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GEOCOMP systems

Dimensions

POINT'N'SHOOT SURVEYING

Imagine you are called out to survey a complex structure you can't reach, like a church spire or a crane. The only gear you have with you is an ordinary digital camera. No worries: just take photos and your field survey s done.

How does this work?

It's pretty straightforward. Take digital photos at different angles of an object or place you want to survey. Scale them by using a known distance in two photos.

Go back to the office, load the pictures into your computer. Using iWitness, a new photogrammetric system for 3D-coordinate location, you mark pairs of points on the photos, as in our example. Keep marking pairs until iWitness has enough to compile an image of your subject. This is easy: an office junior could do it.

iWitness then constructs your object digitally. With care and several photos, you can pick up 20 mm differentials across the survey. You can adjust each point at pixel level.

iWitness works with anything you can measure, but is especially effective with building facades, landscaping projects, hilly terrain—anywhere you can get a stereo pair of photos.

The breakthrough

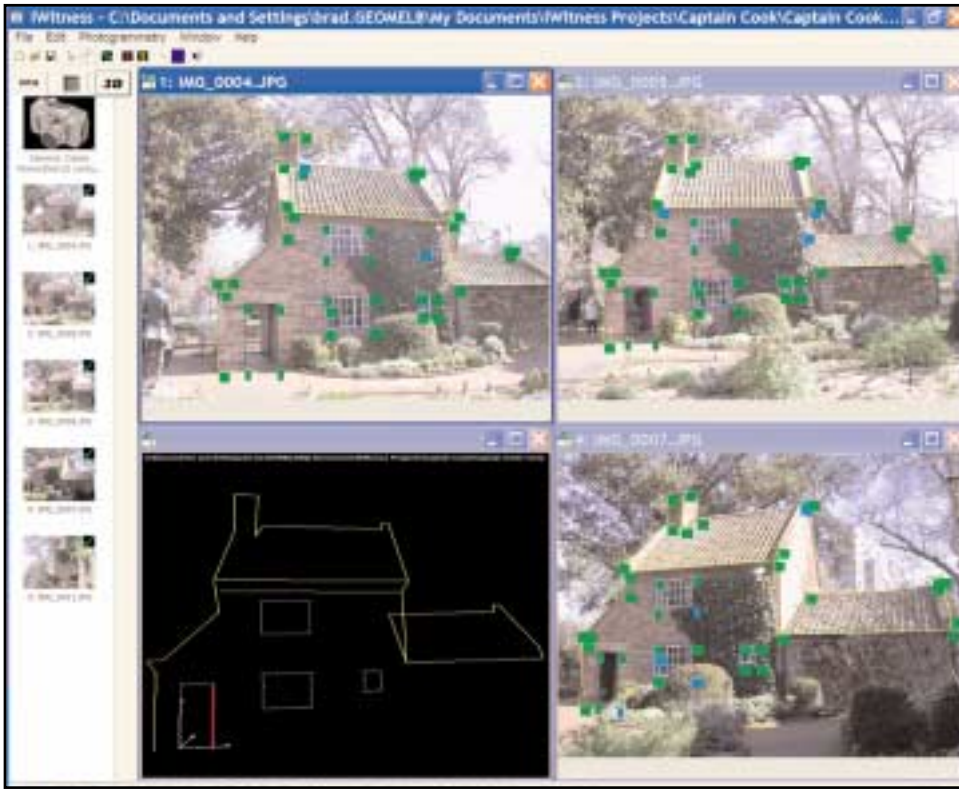
'This idea is not new, but the difficulty was calibrating cameras,' says Geocomp Systems' Jerry Cresp. 'The iWitness developers have now done the full-blown mathematics behind the calibrations, so the method is no longer restricted to highly accurate cameras.'

iWitness takes you through a short calibration sequence in which it works out the lens parameters for your camera. Do this once and iWitness recognises your camera forever. Repeat the process for each camera you use: several surveyors can use different cameras on-site and merge their information to create one model.

The possibilities are revolutionary: for example, Jerry's calibrated a mobile-phone camera. 'This would be rough'n'ready surveying made easy,' he explains. 'It'd be an excellent back-up for traditional survey methods: take photos in case you forget a point and it might save a trip back to the site.'

Mapping change

'Passing phenomena like floods and moving vehicles can be logistically difficult to survey. But two digital photos are all you'd need for iWitness,' says Jerry. 'And it's used in the US to map traffic accidents so the road can be cleared quickly.'



Above: Building a model of historic Cook's Cottage, Melbourne, with iWitness.

Compatibility. You can export iWitness data as DXF or feature-coded ASCII for use with Terramodel or any other CAD or survey software.

Who will use it? Surveyors, architects, construction site managers, quarry managers, landscape designers, golf course managers, housing developers, builders and renovators, council planning departments, town planners ... the list keeps growing. We ve even had a dressmaker look at it. Use your imagination!

Trials. Download a 30-day demo. The full program costs less than you d expect and comes with a comprehensive manual.

Support. Geocomp Systems

www.geocomp.com.au/iWitness

snippets

2004 Thornton-Smith Medal award

The 2004 Thornton-Smith Medal was recently awarded to Geocomp Systems Brad Quick.

This medal is awarded annually to a Melbourne University graduate who has made an outstanding contribution to engineering in the field of Geomatics.

The selection panel included the Head of Surveying in consultation with senior academic staff, the Dean of the Faculty of Engineering and the President of the Institute of Surveyors, Victoria.

The prize commemorates Associate Professor Jim Thornton-Smith, Foundation Head of the University s Department of Surveying who was instrumental in introducing the Bachelor of Surveying in 1948.

Tennis champs

Inspired by the success of Andre Agassi in his tennis twilight, Geocomp System s veterans Brad Quick and Jerry Cresp have again won the Allan Van Tennis Cup. After their victory, *Dimensions* spoke to the pair as they emerged from recovery in the hyperbaric chamber.

Each year the competition seems to get younger, said Brad. But we re confident medical science can keep us competitive long enough to defend our title.

Importing experience

A Civil Designer with 18 years experience in road construction, including Terramodel and AutoCAD, is hoping to migrate to Australia from Mauritius. If you would like a copy of his CV, please let us know.

industry news

GPSLocate

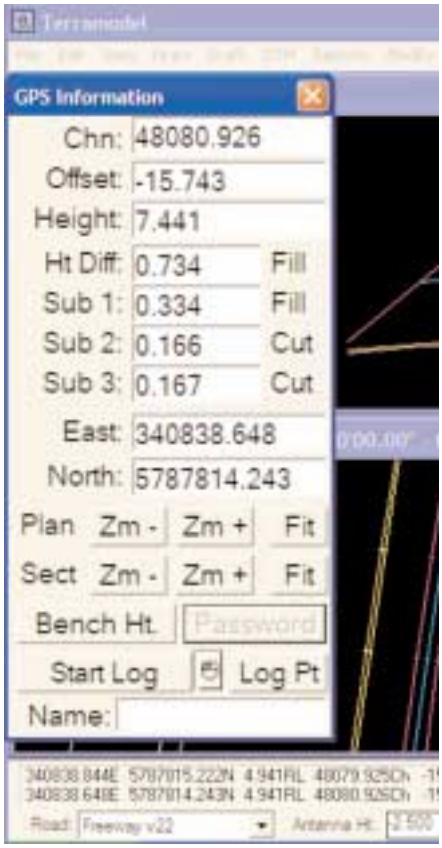
Dimensions readers will be aware of the tremendous technological advances in earth-moving machine control. The promise sounds fantastic: no more pegs, no more stringlines.

These systems are being used on massive bulldozers in mines and even tractor scrapers renovating historic golf greens.

It's not cheap though, and while it makes great economic sense on big jobs, on some projects this technology can be like using a sledgehammer to crack the proverbial walnut.

For example, when your site supervisors come to check progress, the lack of visual guides means they can't tell exactly where they are by chainage, nor offset nor height. Yet their car may be in the middle of a site with an expensive and accurate DGPS network! You *could* put another plant-operator display system in the car, but there's an easier, cheaper way.

Install GPSLocate on a rugged Windows XP tablet PC with Terramodel and GPS. This neat system (pictured below) can show the site supervisor exactly what's going on in plan, section or profile in real time and space. They'll be able to see the design surfaces and remaining depth of cut or fill, log vehicle movements for a terrain model and even show the number of compactor passes.



Contact Geocomp Systems to tailor an on-site tracking system to suit your needs.

Mitcham–Frankston tollway under construction

ConnectEast consortium (Macquarie Bank, Thiess and John Holland) has successfully bid for the $2.5 billion 39 km Mitcham-Frankston tollway in Melbourne.

Australia's largest urban road project includes 88 bridges, 19 exits, 40 km of pedestrian and cycling paths, a $200 million public transport package, and tunnels under 1.6 km of sensitive habitat.

The project is expected to generate 6500 jobs, with $600 million in construction yearly for the next 4 years. A further 12,000 jobs are anticipated in downstream industries during the construction phase.

Geocomp Systems is consulting to this project.

At last: the definitive data transfer standard?

Every industry needs a good data transfer standard. The latest civil and survey standard is LandXML.

See www.landxml.org

Most relevant software applications including Terramodel, support the core features of this format. Already it is an easy way to exchange data with Autodesk, Bentley, Leica and Carlson software. In New Zealand, it's used for fully electronic survey lodgement.

expert advice

Terramodel 10.40 released

Last year, we supplied Terramodel with Geocomp Update for 10.30 by CD and 10.31 by email. If you didn't get the update email, we may have your old email address. We recently released Terramodel 10.40 by CD.

Some important changes between 10.30 and 10.40 include:

- New GCCOORD command with current Australian coordinate systems converts plines
- GCHALEDT Edit horizontal alignments
- Import AutoCAD 2004/2005 DWG and DXF files
- New EARTHWORK and XVOLUMES commands.

Plotting order

In Terramodel and Geocomp, the most recently created objects are displayed and plotted last. But what if the text is plotted over hatching? To force the objects to plot in pen number order, select "Sort by Pen" when you plot from Terramodel. In Geocomp, use SDS 268 or SDS 70.

WEB SITES

www.pdfmachine.com

PDFMachineWhite from Broadgun Software in Melbourne is a handy Adobe PDF-generator which works easily with Terramodel and other Windows applications. Preview your plots or supply them by email.

PDFMachineWhite is available as a free download. Extra features such as editing and password protection are available for purchase.

www.drainspotting.com

Eccentric? Yes, but if you spend just 10 minutes looking at this site, it will change the way you view the streets of your city as you walk around.

Drainspotting (the site) began in 2002 and now features more than 650 photos of drain covers from Luxembourg, Japan, Belgium, Canada and the US, to name a few. And in their words, some of the metal artwork is “pretty cool”.

www.bentley.com

The Bentley Systems web site has a couple of handy programs for (rather large) download.

Bentley View (free) displays current versions of Microstation DGN and AutoCAD DWG and DXF files.

Bentley Redline (trial) can also convert Microstation V8 to V7.

And you’ve got problems with co-ordinate systems?

We recently received this message from one of our clients in the United States.

Don’t get me started on "old strange units". I grew up with these "feet and fractional parts called inches" and I thought it was quite good until I learned the metric system. I like metric. It makes too much sense.

For a short while, the US had a nationwide incentive to convert to metric. The result? We prepared our engineering plans in metric but then our crew had to lay them out in feet and tenths of feet so laborers could work with units they understood. A mess. Conversion to metric should have been mandatory.

To complicate things, the US was surveyed in units called "chains and links" and property was originally described in "rods", but with the advent of GPS, government agencies are requiring lat. and long. on applications.

There s more. In our area, we have multiple vertical datums. We were fine with the national datum (NGVD29) until the government adjusted it (NGVD88), even though all of our local benchmarks are still on NGVD29.

That is, of course, until we get close to Lake St Clair, where the US Corps of Engineers have their own units called IGLD (International Great Lakes Datum), a variable datum depending on when the Corps established or adjusted their benchmarks.

So, if we are near the Lakes, we could have a recorded benchmark that is on one of 5 different units, all of which are within a two foot (0.6 metres, 24 inches, .03 chains, 3.03 links, .12 rods) range. That holds true only if we are north of Detroit, which has its own vertical datum.

Oh yeah, I nearly forgot. The French private claims (abundant in this part of Michigan) predate the US surveys, and have an area unit called an arpent as opposed to acres or hectares.

This gives me confidence I have job security as a surveyor because the public can come to me to sort out these different units. I just hope they can find me, since there is now a movement to change my title from surveyor to "geomatician".

in action

partners in change

I ve put roads across rocks and across soft ground.

This week Peter Cobden is planning irrigation for rice and cotton plantations in central New South Wales. A month ago he was designing roads and calculating volumes for a quarry, and occasionally he surveys potential vineyards.

For the past decade, Peter has been principal of Farm Design Services in Bendigo, Victoria. He started his company with an auto level, tape measure and log book and decided that when the volume of his work increased, he would find the technology to handle it.

Peter became one of the earliest Terramodel users in Australia.

'I was using three different programs: one for road design for a few months, another for irrigation projects for a couple of months, then a third for drafting. I almost needed to relearn the programs each time because I wasn't using them enough.' He replaced all three with Terramodel.

'It was a lot of work to learn how to use it—but remember, I was replacing three programs.'

Fairly soon, Peter was testing the outer limits of what Terramodel could do.

'The back-up support is excellent,' says Peter. 'I'd try to use the software for things it was not specifically designed for, so inevitably I'd hit problems and would contact Geocomp Systems helpline. They'd always come up with ways to get me working better.'

Terramodel worked well with all his surveying equipment. Once he settled into using it, he went on to buy an RTK GPS portable base station. 'The beauty of Terramodel is that it integrates seamlessly with all these gadgets.'

'My gear works just as effectively on major projects as on very small jobs.'

"I ve planned a 750-acre vineyard and a vineyard for a 2-acre block.

And I ve produced flood irrigation plans for a 1000-hectare farm and a 3 hectare farm.

All in a year s work

Peter works on a wide range of projects in any given year. Here he speaks about just a few.

Vineyards

I produce contour maps in Terramodel. These are sent to a viticulturist who works out the variety of grape (based on soil types) to plant and the direction the rows will run. When the soil-type plan comes back to me I use Terramodel to work out the hydraulic design and drainage. I download the completed design direct to my surveying equipment, take it out to the site and peg it out.

Rice growing

In central NSW, its not uncommon to bring water to a farm from 20 km distant and recycle it back again. Rice growing is now very different to methods used 40 years ago. I m working with government agencies and farmers on ways to save water.

Effects of the drought

Its almost impossible to get permission to build a farm dam now—they are totally restricted in some areas. The flipside is that, unlike a decade ago, I haven t worked on erosion studies or flood-control designs for quite some time.

geocomp systems

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HELP HOTLINE
For Customer Care Members with queries about using our software.

We aim to respond to your call within 1 hour.

Toll free: 1800 800 754 (in Australia)
Email: support@geocomp.com.au

8.30 am—5.30 pm Melbourne time, each working day

PRODUCTS

GeoCalc	GeoNav	Geocomp
Terramodel	Visualizer	GCGeocode
iWitness	Paydirt Sitework & Roadwork	

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