

VULCAN MODELS COAL FOR VALE MOZAMBIQUE

Vale has been operating in Mozambique since 2004, after winning a tender to exploit one of the largest carbon deposits in the world.

The Moatize operation, outside the city of Tete in northwest Mozambique, will produce thermal and metallurgical coal. Operations are due to start in late 2011. Initial production capacity is planned to reach 11 million metric tonnes per year over the first few years – 8.5 million metallurgical and 2.5 million thermal.

Vale Mozambique started using Maptek Vulcan™ in 2008 to meet part of their initial operational needs. The first modules were acquired for stratigraphic modelling and mine planning. This was later expanded to include Vulcan Chronos scheduling and optimisation.

The company also took delivery of a Maptek I-Site™ 8800 long range laser scanning system in December 2010,


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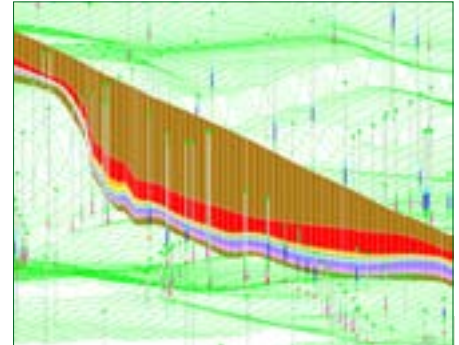
for end of month survey and open pit volumetric management. Coal geology mapping is streamlined using the I-Site 8800's integrated high resolution 3D digital panoramic camera.

Vulcan's HARP block model functionality has provided mine planners with accurate quality and volume information. This would not have been possible using traditional grid based models because of inaccuracies modelling the dipping coal seams (between 6°-15°).

Block modelling functionality allowed Vale to link mine planning aspects to the geological information in one mine planning model. The dipping seams will be mined in horizontal benches. Using a block model will aid in grade control procedures of product and waste handling.

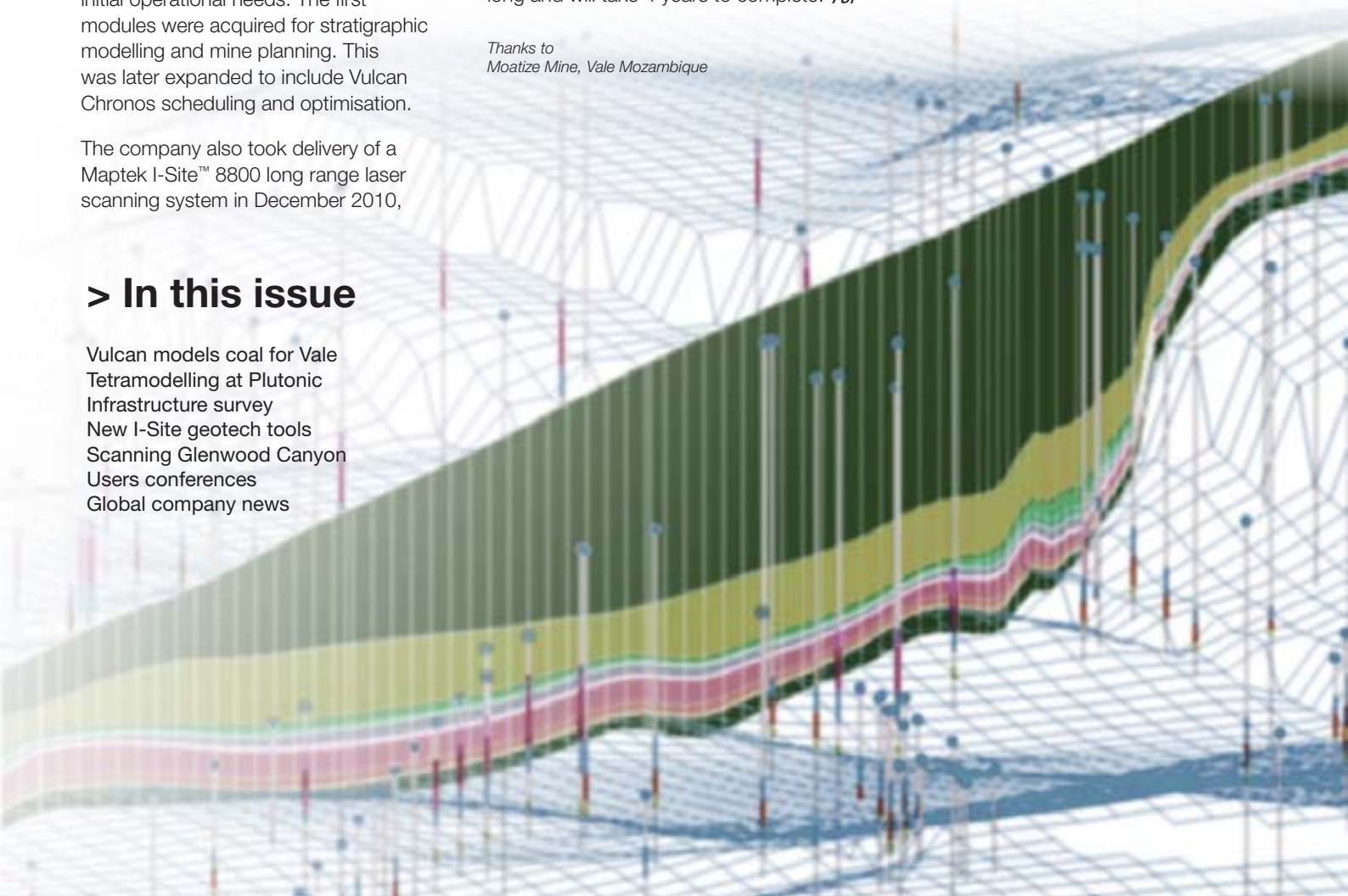
As part of the infrastructure upgrade Vale is constructing a new railway to the port town of Nacala. This will allow annual production to be pushed up to 15 mta by 2015. The railway is approximately 800 km long and will take 4 years to complete. 

*Thanks to
Moatize Mine, Vale Mozambique*



The image displays:

- boreholes drilled into the deposit
- the structure floor grid of one seam
- fault lines cutting the seams
- a HARP model through the centre of the deposit showing overburden blocks in brown and coal seams in various colours



TETRAMODELS AT PLUTONIC

At Barrick Plutonic Gold Mine, approximately 800km northeast of Perth in Western Australia, mineralisation regularly occurs as shallowly to steeply dipping, parallel lodes.

Some mineralised zones or resource areas contain hundreds of multiple sub-parallel lodes. Traditional models generally require a wireframe for each lode, with most of the domains having more than 100 modelled lodes. For one model the wireframing process took 8 months.

The tetramodelling functionality in Maptek Vulcan™ is designed for unfolding and grade estimation of deformed stratabound deposits. It can be applied to any deposit where mineralisation is controlled by stratigraphic or structural surfaces that can be modelled.

Using a distorted search ellipse that follows a modelled surface allows the block model and all the samples used for estimation to stay in their true position. So without unfolding or changing the original position of the blocks and the estimation samples, Vulcan can generate an accurate grade estimate.

By avoiding complex unfolding and refolding, tetramodelling reduces the chances of translational errors.

Tetramodelling was successfully tested on several resource areas of the Plutonic

Gold Mine containing multiple sub-parallel lodes. The results were close to traditional modelling for most of these areas.

Tetramodels were created using a single surface modelled through the middle of the most continuous lode of each resource area. Later this surface was copied to the hanging-wall and footwall levels of the mineralised zone.

All estimation parameters were generally similar to those used for traditional estimations except the search size and orientation involve a rolling search. The bearing was always kept close to the strike of the orebody, and with a rolling search the dip and plunge values were always set to zero. The hanging-wall and footwall surfaces covered the same area without any overhangs.

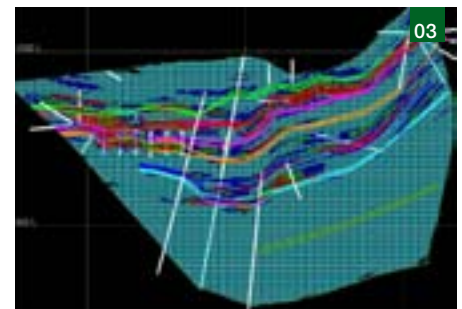
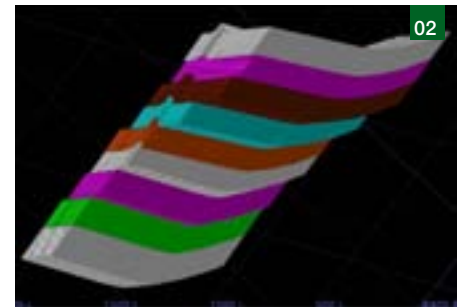
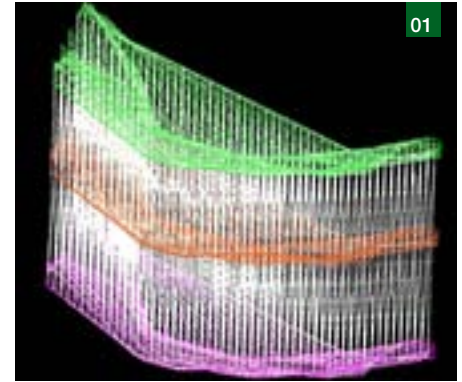
Two types of tetramodels were used. A projection model was used only for vertical projection between sub-horizontal hanging-wall and footwall surfaces.

A grid model was projected in different directions ranging from sub-vertical to horizontal, with a 10m x 10m grid over the triangulated hanging-wall and footwall surfaces. This creates a triangulation composed of tetrahedrons running between the top and bottom surfaces.

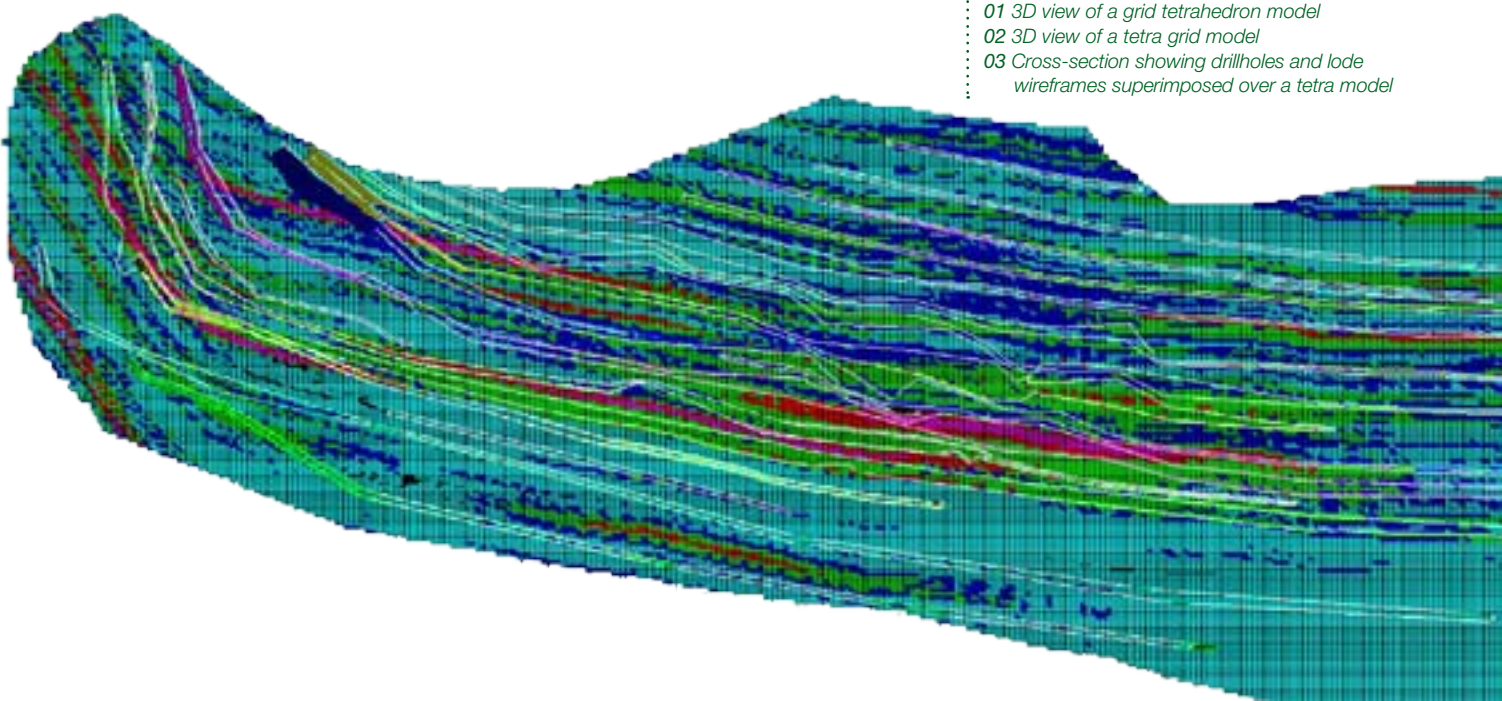
Instead of the months required by traditional methods for creating wireframes for each lode of the mineralised zone, creation of a single surface used for the tetramodel took less than a week. Since tetramodelling produced efficient estimates at Plutonic, this technique was adopted for all resource areas containing multiple sub-parallel lodes.

Tetramodelling is efficient as it requires only one or two modelled surfaces compared to hundreds of wireframes. In areas with multiple sub-parallel lodes, it can be used to quickly identify areas of economic importance. *∞*

*Thanks to Aslam Awan
Senior Resource Geologist
Yilgarn Shared Services, Barrick
Presented at Australian Users Conference, April 2011*



01 3D view of a grid tetrahedron model
02 3D view of a tetra grid model
03 Cross-section showing drillholes and lode wireframes superimposed over a tetra model



MORE THAN PIPE DREAMS

Laser scanning is the ideal method to survey and model complex infrastructure.

Maptek develops innovative laser scanning technology from its headquarters in Adelaide, South Australia. The Maptek I-Site™ 8800 laser scanner has an acquisition rate of 8800 points per second, a long range of 2000m, and is the only scanner with a fully integrated digital camera. I-Site products are in use at mine sites around the world.

Maptek I-Site Studio™ is an intuitive point cloud processing software package designed to handle the massive datasets acquired by laser scanners. Maptek I-Site Forensic™ provides specific tools for analysing crash sites, crime scenes and other situations where data may need to be presented in legal proceedings.

Maptek is also a reseller of the Z+F Imager 5010 in Australia. This laser scanner is designed for high accuracy, short range survey applications. With a Class 1 laser, touch screen and a 187m range, the Z+F Imager 5010 phase-based technology delivers outstanding performance and quality.

Featuring ultra high-speed data acquisition of more than 1 million points per second, this portable all-in-one scanner also has a high resolution camera for full 360-degree 3D imagery. The Z+F Imager 5010 is ideal for forensic or investigative applications, plant and industrial surveying, architectural and tunnelling/underground applications.


The Z+F scanner is compatible with I-Site Forensic and I-Site Studio.

The Z+F Imager 5010 has been used successfully for surveying processing plants and engineering infrastructure. One project involved scanning a processing plant so that sections of the refinery could be redesigned.

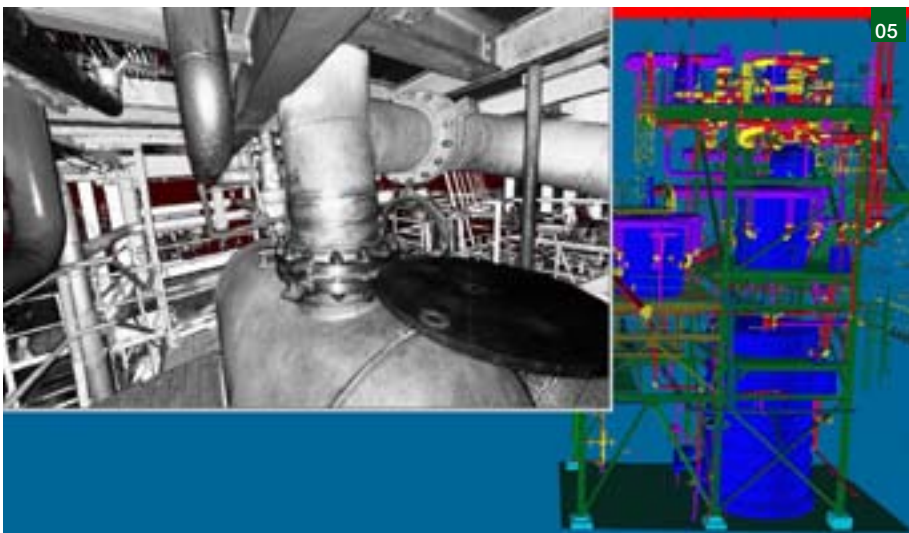
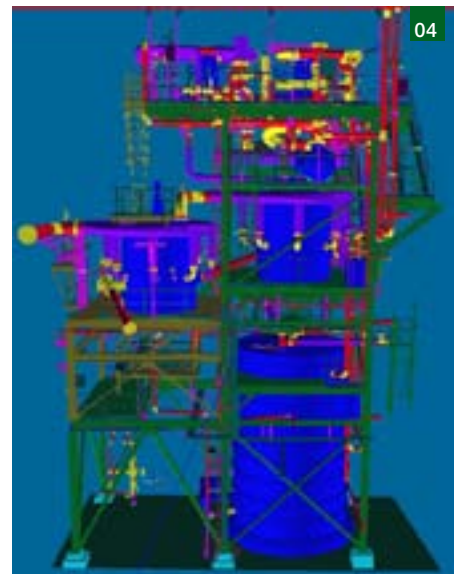
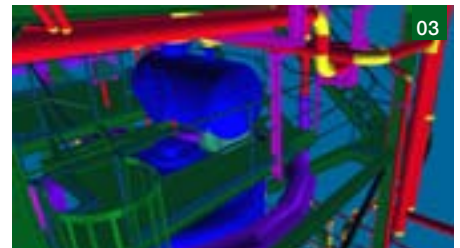
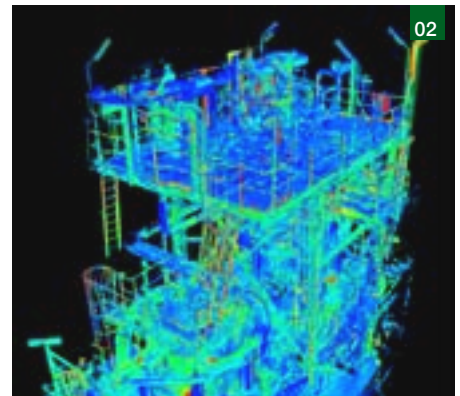
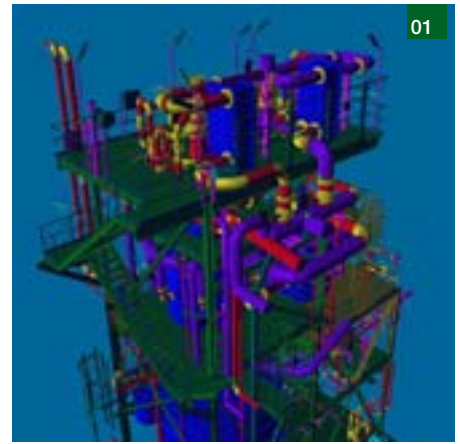
Several levels of the plant were scanned. The aim was to scan the piping, steel work and other infrastructure and then create 3D models. The CAD drafting engineers can then use these models to efficiently plan the removal of areas in preparation for new infrastructure.

The Z+F system provides high quality point cloud data. When modelled, this data delivers outstanding accuracy for the CAD drafting stage.

After capturing a total of 20 scans over 4 hours, the entire area was surveyed to a resolution of just a few millimetres. The scans were then registered and prepared for modelling in LFM Modeller.

Once every pipe, flange, stair rail and structure is modelled, the draftsman can then easily and accurately work in 3D to plan the best way to decommission the structures. 

For more information about laser scanning for infrastructure applications, email isite.sales@maptek.com.au



- 01 View showing top of model
- 02 3D point cloud in I-Site Studio
- 03 Detail of model work in confined areas
- 04 Overall image showing entire model
- 05 Point cloud in model view with overall model in 3D window

SUPPORTING MINING EDUCATION

Maptek has donated equipment and funds to mining schools in North America.

Maptek has established two scholarships for students at the Colorado School of Mines. These will be awarded to selected Mining Engineering and Geology/ Geological Engineering undergraduates.

'Maptek is eager to support students,' says Jon Larson, General Manager, North America, 'they inspire us with the new ideas they bring to the mining industry.'

Maptek continues to support the South Dakota School of Mines Department of Mining Engineering and Management with valuable equipment donations.

Sponsor of the Maptek Advanced Mine Design Center at the university, Maptek recently donated an I-Site 4400 Laser Scanning System. This equipment will enhance the faculty's ability to promote the benefits of laser scanning to students.

Maptek also donated towards providing replacement computers in the state-of-the-art lab, enabling students to work on their own systems while in the classroom. South Dakota's mining program is the fourth largest in the nation with a current enrolment of 100 students expected to grow to 120 in 2012.

Maptek Vulcan™ and Maptek I-Site™ are valuable teaching tools at South Dakota. The Mine Design Center will help the school continue to produce high quality engineers for the mining industry.



Christie Sava of the Colorado School of Mines Foundation, accepts the Maptek scholarship fund from Jon Larson

NEW OFFICE LOCATIONS JOHANNESBURG

The South African office has moved to new headquarters in Rosebank to be more accessible to clients and take advantage of the new direct rail service to OR Tambo International airport.



Suite S4, Floor 2, 26 Baker Street
Rosebank, Johannesburg

Tel: +27 (0)11 750 9660/1
Fax: +27 (0)11 447 3524
Email: info@maptek.co.za

SYDNEY

The Sydney office has re-located to the central business district. Phone and fax numbers remain the same.

Level 5, 299 Sussex Street
Sydney NSW 2000

Tel: +61 (0)2 9957 5554
Fax: +61 (0)2 9922 7551
Email: info@maptek.com.au

MAPTEK MAKES TOP 10 LIST

Maptek ranked 9 in the search for the Best Small Companies to work for in Colorado.

The unique qualities of the Maptek office in Denver were mentioned several times during the Best Companies event.

Staff enjoy their work, and are motivated to help each other, their customers and the community. 'A great place to work.'

GEOSTATS CITATION COURSES 2012

Applied Geostatistics Citation Courses will be hosted by Maptek in Perth, Viña del Mar and Denver offices in 2012.

Theoretical and practical sessions cover the use of modern geostatistical tools in mining. The courses are run by Dr Clayton Deutsch, Professor and Director of the School of Mining and Petroleum Engineering at the University of Alberta.

Successful participants receive an official citation in Applied Geostatistics from the University of Alberta, Canada.

To register for the Perth course or to find out more, email geostats@maptek.com.au

Perth teaching session dates are:

- > 30 January - 10 February
- > 7 May - 18 May

Viña del Mar will be hosting the 11th Citation Course in South America. To register or to find out more, email cursos@maptek.cl

Viña del Mar teaching sessions will be held in March-April.

Denver will be hosting its 8th Citation Program in Applied Geostatistics. Email info@maptek.com Register by January 1, 2012 to save 10%

Denver teaching session dates are:

- > 28 May - 8 June
- > 20 August - 31 August

For more details, visit www.maptek.com



Maptek Denver office staff at the Best Small Companies event: (L-R) Steve Uecker, Bill Blattner, Jon Larson, Todd Husack and Eric Gonzalez

SERVICE CALLS

In 2010 Maptek quietly made the news during the Chile mine rescue, providing scanning, computing power, software and people from the Viña del Mar office for several months.

When the Brisbane River broke its banks in January 2011, parts of the Brisbane central business district were flooded, interrupting the supply of power and other services to many businesses.

Macarthur Coal was among the mines affected by the record January rainfall in the Bowen Basin coal-producing region of Queensland. Its Brisbane corporate office was affected by flood waters, and Maptek provided a temporary Vulcan licence to allow technical services work to continue.

On the other side of the Tasman, Maptek helped Golder Associates NZ to run

Vulcan when Christchurch was hit by a 6.3 magnitude earthquake and several aftershocks in February 2011.

Golder's office was in the 'red' zone where access is still prohibited 7 months later. Maptek supplied a replacement dongle, extending it monthly to allow Golder to continue to supply consulting services in the region.

Maptek staff in Christchurch were affected by the earthquake and relocated to the west coast to provide technical services.

Justin Legg, Senior Economic Geologist, Golder Associates said that Maptek's commitment and integrity exceeded expectations during an extended period of profound personal and professional stress.

'Their 'can-do, will-do' attitude ensured that we could deliver substantial work commitments on time, and are still able to service our clients' ongoing needs. Maptek put customers before contracts, and supported us during a difficult time.'

CELEBRATE WITH US

Everyone has a story to tell. Ours began 30 years ago when a small company started in Sydney, Australia. Maptek today employs more than 300 people in 13 offices around the world.

On August 26 every Maptek office celebrated the journey so far, with one continuous party across the international time zones from New Zealand to the USA.

Customers in 60 countries use Vulcan, I-Site and MineSuite. Our goal remains to solve the issues our customers face every day. We continue to invest in R&D, and to offer services where and when they are needed.

We enjoy meeting customers on site, during global tradeshow and at our users conferences, and look forward to strengthening our successful partnership in the years ahead.



Lima



Viña del Mar



Johannesburg



Edinburgh



Denver



Belo Horizonte



Brisbane



Newcastle



Perth



Adelaide



Sydney

GEOTECH TOOLS COMPLEMENT I-SITE STUDIO

New geotechnical tools were released in August to coincide with I-Site Studio 3.5 upgrade.

The I-Site Geotechnical Module follows a simple intuitive workflow to allow geologists and geotechnical engineers to take control of the information they need to analyse structures and surfaces.

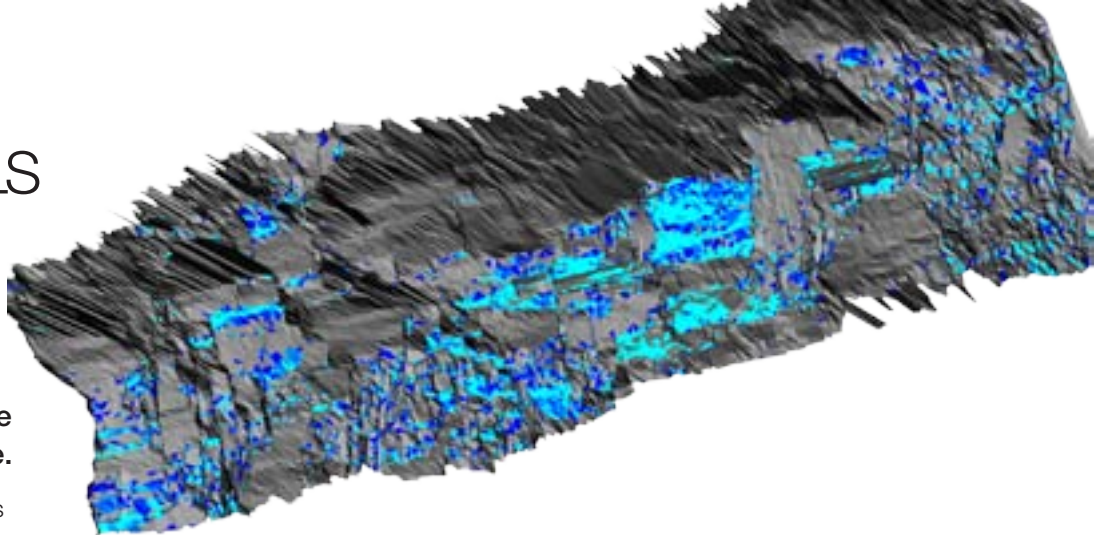
By accessing data straight from the scan all the important detail is preserved and can be used to confidently identify areas of structural weakness that will affect mine planning and operational decisions.

Users can automatically generate great circles representing problem areas; display options include daylight envelope, toppling envelope and friction cone. Rose diagrams can be created to show strike and direction, and plunge of plane poles, with fully customisable angular settings.

Geotechnical tools include:

- > Colouring surfaces by dip and strike for easy identification of fractures
- > Stereonets to highlight structural trends
- > Stereonet contours to help identify discontinuity sets
- > Import of other data into stereonet; export to histograms, mine planning formats
- > Rose diagrams to show dominant trends
- > Analysis of surface change to monitor movement in walls, batters, faces
- > Setting threshold limits for alerts

To arrange a demonstration of these tools please email isite.sales@com.au



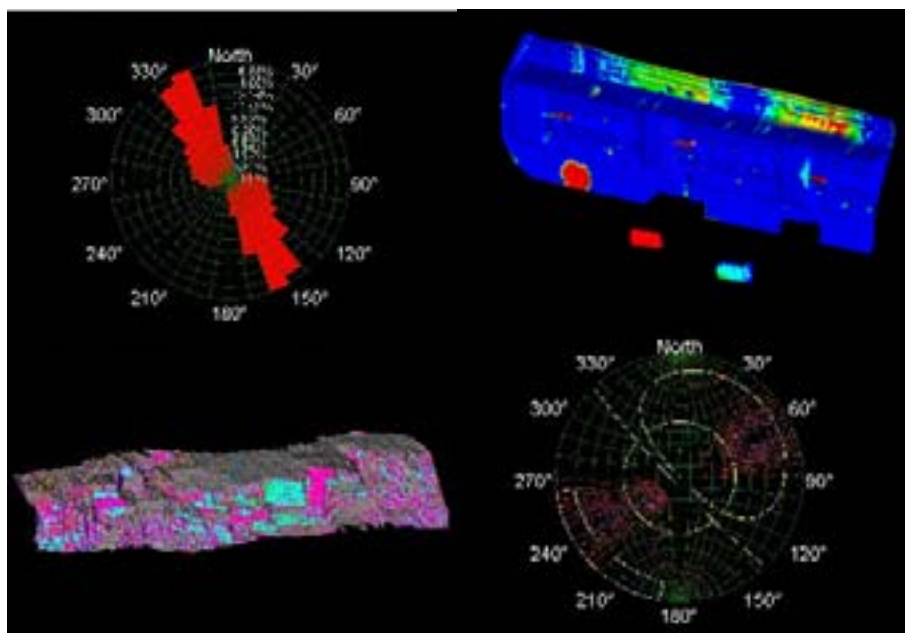
MAPTEK I-SITE STUDIO™ 3.5

features many enhancements in performance and usability. Filtering can now be based on point selection, rather than the entire scan dataset.

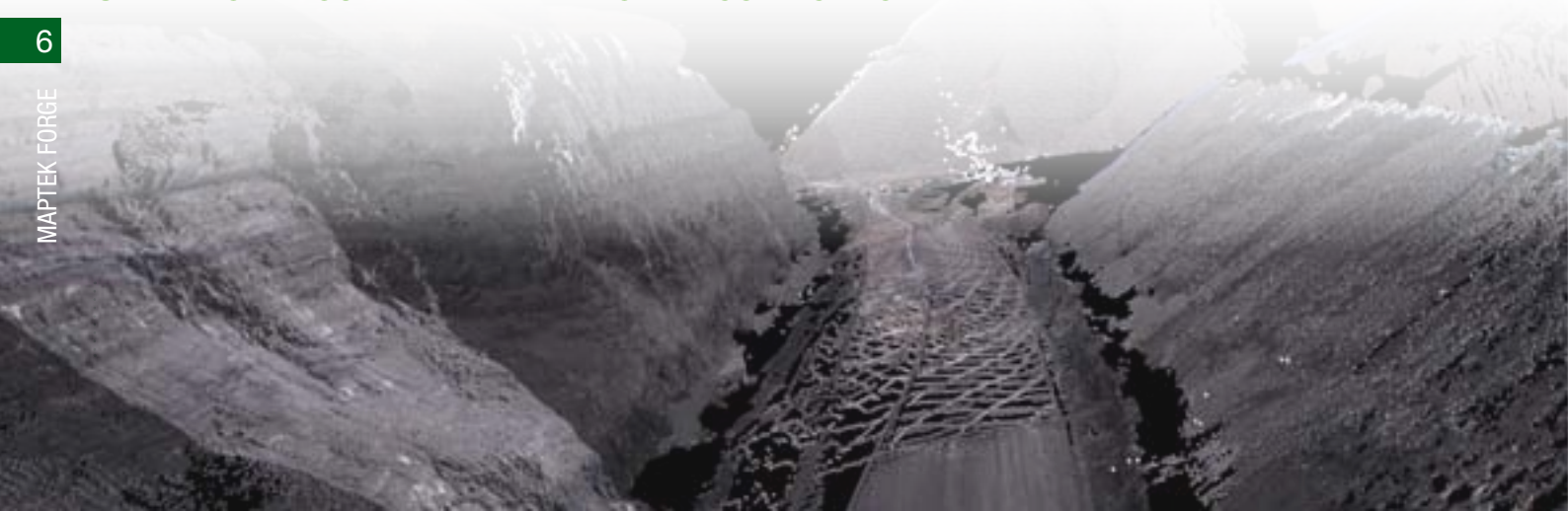
Together with the new freehand or polygonal lasso selection tools, this reduces the time required to remove stray points caused by dust or other transient objects.

Existing tools have been upgraded, with more options for fast comparison of as-builts against design models to highlight variations and non-conformance.

Quick creation of a 3D PDF allows rotatable models to be shared without specialised viewing software. Users can also export to a Universal 3D file of the current view. Valuable information can be shared with decision makers at all levels.



'WE HAVE ALREADY SEEN HOW THESE NEW GEOTECHNICAL TOOLS WILL SAVE US TIME. THIS MEANS WE CAN BE MORE EFFICIENT IN ANALYSING THE STRUCTURES RATHER THAN SPENDING ALL OUR TIME IDENTIFYING AND COLLECTING THE DATA IN THE FIELD.'



SCANNING GLENWOOD CANYON

In 2010 a massive rockslide closed the busy Interstate I-70 Highway in Glenwood Canyon, 160 miles west of Denver.

In many places Glenwood Canyon is too narrow for standard road construction, so the road had been built above the Colorado River with the canyon walls serving as the road boundaries.

One area just west of Hanging Lake Tunnel is particularly prone to rockslides, causing issues for the Colorado Department of Transportation (CDOT) and the Federal Highway Department. Maptek was contacted in early 2011 to take part in a pilot project to investigate measures for monitoring the area.

The Maptek I-Site™ 8800 laser scanner is not designed to monitor small movements, however, it can help measure and locate larger movements, and calculate the volume of material affected by a rockslide.

CDOT also selected the IBIS-M radar system for the pilot project as it can detect small incremental movements of less than 1mm. The IBIS-M was set up for 3 days to prove its capabilities.

A good vantage point was needed for the test. The opposite canyon wall rim gave the best view of the rock slide, but access was difficult by foot. A helicopter transported people and equipment to the top of the canyon. The area to be measured was nearly 3000ft (about 900m) from the vantage point. The I-Site 8800 range easily covered the area of interest. A high resolution scan was completed in less than 1 hour.



01

The area was surveyed with the I-Site 8800, and a 3D digital terrain model was created of the scans. The model had points less than 0.5ft (0.15m) apart, with a high resolution photograph applied in I-Site automatically.

Rock shoots from previous slides could be identified, as well as undercuts and other geological features. The model can be used for rockfall simulation programs as well as for geological mapping.

The slope terrain model can also be merged with radar system data, allowing identification of the rockslide features and identifying problems in 3D. This can be used as a baseline for measuring future rockslides, allowing for very accurate volumetrics and for pinpointing all the affected areas with before and after scans.

More scanning may be required in the future for a longer monitoring project. *rh*

*Thanks to
Colorado Department of Transport*



02



03

01 I-Site 8800 laser scanner overlooking rockslide
02 Position of scanner on canyon wall rim
03 3D imagery captured at same time as scan

CONFERENCES EUROPE-AFRICA

4-7 September, 2011 - Scotland

The 2nd Europe-Africa Users Conference is being held in picturesque Pitlochry, Scotland as we go to press. Look for reports in upcoming issues of *Forge*.

SOUTH AMERICA

5-7 October, 2011 - Chile

The XIV Annual Users Conference in Viña del Mar will feature presentations on a range of topics relevant to the South American mining industry, complemented by interactive workshops and forums.

www.maptek.com/cl/sudamerica_2011/

NORTH AMERICA

24-26 October, 2012 - Colorado

Plan ahead to take part in the Maptek Users Conference in Denver. Training courses will be offered during the 2 days preceding the conference (22-23 October).

For more information, email info@maptek.com

VULCAN

AUX COLOMBIA has acquired Vulcan for geological modelling and resource estimation at their gold mine in Colombia.

BOARDWALK RESOURCES, a coal mining company with projects in New South Wales and Queensland, has purchased Vulcan for use in mine planning and reserving.

BUREAU OF LAND MANAGEMENT will use Vulcan for geological modelling and underground mine design to verify land resources in Farmington and Carlsbad, New Mexico, USA.

GAVIN MINES INC, DOME MOUNTAIN GOLD MINE will use Vulcan GeoModeller and Survey for resource modelling and mine layout at their underground gold-silver mine near Smithers, BC, Canada.

HANCOCK COAL has acquired Vulcan for mine design and reserving work on projects in the Galilee Basin of Queensland, Australia.

NORDPRO MANAGEMENT SERVICES LTD, a consulting firm in Thunder Bay, Ontario, has purchased Vulcan Underground MineModeller for block modelling and underground mine design.

NYRSTAR PERÚ has acquired Vulcan for geological modelling, resource estimation and mine design for the Coricancha and Contonga underground projects, as well as exploration work in Perú.

PANAUST has acquired Vulcan for mine design and scheduling for their copper-gold project in Chile.

RELINCHO, a Teck company, has acquired Vulcan for geological modelling and resource estimation for a new project located near Vallenar city in Chile.

SIGNATURE GOLD, which is seeking listing on the Australian Stock Exchange, has purchased Vulcan GeoStatModeller for exploration and project evaluation work.

SILVER STAR RESOURCES has acquired Vulcan GeoModeller for resource modelling at its silver mine in southern Colorado, USA.

TECK RESOURCES, headquartered in Vancouver, is one of Canada's largest diversified mining, mineral processing and metallurgical companies. Teck will use Vulcan GeoStatModeller for resource modelling.

TETRA TECH, a worldwide consulting and engineering firm, has purchased Vulcan Underground MineModeller and Stope Optimiser for consulting work from their base in Golden, Colorado, USA.

ZÜBLIN INTERNATIONAL has acquired Vulcan for geological modelling, resource estimation and mine design projects in Chile.

I-SITE

AVENG MOOLMANS, a major surface mining contractor in Africa, has purchased an I-Site 8800 laser scanning system for conducting accurate audits of mined areas to compare with measurements acquired by the I-Site 4400LR. Specialty uses for the scanner include the calculation of 'carry back' material after the load has been transported. This will provide Moolmans with the most accurate per-load volumetric reporting available.

FIRMATEK-3D MAPPING SOLUTIONS, LLC (formerly Quarrytech, Inc.), located in New Braunfels, Texas, USA, has purchased a third I-Site Studio software licence to process lidar data as they expand from quarry mapping to new industries.

PROTECH, a service provider to the South African civil engineering and construction industry, has purchased an I-Site 8800 laser scanning system for fast, accurate daily calculations of mined coal boxcut volumes at multiple sites. The system will also be used for original ground level measurements before project commencement, and to record any plant related accidents.

SOLID ENERGY, which has been using an I-Site 4400CR at Stockton mine since 2009, has purchased an I-Site 8800 laser scanning system with a vehicle mount to improve the speed and accuracy of survey pickups and end of month volumes. Stockton will also use the scanner for geotechnical monitoring in inaccessible areas.

THIESS has purchased an I-Site 8800 laser scanning system for end of month and stockpile survey and geological mapping at the Mt Owen open pit coal mine in the Upper Hunter Valley of New South Wales, Australia. Thiess operates the mine for Xstrata.

WALTER ENERGY – WESTERN COAL WOLVERINE MINE, near Tumbler Ridge, BC, Canada, has invested in an I-Site 8800 vehicle mounted system. The scanner will be used for month-end and as-built surveys at both Wolverine and Brule open pit metallurgical coal mines.

VISIT MAPTEK AT THESE TRADESHOWS

2011

September 12-16

Extermin
Arequipa, Perú - Booth 446

September 26-30

APCOM 2011
Wollongong, NSW, Australia - Booth 8

September 27-29

INTERGEO 2011
Nuremberg, Germany - Booth 57, Hall 7

October 26-29

Expomin Mexico
Acapulco, Mexico - Booth 1024

November 8-9

Explo 2011
Melbourne, VIC, Australia - Booth 7

2012

January 28-31

IME 2012
Kolkata, West Bengal, India

January 23-24

Mineral Exploration Roundup (AME BC)
Vancouver, BC, Canada - Booth C-15

February 19-23

SME
Seattle, Washington, USA - Booth 2315

March 4-7

PDAC
Toronto, ON, Canada

May 6-9

CIM
Edmonton, AB, Canada - Booth 506

September 24-26

MINExpo International
Las Vegas, Nevada, USA - Booth 6062



www.maptek.com