



December 2018 Newsletter

Forge

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Underground design
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Global activities



Discussion around disruptive technologies is receiving lots of air time – not just in mining – and our customers are naturally interested in the brands behind their solutions.

They care about the vision and values of the companies they do business with. Our mission remains the same as when Maptek was founded 37 years ago, to develop innovative mining solutions that work.

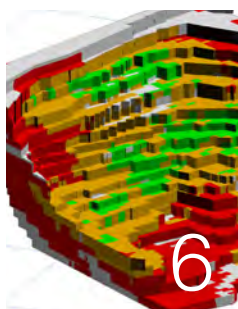
We were first in the market with laser scanners built for mining. We're still the first. Our SR3 laser scanner coupled with the latest PointStudio 3D modelling tools is satisfying the need for an all-in-one survey, mapping and geotechnical solution for underground.

The 3D approach sets Maptek apart. Fragmentation modelling using 3D point clouds provides a superior result to 2D photogrammetry. Combining larger quantities of rock property data from scans with break analysis functionality provides a conduit for reliable and measurable improvements to underground drill & blast. Ultimately our customers will be able to measure and track material all the way from an underground design to the crushed product on the surface.

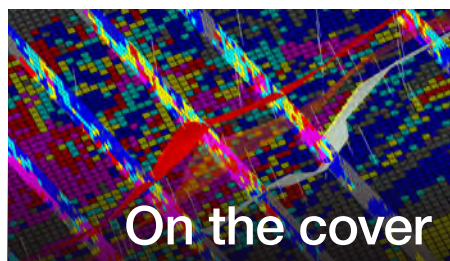
On that positive note I wish everyone a safe and relaxing festive season. We look forward to more exciting innovations in 2019.

Peter Johnson
Managing Director

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



Block models are the powerhouses of Vulcan modelling and the conduit for applying attributes from geology to scheduling tasks



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Reaching the rapid modelling goal

Maptek™ has developed a new solution for evaluating projects, progressing from database to resource report in 30 minutes.

Establishing a conventional ore resource report for a typical deposit can absorb weeks or months of geological effort. In response to the demand for faster results, Maptek™ has developed a new solution which unlocks huge potential for evaluating prospective projects.

Current reality

After database validation and construction of block model geometry, the next phase involves interpolating grade into individual blocks. Commonly used grade estimation techniques include inverse distance, kriging (multiple variants) and conditional simulation (also with a multitude of flavours).

These have been developed and redeveloped, chasing the goal of better prediction of in-situ grades within ore deposits.

‘Mathematical techniques on their own cannot deliver realistic grade estimations,’ said Product Manager Steve Sullivan. ‘The geologist provides an intuitive understanding of the deposit geometry, which is key to guiding algorithms to the ultimate goals.’

Estimation algorithms have been deployed across industry in many software platforms. However, setting up an estimation for a single variable into a single geological domain using the inverse distance technique entails up to 190 decisions.

Likewise, applying ordinary kriging to a single variable/domain takes up to 170 decisions in preparation work alone, to determine appropriate parameter settings using variography and kriging neighbourhood analysis, followed by a further potential 220 decisions to carry out the kriging estimate.

Deposits rarely have a single commodity of economic interest within a single uniform geology. For example, one Maptek customer has approximately 900 variable/geological domain combinations. Applying kriging to estimation of the entire deposit requires about 35,000 decisions.

Little wonder that establishing a conventional ore resource report involves weeks or months of geological effort. Time constraints often do not allow the competent person responsible for the resource reporting process to validate each and every decision.

Future proofing

Through consultation with key customers, extensive R&D and testing with real datasets, Maptek has now developed a new solution to expedite resource modelling and reporting.

The deep learning approach, powered by Maptek’s machine learning engine, has already proven beneficial to the mining operation that partnered the development.

The geological database is uploaded into the deep learning system with several selected parameters. Data analysis leads to automated assignment of estimation parameter settings, followed by geological domain interpretation, grade interpolation and uncertainty analysis.

The results are downloaded in standard Maptek block model format for resource reporting and collaboration with other users of the geological resource model, such as geotechnical, mine planning and mine scheduling engineers.

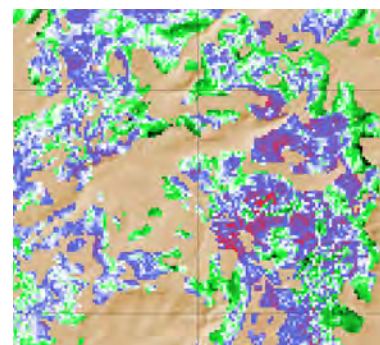
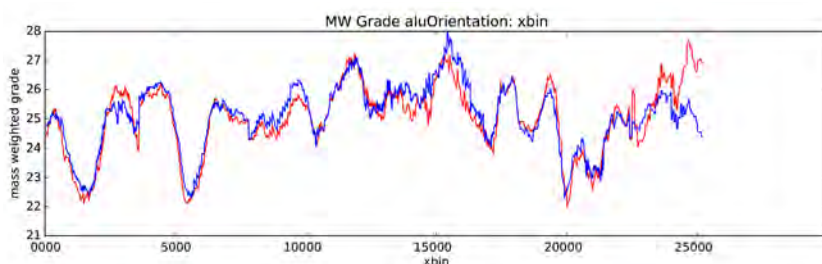
Benefits

The deep learning process models multivariable/multidomain data simultaneously. Input data is validated prior to modelling and results are validated with standard charting techniques.

From geological database to resource report takes about 30 minutes, compared with weeks or months for conventional processes.

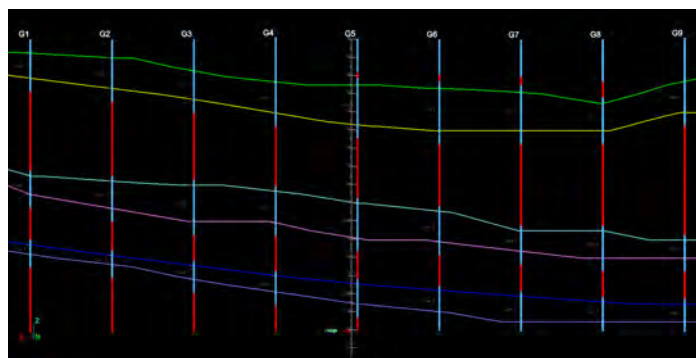
This is a truly rapid modelling technique. Resource modelling using the Maptek machine learning engine will be available in 2019.

Contact solutions@maptek.com.au



Scaled depth of burial for optimal blasts

Automated calculation and update of charge rules based on specified site blast outcomes optimises blast confinement and ensures consistent design.



A coal operation recently adopted Maptek™ BlastLogic™, which handles a range of drill & blast tasks from recording data through design to reporting and reconciliation.

When generating a charge design for each hole, site practice had been based on rule-of-thumb and 'gut-feel' and then carrying out a number of checks, including for confinement. A new approach was sought to optimise blasting practices.

The scaled depth of burial (SDOB) calculation in charge design provides an indication of confinement of an explosive charge based on variables including explosive quantity, explosive location and hole diameter.

Rather than calculating the SDOB values as a manual 'check' for charge confinement, Maptek designed an algorithm whereby desired SDOB values are input to determine the correct explosive position to achieve the user-specified confinement. The process is accurate and able to be repeated at the click of a button.

Achieving consistent outcomes removes user-generated variability, where various approaches may have been adopted in identical circumstances, in order to achieve the design criteria.

The concept was extrapolated beyond confinement in the stem zone and applied to through-seam coal scenarios. Required standoffs are now calculated around coal seams to provide consistent protection from potential blast damage, automatically adjusting for product selection and hole diameter.

When Maptek started working on a solution using the site dataset, we were able to reproduce the existing plans, where the differences incurred were due to the variability in the original process. Although our results were more consistent, there were concerns about following a different process, requiring thorough consultation with site engineers. The initial solution also required additional logic to resolve edge case scenarios.

Time saving with consistent outcomes

The biggest benefit of the Maptek solution was in saving time and removing variability around blast confinement and coal seam protection. Now the drill & blast engineer simply specifies the desired confinement values, and BlastLogic calculates the charge plan that will achieve the required result.

In complex scenarios, one day's work can now be reduced to minutes.

Being able to solve scaled depth of burial in BlastLogic is not limited to design scenarios – it is dynamically recalculated at any point in time for the most recent hole position, geometry and down-hole geological conditions. BlastLogic automatically uses the established rule to recalculate the charge plan.

Engineers can now spend the time saved preparing the design to make sure the desired confinement values are optimal, rather than trying to create a charge plan which conforms to a pre-conceived value.

The unique BlastLogic platform allowed Maptek to devise this solution. While standard options are in-built within the program, the scripted charge rule approach allows for virtually unlimited customisation of a charge design. If it's possible to calculate a result, then it's possible to achieve in BlastLogic.

Full value underground survey solution

Within 6 months of launch, the Maptek™ SR3 system is satisfying the need for an all-in-one underground survey, geological mapping and geotechnical analysis solution.

The short range Maptek™ SR3 laser scanner combines fast, accurate sensing, an integrated 147 megapixel HDR panoramic camera and dedicated mount accessories, targeted towards improving overall efficiency and safety underground.

The productivity factor has been ramped up with the release of new workflow functionality, enabled with the launch of Maptek™ PointStudio™ 8 on the Maptek Workbench last month.

Accuracy, speed and usability are music to the ears of the operator of any technical system, more so when operating in the damp, corrosive and closed confines of an underground operation where personnel and equipment safety is paramount.

The SR3, which complements the long range XR3 and LR3 laser scanners, is designed for underground. Coupled with the latest software on the Maptek Workbench the SR3 handles daily survey, advanced structural stability analysis and high-impact geological visualisation.

Ore and stope survey

A scan window of 130° vertically and 360° horizontally captures roofs and walls in tunnels and underground drives without the need for complicated configurations. Whatever the orientation of the scanner, integrated levelling automatically corrects scans before processing, making short work of the crosscuts for daily pickups.

Scan preview allows safe viewing of the interior of stopes. For scanning in hard to reach places, operators can attach the SR3 to an extendable 4 or 6-piece lightweight boom. Mounting options are also available for underground vehicles.

The SR3 is versatile – it also handles interior survey and surface stockpile measurements.

A requested feature allows import of mine CAD strings and surfaces to view together with scans. In another first, surveyors can log onto any web enabled device and conduct a scan remotely.

Geology highlights

Geologists appreciate the efficient, accurate mapping of structures and ore boundaries underground with the high resolution digital camera and underground light. This replaces the lengthy data processing times incurred when using an open exposure camera to capture imagery.

Changes in geology are extremely easy to highlight using the spectrum intensity data collected by the SR3, leaving more time for interpretation such as geometric analysis of folds.

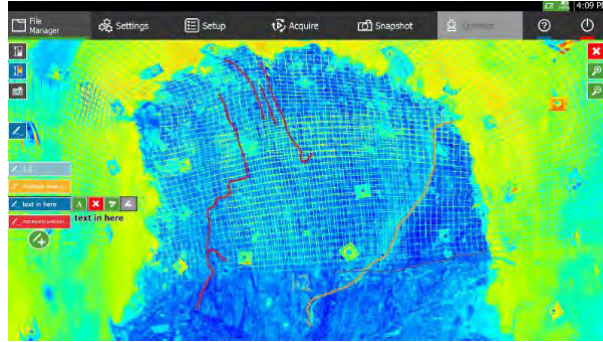
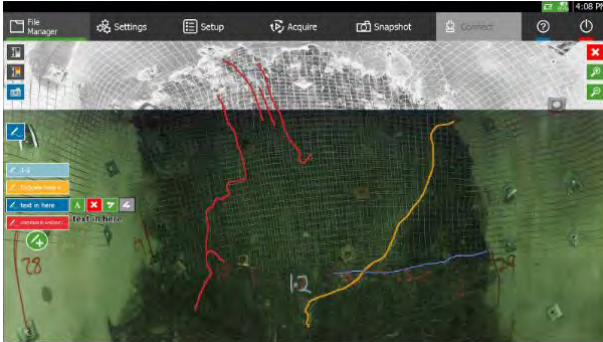
Overlaying imagery on high resolution point cloud data allows enhanced identification of structures, joints and boundaries and a new option enabled through the SR3 laser scanner controller will allow users to annotate scan images with CAD and text while in the field.

Importing this information into PointStudio with the scan data advances underground face mapping capability for better interpretation.

The SR3 laser scanner is already a game changer for underground operations wanting a single technical solution for efficient survey of drives and stopes, accurate geological mapping, advanced geotechnical analysis and safe surface monitoring.

Additional scope for enabling functionality through the scanner controller includes in-field registration, which is destined to further streamline underground survey tasks.





Accurate data analysis

The SR3 is ideal for efficient, accurate identification of underground structures and ore boundaries. Geotechnical engineers can map rock bolts and extrapolate their location onto the hanging wall for key block analysis.

Software tools for stereonet projection and extending major fault planes guide fault and geotechnical analysis.

Underground operations can use their Maptek laser scanner for critical subsidence monitoring and alarm notifications.

The SR3 laser scanner can be deployed for long-term convergence monitoring at 4 mm accuracy. It can also be coupled with Maptek Sentry software for permanent continuous stability monitoring at even higher accuracy.

Safety matters

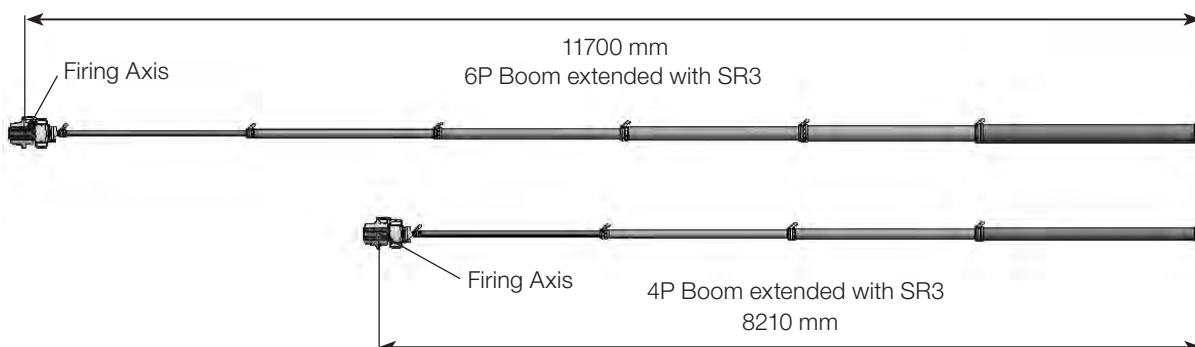
The impact of a versatile and advanced yet easy to use system on site-wide productivity cannot be ignored. The SR3 offers proven benefits for production and operational processes.

Mine to design analysis is streamlined with new automated underground reporting delivered in PointStudio 8, which allows users to easily compare designed solids against surveyed (actual) solids to identify overbreak and underbreak.

The reporting tool can be applied to development drives, stopes or crosscuts for improving grade dilution, highlighting unstable areas and reducing costs by identifying unnecessary development and pre-blast issues.

Engineers can also conduct shotcrete analysis, comparing scans to calculate volumes and target progress.

Operations can be assured of comprehensive on-site training when implementing the SR3, as well as responsive local technical support.



Quality-based resource estimation

Maptek™ Vulcan™ is being used at a marble quarry in northeastern Greece for resource and reserve estimation using quality indicators.

The use of standard estimation and modelling software tools in estimating marble quarry reserves poses several challenges. Reserves are based on marble quality categories, which are unique for each deposit. These categories represent visual and physical aspects such as colour, texture and fractures.

Classification is performed by experienced personnel and is based on much smaller samples than the slabs of marble produced. Furthermore, the available information is mostly qualitative, leading to further complications in the application of geomathematical estimation methods.

Iktinos Hellas SA used Maptek™ Vulcan™ in the estimation of marble reserves based on interpolating quality indicator values from drillhole and quarry face samples to 3D blocks.

The procedure is applied in all working quarries, as typified by this case study. The Platanotopos quarry in northeastern Greece is in public forest land, at 380–540 m elevation.

Geology

The Platanotopos quarry contains calcitic marbles, gneiss and gneissic schists which have no commercial value and are not exploited. Interest is focused on dolomitic marbles, which occur as lenses enclosed by alternating gneissic schist layers and calcitic marbles.

The marble-bearing horizon has a regular strike, with dips between 25° and 30°. The lensoid dolomitic microcrystalline marbles are massive, white, fine-grained and traversed by red-yellow 'spider-web' fractures filled with secondary iron oxides and hydroxides. Because the marbles are massive, large slabs can be recovered with minimal production of waste material. The weathered top 1–2 m of the deposit has a low recovery factor for marketable marble.

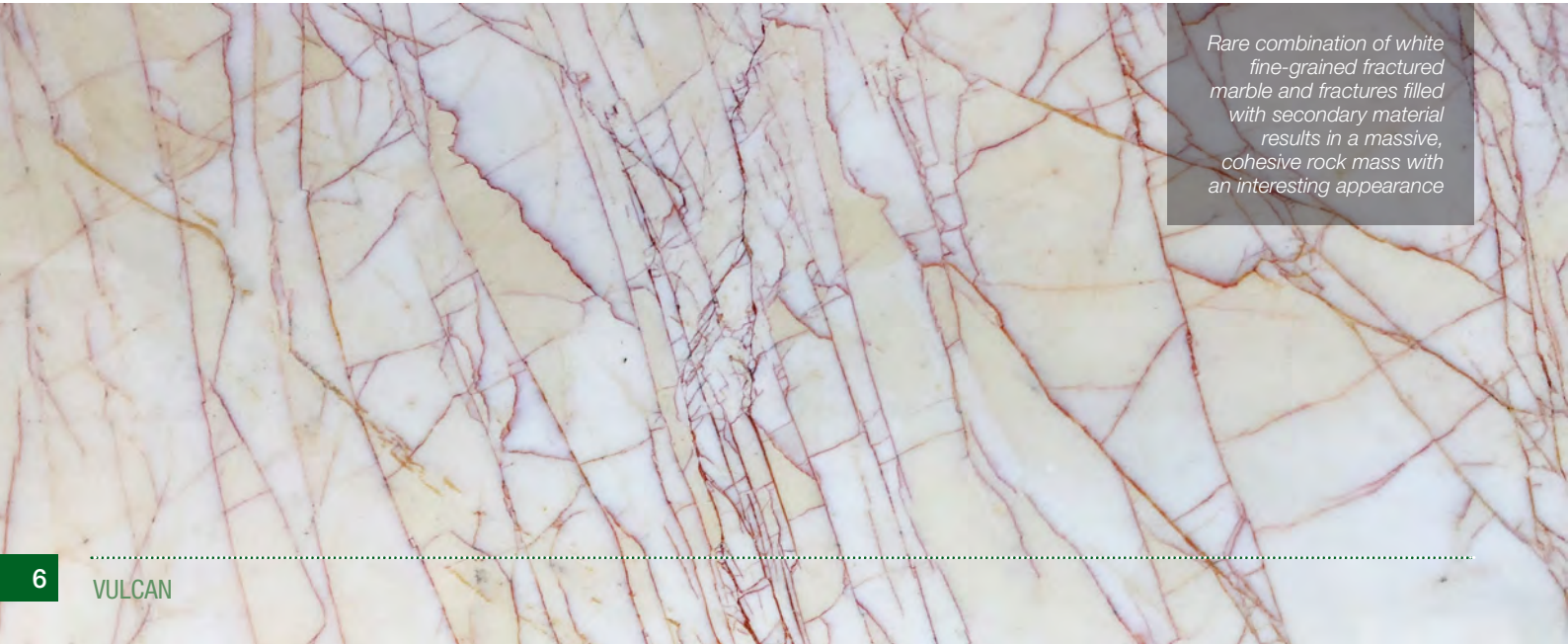
Quarry production is scheduled for 7,000–10,000 m³ per annum, with an estimated operation life of 15 years. The marble, known as 'Golden Spider', has very good physical and mechanical properties and can take a very high polish.

The blocks from the Platanotopos quarry are 6 × 2.8 × 7 m. Quality grading is initially based on colour: gold, yellow or red. Further grading categorises the different spider-web textures. Each block is then classified based on defects such as fractures, dendrite zones, brown lines, discolourings or marks, and a final quality is assigned according to a combination of grading types.

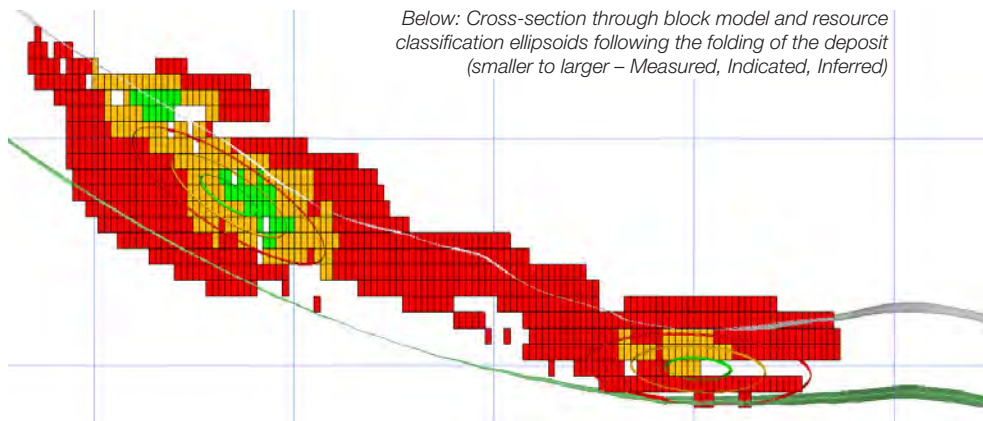
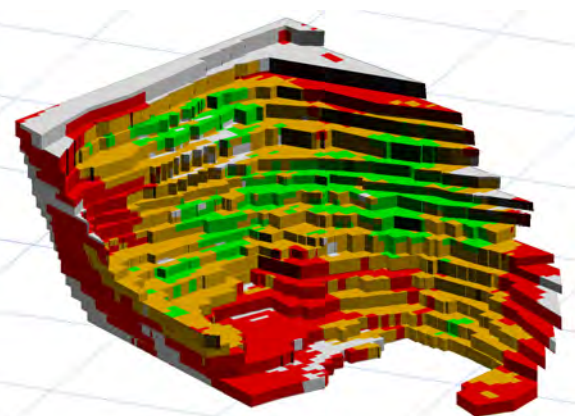
Data used in the study

Data used in the resources and reserves estimation includes the original and current topography, as well as diamond drillhole samples and sections on quarry faces, which are analysed every metre as to the marble quality.

A total of 1684 one-metre samples, from 47 sections and 45 drillholes, was used in reserve estimation. The data covered the extent of the estimated final pit, and was validated in Vulcan for collar location and overlapping intervals.



Rare combination of white fine-grained fractured marble and fractures filled with secondary material results in a massive, cohesive rock mass with an interesting appearance



Far left: Solid triangulation models of the final excavation benches coloured by reserves classification (green = Proved, orange = Probable, red = In-pit Inferred)

Below: Cross-section through block model and resource classification ellipsoids following the folding of the deposit (smaller to larger – Measured, Indicated, Inferred)

Methodology

The estimated volume of the final excavation was designed per bench (level) starting from the existing quarry morphology. The design of each of the 16 benches was modelled as a solid triangulation. These solids were visually checked and validated using triangulation topology checks (self-crossing, opening, inconsistencies) to ensure suitability for volumetric calculations.

The drillhole and section sample database was configured with extra fields (indicators) to allow the interpolation of arithmetic values. Specifically, fields were added representing the different marble qualities based on original colour, texture, fracture and tectonism.

Tectonism is handled separately because the different orientations of large-scale tectonism require a different search ellipsoid orientation. This is combined with initial qualities to derive the final quality classifications, with downgrading as necessary based on the estimated value of this field.

After calculation of initial quality and tectonism categories, the location of each sample is calculated and a weighting factor is assigned.

More weight is given to face sections as quality assessment is performed on a surface larger than the drill core and therefore better approaches the actual quality in that location. Weighting factors are used to further assess samples during interpolation.

Quality class field values were interpolated using the inverse distance squared method as implemented in a Vulcan block model. The estimated volume is divided into blocks of the same size. Block dimensions were configured based on the marble volumes extracted separately at the Platanotopos quarry.

In each block, the percentage of each marble quality was estimated using neighbouring samples. These samples are selected around each block using search ellipsoids oriented according to the geological features of the deposit. A special Vulcan function was used to calculate the appropriate ellipsoid orientation for each block, taking into account reference surfaces that define folding.

Generalisation of qualities was considered necessary as the limited sampling does not allow for a more detailed analysis of reserves

to the original quality categories produced by the quarry. Reported waste quantities are the remaining bench volumes, which cannot be estimated using the available sampling and the limitations set by the reserve categories.

A considerable part of the waste and the Inferred Resources can potentially be upgraded in the future with additional drilling, which will provide a clearer and more detailed picture in areas where there are currently no samples.

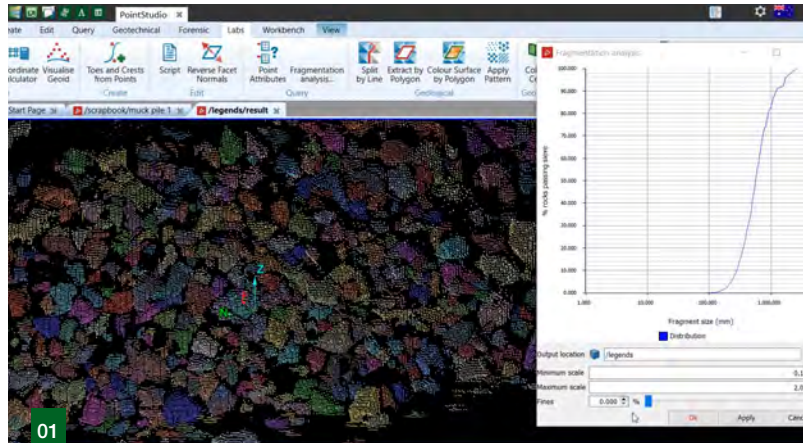
This method gives Iktinos Hellas SA reliable results according to international standards of Resources/Reserves reporting. Future work will include integration of historical production data with the quality estimation process and implementation of an appropriate production quality control system that will produce the necessary data to improve the current quality models and reserve classification.

Thanks to
C. Albanopoulos, Iktinos Hellas SA
and Ioannis Kapageridis, Technological
Educational Institute of Western Macedonia

Excerpt from paper published in Journal of
the Southern African Institute of Mining and
Metallurgy, Volume 118, January 2018

Strengthening underground design

Coupling fragmentation and break analysis tools will enhance the drill & blast process and facilitate a feedback cycle for continuous improvement.



Collaboration between Maptek™ and the developer of Aegis is set to close the loop on underground drill & blast design and measurement, boosting quality assurance and control in this key mining process.

Canada-based iRing Inc. is the developer of Aegis software, which is revolutionising underground drill & blast design and analysis.

Vice President of Development at iRing, Troy Williams recently visited Australia and was excited by the potential for fragmentation analysis in Maptek™ PointStudio™ when used in conjunction with the new Aegis Break Analyzer.

The Maptek fragmentation approach is light years ahead of anything else we've seen.

Using 3D point clouds instead of 2D image-based photogrammetry provides a distinctly superior result for fragmentation modelling.

Aegis Break Analyzer allows engineers to design blasts based on the first principles of rock mechanics and uses geotechnical data collected on site every day to inform ongoing blast design.

Fragmentation analysis

Fragmentation analysis, available for customer trial in PointStudio 8, uses laser scan data to automatically identify individual rock pieces, enabling better analysis of blast results.

'Maptek laser scanners and PointStudio software will be fundamental to measuring the fragmentation,' said Williams.

'Aegis will provide the front-end software and prediction tools to custom design every blast to ensure it meets the fragmentation specifications.'

Williams said that combining the prediction and analysis tools will help achieve the goal of turning a mining operation into more of a manufacturing operation with repeatable processes.

While many areas in mining are repeatable, others are based on skill, experience and intuition. The aim is to capture that learning so that any drill & blast engineer can perform their job successfully.

This will add value at the mine level and also downstream in the mine-to-mill process.

Blast analysis

Williams said quality assurance and control was virtually non-existent in many underground drill & blast processes and sites would benefit from more scientific rigour.

'We see the future is in blast analysis, treating blasting like any other underground process, not as a dark art where one skilled individual knows the mine by feel and can decide what the blast pattern is going to be regardless of the available information,' he said.

Aegis and Maptek solutions can also work together effectively during the early stages of the drill & blast process. Aegis streamlines underground ring design, and laser scanning validates that drilling matches the plan, without interrupting production.

'You'd be amazed how many operations don't know exactly where the drillholes are located,' Williams says. 'With Maptek technology a scan of the working drift could reveal collar locations as a byproduct of a general scan.'

The ability to quickly measure as-drilled information can be the largest contributor to more reliable drill & blast.

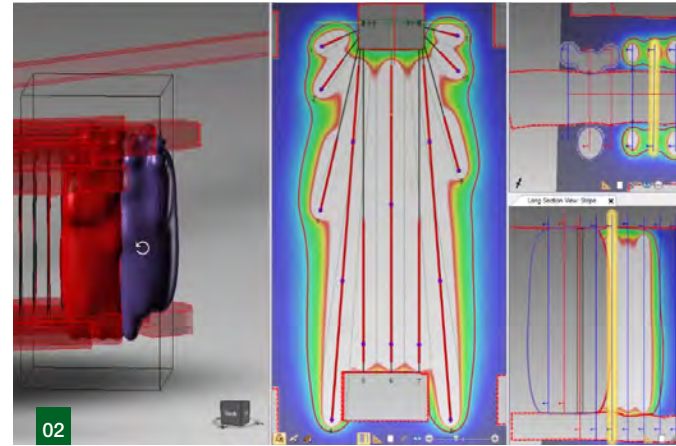
Shining a light on underground blast

Troy Williams, Vice President of Development iRing Inc. explains his reference to the 'dark arts'.

My boss, who has 45 years of blasting experience, always calls it the dark arts, referring to the fact that underground blasting is an experience-based system where you use trial and error until you find something that works.

But it's only good at that site and potentially only good at that area of the mine.

The aim with Aegis is to arm users with tools that focus on scientific facts - 'this is what you really need to worry about, and this is how you can design your blast patterns'.



02

Integration

When Williams met with Maptek, greater data integration between Aegis and Maptek software was high on the agenda.

Maptek Mining Engineer, Mike Winfield said that streamlining data use across Aegis, Maptek™ Vulcan™ and PointStudio would enhance the user experience and deliver better outcomes for mines.

'Triangulations and block model information could be loaded from Vulcan straight into Aegis for design work and then the data can return to Vulcan or go through to PointStudio,' Winfield said.

'Aegis has proven in some cases to speed up blast design up to 25 times. I can see its analysis tools having a huge impact for underground drill & blast processes when used alongside the Maptek capabilities.'

The Maptek Technology Roadmap points to the potential for exciting outcomes for underground mining through collaboration with other developers.

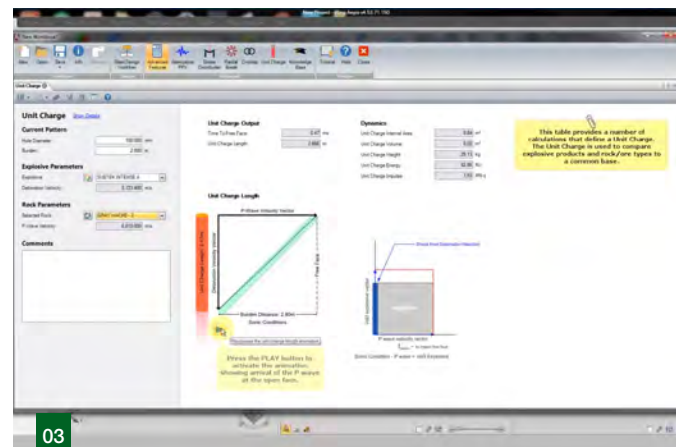
Thanks to
Troy Williams
Vice President, iRing Inc.

01 Automatically analysing particle size distribution by segmenting scan data leads to blast improvements

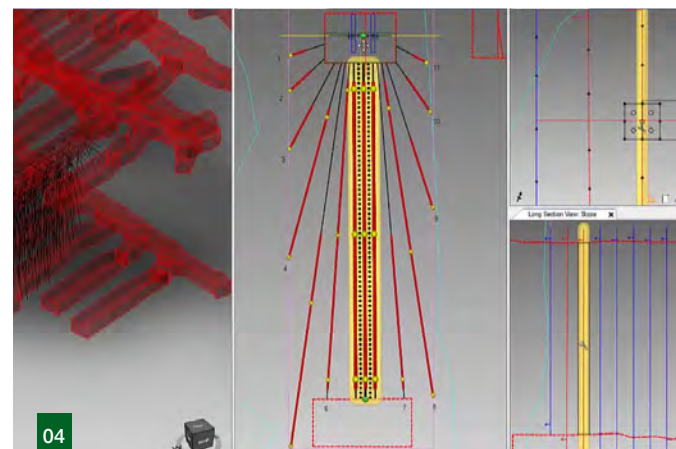
02 Simulating blast cavity break and fragmentation increases efficiency and reduces downstream costs

03 Radial break functionality uses geotechnical data to design blasts based rock mechanic principles

04 Rich 3D environment enables engineers to design and assess drill & blast layouts



03



04

Collective intelligence

Smart tools do not automatically lead to more intelligent results. But what can you do about it? Maptek Leader of Strategic Innovation, Chris Green provides some clues.

Why do some organisations seem so much smarter than others? Why are some companies better able to navigate the uncertain currents of the world around them and handle practically the inherent vagaries of geology and mining?

On the one hand, there are companies making huge profits while running on a tech-enabled model in which most operational decisions are made by machines.

On the other hand, there are organisations full of clever people and expensive technology that act in self-destructive ways. Consider financial institutions that spent vast sums on information technologies, yet failed to understand their data or understood it, but not what lay behind it, and so brought the world to the brink of economic disaster.

Intelligence and automation technology force mining companies across the world to rethink and retool nearly everything they do.

The business opportunities of automation technology are potentially limitless but will require radically new strategies and structures. Some of the answers can be found in the new field of collective intelligence that has emerged over the past few years.

Group thinking

Gerry Stahl, author of *Group Cognition*, explores what kind of thinking works best to achieve meaningful human activity.

'It is important to take the group, rather than the individual, as the unit of analysis,' he argues.

He concludes that the emergence of shared group cognition is the holy grail of cooperative knowledge work and collaborative learning.

In *Big Mind*, Geoff Mulgan says smarter outcomes do not happen automatically; they must be carefully orchestrated to foster dramatic jumps in group intelligence. The properties of a group 'far exceed the capabilities of any one part'.

Companies can attempt to ensure survival through agility enhanced by group thinking, but ensuring the right decisions are made is also important.

'We have learned that every tool that amplifies and orchestrates human intelligence can become a trap. Selecting the data that fit a particular task can lead us to rely too heavily on those data, and miss more important data that at first appear peripheral,' warns Mulgan.

'Predictive tools that make recommendations based on our past behavior can turn us into caricatures of ourselves rather than helping us to learn ... this is why we have to learn both how to use digital tools and when to reject them so that we don't end up trapped in new cages of our own making.'

Collective thinking by itself does not necessarily ensure that the right people are making the decisions.

A paradigm shift from legacy control and command management systems will be imperative although certainly not inevitable.

Many institutions and systems act much more stupidly than the people within them, Mulgan comments.

'There is a striking imbalance between the smartness of the tools we have around us and the more limited smartness of the results.'

As Maptek progresses towards the Enterprise system, and potentially the concept of the 'Digital Twin', it is clear that the world of mining is not just about collecting, storing, analysing and visualising data.

Structures and inter-relationships between mining processes and mining data are being discovered through the use of new generation smart tools of augmented intelligence and machine learning. We can call it 'smart mining', however, this is only the start.

There is a consciousness to an organisation and a mining operation that is not portrayed in the new world of data and data scientists. Group cognition needs to be enhanced and exploited. This is the cognitive culture of the organisation.

Maptek is reaching into this critical domain, understanding that data can become information and knowledge. Cognitive wisdom comes from merging digital knowledge with the historical knowledge and experience of the most powerful 'computers' in a mining operation, people!

This is where we find the true collective intelligence of the smart mine of the future.

The right place at the right time

MineSuite *IntelliTags* represent a new generation of location tracking and relative positioning technology to replace traditional RFI technology underground.

In most traditional underground mechanised mines, RFI tags have been used in recent decades for equipment tracking. This technology has inherent limitations in that the tags are merely location beacons with a short range, and are heavily dependent on tag layout in the mine workings.

MinLog developed MineSuite's new *IntelliTags* to provide for underground production management and higher-level business decision requirements.

MineSuite *IntelliTags* are built around the Nanotron Swarm Bee technology that allows for accurate ranging through time of flight calculations and meshing capability. This is combined with on-board MineSuite Field Computer Equipment to provide ground breaking capability for proximity awareness, traffic management, equipment and product tracking. It significantly reduces the requirement for traditional communications infrastructure.

Real-time operator location and position awareness is enabled even in areas with no communication infrastructure, thereby eliminating latency and failure points common to the environment.

Locations

Locations in the mine are tagged with *IntelliTags*, and a vehicle's position is determined based on recognition of any one of these tags. This allows production tracking, for instance, through active validation of assigned or planned production sources such as stopes, and destinations such as ore passes and stockpiles for haul cycle detection.

Material flow can be tracked from stopes (sources) to tips (destinations) to prevent or highlight incorrect tipping. An on-board message alerts the operator to relocate to the correct location.

Depending on requirements, individual tags can be provided with virtual ranges; tag settings do not need to be altered, but the on-board equipment associates a specific tag with a particular range.

Positioning

Positioning can also be in relation to other equipment. For example, when a truck is assigned to a loader which is working at an intermediate and untagged location, the truck will register that it has arrived at the desired source. The loader acknowledges the arrival of the truck assigned to it, thereby automating the activity cycle.

Tags communicate directly with each other, and the ranging capability allows calculation of the distance separating the tags.

This ranging technology provides an underground line of sight in excess of 200 m for each vehicle. It also covers haulage around corners, and is enhanced by the capacity to mesh. In practice, a stand-alone tag is placed at an intersection; two approaching vehicles can determine their position in relation to the intersection tag and thereby communicate their distance from each other.

Delays

Tracking of operational and engineering delays is achieved through on-board capture and detection of locations such as workshops and fuel bays. The system identifies the presence of equipment in a location and applies associated business rules based on a sequence of events. For example, shutdown in a fuel bay can be used to measure refuelling delays or even queueing time.

Deployment

MinLog has completed pre-production trials of the technology, with the first deployment planned for November 2018. The ability to progress from a technology test bed to a production environment inclusive of related operational software is a result of the relationship with industry partners such as AngloGold Ashanti, as well as technology partners, Nanotron and EDM.

Taking advantage of the latest technology enables an operation to improve safety and productivity. Knowing the location and status of all equipment at any time allows intelligent decisions to be made to avoid and minimise delays.



Vulcan design projects

The partnership between Maptek™ and the University of British Columbia has provided many opportunities for collaboration over the past several years.



Professor Arduini of the Mining Engineering Department recently invited Maptek™ to give a guest lecture to fourth year students working on capstone projects.

Following a one-day introductory training course given at the university earlier this year, Maptek was asked to present on more advanced Maptek Vulcan™ topics.

Rather than presenting a formal lecture, Maptek Vancouver-based Ann McCall used the three-hour block to give an interactive training session on two key optimisation tools in Vulcan: Vulcan Stope Optimiser and Vulcan Pit Optimiser.

Ann also briefly shared her experience in mining, how she connects with members of the industry, and how her mining engineering degree is applied in a software company.

Most of the capstone groups using Vulcan selected an underground project, which made Vulcan Stope Optimiser an ideal tool to spotlight. Ann presented a simplified Stope Optimiser workflow highlighting the basic usage as students followed along to create their own sample

specification. The rest of the class focused on Pit Optimiser for evaluating an open pit deposit.

The hands-on experience familiarised students with advanced Vulcan tools to evaluate and create data for their most important university project.

Students commented, 'It's helpful to have an explanation of what the tools do in simple terms', and, 'We liked having things explained in person to see how to complete a task in our projects'.

'Maptek goes above and beyond to ensure that UBC students get the support they need to grasp a working knowledge of the software.'

- Professor Arduini

Vulcan design prize

Maptek™ provides training to University of Adelaide Mining Engineering students and presents an annual award for the best design project.



The Maptek Mine Design project is among the most challenging, rewarding and valuable aspects of their university studies, according to the 2018 prize winners, Munkhjargal Chukhal, Shae Daniel, Ellen Fryar and Adam Zanardo.

The annual award, first introduced in 2010, requires groups of University of Adelaide Mining Engineering students to create optimised mining pit and underground designs and schedules from an industry dataset using Maptek™ Vulcan™ software.

The competition winners agreed that the project had been highly rewarding and they had found Vulcan very user-friendly.

'I think it was probably the best subject we've taken in terms of what we will actually do when we get out into the field. Vulcan really helps you to visualise the mine.'

'We worked well as a group, everyone has their own strengths. It's been one of the best things about uni – actually working with software that is used in the industry.'

'We got to implement and put into practice what we've learnt over the past few years.'

Maptek Senior Technical Sales Specialist, Steve Sullivan provided the Vulcan software training and judged the award.

'I enjoy providing tuition that is relevant to the students' future careers in mining.'

Learning pathway in mining

Maptek™ Africa has embraced a Learnership program to introduce young people into the mining industry.

A year ago Business Administration trainee Dumisa Mhlobo was eagerly anticipating the opportunities ahead in his new role with Maptek™ Africa.

Dumisa joined Maptek with a keen interest in the administrative side of the business and his experiences have now inspired him to follow a new dream to become a surveyor.

'After visiting mine sites with Maptek experts and attending a presentation at the local university, I developed an interest in survey and Maptek products in particular,' Dumisa says.

'Growing up, the only careers commonly coupled with success were a doctor or a lawyer, but after being introduced to Maptek my perception quickly changed.'

Dumisa has accepted the position of Learner Surveyor at Maptek and in March 2019 will begin studying through the Chamber of Mines, starting with his Elementary Survey Certificate.

'I'm super excited! I can't wait to go onsite and fully apply what I've learnt,' he says.



'I'm currently being mentored by Ayanda Njotini, an experienced surveyor who knows the power of our systems and the inner workings of the industry, so I'm in good hands.'

Dumisa will be supported to undertake his studies while continuing to help the Maptek team with the logistics of implementing Maptek R3 laser scanners on customer sites.

The Learnership program aims to help young people enter the workforce through training and workplace learning. Dumisa appreciates the benefits of being part of this initiative.

'I've learnt how mining technology has transformed operations to meet the increasing demand for efficient production and opened the door for new job opportunities,' he says.

'I really like the atmosphere at Maptek, and how the company continuously invests in its employees. My personal highlights have been when I created my first surface and calculated stockpile volumes, and when I was offered a permanent position at Maptek.'

Elton du Plessis, Regional Manager Mine Measurement, says the Learnership program has been a win-win.

'It's a great opportunity to expose young people to careers that they wouldn't normally have known about or thought of going into, it's really empowering.'

Based on Dumisa's success, Maptek Africa will continue this program in 2019.

Maptek Calendar

2019

January 27-30

45th ISEE Conference
Nashville, Tennessee, USA

January 28-31

AME Roundup
Vancouver, BC, Canada

February 12-14

Minerals Week 2019
Canberra, ACT, Australia

February 24-27

SME
Denver, Colorado, USA

March 3-6

PDAC
Toronto, ON, Canada

March 4-22

XVII Citation de Geoestadística 2019
Maptek, Viña del Mar, Chile

April 9-11

ACG International Conference on
Mining Geomechanical Risk
Perth, WA, Australia

May 21-23

Austmine 2019 - Mining Innovation
Brisbane, Queensland, Australia

May 27-30

Exponor 2019
Antofagasta, Chile – Booth 430

June 18

Copper to the World
Adelaide, SA, Australia

October 23-26

XXXIII Convención Internacional de
Minería
Acapulco, Mexico – Stand 428

November 25-26

International Mining Geology
Perth, WA, Australia

2020

May 12-14

International Symposium on Slope
Stability in Open Pit Mining and Civil
Engineering
Perth, WA, Australia



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