What's New in Maptek Vulcan 11

Vulcan 11 continues the trend of automated functions and workflows supported by high impact visualisation and faster processing. New functionality and enhanced tools target productivity improvements and efficiency gains within Vulcan and on the Maptek Workbench.

- Geostatistics
- Variogram analysis
- Geological sculpting
- Scripting options
- Overbreak/underbreak
- Panel caving design
- Grade control
- Mining block generation
- Split pit solids
- Underground scheduling
- Visualisation and graphics
- User experience

Overview

New and existing users will find a lot to like in Vulcan 11.

New functionality that streamlines operations from design and modelling through to planning and scheduling is delivered alongside automated regimes and workflows, high end visualisation and enhanced computing performance.

New geostatistical options ensure the widest range of analysis techniques, with greater flexibility for simulation and validation studies.

Vulcan Data Analyser offers enhanced variography, intuitive workflows and faster performance for resource modelling applications.

Enhanced functionality makes for smoother mine planning–scheduling interaction. New options in mining block generation improve workflow and productivity for open pit mines. Strip mines gain better control with more options for creating and splitting solids.

Grade Control Optimiser features an improved core optimisation engine, which guarantees locally optimised results.

Faster sample processing and the incorporation of Perl and Python scripting have enhanced the Grade Control module. Plotting and reporting has also been improved.

New graphics and visualisation options provide powerful ways for users to view and interact with data for better understanding of spatial relationships.

The Maptek Workbench is a unified platform that allows users to share workflows and data. It provides a dynamic workspace for running Maptek applications and standard tools that support design and modelling tasks. Version 2 delivers enhanced workflow editor, search facility and technical support features.

The Workbench home page reveals new look product icons, which are part of a wider 2018 Maptek brand refresh.

At Maptek we’re already working on the next release. Talk to your local Maptek office about the exciting projects on our development roadmap for Vulcan 12 and the Maptek Workbench.
Geostatistics

Kriging Neighbourhood Analysis (KNA) is fully integrated into the Vulcan grade estimation process. Charts are readily saved for reporting and it is fast and intuitive to set up and run.

The ability to determine and optimise input parameters for the kriging process minimises conditional biases during estimation. Block size, minimum and maximum numbers of samples, search distances and discretisation parameters can be charted to show their impact on kriging efficiency and slope of regression.

KNA can be run on a single (local) and/or multiple block (global) basis. The optimised settings can be fed directly into a grade estimation run for efficient processing.

Vulcan users can now perform grade estimation using Simple CoKriging, Standardised CoKriging and Ordinary CoKriging in the Gaussian Simulation module, with up to five variables for complex multi-commodity operations.

Multivariate transform

The projection pursuit methodology joins the Vulcan suite of multivariate transformation tools for analysis and manipulation of sample data. This method allows users to reduce any dataset to an uncorrelated multivariate Gaussian distribution. Realisations are simulated on the transformed data.

The associated back transformation restores the original multivariate dependencies to the realisations. Forward and backward transformations can be stored for repeated usage.

Variogram analysis

Vulcan Data Analyser (VDA) is easy to use and is fully integrated with geological resource data. Major improvements to the user experience are backed up with new options for analysis.

Vulcan 11 includes updates to variogram modelling and many visualisation enhancements. Variogram properties can now be saved for use between variograms and projects. Variogram cloud charts show variations between all samples at each lag.

Data highlighting is a streamlined way to check spatial locations of chart outliers and assess their potential impact during resource estimation. Users can simply select data on an existing histogram, cumulative frequency chart or scatter plot and highlight the selected data in 3D.

Multiple points can now be selected for creating deferred scatter plots, which helps users when validating simulations of block grades. New madogram charts are available for validation of Gaussian simulations.

Subsequent to Vulcan 11, VDA will replace the current Advanced Statistics functions, including box plots, support for additional data types and the capability for chart generation to be scripted.

3D geological sculpting

3D Geological Sculpting allows solids created through implicit modelling or other techniques to be modified using a freehand or snapping mode to sculpt, deform, pinch and smooth geological models on screen. Updates in Vulcan 11 allow incorporation of production data and samples databases. Search and filter algorithms now perform up to 40 times faster. Auditability has also improved.

Stratigraphic reconciliation

Compare Stratigraphic Models allows users to directly compare or reconcile an entire suite of grids or triangulations representing the site resource model against the previous output, without the need to create macros or scripts.

Comparison can be done at the directory level, with outputs created automatically and reported statistically, or as contoured variable differences ready for display and plotting. The process is saved as a specification, which can be rerun for reconciliation of future models.
Highwall ramps
Engineers can now create highwall templates with improved flexibility in ramp design, including the ability to incorporate multiple ramps. Reserving is improved, with flow on to more accurate scheduling in Evolution. The update supports dragline passes.

Open pit scheduling workflows
Vulcan offers different approaches when generating mining blocks for scheduling. Enhancements to Mining Blocks Generation and Open Pit Solids provide greater efficiency and improved mine planning–scheduling connectivity.

Open Pit Solids provides a workflow for creating solids for strip mines, with reliable output applicable to all Maptek mine planning and scheduling processes. As well as exerting greater control and flexibility over how pits are split, users can stipulate colours and devise formula-created attributes from generated attributes. Improved options support amalgamated projection methods, projection on grids, stacking and splitting in any sequence.

Dragline
Dragline functionality has been enhanced to create single menu workflows. Updates include automated bench templates, the ability to follow floor undulations more closely when creating the maximum spoil profile, options to doze to RL and doze as flat as possible, and unlimited offset blocks for the spoil report.

Mining Blocks Generation employs a simple, repeatable approach, where any accumulation variable, such as insitu metals or volume, can be selected and applied as a target. Dynamic adjustment of blocks allows simple, interactive solid and attribute modification on the fly.

Users can easily add costs and tonnages as populated variables for block models and produce block models for import into Maptek Evolution. This saves time and effort and reduces risk arising from manual editing or miscalculation of cost and tonnage variables. The specification can be saved for auditing.

Users can also populate Vulcan block models with the results from Evolution optimisation, enabling the creation of end-of-period maps and animation of the scheduling phases.

Overbreak/underbreak
A new tool for comparing designs and as-builds will help surveyors and engineers who need to frequently calculate overbreak and underbreak in underground voids. Clicking on each cross-section displays dimensions for as-built, design, overbreak and underbreak as well as percentage of deviation.
Panel caving designer

New Panel Caving Designer completes the mining value chain for caving. A footprint created in Maptek’s strategic CaveLogic application can be passed to Panel Caving Designer for designing infrastructure and output integrated with activity scheduling in Vulcan Gantt Scheduler.

This allows users to efficiently plan and quickly prepare the operational sectors necessary to comply with production plans defined in the strategic planning stage, using for example CaveLogic.

The automated process for creating 3D CAD level production and sink level mining designs incorporates geometric, technical and operational parameters. Changes made to pillar dimensions and orientations, and drive widths and heights are automatically reflected in designs. Design scenarios can be compared, taking into account operational factors and costs.

The new module is applicable to naturally and artificially supported, as well as unsupported caving methods.

Underground scheduling

Vulcan Gantt Scheduler (VGS) is an activity-based scheduler that allows users to create activities directly from Vulcan designs and triangulations which can then be sequenced, resourced, animated, levelled and reported.

The performance of spatial precedences and resource levelling has been significantly improved to create a more robust scheduler that can be used across various planning horizons.

Reserves can be broken down to a period as small as a day for large triangulation blocks or long centre lines. This allows for better understanding of the grade distribution across periods.

Users can now report every activity on a weekly, monthly or yearly basis with a simple export or copy to csv option. This allows for detailed information to be reported by period and easily formatted into desired output. Additionally, the grade can be reported per individual activity, which is helpful when reporting short range plans.

VGS utilities include resource charting complete with histograms, easier precedence arrow navigation, Gantt bar colouring and labelling. New objects and triangulations can be generated by splitting and colouring by scheduled periods. The result is a diverse toolset that helps planners create, validate and communicate a schedule.

Grade control optimiser

Continually refined since release in 2017, the standalone Grade Control Optimiser module helps operations improve the value of deposits. The latest update includes enhancements to the core optimisation engine, which guarantees locally optimal results.

The tool also includes an option to apply different mining widths. Users can choose to populate the classification grid by reading the variables directly from the block model. The mineable optimisation area can be specified via an additional block selection, and the known upper bound is reported by the optimiser.

The time limit for the optimiser now applies to the entire problem, while recognising that the problem is split into multiple pieces.

Grade control

New Grade Control features dramatically increase speed for resolving samples, additional date formats and the ability to use Perl and Python scripts. Plotting output has been improved, bench plans can be saved, blast reporting panels re-sized and grade blocks edited by a pick list.
Visualisation

Dynamically visualising multiple block variables allows quick assessment of all realisations of a simulation. Users can set up animations to run through all equi-probable solutions.

The update makes it quicker and easier to understand spatial distribution of grade variables in relation to one another, and if pit shells are flagged then pit shells or pit optimiser results can be compared with grade and other block model variables.

A new live topography option in the open pit design sawtooth tool allows users to preview what a mining plan looks like as periods progress.

New ellipsoid display dynamically updates the samples that will be selected for use in grade estimation as the ellipsoid boundary changes. The strike, dip and plunge orientations and the search lengths along each ellipsoid axis can be easily manipulated on screen.

This is very effective for visual validation of sample data and fine tuning estimation criteria prior to the estimation process, and is a powerful method for understanding the impact of estimations.

Python scripting

Python scripting links a user’s data science framework to Vulcan, opening up possibilities for improving outcomes in many applications. Python helps customise solutions for working with large data arrays in block models, databases, mapfiles, grids and triangulations.

Vulcan 11 adds support for Envisage functionality with new and improved interactive abilities for accessing and passing of design data structures. Python is also enabled for use in the Maptek Workbench Workflow Editor.

Graphics

Three new icons on the Graphics toolbar - Solid Slice, Quick Section, Tile and Tie - target niche tasks with big impact.

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Usability features

Clip to fault block - Controls fault blocks through CAD data such as pit pickups or seismic interpretations. Clipping avoids pre-processing of data and ensures that data relates to fault domains.

Creating triangle solids - Returns to previous status if user inadvertently exits the option.

Database recovery - Locates compressed blocks in the database and unpacks them to an output file, reassembling blocks in the correct order.

Drillhole radius labelling - Specifying subsets of drillholes to label by radius better controls the number of labels being displayed.

Implicit modelling - Running implicit modelling without creating any solids allows results to be saved into block model more quickly.

Optional extents for DG1 - Data window automatically resizes to fit the data in use.

Run multiple estimations - Save time by running multiple estimations concurrently from a new user interface.

Labs

Vulcan users can now test prototypes of new features and provide feedback to Maptek for ongoing development. Users can access these options via the Workbench settings menu.

CSV editor - Formula editor and several formatting options have been added.

Repair triangle solids - Enhanced triangulation creation and editing tools focus on determining the best way to resolve triangulation validity issues and easily separate small areas and vertical surfaces.
Workbench updates

The Maptek Workbench is the interface where all Maptek applications will ultimately be available. Workbench 2 release incorporates Vulcan 11, with Eureka 5 to be added in the near future.

The Workbench platform enhances interaction with data and improves access to integrated text and spreadsheet applications that support design and modelling.

Users can create their own toolbars, menus, command lists and shortcut keys, to suit preferred work patterns. Toolbars can be resized into any rectangular shape. Docked toolbar windows can be set to auto-hide and only appear when needed. Users can dynamically switch between supported languages.

The Workflow Editor allows users to build interactive command sequences linking Vulcan and Workbench menu items with entirely new capabilities.

Users can drag and drop components and link them to explorer data to easily run automations in context. Customised components can be saved to reuse in other workflows. Prompts can be built in, variables can be queried and users can troubleshoot workflows.

An updated search feature allows searching for a specific term and then running the function from the relevant options returned in the search.

New charts created from the latest Vulcan applications are now easily dockable in the Workbench workspace.

Users will be able to request support directly via the Workbench and automatically generated log files help in resolving issues.

Vulcan 11 and Maptek Workbench 2 are available for download in a single installer from a secure link in the Maptek Users Area.

Visit users.maptek.com to login or register with your corporate email for access. Current maintenance is a prerequisite for downloading and running the latest version.

Release Notes containing a summary of the changes in this release are also located in the Users Area.