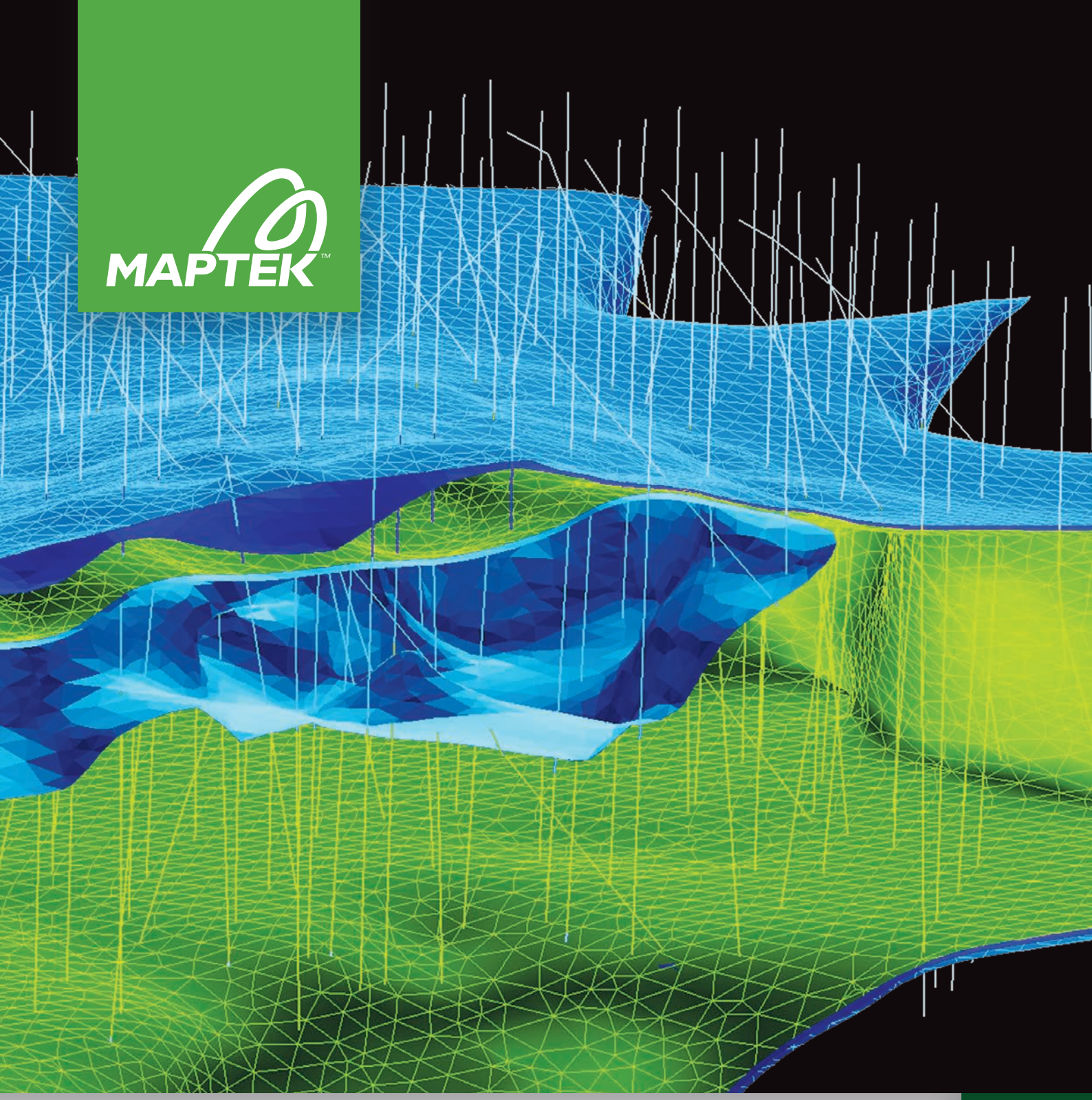



# Innovative Technology

40 years mining experience

Maptek™ has stayed at the forefront of innovative mining technology for 37 years. We specialise in developing powerful 3D visualisation software to help mining professionals better understand their data. Maptek remains committed to providing solutions across the entire mining value chain.

Maptek™ Vulcan™ software provides advanced 3D spatial information, modelling, visualisation and analysis. More than 7000 licences of Vulcan are installed around the world, for applications from exploration, through mine design and scheduling, to rehabilitation.

Maptek™ PointStudio™ offers all the tools to successfully apply 3D point cloud data to survey, geotechnical and engineering tasks within the mining, quarry and civil engineering industries. Dedicated workflows and reporting options improve efficiency and productivity for both surface and underground operations.

Maptek™ Scanners are rated to IP65 to withstand the tough mining environment. Internal high dynamic range 147 megapixel camera captures superb quality digital panoramic imagery ideal for geotechnical analysis, geological mapping and high impact communication. Easy setup combines with powerful software to deliver streamlined acquisition of survey grade scan data.

Maptek™ Sentry is a flexible and cost effective solution for detecting surface change. The system combines a Maptek laser scanner with sophisticated software to track and analyse movements caused by surface instability that have the potential to interrupt mining activity. Sentry is deployed in a custom trailer with power and communications module and laser scanner bollard.

Maptek™ Evolution provides enterprise level strategic and tactical mine planning tools for scheduling and optimisation for open cut mining. Evolution applies grade cut-off techniques for maximising project value and optimises the haulage fleet to deliver cost savings early in the schedule.

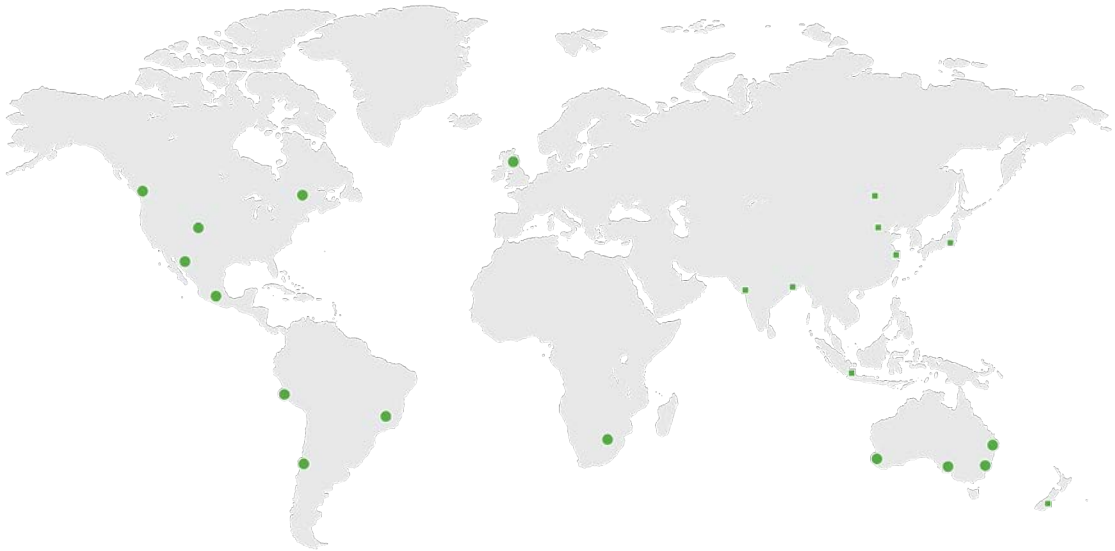
Maptek™ BlastLogic™ improves the effectiveness of drill and blast operations in surface mines, leading to more efficient removal of overburden and minerals. BlastLogic streamlines data management and maintenance, and interfaces with site command and control systems.

Maptek™ PerfectDig is an intuitive excavation and design compliance system, supporting real-time decision making. Tracking conformance to design enables optimised digging, efficient update of designs and short and long term plans. Minimising access to active faces and maintaining wall stability improves safety.

Maptek™ Eureka™ brings together large geospatial datasets and provides modelling and analysis tools to help exploration geologists identify economic resources. Viewing gravity, magnetic and other geophysical survey data along with seismic and drilling data helps to correlate resource models.

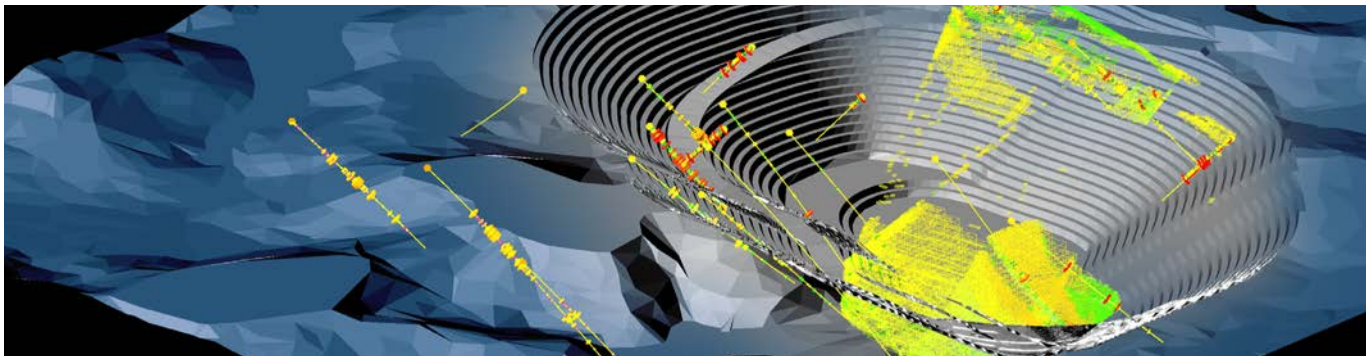
Maptek™ CaveLogic™ allows engineers to more effectively plan and reduce the risk associated with panel caving while improving productivity. CaveLogic incorporates operational and geotechnical limitations and generates multiple scenarios for assessment. Results are readily visualised for confident decision support.

Maptek™ Services include consulting, training, application integration and outsourcing. Maptek offers a wealth of mining expertise combined with expert knowledge of the use of our products to help operations improve performance, productivity and profitability.



# Maptek Vulcan

Maptek™ Vulcan™, the premier 3D mining software solution, allows users to validate and transform raw geological data into dynamic 3D models, accurate mine designs and operating plans. Test mining scenarios on the desktop before mining begins.



## Applications

- Validate and manage drillhole data
- Create and update deposit models
- Construct block models that accurately represent geological and grade information
- Use structural data to assess the safety of the mine design
- Run geostatistics and grade estimation
- Produce accurate open cut and underground mine designs and ore extraction sequences
- Create optimised short and long-term schedules for mining activities

## Design, model & analyse

Maptek™ Vulcan™ plays a critical role in the mining process, from exploration and geological modelling, through to mine design, scheduling and rehabilitation.

Geologists can create and import drillhole data, define geological zones, and accurately model orebodies. Users can manage and visualise multi-attribute data and rapidly perform complex calculations.

Fast processing speed combined with a powerful 64-bit operating system allows virtually instant validation, allowing up-to-date deposit models to be maintained.

The dynamic Vulcan 3D environment allows mining engineers to view, model and analyse data. Powerful block modelling tools and integrated grade control, scheduling, optimisation and geostatistics help improve productivity.

Open pit and underground planning engineers can develop complex 3D designs quickly and easily. Plans can be optimised against commodity prices, safety standards, equipment and customer requirements before mining.

## Innovative, reliable, integrated

Plans can be refined and designs updated as mining proceeds. Different design parameters can be applied to mining phases to improve economic ore recovery.

Scheduling tools can be configured to site requirements to handle various open pit and underground challenges. Complex blending scenarios can incorporate multiple destinations and periods. Short-term and long-term schedules can be defined by operational staff and strategic management teams.

## Geology

- Store drillhole and sampling data
- Manage and display drillhole databases
- ODBC link to external databases
- Visualise 3D drillhole information
- Display and manipulate downhole geophysical data
- Interactive 3D geological modelling
- Compositing for stratigraphic and non-stratigraphic deposits
- Powerful stratigraphic modelling tools

## Block Modelling

- Create rotated block models
- Sub-blocking for accurate modelling of geological contacts and boundaries
- Unlimited variable storage capabilities
- Generate sections and use dynamic slicing
- Incorporate geological wireframes into the block model
- Visualise and plan the mine based on block model data
- Automatically exclude mined-out areas for enhanced grade reconciliation
- Reserving tools; detailed breakdown of information (benches, stopes etc.)

## Resource Estimation

- Comprehensive statistical tools
- Built-in variography tools including directional variography
- Geostatistical analysis: Kriging, Inverse Distance, Indicator Simulation, Conditional Simulation, Kriging Neighbourhood Analysis
- Multiple parameter analysis
- Store estimation results in block model
- Calculate reserves from triangulations

## Mine Design

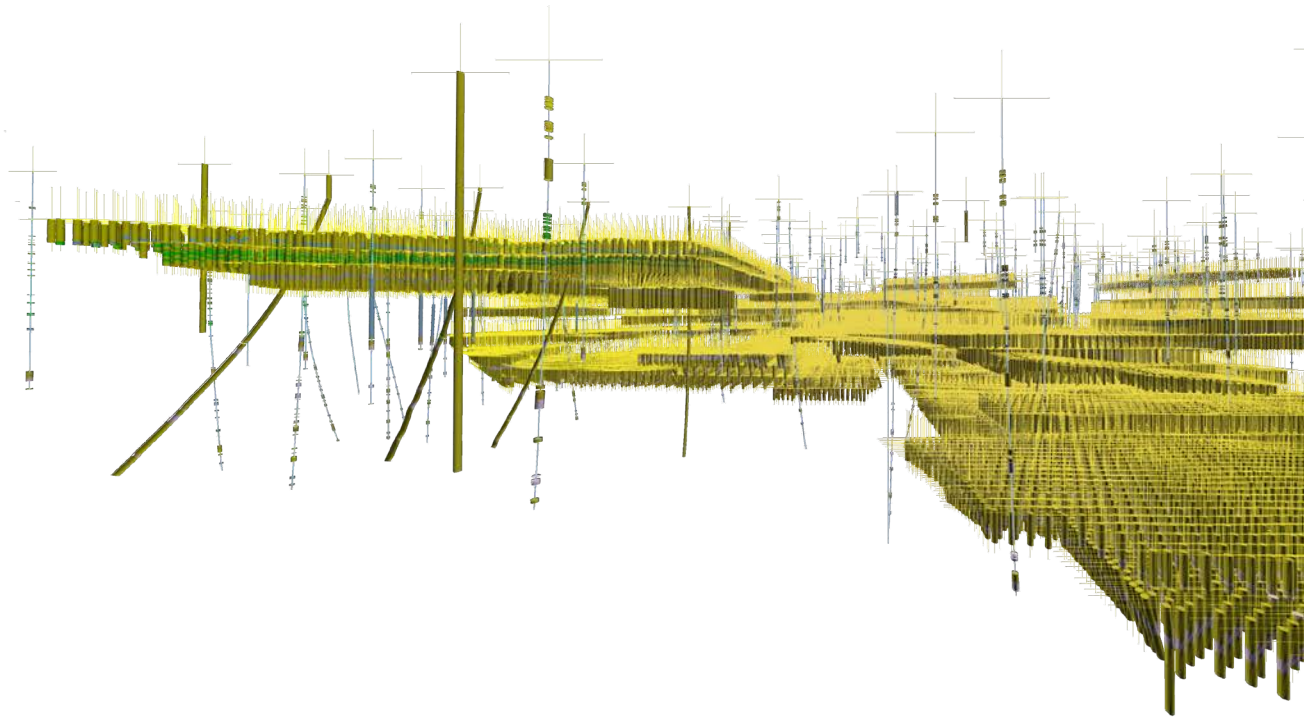
- Tailored pit and dump design tools, including ramp design
- Smooth transition between varying batter and berms (face angle and bench width)
- Built-in pit optimisation tools (Lerchs-Grossman, Push-Relabel, Floating Cone)
- Apply multiple batter angles, bench heights and berm widths
- Interactive editing of underground designs
- Automatic decline generator based on user-defined constraints
- Run multiple scenarios and generate mineable shapes with underground Stope Optimiser

## Scheduling

- Schedule open pit and underground environments
- Resource and activity based Gantt Scheduler
- Short, medium and long term scheduling
- Dynamic analysis and feedback between the mine design, geological model and schedule
- Graphical interactive scheduling of reserves using triangulations and polygons
- Short Term Planner uses information directly from a Vulcan block model for target and extraction points

## Additional Modules

- Survey: Import direct from survey instruments into Vulcan
- Interactive Road Design: Plan, design and construct
- Drill & Blast: Design tools include explosive tie-in design
- Haulage Profile: Determine haulage costs using block models
- Statistics: Analyse Vulcan databases, grids, block models and design data
- Geotechnical Modelling: Plot stereonets, calculate daylight windows and toppling



# Maptek mine measurement

Maptek™ offers a wide range of efficient mine measurment solutions. The integrated hardware-software systems bring 3D laser scanning, high resolution digital imaging and advanced software processing to industrial survey applications.

## Applications

- Open pit, quarry and underground survey
- Topographic survey
- Indoor and outdoor stockpile volumetrics
- Monitoring and rockfall analysis
- Design conformance
- Pre/post blast analysis
- Highwall mapping
- Geotechnical/kinematic analysis
- Erosion and deformation studies
- Civil engineering survey
- Architecture and heritage mapping
- Agricultural and erosion studies

## Point cloud data processing, modelling and analysis

Maptek™ PointStudio™ software is a powerful system for processing and modelling laser scan data. Survey deliverables include accurate volumes for daily, weekly and end-of-month reports, 3D seam maps and volumes, pre- and post-blast models, and accurate models for mine planning. PointStudio includes intuitive CAD tools for working in 2D and 3D.

Designed for mining, civil, geological and other surveying applications, PointStudio helps to integrate mine processes, allowing efficient and accurate delivery of spatial information for guiding decision making across an operation.

PointStudio users can efficiently analyse large datasets using query and visualisation tools such as colour scans by distance and section view mode, and colour by dip and strike functionality to highlight grade and orientation in surfaces. Smart level of detail operates on point clouds and surfaces for quick loading and viewing of large datasets.

The ability to create customised, automated workflows for routine survey tasks allows standard processes to be shared across teams, sites and operations, saving time on data processing and reporting.

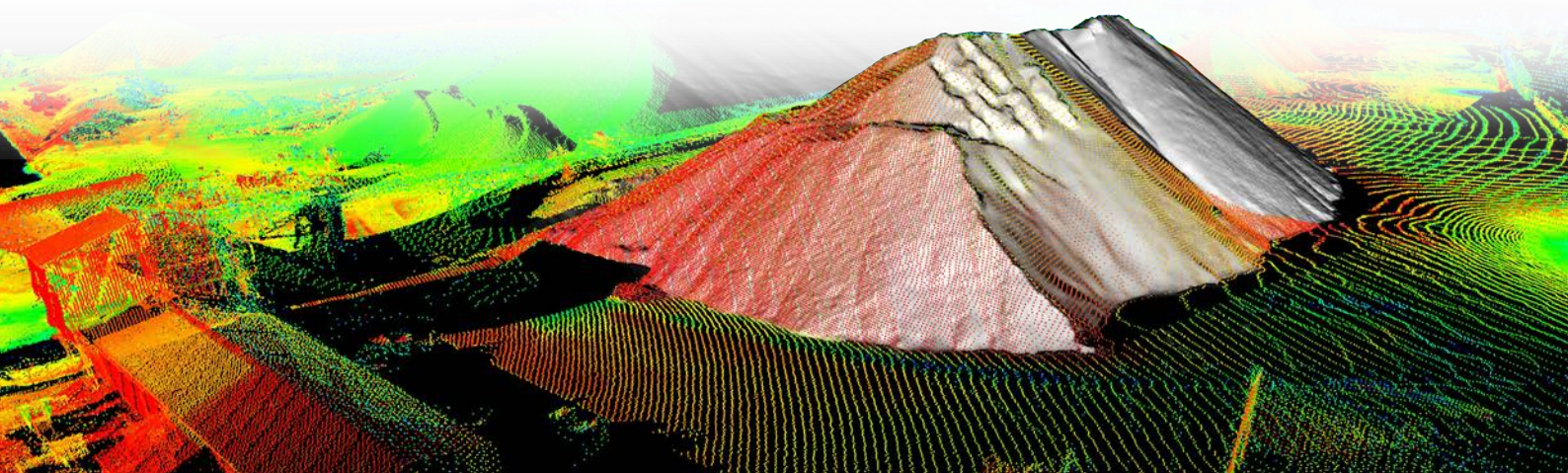
Optional modules provide additional value for specific applications.

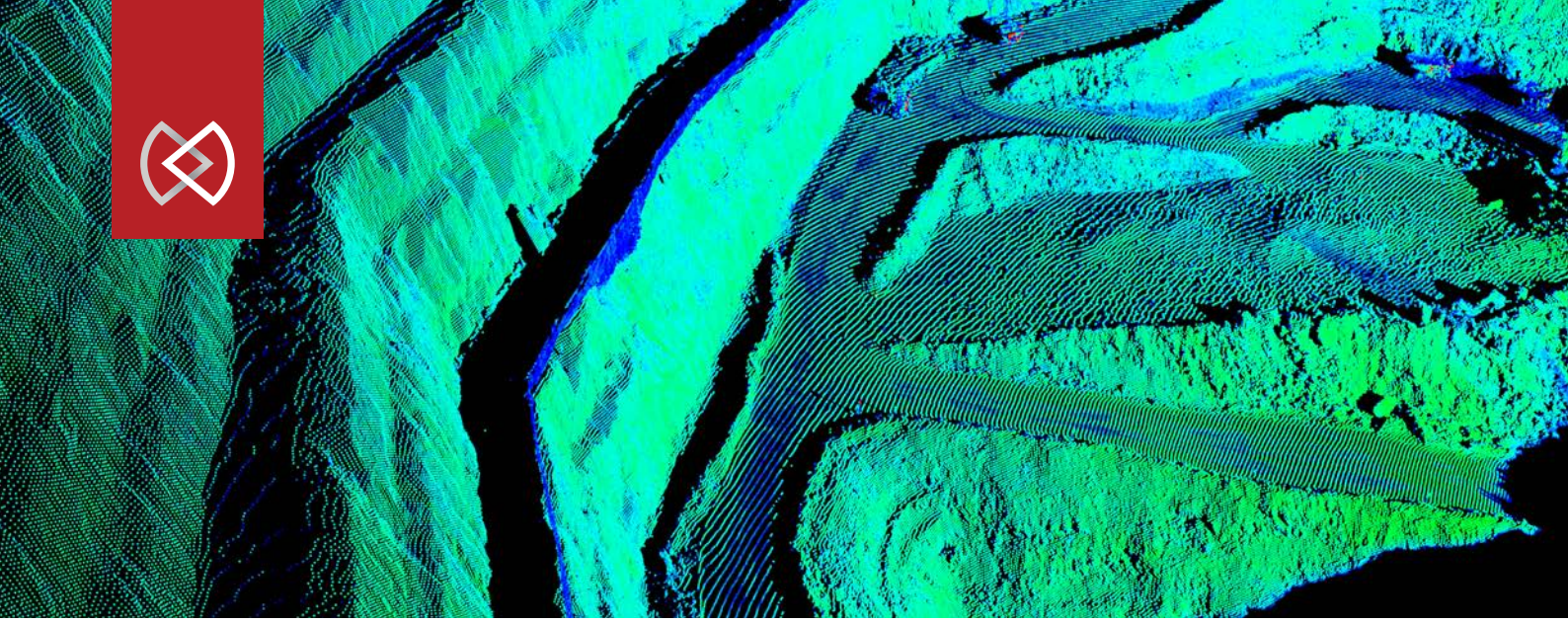
**Geotechnical:** Comprehensive kinematic analysis, stereonets, rose diagrams and discontinuity extraction

**Conformance:** Compare design surface to as-built and other surfaces and export cross-sections and volumes showing variance between surfaces

**Resource recovery:** Identify measured removal of commodities for comparison against resource models and set thresholds to prevent ongoing loss and dilution

**Underground:** Easily calculate overbreak and underbreak to identify unnecessary development that could dilute grade, and analyse shotcrete shotcrete thickness






## Laser scanners

Maptek™ R3 series hardware systems are the only terrestrial laser scanners built for mining which are awarded IP65 for environmental protection.

The systems combine accurate sensing, high resolution digital imagery and powerful modelling software for improving overall productivity and site safety.

Maptek systems are notable for their speed and accuracy of data collection, field to finish deliverables and rugged industrial design. This allows operational teams to work faster and smarter with confidence that accurate, current topographic and volumetric data is guiding mine planning and geotechnical studies.

Maptek laser scanners can be mounted on vehicles for stop-go and continuous survey. The result is reduced field time, improved coverage, greater safety and more flexibility for survey crews.

The internal high dynamic range 147 megapixel panoramic camera captures superb quality digital panoramic imagery without bloom or sun flare. High resolution images are ideal for geotechnical analysis, geological mapping and high impact communication with stakeholders.

## New features

- Scanning range to suit operational needs
- Compact, ergonomic design
- Portable, one-person operation
- 200kHz, 100kHz and 50kHz acquisition rates
- High dynamic range panoramic camera
- Snapshot imagery
- Selectable multi-point returns

## Hallmark features

- Range accuracy of 5mm and repeatability of 4mm
- IP65 protected for tough conditions
- Automated, streamlined survey registration
- Ergonomic design for safe handling
- Surface, point & global scan registration for accurate results
- Multiple scans queued for maximum field efficiency
- Flexible system configuration
- Produced under ISO 9001 certified process
- Mounting options to suit various applications

## System benefits

- Open pit and underground survey
- Topographic survey forms an accurate base for designing mine infrastructure
- Geological highwall mapping
- Geotechnical tools for structural and kinematic analysis
- Stockpile measurements and volume calculations
- Survey active mining faces, including toe and crest, pre- and post-blast
- End-of-month reconciliation
- Simultaneous high resolution 3D image capture enhances geological applications
- Continuous mobile survey with Maptek Drive
- Range of accessories for underground and indoor survey

# Maptek Evolution

Maptek™ Evolution open pit mine scheduling maximises the value of your deposit without compromising operations. The solution applies enterprise level schedule optimisation techniques.

## Why use Evolution

- Ease of setup and use
- Maximise project value
- Maximise resource utilisation
- Reduce operating costs
- Efficient decision making
- Align planning horizons
- Integrated haulage
- Hit blending targets
- Holistic scheduling
- Block-by-block scheduling
- Schedule auditability

Maptek™ Evolution is a fully featured open pit scheduling solution, which delivers practical, high value schedules throughout the life cycle of a mine. Cloud-based processing generates multiple scenarios that are fully auditable.

Scheduling scenarios can be rapidly assessed to present the best options for evaluation and development. Mine planners can then make efficient decisions regarding scheduling to reduce costs and maximise resource utilisation.

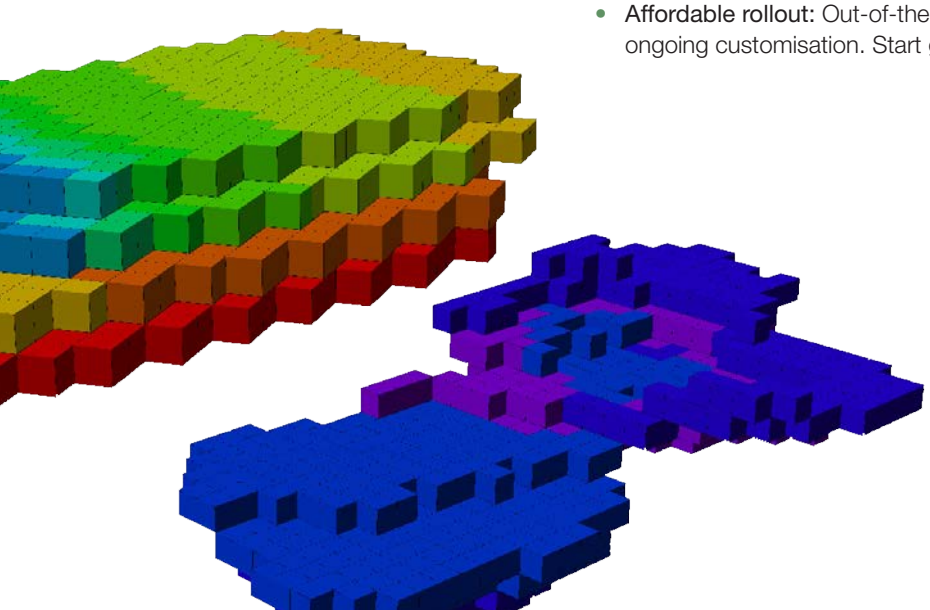
## Solve complex real world problems

Generating multiple schedules from a single simulation run, Evolution uses the entire dataset to schedule across the planning horizons. This helps ensure the consistency of tonnage and grade throughout the mine life. Know which block ore has been mined from and where it will go, ensuring valuable ore is not left in the ground.

## Streamlined workflow

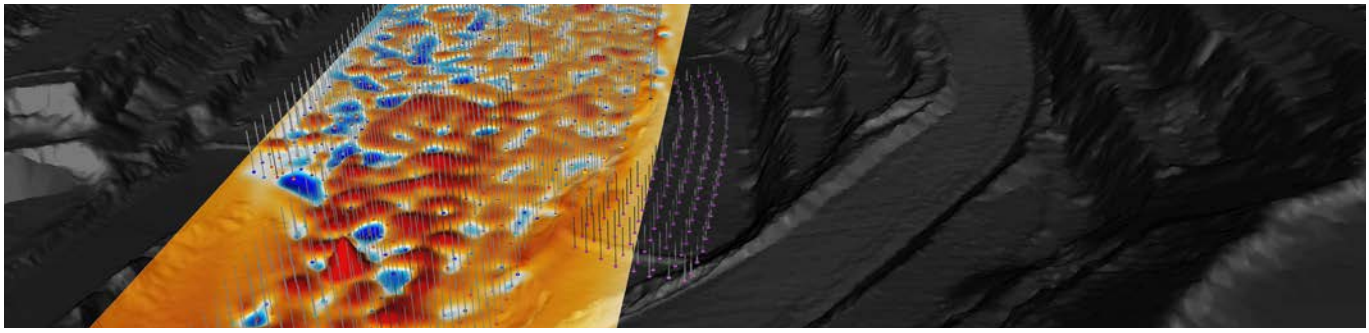
Evolution delivers a seamless workflow from strategic to short-term scheduling using a single data source. Easy to set up and learn, Evolution allows users to generate results within hours. Haulage is integrated into the continuous flow of scheduling information, leading to an optimal schedule that maximises value.

- **Increase project value:** Maximise value using cut-off grade optimisation techniques. Up to 30% increased value can be achieved.
- **Improve productivity:** Produce schedules up to 10 times faster and more cost effectively than other solutions.
- **Maximise investment:** Integrated solution generates optimal haulage routes and optimised waste dumps, lowering software investment by 30%.
- **Reduce costs:** Optimal fleet haulage routes deliver cost savings early in the schedule, improving value in the order of 5-10%.
- **Optimise waste:** Optimising the final waste landform minimises clearing costs and ensures rehabilitation can commence sooner, releasing bonds sooner.
- **Affordable rollout:** Out-of-the-box scheduling solution without costly start-up or ongoing customisation. Start generating schedules within a day.



# Maptek BlastLogic

Maptek™ BlastLogic™ increases drill and blast accuracy via automated validation and design tools. This solution helps pre-empt risk, productivity and cost issues, and provides data for continuous operational improvement.



## Applications

- Automatically record collar data from onsite systems or field survey
- Collate dip, charge and backfill data
- Validate as-drilled data against plans
- Apply blast patterns and charge rules
- Generate custom charge plans
- Search and review historical data
- Blast by blast analytics
- Fragmentation and blast modelling

**Maptek™ BlastLogic™ manages historical records of all drilling activity in a single location and interfaces with supported third party drill navigation systems. Working directly in the intuitive 3D environment allows users to validate, design and analyse drill and blast patterns to ensure blasting is accurate.**

## Design process

BlastLogic provides the tools for superior blast accuracy and performance. The BlastLogic Tablet enables simple electronic sharing and collation of dipping, backfilling and charging data in the pit.

BlastLogic delivers immediate access to critical data, including drill and navigation systems. Central data storage and traceability is provided via a smart SQL database. BlastLogic automatically validates as-drilled data against plans.

## Validate designs

BlastLogic improves drill and blast performance by enabling users to quickly adapt blast designs to realities in the pit. BlastLogic is configured to site parameters with preferred tolerances and thresholds established for automated validation.

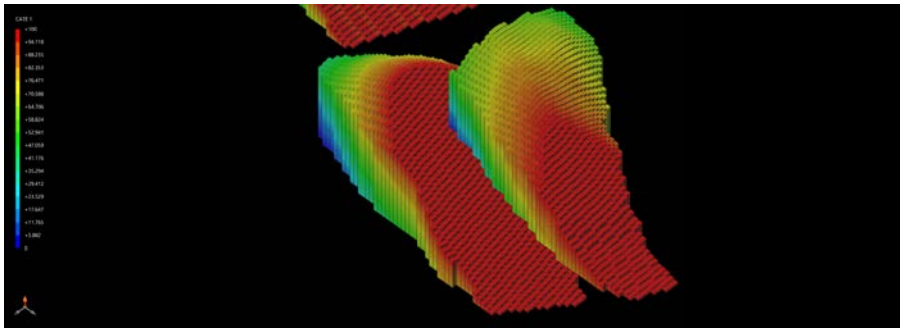
Information from site crews can be overlaid in 3D onto the blasting pattern, giving a visual representation of the blast plan. A custom charge plan can be generated, taking into account water depth, wet holes and predicted fall back.

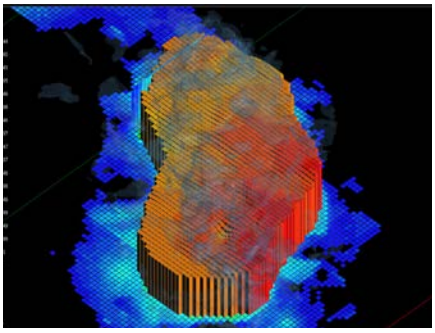
## Improve performance

The searchable repository of blasting information helps drive improvement and the transfer of site knowledge. Blast analytics, and fragmentation and vibration modelling allow users to quantify and track operational and personnel KPIs.

# Maptek CaveLogic

Maptek™ CaveLogic™ is a strategic application that helps operations to simulate the optimum, cost-effective and safe underground mining scenario based on their economic and geotechnical requirements.





## Applications

- Test various scenarios on the desktop for predictive analysis
- Reduce uncertainty through transparent calculations and 3D visualisation of results
- Tighten integration through availability of practical production plans with strategic schedules
- Meet KPIs around safety, efficiency and productivity through repeatable, audible results

Maptek™ CaveLogic™ allows operations to run multiple scenarios using all of their economic, geotechnical and practical considerations before mining starts. Planning engineers benefit from transparency across the entire process.

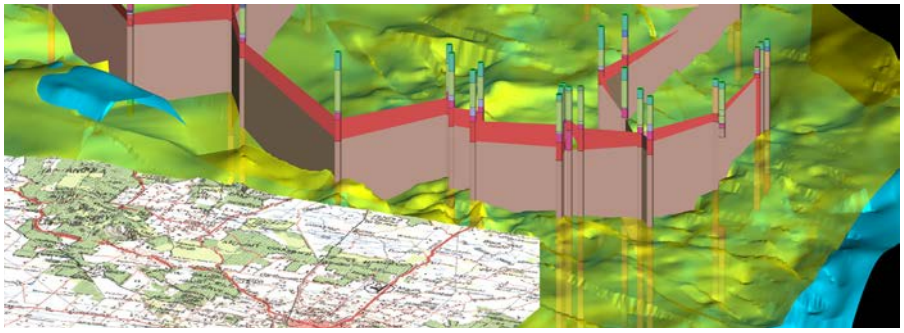
Visualising results dynamically improves communication and provides informed decision support. Mine planning is streamlined overall. Planners can track variables and processes, determine sequencing and generate production plans.

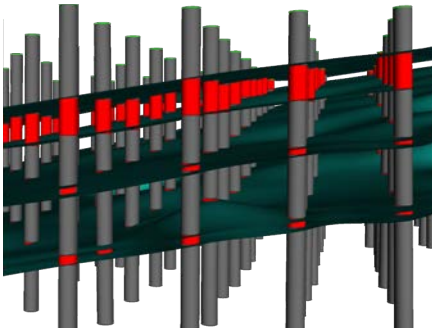
The strategic CaveLogic approach improves operational productivity through confident production planning.

- **Flexibility:** Dynamic approach to project complexity and individual customer needs.
- **Productivity:** Multiple parameters handled when generating alternative scenarios for assessment.
- **Auditability:** Transparent calculations and auditability of results for confident decision support.
- **Communication:** Readily visualise results for sequencing confirmation.
- **Automation:** Streamlined process improves productivity, safety and efficiency.
- **Integration:** Link projected economic value with realistic production plans.
- **Accountability:** Comprehensive reporting for effective management of dynamic processes.
- **Evaluation:** Investigate relative feasibility of underground and open pit mining methods.

# Maptek Eureka

Maptek™ Eureka allows project geologists to visualise and interpret all available geospatial data. Drilling, seismic, gravity and magnetic data can be displayed dynamically in 3D to help drive discovery and generate accurate resource models.





## Applications

- Work with disparate geospatial data in a single 3D environment
- Edit, correlate and model drillhole data
- Model strata from MWD data
- Convert seismic data to depth
- Highlight anomalies for analysis of similar responses
- Explore data at regional level and zoom in to areas of local interest
- Level of detail rendering for ultimate visualisation capability

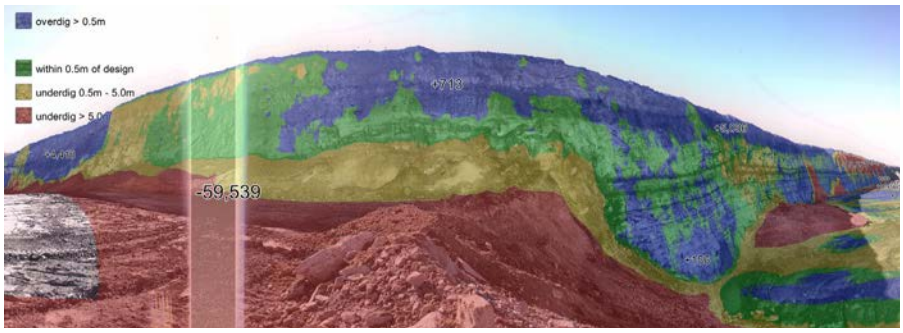
Maptek™ Eureka allows users to work with all available geospatial data on one platform. Easy identification of associations or anomalies can lead to a better understanding of the resource.

Compatibility with standard mine planning software file formats allows seamless transfer between exploration, mine design and production projects. Specialised modules which handle drillhole tools, seismic interpretation, implicit modelling and geotechnical analysis can be added to a base Eureka licence.

- **Drillhole tools:** Users can display and manipulate drillhole data alongside other geospatial data and display stratigraphic correlations in 3D. Advanced grid modelling algorithms can incorporate additional data beyond the drillhole information, so all your knowledge is in one place.
- **Seismic data:** Import and display SEG-Y format seismic data, visualise seismic reflectivity and amplitudes. A smart-tracking tool traces features of interest, such as horizons or faults. Seismic readings can be converted to depth, allowing for intuitive interpretation alongside drilling data.
- **Implicit modelling:** Creating implicit surfaces of drilling or attributed data allows for better orebody interpretation. The technique can also be applied to modelling narrow sub-vertical data such as veins.
- **Lithology targeting:** Downhole gamma logging and Mining While Drilling (MWD) data can be imported to accurately model surfaces and seams.
- **Geotechnical analysis:** Extract dip and strike information (discontinuities) from surfaces, create stereonets and rose diagrams, and perform kinematic analysis.
- **CAD tools:** Dynamic smart CAD tools give users unparalleled control when working within complex 3D datasets.
- **Geodesy tools:** Users can edit and manage frequently used coordinate systems as well as define custom grid systems.

# Maptek PerfectDig

Maptek™ PerfectDig is an easy-to-use system for rapidly evaluating and supporting design conformance. It allows all stakeholders to quickly compare as-builts with designs in the field and fosters real-time decision making.




## Applications

- Protect hardcap and minimise dilution
- Increase mineral recovery
- Optimise equipment usage
- Calculate reconciliation volumes
- Improve high and low wall stability
- Make decisions in the field
- Share results over secure networks

Maptek™ PerfectDig provides all stakeholders with detailed information to track conformance of excavation to design in order to optimise digging, update mine designs and allow for efficient mine planning.

An intuitive interface allows users to specify and dynamically adjust tolerances to more accurately track conformance. A digital history is automatically captured, allowing stakeholders to review why errors may have occurred.

## Better decision making

PerfectDig creates a robust feedback loop. Accurate measurements come directly from a Maptek laser scanner which is operated via a simple interface. Automated scan registration and image correction streamline the generation of results, which are displayed as scenes. Users can load cross-sections, overdig, underdig and design tolerance thresholds, applying their professional expertise to assess excavation progress and make decisions which improve overall productivity.

## Clear communication

Results can be viewed in the pit on mobile devices and tablets and shared immediately across secure networks. Intuitive colouring and labelling facilitate clear understanding of how excavation conforms to design and where adjustments might be needed. Communication between departments is streamlined and no additional software or training is needed to analyse the information.

## Improved safety

PerfectDig improves site safety by minimising staff exposure to active faces and operating machinery. Quick access to a cross-section view helps ensure that batter angles match pit designs for maintaining wall stability. Engineers can assess potential hazards and make informed decisions in the field.


# Maptek Sentry

Maptek™ Sentry is an intuitive visualisation and monitoring tool for better understanding surface stability in mining and engineering environments, providing accurate data for risk management and safety programs.

## The Sentry difference

- Monitor multiple zones within a single scene
- Better visualisation, understanding of failure mechanisms
- Designed for rugged industrial environments
- Safer alternative to prism monitoring
- Complements radar deployment
- Use the same data for survey applications and geotechnical/ kinematic analysis
- Operates in low light and underground

Maptek™ Sentry is deployed in a custom trailer, offering a power and communications module, cellular and wifi networking, a dedicated, stable bollard for a Maptek laser scanner and Sentry software.

Sentry combines a Maptek laser scanner with sophisticated software to monitor and analyse movement over time. The versatile solution allows operations to use the same equipment for all survey and monitoring tasks.

Sentry is quick and simple to set up and operate, allowing site personnel to capture and analyse accurate 3D data for monitoring and managing risk.

## Identify movement

Integrated smoothing tools allow users to identify movement and animate 3D surfaces to show true morphology of changes to terrain.

## Analyse failures

Analyse the mechanics of wall failures with greater fidelity than other systems. Capture and maintain a continuous monitoring history.

## Analyse rock falls

Record rockfalls and easily view the points of origin and landing. Export data to PointStudio for further analysis, including volume calculations, and maintain rockfall databases for reducing risk in the vicinity of highwall toes.

# Maptek Services

Maptek™ provides training, technical support and consulting services to ensure users get the most out of their investment in Maptek products. Qualified staff can fill in for site roles, as well as complete short and long term projects.

## Services

- Customised training
- Responsive technical support
- Telephone support from 13 offices worldwide
- Online help and users forums
- Consulting for survey, geology and mine planning projects
- Database and scripting setup can help automate repetitive tasks to streamline your workflow
- Managed IT services

**Services provided by experienced Maptek mining engineers, geologists, surveyors and systems engineers help users to complete projects efficiently and on time.**

## Consulting

Projects include resource modelling and feasibility studies, mine design, mine planning and optimisation, geotechnical studies and scheduling. Pit and topography surveys, end-of-month and end-of-period pickups, stockpile surveys and volume calculations can be conducted using Maptek laser scan technology.

## Technical support

Telephone support is available where and when it is needed. Users can also access an online searchable knowledge base, FAQs and product forums. Product releases and feature packs can be downloaded. Maptek can install products at any site, ensuring a smooth transition.

## Training

Maptek training courses ensure users get the most from our products. Training can be delivered on site or in our offices, with course content tailored to site needs.

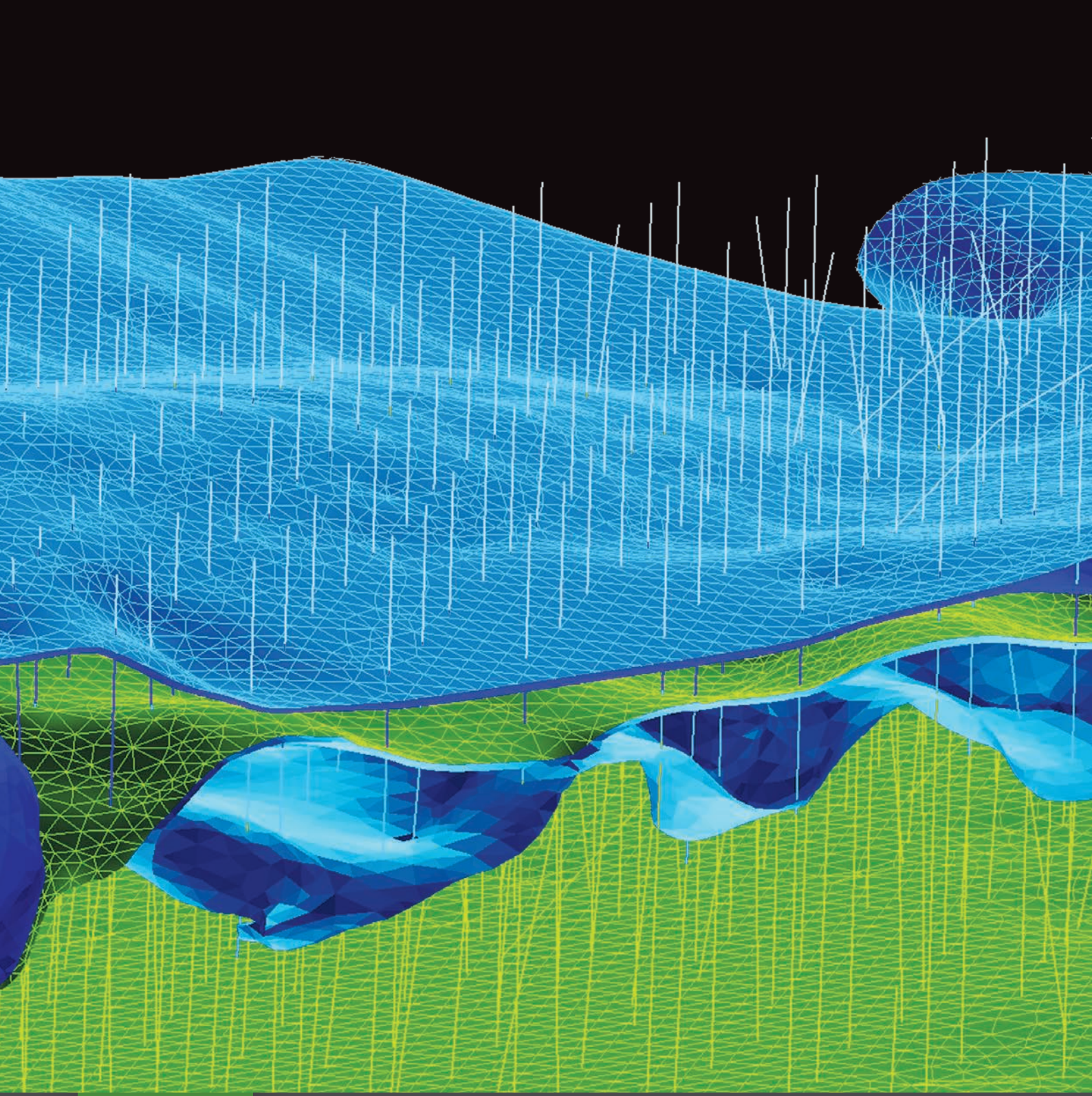
## IT solutions

Maptek staff can review and analyse systems to help streamline business processes. Services include application development, IT consulting, product implementation, systems integration, architecture analysis and benchmarking.

## Conferences and forums

Maptek users conferences provide an opportunity to hear the latest product news and development plans and participate in hands-on workshops. Regional forums provide informal product updates and networking opportunities.


Your whole mine solution.
Waste Landform
Environmental Management
Exploration
Slope Monitoring
Geological Modelling
Geotechnical Analysis
Mine QC
Mine Design
Underground Applications
Drill & Blast
Grade Control
Optimisation
Scheduling
Survey



MAPTEK™



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