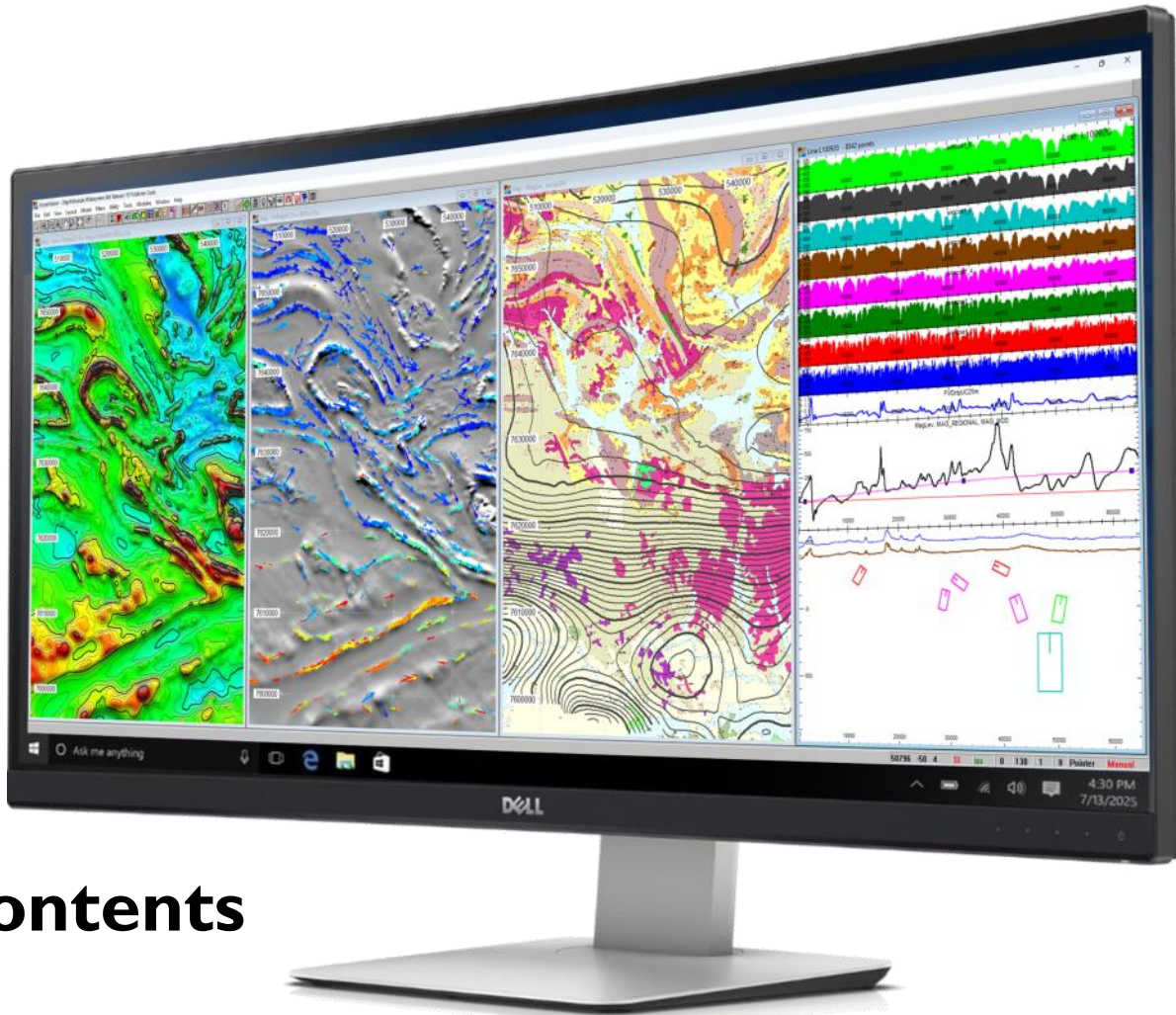


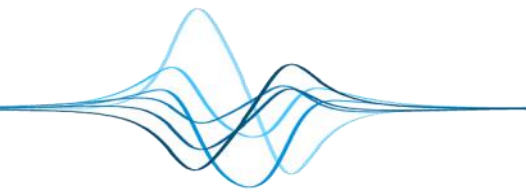
ModelVision

18.0 Release Notes



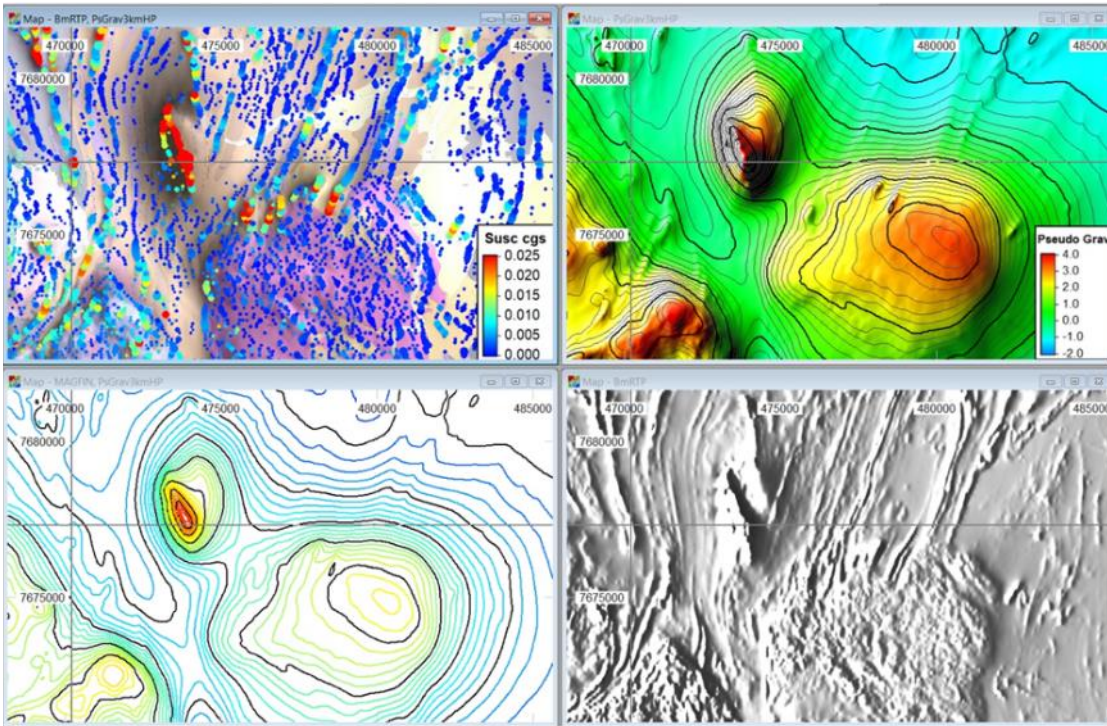
Contents

- **Visual enhancement** [2](#)
- **A new Calculator** [4](#)
- **Polygonal body selection and deletion** [4](#)
- **Create models from data points** [5](#)
- **Full text search** [6](#)
- **Summary list of improvements and Fixes** [7](#)
- **Support and Updates** [9](#)

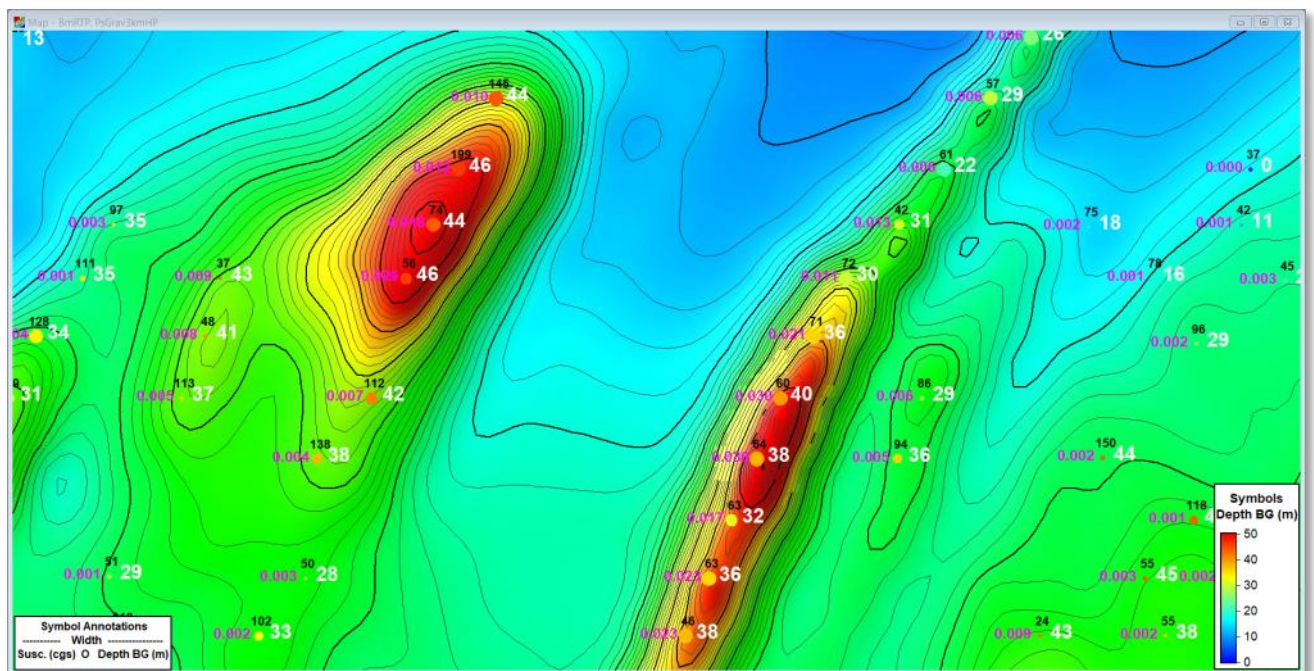


Visual Enhancements

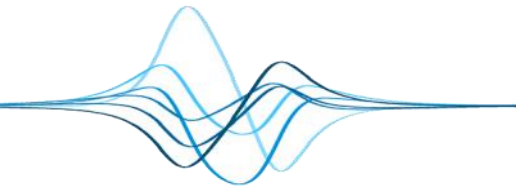
We have improved the imaging of new structural symbols for points, geophysical grids, continuous/discrete colour legends with range and increment controls, colour contouring and real-time updates with many Apply buttons added to property dialogs. The common multi-map crosshair is a great help when working with different image and body maps. Use it easily with the linked pan and zoom feature. Here we show some examples using flexible data point annotation, AutoMag solution visualisation and QuickDepth symbols.



In the point annotation image below, the symbol sizes and colour selections would not normally be used in this way, but they do demonstrate the level of control. Importing geochemistry data or rock property measurements can also be used in this way.

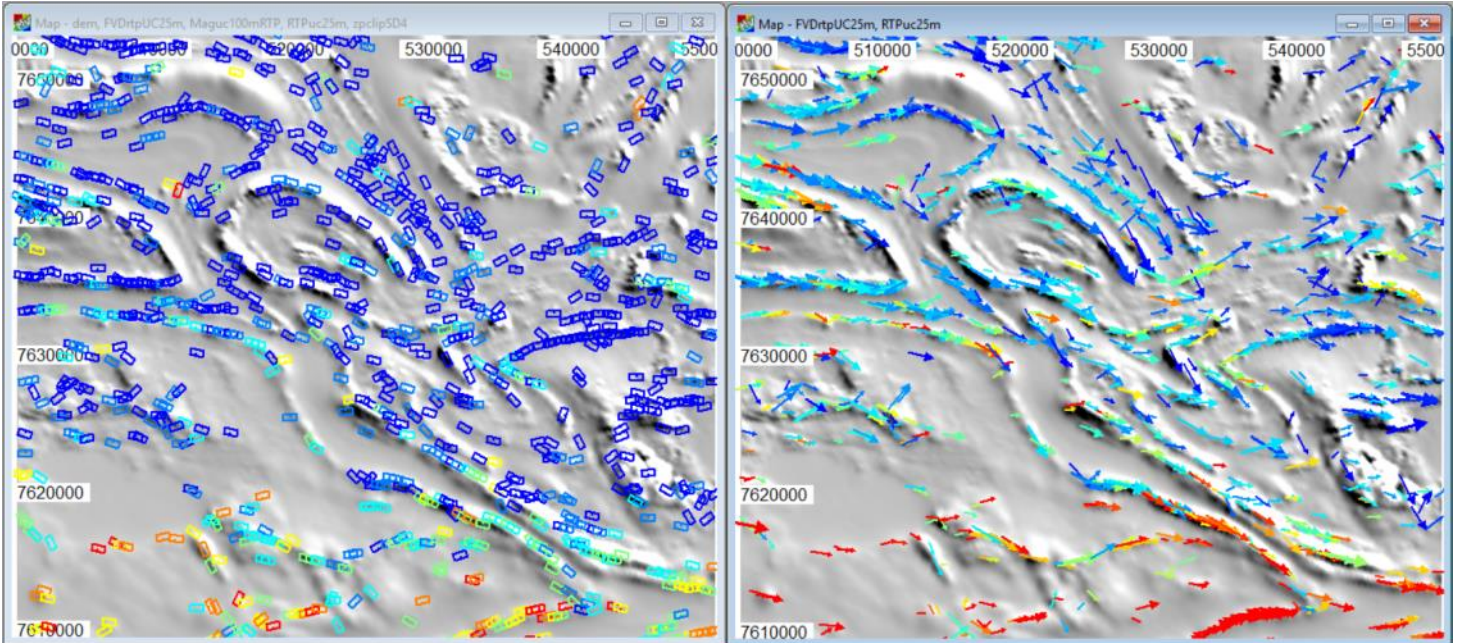


An RTP image with contours and point data displayed as colour and size modulated symbols with colour = depth below ground, diameter = depth quality estimate. The title box in the left corner is designed to show the names of the channels and their relative locations. Annotations clockwise from left side are mauve for magnetic susceptibility (cgs), black for formation width (m) and white for depth below ground (m). Font size, decimal points, position and orientation are controlled for each annotation.



Visual Enhancements cont.

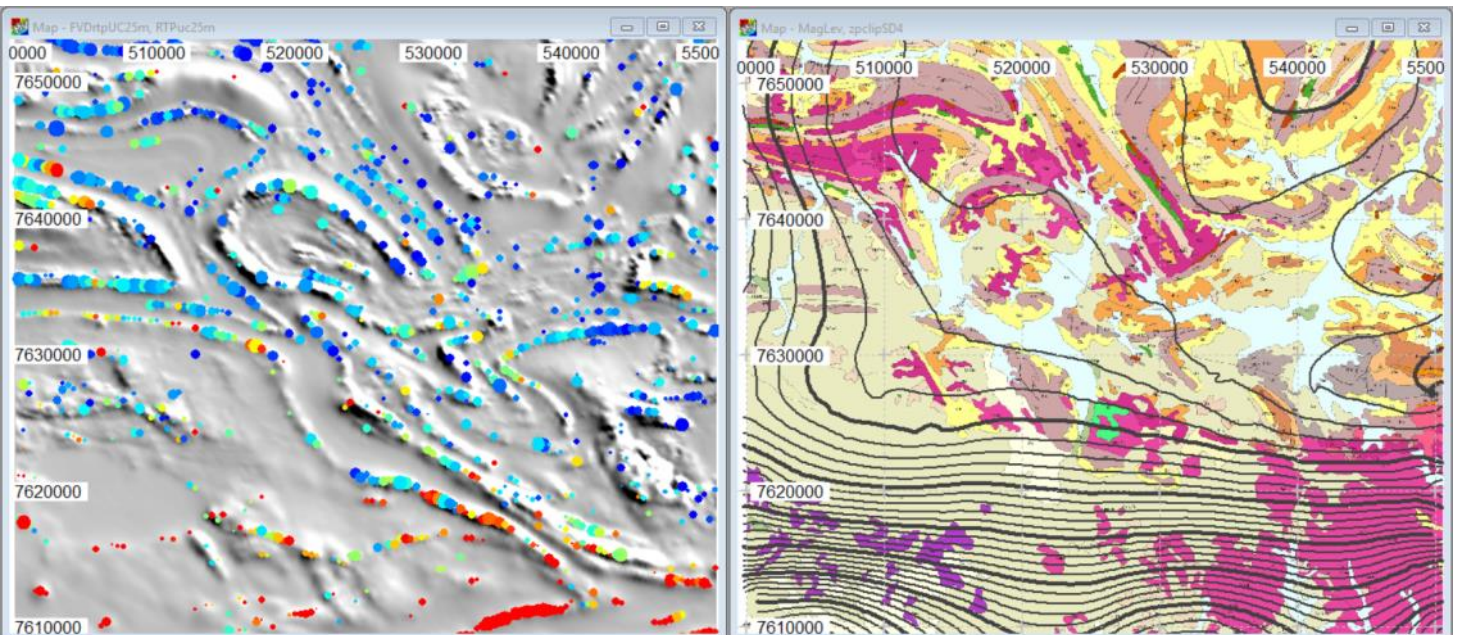
In the left-hand AutoMag example below, the conventional Smart points representing strike and dip directions are colour-coded by the Level number as the width of the sample data expands by a factor of 2. The right-hand image is using points generated via the **Standard points** button on the AutoMag toolbar.



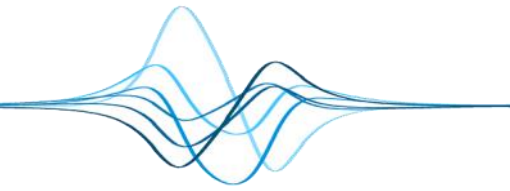
Left - AutoMag solutions as smart points with symbols showing tabular body strike and dip directions. Right - The smart points were converted to standard points and then displayed using the new structural symbol set where the trend direction is used as the strike angle and the symbol size is scaled by trend confidence.

Adding Value to the Depth Results

The trend confidence information that is used as part of the AutoMag processing also produces an estimate of the trend confidence. This value is highest for linear trends and lowest for noise or small circular features. We use the trend confidence to modify the size of the depth symbol to intuitively indicate the reliability of the depth estimate. Also, we exported the data and applied a simple, second order weighted piecewise polynomial fit to the depths using AutoMag's trend confidence as the weight to build a grid of the weighted depths that makes it easier to see the underlying depth trends.



Left - The standard points are displayed using the small filled circles coloured by the corrected depth below ground and the symbol size is scaled by trend confidence. Right - The weighted piecewise polynomial surface derived from the AutoMag depth analysis displayed as 10 metre contours over the outcrop geological mapping.



Powerful new Calculator engine

The old calculator engine has been replaced with a more powerful engine with improved logic, functions list, scripting and mixed case support for output variable names.

- Equation entry line with advanced math functions, logic syntax and support for Null handling
- Scripting with multiple entry lines appended to a file
- Channel selection list selection button saves typing
- Mode selector for line, point, drillhole, grid data types
- Object selection for sub-setting of lines and points
- Keypad for numeric and common function entry
- Function (Fn.) selector list
- Compute button

Math and Logic Functions

exp	Ln (log e)	sin	cos
tanh	sinh	cosh	tan
asin	acos	atan	atan2
^ (power)	abs	sqrt	pi
rand()	log (log 10)	degto(a)	radto(a)
int(a)	round(a,b)	mod(a,b)	alog (10)
aln(a)	ceil(num)	floor(num)	min(a,b)
max(a,b)	diff(a,b) (-)		

IF	>	>=	<
<=	=	(or)	&

The **IF statement** allows you to include another cascading IF statement in place of a simple parameter or calculation. For example, say you have three parameters A, B, C, you can craft a multi-tiered expression where either input parameter can be replaced by a logical expression.

$$D = \text{IF}(A > B, C, A+B)$$

$$D = \text{IF}(A > B, (\text{IF}(A = \text{NULL}, C, A+B), A+B))$$

If you include If statements within the script, you can then apply complex decisions that are dependent on the data stream. Effectively, it allows you to write mini-programs for conditioning of the data.

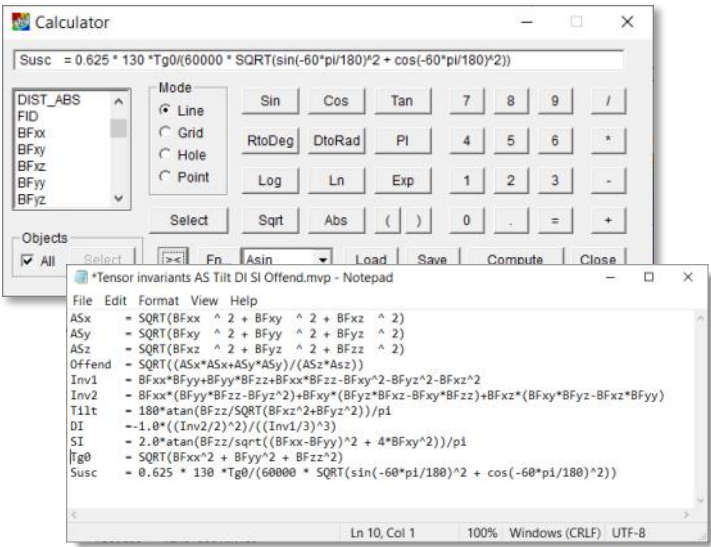
Multi-body Polygonal Selection

If you have complex models with many bodies, especially where you use the **Model>Import>Bodies from Points** feature, you can use the right mouse menu to bring up the Polygon Select option with the sequence:

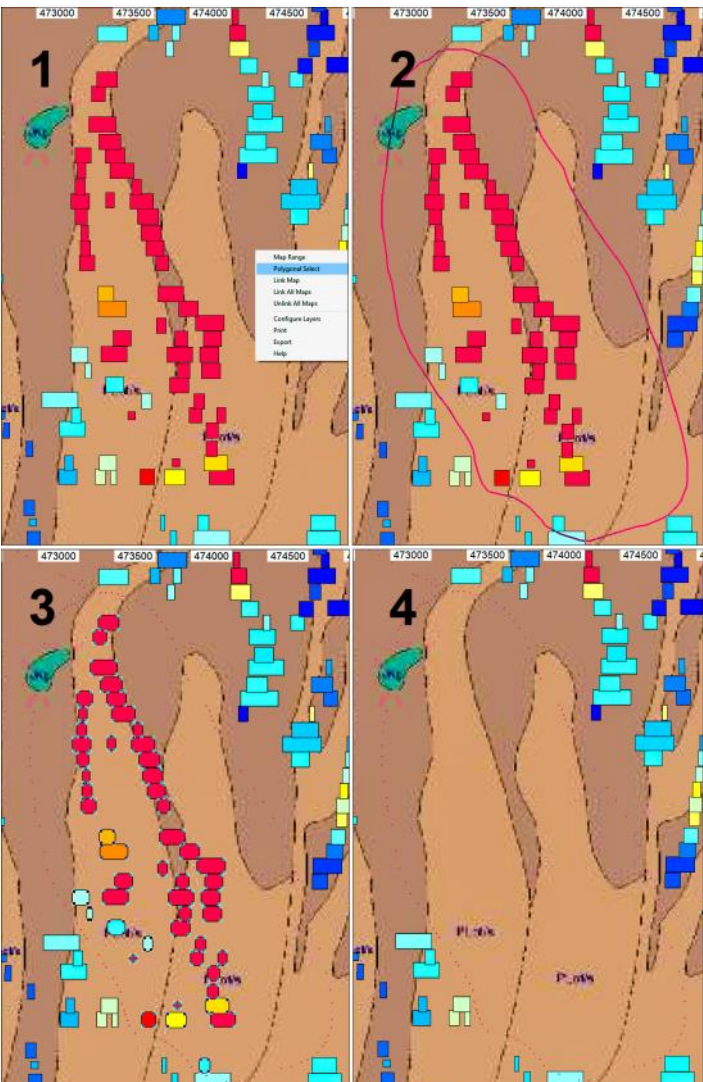
Right mouse Polygon Selection

1. Draw polygon boundary
2. Check selection
3. Press Delete key.

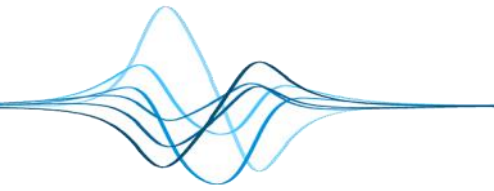
This process can be applied multiple times to remove background bodies prior to a focussed inversion campaign.



The script example shows the calculation of the first invariant of the magnetic tensor (I1), calculation of the analytic signal of the z component of the magnetic tensor and estimation of the terrain elevation using the radar and aircraft GPS. Note the detection of null values in the radar data.



Multi-body polygonal selection and deletion for complex models.



Create Models from Data Points

For researchers interested in studying large scale models, the point to body conversion tool has been expanded to include tabular, spheres, ellipsoids, circular and elliptical pipes. Use ModelVision survey simulations to test your survey specifications before you fly. It is now easy to create a model of near surface maghaemite nodules using randomly distributed ellipsoids or spheres along with your target model. You can build the full model point data in Excel or other applications such as Python or MATLAB which is much faster than creating the multi-body model manually with the **Create Body** tool.

A random value generator can be used to create the easting, northing, susceptibility and elevation can create distributed geological noise for more realistic models when testing filter and inversion performance.

Lab measurements of density or magnetic properties can be converted to a located point set and turned into simple spheres that can be overlain on geological and image maps. At any time, you can convert the body to another body type and start modelling. If you have many samples, use the bodies (samples) in the RockMod module to assess their possible lithology classifications by overlaying the lab measurements on one or more of the charts.

An example dialog box showing the body types available for creation from an incoming data point stream where some channels are used to populate the parameter values and others are substituted for fixed values. The Body Type parameter is used in automatic mode to select the correct parameters where multiple types are included in the input file.

Example of a large point to body conversion from the Cloncurry region where the Tabular body type is applied to all points in the set



Full Text Search Help System

ModelVision's help system has been modernised to take advantage of recent advances in search engine technology. Our help system, user guide, supporting documentation and tutorials are moving to the web for quick searching for solutions to specific issues. The results of a full text search for a specific outcome are shown to the left.

We have even included an experimental AI Assistant that uses our documentation with a ChatGPT-style large language model (LLM). If the web is not accessible, you will still have access to new versions of the local help system and PDF formatted guides. We have many researchers around the world who undertake fundamental research using the tools provided in ModelVision so it is important we have these. The AI Assistant is a welcome addition to the learning process because you can ask it plain English questions and refine them as you go.

Search in ModelVision Help 18.0

List FFT Filters available in ModelVision

6 documents found in ModelVision Help 18.0 for: List FFT Filters available in ModelVision

Sort by: Relevance

12 2D and 1D Filters

...and 1D Filters 2D and 1D Filters play an important role in modeling and interpretation of magnetic and gravity data and ModelVision has an extensive list of 2D grid filters as well as 1D line filters. These filters may be used for data...

Line Filters

...The Output name assigns this name to the filtered output channel. The name of the output filter channel is generated automatically by ModelVision appending two characters that indicate the type of filter. It is possible to override this name by editing the Output name...

Grid Filters

...main 2D FFT module Filters>Grid Filters>GridFilter and select the Convolution tab. To use Grid Filter, the grid must first be loaded into ModelVision. You select a grid to filter from a list of currently loaded grids which is then passed to the GridFilter plugin...

Main Menu

...use with the current session including profile data, gridded data, drillhole data and point data. Setup Edit the default settings used in ModelVision sessions, including display parameters and magnetic and gravity property units. Project Properties Examine or edit the settings associated with the current...

Grid Filter Plugin	Filter	Description
FFT	Class	2D FFT operators (comprehensive)
TMI to Bc	Component	TMI to a single magnetic component (e.g. I)
TMI to Bx, By, Bz	Component	TMI to 3 X, Y, Z components
TMI rotate	Component	General inclination and declination transform
1VD, 2VD, 3VD	Derivative	Multi-order vertical derivative
Directional derivative	Derivative	Advanced multi-directional, any fractional order
Integration	Derivative	Multi-order any direction integration
Analytic signal	General	Total magnetic gradient
Band pass	General	Band pass wavelength filter
Butterworth	General	Butterworth filter
Continuation	General	Upward or downward continuation filter
Directional	General	Directional cosine filter
High pass	General	High pass wavelength filter with roll-off shape
Low pass	General	Low pass wavelength filter with roll-off shape
Pie slice	General	Directional pie slice filter
Gz to tensor	Tensor	Convert gravity to the gravity tensor
TMI to tensor	Tensor	Convert TMI to the magnetic tensor
Gzz to Gz	Tensor	Convert any gravity tensor component to Gz
Bzz to Bx, y, z	Tensor	Convert and magnetic tensor component to Gz
Pseudo-gravity	Transform	Convert TMI to pseudo-gravity
Pseudo-mag	Transform	Convert gravity to pseudo magnetic suscep
RTE	Transform	Reduction to the equator
RTP	Transform	Reduction to the pole
RTP low-lat	Transform	Reduction to the pole at low magnetic latitude
Phase transform	Transform	General phase transform induced or generated
Other		Special Purpose filter operations
NSS	Special	Normalised source strength grid from a TMI
Fill holes	Special	Fills holes inside grids using infill gridding
Noise	Special	2D noise generator designed to fill a grid

Example full text search to find a list of FFT filters where references to line and grid filters were returned.

AnswerGenius AI Assistant

AI Assistant

Hello! I'm AnswerGenius, your AI assistant! ??

Ask me a question on the documentation you're reading.

Can I use FFT to transform total magnetic intensity grids to the magnetic tensor?

Yes, you can use FFT to transform total magnetic intensity (TMI) grids to the magnetic tensor. The process involves using fast Fourier transform filters to compute the magnetic tensor grids from a grid of TMI measurements. This transformation allows for further interpretation and analysis by computing various parameters such as invariants I1, I2, dimensionality, and more advanced functions.

Sources:

- [The FFT Filters for Transforming TMI Grids to Any Element of the Magnetic Gradient Tensor \(MGT\)](#)

Ask your question...

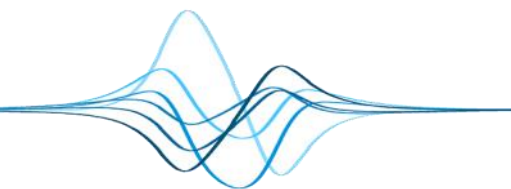
The FFT Filters for Transforming TMI Grids to Any Element of the Magnetic Gradient Tensor (MGT)

It is possible to compute the magnetic tensor grids from the total magnetic field intensity grid using the fast Fourier transform and the equivalent can be computed from a grid of gravity (Gz). The full tensor of the magnetic field can be used for computing many useful parameters for further interpretation such as dimensionality and more advanced functions such as those introduced by Beiki et al. Tensor transformation is useful for the conversion of a gravity survey grid to a tensor or for testing different geological models to determine their effects of a gravity gradiometer survey. There is a lot of 3D spatial information in a gravity survey that can be resolved from the primary field or vertical gradient.

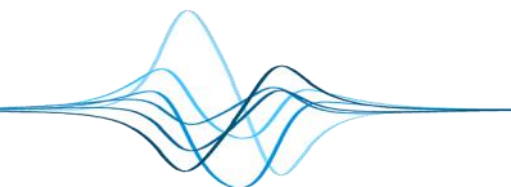
Grid Filter

Grid Filter dialog box showing various filter options and a preview of the filtered grid.

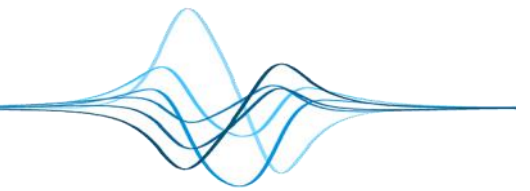
In this example, the AI Assistant was asked "Can I use FFT to transform total magnetic intensity grids to the magnetic tensor?". It responded with a summary of what it found and a link to the most useful page in the documentation. There may be more than one link depending on the nature of the nature of the search.



Improvements	Description
Web-Based Documentation	We are moving to web-based documentation to provide a more functional experience with finding answers to questions. Full text search with Google-style reporting and an experimental AI Assistant. A full User Guide will be included with the final release along with a compressed HTML version of the online documentation (CHM). We will be able to make updates to the online documentation between releases.
Google-Style Search of Documentation	Use Google-style full text searches to find more relevant links to resolve your questions. This is generally much faster than using the conventional search of the contents.
AI Assistant (Experimental)	There is an AI assistant available for the online help that uses a cut-down version of a large language model that focusses on the ModelVision User Guide and related Tensor Research documentation.
Delete Multiple Lines Interactively	Clean up messy line datasets using the Active line toolbar. Select tie lines, duplicates and short lines from complex datasets.
Calculator Supports Case Sensitivity for Output	Mixed case output channel names are now supported for all calculator data types. This was part of a major rewrite of the underlying calculator engine.
Standard Points Visualisation	Improvements have been made to Point visualisation with new structural symbols, advanced annotations, size, colour, azimuth modulation and legends. The new Apply button allows you to test your settings before exiting the dialog.
Body Label Visualisation Control	The operation and capabilities of the body label dialog have been expanded to provide access to all the location, shape, density, magnetic and remanence properties of bodies visible in map and section views. A pull-down list of the property substitution parameters helps you select the most appropriate property names. Labels are better behaved when zooming or panning and you can now enter a specific font size instead of using the slider. A new Apply button allows you to test your changes before exiting the dialog.
Contour Controls	Improved decimation down to 1.0 for smoother contours, line thickness and heavy contours.
Coloured Contours with Legend Support	Coloured contours added with the option of including a legend that can be positioned anywhere in the map.
Model Without a Data Input Channel	A checkbox to define an input channel has been added so you can go straight to modelling without input data.
Point To Body New Body Types	Import from points supports body type for sphere, ellipsoid, circular pipes, elliptic pipes and tabular shapes.
Polygonal Selection Tool	A polygonal area selection tool was added (right mouse access) to assist with body selection and body deletion. Useful when you have many bodies, especially from AutoMag and RPD Mapping.
RockMod Polygon Body Select	Polygonal body selection added to focus in on specific target areas of a map. Especially useful with AutoMag, RPD Mapping imports and rock property measurements.
Improved Image Resolution With Bicubic Interpolation	The default grid interpolation method is now set to bicubic instead of linear and this enhances the quality of images and image shading.
Special Symbols added for Point Display	Several new symbols have been added to ModelVision for special point display that includes an azimuth modulation component. The arrow symbol is especially useful for AutoMag trends and RPD Mapping point import. This feature is very useful for a broad range of mapping and annotation of diverse point datasets.
Point Annotation in Maps	The annotation control dialog gives you more control over the position of multiple annotation around a point plus a new Apply button allows testing the display style. Very useful for rock property data, geochemistry, gravity QC and the display of our RPD Mapping property data.
Point Colour Legends	The colour legends for points now support discrete and continuous colour tables along with user-controlled ranges and annotation increments.



Improvements	Description
Colour Legends with Apply Button	Colour legends in most cases have been upgraded to include continuous or discrete colour lookup tables (LUT) and control over the clipping limits and annotation increments. Body colours are restricted to discrete LUTs.
Colour Legend Annotation Increment	Most colour legends provide a control for the annotation increment that links to the range setting.
Colour Legend Rounding Button for Range Setting	For colour ranges where you can set the annotation increment, you can use the Round button to quickly reset the min and max values.
Remanence Flipping at Near Vertical Resolved	Flipping of the direction of very steep remanent inclination during inversion has been resolved.
Improved Consistency of Magnetisation Units in TKM File	Magnetisation units in TKM files so that they match the units (cgs/SI) shown in the magnetic properties dialog.
TKM Model Export Theta	Theta section numbers used during modelling are now retained when exported to a model file to preserve the volume computation.
Body Label now has an Apply Button	The body label configuration dialog now has an Apply button and both this and the Apply to All Labels buttons keep the dialog open.
Recent Projects and Sessions	The recent lists have been moved to a sub-menu to reduce the total width and make navigation to your directory much faster.
Body Labels Slider Control changed to Font Size	The body label size slider control was difficult to use and was replaced by a font size control.
Multi-Map Crosshair Cursor	A common crosshair will appear in all open maps when you select a point with the left mouse. Very useful for zoom and pan when maps are linked.
External RGB Bitmap Import Format For JPG, GIF & PNG	You can now use JPG, GIF and PNG files as well as BMP format files for sections and maps. PNG rendering is not always satisfactory.
Georeferenced RGB Map Export	You can export your map view to a georeferenced image at a user-defined resolution. The EGB sidecar files contain the real world reference information and are compatible with PA Explorer and Datamine Discover. Future releases will support GeoTIFF and ESRI World formats.
Drillhole Body Properties	Completed new feature to sample body properties in a drillhole display. Sampling parameters are stored in the document so that each hole window has its own settings. These are retained in the session.
Project INI File Updated During Session	Changes that you make to INI file related project parameters are saved during the session rather than just on exit.
Project Selection Navigator	The project selection dialog has been expanded to provide more context and faster navigation.
Project Navigator New Project Button	You can now create a new project from the Project navigator window.
AutoMag and QuickDepth Menu Entries	Both moved to a single level access from the Modules menu.
AutoMag Run added to Speed Toolbar Dialog	Quick access to the AutoMag Run Toolbar has been added to the Speed Toolbar when repeated quick access is required.
1D/2D Summary Filter List	ModelVision's 1D, 2D FFT and Convolution filters are summarised in a quick view table in the documentation. Make sure you check it out, especially the magnetic tensor list.



Fixes	Description
Grid Image Artifact on Irregular Boundaries	A dark contour appeared around the outer edge of an image adjacent to nulls. Introduced with smooth bicubic grid interpolation which failed to detect nulls beyond the data margin.
Restoration of Regionals	Fixed problem with session restoration of some regionals where the most recent version in memory was not being applied.
Layout Window Image Distortion	Image layers in the interpretation Layout Window drawing tool were distorted due to an image scaling problem.
Magnetic Modelled Components Selection	In the pull-down list for modelled components, Bzz was referred to as the First Vertical Derivative (FVD) and has been changed to dT/dz to refer to the FVD of TMI.
GINT Function Retired	The grid interpolation function has been retired with the new calculator. Use the menu option Utility>Sample from grid to create a data channel from a grid.
NSS Computation Line Filter	Fatal error resolved.
Regional Field may not Restore Correctly	When reloading a session file, a regional may not restore correctly when immediate mode is turned on.
Drillhole Documentation	The section on drillhole documentation was a draft version rather than the final.
Point Mode for Calculator	ModelVision crashed when trying to do any calculation in Point mode with the Calculator.
Points Annotation Font Corruption	Font selection has been removed as an option due to issues with a low level graphics library. The low level software library does not support fonts in this mode so font control has been removed.
Point Mode Colour Stretch	When clipping the colour range, the top colour was not displayed correctly in the map.
Sysinfo	After Microsoft removed this function from Windows 10 in 2022, ModelVision would crash when inserting the info into the support email request.
Active Points in Section View	Previously required you to have a map view selected before you could set the active points in a section. The points can now be activated from an active cross-section window.
Very Long Line Import Fails	Lines with more than 32,000 points caused the map window subsystem to crash when displaying the flight lines. These are now detected, and you are presented with options to subset or exit.
Small Contour Interval Crash	Contour increments less than 1 with heavy contours could cause a crash.
Regional Modification	When reopening a cross-section view that previously had a regional set, the regional was reset to an average fit.
Recent Project and Session List	Moved to a sub-menu to declutter the menu selection process.
IGRF Update	IGRF coefficients updated for the 2020 to 2025 epoch.
Active Point Polygon Reselection	When reusing an active point polygon in a map view, it did not activate the points until a refresh redraw is performed.
Body Labels Annotation	Documentation referred to an arrange button. Removed in line with new capabilities for controlling annotation positions and sizes.
External RGB Bitmaps	If you have external bitmaps and they are not located when loading a session you can now navigate to the files or ignore them.
TK And TKM/V7 Model Formats Retired	Reduce clutter in menus and documentation as we do not believe they are used any more.



ModelVision Support & Updates

Your annual support and updates payments are allocated to the development of new features, improvement of existing features and support for issues that you may encounter on your own projects. ModelVision is now a large system of tools and wizards designed to solve practical exploration problems across a broad spectrum of potential field applications. For the major components we have prepared **tutorial datasets and documentation** so that you can develop your skills prior to working on your own project.

ModelVision has a comprehensive **interactive help** system, but you should also be aware that there are some very helpful resources in the FAQ's section of our website [Knowledge Base | Tensor Research](#) and the documentation areas that are accessible from the ModelVision **Help>Guides** menu:

User Guide - ModelVision User Guide with over 700 pages of practical information on using ModelVision,

Interpretation - ModelVision Geophysical Interpreters Guide - a 100 page booklet on magnetic and gravity geological solutions,

Tutorials - ModelVision document with over 12 step-by-step instructions on how to use ModelVision for modelling data.

Use the email address support@tensor-research.com.au to register any questions or problems that you may have and we will respond with a solution or a request for more information.

If you purchased ModelVision from one of our **international resellers** ([Resellers | Tensor Research](#)) who were selected for their expertise in geophysical modelling and inversion, then you can also contact them directly for assistance.

YouTube Video Tutorials

There are a number of useful YouTube videos available from our website [Videos & Tutorials | Tensor Research](#) to provide an overview of some of the key applications of ModelVision. These are intended to help users better understand and learn the workflow processes required for a successful modelling outcome in ModelVision. The latest videos available from the Tensor Research website include:

- RockMod - Plotting Rock Properties in ModelVision
- Regional Calculation and Handling in ModelVision
- QuickDepth for Rapid Magnetic Source Estimation
- Using the Speed Toolbar
- Using the Active Lines Toolbar
- Importing Points to Bodies in ModelVision

Other videos previously available in the YouTube Video Library on our website are:

- Target Wizard in ModelVision
- Normalised Source Strength in ModelVision
- Constrained Gravity Inversion
- 3D Magnetic Component Vectors
- AutoMag Depth Estimation

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