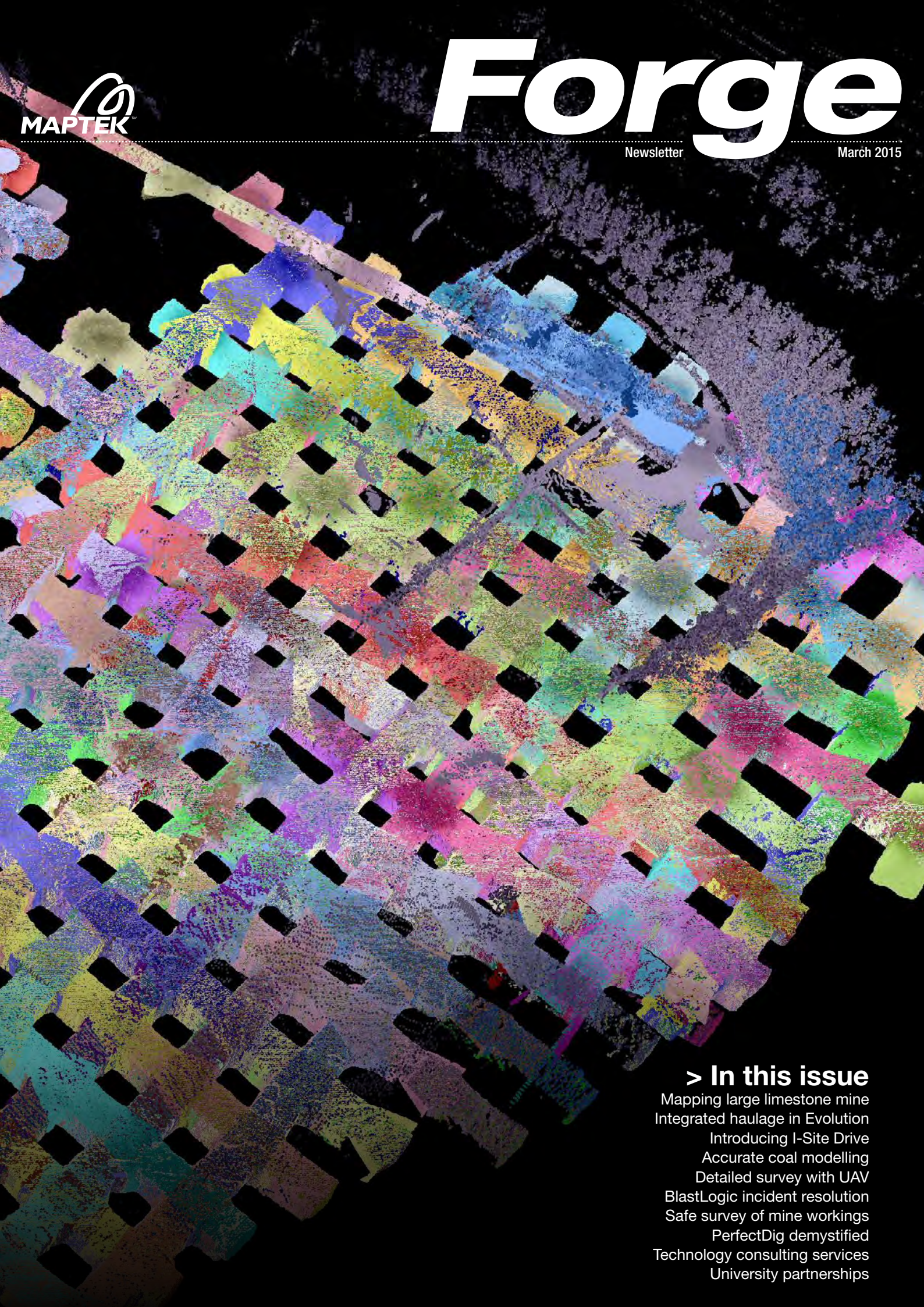
MAPTEK

Forge

Newsletter March 2015



> In this issue

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Integrated haulage in Evolution
Introducing I-Site Drive
Accurate coal modelling
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Technology consulting services
University partnerships

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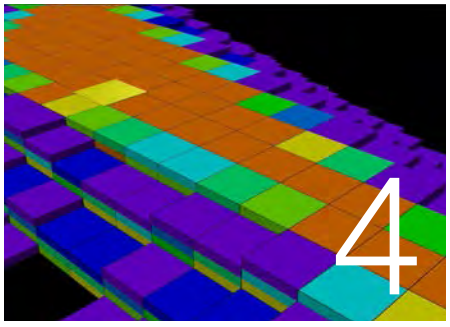
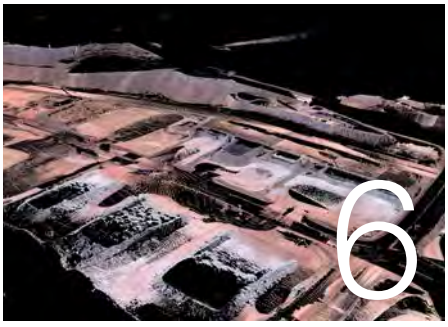




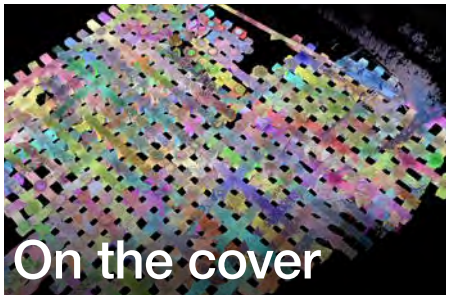
In this issue

Mining companies need robust technology systems that allow them to consider a wide range of possible futures. Fluctuating commodity prices demand a flexible mine plan that accounts for uncertainty.

Case studies in this issue outline ways that Maptek solutions can help you accurately model and design your mine. Efficient tools for stockpile reconciliation, resource definition and conformance to design will enhance operational safety and productivity.

Sensitive scenario planning and more sophisticated data analysis helps to manage potential risk and secure the best outcomes.

And if you can't do it yourself then our consultants can do it for you!



A total of 676 I-Site laser scans and 1.3 billion points provided the detail for modelling underground works at the Lafarge Conco Mine.

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Survey solution for underground

Maptek™ I-Site™ laser scanning handled a large underground survey project with ease, delivering timely, accurate data to guide limestone mining operations.

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In late 2014, the extensive northern underground workings of the Lafarge Conco limestone mine near North Aurora, Illinois, were surveyed using the Maptek™ I-Site™ 8200 laser scanner.

'Our main objective was to complete old mine maps of historical workings and catch up to current production,' explained Talia Flagan, Quarry Manager of the Paulding Cement sector of Lafarge.

Limited staff on site meant there was not always time to survey the pillars. Lafarge needed a map of the existing underground workings with accurate pillar locations. They wanted to ensure that the mine design was being followed, and also that the pillars were not being undermined from the level below.

Lafarge determined that, due to the extent of the workings, a traditional survey would take more than 3 months and also be very costly. Traditional methods would have been adequate for the as-built needs but timing and cost were major factors leading to the choice of laser scanning.

'Maptek was highly recommended by our geotechnical consultant. The I-Site system is a leader in this field, and competitive pricing enabled us to move ahead with the project,' added Flagan.

> With more than 600 scan locations, it was a big survey job, requiring 10 days of scanning across 10 to 12 hours a day.

It took about 30 minutes to travel into the mine and set up the equipment. Setups were on average 90 feet apart. and a low resolution 360° scan was completed in 3 to 4 minutes.

The I-Site 8200 laser scanner was ideally suited to the underground survey task. The 125° scanning aperture ensures good overhead coverage. It has a tilt compensator and integrated compass.

Data can be collected at up to 500 metres, with multiple point density settings for different purposes. The minimum range of 1 metre allowed scanning of the tops of the pillars on the double benched areas; this provided important data for later model creation.

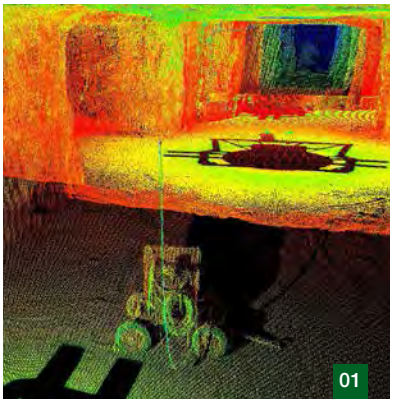
The biggest advantage of the I-Site 8200 laser scanner is the ability to attach it to various industrial vehicles. At the Conco operation it was mounted on a Bobcat 3400XL.

Conco Mine has a single access portal for vehicles. Tunnels range from 100 to 2,100 feet. Single bench height is approximately 25 feet and double benches 50 feet. Active mining was underway during the project. Maptek coordinated with other equipment operators to ensure production was not impeded and staff remained safe.

Surveying was undertaken from all accessible and safe drift intersections of the mine extent. Of the scan locations, 435 were at Conco North Mine Level 1, and 211 at Level 2.

Getting started

Tripod mounted setups at 13 surveyed scan points allowed the I-Site instrument height to be measured, with internal compass readings used to determine the azimuth of the laser scanner.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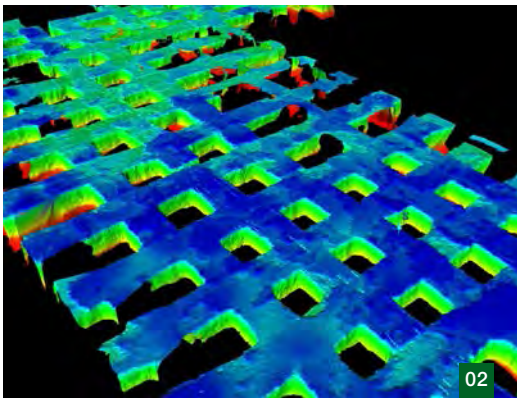
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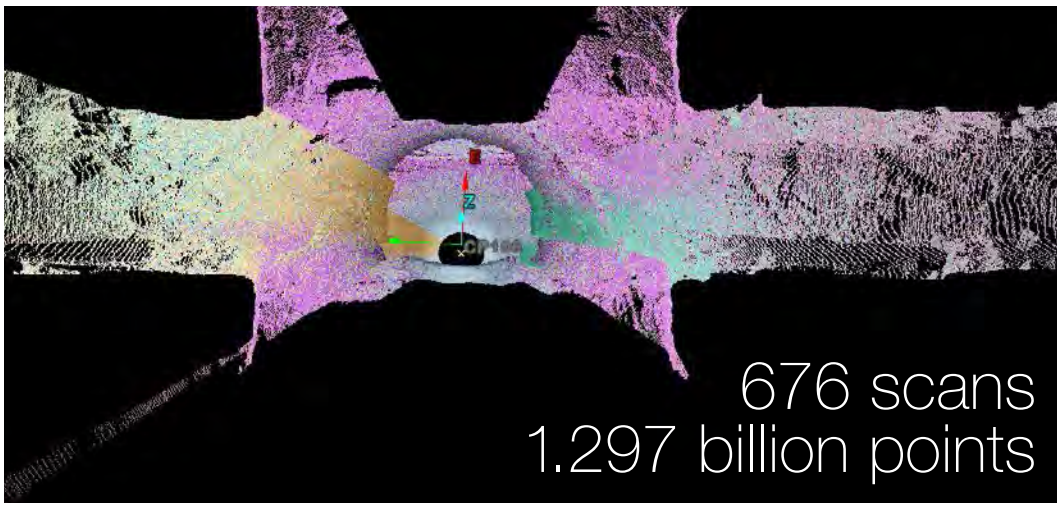

Additional scans at higher resolution from these survey-controlled locations provided extra detail. A total of 30 high resolution 360° scans completed the setup phase.

The I-Site 8200 laser scanner was then transported on the bobcat to conduct stop-go scanning at drift intersections. Each of these lower resolution scans averaged 2 million points, collecting about 1.3 billion raw points of data overall.

Using Maptek I-Site Studio 5.0 software, all the point cloud data was registered to the survey data, creating a single 3D point cloud containing millions of individual x, y, z points. Scans were easily registered to one another using global registration. A triangulated 3D surface was then generated from the registered point clouds for the 30 higher resolution and 646 lower resolution scans.

After surfaces were created for each of the two levels, mid-rib contours were created at the requested elevations of 340 feet for Level 2 and 416 feet for Level 1. The mid-rib line represented the as-built, showing areas that had been mined.

Accurate results

Once all the scans for both levels were registered, surfaces were created and exported as .dwg and .dxf files. Mid-rib contours were created, and polylines also exported in .dwg and .dxf format for use in the site CAD software.

Other deliverables included scan coordinate locations in .txt and .csv formats, and 3D PDFs for viewing Levels 1 and 2. Field notes recorded on level maps during scanning were supplied with corresponding intersection names.

Lafarge now has a comprehensive 3D map of its underground workings for planning, operations and any closure studies.

> The collected 3D scan data can be used in future evaluations without the need to re-survey.

The data collection phase of 10 days, plus a further 2-3 weeks processing the massive point clouds, was a significant reduction on the 3 months estimated for conventional survey.

Screen captures showing dominant trending structural orientations as strike and dip provide excellent detail for conducting geotechnical analysis of large structures, faults and bedding planes. Further geotechnical analysis could help to determine structural density, bedding orientations and major trends for the aggregate operation.

Looking to the future, Lafarge is considering the laser scanning approach for mapping all sill thicknesses, Level 3 of the mine, and geological features. Data will be used for stability studies for site safety, as well as for assessing changes if equipment is modified or replaced.

Thanks to Lafarge, Conco Mine

01 Laser scanning setup at drift intersections
02 Modelled surfaces coloured by intensity
03 I-Site 8200 laser scanner mounted on bobcat
04 Laser scans registered together with pillar locations

Calculate haulage while scheduling

Maptek™ Evolution calculates haulage data on the fly when running schedules, helping to rationalise costs early in a mining project.

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With mine haulage accounting for around 45% of operating costs it makes sense to use a solution where haulage data is an integral part of the scheduling process.

Maptek™ Evolution allows dynamic creation of production schedules alongside automatic haul route allocation, cycle time, productivity and fuel burn calculations.

The critical deficiency of spreadsheet or fleet calculator approaches is that the choice of waste destination and the associated costs are pre- or post-scheduling decisions.

Accounting for waste

Many open pit operations are in reality waste mines due to high stripping ratios. The cost of waste mining effectively drives costs.

Optimising the waste as part of the scheduling process inherently leads to an optimal schedule and therefore maximises value.

Accurate waste location data is vital for obtaining accurate haulage hours for scheduling. Evolution integrates haulage into a continuous flow of information where the haulage network is defined as in-pit and ex-pit roads, and waste dump ramps. Haul profiles are imported and equipment fleet/s attached to the set of profiles.

Gradient, rolling resistance, minimum and maximum speeds, cycle times and fuel burns are automatically calculated. Traffic control networks can be added.

Evolution approaches scheduling on a block-by-block basis to ensure the integrity of the geo-metallurgical model is not smeared or averaged.

Waste material that needs to be encapsulated for environmental rehabilitation can also be modelled and accounted for. Destinations can be determined on the fly. When choosing which block to mine, Evolution considers all objectives and constraints, as well as the cycle time of each block to reach its final destination.

Therefore, waste blocks are dynamically assigned to their most economic locations within a waste dump, resulting in a development sequence for building the waste dumps as the pit is being mined.

Optimising fleet

The number of trucks and the resultant truck hours per period are the variables used in scheduling. Balancing truck numbers against material movements for a period is an iterative process.

Mine planners seek the right trucking level to move the required tonnes of ore, while minimising the tonnes of waste.

Another practical issue is how to maintain smooth, step-wise changes to truck numbers. It is a challenge for material movement focused schedules to avoid large variations in the truck fleet.

Using truck count as a variable, practical truck fleet numbers can be set to ensure ore production is met. Evolution can quickly determine if it is possible for an operation to maintain its current fleet.

Project value

Two ways to increase project value are to reduce costs or increase revenue, particularly early in the mine life. Evolution allows scheduling of higher value ore in parallel with following the lowest cost mining approach. Limiting the number of trucks required in start-up years favourably impacts both capital and operating costs.

Evolution helps to balance the benefit of deferring truck usage as long as possible without generating an insurmountable 'wall of waste' down the track.

Summary

Evolution acknowledges the importance of haulage optimisation in order to minimise haulage costs. Optimal fleet haulage routes can be achieved without the headaches of a manual approach.

Mine planners using Evolution can be confident that all factors are taken into account, including where each block will be mined from, the time it takes to be transported to its destination, the return trip time and fuel burn.

> Evolution ensures haulage costs are minimised by planning everything down to the optimal waste landform shape.

Data can be displayed graphically for transparency, auditability and for negotiating haulage contracts.

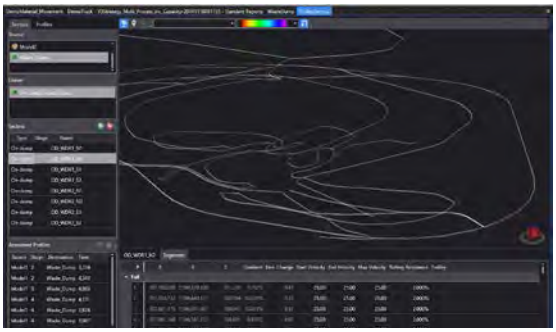
Evolving functionality

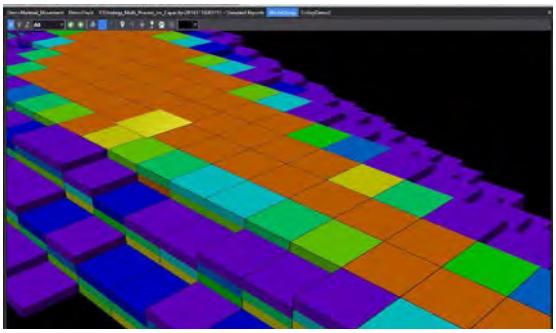
Evolution continues to be developed. Enhanced haulage tools allow import of .csv files, automatic addition of rolling resistance and speed, and also accounts for stockpile overflow.

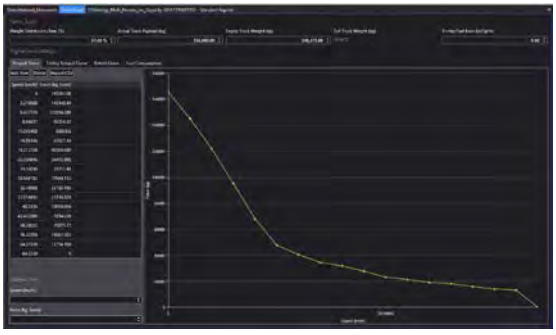
Dynamic destination modelling and blending enables an optimised schedule with no pre-definition for multiple destinations (i.e. wet and dry plants). Classification is based on the required blend and capacity constraints.

Users will be able to target ore or total tonnage on a period by period basis, and turn sources on/off as part of the blend process for short term campaigning. Other enhancements include lithology breakdown for different processing streams, phase optimisation, cloud implementation and blend optimisation.

Email evolution.sales@maptek.com.au







Optimisation algorithms

The Vulcan Pit Optimiser uses the **Lerchs & Grossman, and Push and Relabel algorithms** to find the ultimate pit extent based on a set of cost and price assumptions. It can apply geotechnical constraints during processing.

Evolution uses **genetic algorithms** to determine the sequence of mining stages within the ultimate pit which return the highest Net Present Value (NPV) for the project. The Evolution algorithms also take into account the haulage cycle and waste dump sequencing during optimisation.

I-Site Drive for fast stockpile volumes

Maptek™ I-Site™ Drive provides mines and quarry operations with a faster, more accurate system for frequent stockpile volume reporting.

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Maptek™ I-Site™ Drive allows an I-Site laser scanner mounted on a moving vehicle to acquire data continuously, without stopping. Surveyors can quickly and safely measure stockpiles for reconciling daily or weekly volumes.

The I-Site laser scanner can also be used with tripod, vehicle mount and custom bracket accessories for pit and road survey, pit updates, geological mapping and silo volumetrics.

The Inertial Navigation System (INS) installation in the custom vehicle mount is the key to survey efficiency. It allows the laser scanner to acquire data continuously, reducing the time for data collection and minimising interruption to site activities. Data is collected in real world coordinates, ready for opening in I-Site Studio software.

> Faster data collection, reduced risk to operators and shorter processing time are key benefits of I-Site Drive.

The reconciliation process is streamlined and accurate stockpile volumes are quickly available. Highly detailed geotechnical data can be collected with the same laser scanner on a tripod.

Setup is incredibly easy. Just install the laser scanner on the mount, connect the power and network, attach the RTK GPS and initialise scanning on the tablet computer.

Calibration is automatically performed while driving to the first scanning position. The recommended maximum speed to acquire a uniform grid of points is 14 kph, with a maximum of 40 kph while driving without scanning.

Data is simply opened in I-Site Studio for calculating volumes; scan registration is not necessary.

Accuracy & speed

Stockpile data is currently collected by driving around the perimeter with a vehicle-mounted GPS. Volumes are then extrapolated by projecting the angle of the GPS string from the stockpile base.

I-Site Drive links the laser scanner with GPS to generate a profile as a stockpile is circumnavigated. The volume is accurately calculated without estimating or inferring from unknown points.

While tripod setup provides the high accuracy data required for geological and geotechnical studies, I-Site Drive is suitable for positional highwall survey. Surveyors can be in and out of the pit in minutes, capturing stockpile volumes and faces in one pass.

Flexibility & safety

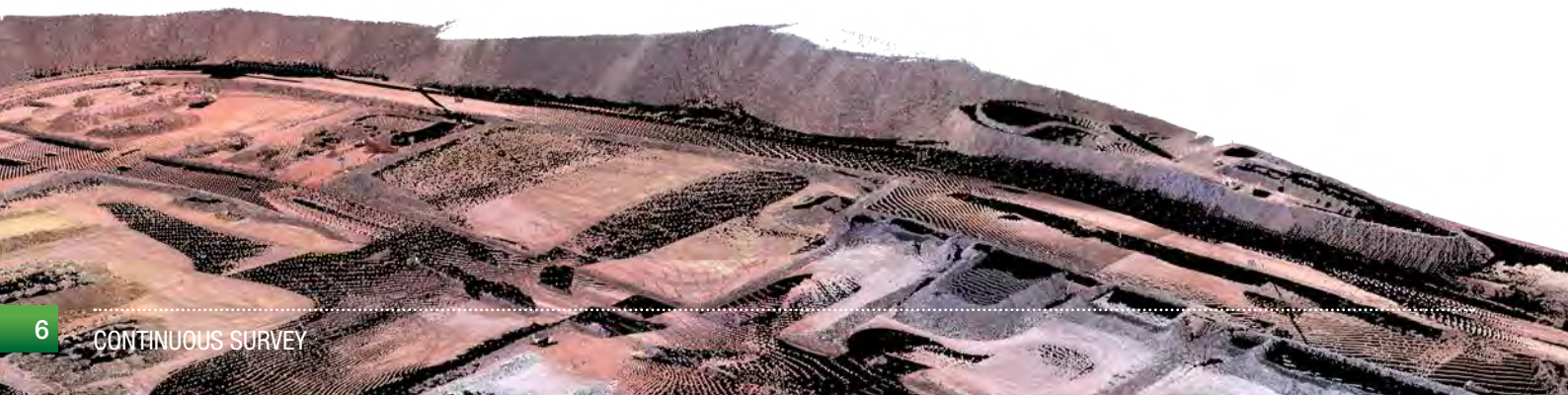
I-Site Drive is more flexible and cost-effective than other dedicated mobile solutions. Real time view of the scan data on the tablet makes it easy to spot 'shadows' and drive around again.

Survey is conducted without personnel needing to leave the safety of the vehicle.

Operational safety is optimised with I-Site Drive, meeting work health and safety requirements in pits.

Mine surveyors can now use the same laser scanner for tripod, vehicle-mounted stop-go, rail or hatch-mounted survey, and continuous survey. One I-Site laser scanner can deliver all digital survey data requirements for an operation.

Email isite.sales@maptek.com.au to find out how I-Site Drive can help optimise your survey tasks.



Automatically detecting coal seams

Maptek™ Eureka™ allows users to fully exploit LAS and MWD (measurement while drilling) data for building accurate coal strata models.

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LAS data

Recent development in Maptek™ Eureka™ uses downhole geophysics to automatically detect coal seams.

LAS data relating to drillholes is imported, and parameters are set to auto assign downhole intervals based on the change in properties of differing material types. Coal is generally less radioactive than its host rocks and softer than overburden, making it identifiable using gamma and density logs.

It is therefore possible to automate what has been a time consuming manual process. Single or multiple traces can be viewed beside the drillholes in 3D (image 1), providing confidence in the method. Once the seams have been identified automatically, manual edits can be performed easily using on-screen handles (image 2).

Using the geological modelling tools in Eureka, roof and floor surfaces of each seam can then be created to give an accurate reference for charge placement in Maptek™ BlastLogic™. The limitation of the process for generating accurate coal seam models from downhole information is that holes still need to be geophysically logged, which costs money and takes time.

MWD data

Automatic modelling of downhole intervals minimises the need for additional logging.

Drill automation systems on rigs capture vast amounts of data for every hole drilled. This data is largely unused for mine planning. However, it contains valuable information that can be used for strata recognition.

Telemetry data such as pull down pressure, air pressure, drill bit rate and torque are recorded while drilling. Similar to the gamma traces produced when logging, these variables change as the hole is drilled through different strata. Denser lithology requires more energy to drill through, while coal seams being softer require less energy (image 3).

> MWD data can be visualised in Eureka, analysed and converted to strata models.

On average, every fifth blast hole is geophysically logged, at $100 to $150 per hole. A typical blast on a strip mine has about 800 holes. An operation could save up to $24,000 per blast, as well as 4 to 5 days of logging from the drill and blast schedule (assuming 12 holes/day).

Removing the need for geophysical logging takes people away from the pit, improving safety for the blast crew. Along with the immediate and tangible cost benefit, building a coal surface from every hole drilled in the pattern, rather than every fifth hole, gives a clearer account of the resource (image 4). Data is available earlier with MWD than LAS, resulting in a faster turnaround for modelling.

For through-seam blasting the method allows accurate charge placement in BlastLogic and loading for every single hole, leading to less coal damage and greater recovery.

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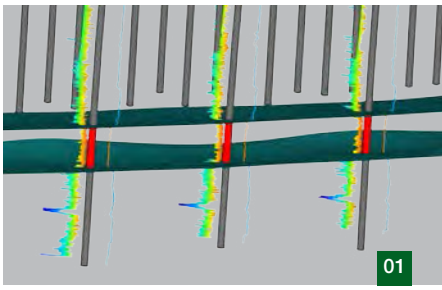

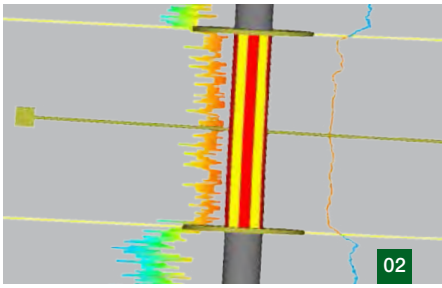

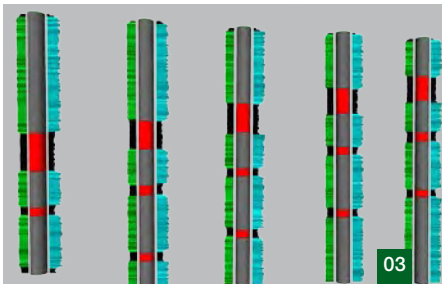

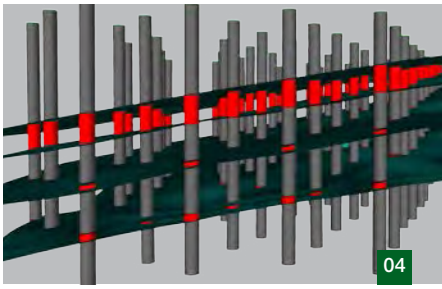

01 Automatic strata recognition using gamma and long-spaced density logs with interpreted coal seam in red.

02 Handles can be used to adjust an interval to match trace.

03 Automatic strata recognition using MWD logs. Left green trace is weight on bit and right blue trace is torque.

04 The interpreted seam intervals in red can be used to create accurate coal surfaces.

Survey value takes off with UAV

Landpro has been using an unmanned aerial vehicle (UAV) to deliver better survey value to mining, quarry and land development clients in Australia and New Zealand.

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Landpro applies the latest survey techniques to volumetric and stockpile surveys, permit mapping, mine plans, deformation surveys and compliance plans.

Landpro acquired a Topodrone-100 in 2014. The gyro-stabilised mount was a key reason for the purchase, along with accuracy and regional product support, according to Landpro Director of Technical Services, Mike Borthwick.

> UAVs provide more accurate data than GPS surveys, with the bonus of aerial imagery and at a fraction of the cost of lidar.

Full site height information provides much greater accuracy than results from ground based survey.

'Topodrone-100 results are reliable and repeatable. Comparison to previous surfaces clearly demonstrates a data accuracy better than 50 mm for mining projects. Mission planning and strategically placed control points are key to obtaining highly accurate results,' added Borthwick.

Example - End of month survey

	UAV	Ground
Fieldwork	2-3 hours	3-4 days
Processing	1-2 days	2 days
Total time	3 days	5 days
Cost/month	$7000	$10000-12000

Landpro conducts UAV surveys to collect data for modelling and volumetrics to reconcile end of month payments. Batter angles and haul road gradients are also checked. Collecting waste dump or engineered landfill data at the same time is a bonus. Ground teams would only survey these on demand for monthly progress data.

A typical UAV survey project with 3 to 4 flights of 30 minutes duration involves up to 4 hours at a site. About 300 photographs are generated per flight. Ortho-rectified high resolution images are created along with data clouds of up to 100 million survey points. Data is reduced to 5 million points for a digital surface model. Filtered data is validated against full datasets to ensure accuracy is maintained.

Deliverables include a filtered point cloud, surface model, low resolution aerial image and large scale plots of aerial data and contours. Volumes of mined areas, waste dumps and stockpiles are provided. Video fly-throughs are always appreciated.

'An issue with UAV mine survey is finding launch and landing sites,' said Borthwick. 'You can launch from anywhere, but smooth landing terrain is scarce. Our investment in skilled pilots provides surety and reduces overall flight time.'

UAV survey is far more efficient than ground survey. UAV data is processed overnight depending on project size and computing power. Only 8 to 10 hours of this is hands on, comparing favourably with 16 to 20 hours for traditional methods.

Output such as aerial imagery is useful for mine planning, providing clear reference points for mine staff and contractors. The site survey dataset is far more detailed than traditional methods, and includes areas that could not otherwise be surveyed due to access or work health and safety limitations.

'Our clients want the best data in the safest way. Cost reduction is a bonus. Getting highly accurate data without placing people into dangerous areas ticks all the boxes. This data enables easy production of work and rehabilitation plans to satisfy all regulatory requirements,' Borthwick concluded.

With the UAV, Landpro can now save significant time on large scale topographic surveys, avoiding risk to ground crews.

Thanks to Landpro

Incident resolution with BlastLogic

Maptek™ BlastLogic™ effectively manages all operational drill and blast data, streamlining incident resolution and fostering continual improvement.

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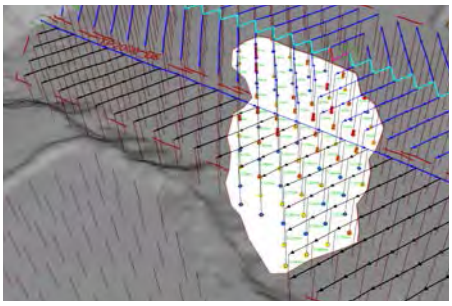
The challenge

When an incident occurs at a mine there is an urgency to find out what happened and why. Survey locations must be cross referenced with drill designs, timing and videos. Then comes a search through files for shot reports and explosives loading sheets. It can take several days before you really know the full picture.

Now you need to consider how to make it easier next time, and, more importantly, how to make sure there is no 'next time'!

Imagine the productivity gains if all site drill and blast data was connected, centrally stored and able to be instantly recalled for analysis. This is the Maptek™ BlastLogic™ solution.



The scenario

Consider the scenario where production crews have run into significant hard digging in the pit. A truck operator has been injured when loading oversized material. There is minor damage to the digger as well. Why did this happen?

The first step is to identify where the problem occurred. BlastLogic steps you through the complete history of the area.

You can view the drill design against the as-drilled data. Other questions arise.

How much water was present, what was the downhole delay and its associated timing, and were there any post blast effects? Check the explosives used and any misfires. Video footage can also offer important information.

> BlastLogic allows all of this blast information to be found, reviewed and reported in 1 hour.

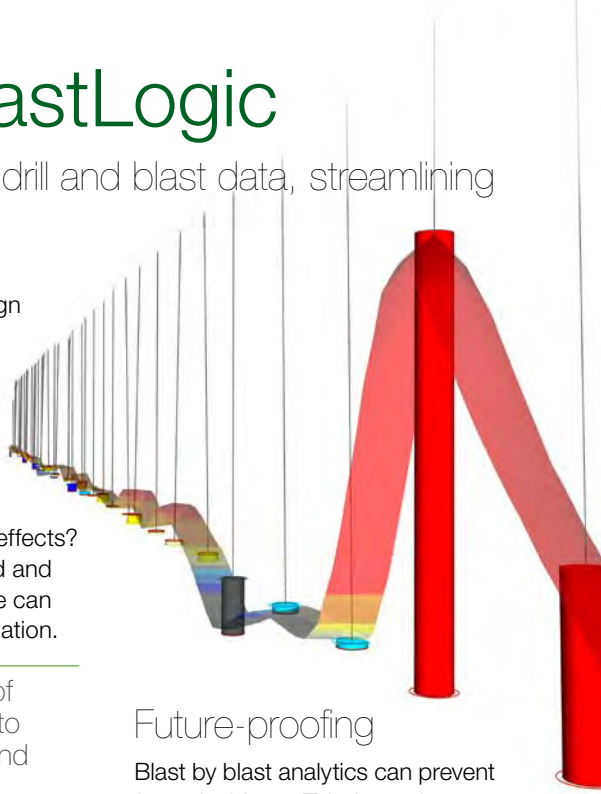
Having determined the cause of the problem, a solution can be implemented and tracked.

The solution

Under-drilled or backfilled holes are a common cause of hard digging incidents. BlastLogic displays your entire drilling history for comparing holes to design. Is there a link between bad holes and an operator or drill rig? Should hole savers be used to prevent excessive fall back? Daily visual feedback from BlastLogic informs operators how close they are to target.

Backfilling and explosives loading performance can be improved. If current accuracy is 80%, just set a new goal of 85% and track accordingly. Custom properties can record observed blast performance, or indicate whether hole savers were used.

Checks at critical stages can track adherence to the blast plan and ensure that certain criteria are met, such as timing design approval.



Future-proofing

Blast by blast analytics can prevent future incidents. Tabular and 3D analytical tools allow ready comparison of parameters across multiple blasts. You can identify factors impacting performance, look for trends and plan improvements.

Performance summaries by hole or blast enhance pre-design research or month end reviews.

For example, you can load all previous year holes, display the powder factor trend for the lower bench and highlight misfires.

What products were used in the shot and who was in charge? The answer is instantly displayed. Focus can then shift to improvements, by filtering data for best dig rates or lowest vibration. New tie up designs can be tracked against post blast metrics such as digability or fragmentation.

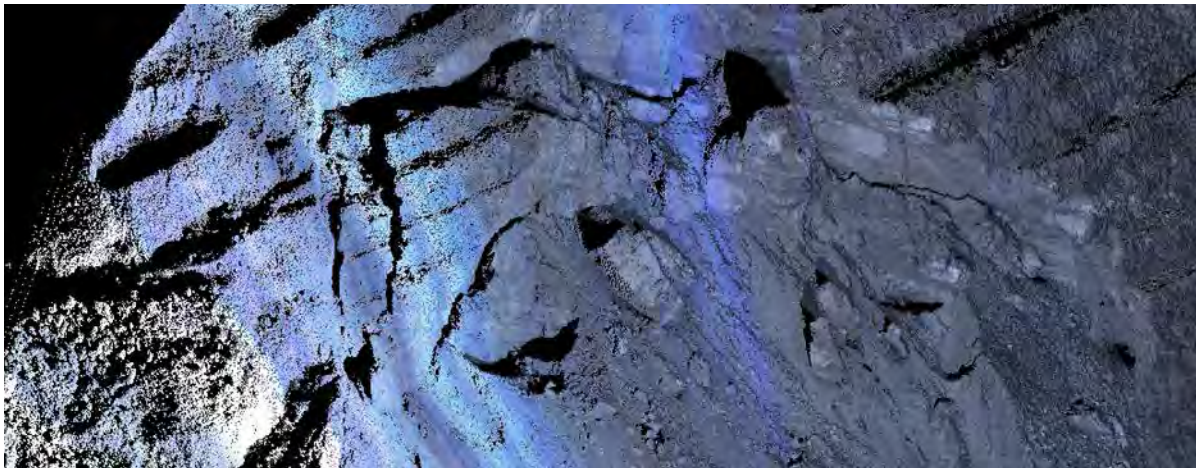
BlastLogic takes the worry out of managing data so mines can identify problems faster and track a solution more effectively. Access to all drill and blast data drives advances in design and processes.

Email blastlogic.sales@maptek.com.au

Survey solution for safety offsets

When sites need accurate mapping of the interface between underground and open pit operations, the Maptek™ I-Site™ laser scanner provides detailed survey data.

LEARN MORE ONLINE



Modelling the interaction between underground and open pit operations helps to ensure that safety offsets meet regulatory standards and allows development to proceed with confidence.

During 2014 the Sichuan Safety Science and Technology Institute combined 3D laser scanning with other measurement techniques for mine survey projects.

Laser scanning & TEM

Lanjian Iron Ore mine near Panzhihua City in Sichuan Province employs sub-level cave mining. Managing the interaction between open pit and underground workings is key to the ongoing success of the project.

The Institute combined laser scanning with transmission electron microscopy (TEM) to measure the thickness of material between surface and underground operations.

The Maptek™ I-Site™ 8810 laser scanner was used to survey the open pit. Surface digital elevation models generated from the point cloud revealed several locations where subsidence had occurred. These were then viewed alongside 3D models of underground tunnel sections created from existing survey data.

Using TEM, which focuses a beam of high energy electrons for micro-structural examination, the interface between the overburden and bedrock was determined.

This information was then combined with the 3D surface model to accurately calculate the covering thickness of transverse drifts in sections.

One of the biggest challenges was in registering the surface and underground data together. Once a surface local survey and control network was established, a total station was used to obtain coordinates of underground features, including scanning locations, back viewing points and TEM measurement points.

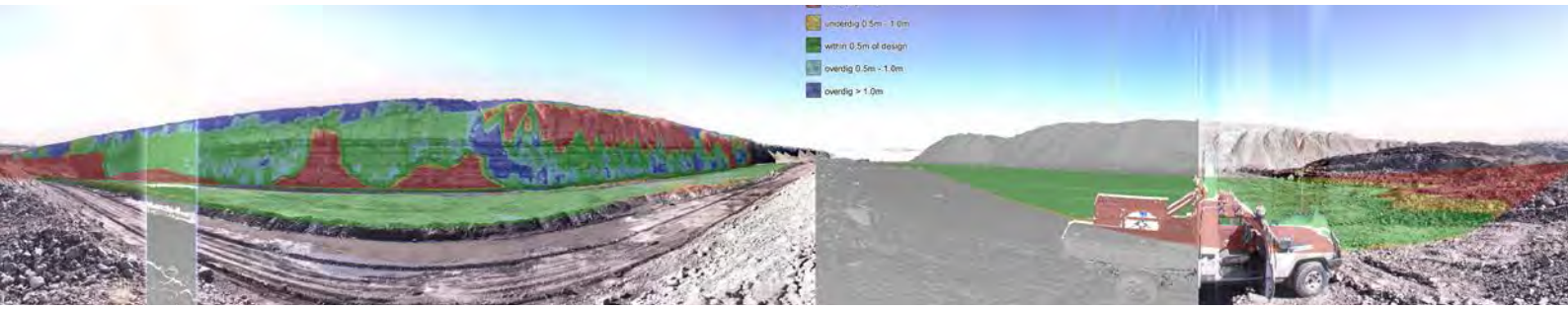
Finally, the surface and underground data were merged into the same coordinate system.

> The combined laser scanning-TEM approach is suitable for stratigraphic and non-stratigraphic operations. It provides a relatively simple methodology for capturing data over a wide area and delivers accurate results.

Changing conditions are the reality of mining. Updating mine plans is never more critical than where surface and underground mining intersects. Sichuan Safety Science and Technology Institute proved that laser scan technology is a safe, effective system that delivers accurate results.

Thanks to
Sichuan Safety Science & Technology Institute

An additional case study covering laser scanning and georadar techniques at a coal mine can be found online at www.maptek.com/forge/



Mine to design with PerfectDig

Maptek™ PerfectDig takes the guesswork out of conformance, enabling mine planners to make the right decisions to design safe and profitable operations.

LEARN MORE ONLINE

A mining engineer needs to design a mine plan that will extract the most ore out of the earth at the lowest cost, and ensure the structural integrity of the mine. Hours are spent at the computer analysing data, testing and refining the design.

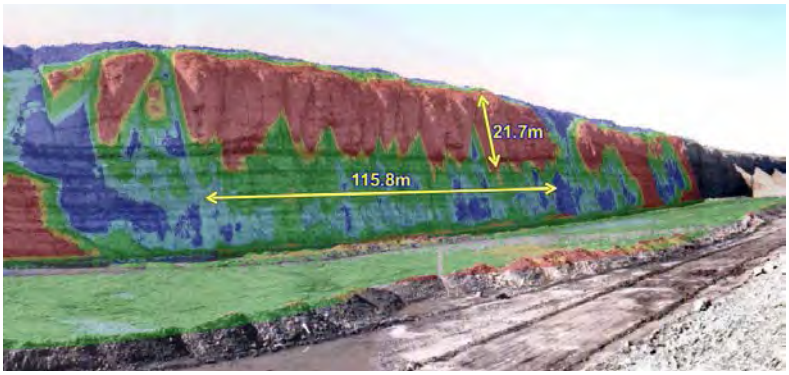
Surveyors take the design and peg it out for the excavators. What happens if the design is not followed? The implications of non-conformance can be costly and also a safety risk. Ultimately, the success of the mine design depends on its implementation.

Maptek™ PerfectDig takes a mine design and compares it to 3D data to generate imagery which immediately identifies areas of non-conformance. Engineers, surveyors and equipment operators can quickly see the design and compare it to progress in the field.

This save time and money in the short term, and also helps ensure the longevity of the mine by promoting adherence to design.

PerfectDig uses a photograph from the input image data which serves as the current reality. The software adds a number of overlays to provide the extra information to the user, creating an augmented reality.

PerfectDig compares input image data such as laser scans, existing surfaces, airborne lidar point clouds or UAV data with the mine design (.00t, .dxf or .dwg format) in real time.



The software automatically processes the scene, generates high quality conformance layer imagery and identifies areas of underdig and overdig.

Field and office

Two PerfectDig applications have been designed to allow sites to work in different ways.

PerfectDig Field works with 'real time' data from I-Site 8800, 8810 or 8820 laser scanners. A ruggedised tablet has an easy to use interface for immediately comparing mine to design. Intuitive tools enable cross sections, distance to design and 2-point distance queries. A comparison takes 5 minutes, with design conformance information available in near real time.

For some operations, the best option may be to use PerfectDig Office. Existing image data (laser scans, surfaces, airborne lidar point clouds or UAV data) can be conveniently compared with the mine design on an office PC.

The conformance report wizard in both PerfectDig packages guides the user through the simple process of specifying the input (design, block lines and as-built data) and then defining the area of interest from an overhead view. Previews allow further annotation of reported sections.

Conformance reports are published to PerfectDig Online to share with key stakeholders. Scenes are interactive and cross sections can be queried through the internet browser. Alternatively a PDF can be exported and saved.

Completing a mine to design is the ultimate goal for mining engineers. PerfectDig takes the guesswork out of decision making.

Email isite.sales@maptek.com.au

Technical engineering and consulting

Maptek™ is well-known for innovative mining software, technology and services. Delivery of efficient business and system solutions assists operations to optimise their resources.

Maptek™ has more than 30 years of experience in the mining sector. Multi-disciplinary teams of specialists, including geologists, surveyors, mining engineers and software engineers combine their expert knowledge to assist clients.

Project managers and system problem solvers engage in an operation's unique business and system requirements, using mining domain knowledge and practical methodologies. Maptek technical consulting teams in Australia help integrate complex products with existing systems, identifying opportunities for improvement.

> Maptek has a proven history in constructing specific enterprise solutions where off-the-shelf products are not feasible.

Material tracking

A system has been developed to allow pseudo real-time quality and material tracking through the mining facility, from pit/ROM to stockyards, wash plants, train or ship. Origin information can be retrieved from fleet management systems and quality actuals can be sourced from laboratory systems or automated scanners.

A virtual 3D model of stockyards can be engineered using information in historian systems to display and interrogate the stock inventory.

Grade control

Applications have been developed and supported to track and report grade and tonnage in both pit and plant, and as loaded onto trains. These applications also allow grade blocks to be created interactively, with the results suitable for integration with mining packages, such as Maptek™ Vulcan™.

Stockpile management

The application tracks stockpile balances and movements of products through the individual mine sites of an enterprise via rail transportation and port stockpiles, and confirms the accuracy of ore quantities. Defined production measures can be validated and balances for stockpiles or pit locations can be adjusted for end-of-month production reconciliation.

Production planning

Technical applications have been developed and maintained to provide online mine planning approval workflow systems. Robust checks and balances ensure all approvals are complete before implementing an improved plan.

Reports can be created on mine production activity, equipment utilisation and material movements. Supply chain data can be displayed on screen.

Tonnes and equipment

Truck and excavator status, operational hours and tonnages are tracked between pits, stockpiles and crushers. Plant operations such as belt tonnes and train loadouts are captured. Train weight information such as tonnes loaded, tonnes per car, number of cars, times to load, and daily and weekly averages can be reported. Data models are tailored to the enterprise and its operating behaviour.

Global expertise

We have supported more than 150 business critical applications for prominent global mining companies over the past 15 years.

'We collaborate with subject matter experts to ensure that your enterprise benefits from our improvements', said Maptek Service Operations Manager, Tym Zon. 'We help our clients improve their processes and outcomes.'

Contact tym.zon@maptek.com.au to discuss your technology consulting needs.

Precision spatial tools aid research

Geology researchers to benefit

The Universidad Nacional Autónoma de México, Institute of Geology has equipped their Superficial Dynamics Laboratory with a Maptek™ I-Site™ 8820 laser scanner.

The I-Site laser scanner will be used by the Institute to strengthen research in a number of key areas. In particular, the focus will be on evaluation of erosion and accumulation in riverbeds, slope change detection as a consequence of mass wasting processes, and estimation of resulting soil loss.

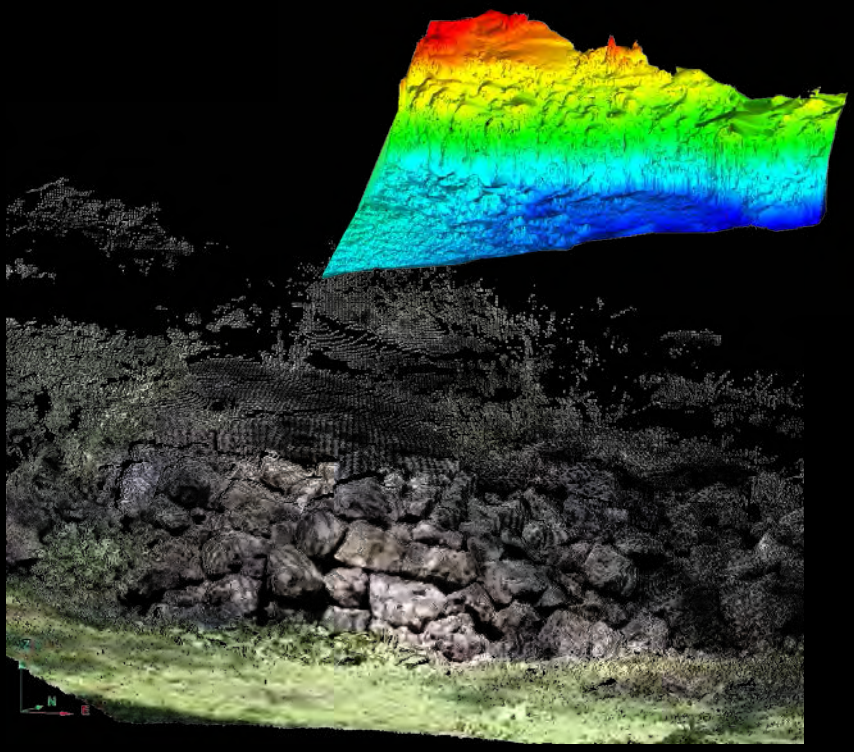
The operational capabilities and precision of the I-Site 8820 laser scanner appealed to researchers at the Institute. Professor Miguel Castillo explains, 'The broad scanning range of the I-Site 8820 provides us with a comprehensive system to cover all aspects of our research.'

'We required a laser scanner that could capture vast areas of square kilometres as well as data for small-scale studies at the square centimetre level.'

Data captured by the I-Site 8820 laser scanner will be processed in I-Site Studio and used to generate digital terrain models for high resolution surface and morphometric analysis.

Maptek has donated 10 academic licences of I-Site Studio to the Institute of Geology for students to process point cloud data, filter elements and generate digital terrain models.

Thanks to Professor Miguel Castillo Universidad Nacional Autónoma de México



Maptek Calendar

2015

May 9-13
Canadian Institute of Mining, Metallurgy and Petroleum
Montreal, BC, Canada - Booth 2009

May 11-15
Exponor 2015
Antofagasta, Chile

May 23-27
APCOM
Fairbanks, Alaska, USA - Booth 1

June 4-5
Elko Mining Expo
Elko, Nevada, USA - Booth 110

June 11-12
Africa Australia Technical Mining Conference
Adelaide, South Australia - Booth 1
Technical presentation on crusher scanning

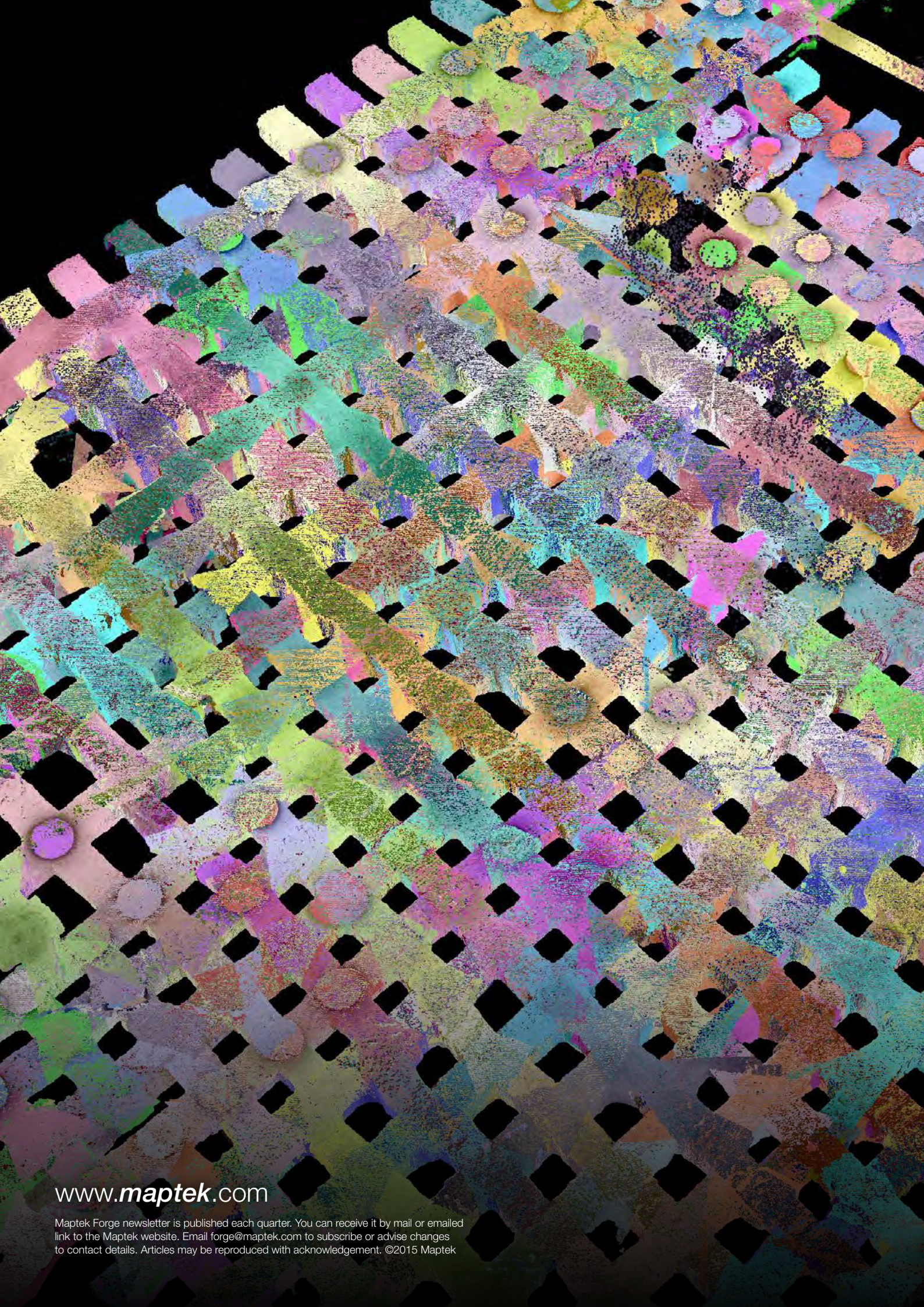
July 13-15
Iron Ore 2015
Perth, Western Australia - Booth 20

August 24-26
Fragblast 11
Sydney, NSW, Australia - Booth 16

September 21-25
Perumin Extemin
Arequipa, Peru - Booths 1591 & 1592

October 7-9
7th Bowen Basin Geology Group Symposium
Brisbane, QLD, Australia - Booth 37

October 7-10
XXXI International Mining Convention
Acapulco, México - Booths 1529A & 1531A



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