



> In this issue

Complex scheduling challenge New Maptek functionality Dynamic grade analysis Information and knowledge Design conformance Underground drill and blast New mine measurement systems Monitoring tailings dams University partnerships







Global activities

Latest Maptek mine planning and measurement solutions on show.







10

Forge

MAPTEK FORGE / JUNE 2017



At the halfway mark, 2017 is shaping up to be a year of consolidation for mines.

The case studies and articles in this issue reflect our mission to deliver smart systems that guide operations on the path to success.

Compliance and conformance systems support continual improvement. Reconciling design against actual is a powerful approach to synchronising digging, drill and blast, and mine to mill processes.

Accurate, timely reporting is a key enabler for Maptek solutions. It breaks down silos of information, delivers single source of truth data across operations and maintains a focus on effective management practices.

Maptek continues to add value to our technology platform with new and enhanced solutions to drive safety, efficiency and productivity.

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





Contents

Complex scheduling challenge solved Evolution Origin meets production goals	2
New modelling, design and planning functionality Maptek Workbench hosts Vulcan 10.1 and Eureka 4	4
Visualising and analysing complex gold vein geometry Improved resource estimation for strategic mine planning	6
MineSuite informs operational knowledge Effective decisions drive productivity and efficiency	7
Design conformance guides safe, efficient operations PerfectDig value for survey, geology and geotechnical teams	8
Underground blast design and analysis Aegis design, modelling and analysis functionality	9
Advanced mine measurement systems New I-Site laser scanners designed for mining	10
Focus on streamlined drill and blast processes BlastLogic improves mineral recovery	11
Laser-based solutions for monitoring tailings dams Safe, accurate and effective mine management	12
University partnerships Training future mining professionals	13
Calendar of events	13



New dragline tools are just one highlight of the Vulcan 10.1 release



Evolution meets scheduling challenge

Dynamic optimised schedules take account of the complexity of mining a new project at Diavik Diamond Mine in the remote Northwest Territories of Canada.

Rio Tinto operates the Diavik Diamond Mine, which is built on four diamond-bearing kimberlite pipes bordering an island 220km south of the Arctic Circle.

The operation commenced open pit mining of the pipes in 2003 and began underground production in 2010.

The kimberlite pipes are located under the vast Lac de Gras. Mining is enabled by building and maintaining dikes to hold back the water until the end of mining when the lake can be restored.

A processing plant on the island separates white gem-quality diamonds from ore delivered from three kimberlite pipes named A154S, A154N and A418. Diavik uses Maptek[™] Vulcan[™] and I-Site[™] for mine modelling, analysis and reporting, and contacted Maptek seeking a scheduling solution for its new A21 open pit project.

The A21 project is set to begin open pit production in 2018. It involves mining a near surface kimberlite pipe off the southeastern corner of the 20km² island.

Maptek Evolution Origin provides Diavik with a solution which takes account of the challenges of the unique project. Flexible, dynamic, optimised schedules can be run over 90 monthly periods.

The strategic role of the A21 pipe is to supplement the declining feed from underground operations to fully utilise the 2.3Mt process plant capacity. In addition, operating strategy dictates that significant ore stockpiling should be avoided. Therefore any A21 schedule should target and provide specific ore quantities dictated by these criteria on a monthly basis.

Calculating the combined monthly production of A154S, A154N and A418 and comparing with the available monthly plant capacity provides production targets for the A21 project.

Meeting the challenge

The key challenge for scheduling the A21 project to meet these targets is the need to mine the kimberlite pipe at a 5m bench height while the granite surrounding the pipe would be mined at a bench height of 10m.







Scheduling of the face advances within the open pit must take this into account, and different equipment with different rates and capacity is used to mine each material.

A customised lava script allows Diavik to process the two different bench heights and quickly produce monthly schedules covering the 90 periods.

The Evolution solution combines two 5m blocks to represent the single 10m bench height in the granite wall-rock. By combining the granite waste tonnage in the upper, or 'crest' block of the 10m pair, the correct tonnage can be scheduled, and the granite face can be advanced at the correct rate. The lower block of the pair is set to a total of 1 tonne, and thus has no impact on the schedule or face movement.

Only Evolution's industryleading genetic algorithms, combined with Maptek's commitment to solving individual customer challenges, could handle this complex multi-bench scheduling solution. The processing power and use of cloud-based technology allows complex schedules to be generated in minutes. Therefore mine planners can dedicate time to fine tuning constraints, rather than waiting for schedules to process.

As the Diavik mine plan is updated, new monthly targets can be created for A21 production. Copy and paste of the targets into Evolution allows fast rescheduling to account for changes in underground and process plant production plans.

Fully attributed Vulcan block models can be imported into Evolution for scheduling, and schedules are clearly animated to enhance communication across the operation. Management, shareholders and the team on the ground can be informed where each mining block is moved at each stage of the schedule.

Evolution also allows schedules based on the available fleet haulage hours. When the plant is at capacity, decisions on long-haul versus short-haul material movement can be modelled and analysed.

- 01 The A21 open pit contribution to mill processing capacity is complementary to the sum of ore tonnes sent to the mill from A154S, A154N and A418 underground production.
- 02 Materials in the open pit which are used to determine mining bench height for scheduling in Evolution.
- 03 Evolution representation of the face position in Phase 1, end of Period 8.
- 04 Vulcan topographic models viewed with the scheduled period-by-period animation in Evolution.

Evolution advanced tactical scheduling software produces robust solutions which are easily updated to meet constraints and production goals faster than anything else available.

Diavik initially rented Evolution Origin and has purchased the product on the back of the outstanding results achieved.

Thanks to Erik Bellefleur Mining Engineer Diavik Diamond Mine

Latest geology and mine planning tools

The Maptek™ Workbench allows dynamic access to data and applications across processes. Vulcan™ and Eureka™ now share this single interactive environment.

Integrating workflows and data throughout the mining chain is the future of robust mining processes. Maptek[™] continues to focus on delivering multiple applications on the Maptek Workbench.

Maptek[™] Vulcan[™] 10.1 features new functionality to streamline modelling and design, optimise scheduling, and improve speed and usability. Maptek[™] Eureka[™] 4.0 is included in the release, with core viewing and drillhole tools on a timed trial ending June 2017.

Mining blocks

Mining block generation is now handled by a single tool allowing users to segment information within block models (polygons, solids, surfaces) to prepare mining blocks for short term scheduling. Combining design and reserving tools improves productivity.

Users can now interrogate mining blocks for defined attributes as well as reserve calculations through dynamic link to the block model. Mining block generation is easy to set up and run. Multiple pits are supported, with the topography considered for adjacent pits.



Underground scheduling

Enhanced integration in Vulcan 10.1 allows the Vulcan Gantt Scheduler to directly read a Vulcan block model, removing the need to run templated attributes and advanced reserves to populate designs with reserve information. The process for updating the schedule with changes has been streamlined.

Swapping out data with the same name preserves sequencing for easier viewing of the impact of design changes on schedules. Multiple vgantt files can be imported and exported for scheduling shorter range plans from LOM. Multiple users can schedule different zones. Summary reports can be imported for a holistic view of the mine schedule.

The Schedule Optimisation tool

is an add-on to VGS for creating long term schedules that optimise NPV while adhering to operational resource constraints. Multiple scenarios can be run for analysis, and built-in reporting improves user experience.

Decline optimiser

Decline Optimiser quickly creates cost optimised single or complex decline networks. Integration with Vulcan Level Designer generates multiple underground development scenarios to consider for mine planning.

Block model manipulation

New utilities allow users to easily manipulate block models. Chopping a model, running complex computations on separate computers, and then joining the models speeds up workflow and benefits users working with large datasets and block models.

Dragline options

New dragline tools automate the creation of maximum dragline spoil topography and spreadsheet template setup for comparing available spoil room to actual sectional spoil volumes.

Creating a level bench of specified width or RL is now done in a single step, avoiding trial and error. New dragline preferences allow tailored prompts and defaults for rehandle.

Multi-ID grade estimation

Speed for grade estimation is further increased by estimating groups of IDs together and making better use of multiple cores available in modern processors. Estimation runs that took 5 hours now take less than an hour.

Python scripting

Vulcan 10.1 includes an interface to the Python scripting language. Customising solutions for block models, databases, mapfiles, grids and triangulations provides an efficient method for working with large arrays of data.

Graphics speed

Updates to the graphics driver improve the interactive interface so that larger datasets can be handled efficiently. New transparency display algorithm and keyboard mode selection options enhance speed and convenience for editing designs. Integration of dynamic model display with the Property Editor provides an intuitive tool for interpreting block models.

For an overview of new Vulcan functionality visit www.maptek.com/vulcan10.1

Eureka 4.0

Eureka now shares the Maptek Workbench environment with Vulcan, offering improved workflows, data sharing and access to additional applications on a single platform.

Eureka provides an interactive 3D environment for visualisation and modelling of exploration and project data including drilling, geophysics, seismic, GIS, maps and other imagery.

Vulcan and Eureka maintain their own file explorer and menus. Tied views allow viewing of data in Eureka on one screen and the same or different data in Vulcan on another.

Rotate or zoom actions in one window are replicated in the other. Drilling data edited in Vulcan is dynamically updated in Eureka boreholes. An implicit model created in Eureka is instantly available for use in Envisage as a triangulation file.

Maptek Workbench

The Maptek Workbench is the interface within which all Maptek software products will ultimately be available. This release incorporates Vulcan 10.1 and Eureka 4.0.

The Workbench platform allows efficient interaction with data and access to applications that support design and modelling.

Users can create personalised toolbars, menus, command lists and shortcut keys to suit their own work patterns. All of these customisation points may include both Vulcan and Eureka.



An integrated text editor includes advanced features such as syntax highlighting and region folding. Integration of spreadsheet functionality facilitates efficient editing.

Enhanced tooltips show summary and status information for all items. Files and file components are colour coded to reflect their status as changed, loaded or edited by a Workbench application. Items capable of rendering to an image include a preview thumbnail. Groups of items can be displayed as icons or details, and scaled and dragged into other windows.

Thumbnail views can be docked to the side or base and used as a palette. The dynamic filter allows quick search for assets.

The Workbench Explorer knows which files can be edited and will make the edit option available in the context menu. A new tab lists file changes in the current working folder. This chronological log records creation, modification, renaming and deletion of file types in the data tab.

Working space can be increased by auto-hiding docked windows, such as the Explorer, Logs and Properties. The Envisage window can be undocked and maximised on another monitor. Attached toolbars move with the windows.

Windows can be pulled out and docked together on another monitor to create a richer working environment.

Toolbars can be resized into any rectangular shape. Docked toolbar windows can be set to auto-hide and only appear when needed.

Users can dynamically switch between supported languages.

Command lines and scripts can be edited in simple panels that recognise the types of required values. Editing a command line automatically takes users to the correct panel for that executable.

The Workbench can constantly monitor memory usage of client and server processes, as well as overall system memory. A dashboard displays memory usage in easy-to-read scrolling charts. This information can be used to help identify performance issues in the software or with the platform.

I-Site Studio and BlastLogic will join Vulcan and Eureka as integrated Workbench applications later in 2017.

Accurate portrayal of geological variance

Maptek™ Vulcan™ is employed to visualise and analyse complex vein geometries, providing better understanding of gold distribution and grade.

Located in the historic Juneau Gold Belt of Alaska, the Kensington Gold Mine is a classic orogenic gold deposit owned and operated by Coeur Alaska Inc.

The deposit is defined by dense vein arrays with gold telluride minerals as the main ore bearing phase and is mined through underground long hole stoping. Coeur Alaska acquired full control of the property in 1995 and began production in 2010.

Since the exploration stage and throughout the production stage Maptek[™] Vulcan[™] has been used for nearly all technical processes including grade control, resource estimation, surveying, short and long term planning, drill and blast, and reserve calculation.

Complex geometry

The most challenging geological aspect of the Kensington deposit is the unique vein geometries. The deposit is defined by a combination of shear, extensional, sigmoidal, and fault-fill veins. Therefore, the economic domains are not defined simply by vein boundaries, but by a limit where vein density drops and gold grade falls below economic cutoff.

Resource model with high grade internal sub-domains estimated separately. Hotter colours indicate higher gold grade. and was not taken into account for the e, parameters of the estimation search ellipse. Vulcan is used extensively to solve this problem. ere Visualisation of drillholes and the various geological information from e falls logging was integral. For example, high-grade continuity seems to be directly down dip. However, on analysing the vein distribution, it becomes apparent that the high



Geological mapping and drill section interpretation combine to depict the complex vein geometries seen in the Kensington deposit.

The economic domains contain many or all vein types, and while most have a similar north-south strike, each vein type has a unique range of dips. This poses issues for resource geologists working to create an accurate estimation of the deposit.

Initially, this issue of complex vein

geometries led to a significant

overestimation of the resource.

grade is defined by a massive

fault-fill vein dipping obliquely

to the main domain boundaries.

The continuity of high grade was

overstated because vein orientation

These zones of internal high grade are grouped and estimated as separate sub-domains. Vulcan grade estimation functions helped create a seamless process for prioritising and estimating the grade of this complex set of nested domains.

The variogram mapping tool in Vulcan allows dynamic analysis of grade continuity, providing an opportunity to test various orientations with little effort.

An improved understanding of vein geometries brings a more realistic resource estimation. This has led to strong reconciliation and prediction of grade, allowing for better mine planning and a more robust strategy. The understanding of vein distribution has also allowed for confident prediction of future high-grade zones within the deposit.

Thanks to Joe Ruffini Senior Resource Geologist Coeur Mining

> Kensington Gold Mine is located in Berners Bay, southeast Alaska.

Applying knowledge strategically

MinLog™ MineSuite™ plays a crucial role in turning information into knowledge that can be applied to decisions which improve operational productivity and efficiency.



The roles and information depicted in this scenario reflect the dayto-day benefits of the MineSuite deployment at the Khumani Iron Ore Mine in South Africa.

Before start of business each morning, the **Plant Manager** studies the MineSuite Plant Production Report to verify the previous day's production against target, and to identify exceptions that may require attention.

On this day, the feed to the plant ROM has fallen behind target, and the ROM stock balance is too low. Should the trend continue, this will have a negative impact on the production tempos required to achieve the monthly target.

At the daily 07:00 **Production Meeting** the Plant Manager raises the issue with stakeholders – plant superintendents, planners and engineering heads. Various delays reported by MineSuite are reviewed along with the plant report; the discussion focuses on the plant ROM and the reason for the tonnage decline.

It immediately becomes evident that a tear in a section of the overland conveyor belt was the primary cause. The **Plant Superintendent** had been made aware of the conveyor tear the night before, so runs the MineSuite Plant Report to understand the impact of the breakdown on the ROM actuals. Running MineSuite Engineering Reports verifies maintenance progress on repairing the belt tear.

Knowing that questions will be raised during the daily production meeting, the Plant Superintendent contacts the engineering head responsible for conveyors to discuss the cause of the breakdown and the tactical and strategic measures taken to alleviate the loss and to prevent future occurrences.

Given the availability of MineSuite reporting tools, like the Pareto Dashboards, Top 10 Delay Report, Time Usage Report and Delay Detail Report, the **Engineering Manager** is well aware of the event and its impact before the Plant Superintendent brings it to attention.

It is clear that the failure had a significant impact on the overall availability of the overland conveying process. The Engineering Manager tasks the foreman on duty to conduct a root cause analysis to determine whether this breakdown could have been avoided and to assess remedial and preventative action.

At the weekly **Management Meeting** the Plant Manager presents the week's MineSuite Plant Report to the General Manager and Department Heads.

They are informed that the overland conveying issue has been attended to, and of what preventative and remedial action has been taken. The new forecast is advised using MineSuite reported trends.

This scenario would have been very different before the implementation of MineSuite. Daily production meetings often focused on whose information was correct, rather than how best to manage the issues.

MineSuite provides a single version of the truth across disciplines and processes, allowing managers to focus on exceptions.

MineSuite provides easy to interpret operational information representing complex processes in an intuitive manner for use by management.

Thanks to Khumani Iron Ore Mine

Perfect design conformance solution

Maptek[™] PerfectDig[™] provides the ideal solution for survey, geology and geotechnical teams at the Barrick Cortez gold operations in Nevada.

Since 2012 Barrick Nevada, Cortez District has applied the Maptek[™] I-Site[™] 8800 laser scanner to a range of survey solutions. With the addition of Maptek[™] PerfectDig[™] software, their I-Site point clouds are now being used in new ways.

PerfectDig is an intuitive system for rapidly comparing digging against designs, improving decision making and resource recovery. Photo-realistic comparison of site designs and excavation progress in real-time fosters communication between surveyors, engineers, supervisors and operators.

Cortez initially deployed PerfectDig to solve survey challenges. The first was to improve their process for checking the highwall toes and crests once the shovels had mined to design.

PerfectDig lived up to its name. Having daily scans as a shovel mines a final highwall allows Cortez to check for toe and crest design conformance without sending a surveyor near a highwall.

This simple change to process improves their ability to safely and accurately perform design checks, and allows them to check conformance of both vertical walls and benches. And now, Cortez is also using PerfectDig to check the design conformance of mine and dump haul ramps. 'We can now conduct design checks efficiently and safely. And we have data that is useful for feeding back to our open pit operations group.'

At Cortez, a scene is created in PerfectDig for each conformance scan. The scene is provided to the operations supervisors who can then share visual and verbal conformance feedback with shovel operators. The operators receive a reliable and accurate indication of how they are digging.

In the future Cortez plans to create PerfectDig scenes in the field and send them directly to operators in near real-time.

Once an entire bench has been mined, or upon request from the geotechnical group, all of the scenes generated for that bench are combined to form a Design Conformance Report. This is an extremely useful tool for determining design conformance and evaluating bench performance.

A report of this scope would take a dedicated person many hours to complete using conventional methods. With PerfectDig it takes just 20 minutes from start to finish. Maptek PerfectDig allows rapid evaluation of design conformance. Stakeholders can quickly compare as-builts with designs in the field, aiding real-time decision making.

PerfectDig presents enhanced photographs of a mine scene coloured with 3D design conformance information, facilitating immediate, intuitive understanding.

PerfectDig also provides a geology solution for Cortez. When the survey group captures laser scans they pay attention to image quality as well as the point cloud data. Ensuring that the digital images acquired are of high quality, allows the geology team to perform highwall mapping directly on the laser scans. This derives additional value from the scans and keeps geologists safely away from highwalls.

For Barrick, personnel safety is paramount. PerfectDig allows survey, geotechnical and geology colleagues to work safely and effectively while collecting valuable operations data.

Thanks to Brandon Barnum Chief Surveyor Barrick Nevada, Cortez District

underdig > 5ft underdig 3ft - 5ft within 3ft of design overdig 3ft - 5ft overdig > 5ft

Underground blast design and analysis

New features enhance the value of Aegis drill and blast tools to aid underground blast design and analysis.

Maptek[™] began selling Aegis in 2016 to complement existing underground design tools. New functionality in this easy-to-use underground drill and blast design and analysis product provides further value for operations.

Advanced Cost Modelling in Aegis Analyzer allows users to prepare a detailed model to estimate the total cost of a stope, including fixed costs of preparation, drilling, explosives and mucking.

The flexibility of the model allows costs to be determined based on calculated quantities, such as number of holes, metres of drilling or kilograms of explosives. Cost models can then be applied to scenarios to calculate the total cost.

When combined with the unique Aegis break prediction abilities, and forthcoming fragmentation functionality, Advanced Cost Modelling will allow blasting engineers to compare different scenarios. For example, what are the real cost savings of switching to a cheaper explosives product? Given that changing explosives might also require a change in drillhole diameter, spacing, priming, loading procedure or any number of other variables with associated costs, accurate modelling is necessary to determine the true cost difference to achieve the same blast results.

Break Analysis functionality in Aegis will give blasting engineers advanced tools to analyse and improve blasting practices. Along with blast monitoring, which will feed into the analysis, these tools will help operations to reduce overbreak and underbreak.

The full 3D break analysis will be a key part of **Aegis Analyzer**, while a simpler 2D analysis is being added to the already rich feature set in **Aegis Designer**.

A **Fragmentation** prediction algorithm will in the future be incorporated into break analysis, allowing further optimisation of the results of underground blasts. Users will also be able to calculate the estimated **Blast Vibration** attenuation resulting from a blast, at any point in space. Mines will be able to adhere to vibration restrictions more dynamically than using the conventional method of a simple cap on the weight of explosives per delay.

A new Lateral Development module will apply advanced userfriendly long hole drill and blast tools. Users will be able to model face rounds in 3D and adjust the

positioning and distribution of holes both at the face and at any point in the round. Blasts can be modelled using the Break Analysis algorithms to

the Break Analysis algorithms to estimate the extent of break and damage. The predicted excavation can then be reconciled to a survey.

Aegis is more than just a drill and blast design tool – it is a complete underground blast planning, analysis and optimisation solution incorporating the latest innovations in explosives engineering.

Aegis is available in English, Spanish and Russian.





Advanced mine measurement systems

New Maptek[™] I-Site[™] laser scanners provide high definition imagery and accurate measurement capability in an impressive ergonomic design.

Maptek[™] I-Site[™] laser scanners are designed for mining. The new I-Site XR3 laser scanners bring the advantages of superior imagery, improved speed and higher accuracy in a lighter system.

The acquisition rate is five times faster than the previous I-Site 8800 laser scanner series.

Highwall scans can be captured with imagery in less than two minutes.

The integrated 147 megapixel HDR equivalent CMOS camera delivers superior imagery which is a dramatic improvement in quality over previous models.

All I-Site laser scanners are rated to IP65 for environmental protection, necessary for mine sites.

The new ergonomic design makes for a user-friendly instrument which is perfectly balanced and easily handled by one operator. The systems feature an integrated battery for easy swapping, and a single case for transport. A dedicated field tablet manages 3D visualisation, scanner acquisition and registration checks.

I-Site systems provide the fastest field to finish performance.

I-Site Studio 7, released to support the new I-Site XR3 laser scanners, provides new modelling, analysis and reporting functionality for survey, geology, geotechnical and mine planning teams.

A key upgrade is resource recovery reporting which compares extraction volumes against design. Thresholds can be set for an acceptable amount of loss and dilution. Actions to prevent ongoing loss and dilution can then be made, and planning assumptions can be adjusted to improve mineral recovery.



Displaying drilling blind zones on stereonets helps identify regions that may provide poor geotechnical information. Improved registration options save time in aligning scans.

New smart CAD tools allow for manipulating data and highlighting areas of interest quickly and easily, giving users better control.

	I-Site XR3	I-Site 8800 series
360° high resolution scan with imagery	4 minutes	23 minutes
Image quality	147 megapixel	70 megapixel
Accuracy	5 mm	8 mm
Repeatability	± 4 mm	± 8 mm
Weight	9.4 kg	14 kg

Focus on drill and blast improvements

Maptek[™] BlastLogic[™] is an all-in-one solution adding value to open cut operations by streamlining drill and blast processes.

Maptek[™] is investing heavily in improving the drill and blast process to help operations maximise efficiency. A solid track record in identifying customer issues guides development of advanced solutions to streamline mine processes and improve mineral recovery.

Major operations across the world are taking advantage of the responsive delivery of tailored solutions to reliably achieve greater accuracy in critical processes such as drilling, charging and stemming.

BlastLogic 2.1

The introduction of temperature logging in Maptek[™] BlastLogic[™] 2.1 adds value to both upstream and downstream processes.

The last known temperature, previous temperature and change in temperature can be entered via the BlastLogic Tablet or data entry panels in the Desktop client, and then the information is displayed in the hole tabular view.



Hole temperature can be viewed or edited, and dip, backfill and charge sheets now show temperatures.

Other upgrades help operations improve mineral recovery through streamlined drill and blast planning, tracking and monitoring.

Electronic tie-up

BlastLogic 2.1 offers tools to create both pyrotechnic and electronic tie-ups and provide visual feedback on the effectiveness of designs.

Electronic initiation systems offer finer timing control and reduced misfire potential, increasing safety and reducing excessive vibration and noise.

Addition of electronic tie-up rounds out BlastLogic as the complete blast design and reconciliation solution.

Making small hole-to-hole and row-to-row changes while accounting for actual drilling, charging and stemming positions is easily achieved. This helps ensure optimum performance in safety and fragmentation for every blast.

BlastLogic allows better analysis and modelling of drill and blast. Cost-saving measures can be achieved, such as expanding the blast pattern and reducing explosives use without compromising blast performance. The superior BlastLogic interface allows users to quickly design blast tie-ups which allow explosives to be individually detonated and timed to the millisecond.

Auto-fill enhancements duplicate a row design across multiple rows with a single mouse drag. Drill and blast engineers can complete tie-up design faster.

Communication across operational departments is enhanced as tie-up sheets are easily exported. Blast crews can access printouts showing how to tie-up blasts.

OData service

The addition of an OData service to the BlastLogic Server supports customised reporting, allowing operations to track and monitor data against their KPIs to improve productivity.

BlastLogic enables operations to make blast design and implementation decisions with reference to mine plans, geology and geotechnical data.

Connecting fleet systems, explosives loading and initiation, and production management and reporting systems allows continual improvement both upstream and downstream from the drill and blast process.

Monitoring tailings dams at active mines

Maptek™ I-Site™ systems enhance effective management of tailings dams, improving safety, productivity and environmental compliance.



Sentry allows heatmap display of sediment build up in a tailings dam over monthly monitoring cycles.

Effective management of tailings dams is essential to mine site safety, productivity and compliance with environmental standards.

Maptek[™] I-Site[™] spatial technology provides fast, reliable, repeatable mapping and analysis tools for measurement and reporting.

Tailings dam walls and surfaces can be safely surveyed from a remote standoff to manage deposition as the material dries, shifts and settles.

Operations can easily analyse change over time, comparing sediment level to a designated plane to identify areas of recent build up. This helps determine which valves must be operated to ensure sediment is evenly dispersed.

Results are easily visualised and reports are generated quickly for communication and further analysis. Trends can be determined for future design and planning. I-Site Studio software can process spatial data captured by any source to help manage tailings dams.

Using an I-Site 8800 series laser scanner for data capture and I-Site Studio for generating results sees a field-to-finish time of 1 hour and 20 minutes.

The newly released I-Site XR3 laser scanners further streamline the field workflow. The systems are faster, longer range, lighter and more compact. An integrated 147 megapixel HDR camera provides extra high quality panoramic and snapshot imagery.

Sentry

I-Site laser scanners provide versatility for other periodic surveying tasks. For example, the laser-based Sentry stability monitoring solution handles surface deformation and wall stability analysis. Sentry is rapidly deployable. It provides current system status and stores the history of movement over the life of a monitoring period. This allows long term analysis of large scale structures and their movement.

Easy to use hardware systems are integrated with powerful software for generating accurate and reliable data for analysis and reporting in a range of situations and environments.

Advanced sensor technologies provide safe, accurate and versatile solutions for monitoring change in mining operations.

Maptek will continue to focus on developing applications to add value to mine measurement and survey processes.

University partnerships

Valuing relationships with universities allows Maptek to help train the next generation of mining professionals.



A four-day Master Class was held during May for 52 sixth year and 4 graduates in Geology from the University of Concepción as well as 9 Civil Mining Engineering students from the University Pedro de Valdivia. This was hosted in the Maptek office in Viña del Mar, with Marcelo Arancibia, General Manager of Maptek South America, as lecturer.

The class had a more practical focus than last year, and addressed different case studies, while still paying attention to the theoretical basis.

The case studies were oriented towards geostatistical applications, variography, kriging theory and implicit modelling. In addition, issues with modelling porphyry copper were covered by 3D Geological Sculpting. Each student constructed a typical 3D porphyry model including low grade core, ore area, pyrite halo and zone of hypothermic hydrothermal alteration.



I consider that students can see the scope of Vulcan and are motivated to apply it in their work. *Professor Fernanda Alvarez*

University of Concepción

The most important benefit is student learning and familiarisation with software widely used in the industry. A geologist with Vulcan knowledge has an advantage when joining the mining profession.

Maptek Calendar 2017

June 14-16 3rd Congress IME Minerals & Energy Chihuahua, Mexico - Booth 44

July 24-26 Iron Ore 2017 Perth, Western Australia - Booth 6

July 25-26 SA GeoTech 2017 Gauteng, South Africa

September 2-7 IAMG International Association for Mathematical Geosciences Perth, Western Australia

September 18-21 Exposibram 2017 Belo Horizonte, Brazil

September 18-22 Perumin - Extemin Arequipa, Peru - Booths 359 & 360

September 20-22 Tenth International Mine Geology Conference Hobart, Tasmania, Australia - Booth 26

October 11-13 First International Congress on Underground Mining Technology Sudbury, Ontario, Canada

October 17-19 XVIII Maptek Users Conference 2017 Viña del Mar, Chile

October 25-28 XXXII Conferencia Internacional

de Mineria Guadalajara, Mexico - Booth 679



Maptek Forge newsletter is published each quarter. You can receive it by mail or emailed link to the Maptek website. Email forge@maptek.com to subscribe or advise changes to contact details. Articles may be reproduced with acknowledgement. ©2017 Maptek