GEOCOMP *systems*

DIMENSIONS

APPLES FOR THE TEACHER

Do you fantasize about setting up your surveying gear to define property boundaries in featureless embryonic subdivisions? No?

Well, your dreams might be more like Ben Craig's memories of working in Kazakhstan, the ninth largest country in the world, lying at the heart of the largest continent.

Russia abuts the country's northern borders. From the east where Kazakhstan touches fingertips with Mongolia, the border runs to the Caspian Sea in the southwest, passing Kyrgyzstan, Uzbekistan and Turkmenistan along the way.

On behalf of Engineering Ministries International, surveyor Ben Craig travelled to the country's main town, Almaty.

Sound remote? On the contrary— Almaty, population about 1.4 million, lies on the old Silk Road and today hosts a diverse population of expats. Among other attractions, the Almaty region is the ancient source of the domestic apple, and the great genetic diversity of its wild apples creates interest internationally.

Ben's job was to do a topographic survey of the site chosen for a new international school, to be designed by a team of engineers and architects.

Since 1966, the earthquake-prone region had imposed tougher construction standards on new buildings.

'The old school building was considered at risk of severe earthquakes.'

'It was also located in an area earmarked for redevelopment,' Ben explained.

A 9.2 ha site had been bought to build a new school for up to 500 children from kindergarten through senior years. It was located on the fringes of the city, in an old orchard surrounded by farms with views to the Tien Shan massif.

Ben's survey worked out the site's drainage pattern and this in turn, enabled decisions about where roads and other infrastructure would be built. 'Sewage was to be treated on site, so understanding the land's slope was fundamental,' Ben said.

'The school also wanted to keep as many of the fruit trees as possible, so I needed to locate the denser areas of vegetation on my map for the designers.'

'The other notable feature was a yurt near the site's northwest corner.'

'I had worked in Asia before, in Thailand's hill-tribe areas, preparing sites for schools and community centres. That work gave me the experience to know what to do when there's not a lot of high-tech equipment to rely on.'

The rural fringe of the the city of Almaty, Kazakhstan, in the shadow of the Tien Shan ranges, central Asia. Orchards in the foreground. Photo: Vassiliy Mikhailin, iStockphoto.com

INDUSTRY NEWS

If you've ever left the city limits and driven through dairying country, you may have seen industrial-sized irrigators.

The irrigator works as a series of arms held aloft and attached to wheels, enabling the arms to spin in a circle around a centre pivot.

There's a question of scale here: the main supporting posts can be 4–6 metres tall and depending on the number of arm extensions, these irrigators can be more than 1000 metres long. These machines are what your backyard sprinkler wants to be when it grows up.

As you've driven past, you might not have thought about how farmers might set up a flotilla of irrigators across their properties. Luckily, Geocomp Systems' Brad Quick has put his mind to it, because his new software will make irrigation more efficient.

Ultimately, if farmers get this right it means they can grow pastures in hilly, dissected country where they otherwise couldn't. In Tasmania, Gippsland and New Zealand, this is an immediate issue.

'On flat land, this is relatively straightforward to work out,' said Brad.

'However, once a property has a couple of hills, things become much more complicated.'

'For example, on land with a hill to one side, a 200-metre arm won't irrigate a direct distance of 200 metres because you need to allow for it rolling up the slope and down again. The distance that the arm can reach varies with the slopes it encounters.'

Working out your irrigation plan becomes trickier than simply drawing rows of perfect circles on a map. 'You need to work out the location of the central point and the height and span of the main irrigation arms,' Brad said.

'You also need to make sure that cows can walk under the angled arms safely near the hill slopes.'

'And you need to keep any bending and twisting at the knuckle points within manufacturer's specifications.'

'If the wheel-climb slopes are too steep, the motors might fail or the irrigator might fall over.'

'To work out your watering pattern, you need to determine whether the pivot will fit the pattern that you want to use or whether you need to re-shape the land to make it fit!'

Farmers will sometimes call in irrigation designers to help determine best fit, but also to find the most economical form of land sculpting, given the high cost of moving earth around.

Brad's new Terramodel adaptation can do the process for you. To find out more, contact Geocomp Systems.

NO-YOU CAN'T HAVE RAINCOATS
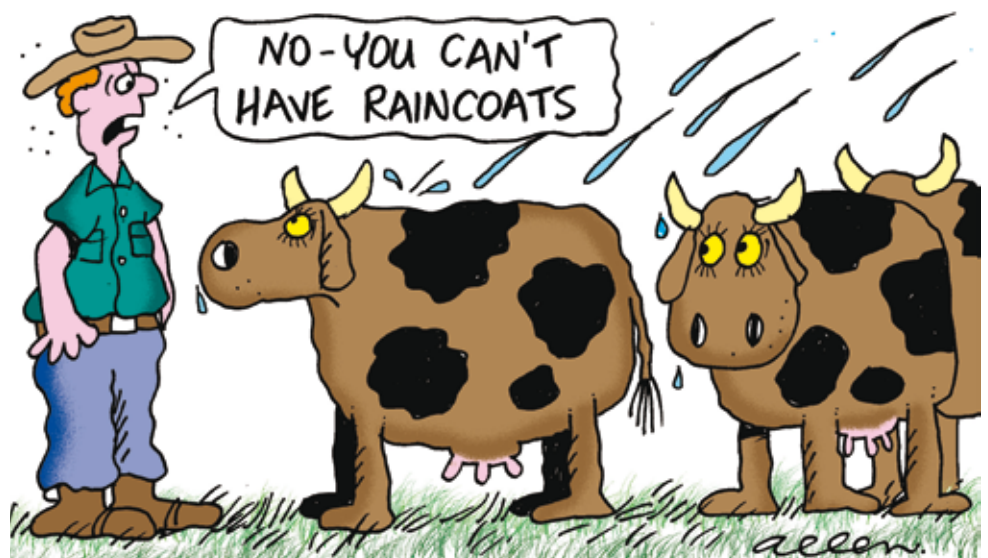
EXPERT ADVICE

The latest hints and tips from our experts

Geocomp

The current version of Geocomp is 10.2. See www.printfil.com for an easy way to print from Geocomp to Windows printers, including to PDF.

Latest TMLs

In April this year we released Terramodel 10.60G on CD to all our Customer Care Members. The 'G' suffix indicates that the CD includes our Geocomp Updates.

Since then we have released Terramodel 10.61G with the latest TMLs (in September). If you haven't received any of these, please let us know.

Our longest set of release notes so far lists the many new features.

In the Help menu, there is now a DOCUMENTS command. This opens a page that lists all the manuals, tutorials, worked examples, etc., that we have collected and installed into the C:\Program files\Trimble\Terramodel\Geocomp\Docs folder. Now you can read these even when your IT department won't let you keep the installation CD.

Colour Palettes

The PALETTE command allows you to choose which colours are displayed on the screen for all projects. You can switch between the palettes and colourmaps at any time. We prefer palette Geocomp 64 and colourmap One_to_one_64.

If you want the colours in Terramodel to match the colours in TVLITE or Visualizer, select the Default palette and OldPalToDefault colourmap. Then open twin lakes.pro from that \Docs folder into Terramodel to see a great example of point colours controlling the triangle colours in TVLITE.

Alignment editing

GCHALEDT and GCPRFEDT will help you edit alignments graphically.

Trimble SCS900

You can import surveys from SCS900 by CSV file or DXF, but for best results use our new SCS900IN command which reads the SCS900 survey report directly.

GCACTIVE

Many alignment and roadway functions require you to select an alignment. This is easier if you have chosen an active alignment first, but it's so easy to pick the wrong one. GCACTIVE lets you choose the active alignment from your registered HALs, then redo the current roadjob, layers, xlines and DTM.

Transformation

You can transform selected objects with respect to pairs of control and data points. The data points are in the coordinate system where you are now, and the control points have corresponding locations where you want to be.

To transfer from one local system to another use GC07—the Helmert transformation—which computes factors for scale, translation and rotation.

For digitising, GC38 has factors for both X and Y axes.

GC3DADJ is a 3D conformal adjustment. You can use this to check if a bridge or building component constructed on the ground will fit into the space prepared for it.

Leica GradeSmart

The new GRADESMT command creates the CL, 2D plan, 3D string layer or DTM files for Leica GradeSmart 3D machine control.

Latitude and Longitude

In these GPS times, we need ways to import and export latitude and longitude and transform lat/long to coordinate systems such as MGA.

If you have imported X and Y data with decimal lat/long coordinates, you can use GCCOORD to transform your data to metres.

The GPX format is for exchange between GPS receivers. We have GCGPXIN and GPXOUT commands for this. See www.topografix.com/gpx

To export to Google Earth in KML format, use GCKMLOUT command. To import point and lines, use GCKMLIN. In Google Earth, you can also select what layers you want visible then Save an image which you can then use in Terramodel Image Manager. KMZ files are simply zipped KML files.

Apples for the Teacher

'We had to work out where to start on this unfenced site. A hand-held GPS did the trick, giving us a rough idea of coordinates and our height above sea level. We chose an arbitrary north point.'

'After setting the site coordinate datum, the rest of the data gathering was done using a Trimble 5603, temporary benchmarks (TBMs), hammers, wooden stakes and line-of-sight,' said Ben.

'This was trickier than it sounds, as it was late summer with long grass and wildflowers all over the site—beautiful!—but we needed to make sure we could see the target.

And I couldn't always maintain line-of-sight amid the fruit trees!'

'Luckily, a local teenager enjoyed helping me to relock the total station manually.'

The survey—to 1 metre contours—took only three days using Ben's process of setting TBMs, resecting them and working the rest of the site relative to them.

Ben transferred the data to Terramodel to create the plot.

'We rotated our arbitrary north point to fit the GPS north—it turned out we were only 3 degrees off the mark.'

Then the EMI team of two architects, a civil engineer, a draftsman and an electrical engineer took over and completed the design in record time.

'It was an incredible week's work, made even more memorable by a trek up the mountains through Shymbulak ski resort to the top of the Talgar Pass at 3200 metres above the sea.'

Almaty will host the Asian Winter Games at Shymbulak in 2011. Children from the new Tien Shan International School may take part in the celebrations, but one thing's for sure—there'll be apples for everyone.

To read about Ben's survey in detail, see the September 2009 issue of Professional Surveyor Magazine *at www.profsurv.com.*

Ben Craig currently conducts Terramodel training for Geocomp Systems.

Map left: Almaty, near the Kazakhstan border. Elena Elisseeva, www.iStockphoto.com

Photo top: Ben Craig on location near Almaty, Kazakhstan.

Engineering Ministries International (EMI) is a non-profit organisation of architects, engineers and design professionals who donate their skills to help children and families around the world step out of poverty and into a world of hope.

See their website at www.emiworld.org