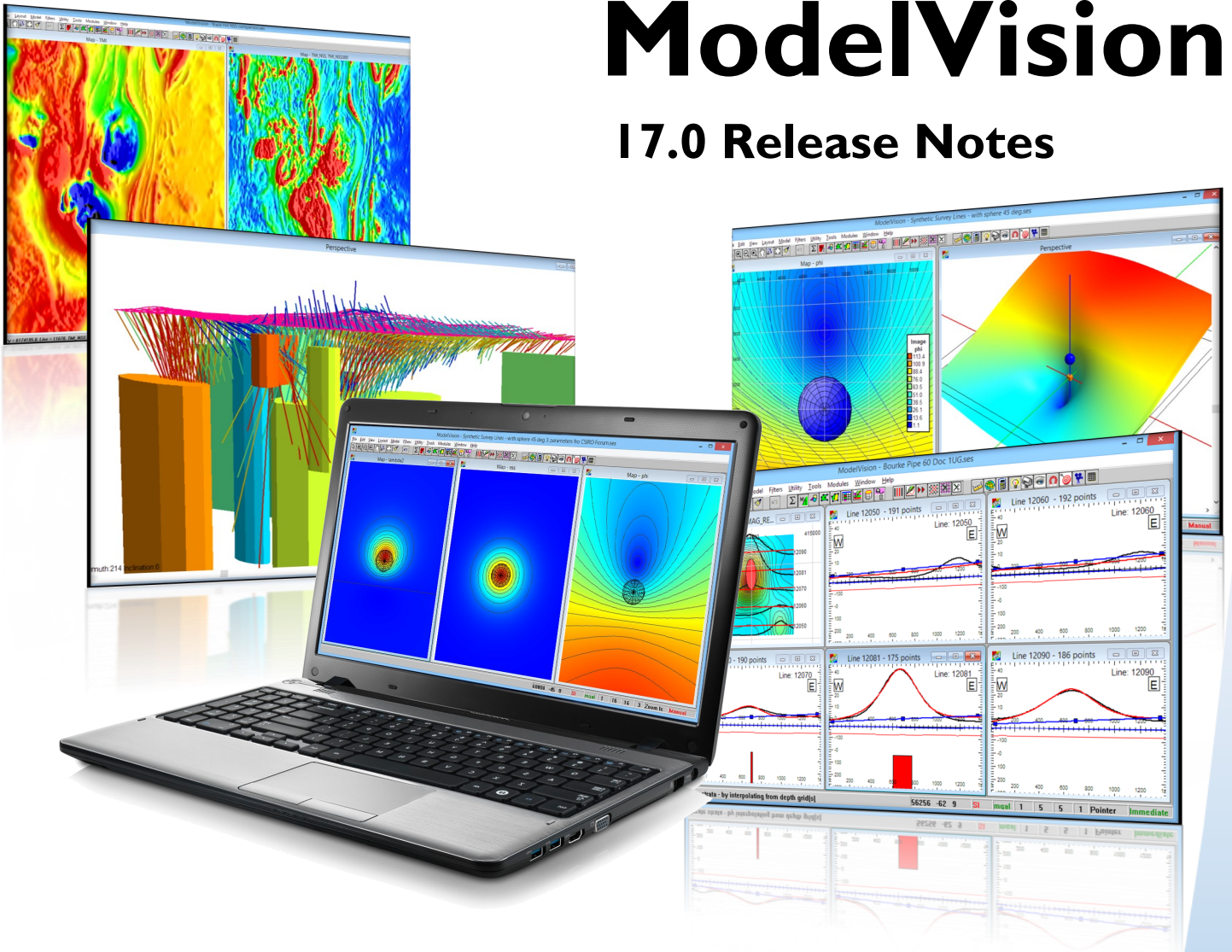


ModelVision

17.0 Release Notes



New Features

- **Windows 10 Upgrade** [2](#)
- **Georeferenced Image File Support** [2](#)
- **NEW RockMod: Rock Properties Plugin** [3](#)
- **NEW QuickDepth (Optional Module)** [5](#)
- **Improved Regional Handling** [6](#)
- **Line Data Maintenance** [7](#)
- **ModelVision Improvements and Fixes** [8](#)
- **About Release 17.0** [9](#)
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Windows 10 Upgrade

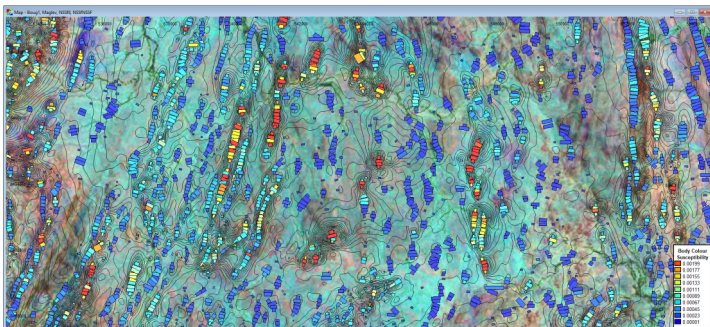
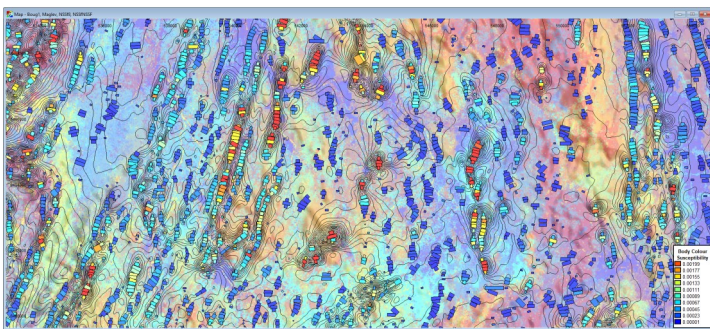
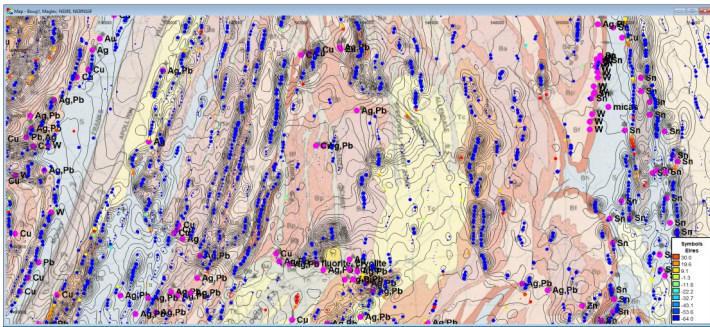
Maintaining compatibility with Windows 10 after Windows 7 and 8 has been challenging with the constant update releases from Microsoft. ModelVision is developed on Visual Studio and a versatile GUI platform that allows ModelVision to run on other operating systems such as Unix or Apple's macOS. We have recently upgraded both components of the ModelVision development environment to ensure its ongoing compatibility with Microsoft Windows 10.

The upgrade has required a major investment of our developer's time which has made this release much later than we had anticipated. So, what are the benefits to you?

- High reliability with each upgrade to the operating system is an important one given the frequency of change introduced by Microsoft.
- Improved security for installations and the use of the latest Microsoft libraries.
- An Intel Math Library upgrade provides access to a much broader range of maths utilities that will provide opportunities for future expansion of processing and modelling capabilities.
- All forward modelling code has been upgraded to the new compiler and library providing an opportunity to fix a few singularity conditions.
- The Fortran compiler used for the underlying modelling and inversion libraries has been moved to the Intel compiler which provides new opportunities to improve capabilities and performance.
- Support for an increased range of image files including JPG and GIF in addition to the original BMP format. Both new formats are compact when compared with BMP and GIF is similar to PNG in preserving line detail.

Did you know that ModelVision uses images created directly in Discover PA by reading the .EGB file associated with the image? The image reference points are created automatically by PA, making it a very easy way of creating quality bitmap backdrops for ModelVision's map window. The examples shown here provide ModelVision with a lot of flexibility and the use of Discover PA makes image generation and use much easier.

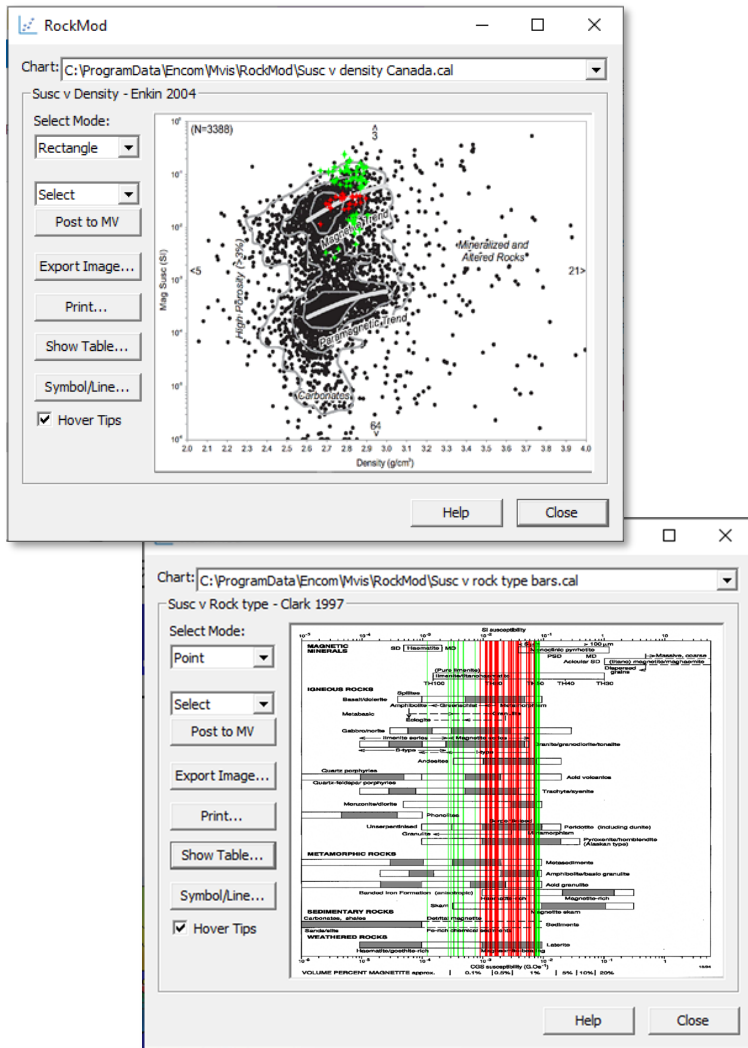
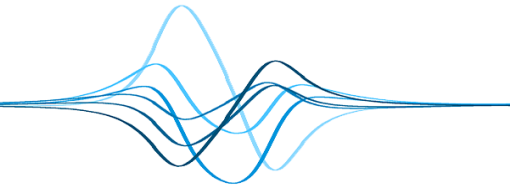
There are a few minor conversion problems that remain to be resolved and these are listed in the installation notes.



Sample backdrop images created in Discover PA showing a geology map, SOM image and Landsat Brovey transform image.

```
GeoreferenceImage Begin
  Comments = "Discover PA Graph Export"
  Image = "Geology and deposits.bmp"
  ImageFormat = BMP
  TransparentColour = DEFINED,RGB(255,255,255)
  ImageStretch = HIGH_QUALITY,COPY
  Geometry = QUAD
  DimensionX = X
  DimensionY = Y
  Registration Begin
    TopLeft = 532161.0383,6506746.756,0
    TopRight = 555162.693,6506746.756,0
    BottomLeft = 532161.0383,6489494.953,0
    BottomRight = 555162.693,6489494.953,0
  Registration End
  CoordinateSpace Begin
    CoordinateSystem = "CoordSys Earth..."
  CoordinateSpace End
GeoreferenceImage End
```

Sample Discover PA EGB file with image registration information.



NEW RockMod Plugin

RockMod is a rock properties plugin tool that allows you to compare magnetic, remanence and density properties in a range of standard rock property charts. ModelVision inversion produces compact rock properties that are much closer to the bulk rock properties of geological formations than can be obtained from unconstrained voxel inversions. This means that you can make geological inferences from your inversion data that will help you prioritise targets for further investigation.

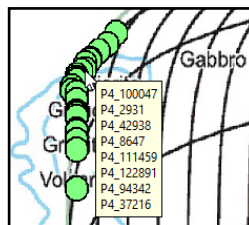
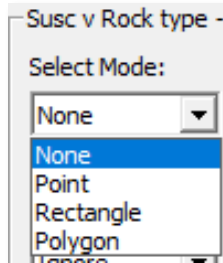
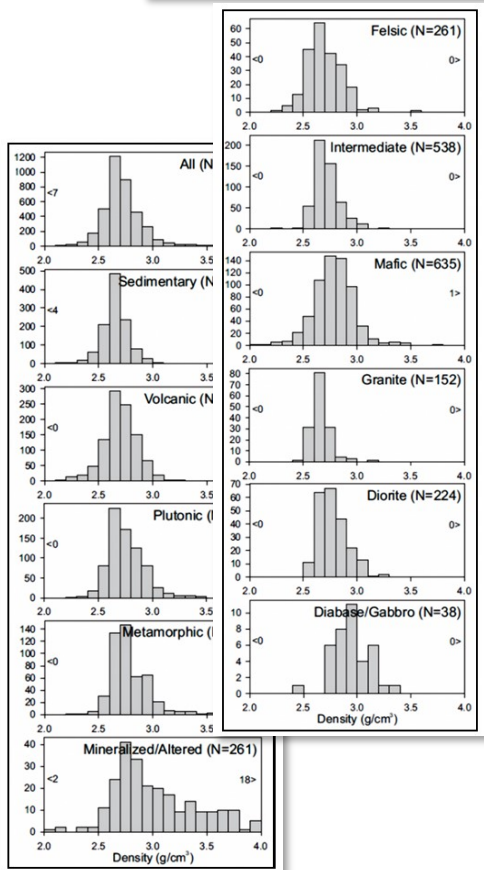
RockMod can also support spatially located lab data, which is imported to a Point dataset from a CSV file and then converted to ModelVision bodies using the Bodies from Points option. This converts the lab measurement to tabular pseudo-bodies that will behave in the same way as normal ModelVision bodies. The magnetic, remanence and density properties from the original lab data will then be available for use in RockMod.

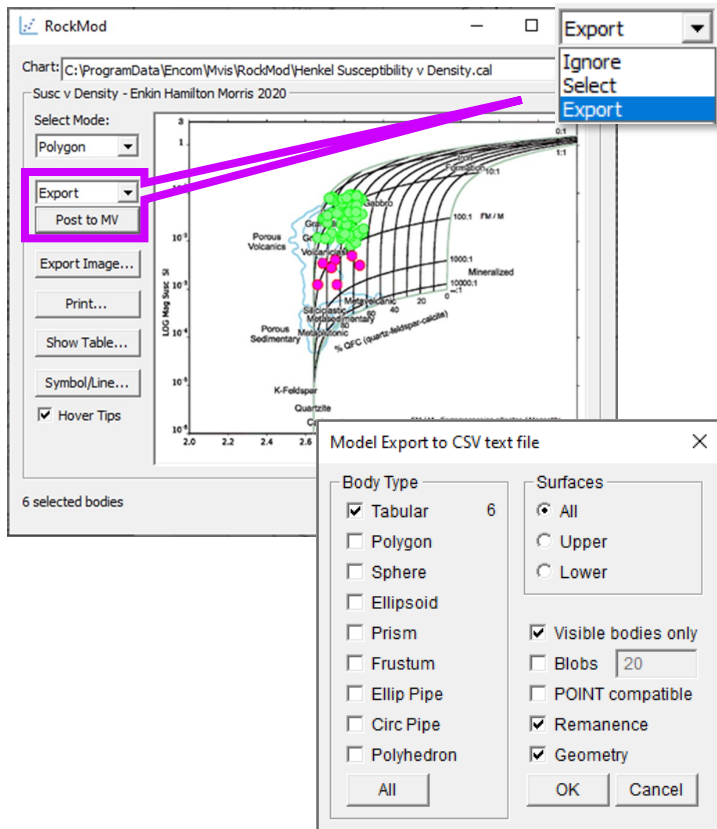
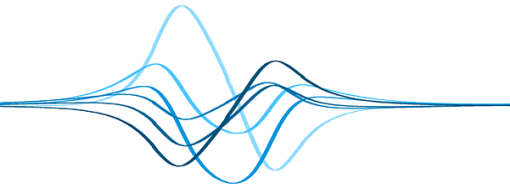
RockMod Charts

RockMod is installed with a range of useful chart styles for magnetic, remanence and density properties. The chart images are associated with a companion calibration file that locates the graph section, determines the axis style (log/linear), property ranges, units and chart authorship. A series of special charts have been compiled from recognised rock property experts' publications and internally developed charts. The charts consist of an image file in PNG format and a registration (.cal) file that contains the chart calibration information. You can create your own charts using data from your own lab measurements or confidential reports and connect them to one or two fields in the model data set. Use magnetic susceptibility, density, Q, resultant magnetisation (J_{res} , J_{inc} , J_{dec} , ARRA) and remanence (J_{nrm} , $Inrm$, $Dnrm$).

RockMod Body Selection

RockMod provides tools to select, query, list and control the display of the body properties. The interface provides different methods for selecting symbols in the nominated chart (see image to the left), which include Point selection, Rectangle selection and Polygon selection. RockMod also has a hover mode which when active, shows a vertical list of up to 10 body names that are near the current mouse cursor location. The names can be found in the ModelVision Body Properties table for identification of all the magnetic and density values.





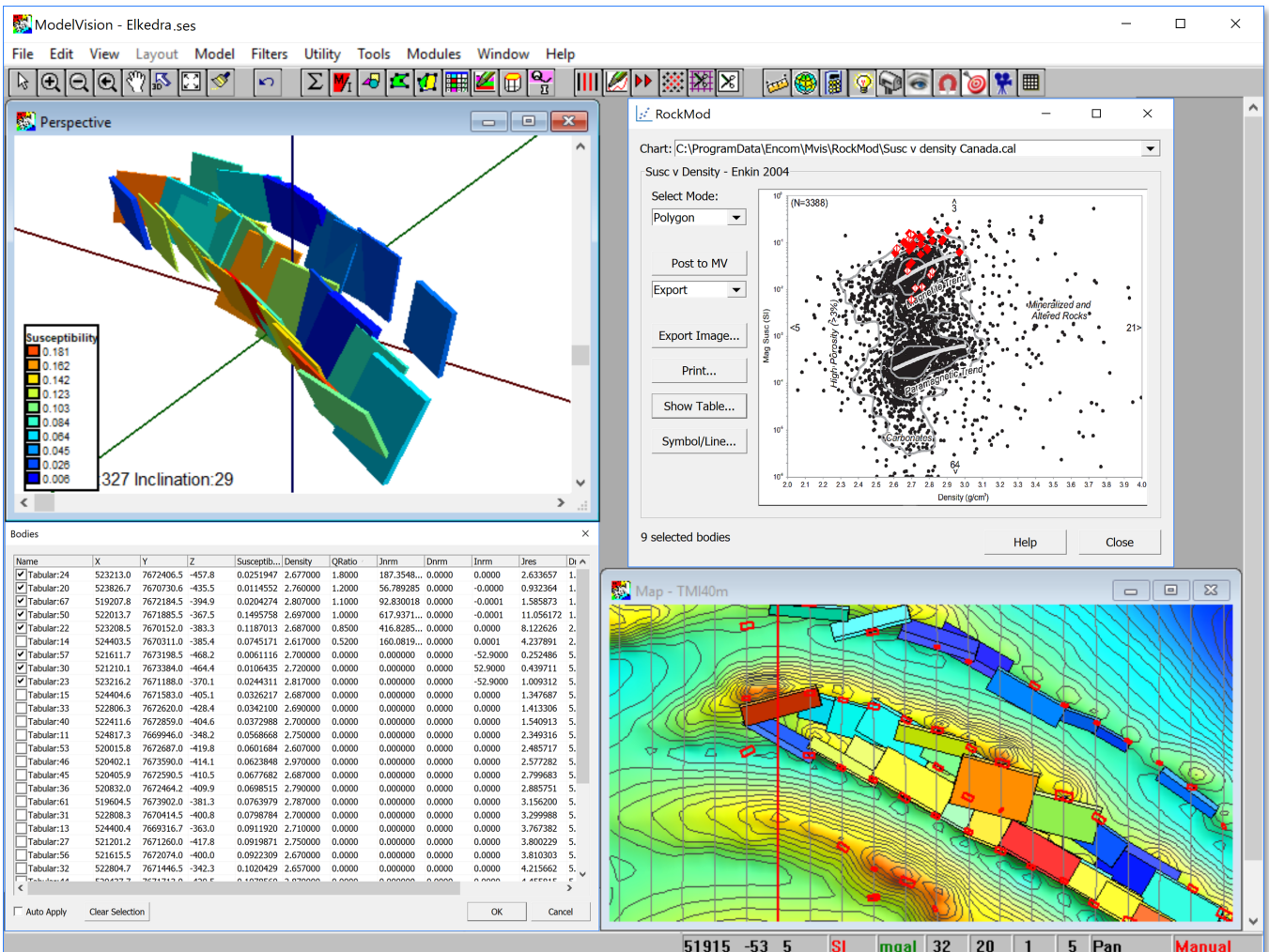
RockMod Actions

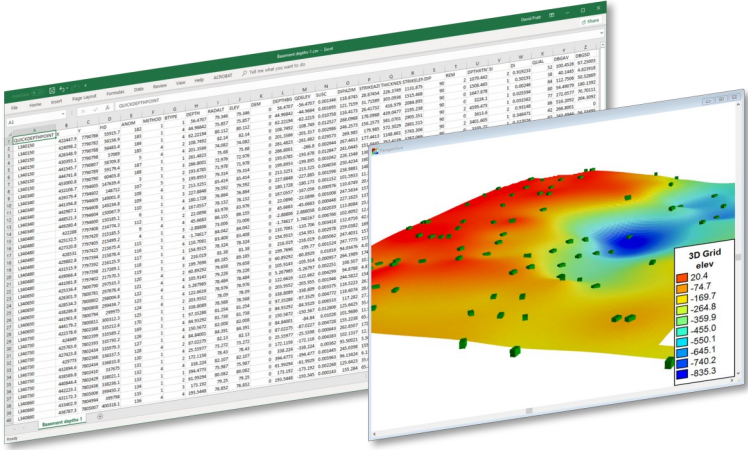
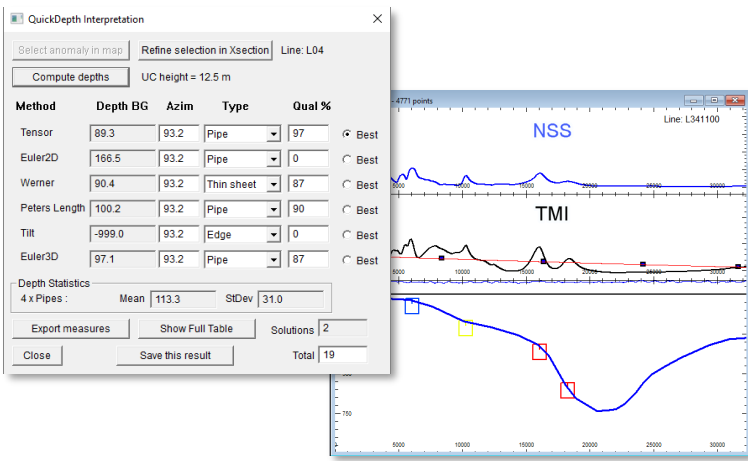
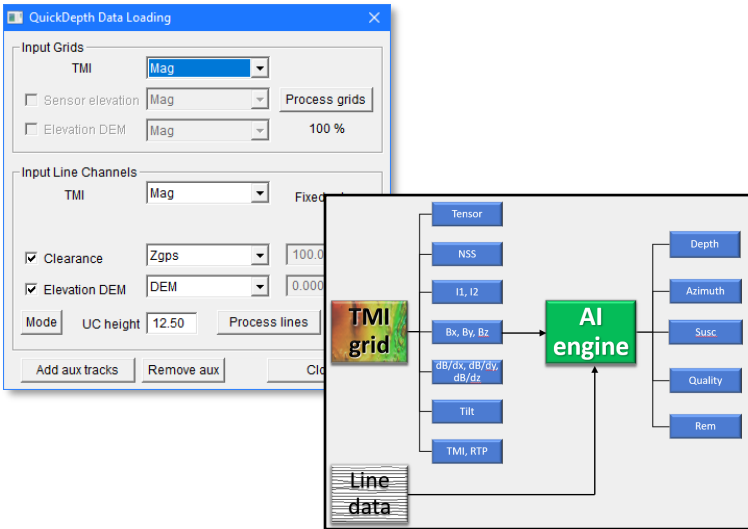
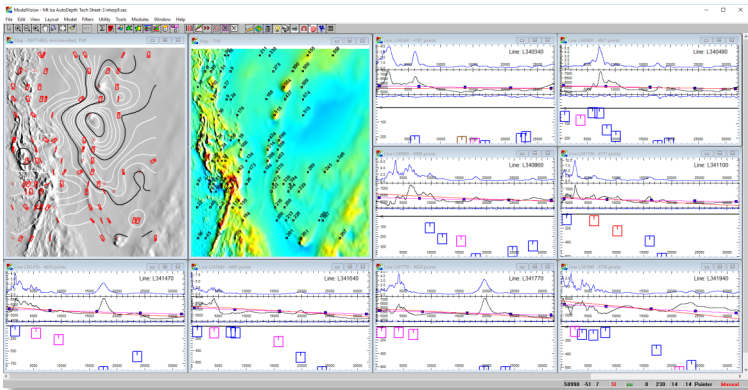
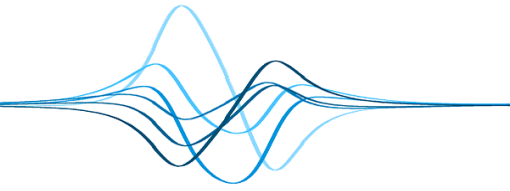
Selections made on your chart can be ignored, displayed or exported from ModelVision.

- If the **Ignore** action is selected in RockMod, bodies selected in the chart view are not returned to ModelVision even if Post to MV is actioned.
- The **Select** option used with the **Post To MV** button sends the current selection of bodies back to ModelVision to be displayed in a map view. The unselected bodies are temporarily rendered invisible and inactive in ModelVision.
- The **Export** action activates the Model Export to CSV Text File dialog in ModelVision.

RockMod Body Table

A table view of the bodies loaded into RockMod displays a spreadsheet view of all the body properties along with the name, location and selection status. If you double click on any column header, it will sort the data based on the order of that field.





QuickDepth (Optional Module)

QuickDepth applies AI principles to the estimation of depth, magnetic properties and geological style from magnetic data. The AI component speeds up the interpretation process but leaves the interpreter in control of the geological interpretation. It uses the line data for the highest possible depth precision and the associated grids to gather 3D spatial information on the shape characteristics of each target. For existing AutoMag owners there is a discount on the purchase price and there is a discounted bundle price for the purchase of both options.

Information extraction phase

The information extraction phase must be run prior to starting the depth interpretation and the results are then available for the current and future sessions. The total magnetic intensity grid is used to derive the estimates of the magnetic tensor, tensor invariants, normalised source strength, magnetic field components, total field gradients and reduction to pole of the total magnetic field. The 3D attributes of the full magnetic tensor implicitly carry a lot of shape information such as elongation or dimensionality and strike direction. This phase only needs to be run once prior to commencing the depth interpretation stage. This information is automatically saved with the ModelVision session file.

Depth interpretation phase

QuickDepth uses the AI engine to analyse the shape characteristics of a selected anomaly in cross-section to infer the geological style of the target anomaly. Geological styles are defined in terms of intrusive pipes, sheets, dykes, edges, sills and ellipsoids. The inferred geological style is displayed, but you can override the selection if another style is more appropriate.

The AI engine uses the pre-conditioned data to determine the shape and then uses one or more depth estimation methods to obtain a depth value for the selected shape.

There are many ways to visualise the result of your QuickDepth interpretation. The solutions are automatically displayed in depth sections and easy to add to a map view. It is simple to export your depth points as a spreadsheet or GDB file for use in other products.

For further details on QuickDepth refer to the [Quick-Depth Technical Sheet](#) on our website.

For further reading on QuickDepth refer to the AEGC 2019 paper by David Pratt et al, titled, "[An AI approach to using magnetic gradient tensor analysis for quick depth and property estimation](#)".

Improved Regional Handling

Line Regional Calculation


In version 16.0 of ModelVision we introduced an automated regional calculation for an active line, called Local Regional Calculation (or Single Line Regional Calculation). This was implemented to improve the workflow for general modelling and inversion of single line magnetic data. It also made it easier for new users to learn modelling and inversion.

For experienced users doing depth interpretation of magnetic data, this mode of operation is very efficient. In this mode, the cross-section is automatically opened and a regional calculated using only the data for the open line. In this way, the user does not have to separately activate the same line for regional calculation. This mode of regional calculation remains available in ModelVision 17.0, but the user must activate this method by selecting the **AutoReg** option in the Line Control dialog, the Compute Regional dialog or the Model>Edit Regional>Magnetics menu.

Note: This mode of operation is not available for the gravity method which generally requires more control over lines which are active for the regional calculation.

Global Regional Calculation

When the above mode is not selected then the default method for calculating the regional for modelling is the Global Line Regional calculation. The Global Line Regional method is the original method for calculating the regional which was available in ModelVision prior to version 16.0 (i.e. version 15.0 and older) and is still the recommended method for modelling on a predetermined set of lines containing magnetic or gravity data in ModelVision 17.0. The regional is calculated when configuring the data modelling in the Line Control dialog by activating the **Use Regional** check box for Magnetics or Gravity and clicking on the **Compute Regional** button to access the Mag Regional or Gravity Regional dialog. The line(s) to be used in the regional calculation must be specified in the Active Lines button for this dialog as illustrated in Figure 2.

Note: The easiest way to activate lines for modelling and regional estimation is to use the **Active Line** toolbar button. 

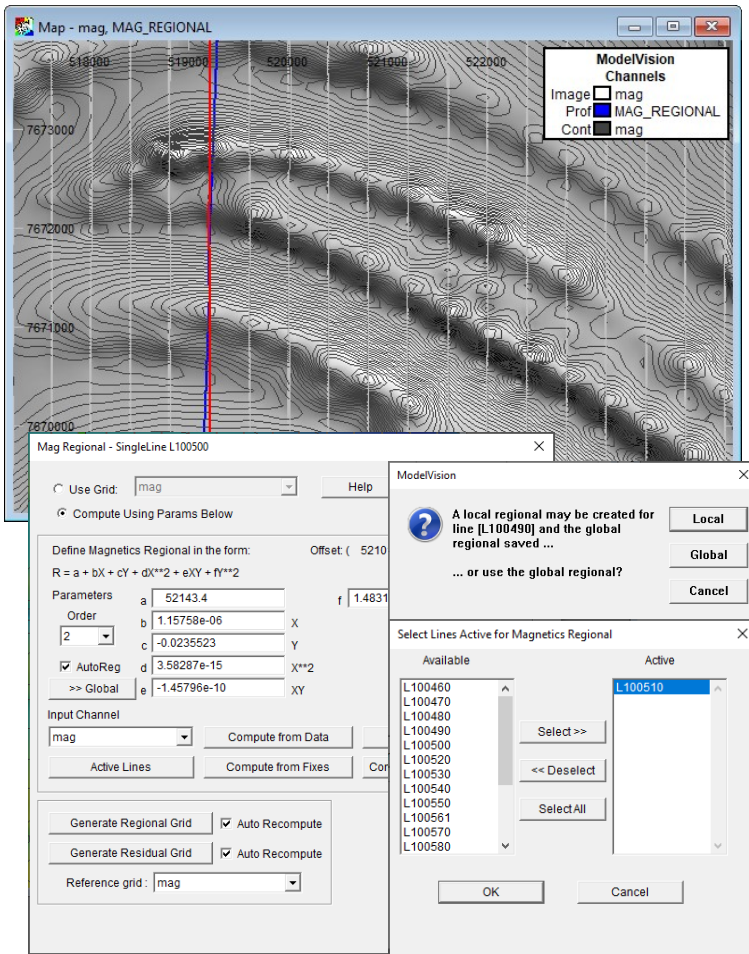


Figure 1: Stacked Profile of a local regional calculated for only one active line, overlaid on a TMI grid image with greyscale colour modulation and contour map.

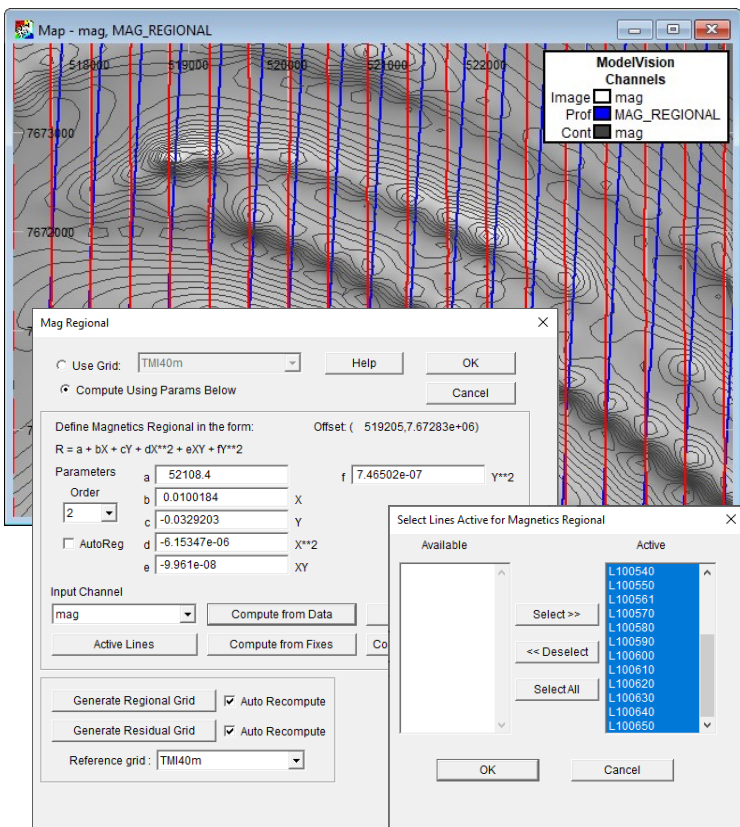


Figure 2: Stacked Profile showing a global regional calculation for all active lines,

Line Data Maintenance

Line Decimation (Creating a Subset)

A line subset option has been introduced in this version to allow the decimation of a line dataset by nominating a decimation factor from within the **Line Data Maintenance** dialog. This is a useful option when you want to do depth interpretation on a subset of the line data.

When creating a subset of lines there are two methods to use. The first is to manually highlight the lines to be removed from the main list in the **Line Data Maintenance** dialog, press the **Delete/Subset** button and choose the **Selected** option from the **Line Delete Options** dialog). The other method is to use the **Decimate By** option in the **Delete/Subset Lines** dialog and specify the decimation number to create a subset using an ordered delete pattern, e.g. delete every 2nd line by choosing to decimate by “2”.

Trim Trailing Nulls

The **Line Data Maintenance** dialog also includes a new feature called **Trim trailing Nulls** which will eliminate null data points at the start or end of lines. Nulls internal to a line are not affected.

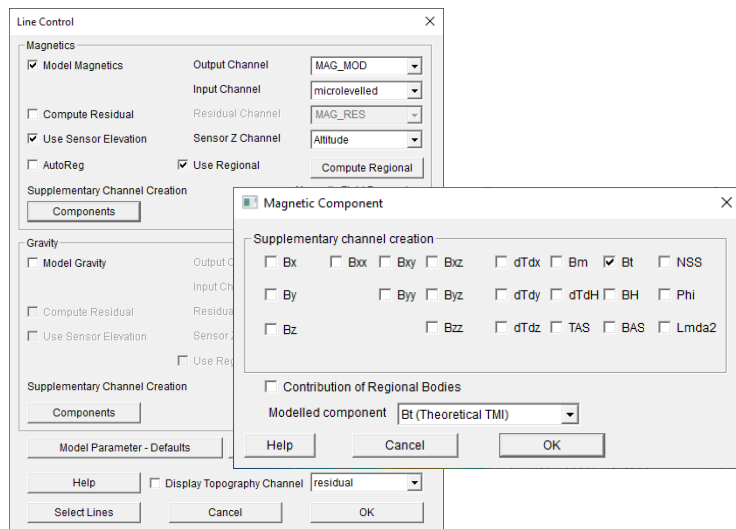
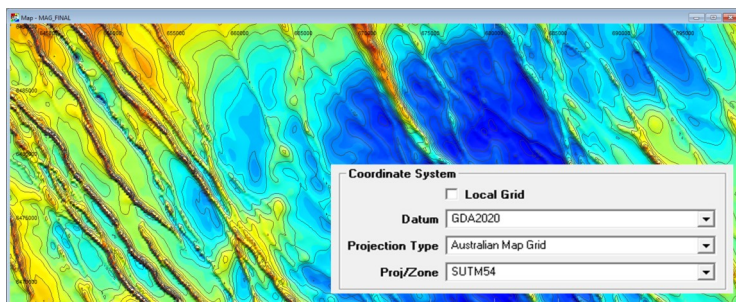
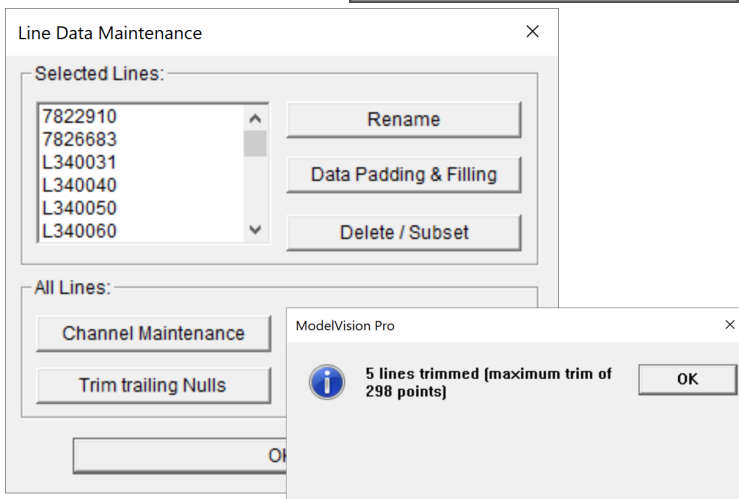
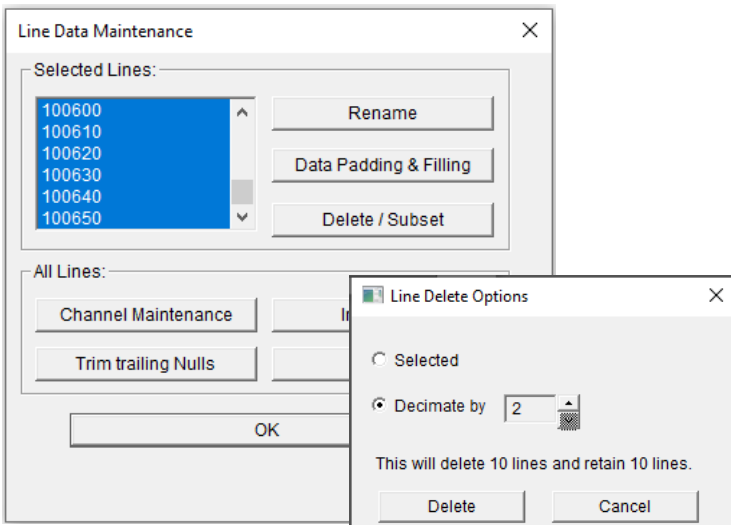
GDA2020 Coordinate Projection Support

ModelVision 17.0 now supports the Map Grid of Australia GDA 2020 coordinate projection system as defined by Geoscience Australia. For further information on this system refer to the ModelVision User Guide documentation.

Theoretical TMI Component

Bt has been added to the Magnetic Component dialog and replaces Bp. This parameter is the theoretical total field anomaly. Refer to the ModelVision User Guide for further reading.

For Reference: Emerson, D.W., Clark, D.A. & Saul, S.J. 1985, Magnetic Exploration Models incorporating Remanence, Demagnetization and Anisotropy: HP 41C Handheld Computer Algorithms. Exploration Geophysics (16), p. 1-122.





ModelVision Improvements and Fixes

Improvements	Description
Joint Inversion	Joint inversion now supports the use of a dc regional for single and multiple channel inversions.
NRM Body Properties	Improved NRM, Demagnetisation and Anisotropy User Interface. Changes to the body properties dialog for management of remanence, demagnetisation and anisotropy.
Quick Inversion	The QuickInvert user interface has an improved regional calculation method.
Default Units for Modelling	The default units for modelling magnetic and gravity data have been updated from being cgs and mgal and are now set to SI and gu respectively.
REMCAL	The Remanence Calculator UI has been improved to be more intuitive.
Point to Body Import	Point to body import has been extended to include remanence input parameters.
Fixes	Description
Create Traverse	Creating a new traverse from a zoomed region of a grid reset the map extents.
NSS forward model corruption	Computing the forward response for Normalised Source Strength corrupted the data.
NSS inversion crash (note)	Normalised Source Strength (NSS) inversion is not supported in this release.
.CSV default for Import ASCII	CSV file format is now the default file format when using Import ASCII.
Drill-Log model display	Model displayed in Drill-Log view would disappear if dragged vertically in Model channel.
Incorrect reporting of Q	Q needed to be changed from a rock property to being computed from vectors.
Filters menu confusion	Filters menu structure has been revised to group filters by Line and Grid to eliminate confusion.
ModelVision crash	Opening new cross-section while the QuickDepth dialog is open caused ModelVision to crash.
Line Thickness setting	Line thickness defaults were not being remembered from Project Properties.
Cannot import .LIN Profiles	Cannot use .LIN files for Profile data import.



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 www.tensor-research.com.au/faqs-and-knowledge-base 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** (www.tensor-research.com.au/our-company/resellers) 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 www.tensor-research.com.au/tutorials 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 www.tensor-research.com.au/tutorials page of 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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