"Anything worth knowing cannot be understood by the human mind"
Woody Allen

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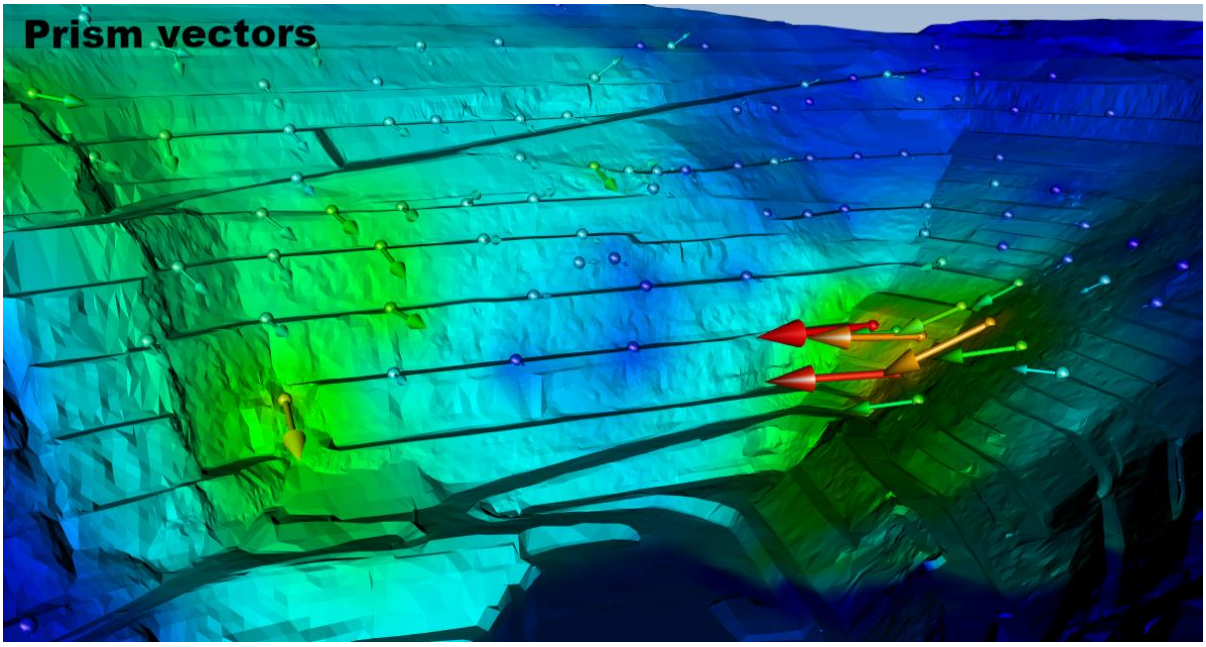
BasRock Software for Geotechs Newsletter

2014 Quarter 4



Use the Facebook page to stay up-to-date with developments, and use My blog to get the detail on version additions, changes and instructions.

The latest software packages (currently free of charge):
GEM4D: A 3D "drag-and-drop" DXF-visualiser that also provides the specific functionality required by Geotechnical Engineers - see a video here.
Trajec3D: A 3D rigid body dynamics rock

New stuff: 2014 Quarter 4

See My Blog for details on all additions and changes to the packages.

1. GEM4D Version 1.6.3.0 main additions:
   * Read and write support for DWG-files.
   * Major changes to the DXF library to improve compatibility with mining software packages.
2. The GEM4D webpage had slow access and some users had trouble downloading the installation file. The webpage was rebuilt, and site access is back to normal.
3. I received many requests for previous newsletters, and they are now available from here.
4. The Trajec3D and PhotoCoreLog development are currently slow, therefore their expiry cycles changed to 6 months.

Tutorial: Combining forces

Different techniques available in GEM4D can be combined to effectively visualise prism vector data. The process to produce the "***Prism Vectors***" image above involves the following steps:

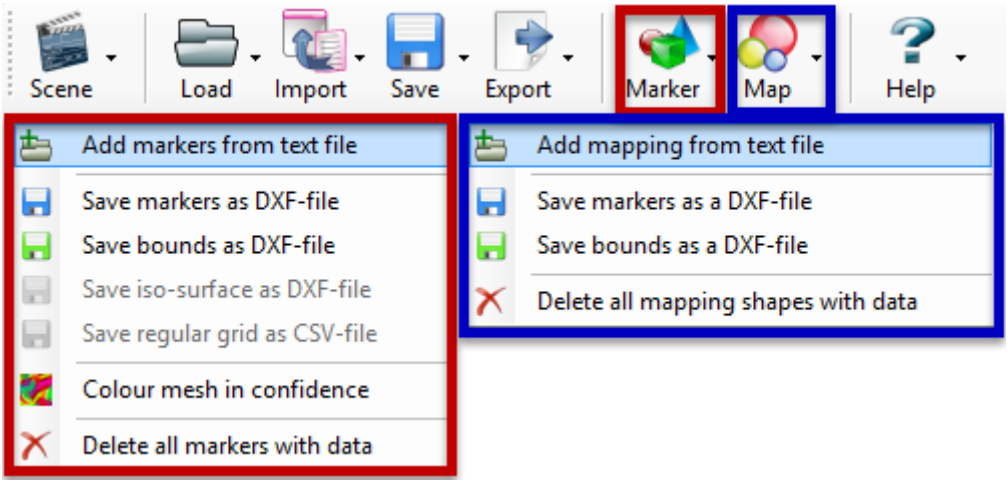
1. Get the 3D coordinates for each prism at different times.

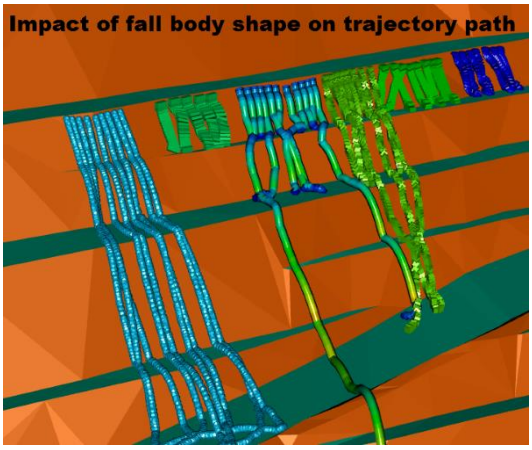
fall analysis program that accommodates fall bodies of any shape and size with movement in real time - see a video here.

PhotoCoreLog: Image preparation and automatic recording of the core logging measurements from photographs into a data grid.

2. Calculate the displacement vectors for the prisms.
3. Create a CSV-file with the columns ***Easting***, ***Northing***,***mRL***, ***Dip***, ***Azimuth***, ***Displacement***.
4. Load the CSV-file with both the "***Marker***" and "***Map***" buttons - see image directly below.
5. Use the markers functionality to create, colour and scale the spheres; and heat-map the pit mesh.
6. Use the mapping functionality to create, colour and scale the arrows.
7. Make sure the marker and mapping settings are the same to produce matching colours.

If a sufficient number of users are interested in learning more about this process, let me know and I will create a video with detail instructions.





Newton Game Dynamics

A paper by Hummel et al. (2012) evaluates different physics engines, and the Newton physics engine used by Trajec3D performed very well in all the accuracy tests. Two quotes from the paper:

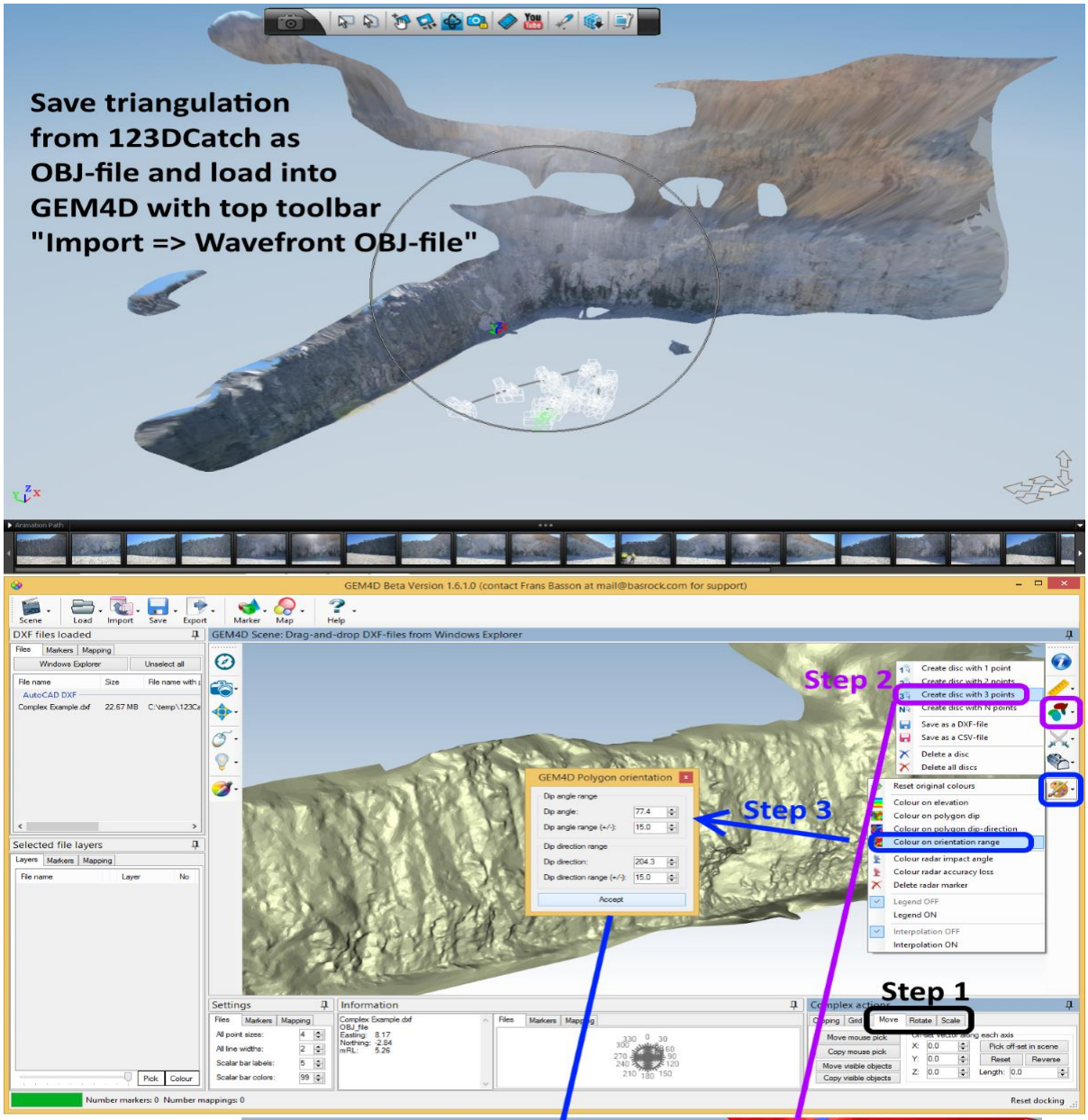
1. "*However, instead of using linear complementarity problem or iterative methods, Newton uses a deterministic approach in its solver, promising very accurate results.*"
2. "*Newton's approach of the deterministic solver appeared to produce indeed most accurate results.*

Let's play catch

Autodesk 123DCatch is a free photogrammetry package and surprisingly accurate and simple to use. Not a replacement for commercial packages, but it is fun to have the ability to create a triangulation of any scenario that catches your interest.

1. Take multiple photographs of the area (or object) of interest from different angles.
2. Upload your photos to the web using the free 123DCatch software.
3. Wait for Autodesk to do their magic and they send you back a triangulation.
4. Remove the polygons that are not of interest and save as an OBJ-file.
5. Import the OBJ-file into GEM4D as save as a DXF-file.
6. The triangulation is created around the coordinate origin (0, 0, 0), and not scaled or oriented. Use the GEM4D "***Complex actions***" to roughly translate, rotate and scale the triangulation into position.
7. Use the GEM4D heat-map options to colour the triangulation and highlight geological structures.The colouring options are:
   * Polygon dip (green-yellow-red image at the bottom right).
   * Polygon dip direction (shades-of-blue image at bottom left).
   * Specified orientation range (red-and-blue image with a purple disc).

Mapping is done with the right toolbar disc icon (third from the top) and "***Create disc with 1 point***", "***Create disc with 2 points***", "***Create disc with 3 points***" and "***Create disc with N points***". The orientation values are automatically copied to "***Colour on orientation range***" heat-map function to create the red-and-blue type images.

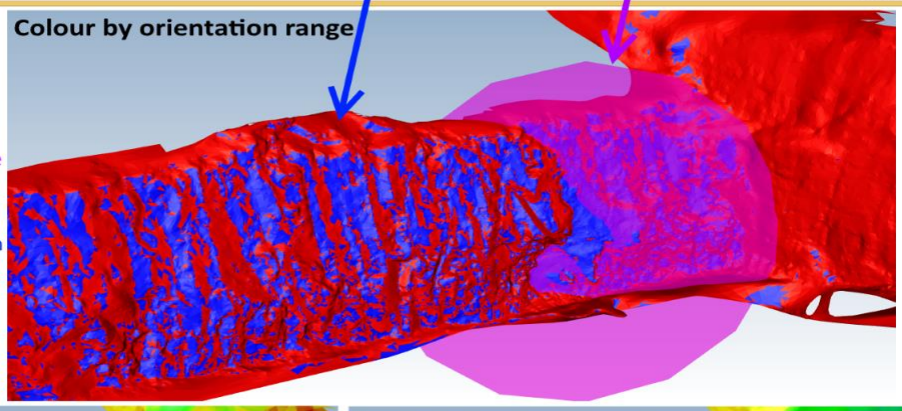


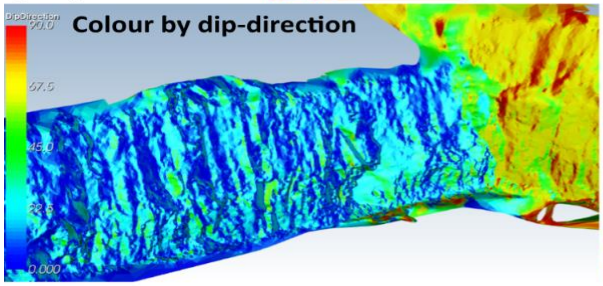
Step 1
Scale, rotate and move the triangulation.

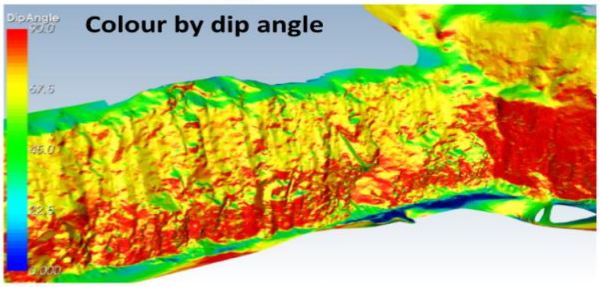
Step 2
Select a plane by three points to determine the orientation.

Step 3
Colour all polygons with an orientation within the selected dip and dip-direction range.

3 options to explore the highlighting of geological structures.







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