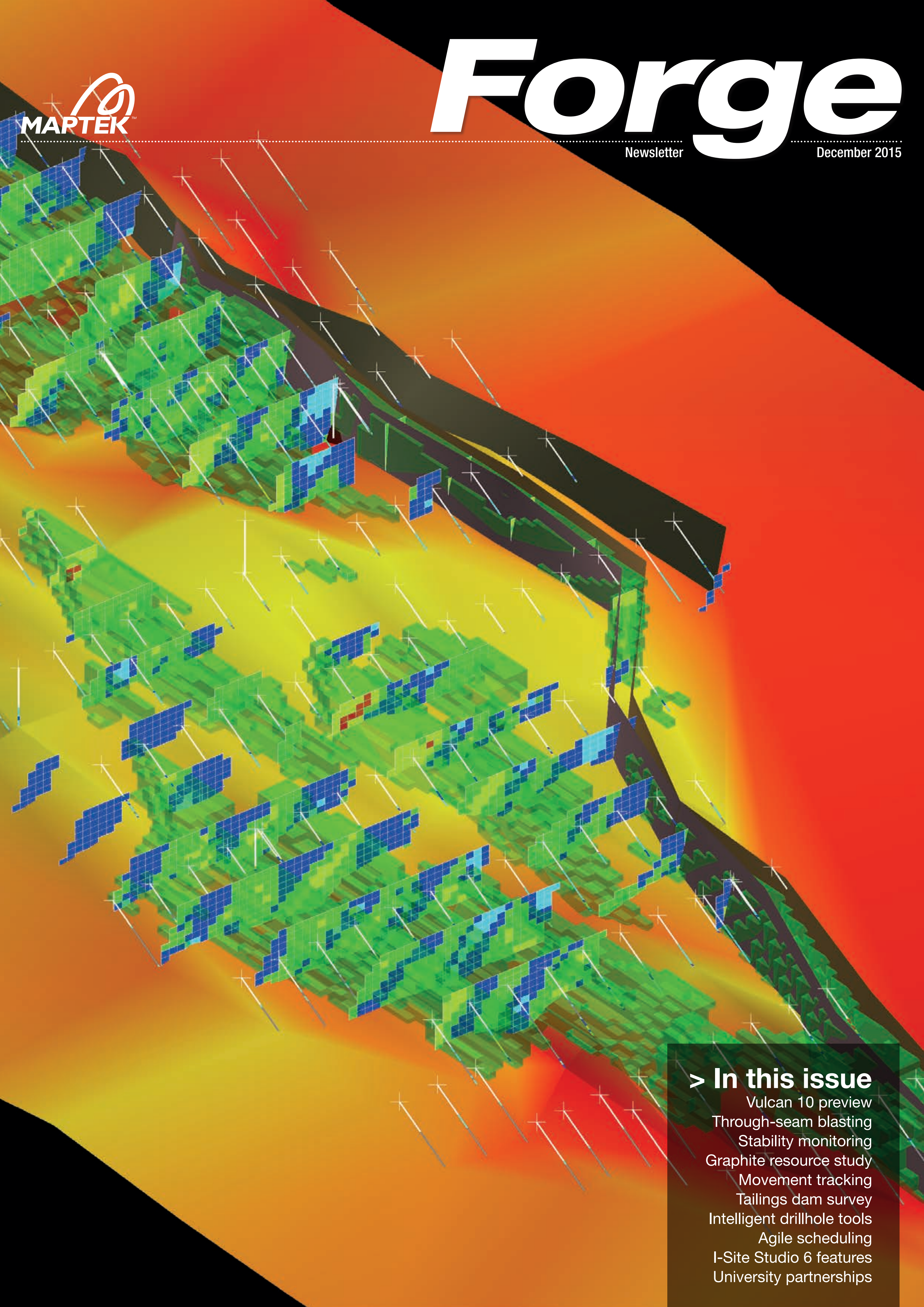
MAPTEK

Forge

Newsletter December 2015



> In this issue

FELIZ CUMPLEAÑOS

Maptek 10 years in México

From humble beginnings in Cancun in 2005, to an office in México City in 2011 and the recent opening of a new branch in Hermosillo in Sonora, Maptek México & the Caribbean has experienced steady growth.

(L-R): Sara Estudillo, Brenda Meyer, Mélida Bretón, Jorge Sanchez, Alberto Ramirez, Flavia Rodriguez and Eden Rivera

Initial training in 2005 for Peñoles, one of the first Maptek customers in México

'Congratulations on your 10 year presence in México. During this time we have received quality products and timely consultancy services. Maptek has contributed to the success of projects in Peñoles'.

Mr Alejandro Contreras
Mining Project Manager - Peñoles

Customers come from México's major mining regions, Caribbean countries the Dominican Republic and Jamaica, as well as Guatemala, El Salvador, Costa Rica and Nicaragua in central America.

'We are proud to offer Maptek products and services. Our tools help customers to confidently advance their projects in a competitive market,' said Alberto Ramirez, Regional Manager of Maptek México & the Caribbean.

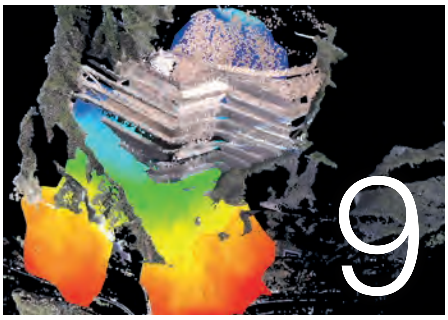
'Delivering the highest quality support and service is fundamental to Maptek's mission,' he said.

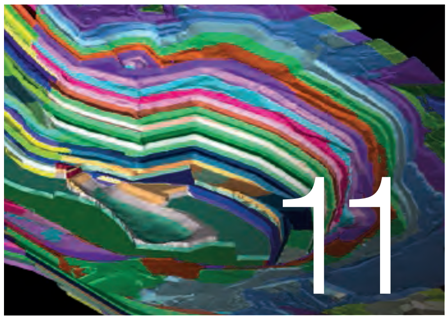
'Maptek has been a leading supplier of software, hardware and innovative services to the global mining industry and our commitment is ongoing. Today, Maptek is still inspired by innovation, and 20% of all revenues are invested in research and development to offer our customers the latest technology,' Ramirez concluded.

Maptek staff celebrated the 10-year anniversary at the Acapulco Mining Expo in October.

'Endeavour Silver Corp. is pleased to congratulate Maptek on 10 years of outstanding work in México. Using Vulcan facilitates the development of our programs and daily activities. A special mention to the customer service and support team, always accessible and responsive. We sincerely wish Maptek continuing success around the world.'

Ing. Luis R. Castro Valdez VP Exploration
Endeavour Silver Corp.





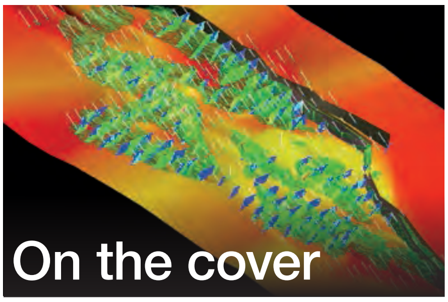
In this issue

It comes as no surprise that controlling expenditure remains a top priority for global mining. Heightened efficiency and improved safety performance are also important objectives.

Although there are no easy answers, Maptek 'mine to design' solutions offer the best chance of reducing costs and streamlining processes. Knowing exactly what is being blasted, mined, stockpiled, blended and transported provides a better understanding of where economies can be found.

Maintaining a safe working site is an ever present challenge. Maptek monitoring and tracking systems deliver accurate, repeatable results fast. Integration with survey and planning allows monitoring to become an integral part of the overall mine plan.

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



Block modelling and grade estimation for Oakdale Resources graphite project

Contents

Vulcan 10 preview

Maptek™ Vulcan™ 10, set to be released in March 2016, includes a new tool which removes the tedium from open pit design tasks.

Conventional open pit mine design can be time consuming. Engineers often spend a week or more to generate just a handful of potential mine designs.

Market conditions resulting in staff shortages exacerbate the problem, and sites are continually looking for ways to cut costs and drive efficiencies.

Traditional methods require a lot of work to achieve a single realistic design. It's difficult to account for design parameters such as mining width and local geotechnical conditions.

Open pit engineers may spend valuable time generating models that are disconnected from what actually occurs in the mine, leading to erroneous decisions.

Vulcan **Automated Pit Designer** addresses these challenges. It provides a tool that enables engineers to quickly iterate mine designs to generate the most economical pit design possible.

The Automated Pit Designer removes the need for mining engineers to manually draft designs.

Instead, they can transform optimised block model results into realistic mine design contours in a matter of seconds.

These contours serve as a base for further design work or can be used to generate more accurate analyses such as pit-by-pit graphs and long term schedules.

All designs must mirror real-world constraints. Benches, for example, can vary by elevation and height allowing for arbitrary configurations including double benches.

Design parameters - batter angles, berm widths, and pit slopes - are rarely uniform. They can vary by location and direction. In Automated Pit Designer, operating parameters such as minimum mining width and material digability are direct inputs which can be manipulated to create operational designs.

The resulting design is flexible and can be changed as new drilling or mining data becomes available, or it can be adapted to changing economics. Multiple scheduling options can be reviewed, and different design parameters can be evaluated.

Mining engineers no longer have to struggle with a single static model. The new dynamic design process allows them to work more efficiently and effectively.

Automated Pit Designer will be included with the Open Pit MineModeller bundle in Vulcan 10.

Performance

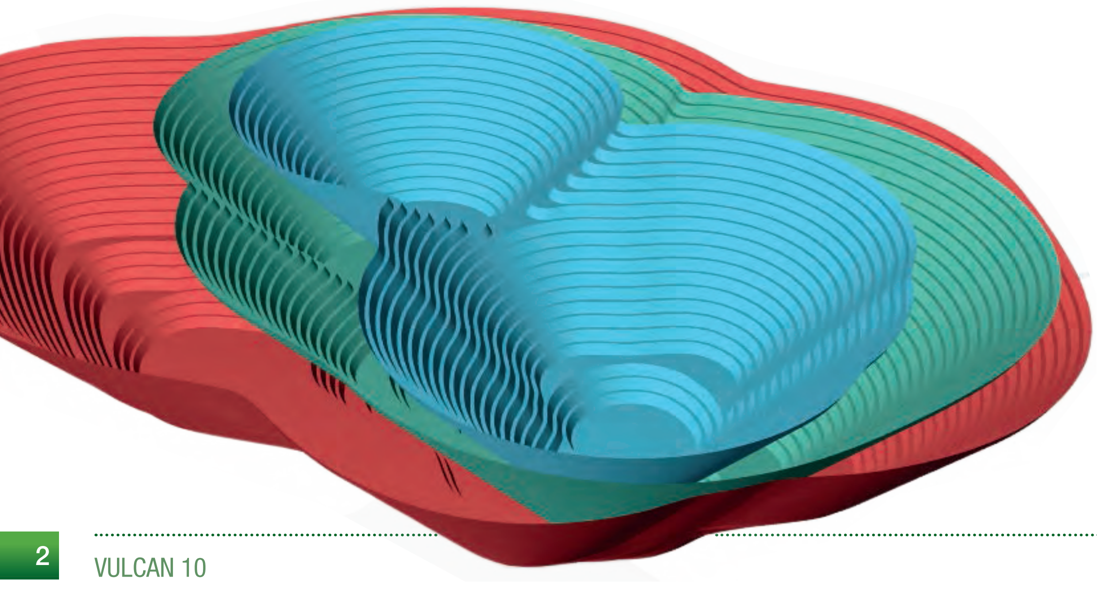
Vulcan 10 delivers additional support for multi-threaded processors for up to 10 times better performance over Vulcan 9.1.

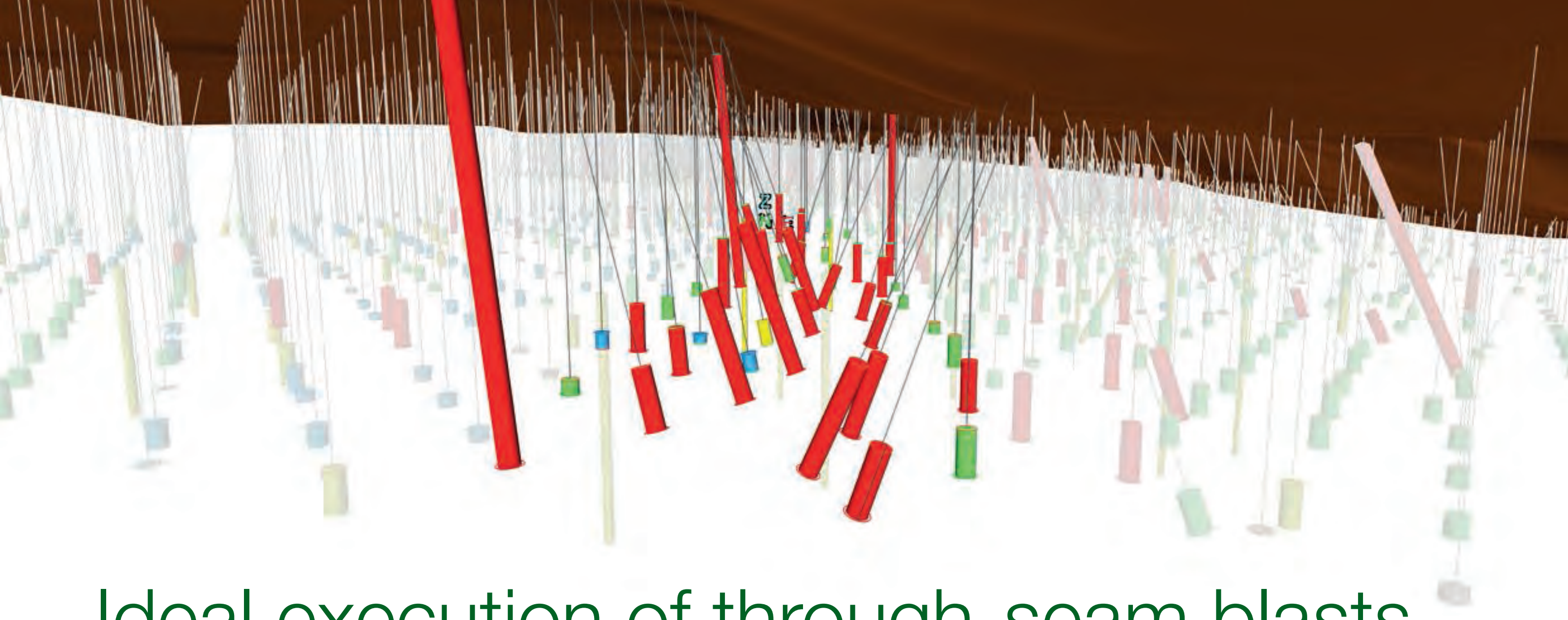
A new **block scripting** engine processes larger scripts and completes calculations 10 to 1000 times faster. **Block slicing** has received a speed upgrade, running 3 to 5 times faster in Vulcan 10.

Implicit modelling speed is also increased. Many calculations can be carried out on a GPU for accelerated computation, or with a CPU estimation process optimised for implicit modelling. The new accelerated code also supports trend models.

GPU acceleration in **grade estimation** tools allows estimations for some parameters to be completed faster than previously possible. Block model **attribute importing** uses an intelligent process to assign values into block models several times faster.

Vulcan 10 also features a new threaded sequential **Gaussian simulation** module which effectively uses modern multi-core CPUs to accelerate simulations.





Ideal execution of through-seam blasts

With the help of Maptek™ BlastLogic™ software, mines can improve drill and blast processes and increase coal recovery.

The Bowen Basin in Queensland is known for its high grade coking coal. However, these rich deposits bring the challenge of complex geology (folds, faults and seam dips exceeding 30 degrees).

Through-seam blasting involves mining in level benches at a consistent depth across the pit. Each bench contains waste material and coal seams. The through-seam method typically requires drilling to a fixed depth, and digging in a series of smaller benches.

Benches containing waste and coal have a high risk for dilution when digging. Care must be taken when loading explosives to ensure that coal seams remain intact.

Several factors must be considered when creating a through-seam drill design, including drill access, explosives loading timing and the same factors on the next bench. One of the most important considerations is where the explosives will sit relative to the coal.

An optimum powder factor can be selected based on historical shots, and is used to dictate drill burden and spacing. A key factor when calculating these is to ensure the powder factor is maintained in areas where stemming is added through coal areas. Because explosives are not required in coal, a smaller burden and spacing are indicated.

An explosives loading rule is created to handle complicated through-seam designs. These rules generally dictate how much stemming should be loaded through coal and at the surface, and the type of explosives for wet and dry conditions.

The design must then be successfully executed. Tracking the execution progress ensures that any insights are passed along for future blasts. The first step is the drill bench preparation. If drills do not have access to where holes are needed, the blast is off to a bad start.

Through-seam explosives loading is unique for every hole in the blast and specific loading instructions are required based on where the coal is in each hole.

> Any variation from the designed load plan can cause dilution of coal and ultimately reduce revenue.

The multi-process nature of blasting allows mines to make corrections at each step. For example, drilling mistakes can be corrected by adjusting explosives loading. Similarly, loading mistakes can be mitigated by adjusting the blast timing. However, these corrections can only be made if issues are caught early in the process.

> A robust, easy to use tracking system is critical to the outcome of a successful blast.

Maptek™ BlastLogic™ can help track each process and adjust designs along the way. Instant access to data provides more time for review and analysis. Detecting issues earlier helps avoid the costly mistakes which can be associated with large complicated blasts.

BlastLogic interfaces with site drilling navigation systems to automatically retrieve as-drilled data. With live information, engineers can visually review changes to the explosives loading plan as soon as the holes are drilled.

Engineers can also easily track the progress of drilling and change plans as needed. Complex charge plans can be pre-programmed to adapt to drilling changes. This saves time and reduces delays in getting updated information to the blast crews.

Importantly, information on the performance of a blast can be used to design future blasts. It may take several attempts to optimise the blast, and keeping good records guides long-term improvement.

Sentry aids stability monitoring

The Maptek™ I-Site™ 8820 laser scanner and Sentry software have proven their value in stability monitoring during a research and development trial in South Australia.

The scanner and software system provided a critical alarm for a rock topple event at Kanmantoo Copper Mine, located about 45km east of Adelaide in the Adelaide Hills.

Hillgrove Resources Limited operates an open cut mine which produces 20,000 tpa of copper metal with associated gold and silver. In 2014 Kanmantoo had a series of three open pits.

The mine has been trialling Sentry since 2013. Sentry combines laser scan data with dedicated software to track and analyse surface movement over time. A Maptek™ I-Site™ 8820 laser scanner is connected to Sentry software installed on a ruggedised laptop.

A trial to assess the capabilities of the system in monitoring movements on an open pit wall anticipated events in ductile rocks at the site.

The Sentry system was initially set up to collect data in the Nugent Pit. Scanning was conducted from a fixed bollard at distances of 180m and 260m.

> Sentry was shown to be capable of monitoring rock movements from 1.5 tonne rockfalls to a 40m high toppling wall failure.

The location, size, run out distance and time of occurrence of minor rockfalls were identified, providing precise data to be incorporated into the Hillgrove rockfall risk management program.

In the first part of the trial the scanner was used intermittently to monitor the southeastern and southern walls of Kanmantoo's small satellite pit, Nugent Pit.

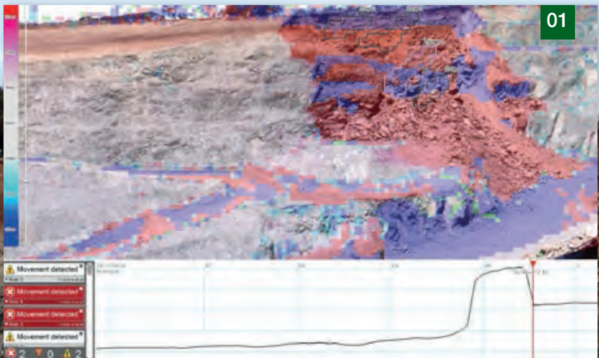
Several rock movements were detected from June to October 2014, including initial rock dilation, small rockfalls and a slump failure.

A flexural topple event, in which columns of rock separated by discontinuities broke as they bent forward, occurred on November 29.

A slope stability radar was used to successfully provide alarming capabilities, allowing operations to retreat from the area on the day before the final wall collapse.

The I-Site laser scanner was used throughout the development of the toppling failure to monitor movements, starting from initial dilations through reverse scarps and to the final collapse.

In January 2015 a second laser scanner was set up in Kanmantoo's Emily Star Pit.



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The scanner detected rock displacement movements on an area of the near vertical eastern wall, just to the south of a stability buttress.

Inspections indicated that block toppling might eventuate so alarms were set in the Sentry system at 2mm/hr (geotechnical alarm) and 3mm/hr (critical alarm).

The failure occurred at 7am on January 29. The two alarm levels were activated at 2pm and 6pm on January 28, providing several hours notice prior to the event.

> Sentry identifies movement trends as small as 1mm/day and allows analysis of the mechanism of wall failures.

Sentry allows monitoring of multiple areas of concern within a single scene. Users can set tolerances for notification and determine the monitoring frequency.

Raw laser scan data can be exported to I-Site™ Studio software for advanced modelling, including volume calculations.

The information collected can be used in rockfall databases for reducing risk in the vicinity of highwall toes.

The results of the trial were presented by Hillgrove Principal Engineer Bruce Hutchison at a slope stability conference earlier this year. He said that the Maptek solution provided a powerful analysis tool.

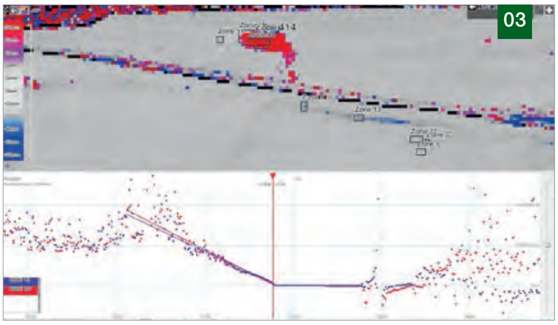
'Since all of the datasets and points are georeferenced, the total rock movement history can be compiled from the base dataset,' he added.

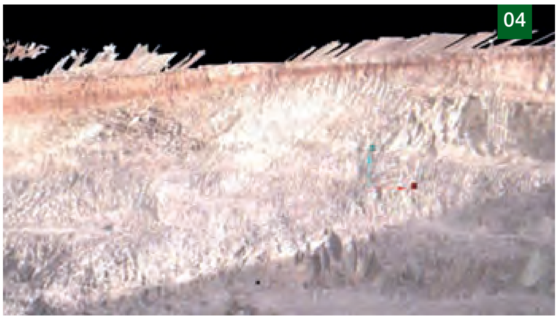
Hillgrove appreciated the fact that the I-Site 8820, an IP65-rated laser scanner, could be used for a wide range of mine survey applications.

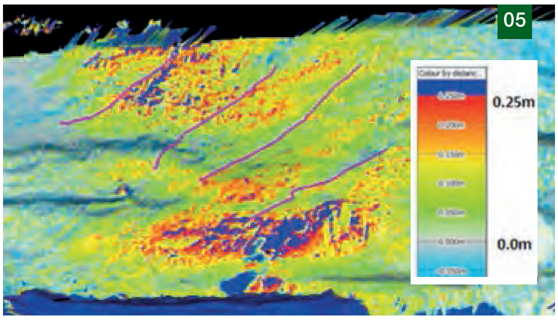
'It is extremely important to retain the monitoring history. If the laser scanner is taken for use elsewhere, or needs to be moved for a blast, or experiences power failure, new data can be directly compared to the original dataset, provided the same base station and backsight are used,' Hutchison said.

The Sentry system proved to be a very important tool for monitoring rock movement at Kanmantoo.

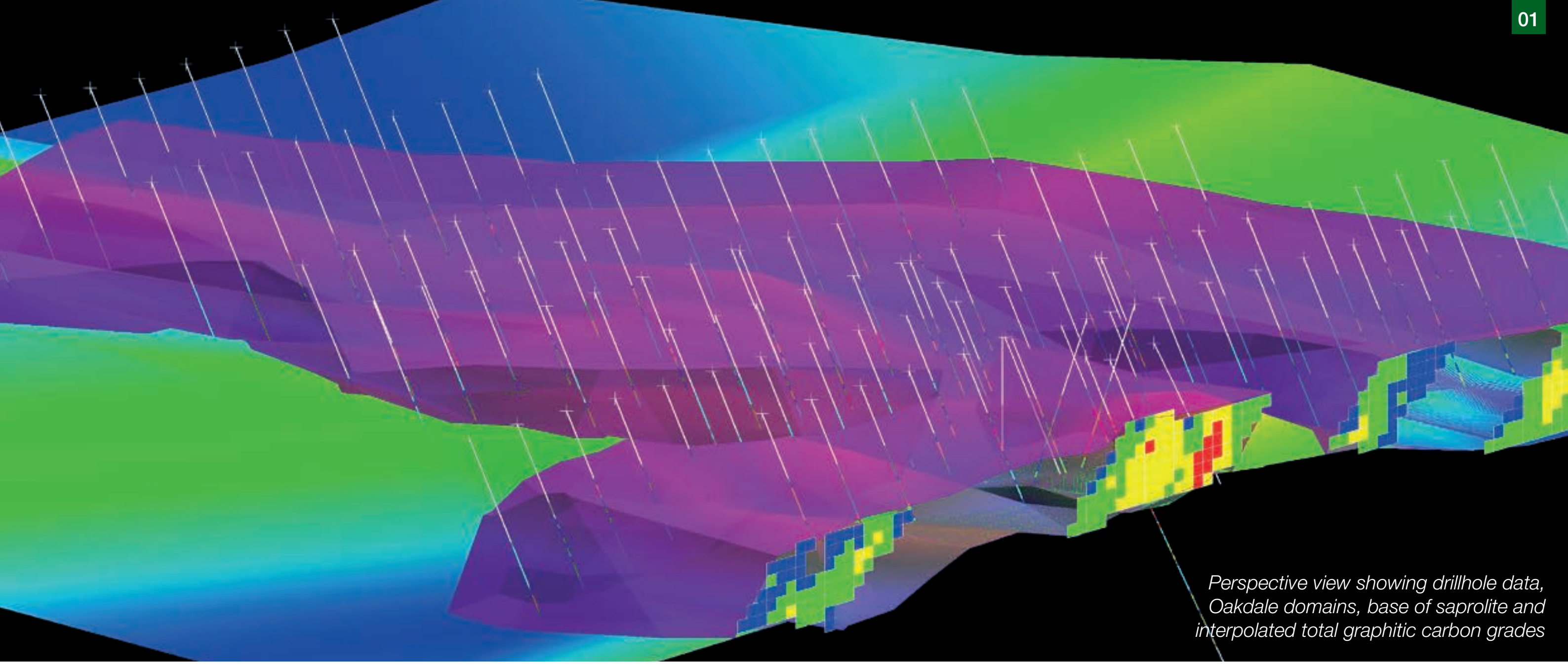
Thanks to
Hillgrove Resources Limited
Edited extract of paper presented at SAIMM Slope Stability Conference, Capetown 2015







01 Eastern wall of the Nugent pit showing flexural toppling failure. Sentry heat map and graph clearly indicate an increased rate of movement in zones of interest
02 Sentry setup at Hillgrove Resources Kanmantoo Mine
03 Post-failure analysis of inverse velocity data shows prediction of failure 18 hours before it occurred
04 Pre-failure image of the pit wall
05 Sentry monitors movement and maps the development of scarps



Perspective view showing drillhole data, Oakdale domains, base of saprolite and interpolated total graphitic carbon grades

Oakdale Resources graphite project

A maiden resource study on the Oakdale graphite deposit in South Australia has provided a thorough understanding of the geology and prospects for mining.

The Oakdale Resources Ltd project on South Australia's Eyre Peninsula comprises two graphite deposits - Oakdale and Oakdale East. The coarse flake graphite occurs within Archean rocks which have been metamorphosed to a high grade granulite facies.

Maptek™ Vulcan™ was used to model the Oakdale geology for the resource report. Only graphite above the base of saprolitic weathering was considered.

Oakdale drill samples and bulk density measurements provided the input data. A Vulcan database was built from .csv files containing drill collar, downhole survey, lithological and analytical data.

Validation and cross checking of the imported data was performed and any discrepancies remedied. Selection files were established to include or exclude drillholes for use in estimation based on the level of confidence in the drill collar survey or downhole sample intervals.

> Confidence in the geological data resulted from the drilling and logging of 330 air core and 11 diamond drillholes.

There is no surface expression of the orebody so drill data was extrapolated to define geological boundaries. Viewing cross-sections perpendicular to the interpreted strike direction of the graphite mineralisation in Vulcan enabled interpretations on each section to define hanging wall and footwall contacts of significant mineralised intervals.

Where there was no defined geological boundary, such as a fault, vein or stratigraphic contact which constrained mineralisation, a nominal cut-off of 1% total graphitic carbon was used to delineate the resource domains.

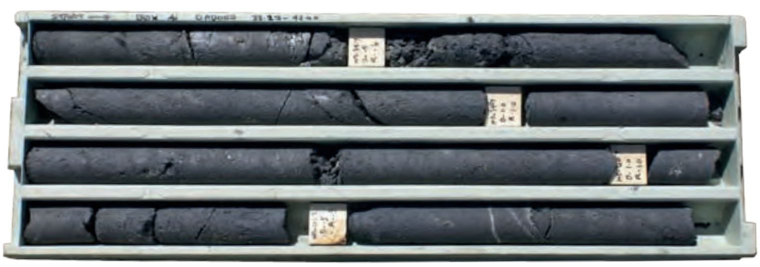
Section data was reviewed in 3D, as well as long section, to determine the correlation of hanging wall and footwall boundaries.

Three dimensional domains were created as triangulated solids by identifying graphite mineralisation that could be traced through several drilled sections. Parameters used to join mineralisation between sections included consistent orientation along strike and dip, host lithology, and the presence of constraining or cross-cutting structures.

The correlations were compared with 2D plan interpolations direct from drilling data.

The resulting Oakdale graphite deposit is 1500m long by 500m wide to a maximum depth of 55m. Oakdale East is 300m by 130m to a maximum depth of 45m. The 2.5km region between the two deposits has not been explored.

The Oakdale deposit was subdivided into 6 domains and Oakdale East into 2 domains for resource estimation.


Core samples showing soft saprolitic graphite rich clays

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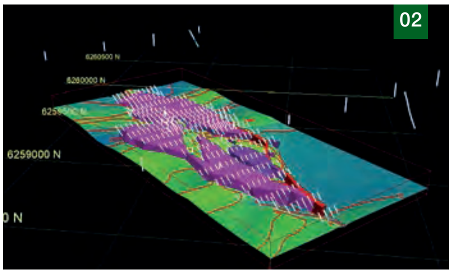

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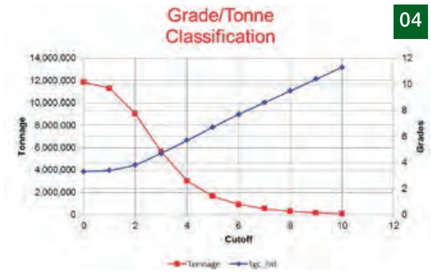

Perspective views showing drillhole data, domains, base of saprolite and block model extents for Oakdale (above) and Oakdale East (below)

Tonnage-grade curves for total graphitic carbon for Oakdale (above) and Oakdale East (below)

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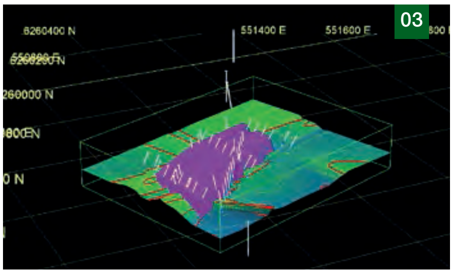

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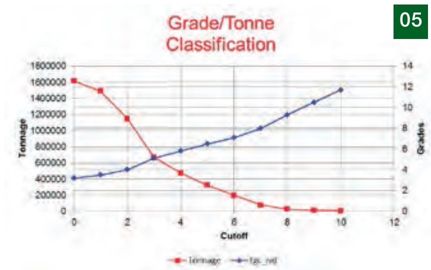


These geological domains were used to control interpolation of graphite grades within the resource block models. Only individual samples within each domain were used for estimation of blocks located within that domain.

Graphite grades were estimated into a block model for each deposit using both inverse distance squared and ordinary kriging methods in Vulcan. Only total graphitic carbon was estimated.

Variography was completed for Oakdale to determine an appropriate search orientation dimension and directions for samples to apply to grade interpolation using ordinary kriging. Slope of regression and kriging efficiency were calculated within each interpolated block.

Bulk density data was segregated into dry and wet sample types. Only dry samples were used so that the resultant model could report tonnages on a dry basis. Bulk density was estimated into the resource block model based on resource domain.

The Oakdale block model was created using a parent cell size of approximately half to a quarter of the nominal drill spacing. Block model extents for the Oakdale model can be seen in *Figure 2*.

The Oakdale East block model (*Figure 3*) was constructed with sufficient extents to contain all drilled graphite mineralisation, which is open in both strike directions. The density of drill data at Oakdale East was insufficient to warrant the use of sub-blocks.

Block grades for both deposits were compared with drillhole assay values on cross-sections, plans and long sections (*Figure 1*).

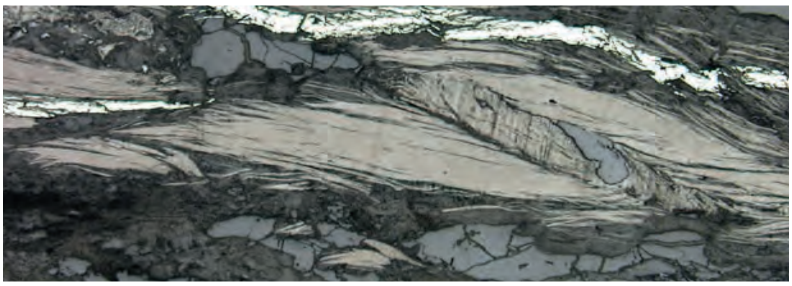
Swath plots were generated on nominated easting, northing and elevation slices, comparing original sample grades with interpolated block grades.

This review found that global interpolated block grades were comparable to the weighted averages of the raw drill sample grades within the resource domain boundaries.

The distribution of mineralised tonnage at various graphite cut-off grades for the Oakdale and Oakdale East deposits were charted in Vulcan for clear visualisation of economic impacts (*Figures 4, 5*).

The mineral resource study provides Oakdale Resources with the confidence to proceed with a scoping study into potential development of its flake graphite discovery.

Thanks to
John Lynch, Managing Director
Oakdale Resources Ltd



	Total graphitic carbon content (3% cut-off)	Total mass (tonnes)
Oakdale Indicated	4.7%	2,686,000
Oakdale Inferred	4.7%	2,964,000
Oakdale East Inferred	5.1%	670,000
Total Indicated & Inferred	4.8%	6,220,000

Movement tracking and stability monitoring

Maptek™ Sentry is a safe, accurate and cost-effective method for tracking movement and monitoring deformation of surfaces.

In July 2015, Consolidated Mining & Civil Pty Ltd (CMC) acquired a Maptek™ Sentry monitoring system for use at the Havilah Resources Limited Portia Mine in South Australia, 100km northwest of Broken Hill.

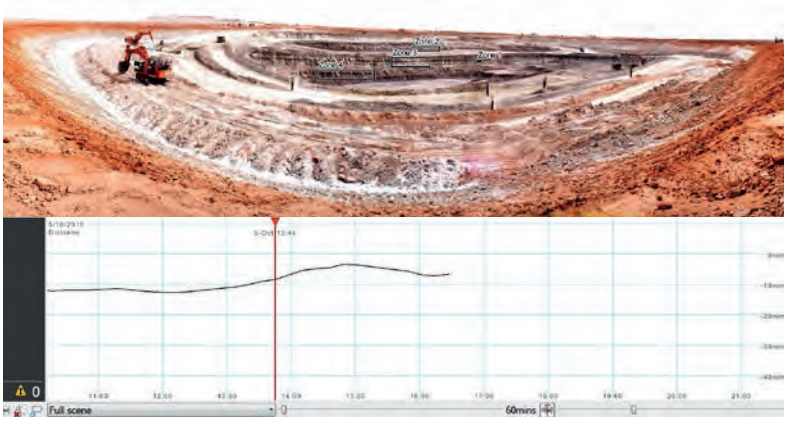
CMC is responsible for removing all of the overburden and bringing the ore to the surface at the gold mine. Sentry is an active monitoring system for tracking movement and notification of potentially unsafe areas of an operation.

A long range Maptek I-Site™ 8820 laser scanner and dedicated software measures and analyses wall movement. The wide coverage of I-Site laser scanners provides a clear picture of surrounding areas in 3D and a digital terrain model.

At Portia, CMC uses Sentry to track movement and stability of walls in the open pit. Sentry is easy to deploy. Concrete rafts support the laser scanner on stationary bollards at 5 locations around the pit.

> Sentry can run continuously 24 hours a day. It can be easily moved between locations for monitoring surface movements.

Setting up the Sentry system at Portia Mine



Sentry output shows a laser scan of the open pit draped with a coloured digital image. The graph shows the slight variation (maximum 7mm) in distance of the far pit wall over a 6-hour period, possibly due to thermal expansion at the warmest time of day.

'Safety is very important to us. The Sentry solution provides a diagnostic tracking tool with clear visualisation and analysis capabilities so we can make reliable engineering decisions', said CMC Principal Steve Radford.

Intensity measurements allow operations to track changes in moisture content and identify seepage as a predictor of potential failure. Repeated mapping allows a stringent audit of pit wall stability for regulatory needs.

Sentry streamlines scanning and monitoring workflows and allows multiple zones of interest to be watched. The weather station supplied with Sentry automatically corrects scan range for temperature and atmospheric pressure. Velocity, inverse velocity and displacement reports aid safety assessments.

'Pit wall monitoring data provided by the laser scanning system gives us a better understanding of how the clay and sand behaves during mining,' said Havilah Resources Managing Director, Chris Giles.

'This is crucial because the material has never been mined in this region. The monitoring data combined with geotechnical studies will help us to balance a structurally safe pit wall angle against minimising the volume of waste that must be removed,' concluded Giles.

CMC also uses the I-Site laser scanner throughout the Portia operation for routine survey tasks.

The I-Site point cloud data can be modelled for stockpile volumetrics and reconciliation, geological mapping and geotechnical analysis. Animations and graphical reports provide comprehensive information for reviewing results to guide future monitoring.

Thanks to
CMC and Havilah Resources

Tailings dam survey

An essential part of risk management is the quantification of risk. Mapping of structures using Maptek™ I-Site™ helps operations meet regulatory and safety requirements.

Maptek™ I-Site™ laser-based survey and monitoring systems provide a safe, accurate and cost-effective solution for dam wall stability monitoring. Capturing extremely detailed data enables advanced modelling and stability analysis.

The Sichuan Academy of Safety Science and Technology (SCASST) has undertaken extensive surveys of tailings storage facilities across the province of Sichuan in southern China.

Sichuan is a mountainous region prone to earthquakes and landslides. A large earthquake in 2008 killed almost 70,000 people and left millions homeless.

> When tailings facilities are close to populated areas failure could have catastrophic consequences.

SCASST acquired two I-Site 8810 laser scanners in late 2013 and early 2014. The laser scanners have been deployed to survey tailings storage facilities, capturing detailed topographic information of structures and surrounding areas.

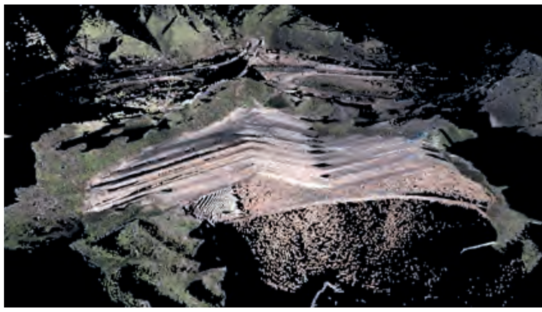
The laser scanners have also been used to survey water drainage channels, with the resultant 3D topographic models applied to hydrographic modelling. Combined with rainfall statistics, this can help to determine if drainage channels are adequate.

The 3D topographic model is useful for generating failure simulations, which in turn can be used as the basis for mitigation plans.

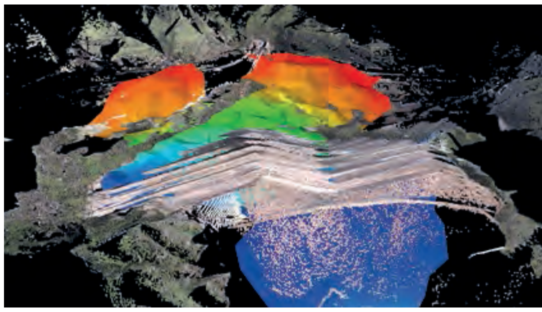
The Maptek solution is flexible and easy to deploy. The wide coverage of I-Site laser scanners ensures a clear picture of surrounding areas in 3D, as well as detailed data for areas of interest.

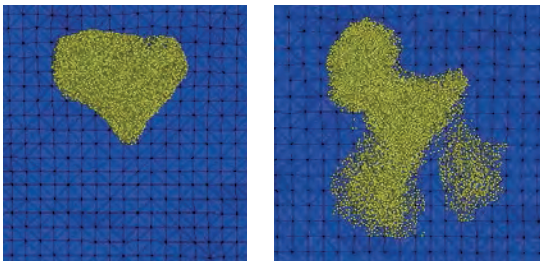
Reliable repeated mapping allows a close audit to be maintained on the integrity of tailings dams and shows regulatory bodies that safety issues are being considered.

Thanks to
Sichuan Academy of Safety Science and Technology



Stability analysis can be conducted on detailed I-Site point clouds and accompanying digital imagery





Pre and post failure simulation

High resolution digital image captured during laser scan survey

Intelligent drillhole tools key to success

A Canadian company has benefited from Maptek™ Vulcan™ drillhole tools during its 3-year exploration program.

Key to the success of any drilling program is the accurate placement and orientation of drillholes to intersect specified geological targets. Maintaining a record of this information helps ensure that objectives are achieved.

Constantia Resources Ltd, a private company affiliated with Hunter Dickinson Inc. is part way through exploring the Maggie Project in southwest British Columbia. Historical data from the 1970s indicates the presence of copper and molybdenum mineralisation.

Terrain characteristics and proximity to historical or cultural artefacts in the area often require changes to proposed drill coordinates.

Field personnel have been relying on Maptek™ Vulcan™ to update field data and have those changes reflected automatically in the drillhole database. An additional benefit is the ability to display selected drill metadata using Intelligent Objects.

Central to this system is an SQL database containing proposed drillhole coordinates, orientation, length and rationale for drilling. An ODBC connection enables sharing between Vulcan and the SQL view of the data.

The proposed drillhole database is populated at head office during technical discussions with project geologists. The focus is an interactive session in which existing project data is displayed and interpreted.

> Access to the database is user friendly and particular care is taken to record reasons for drilling and expectations for each hole.

Once field personnel have inspected the proposed site, adjustments may be required due to proximity to sensitive areas.

Field personnel have privileges to access the head office network via VPN and insert modified proposed coordinates in the database and update any other fields pertaining to the hole status.

Functionality is embedded in the SQL view to select modified coordinates if they are present. This ensures the most recent coordinate set is used. If required, drillhole azimuth, dip and length can also be modified accordingly.

To aid planning and assess the success of a drillhole a link is established via Intelligent Objects back to the underlying SQL database. Hovering over drillholes allows for dynamic display of selected data such as purpose, priority, status of environmental clearance, comments and change history.

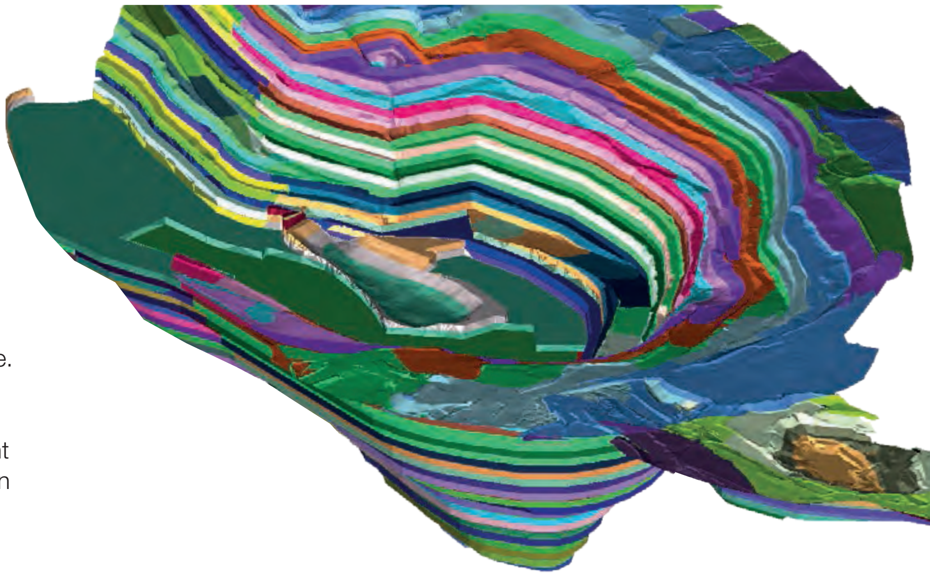
The Maptek solution ensures that field and head office personnel are using a single set of data at all times. Moreover, any changes made to the drilling program based on field criteria are reflected immediately and can be assessed against the agreed goals.

The current phase of the Maggie exploration program is expected to be completed in 2016.

Thanks to
David Gaunt
VP Resource & Database
Hunter Dickinson Inc.

An agile scheduling solution

The latest advances in strategic scheduling software in Maptek™ Evolution will allow users to quickly re-engineer staging without destroying value.



Existing Maptek™ Vulcan™ technologies have been adapted to create new pit optimisation and phase definition tools in Maptek™ Evolution.

Schedules are only as good as the stage design. Creating an optimised schedule from poor stage design asks a lot of any scheduling software.

The solution needs to be mineable. For example, changing the processing strategy may require changes to the stage development strategy, which would in turn mean redesigning the stages to fit the revised strategy.

Pit optimisation routines have now been employed inside Evolution, allowing users to accumulate optimal shells for creating higher quality schedules to achieve this redesign quickly.

Mining rules will allow the user to build stages which talk to the processing strategy in a more appropriate way, for example, incorporating rules such as pricing, volume to be mined, mining width, haul distance and equipment.

An agile scheduling approach allows operations to develop plans which are realistically achievable. Evolution helps efficiently develop staging logic to talk to different scenarios.

Operators will be able to easily investigate optimised schedules based on different strategies, such as smaller scale selective mining versus bulk mining methods.

By mid 2016 Evolution will facilitate short term scheduling using fully attributed solids from Vulcan.

A new Epoch

Evolution Epoch will cater for large datasets of more than 100,000 solids and will be ideal for planning periods of up to 18 months while complying with a longer term strategy.

Epoch will allow users to employ attributed solids, not just regular block models. This brings the optimisation technology developed for longer-term scheduling into the short-term planning environment, allowing for good quality, high value, short-term schedules.

This year Evolution has helped various operators add more than $800 million to NPV across 8 projects, including gold, uranium and diamond mines, over a 13-year mine life.

By optimising cut-off grades cashflow is improved during the early stages of projects. This has the potential to improve NPV by up to 20% in some cases.

For one project, Evolution was initially used to audit plans to ensure the direction was practical and high value. This confirmed the overall strategy was sound. It also showed that implementing a cut-off grade policy combined with some changes to design could significantly increase value.

Usability upgrades

A new viewer leveraging off existing Maptek graphics capability enhances the simultaneous display of models, haulage profiles and schedules. Benefits include visualising extremely large datasets in real time, such as topographic models, waste dump models and other graphical objects.

Drag and drop functionality between Vulcan and Evolution bypasses data conversion, providing a seamless user experience. Accessing a single source of the truth for scheduling improves overall efficiency.

I-Site Studio 6 time savers

New modules in Maptek™ I-Site™ Studio 6 streamline workflows and directly address the need for surveyors to report as efficiently as possible.

Geology

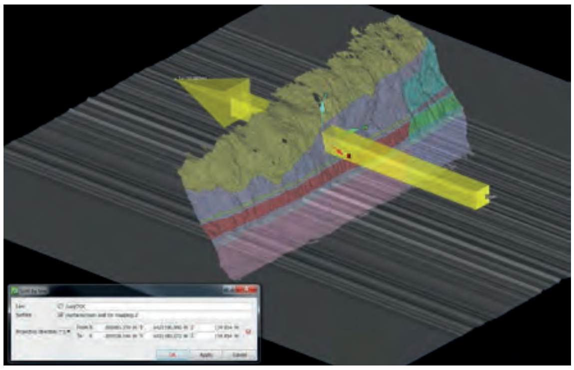
A new Geology Module includes several features for defining geology directly from 3D point cloud data. Intuitive tools streamline the mapping workflow.

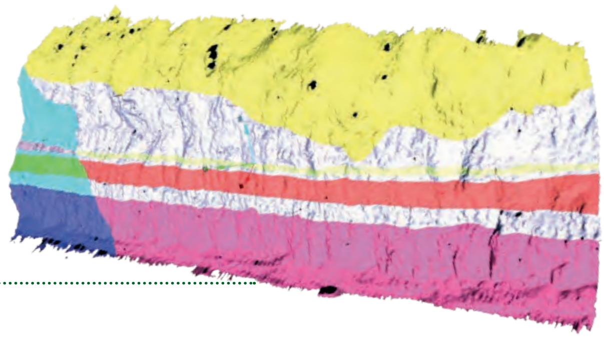
Split by line splits a surface such as a highwall face into separate facet networks based on a user defined line. This could be the top of coal or a fault line which is easily viewed on the detailed scan data.

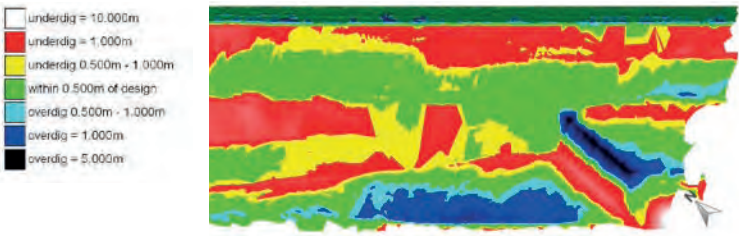
Extract by polygon extracts a new surface based on a digitised polygon. **Colour surface by polygon** fills an area with a uniform colour based on a digitised polygon to define the geology.

Apply a texture fill pattern to a surface overlays patterns like those used in geological face mapping to denote rock types.

Ongoing development will further improve I-Site–Vulcan workflows for geological and geotechnical analysis.







Reporting

A new Reporting menu contains **two new modules** for streamlining the creation of configurable reports. Automating conformance and performance monitoring dramatically improves survey productivity.

The **Volume** reporting module allows users to apply a base surface, stockpile surfaces and polygons to generate volumes for multiple regions. Reports will summarise stockpile volumes and colour code by region. Templates are fully customisable, making it possible to attach photographs and other documentation to the PDF being exported for distribution.

The **Design Conformance** reporting module compares a design surface to as-built and other surfaces. PDF export summarises sections, reporting on underdig, overdig and percentage of volume variance for each block.

University partnerships

Geology

Undergraduate geology students at the University of Wisconsin-Eau Claire have appreciated Vulcan tuition provided by Maptek. The connection with the Geosciences faculty is tightened when the Maptek trainer is alumni Anne Gauer.

Anne specialises in customer Vulcan implementation, customised training, geological consulting and site specific documentation. Her expertise in stratigraphic and metalliferous geological modelling, resource modelling, grade control and geotechnical analysis ensures students will be well trained to serve the mining industry.

Survey

Survey students from the South West Institute of Technology (SWIT) in Western Australia recently spent a week working on mine sites. Surveyors Simon Johnston and Derek Carter from Maptek joined them for a day to demonstrate the technical capability and benefits of the latest I-Site laser scanners for mine survey applications.

The experience gave the SWIT Diploma of Survey students the opportunity to use an I-Site laser scanner in the field. Maptek provided guidance and mentored the students on best practice survey methodologies. Processing and visualising the point cloud data of the mine in I-Site Studio software closed the survey loop.

The access to survey technology and workflow gave students unique insight into the real world environment.

Maptek Calendar

2016

January 31-February 3
International Society of Explosives Engineers
Las Vegas, Nevada - Booth 1407

February 21-24
SME
Phoenix, Arizona - Booth 1221

March 6-9
PDAC
Toronto, Ontario - Booth 1039

April 5-7
Discoveries 2016
Hermosillo, Sonora, México - Booth 34

April 13-15
XI Conferencia Internacional de Minería
Chihuahua, México - Booth 167

April 25-29
Expomin 2016
Santiago, Chile - Booth 811-2, USA Pavilion

April 26-28
Mining World Russia 2016
Moscow, Russia

May 17-18
12th International Gold & Silver Symposium
Lima, Peru

June 15-17
GeoMet 2016, Third AusIMM International
Geometallurgy Conference
Perth, Western Australia

June 16-18
Euromine Expo 2016
Skelleftea, Sweden

August 17-20
México Minergy 2016
Cancun, México - Booth 240

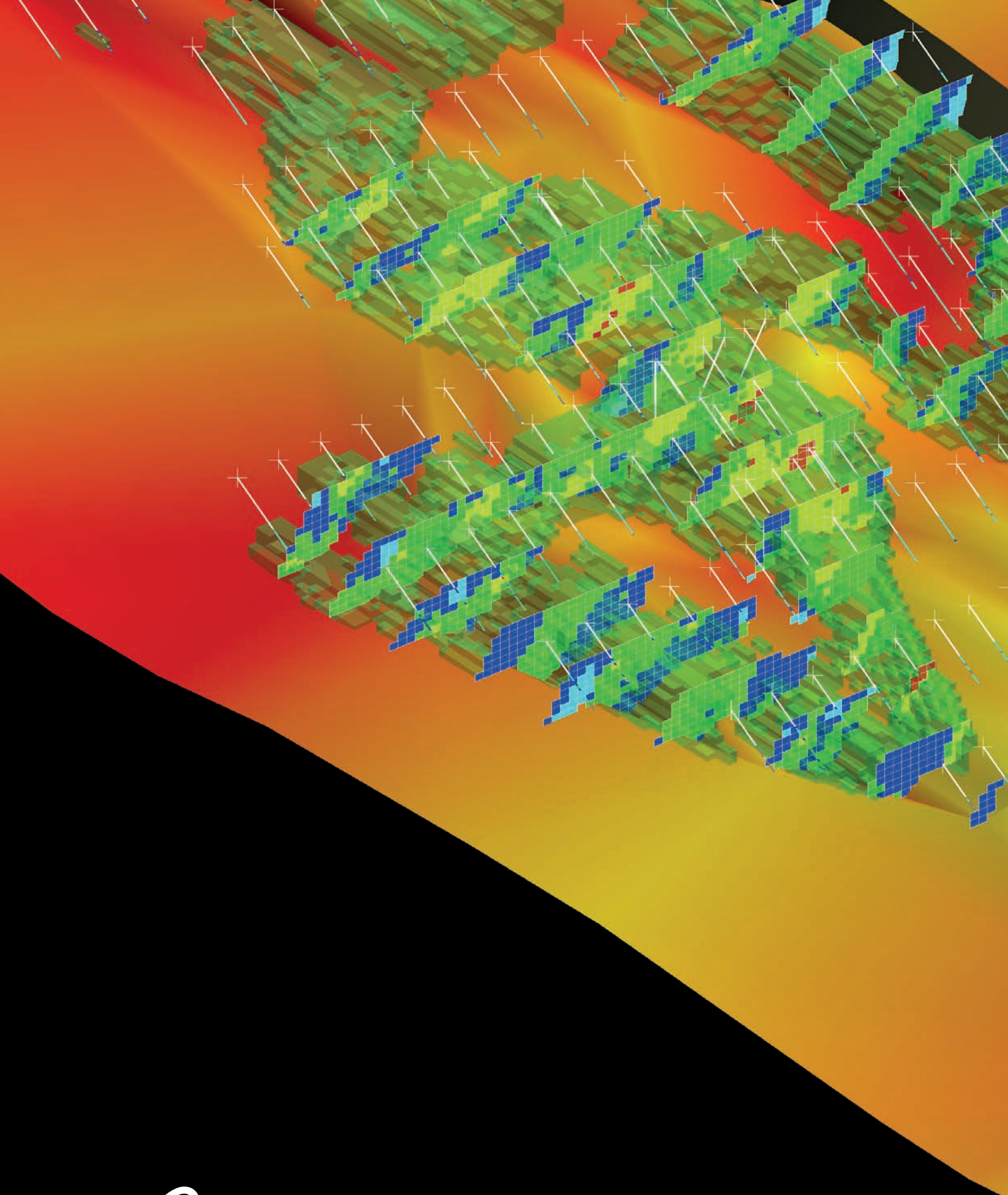
August 24-27
5th Congress - Tendencias de Actividad
Minera en México
Durango, México - Booth 14

September 14-16
ExpoMina Peru 2016
Lima, Peru

September 16-18
International Mine Surveyors Conference
Brisbane, Queensland

September 16-28
MINExpo 2016
Las Vegas, Nevada

October 16-19
XVIII Geology Congress
Lima, Peru



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