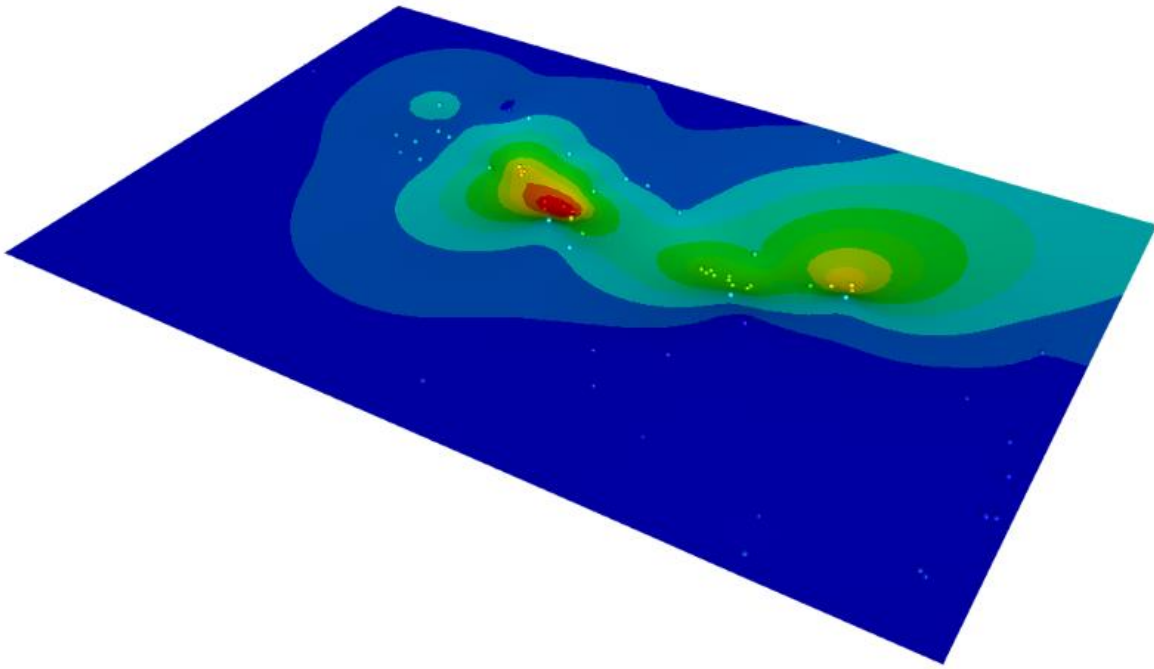




# NEWSLETTER

## 2017 Quarter 2



The GEM4D surface warping tool was expanded and surfaces can now be warped from Mesh, Marker, and Mapping data. Marker data normally works best with large data sets and Mapping data for smaller data sets, as Mapping also takes account of the orientations. The example above was created from piezometer-data that was loaded as Marker-data.

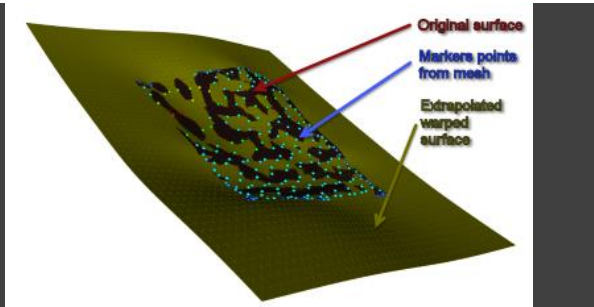
## Latest additions to GEM4D and Trajec3D

I had many questions from users regarding the GEM4D warped surfaces after the last newsletter and significantly expanded the functionality. The warped surface functionality is the main theme for this newsletter, as the functionality is useful for many applications.

The main GEM4D additions from the last newsletter are:

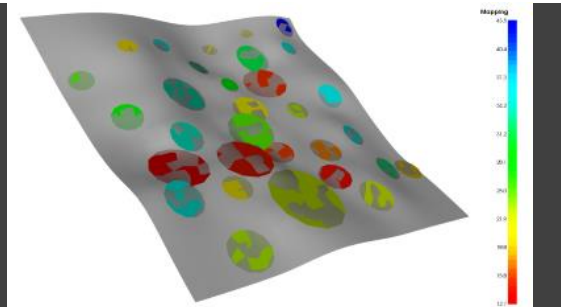
1. Changes to the interface when selecting files and objects; also when changing object colour and opacity - see "GEM4D interface changes".
2. Create warped surfaces directly from Marker and Mapping data - see "GEM4D best fit warped surfaces".
3. Show drillhole collar names in the scene - see "GEM4D drillhole collars as text".
4. Digitising lines with the "Measuring Tool" - see "GEM4D measuring tool" below.
5. Many more error catchers to automatically manage incorrect inputs.

A runout distance tool was added to Trajec3D - see "Trajec3D runout distance" below.



An example of extrapolation of an existing fault triangulation by writing the mesh information out with "Ribbon => Mesh => Export files => Poly info", which exports information of each polygon centre as a CSV-file.

The saved CSV-file was loaded with "Ribbon => Marker => Load files => Text (CSV)", and the surface created with "Ribbon => Marker => Marker actions => Surface => Warped surface".



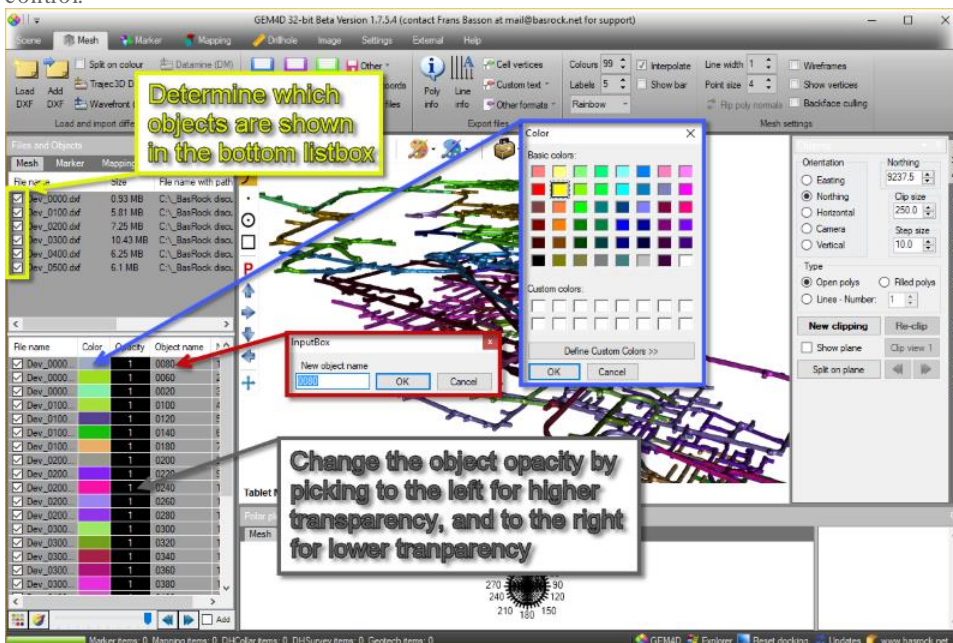
An example of mapping data that was used to create a warped surface. The warping is affected by the coordinate, orientation and trace length of each mapping point, and takes longer to solve as the Marker equivalent function.

The data was loaded with "Ribbon => Mapping => Load files => Text (CSV)", and the surface created with "Ribbon => Mapping => Mapping actions => Surface => Warped surface".

## GEM4D interface changes

Significant improvements were made to the interaction with files and objects. In the new logic, the top listbox determines what is shown in the lower listbox, and the lower listbox interacts directly with the scene objects:

- Use the upper listbox check boxes to show the file objects in the lower listbox.
- Pick the "Color" column and directly select a colour from the pop-up control.
- Pick the "Opacity" column to change the object opacity. Pick to the left in the cell for higher transparency, and to the right for lower transparency.
- Pick the "Object name" column and directly change the object/layer name in the pop-up control.



## GEM4D best fit warped surfaces

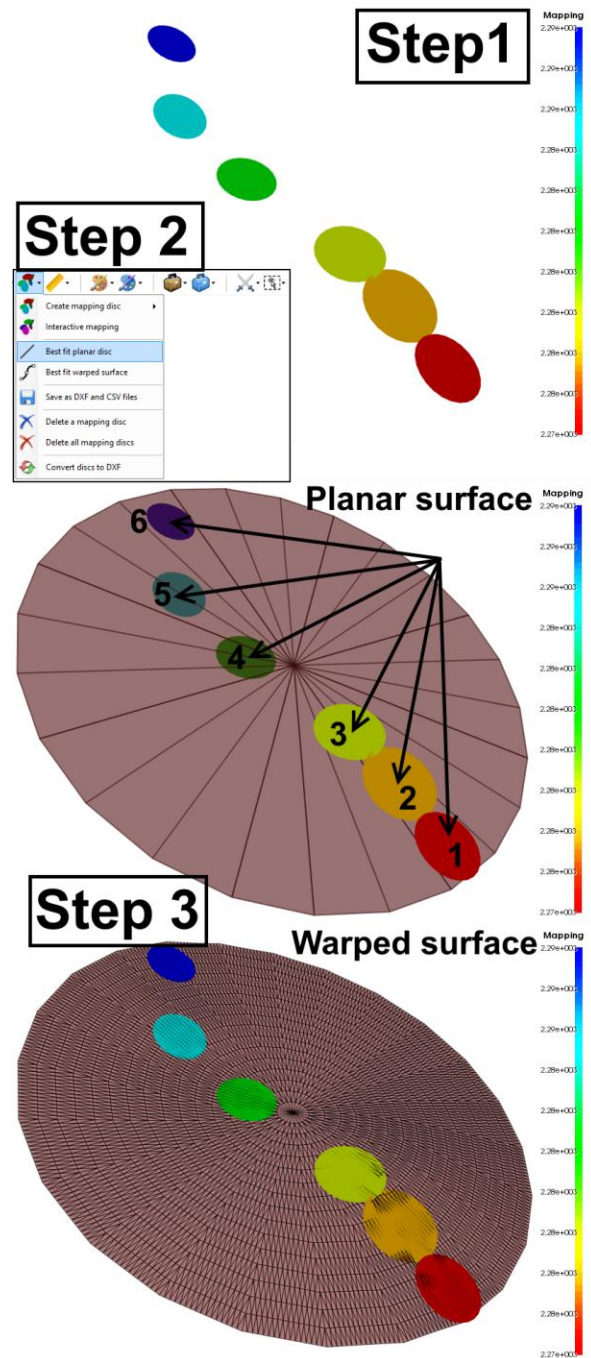
### Manual selection

- Step 1: Load mapping data with "Ribbon => Mapping => Text (CSV)" and show them as disc shapes.
- Step 2: Select either "Best fit planar disc" or "Best fit warped disc" from "Top toolbar => Discs icon => ". Mouse pick the mapping discs of a single structure with the left mouse button, and the best-fit plane through the mapping discs will be updated with every pick.
- Step 3: When all the mapping discs are selected, click the right mouse button. A pop-up input will request the disc size, select a large value to extrapolate the best-fit surface.
- Step 4: Select "Convert discs to DXF" to replace the surface with a mesh that is saved as a DXF-file. All the mesh functionality from the top and right toolbars are then available to colour or transform the meshes.

### Directly from Markers and Mapping

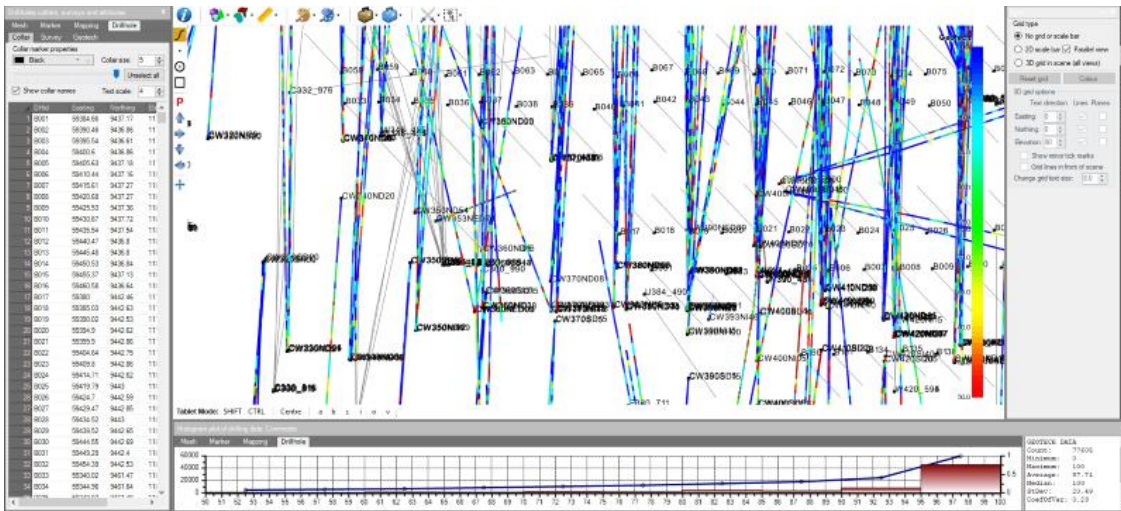
Create best fit planar or warped surface directly from visible Marker or Mapping data with:

- "Ribbon => Marker => Marker actions => Surface => Planar/Warped surface"  
OR
- "Ribbon => Mapping => Mapping actions => Surface => Planar/Warped surface".



## GEM4D drillhole collars as text

Show the drill-hole collars text in the scene by checking the "Show collar names" checkbox. Change the scale of the text with "Text scale", and the text colour with the colour selection button. The text is always created parallel to the camera view; refresh the text when required by unchecked and rechecking the "Show collar names" checkbox.

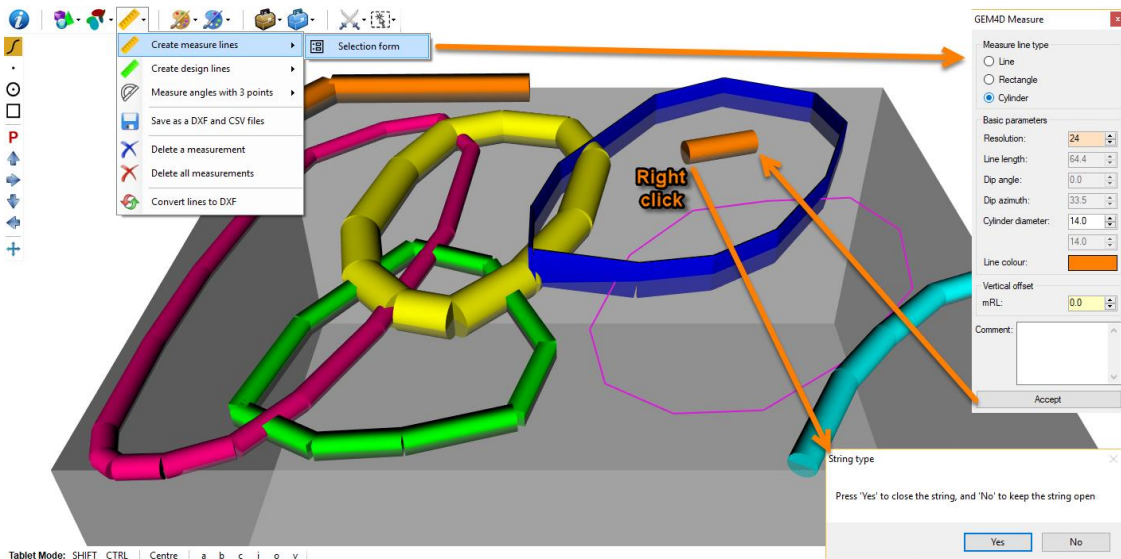


## GEM4D measuring lines

The discussion is also applicable to the "Manual Markers/Mapping" buttons directly to the left on the top toolbar.

The "Top toolbar => Measuring Tool" (yellow ruler icon) can be used to create open and closed lines - or solid shapes such as rectangles or cylinders. Make the selection from the pop-up form with "Top toolbar => Measuring Tool => Create measure lines => Selection form". The form allows the selection of lines (or solids such as rectangles and cylinders).

Click on any mesh surface to start the digitising, and use the left toolbar to change the snapping mode as required, and the snapping can be changed between picks. Press the "Ctrl" keyboard button to temporarily deactivate the function to reposition the scene, and press either "Backspace" or "Delete" to delete the last pick point. Right mouse click when the digitising is completed, which will provide an option to close the string.

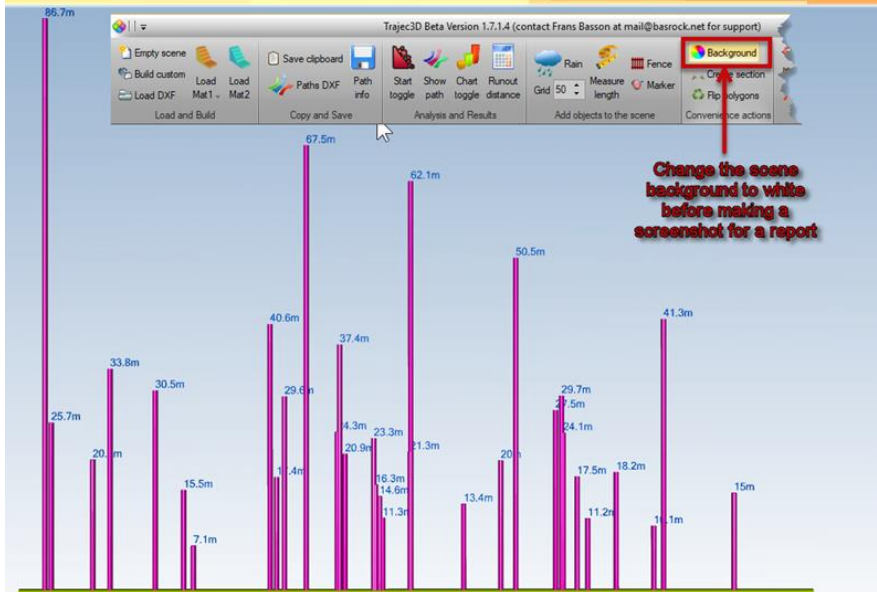
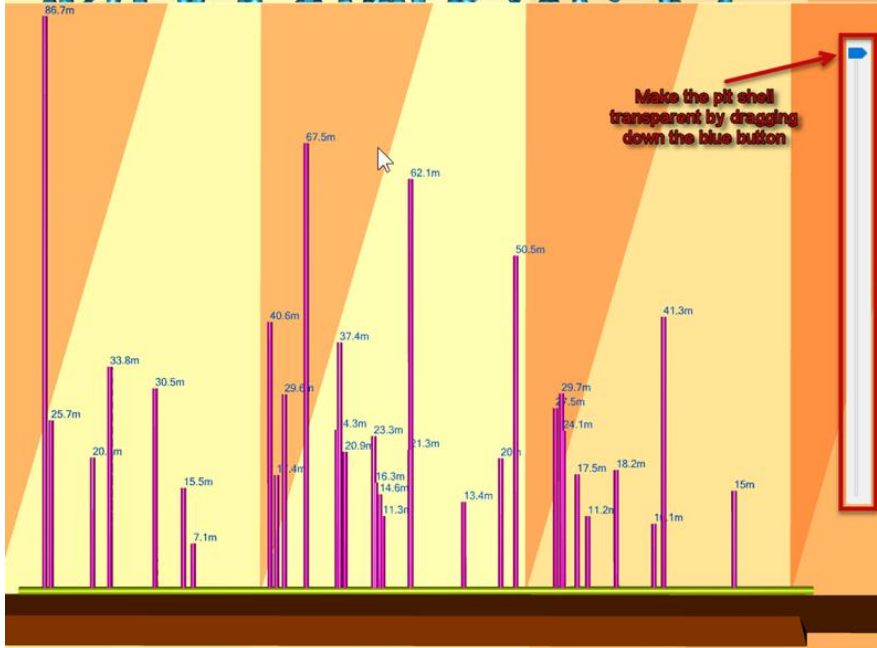
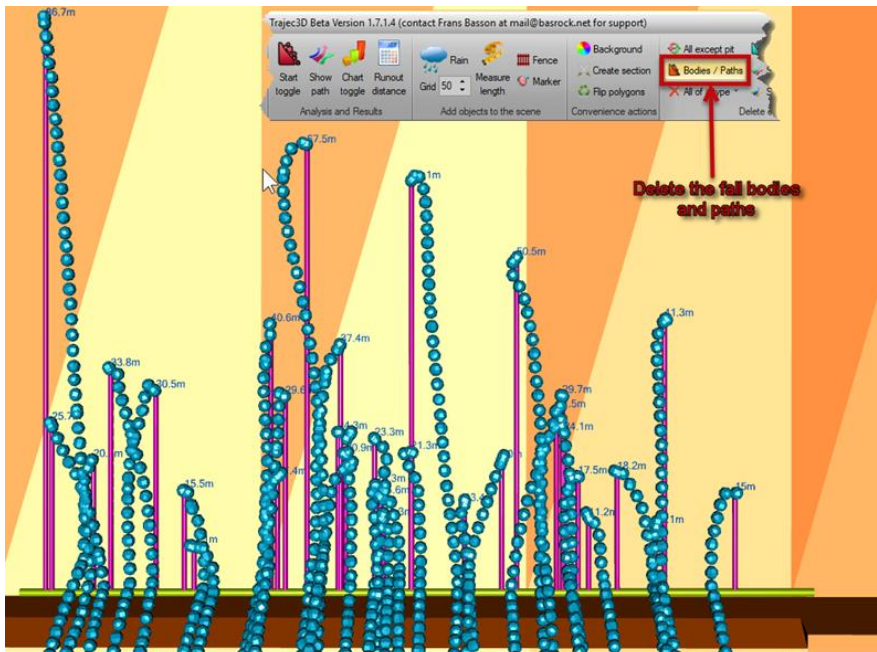


## Trajec3D runout distance

The run-out tool "Ribbon => Analysis and Results => Runout distance" has limitations at the moment, as all measurements are taken perpendicular to a single line drawn with the mouse by picking two points.

The elevation variance is requested after the second point is selected, which determines the difference in elevation considered above and below the picked line. Fall bodies outside the elevation limits will be ignored for the calculation. The run-out distances are given as plan-view two-dimensional distances, with the elevation ignored in the calculation.

The screenshots below were taken directly from above, and the scene rotated until the picked yellow line was horizontal. The run-out distance for each falling body is shown at the top of each perpendicular purple line, which connects the fall body position with the closest point on the yellow picked line.



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