to create 2D civil or architectural drawings, 3D computer models or final survey documents.

With measuring speeds up to a million points per second, laser scanning allows the work to be complete at maximum detail in minimum time. The scanning can be done from a safe distance so operations are not interrupted and, if necessary, can even be done in darkness.

As such, not only does it minimise the need for site interruptions at time of capture, but the efficiencies gained in capturing total site information at a greater accuracy - and thereby providing the opportunity to calculate all potential implications of a project prior to committing resources - makes it a more financially sound option for many company bottom lines.

Because the scanned data produces a fully workable 3D model of the entire site, it can then be used to view and measure every possible data point from every angle and reference point. So no matter where the scanning locations are on site, you can view the 3D model later from any angle.

While the movie industry inspires us with artificial reality created from wire-frame modeling, surveyors

are working in reverse re-creating reality that's dazzling in its speed, its accuracy and its ability to capture a degree of detail never seen before.

A QUICK HISTORY OF SURVEYING

1200s Chinese discover elements of the compass, using it as a fortune telling tool until, two centuries later, they hit upon the idea of using it to find direction.

1533 Invention of triangulation – making direction plots of the surrounding landscape from two separate standpoints.

1571 The theodolite was first mentioned in English surveying textbook, A Geometric practice named Pantrometria, describing how horizontal angles could be fixed.

1600-1800s Gradual development of altitude recording.

1840s Measurements become much more accurate with first 'transit theodolite', a short range telescope coupled to the compass, with the angle of measurement read off a steel plate. The telescope could be flipped in a vertical 'transit' for a reverse reading to double-check the measurement. Also, old fashioned 'chain' measure of distance is displaced by the steel tape measure, further enhancing accuracy.

1850-1950s Continuing refinements of theodolite.

1970s Electronic revolution, with the micro-chip, brings small, lightweight and easy-to-use distance measuring devices, called EDMs, mounted on the theodolite, and operated by transmitting a narrow beam of infrared light to a reflector and measuring the time it takes to return.

1979 US Department of Defence launches first of its constellation of 24 satellite vehicles, Global Positioning Systems (GPS). Their use for surveying is limited to areas where receivers have an unobstructed view of the sky.

1980s Miniaturisation, allowing electronic measurement of angles and the storage of digital data, which could be downloaded for calculations or CAD drafting. Their speed, accuracy and substantially lower cost make the modern 'total station' today's industry standard.

1990s First commercial use of 3D laser scanning for surveying.

2012 Landair Surveys introduces 3D laser scanning in Australia.

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