VisLog User's Manual (Novo Tech Software Ltd.)

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1. About

Software :	**VisLog**
First Release :	September 2008
Development :	Microsoft Visual Studio 2010
Licensing Model :	License File, On-demand
Production Team :	Programming: Alireza Afkhami (M.A.Sc Civil/Geotechnical, M.C.P, I.C.D.L, P.Eng)
Similar Programs :	-
Updates :	click to open
Disclaimer :	click to read (See 2.)

Using VisLog, the user is able to enter borehole information including their depth, coordinates, ground water level, etc. and have a three-dimensional interactive view of the subsurface layers at the site. The ultimate aim of VisLog is to help users with making an image of the soil layers close to real condition. Input data can be manually entered or imported from gINT - the most widely used borehole log software in the world. User can enter data using internal borehole editor. When the model is built based upon the borehole information provided by user, user can zoom, pan and rotate the 3-dimensional model, print it or even save it as graphic formats or video.

Please keep your software up-to-date by visiting the program's web page.

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3. Contents

3.1 Introduction

This computer program has been designed to help all geoscience engineers making an image of subsurface soil layers. Using *VisLog* you can import most of your existing data from text files or gINT database files and run the model. VisLog can export your 3D model to graphic formats such as JPG, BMP and so on. Some of the most common use of *VisLog* are listed below:

Borehole Log Visualization

The main usage of *VisLog* is to visualize the boreholes in a site. Input data for this type of application comprises of: Borehole Name, Total depth, Coordinates, Water Level, and more. *VisLog* will show the 3D view of all boreholes in a project and visually presents the ground and water surface. It also automatically draws the soil profiles through selected boreholes. You can either manually enter Boreholes data using Borehole Editor(See 3.4) or import data from text files, excel spreadsheets, or gINT databases .

Ground Improvement or Piling

Another application of *VisLog* is to envisage the ground improvement in a site. For example, in a given site if the stone-columns are required to improve the subsurface soil layers, *VisLog* can demonstrate the 3D view of the site showing the stone-columns in place, with their length as well as scatter of diameter, length, volume, etc in different colors across the site. Please see Ground Improvement Example(See 3.15.2) for more details

Topography and Site Visualizer

This application helps users to add additional objects such as buildings, topography surfaces, polygons, etc to the scene. For more information on how to use this feature please see Topography Example(See 3.15.1) and Object Management(See 3.13) help pages.

3.2 Toolbar and Menus

You can access most of the commands by using toolbar buttons. These buttons are also accessible through the menubar.
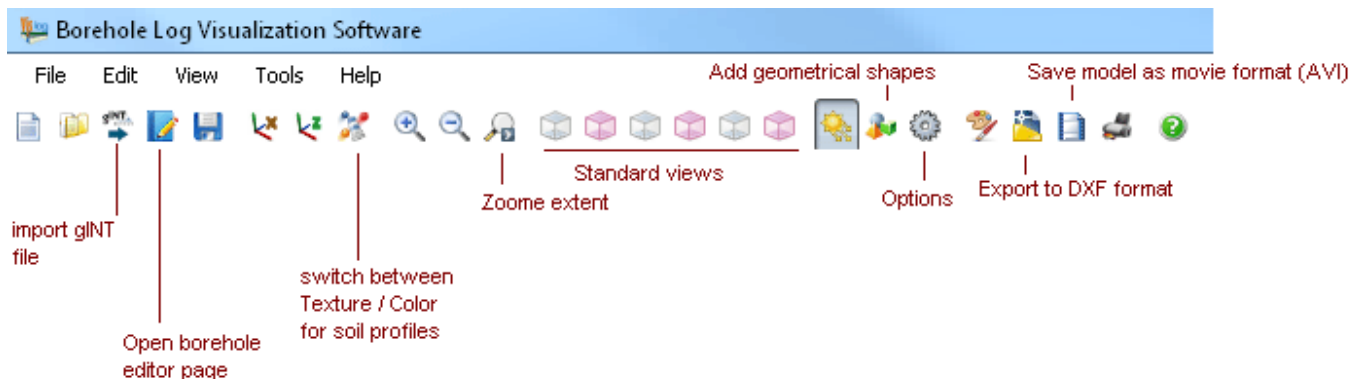
New : To start a new *VisLog* model.

Open : To Open an existing *VisLog* model.

Import from gINT : imports borehole data from gINT database files.

Edit Boreholes : To edit the properties of the boreholes or adding new boreholes in Borehole Editor(See 3.4) page

Save : To save the current *VisLog* model.

Rotate X : To rotate the current *VisLog* model around the X axis.

Rotate Z : To rotate the current *VisLog* model around the Z axis.

Toggle Texture/Color Mode : click to switch between using textures (image files) or plain color for drawing soil profiles (read more(See 3.6))

Zoom In/Out : used to zoom in and out the model. Alternatively you can use mouse wheel for zoom actions.

Zoom Extent : To show the whole model in the viewer.

Standard Views : To show the standard (top, bottom, front, back, left and right) *VisLog* model.

Light On/Off : To turn the scene light on and off.

Object Manager : To open the Object Management(See 3.13) page.

Options : To open the preferences page(See 3.10).

Save As Image : To save the current view of the model to graphic formats such as BMP, JPG, etc.; see Export features(See 3.9.1) for more information.

Save As Movie : When enabled, it captures any actions in the viewer(See 3.14.2) into a movie and saves it on the user's hard disk.

Save As DXF : is used to save the current model to AutoCad DXF (R12) format.

Print : To prepare a report containing 6 pictures from different view-points from the current *VisLog* model. This Report can also be printed.

About : To open this help file.

3.3 Using Help

Activating Help

Help button is placed at the top-right corner of all pages, as shown on this screenshot. In order to get the help content associated with the page, please click on this button.
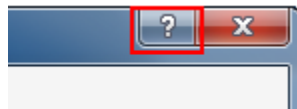
How to Choose Help Language?

Most of our help files are available in both **English** and **Spanish** language. In order to choose your desired language please click on Help ▸ Help Contents menu and choose your language from the list. Please notice that Help language could be different from the program user-interface language(See 3.10).

The entire help content is also available in PDF format and is presented through User Manuals menu as shown on the right.
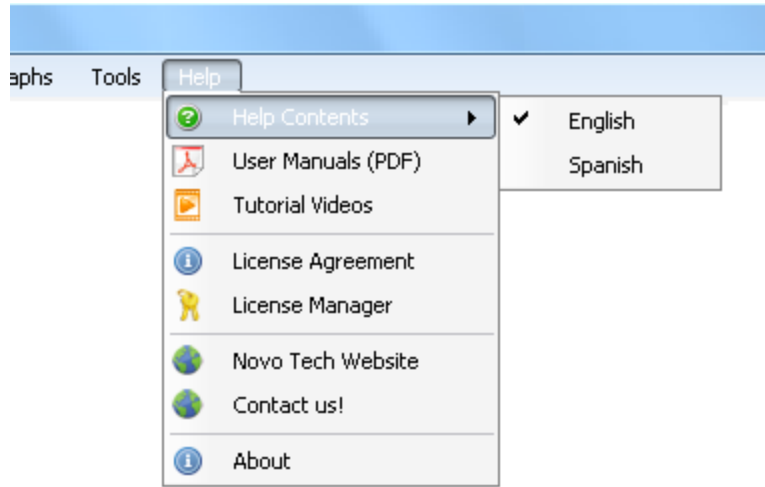
3.4 Borehole Editor

This page is used to add, edit or delete the list of boreholes. Different portions of the page are illustrated below:

ⓘ All input data in *VisLog* are unit-netral; for example when depth of a borehole is entered as 14.5, VisLog uses this number for all visualizations. Remember that *VisLog* only deals with presentation of your data and no interpretation or data-manipulation is performed by *VisLog*. So if you enter

borehole depth and co-ordinates in metres, the same unit should be used when you enter depth of each field test and thickness of each layer. In *VisLog* there are 3 ways to enter borehole data:

Manual Data Entry

To enter a new borehole click on "Add new borehole" button on toolbar; a new empty row will be added to the end of the boreholes and soil layers table. The Field Test table on the right hand-side of the page will be empty as well. Please enter borehole data in the new row and then enter soil layers and field test data on corresponding tables.

Import From Text File

If you have already stored the boreholes data in a Text file, you can easily import them (using the yellow folder icon on top-right corner of tables) into *VisLog* . Please read The Import from File help page(See 3.8.1) for more information.

Import From gINT database files

VisLog has a feature to import directly from gINT database files; Please read Import From gINT Database Files(See 3.8.2) for more info.

Field test data can be any sort of test performed in a borehole including SPT, CPT, Moisture Content, Vane Shear, Shear Wave Velocity, etc. Just enter test depth and test value in the corresponding table.

VisLog supports all soil classes defined in Unified Soil Classification System. For visualization purposes when you select a Soil Type from the drop-down list, *VisLog* automatically finds the Soil Group it is associated with. An then the Soil Group texture / color is used for visualization and drawing soil profiles. To see how to manage Soil Grouping, please read this article(See 3.11).

3.5 Soil Profiles

To draw soil profile you need to first complete data entry for boreholes(See 3.4). A list of all boreholes is shown on top-left on the screen. To include a borehole in an existing Soil Profile, follow these steps:

Step 1

Click on the borehole which should be added to an existing soil profile.

Step 2

Hold the left mouse button and drag the selected borehole into "List of sections" frame.

Step 3

Release the mouse button on the section you want it to be added to.

The selected borehole will be placed after the last borehole in the corresponding section (soil profile). User can use the following buttons to modify the soil profiles:
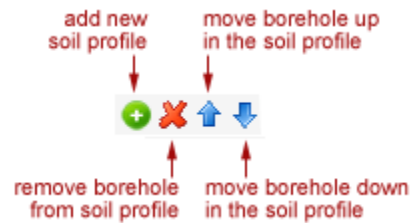
Once a soil profile is defined, it is updated in the viewer. Each soil layer along the profile will be shown with corresponding texture image. Similar soil layers in adjacent boreholes will be automatically connected together. For more information on how to define soil groups and assign texture images, read this article(See 3.11).
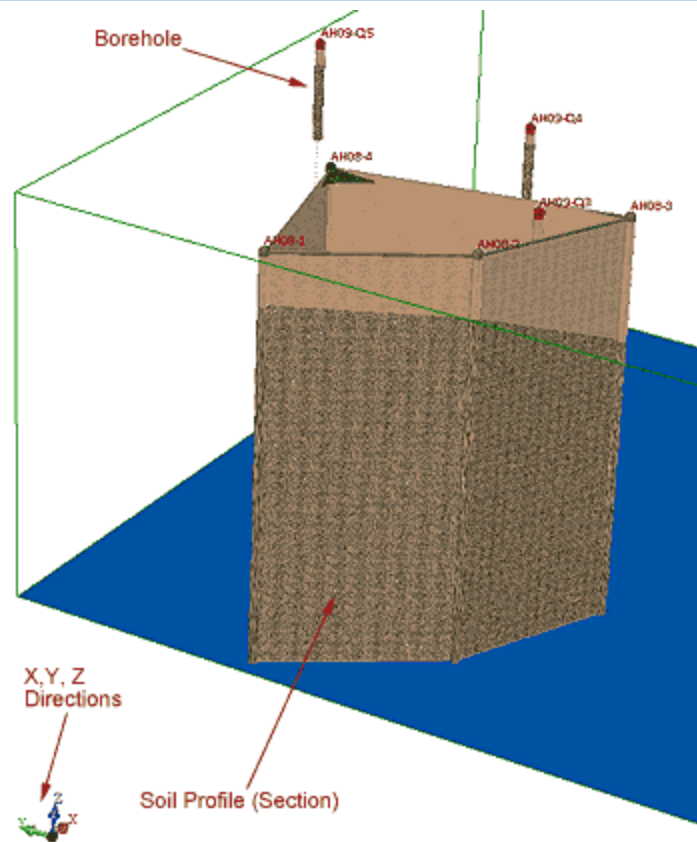
## 3.6 Texture or Color?

VisLog can draw soil profiles and visualize the soil layers by using either Textures (image files selected for each Soil Group(See 3.11)) or Plain Colors. Click on the 🔬 button on the toolbar to switch between using textures and plain colors. When Plain Color is selected, *VisLog* will mathematically calculates the dominant color of the Soil Group texture and assigns it to the soil layer.

3.7 Working with graphs

We understand that presentation of the analysis results is very important to our users. Everywhere in Novo Tech Software programs when you click on a chart, a new dialog appears containing the chart and its associated data. In the following example, the corresponding dataset is shown on right and can be scrolled horizontally and vertically to view all data. In addition, toolbar buttons provide you with more features:
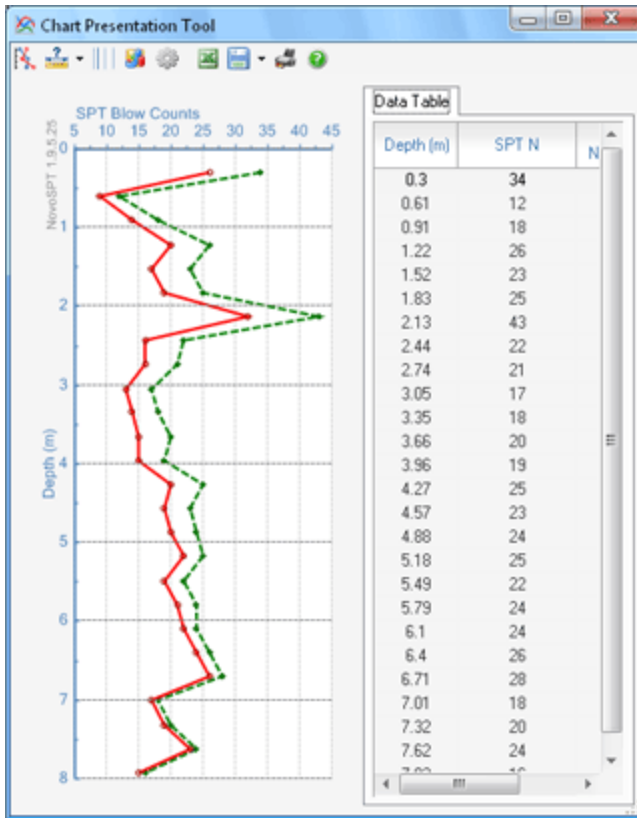
	To change line styles of the plot
	To change the scale (minimum, maximum and gridlines) of each axis. Please click on small arrow on right side of the icon to open the dropdown menu
	To toggle between normal/logarithmic scale for horizontal axis
	To change the chart type
	To open the advanced settings page for the chart
	To save the dataset table as Microsoft Excel file
	To save the chart as text and graphic format
	To print the chart
	Opens this help page

How can I change the appearance of the chart such as legend, chart type, etc?

You can configure almost everything in the chart by clicking on ⚙️button from the toolbar. This will open the following dialog box:
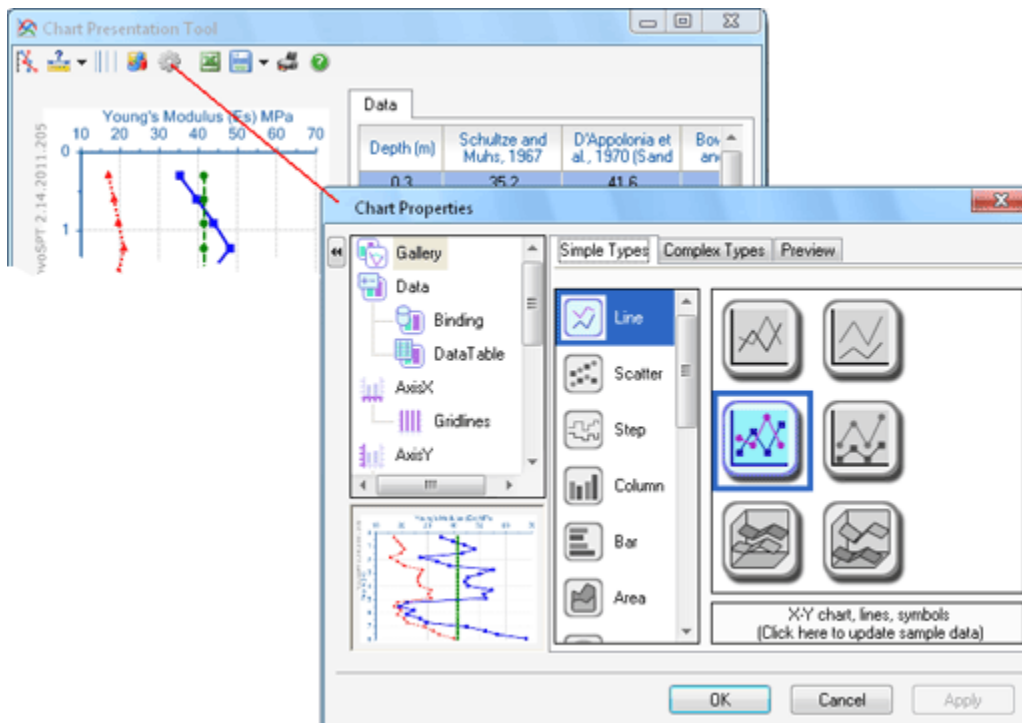
Click on the desired element from the list located on the left side of the page; more options will be shown on the right portion. Click on OK button to apply your changes.

3.8 Import

3.8.1 From text file (*.txt)

If your boreholes data stored in a text file, you can import them directly to VisLog and save the data entry time. The first 8 columns should be arranged in the following order:

- Name
- Depth
- X
- Y
- Z
- Water Level
- Azimuth
- Plunge

You may add more columns for custom data such as diameter of Borehole or Pile to the subsequent columns. Separate data columns with **comma** on each row. Following is a sample of boreholes data saved in a text file. In this example, three custom data: "Gravel Vol", "Diameter" and "Date" are also stored in additional columns.
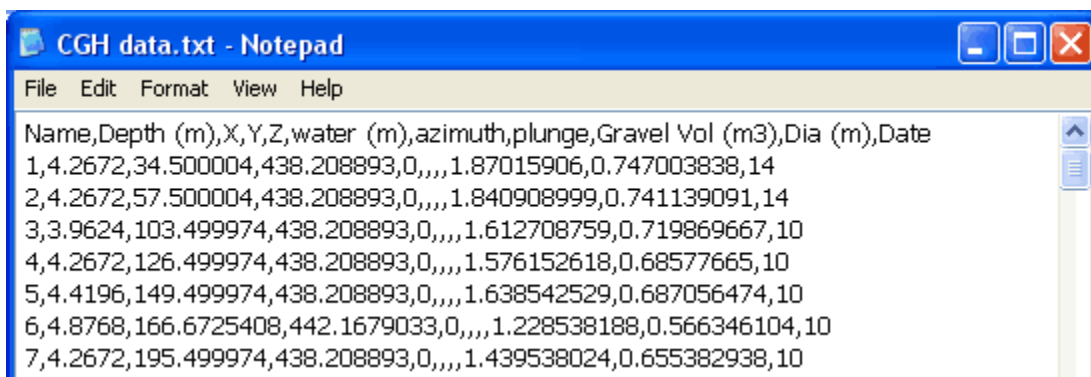
Figure 1 : borehole data stored in Text file.

Importing data from Microsoft Excel

You can also import data indirectly from Excel spreadsheets. The first 8 columns should be arrange in the following order:

- Name
- Depth
- X

- Y
- Z
- Water Level
- Azimuth
- Plunge

You have the option to add custom data such as Diameter of Borehole or Pile in the subsequent columns. Once the Excel file is prepared as described above, please save it with 'comma-delimited Text' format by using **Save As** menu in Excel. Then use *VisLog* "Import from text file" feature to import this data.

Figure 2 : borehole data stored in Microsoft Excel file.

3.8.2 From gINT file (*.gpj)

Please read our online documentation about importing gINT files into *VisLog*:

http://www.novotechsoftware.com/docs/onlinehelp/smartsync/

3.9 Export

3.9.1 As image format

This feature is used to save the current view of the *VisLog* model to graphic images. To access this feature click on the corresponding button from toolbar or click on File ▸ Export ▸ Image File menu. In the following dialog, select the name, path and format of the image.
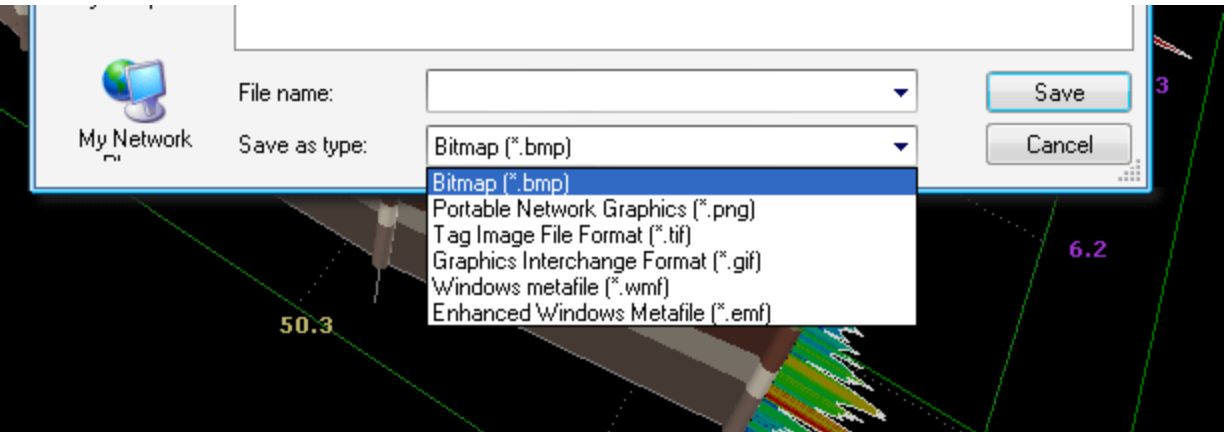
3.9.2 As Autocad R12 DXF format (*.dxf)

This feature is used to save the current model to AutoCad DXF (R12) format. This is especially useful when user wants to edit the soil profiles in AutoCad and prepare the report. Click on File ▸ Export ▸ AutoCad DXF R12 file menu to save the model. Please notice that DXF format does not support textures for the soil profiles. So if you have set the model to show textures, please switch to plain color(See 3.6) before exporting your model to DXF format.

3.9.3 As movie format (*.avi)

Use toolbar button, or File ▸ Export ▸ Video File menu to start recording the scene into AVI format. You will be provided with a dialog box (as shown below) which allows you selecting the compressor type by which screen capture is done, as well as frame rate, quality, etc.
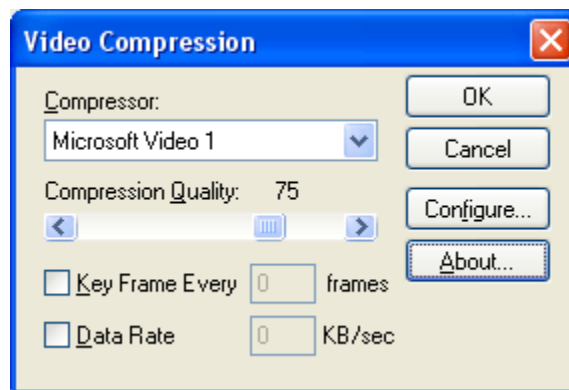
While recording you can rotate, zoom, etc in the model. When done, click on corresponding toolbar button to stop recording. Please notice that the size of the movie depends on your screen resolution, selected codec, frame per second and other options selected by the user.

See sample video captured by VisLog

3.10 Preferences

VisLog preferences can be set on this page. In toolbar menu select Tools ▸ Options to set the preferences. This page has three tabs:

Texture & Grouping
All existing texture images are shown in this tab. To change the soil types associated with each Group, you can use Soil Group Manager(See 3.11).

Scene Properties

The following parameters can be set using this tab:

Background Color : sets the background color of the viewer and can be set to either White or Black.
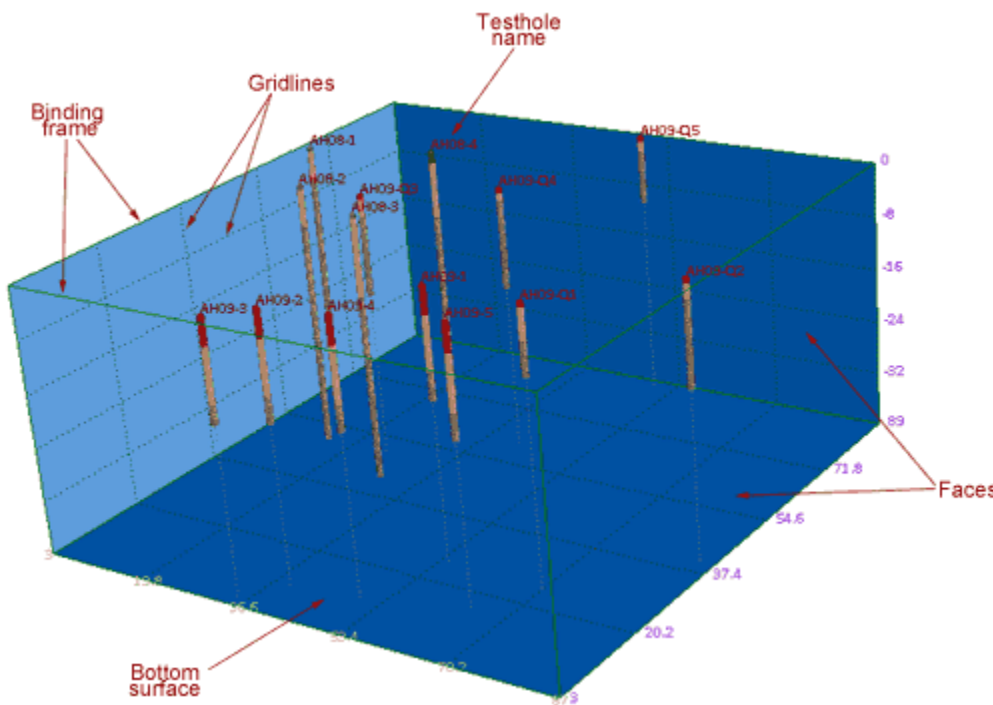
Name Color : sets the color of the title of boreholes in the viewer.

Always Show Borehole Locations : If selected, even if user has chosen to hide the boreholes' information layer(See 3.14.3), locations of borehole will be specified on the viewer with a small sphere.

Show Borehole's Name : If selected, name (title) of the boreholes will be printed adjacent to each borehole.

"Zoom All" During Auto-rotation : If selected, when user clicks on Rotate X or Rotate Y buttons from toolbar and when scene is rotating, all the boreholes and soil profiles will be fit into the viewer on each frame.

Faces Color : Sets the color of faces (see illustration).

Gridlines Color : Sets the color of gridlines (see illustration).

Always Draw Binding Frame : If selected, always shows the binding frame always (see illustration) even if Gridlines are turned off in information layers.

Always Show Bottom Surface : If selected, always shows the bottom surface always (see illustration) even if Gridlines are turned off in information layers.

Use dominant plain color :

If selected, instead of associated texture(See 3.5) for each soil layer, its dominant color will be used. This is especially useful when you want to export *VisLog* model to DXF format (because DXF format does not support texture).

Misc.
On this tab, user can choose the user interface language.

3.11 Soil Grouping

With "Soil Class Grouping" you can define the texture of soil layers in 3D model. This page is accessible through **Tools ▸ Soil Group Manager**. The main idea behind soil grouping is to enable users to group the soil classes as per the requirements of each project. For example, CL and ML soil classes (according to USCS) may consider as one soil group in a given project; on the other hand, the exact soil classes can be two different groups in other projects. Following are the definitions of the terms used in this article:

Soil Class : Refers to conventional soil types in geology or geotechnical engineering. This may be USCS, AASHTO, etc. or even user defined soil/rock type. For example you can define new soil class as "New Red Granite" in your project (See here(See 3.12) for more details)

Group : Represents a group of Soil Classes which will be shown on the *VisLog* viewer with the same texture.

Texture : Is the image pattern by which a Group of soil layers will be rendered on the *VisLog* viewer. You may also choose to use colors instead of textures (read more(See 3.6)).

Library : Is a text file which will be saved on your hard-disk and hold the information regarding all defined Groups (list of Groups with their associated Soil Classes). Library files have **lib** extension and when you install the *VisLog* , a default library file is installed in *VisLog* installation folder. This file (**defgrp.lib**) should never be removed from your hard-disk. You may have several Library files on your computer and can activate them by selecting the Library file and pressing "Set As Default" button (see following illustration).

Some features of soil group manager page are illustrated below:
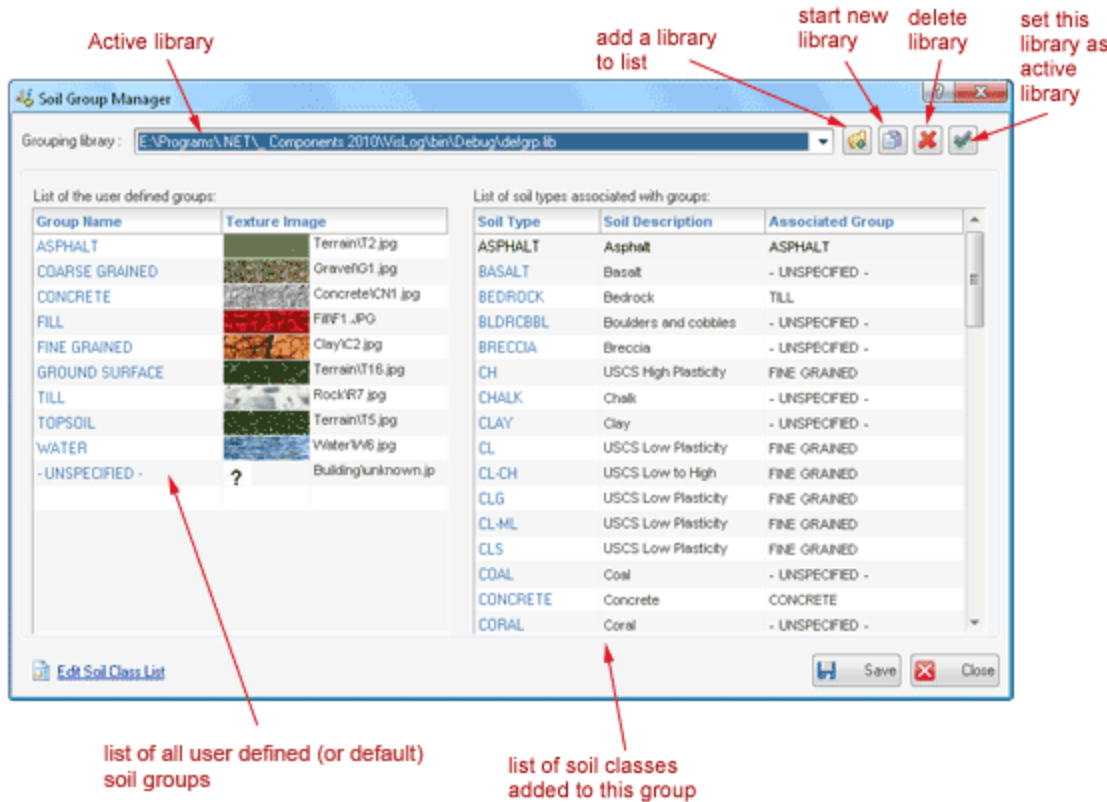
How to associate a soil type to a soil group?

1- Make sure the soil group exists in the left table. If necessary, add a new soil group to the bottom of the table.

2- Find the soil type on the right table and click on the corresponding row.

3- Click on the "Associated Group" column to open up the list of soil groups.

4- Select the desired soil group to which this soil type should be associated

ⓘ To change the texture of a group, simply click on third column in the "Groups" table and locate the image file.

ⓘ Please note that any changes in the texture images will be reflected in the 3D viewer.

3.12 Soil Class Editor
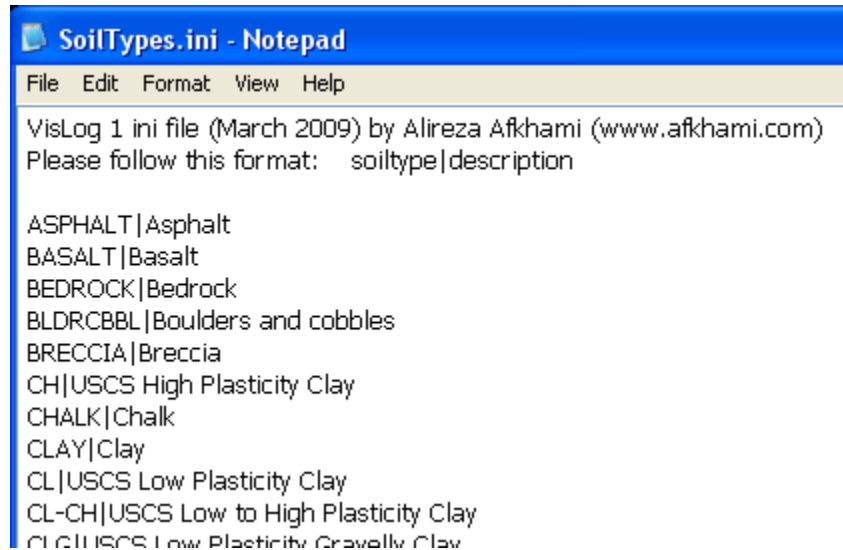
In "Soil Classification Log File" you can edit the list of <u>Soil Classes</u>(See 3.11). This feature is accessible from **"Edit Soil Class List"** link in <u>Soil Group Manager.</u>(See 3.11) All soil classes are stored in **SoilTypes.ini** file in *VisLog* installation folder and may be edited using any text editor such as Notepad. As it is shown below, each line in this file contains information regarding one soil class with the following format:

<div align="center">

Soil Type | Description

for example: **BLDRCBBL | Boulders and cobbles**

</div>

Please note that "description" is only for user's information and will not be shown in *VisLog* interface, while "soil type" will be shown on the first column of Groups table in <u>Soil Group Manager</u>(See 3.11) page. A pipe character **|** is needed to separate "description" and "soil type" fields. There is no

limitation of number of soil classes in this file and if you need to define a new soil or rock class and associate a new texture image to it, first add **a row to new** class and then add this new class to corresponding group (see [how to add soil class to a group](See 3.11))

Figure 1 : An example of soil class file and its structure.

3.13 Object Management

This page is accessible through Tools ▸ Manage Objects menu. In Manage Objects page, you can add geometrical objects such as sphere, polyline, polygon, and more to the scene for better visualization of the site.

list of object already added

preview of active object

How to add a new object to the scene?

1- Select object type

2- Enter object's size and color

3- Click "Add object" button

4- Click "Close" to come back to main page and see the viewer

ⓘThe required format for coordinates is X,Y,Z (separated by comma)

ⓘWhen Polygon, Pointset and Surface objects are to be added, their vertices coordinates should be read from Text files. To see the sample Text files click on corresponding link:

≫File format for showing a set of Points (See 3.16.1)

≫File format for showing a set of Polylines(See 3.16.2)

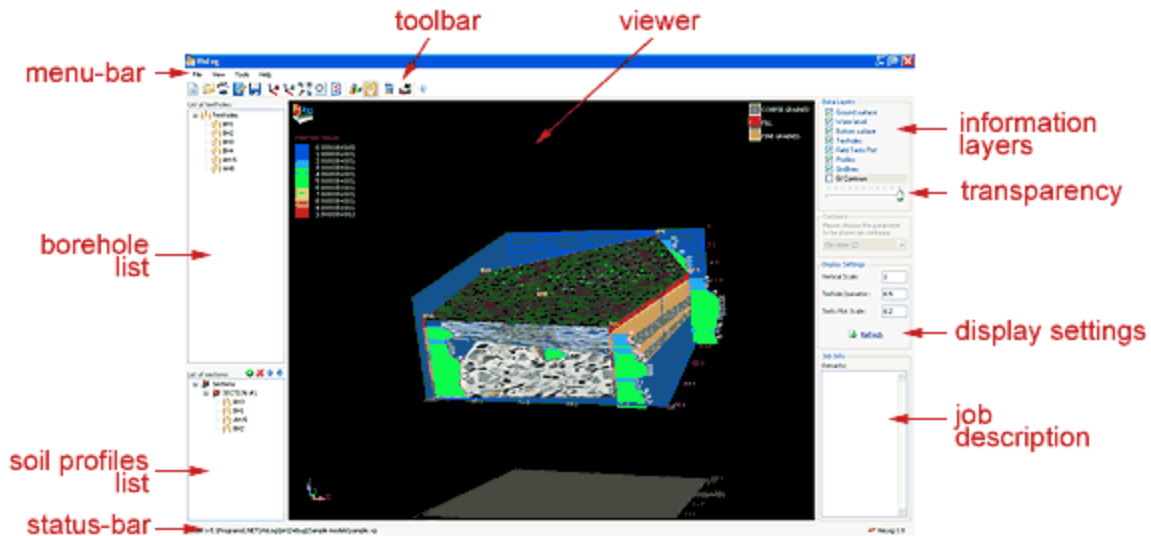≫File format for showing a set of Polyfaces(See 3.16.3)

≫File format for showing a Surface(See 3.16.4)

select type of new object

enter object's size & color

3.14 Viewer

3.14.1 Starting with VisLog
The main page of *VisLog* can be divided to the following parts:

Menubar
To access the general commands like open, save, exit, redraw, and more

Toolbar
To access the most commonly used commands like open, save, and more(See 3.2)

Viewer
To show the 3D view of boreholes, soil profiles, legends, and more(See 3.14.2)

Information Layers
This plan lists all information layers such as "ground surface", "water level", "soil profiles" which can be turn on and off by user. more ...(See 3.14.3)

Transparency Track-bar
To adjust the transparency level of each information layer (read more (See 3.14.3))

Display Settings
To set the vertical scale and borehole diameter (read more(See 3.14.3))

Job Description
Is a text description of the job for which the *VisLog* model is prepared (read more)(See 3.14.3)

Borehole List
Contains a list of all boreholes defined for this *VisLog* model. Boreholes' data may be edited using Borehole Editor(See 3.4) Page.

Soil Profiles List
Contains a list of all soil profiles which are defined to connect boreholes and make the 3D view of the profiles. This list may be edited by using the buttons located on top of this panel (read more)

Status-bar
Shows the status of the program (e.g. "connecting to server", "saving ...", etc.)

3.14.2 3D Viewer

The 3D viewer of *VisLog* provides visualization of the boreholes, soil profiles, tests, etc. Different parts of the viewer are illustrated below:
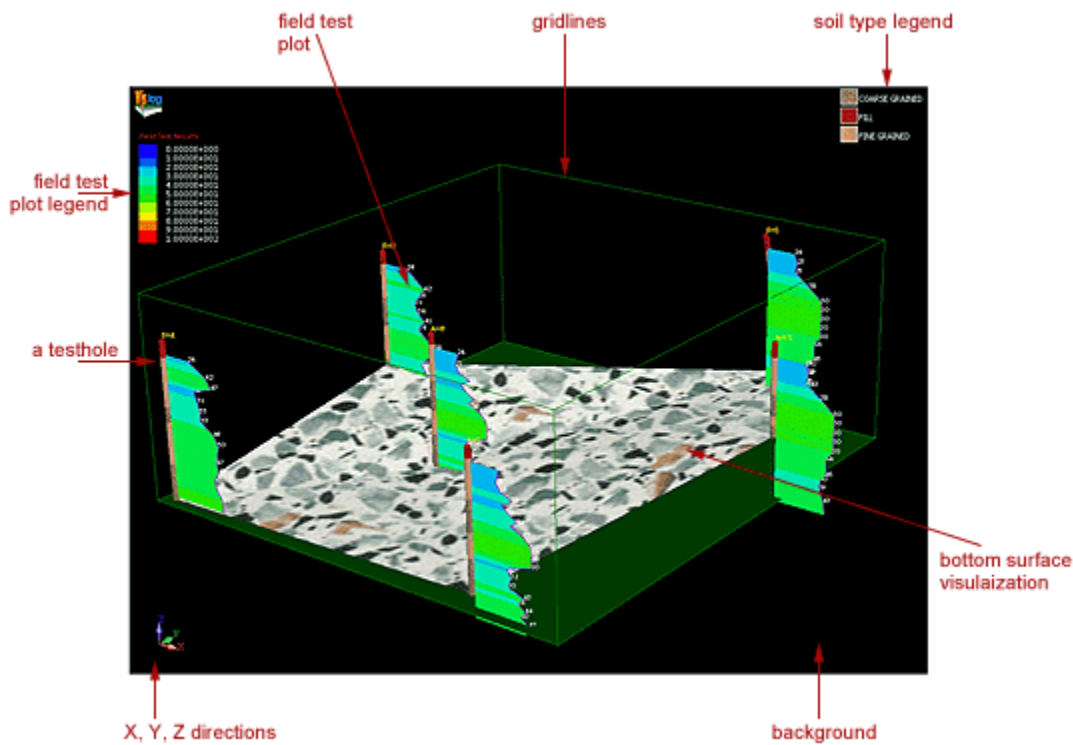
Viewer Controls

Zoom : use your mouse wheel for zoom-in and zoom-out

Zoom Window : user left mouse button + Shift

Fine Window : user left mouse button + Ctrl

Pan : Hold the mouse middle button down and drag the scene to move

Rotate : Hold the mouse left button down and move the mouse to rotate the scene

3.14.3 Info-Layers and Viewer Settings

Data Layers

- [ ] Ground surface
- [ ] Water level
- [x] Bottom surface
- [x] Testholes
- [x] Field Tests Plot
- [ ] Profiles
- [ ] Gridlines
- [ ] GI Contours

Contours

Please choose the parameter
to be shown on contours:

Plunge (p)

Display Settings

Vertical Scale: 1

Teshole Diameter: 0.5

Tests Plot Scale: 0.2

Refresh

Job Info

Remarks:

Layers

In *VisLog* , all available information layers could be turn on/off by clicking on checkbox before each item on "Data Layers" frame. Also when a layer is selected, its transparency may be adjusted by the slide-bar below the list:

Ground Surface	Represents a triangulated 3D surface of the ground surface. This surface is mathematically generated based on top elevation of boreholes.
Water Level	Represents a triangulated 3D surface of the water level based on boreholes data.
Bottom Surface	Represents a triangulated 3D surface of the bottom elevation of boreholes. This feature may be especially useful when boreholes have been stopped by encountering a bedrock; In this case, this surface shows the bedrock surface.
Boreholes	Represents all boreholes of the model
Field Test Plot	Represents the plots of field test data for each borehole. This field test data could be SPT, Vane Shear, CPT, DCPT and any other field test. This plots are shown dimensionless so literally any field test can be presented using this feature.
Profiles	Represents all soil profiles which are defined by the user.
Gridlines	Geometrically, the scene containing all boreholes and other objects inside the model, is embedded in a cube. Faces of this cube is shaded for better 3D imagination. Gridlines represents faces of the cube and could be turn on and off if necessary.
GI Contours	If additional data is imported and attached to the boreholes (such as length or diameter of piles in a project), those data can be shown across the site via color contours.

Adjusting Transparency

To change the transparency level of each info-layer, simply click on it and then use the slide-bar to adjust the transparency of the object. While dragging, notice the change in transparency of the info-layer in the viewer.

Contours

This feature is specifically used when user-data is imported and attached to the boreholes data. Select the corresponding parameter from the drop-down list inside the "Contours" frame to see the variation of parameter on ground surface.

Display Settings

Display Settings are to change the vertical scale or borehole's diameter. If you select to show the field test plots along with boreholes, you may adjust the scale of these plots as well. After changing the fields, click on Refresh button to apply the new settings.

Job Information

This is a text description of the job for which the *VisLog* model is prepared.

3.15 Examples

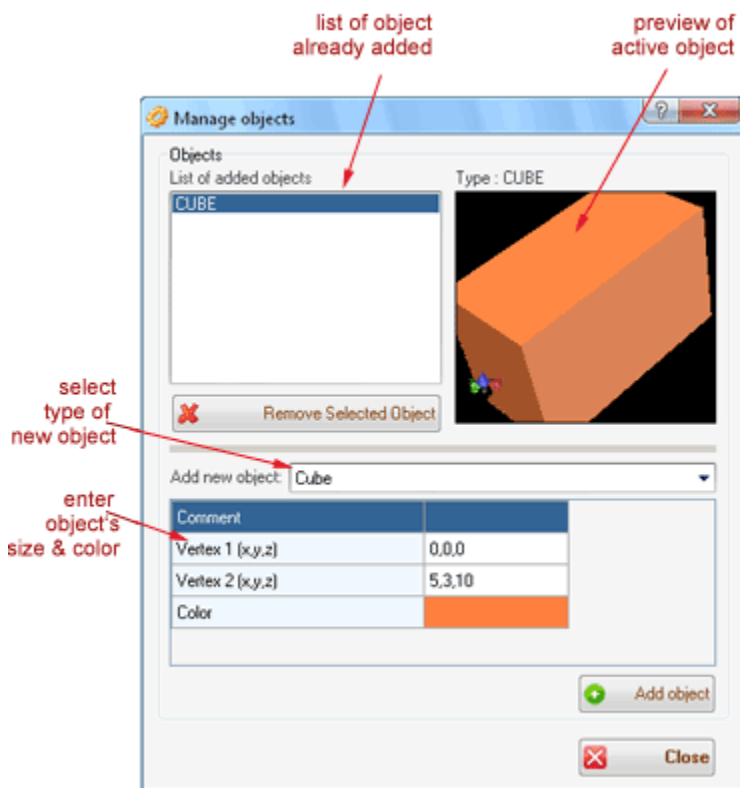### 3.15.1 Topography Modelling
coming soon ...

3.15.2 Ground Improvement Modelling
coming soon ...

3.15.3 Object Modelling
This page is accessible through Tools ▸ Manage Objects menu. In Manage Objects page, you can add geometrical objects such as sphere, polyline, polygon, and more to the scene for better visualization of the site.

How to add a new object to the scene?

1- Select object type

2- Enter object's size and color

3- Click "Add object" button

4- Click "Close" to come back to main page and see the viewer

ⓘ The required format for coordinates is X,Y,Z (separated by comma)

ⓘ When Polygon, Pointset and Surface objects are to be added, their vertices coordinates should be read from Text files. To see the sample Text files click on corresponding link:

≫File format for showing a set of Points (See 3.16.1)

≫File format for showing a set of Polylines(See 3.16.2)

≫File format for showing a set of Polyfaces(See 3.16.3)

≫File format for showing a Surface(See 3.16.4)

3.16 File Formats

3.16.1 Points

The presumed formatting for a file containing this type of object is explained below:

Point set.txt - Notepad
File Edit Format View Help
```
10,0,1
10,2,1.16666666666667
10,4,1.85714285714286
10.6.2.875
```

Data format

1- Each line consists of 3 numbers separated by comma

2- Numbers will be X,Y,Z on each line, respectively

3.16.2 Polyline

Data format

1- Each polyline is represented with n vertices information

2- Each line holding one vertex comma on each line

3- X,Y,Z are separated with

4- An empty line after each polyline

PolyLine.txt - Notepad
File Edit Format View Help
```
5,0,0
1,0.5,0
-1,0.5,5      first polyline
-2,0,5
0,0,0

1,3.5,0
0,4,0
-2,4,5        second polyline
-1,3.5,5
1,3.5,0

1,0.5,0
2.2.0
```

3.16.3 Polyface

What is a Polyface?

It is a 3D surface defined by its vertices and is shown as a surface filled with a color.

Polyface.txt - Notepad
File Edit Format View Help
```
0,0,0
1,0.5,0
-1,0.5,5      first polyface
-2,0,5

1,3.5,0
0,4,0
-2,4,5        second polyface
-1,3.5,5

1,0.5,0
2,2,0
1 2 5 0
```

Data format

1- Each Polyface is represented with n vertices

2- Each line holding one vertex information

3- X,Y,Z are separated with comma on each line

4- An empty line after each Polyface

3.16.4 Surface

Data format

1- Each line on the surface

2- Numbers will

3- VisLog will triangles

TOPO.TXT - Notepad
File Edit Format View Help
```
0,40,250
20,40,225
64,40,200
130,40,175
160,40,175
209,40,200
315,40,200
353,40,175
400,40,170
0,80,210
20,80,225
50,80,225
110,90,200
```

consists of one vertex information for each point

be X,Y,Z on each line, respectively

triangulate all points and generates 3D faces for connecting points together.

This feature is especially useful when visualizing topographic data.

4. Online

4.1 Novo Tech Software website
http://www.novotechsoftware.com

4.2 Our other programs
http://www.novotechsoftware.com/products/

4.3 Updates
http://www.novotechsoftware.com/updatelogs/vislog.txt

4.4 Contact us
http://www.novotechsoftware.com/html/contact/Contact.htm