



> In this issue

- Latest news
- Education support
- Underground tools
- Vulcan case studies
- BlastLogic & Eureka
- I-Site heritage scanning

Forge

Contents

Latest news	1
Education support	3
Maptek and universities	
Vulcan underground tools	4
New in version 9	
Scanning underground	5
I-Site 8200 and version 4.1 software	
Case study: Resource estimation	6
Vulcan at REE project in Tanzania	
Case study: In situ reserves	7
Vulcan at gold-silver mine in Chile	
Case Study: Grade control	8
Vulcan at iron ore mine in Chile	
Feature: BlastLogic	9
The rock factory	
Feature: Eureka	10
Working with drillholes	
Case study: Rock art scanning	11
I-Site in Kakadu National Park	
Case study: Filling the void	12
I-Site in Serbian cave archaeology	
Case study: Sydney Opera House	13
I-Site aids heritage project	

Want more?

➤ More information available online

👤 Video

📄 Detailed article

🖼️ Photo gallery



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In this issue

The seemingly small things often have the greatest impact. This is why Maptek works with customers to define their concerns and shape our product development to continue to deliver value where it's needed.

This issue highlights our links with universities; Maptek technology will ensure future mining professionals enter the industry with technical skills and relevant experience.

What do Cerro Negro Norte and El Peñón in Chile, and Wigu Hill in Tanzania have in common? The need for improved resource estimations, met by Vulcan. Vulcan 9 will be with customers before the end of the year - this issue outlines some of the new underground tools.

The I-Site 8200 is already delivering on underground survey. Road trips in Australia, Chile and the US have confirmed that the scanner matches its predecessors in handling the daily survey challenges.

I-Site technology was an integral part of three diverse heritage preservation projects: scanning the iconic Sydney Opera House, an archaeological dig in Serbia and indigenous rock art in northern Australia.

What's the point of technology that is not easy to use? Eureka takes a novel approach to armchair exploration. BlastLogic proves that simple improvements at the blast stage flow through all processes in the 'factory for rocks'.

We hope you enjoy this issue and welcome feedback at forge@maptek.com

'Invest in Yourself'

The 2013 Maptek Users Conference will be held in Brisbane, Queensland from October 21-23. Customers from around the globe are invited to network with industry colleagues and hear about our latest products.

Presentations will be complemented by a range of workshops offering opportunities to explore specific techniques. This conference is about providing an experience that will benefit your career.

Keynote speaker Richard Simpson has been involved in 3D visualisation and cutting edge spatial technologies for more than 25 years. Richard serves on the executive committee of the International Society of Digital Earth, and chairs the Digital Cities working committee.

Discounted early bird rates, free registration for speakers, presentation themes and more on our website! Visit www.maptek.com/users2013

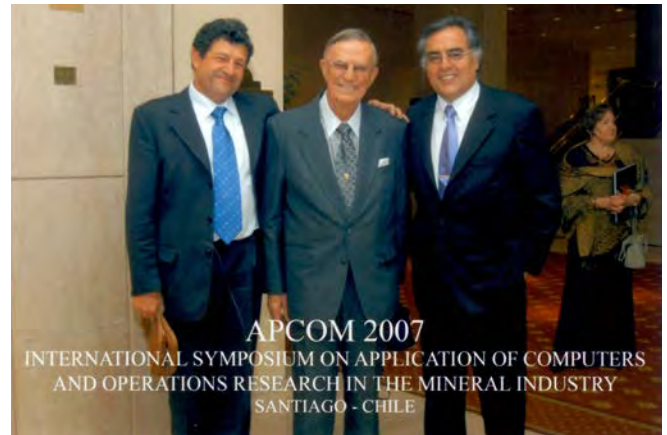
Geostatistics Citation Viña del Mar

Fifteen people attended the XII Citation in Geostatistics held at the Maptek Viña del Mar office in April.

Participants from mining and consulting companies in Peru, Chile, Argentina and Brazil completed the 5 weeks of classroom study on the theory and application of geostatistics, under the tutelage of Dr Clayton Deutsch from the University of Alberta, Canada.



Vale Danie Krige



Professor Danie Krige died in March in Johannesburg. A pioneer in the field of geostatistics, his vision to perfect the prediction of mineral resources with sparse spatial data was recognised worldwide.

French mathematician and geologist, Professor Georges Matheron named the most commonly used grade estimator in the mining industry after him.

Professor Krige's drive and passion set the direction for the development of many tools that are used today by mining companies and banks to assess natural resources.

Maptek users benefit from Krige's legacy, with geostatistics being an integral part of Maptek Vulcan mining software. An extensive set of grade estimation and modelling tools use engines derived from his initial work.

Maptek pays tribute to Danie Krige, and remains committed to following his example in applying innovative techniques to solve challenges in mining.

Maptek Calendar

June 4

Regional Workshop
Calama, Chile

June 6-7

Elko Mining Expo
Elko, Nevada - Booth 110

June 10-17

Exponor
Antofagasta, Chile - Booth 579

June 18-20

Mining World Central Asia
Almaty, Kazakhstan

June 21

Australian Inst of Mine Surveyors (AIMS)
Mackay, Queensland

June 25-26

Minerals Week 2013
Canberra, Australian Capital Territory

July 5

AIMS Regional Workshop
Mt Isa, Queensland

August 11-14

ASEG-PESA 2013
Melbourne, Victoria, Australia

August 12-14

AusIMM Iron Ore 2013
Perth, Western Australia - Booth 78

August 14-16

AIMS Annual Conference
Adelaide, South Australia

September 16-20

Extemin 2013
Arequipa, Peru - Australian Pavilion

September 16-20

International Society for Mining Surveying
Aachen, Germany

September 17-18

West and Central Africa Mining Summit
Accra, Ghana

September 25-27

World Gold 2013
Brisbane, Queensland - Booth 26

October 16-19

XXX Convención Internacional de Minería
Acapulco, Mexico - Booths 3051, 3093

Maptek honours education pioneer

The South Dakota School of Mines and Technology has created an endowment in honour of the recently retired Dr Zbigniew (Ziggy) Hladysz, thanks to a \$280,000 donation from Maptek.



Jon Larson was one of Ziggy's students during his 39 year professorship at the university

The endowment will be used for Mining Engineering Department scholarships and to maintain the Maptek Advanced Mine Design Center which was unveiled in 2008.

The Maptek design lab serves about 200 mining, engineering and geology students, and is home to 25 computers equipped with Vulcan software.

'Maptek has enjoyed a long relationship with the university. Ziggy has truly been a pioneer in implementing the practical use of technology in the mining engineering curriculum,' said Jon Larson, General Manager of Maptek North America.

Maptek computing prize

The Maptek Prize for the School of Computer Science is awarded to the second year student at the University of Adelaide with the highest academic results.



Inaugural recipient, Craig Lawrence is also likely to gain engineering work experience over the summer break at Maptek.

At the award ceremony, Simon Ratcliffe, Maptek Software R&D Manager, gave a talk on a new mining application, PerfectDig.

Craig Lawrence receives his award from Maptek's Simon Ratcliffe

Maptek gold sponsor for APCOM 2013

The 36th session of this prestigious international event for computer and operations research in mining will be held in Porto Alegre in Brazil from November 3-8.

Maptek looks forward to learning how specific technologies can benefit operational outcomes. Vice-President of South America region, Marcelo Arancibia will host a technical session, with the program featuring presentations on Eureka and BlastLogic.

'Talking with mining companies gives Maptek a greater understanding of the quality gates, pressure points and connecting processes in operations. We can then develop tools that smooth those concerns,' commented Arancibia.

Mining in Turkey

Maptek joined the recent Austmine 'Mining Mission to Turkey 2013'.

During the 5 day event in Istanbul and Ankara Maptek met mining professionals from some of Turkey's largest and most successful companies.

Turkey continues to experience growth in the mining sector, with significant investment from the Turkish Government and foreign mining organisations.

This growth is matched by an increasing demand for better technology to help improve the efficiency of mining operations. Australian technologies on show represent an important avenue for advancement.

Local mining professionals and mining graduates quickly identified the benefits of using Maptek Vulcan and I-Site products in a modern mining environment. Maptek also appreciated the opportunity to network with Vulcan customers in Turkey and receive valuable feedback.

Online knowledge

Vulcan customers with active maintenance are encouraged to register for the new users area.

- > Submit, track and manage your support cases
- > Learn from solutions in the knowledge base
- > Search FAQs, tips and tricks
- > Download Vulcan releases and feature packs
- > Post comments and share information with other users

Contact users@maptek.com

New office location

Av. Horacio 340 Piso 7-A
Col. Chapultepec Morales
Del. Miguel Hidalgo
Mexico DF 11570
México

T: +52 55 5250 8028
T: +52 99 8892 0030

Maptek supports universities around the world



Maptek has provided 15 educational licences of Vulcan software to the Mongolian University of Science and Technology (MUST) in Ulaanbaatar.

Maptek reseller, Information Technology Experts LLC will train staff and teach 4th year students in the School of Mining Engineering. About 2400 students study mine engineering at MUST. Students will have access to open cut and underground mine design, pit optimisation and geostatistical applications.

At the launch ceremony for the Maptek Vulcan laboratory in April, Manager of Information Technology Experts Mr Batchuluun Bayanmunkh said that the software would help prepare students for job opportunities in the private sector as well as with state agencies.

The School of Mining Engineering has a strong research base that is closely linked to industry. Many academic staff come from industry and bring practical, educational and research experience to the faculty.

Sponsorship from Maptek helped 21 students from the Camborne School of Mines in Cornwall, UK to attend the International Intercollegiate Mining Games in Golden, Colorado in March.

The 35th Mining Games was hosted by the Colorado School of Mines, and drew teams from universities throughout the United States, Canada, Australia, England, Germany and Holland.

The competition allows international mining students to network with each other and mining companies.

The University of California Berkeley can now use I-Site technology for graduate and undergraduate research, thanks to a donation from Maptek.

Before the donation of a scanner and educational licences, a small group of graduate students was using laser scanning for vegetation and hydrological mapping research projects.

'We taught each other,' said PhD student Danielle Svehla Christianson, who is conducting a forestry study in Sequoia National Park, measuring the impact that climate and other variables have on seedling growth.

'With the scanner I can map my site in days rather than weeks,' she said. 'I can't wait to see how the data compares to my first field survey.'

'We plan to use the scanner in training seminars for surveying and LiDAR equipment operation, and to educate students on manipulating and managing their data in I-Site Studio,' said Rune Storesund, Research Specialist in the Landscape Architecture Department.

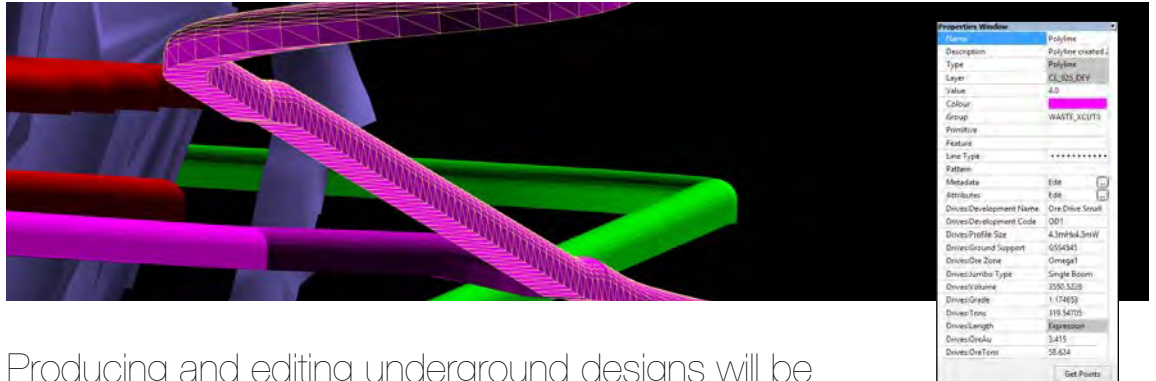


Viewing the 'virtual forest' in I-Site Studio (above) and students receive I-Site Studio training (below)



Vulcan underground tools

Maptek Vulcan™ 9 release is scheduled for beta testing mid 2013. Enhancements to existing underground tools will streamline workflow, save time and increase productivity.

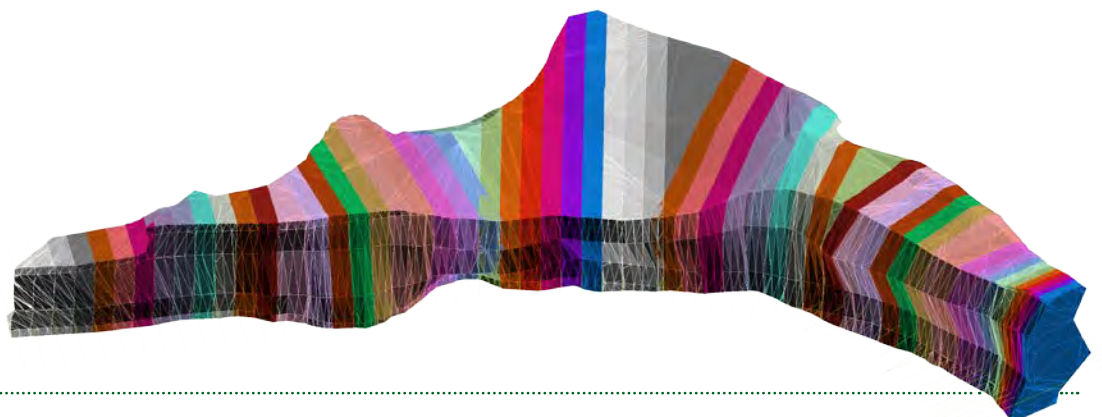


Producing and editing underground designs will be much faster than in previous versions of Vulcan.

- > Object Attributes are now user-defined. Calculated attributes can be derived 'on-the-fly' using the object itself or other object attributes.
- > Attributes can access block model and primitive information for auto-reserve.
- > The attribute editor has been enhanced to allow editing of user-defined attributes. Users will save time with visibility options linked to expanded object attributes.
- > Modernised and enhanced panels make tools more intuitive to use, requiring less training.
- > Look-ahead functionality with the Centre Line tool allows users to view designs as they evolve, without switching in and out of the tool panel.
- > Start and End gradient definition allows designing centre line segments with smoothly changing grade.
- > Modifications to related functionality, such as the corner peel tool, will enhance workflow.

Underground ring design has been streamlined, leading to faster setup and processing.

- > New tools are available for designing stand-up ring sections within the Vulcan interface. The tool now assists engineers to determine dump and number of ring sections.
- > Enhancements have been made to sectioning triangulations. The ability to section solids using a ring section value minimises time-consuming manual creation of stope shapes.
- > A major improvement in graphics loading times means that large ring datasets will now load in seconds rather than minutes.
- > Users can rename rings with a configurable naming system.
- > Enhanced explosives loading to allow for primers and deck charging reduces the need for modification of charging plans after printing in Vulcan.
- > Enhanced ring reserving tools are available.



Scanning underground

Maptek I-Site™ 8200 and the latest I-Site tools for modelling stopes, headings and tunnels have been impressing survey and planning teams at underground operations.



Stopes and voids

At this underground mine in Australia, the I-Site 8200 was mounted on a 10-metre carbon fibre boom and extended over the void.

The 125-degree scan window on the I-Site 8200 captured all of the required data in one scan.

The new **spherical close solid** tool in I-Site Studio and I-Site Void 4.1 mean a solid model is built and calculated in minutes.

Result: Safe and efficient survey, capturing the level of detail required for calculating accurate volumes.

Development headings

An important task for underground surveyors at this Australian operation is to check the alignment of drives against designs.

The new **filter obstacles** feature in the loop wrap tool in I-Site Studio and I-Site Void 4.1 allows users to easily remove artefacts such as services and vehicles to obtain an accurate drive shape.

Result: See results quickly, save time in processing data.

Tunnels

Tunnels at this underground mine in South America are muddy, making it difficult to extract accurate data.

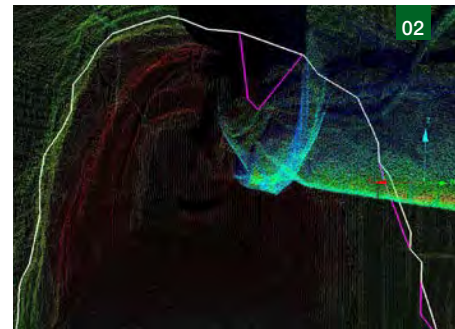
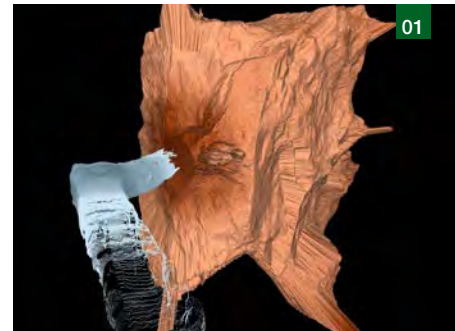
Three scans were conducted with the I-Site 8200 mounted on a tripod.

Scans were modelled in I-Site Void, with the distance from roof to floor displayed for every metre of tunnel. This is much quicker and easier than taking measurements every metre of the tunnel.

The new **edit close** function in I-Site Studio and I-Site Void 4.1 makes it easy to join multiple surfaces together and close them into a valid solid.

Result: Safe, efficient survey and accurate results.

Auto scan levelling is the best feature of the I-Site system. A completely upside down scan comes in level within 1 degree of accuracy.



- 01 Safe survey of voids with accurate data for volume calculations
- 02 Fast pickup of development headings and simple tools to define drive shapes
- 03 Accurate tunnel survey with easily understood measurement results



Snow and dust filter in I-Site 4.1 software

A new filter option in I-Site 4.1 software makes it easy to remove airborne particles from scan data.



Improved resource estimation

Maptek Vulcan™ was applied to geological modelling and resource estimation to help increase grade tonnage for the Wigu Hill property in Tanzania.

In early 2012 Montero Mining and Exploration Ltd contacted Maptek to conduct resource estimation work for their Wigu Hill property in Tanzania. Montero needed a detailed study of the project to increase the resource.

Maptek provided Montero with an improved constrained resource block model, a grade and tonnage report, and a CSV resource block model compatible with mine planning software. This gave Montero the information they needed for mine design and optimisation, and to create a base scenario schedule to move the project forward.

Maptek worked with drillhole and trench data provided in Microsoft Access® databases. A geological model was built and a resource was calculated using grade estimation tools in Vulcan.

The Wigu Hill property is a large, rare earth element (REE) enriched carbonatite hosted in a dolomitic vein/dyke system that cuts into Precambrian gneisses. The coarse-grained carbonatite dykes largely contain dolomite, calcite, bastnaesite and quartz.

REE mineralisation is concentrated in these carbonatite dykes. The REEs occur predominantly in the bastnaesite, monazite and synchysite, with some parisite and goyazite.

The study was carried out on the Twiga target. The area was drilled and trenched; grab samples were taken. Fourteen diamond drillholes were drilled for 1465 metres.

Initially a non-constrained block model was used to understand grade continuity within the samples. Statistics were then run on the drillhole database to create composites identifying grades above a set cut-off to generate triangulation sections.

Maptek also created solid models from CBA (bastnaesite bearing carbonatite) sectional interpolation maps received from Montero Mining. Comparison was made on the CBA section model, total REE model and grade shell model to verify continuity.

The estimation work was done within the final Vulcan model with user defined estimation parameters.

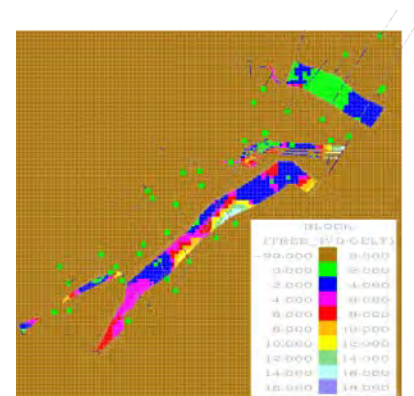
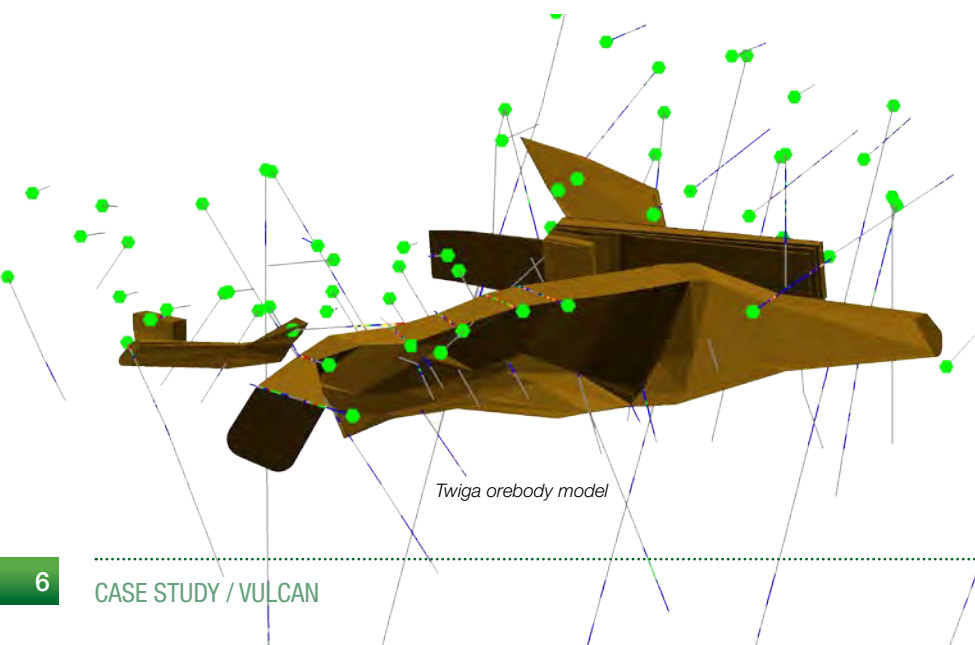
From the solid orebody model, a resource block model was created. Nine elements were estimated: total rare earth, lanthanum, cerium, neodymium, praseodymium, samarium, uranium, thorium and strontium oxide.

The estimation was limited to the interpreted modelled carbonatite orebody. Grade estimates were calculated in Vulcan using inverse distance estimation. User-defined parameters included block model sizes, search ellipsoid orientation and search distances.

The Vulcan advanced reserves editor was applied to calculate reserves on the block model. A cut-off of 4% was selected for the main Tree_ivd variable, and the reserves report was based on this cut-off grade.

Maptek then provided an improved detailed block model comparing results to the previous work on the Wigu Hill area. The final report produced an improved grade tonnage of the REE resource.

Thanks to
Montero Mining and Exploration Ltd
Presented at 2012 North America
Users Conference



Reserving at El Peñón

Modelling using Maptek Vulcan™ gives El Peñón confidence in the in situ reserves generated for long-term mine planning.

Yamana Gold owns a high grade underground gold-silver mine in northern Chile, 160 km from Antofagasta. El Peñón is a low-sulphide epithermal deposit with mineralisation hosted in veins and hydrothermal breccias.

The mining method is split blasting by benching and filling, where an excavation allows ore to be extracted between two previously developed sublevels (drifts).

The objective was to obtain solids representing current available mineable resources, subject to technical and economic evaluation for determining reserves and developing long-term mine plans.

Vulcan was used to maintain up-to-date in situ geological resources for each of the veins of the deposit.

An updated representative solid resource model is fundamental to determination of reserves and the subsequent development of long-term mining plans.

A solid representation (grade shell) of each of the veins is created, taking into account geological modelling information linked to drilling and channel sampling.

The resource is updated by solids derived from topographic survey with the Maptek I-Site laser scanner, and survey data of the mine interior.

Where veins do not bifurcate, a polygon is drawn around the ore zone, and a solid is generated from the polygon enclosing the exploited/mined area.

When complicated branching of veins occurs, polygons are constructed around the orebody. Complex solids must be generated that do not exceed the ore limit.

Boolean sectioning tools are used to create accurate solids. This allows the actual in situ geological resources to be generated.

Summary of benefits:

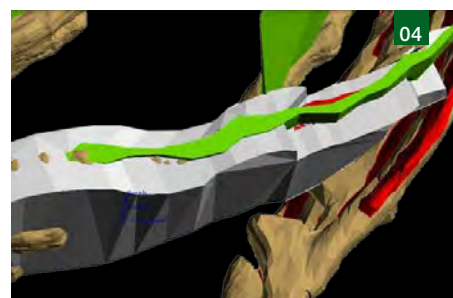
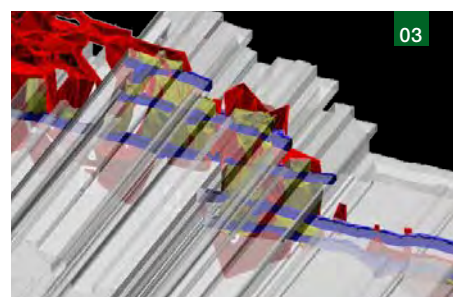
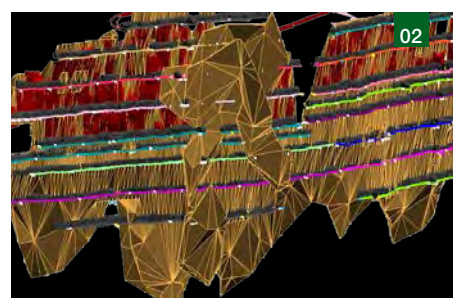
- > Saving of approximately 400 effective work-hours
- > Major time-saving in measuring depletion of the deposit
- > High precision results provide an accurate resource evaluation

At present the planning and development management team performs this work using a series of manual steps; future plans to automate the process will see further improvement.

Collaboration and continuous feedback between El Peñón's experience and software innovator Maptek resulted in the development of an effective solution for in situ reserving.

*Thanks to Pablo Quiero Jaque
Long Term Planning Engineer
Yamana Gold - El Peñón*

*Presented at 2012 South America
Users Conference*



- 01 Solids representing exploited sectors
- 02 Grade shells intersecting exploited solids and topography inside mine
- 03 Solid generated from polygons around exploited zone
- 04 Solid generated on bifurcated vein
- 05 Validating in situ resource against exploited solids

Grade control at Cerro Negro Norte

Collaboration between Maptek™ and Cerro Negro Norte to control ore grade resulted in better decision-making and improved site practice.

The Cerro Negro Norte mine, owned and operated by Minera del Pacífico S.A., is located in the Copiapó valley in Chile, 1100 to 1500 m above sea level.

The mine is on a 600 km iron-rich belt, where the orebodies are mostly massive magnetite lenses. Cerro Negro Norte is an irregular deposit hosted by volcanic or metavolcanic rocks in the vicinity of intrusive bodies.

The mine required a grade control system to manage allocation of materials to be extracted from blasting. The scope included grade evaluation and quantities to extract per block, automatic and manual assignment of blocks to different destinations using assignment rules, evaluation using blast holes and block model grade estimations, report generation and plotting.

The objective was to reduce the runtimes in the daily update of blasting zones and conform to the short term schedule.

The existing blast management database was in spreadsheet format, and there was no short term block model.

When Vulcan Grade Control was implemented, an historical blast database and a short term block model were created. Grade control scripts were configured to classify the material type and destination based on zones generated by the production geologist.

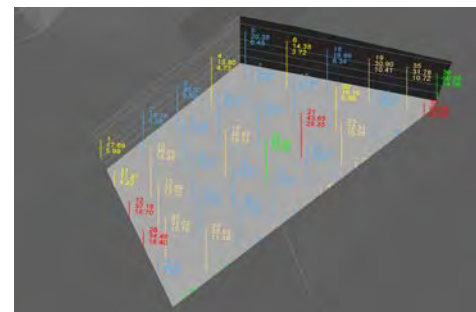
Subsequently, using Vulcan tools, procedures were established to perform statistical analysis of long term data (grade estimated from the drilling data) and short term data (grade estimated from blast hole data). Boolean tools were used to update the topography daily, to provide better control of production.

Advantages of the new grade control process:

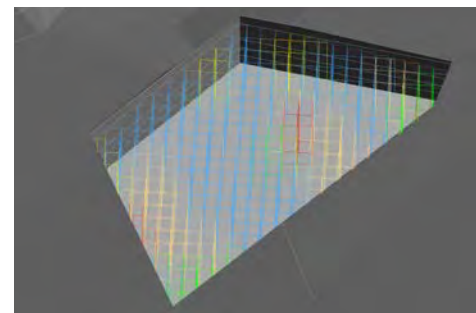
- > Hours are saved in the blast zoning process, improving quality and productivity, allowing closer attention to operational requirements.
- > Fully integrated system for grade estimation parameters and product classification. All information - drillholes, solids, blocks and reports - is stored in an accessible centralised grade control database.
- > Faster generation of more effective reports (monitoring, tracking, audits).
- > Comparison between long and short term information.
- > Quick recall of blasting already done for reconciliation.
- > Automation and connection with other systems to integrate all processes of the grade control cycle (e.g. dynamic equipment allocation).

Better management of the blast information in turn leads to better decisions, incorporating technological development and best practice on ore control at Cerro Negro Norte.

*Thanks to Cristián Astudillo
Chief Geologist, Cerro Negro Norte
Compañía Minera del Pacífico
Presented at 2012 South America
Users Conference*

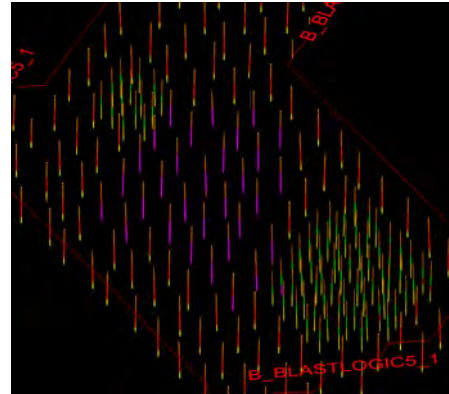
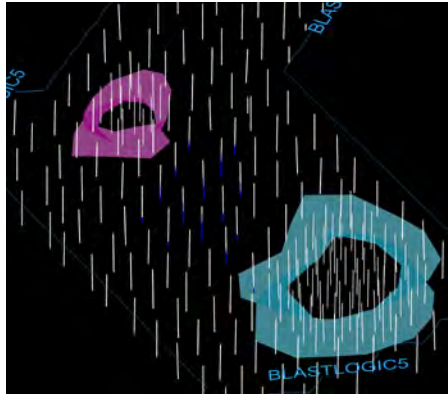


Blast holes according to material (above)
and with modelled blocks (below)



The rock factory

Maptek BlastLogic™ provides mining operations with a strategic tool to ensure the most efficient use of equipment for processing ore.



The same pattern with slightly different views illustrates how the charge plan varied from waste to ore, and wet to dry holes.

An optimal charge plan will achieve blast objectives like good fragmentation and minimal material movement between ore boundaries.

A mine is like a factory for rocks. Inefficient processes in any part cost money. Quality control must be applied at every stage - blast, grade control, mining, blending - if your rock factory is to be productive and profitable.

Discovering at the smelter stage that your ore has a lot of impurities will mean more processing and more energy consumed. Similarly, oversize material at the crusher means spiralling electricity costs.

Blasting is one of the highest cost areas. This critical first process in the rock factory often involves trial and error, which affects processes downstream. When designing a blast, no software algorithm can reliably be used to accurately predict the material size, as there are too many variables.

Blastlogic immediately appeals to mining operations as a strategic tool for managing blasts.

Better decisions can be made by taking into account the history of blasting at the site and matching it to the processing outcomes.

For example, you can track how material size affects the teeth of the shovel, as well as the truck load and haul costs.

Applying BlastLogic to the first stage - drill & blast - allows energy consumption at the crusher to be better managed.

Imagine you are the operations manager reviewing energy consumption for your plant over a specific period, and notice a spike.

With BlastLogic you can easily recall historical blasts that correlate with the material being processed, which are attributed to the spike.

A searchable data repository ties drill design, as-drilled, dipping, backfill, charge plan, as-loaded and observed blast performance data with videos, third-party reports and laser surveys to each blast.

Easy access and analysis of blast data provides the mechanism for continuous improvement.

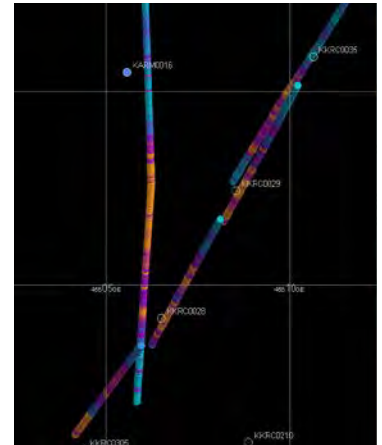
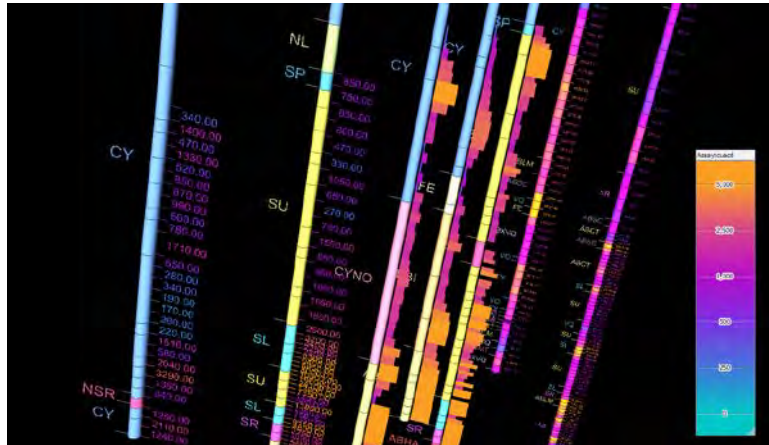
Another key benefit of BlastLogic is that immediate access to drill and blast data identifies potential issues early on, minimising their downstream impact.

BlastLogic has streamlined routine tasks and increased blast performance at several metallurgical coal operations in Queensland, Australia.

- > Improved allocation of assets: immediate recognition of short holes after drill validation means less tramming of rigs over long distances to redrill.
- > Improved wall control: better accuracy of drill angle and bearing, especially on pre-splits, ensures correct placing and separation of holes, and that drilling is on the correct plane.
- > Ease of access: all the data is in one place and everyone is using the same data.
- > Improved charge design: charge per hole based on actual data instead of design data, has resulted in better blast performance.
- > Immediate access to data: quick validation of drilling to coordinate dipping requirements; faster location of clusters for redrills in a pattern after dipping.
- > Ease of use: multiple charge rules and powder factors can be easily applied to patterns.
- > Improved process: efficiencies due to identifying drill set-up errors that help to reduce the incidence of oversize rock and poor digability.

Working with drillholes

Exciting tools and ease of use, not just what it can do and how much data it can handle, set Maptek Eureka™ exploration software apart.



In a world of ever-expanding technology, the claim to be ‘most innovative’ faces an important challenge: ‘Is it easy to use?’

It is impressive when technology can achieve a new outcome, but if the process is tedious, the technology loses much of its value.

Eureka targets exploration geologists, enabling them to visualise vast and disparate data sets, simultaneously. User-friendliness and functionality continue to be top priorities.

Eureka opens up a new world of desktop 3D exploration. The tools make it particularly quick and easy to visualise data and generate interpretations. More analysis can be done in less time with less effort, meaning greater likelihood of making useful connections.

Drillhole import is a simple insert process from a browse window. Drillholes import as geospatially correct objects which can be viewed in 3D space.

Drillhole appearance can be changed through tabular menus, and colour legends containing relevant information are automatically created when required.

‘Click and drag’ functionality and a sidebar of listed drillholes, legends and surfaces allow easy selection for further analysis.

Simply click ‘Apply’ to update, preview and edit display variables without needing to close the panel.

Drillhole visualisation in Eureka includes display features such as labels and colour, and display by attributes such as formation, lithology or easting. Legends are automatically applied.

The appeal of **editing drillholes** in Eureka lies in the dynamic data sharing. Right-click on a drillhole and the changes are automatically updated in the CSV data file. No import/export is required to ensure data is synchronised - it is all captured seamlessly.

Eureka makes it easy to focus at several levels, with **multiple views open simultaneously**. A small selection of drillholes in a large deposit can be viewed exclusively in a new tab, while the original tab showing all drillholes remains - the ‘overview’ and ‘specialised’ windows are just a click away.

Grids showing the distribution of different formations across a large area can be created in seconds. A calculator option performs grid summations, differences and other functions. Results are easily pulled into Maptek Vulcan or other software for further modelling.

Fence diagrams display the **correlation** of formations between drillholes. Correlations can be run on a small or large selection of drillholes. Correlation storage ‘containers’ in the sidebar allow for easy file management, referencing and conversion to triangulations for use in Vulcan.

Rock art preservation

Maptek I-Site™ Studio software has been used for 3D reproduction of historical Aboriginal rock art at Kakadu National Park in Australia's Northern Territory.



Aboriginal rock art is part of a tradition of painting and engraving that stretches back thousands of years. The escarpment, gorges, and rock outliers of Kakadu hold one of the world's greatest concentrations of rock art. Approximately 5,000 sites have been recorded and a further 10,000 sites are thought to exist.

These sites are recognised internationally for their cultural value; Kakadu is on the United Nations list of World Heritage properties. This project aimed to preserve Australian cultural and heritage listed artefacts in an accurate reproducible 3D format.

Laser scanning is a means of non-intrusive measurement of millions of points along a wall for accurate modelling.

The Z+F 5010 series engineering laser scanner was used to obtain high precision results at the very short range required to scan these small paintings in confined spaces.

The photo registration tools in I-Site Studio allow photographs from digital cameras and other sources to be projected in any orientation onto a surface.

Photographs from different times can be analysed in 3D to detect any fading of the artwork.

Laser intensity data from the infrared signals was used to match points in photos with points in the 3D scene. The position of the camera when the photo was taken can also be determined.

When artwork spanned 2 sides of a rock it was not able to be covered accurately with a single photo. Two photos from different perspectives were therefore able to be matched in I-Site Studio.

Vegetation often obscured part of the drawings, so certain data from each textured model was cropped and combined to allow for multi-perspective imagery on the 3D model.

The excellent results obtained proved that this method was suitable for recording and reconstruction of rock art.

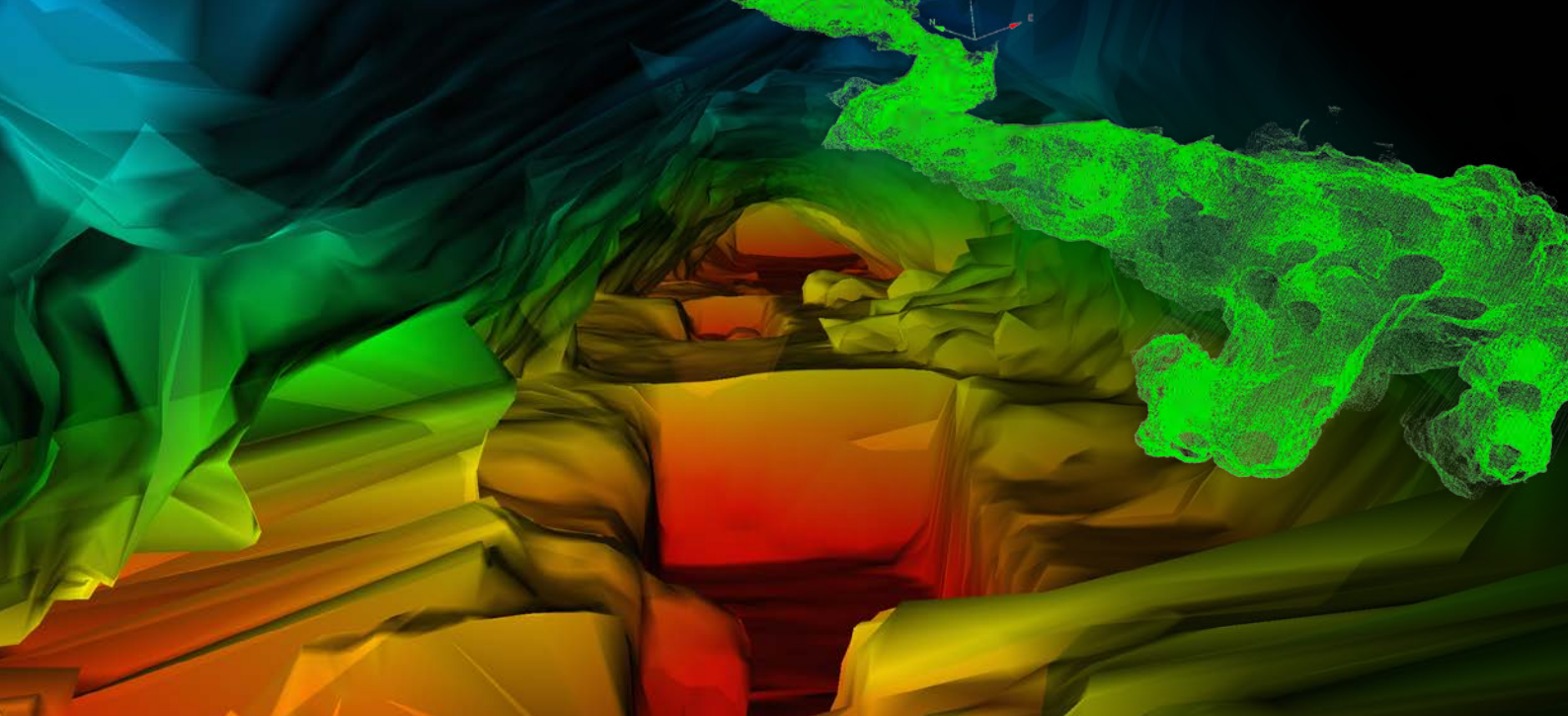
Thanks to the Department of Sustainability, Environment, Water, Population and Communities and the Aboriginal traditional owners of Kakadu National Park



Four scans taken along this wall collected 74 million points - each setup was approximately 12 metres apart



Careful processing of the data was needed to produce accurate perspective models



Filling the void in cave archaeology

Maptek I-Site™ Void software has been used to model 3D point cloud data of caves being investigated by archaeologists in Serbia.



The discovery of one of the oldest human bones, in a cave near Niš in Serbia, prompted a team from Belgrade University to digitally preserve archaeological information using laser scan data.

John Meneely, a geologist from Queens University Belfast used I-Site Void software to model 3D point cloud data of the caves.

'A 3D model provided the archaeologists with a greater understanding of the spatial relationships between the caves being worked in,' Meneely said.

Helped by training from Maptek UK office over Skype, Meneely created a 3D model in 5 minutes.

'The ease of use and speed at which the software calculated the data was astounding. The underground specific tools in Void were great,' Meneely explained.

'If I had done the work in CAD, section by section, I would probably still be working on it.'

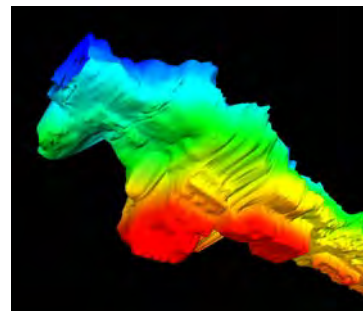
The archaeologists dig trenches in the caves, and when they discover a new item of interest map the location using a total station. The X,Y,Z coordinates of the archaeological finds will be mapped in the final 3D model.

The 3D model will be used to create an interactive digital representation of the caves.

This will provide insight into the spatial and temporal distribution of all the recorded finds within the modelled cave system. The 3D display will give archaeologists a new perspective on investigating how our ancestors lived thousands of years ago.

The ultimate goal is to have all of this information in a GIS database available to the public. Anyone will be able to view the cave in 3D and see the layout of all of the discoveries. Each discovery will be linked to further information, photos and stories about cave life.

*Thanks to John Meneely
School of Geography, Archaeology
& Palaeoecology
Queens University Belfast*



Scanning of Sydney Opera House

Maptek I-Site™ high performance laser scanning technology proved its value during a recent project by the Scottish Ten to record the Sydney Opera House in 3D.



The Scottish Ten is a project which brings together Historic Scotland, Scotland's Government heritage organisation, 3D scanning experts from the Digital Design Studio at Glasgow School of Art, and California-based digital heritage organisation CyArk.

The I-Site 8810 and I-Site 8800 ultra long-range scanners captured the Opera House from all angles.

Scanning from vantage points such as Fort Denison, Mrs Macquarie's Chair, the Sydney Harbour Bridge and Circular Quay ensured capture of the best possible detail of the Opera House setting.

'The Maptek team covered a huge amount of ground in their time on site with us. The data looks fantastic. Their enthusiasm and support has been phenomenal and it has been our pleasure and privilege to work with them', said Dr Lyn Wilson, Scottish Ten and CDDV Project Manager.

The I-Site laser scanner was mounted on a vehicle to drive through the Royal Botanical Gardens to scan the southern and eastern aspects of the Opera House and Harbour Bridge.

The ability to set up so quickly, obtain the scans and move between strategic locations meant Maptek could 'fill in the pieces of the puzzle' that the Scottish Ten scanning pass did not capture.

The Scottish Ten team has used aerial scanning to collect data of the setting for other sites.

I-Site terrestrial laser scanners allowed them to collect the same type of data for the exterior and interior of the Opera House.

More importantly it meant accurate portrayal of vertical structures and the complex engineering of the underside of the Harbour Bridge, not possible with aerial methods.

The long range scanning ability of the I-Site 8810 and I-Site 8800 was ideal for this project.

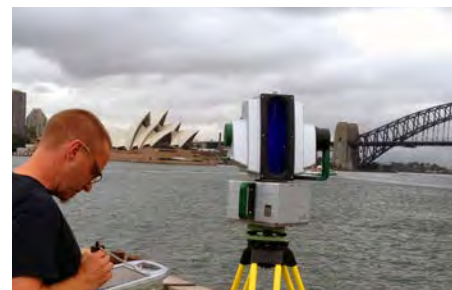
Complicated access to built and natural environs, including an island in the middle of the Harbour, and tight deadlines meant efficiency was crucial. In all, 144 scans of different resolutions were captured over 3 days, with more than 100 different set ups.

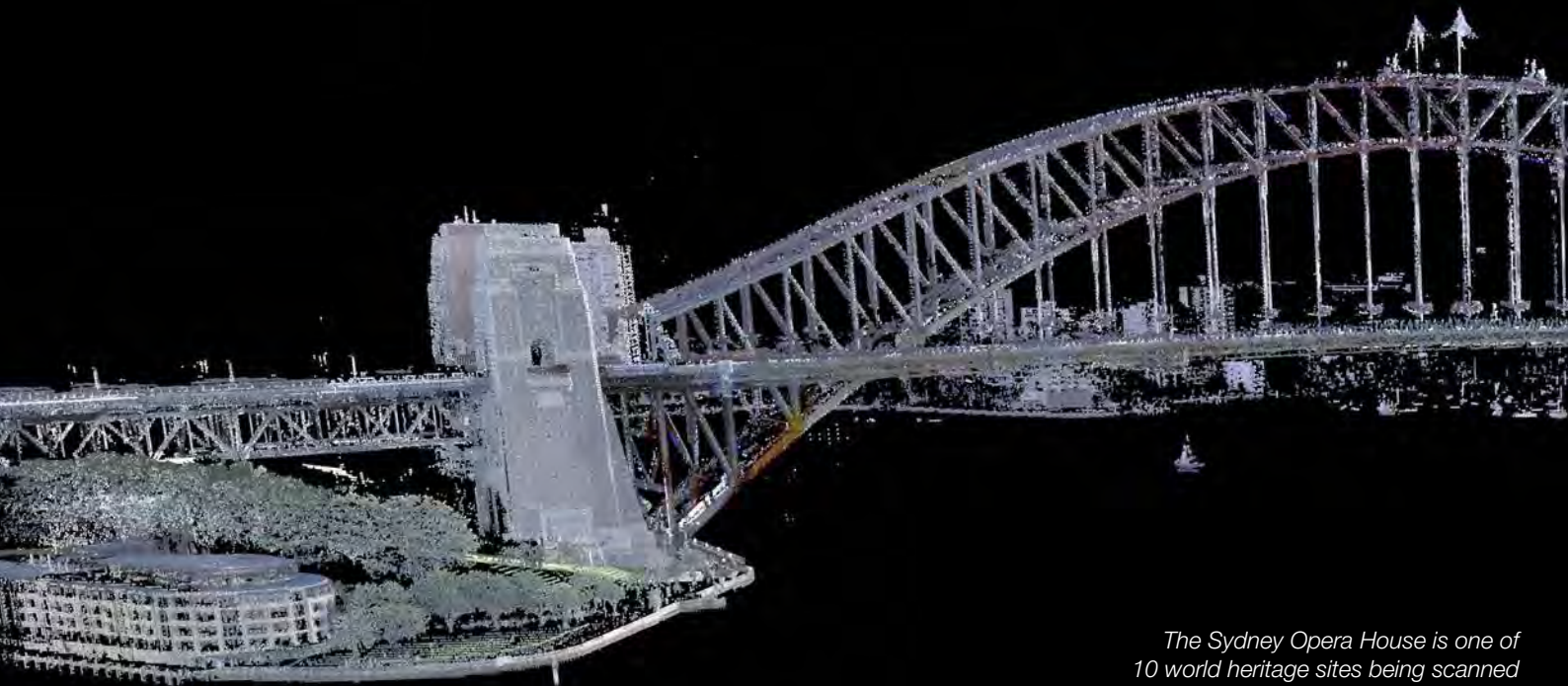
Simultaneous capture of high resolution colour imagery with I-Site systems allows for spectacular animations and realistic models which reflect the unique beauty of the Opera House in its setting.

Maptek I-Site Studio software easily registered the scans in local coordinates. Base scans from key positions established survey control, streamlining setup and capture of remaining scans.

Dynamic transformation and registration tools adjusted the new scans to the reference scans, bringing the data into its correct spatial location for modelling.

Thanks to the Scottish Ten and Sydney Opera House





The Sydney Opera House is one of 10 world heritage sites being scanned to create 3D models to preserve them for posterity. Five sites are in Scotland and five in other parts of the world.

The Scottish Ten team worked closely with the Sydney Opera House Trust to facilitate the 3D scanning project.

Find out more at www.scottishten.org



www.maptek.com