DIMENSIONS

IN THE GLOBE'S CORNERS—GEOCOMP!

**Use these clues to guess where British surveyors Tony Hayes and Derek McFall work:
they are employed by a Norwegian offshore construction company (Stolt) out of Paris;
Tony commutes from Cyprus, Derek lives near Newcastle, UK;
the best way to telephone them is to ring Aberdeen, Scotland, and ask for their extension;
and their survey software support is from Melbourne, Australia.**

Of course, it could only be Western Africa. Cabinda, Angola, to be precise.

Their office base is a corrugated zinc-alum shed ("quite comfortable inside") in a company town in Cabinda province, which is an enclave wedged between the Atlantic Ocean and the two Congo republics.

ChevronTexaco's oil finds since 1977 have helped to make Angola one of the world's richest deep-water oil discovery regions in recent years. The company is Angola's largest petroleum producer, with a combined yield of nearly 600,000 barrels of oil a day, 50% of which is destined for the USA. Cabinda's output accounts for more than two-thirds of Angola's total oil production.

"Essentially, Derek and I provide all the municipal surveying services for the oil settlement, or 'camp' as it's called," says Tony. "Our jobs range from the simplest to the most complex and include all aspects of topographical survey, construction survey, setting out, mapping and so on. Sometimes we set out oil tank sites—there's always something being built."

"Cabinda town, 21 km to the south, has the faded grandeur of a former Portuguese colonial town. Other settlements are mainly bush villages of huts," says Tony. "The hinterland forests are home to gorillas, chimps and elephants. I used to travel outside the camp quite a lot, but since a spate of kidnappings we stay mostly inside."

"The camp houses 1200 men—no families. At least another 2000 more come in each day, mostly from Cabinda town," says Tony.

Eighty per cent of the jobs here are held by Angolan nationals and about half of the on-site population is expatriate. "We have about 60 nationalities here. The main groups are British, Americans, Angolans, French, Lebanese, South Africans, Canadians, Dutch, Italians, and Australians."

"It's a big operation. For example, the canteen makes about 3000 meals each day for lunch."

"The engineers do all the design work from our Geocomp data files. Other than drainage—we do that," says Tony. "Sometimes we send our Geocomp files to the US. Increasingly people will use us for GIS work, like finding under-ground pipes and work sites."

"We've been using Geocomp since 1990. We gather data with a total station and do post-processing using desktop computers with Geocomp survey software."

"Before we began using Geocomp, we were doing hand drawings, and still did them until 1995 when we had the drawings digitised."

Tony has worked 28 days on and 28 days off since 1988. Derek McFall joined him on rotation in 1995.

The work itself might sound straight-forward, but Tony once caused a riot by putting a survey mark in a garden in Cabinda town. "It was at someone else's instructions, but the mob came to find me with machetes."

While some of their more complex calculations are well within the ambit of our expert helpline, this was one of those situations in which we were unable to offer our usual timely, accurate technical advice.
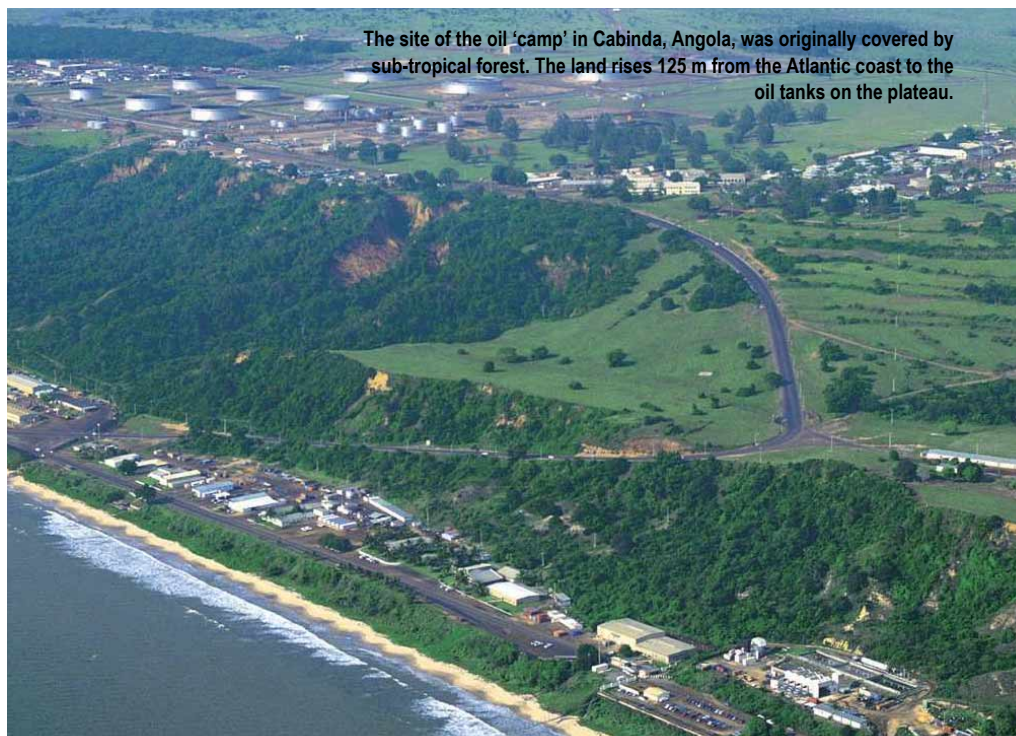
The site of the oil 'camp' in Cabinda, Angola, was originally covered by sub-tropical forest. The land rises 125 m from the Atlantic coast to the oil tanks on the plateau.

IN THE NEWS

LOCATING A MODERN-DAY SHIPWRECK

A new look at one of Australia's most extraordinary maritime accidents.

The Tasman Bridge over the Derwent River in Hobart, Tasmania, was opened in 1964. This 1.5-km five-lane arch over the estuary saved having to cross the river by ferry, or travelling 35 km to a road bridge upstream.

In January 1975 the ore carrier *SS Lake Illawarra* cruised up the river with a cargo of zinc. Captain Pelc's approach to the bridge was doomed—too fast and at the wrong angle. The ship rammed Pillars 18 and 19 near the eastern shore.

A massive section of the roadway fell, crashing on to the vessel and spilling cars into the water. The ship sank 35 m to the river bed, close to Pillar 19.

It took nearly three years to repair the spans. Until the bridge re-opened in October 1977, Hobart's residents had to struggle to maintain their connections across the river. Pillar 18 was never replaced; instead there is a wider gap for ships to travel through.

Water craft pass right over the wreck every day on their way up and down stream.

The ship's paint is still visible under a surface layer of mud, rust-coloured algae and jewel anemones, although the water visibility is 1 metre.

Late last year, while Geocomp Systems were training Hydro Tasmania to use their newly-installed GeoNav Hydrographic Data Management System, the images below were recorded by a Reson Navisound 215 sounder connected to a Reson TC2166 dual side 200 kHz side-looking sonar transducer.
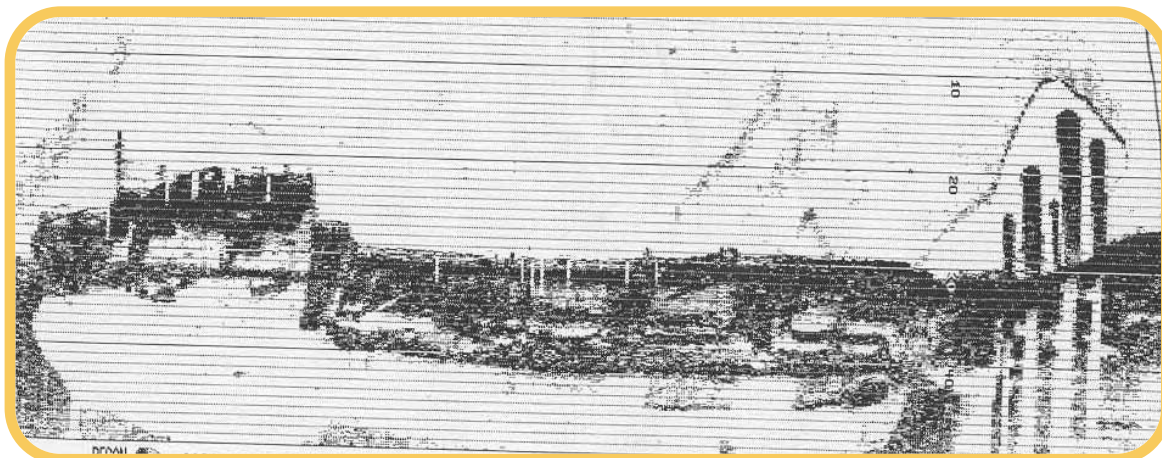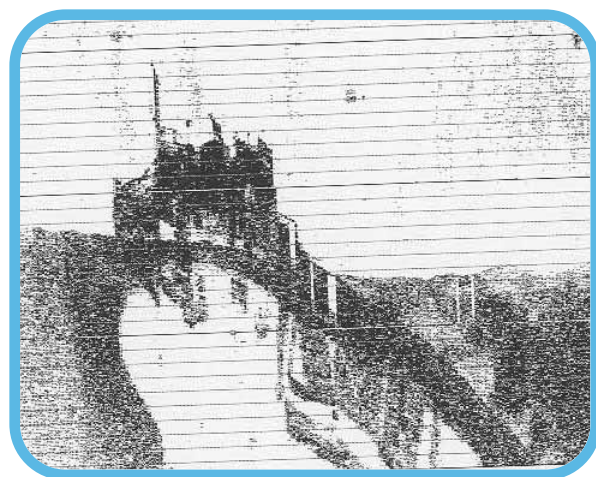
Scans showing the sunken SS Lake Illawarra *on the Derwent River bed.*

Top: a view of the stern of the ship.

Left: a side view, showing the ship's proximity to Pillar 19.

EXPERT ADVICE

Once upon a time, CAD stood for Computer-Aided Drafting. Nowadays, CAD companies would like us to believe that it stands for Computer-Aided Design, but the drafting origins are still evident in their data structures. This has important implications for data transfer between 3D applications.

Geocaching for dogs

Geocomp, Terramodel and CivilCAD are point-based applications which define arcs relative to these points. This is quite different to the string-based 3D model used by AutoCAD DWG and DXF and Microstation DGN files.

Lack of connectivity of strings results in well-known duplicate point problems, but arcs have peculiar problems in 3D for civil and survey applications.

AutoCAD, for example, defines an arc by the 3D coordinate of the centre point and the radius and bearings to the tangent points. This uses only one elevation, not three. Even if each arc had its own User Coordinate System, this would just place the arc in 3D space.

This is ideal for mechanical applications, but is not suitable for survey or civil engineering which generally consider that the arc is a true arc in plan, with two or three points that control heights interpolated from the arc.

Therefore, avoid DWG, DXF and DGN files for transferring 3D engineering or survey data to or from any application unless you have a clear understanding of what will happen to any arcs.

Exporting arcs

If it must be an arc, create a 2D arc. If it must be 3D, approximate an arc with a series of short 3D chords.

For Terramodel, before you export 3D arcs to DXF, DWG or DGN, either replace arcs with 3D chords use ARCBREAK or add 3D chords using ARCBL. For Geocomp, you choose whether to export arcs or chords during the export.

Moss Genio files store arcs as a series of chords, except for alignments, so transferring via a Genio file is often the simplest solution.

The Geocomp 'Points and Strings' format defines arcs by three points, any of which can be 3D. This is an excellent way to transfer 3D arc information between applications that export and import this format. Arcs defined by a centre point and two tangent points transfer neatly.

Arcs defined by three points on the arc, such as in Geocomp, are broken up into two centre-point arcs when imported into applic-ations (such as Terramodel) that don't store three-point arcs as a single element. Some applications do not store the height from the mid-point. To create a three-point arc in Terramodel, use GC3PTARC to create two centre-point arcs in a set.

Wherever you can, use the native transfer format for one of the two applications. If two applications don't have a common point-based transfer format, often transferring via Geocomp or Terramodel is better than relying on DXF.

Both Geocomp and Terramodel include conversions for CivilCAD, MOSS Genio, Surpac, Wescom, DXF, DGN, ASCII, Mapinfo, Kork and a wide range of other survey, hydrographic and alignment formats.

Terramodel can also import or export DWG, ESRI SHP, 12DA, Quantm, TPSetout, TPStakeout, HEC-RAS, Keays, Minespace, QSurv, Caice, Geopak, Trimble, VRML, LandXML, and of course, Geocomp data. Most conversions are included as standard options.

PaperSpace

AutoCAD Release 11 introduced PaperSpace. This is equivalent to the Sheet view in Terramodel, so DWG and DXF data from the Terramodel Sheet view is usually exported to PaperSpace.

AutoCAD users unfamiliar with PaperSpace often don't know what to do when confronted with blank ModelSpace. A simple way to help them out is to export the data in AutoCAD R10 format (as Geocomp does automatically) so all data comes out in ModelSpace.

Similarly, Terramodel imports ModelSpace data into Plan view and PaperSpace data into Sheet view.

Updates

Terramodel 10.30: now with tunnels

Our upgrade to Terramodel 10.30 offers:

- New tunnel features which make working with tunnels much easier.
- Support for the Trimble SCS900 Site Controller System.
- More Nikon communication options.

Working with tunnels

Terramodel now includes better support for engineers and surveyors who work on underground projects. Using a HAL and a VAL, the TunnelDTM command *unwraps* the points on a specified layer into a special coordinate system. This enables the Terramodel DTM engine to link the points, even though the points may overlap if viewed from above. Other commands improved to suit tunnelling include Visualizer, TVLITE, RDX, XSHEET, SHAPE, EARTHWRK, ROADDTM, XSECTIONEDT, COLORCODE and COLORPT.

The *Tunnel Training Guide* and example files are included in the \Examples\Tunneling folder on the Terramodel CD. The Guide explains the capabilities and limitations of working with tunnel data.

Some menu files now include a Tunnels menu of tunnel-related commands.

Trimble SCS900

Terramodel 10.30 has added support for the Trimble SCS900 Site Controller System.

This system uses GPS to allow construction site supervisors to easily compare design surfaces with their current position, check grades, setout, and measure elevations and differences.

Import/Export support for Nikon

The Import and Export commands now support raw data and coordinate data from the 300 and 500 series instruments. Coordinates as well as feature code (.lst) files can be uploaded to these instruments.

The colours on this tunnel wall indicate the difference between the as-built survey and the design.

GEOCOMP SYSTEMS

HEAD OFFICE
2 Albert Street, Blackburn 3130
Victoria, Australia

Tel: +61 3 9877 8400
Fax: +61 3 9877 8411

Email: info@geocomp.com.au
Web: www.geocomp.com.au

NORTH QUEENSLAND OFFICE
6 Carisbrooke Court, Townsville 4814
Queensland, Australia

Tel: +61 7 4755 0521
Fax: +61 7 4755 0523
Email: Barry.Smith@geocomp.com.au

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

We aim to respond to your call 95% of the time within 30 minutes, and 100% of the time within 2 hours.

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
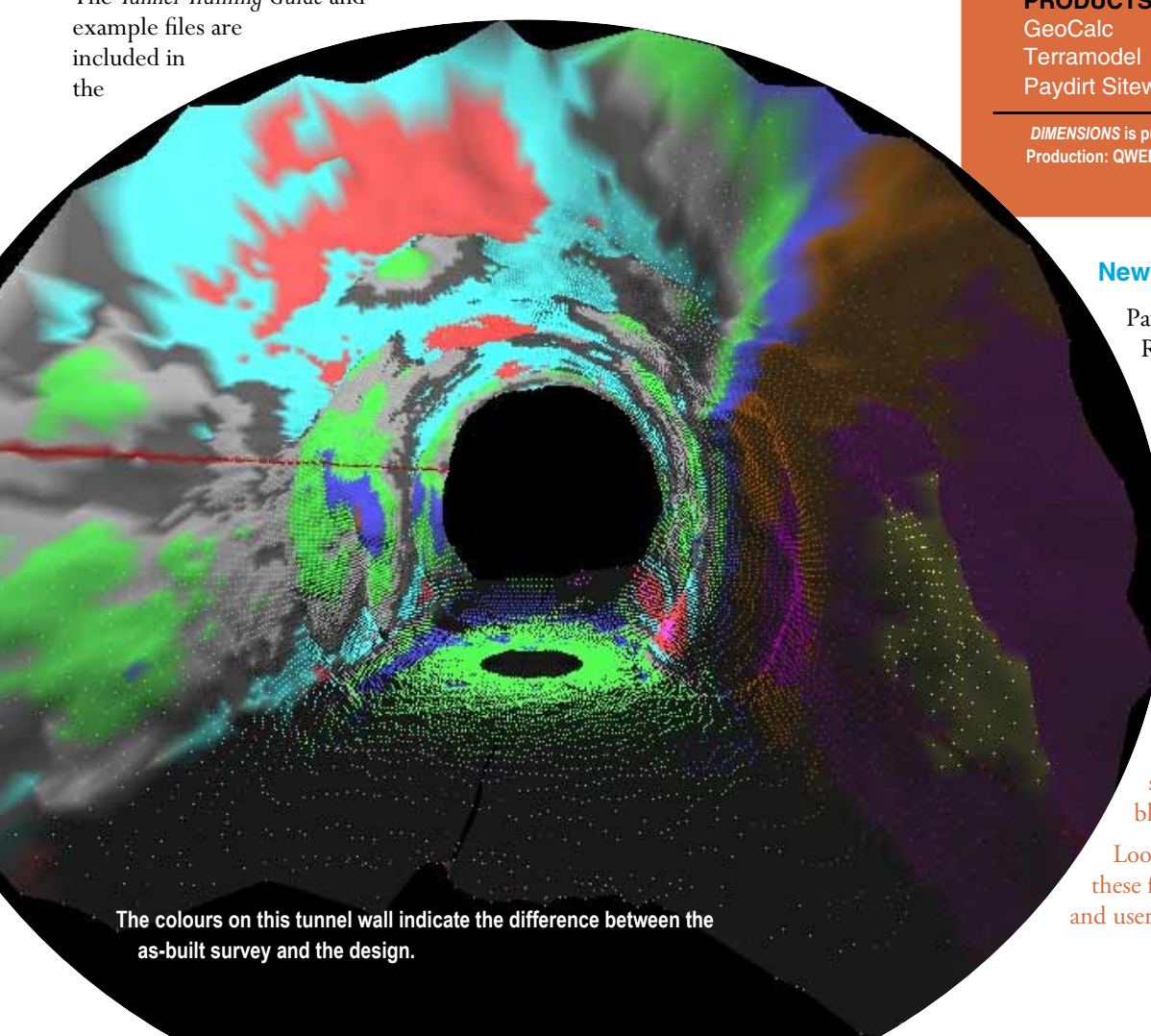Paydirt Sitework and Roadwork

New Paydirt CD

Paydirt Sitework 5.2.1 and Roadwork 2.03 have just been released in Australia. These include better communication with Terramodel and automatic contour closing.

Tips

Terramodel tips, which were previously only available on the web, are now included on the installation CD. These include a graphical table showing standard Terramodel blocks.

Look in \Documentation for these folders and lots of training and user guides.