Get your facts first, then you can distort them as you please. **Mark Twain**
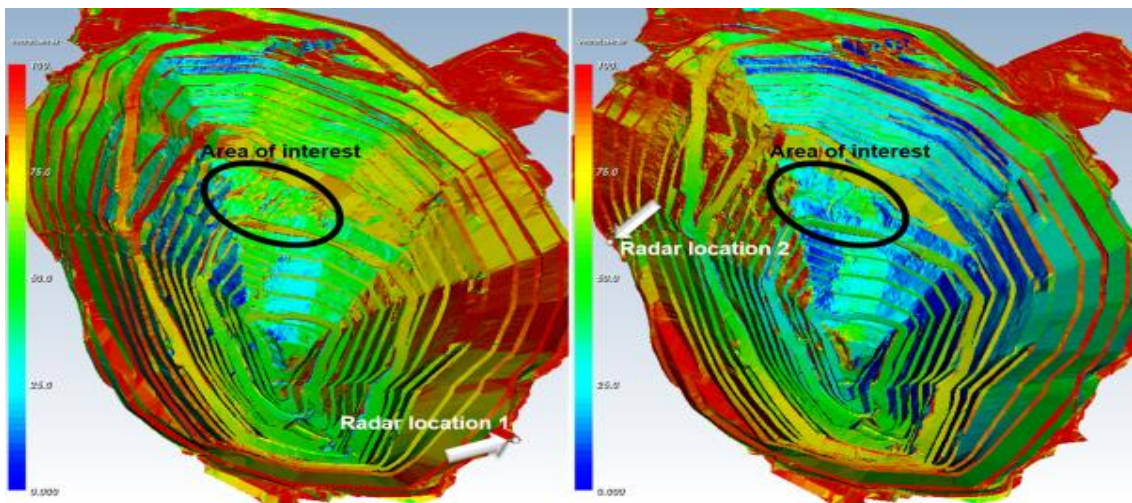
BasRock Software for Geotechs Newsletter
2014 Quarter 1
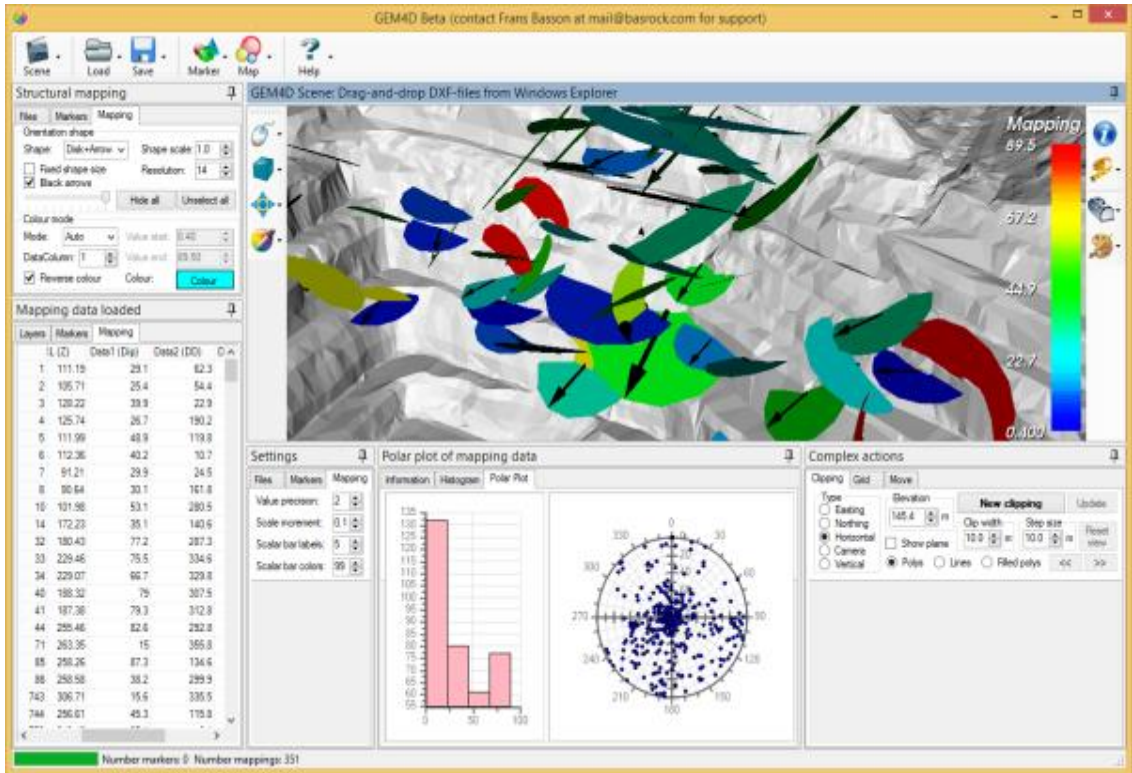
GEM4D: Mapping data displayed as discs, dip arrows, or a combination of both

GEM4D: The percentage deformation vector loss on all the walls for selected radar locations

The BasRock site contains 8 freeware software packages for download from here.
The latest software in development are currently also available at no cost:

- Trajec3D - a three-dimensional rigid body dynamics rock fall analysis program.
- GEM4D - a 3D "drag-and-drop" DXF-visualiser that is focused on the needs of Geotechnical Engineers.
- PhotoCoreLog - image preparation and recording of core logging measurements from photographs.
- Profu - very early stage of Probability of Undercutting (Cumulative Frequency Analysis) software.

New stuff: 2014 Quarter 1

Old newsletters are available from the BasRock Facebook page. This page is also the best way to keep up-to-date on developments as they occur.

GEM4D

See blog posts "GEM4D Version 1.5.0.3 available for download" and "GEM4D Version 1.5.1.0 available for download" for details":
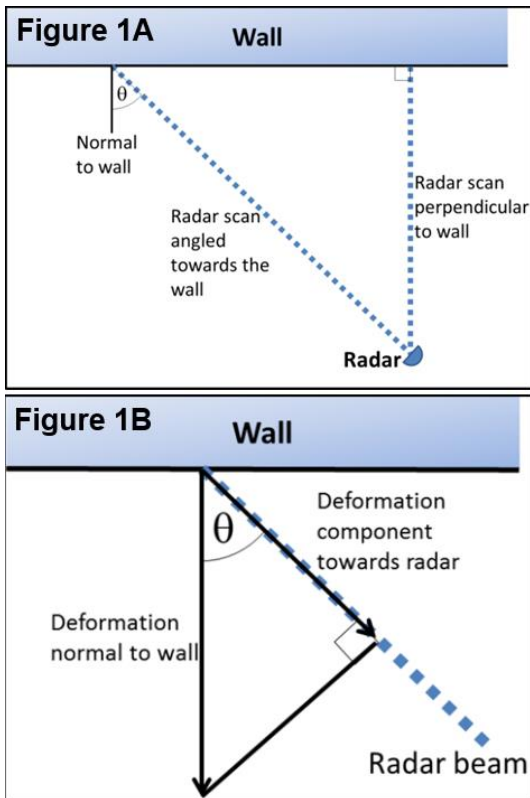
1. Digitising is now possible with the "Measurement line" tool and can be saved in DXF-format as strings or cylinders.
2. Layers can be sorted by clicking the header columns.
3. Use the Ctrl-button to temporarily de-activate actions for scene repositioning.
4. The interface was changed to accommodate new functionality.
5. The scene cursor now changes to a cross when picking points are required.
6. Multiple Surpac STR and Open Inventor IV-files can now be simultaneously opened.
7. Mapping data can be loaded and displayed as points, discs, arrows, or a combination of both.
8. Charts were added to both the marker and mapping functionality.
9. Radar functionality was added as explained in the first article below.

Trajec3D

See blog posts "Trajec3D Version 1.6.2 available for download" and "Trajec3D Version 1.6.2.1 available for download" for details":

1. Ability to create continuous fences whilst pressing the Shift-button.
2. Use the Ctrl-button to temporarily de-activate actions for scene repositioning.

3. Time step changes to enable more accurate solutions.
4. Ability to make the pit transparent.
5. Smaller physics world to limit the "falling-off-the-edge" effect.

Figure 1A

Wall

θ

Normal to wall

Radar scan angled towards the wall

Radar scan perpendicular to wall

Radar

Figure 1B

Wall

θ

Deformation component towards radar

Deformation normal to wall

Radar beam

Radar deformation vector loss

Radars only record the full wall deformation when the radar beam is 90° to the pit wall, and all the wall deformation is towards the radar. This seldom occurs, as radars are stationary whilst scanning and the dish pivots around a fixed mechanical joint. This angle impact is schematically shown in Figure 1A, but there is also an additional dip angle component in three dimensions.

The actual deformation is given by L.cos(theta), where L is the perpendicular deformation, and theta the angle between the radar beam and the normal to the wall as shown in Figures 1A and 1B. The deformation not recordable by the radar can be expressed as a percentage vector loss (VL%):
VL% = 100 - [cos(theta) * 100].

There are some engineers that argue that radars could replace prisms. Prisms and radar are complementary technologies, and the one cannot replace the other. Radars are excellent for safety critical applications, but could be "blind" to some deformation components relative to the radar location.

Markers and Mapping

The data files used for displaying markers and mapping have to "clean", as GEM4D does not yet have build-in quality control routines. At the moment, please ensure that data files:

1. Do not contain a header row.
2. Do not contain empty values.
3. All strings consist of one word only - combine multiple words with and underscore.
4. Marker files require: X, Y, Z, ... (optional data columns).
5. Mapping files require: X, Y, Z, Dip, DipDirection, TraceLength, ... (optional data columns).