GeoGIS2005 – GIS Export Manual

GeoGIS2005

Manual

August 2008

RAMBØLL

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Table of contents

1.	**GeoGIS2005 – General Description**	**1**
2.	**User interface**	**2**
2.1	Open Database	2
2.2	Datagrid	3
3.	**GIS Export**	**4**
3.1	Simple View	7
3.2	Folder - General Information	8
3.3	Folder - Data	9
3.4	Folder – Style	11
3.5	Folder – Categories	12
3.6	Folder – Point / WKT	13
3.7	Folder – Line / Square	15
3.8	Folder – Circle	16
3.9	Folder – Cylinder	17
3.10	Folder – Batch	18
3.11	Folder – Settings	21

1. GeoGIS2005 – General Description

GeoGIS2005 is a general framework for managing technical databases. The system includes a number of functions especially made for geological, geotechnical and water technical data and jobs.

GeoGIS2005 applies mainly to public institutions, consultants and contractors.

Data may be viewed in data lists, graphs, documents and maps. The user may import/export data in a number of different formats. Especially worth mentioning is the correlation between GIS-systems such as MapInfo, ArcGIS, GIS Viewer and Google Earth.

This manual has special focus on the GIS Export functions. The general use of GeoGIS is described in the manual: GeoGIS2005_Manual.

2. User interface

2.1 Open Database

The GeoGIS2005 programme may be started using the Windows Start menu or by clicking on the icon:

GeoGIS2005

When GeoGIS2005 is started for the first time the user needs to attach the databases to the system. For Microsoft Access databases this is done simply by dragging the files onto the GeoGIS2005 background.

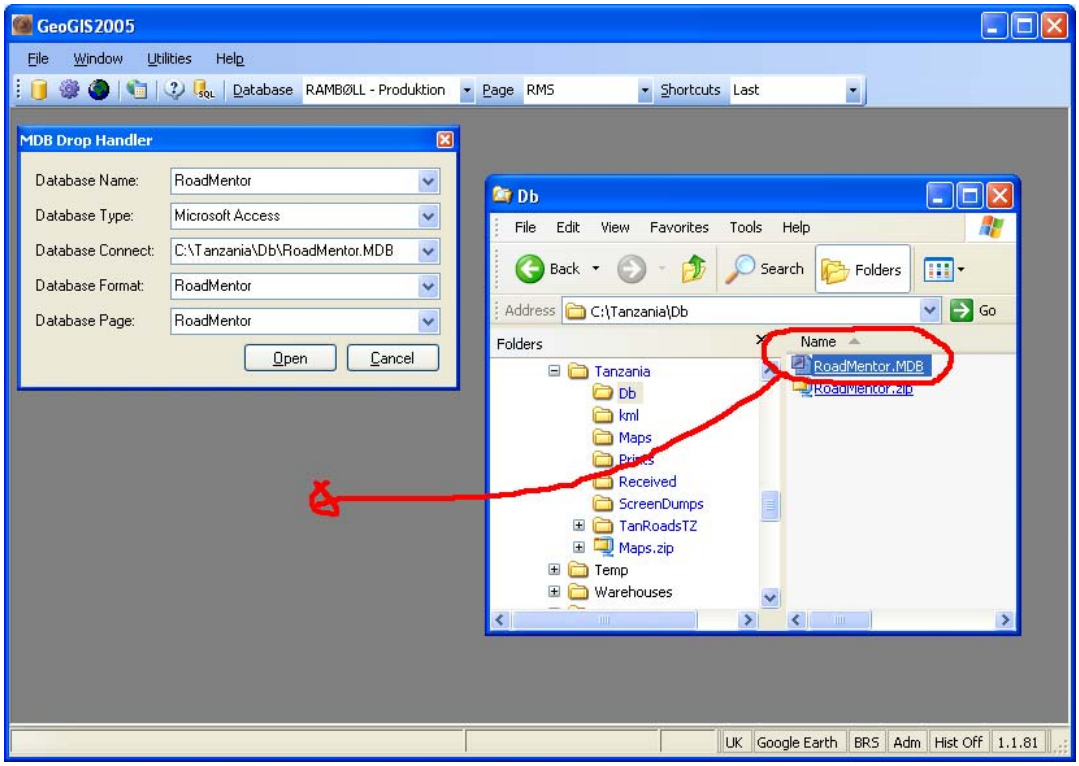


Figure: Drop MS Access (MDB) files on the GeoGIS2005 background.

The MDB Drop Handler dialog contains the following parameters:

Field	Description
Database Name	The name of the database derived from the database filename.
Database Type	The database file format.
Database Connect	Path to the database file or connect string for advanced databases.
Database Format	The database format e.g. RMS, RoadMentor or Romdas.
Database Page	The default page for the database.

If a MS Access database has been divided into several databases and the user wishes to join information from different databases, the user may access the databases through an empty database containing table links to the databases.

When databases have been attached to the system, they may be selected in the database toolbar:

The database attachments may be edited in the *Utilities* > *Database Administrator*:

2.2 **Datagrid**

Data in GeoGIS2005 are listed in database windows. The user may open several database windows at a time.

GeoGIS2005 displays data in a tree structure similar to the Windows Explorer. For each select made in the tree structure to the left, the corresponding data will show to the right. If there are sub-folders to the selected folder, data will show in a tabs structure.

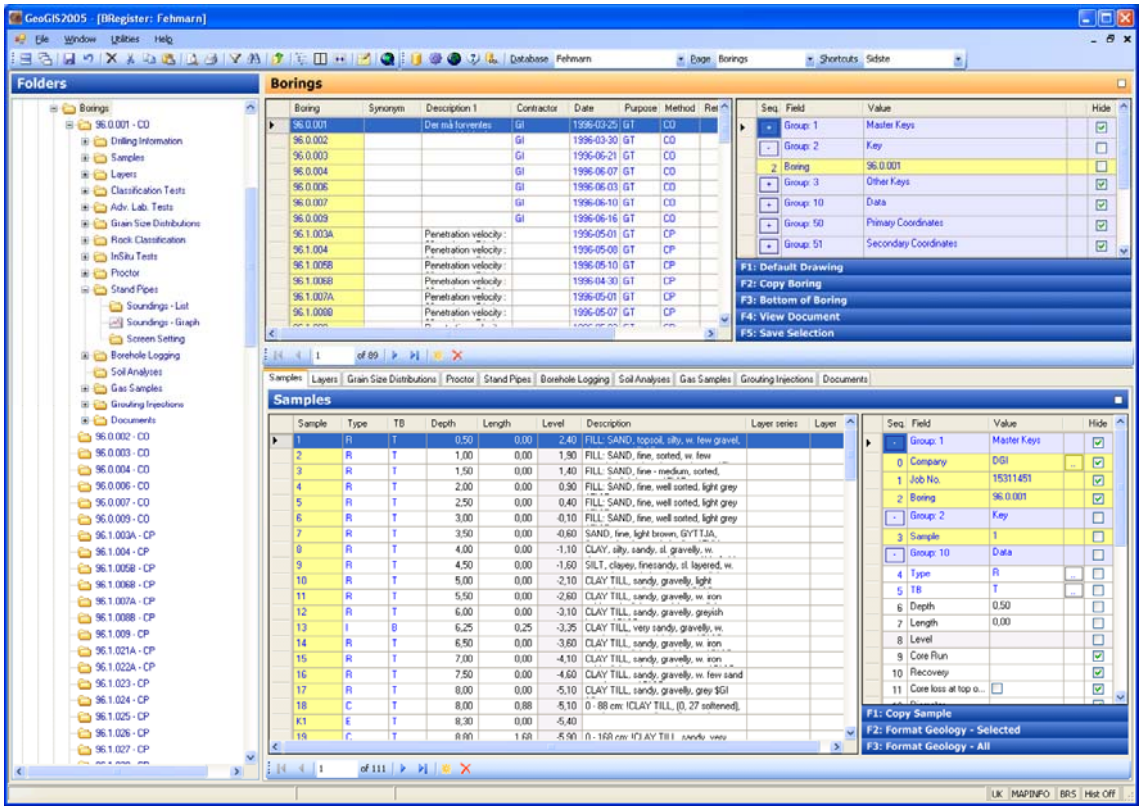


Figure: An example of a database window showing data from GeoGIS2005. To the left is the tree structure, to the right data in lists and tabs.

3. GIS Export

GeoGIS2005 has a number of functions for exporting data to desktop GIS systems directly from the windows. This is made possible by showing data together with the relevant coordinates.

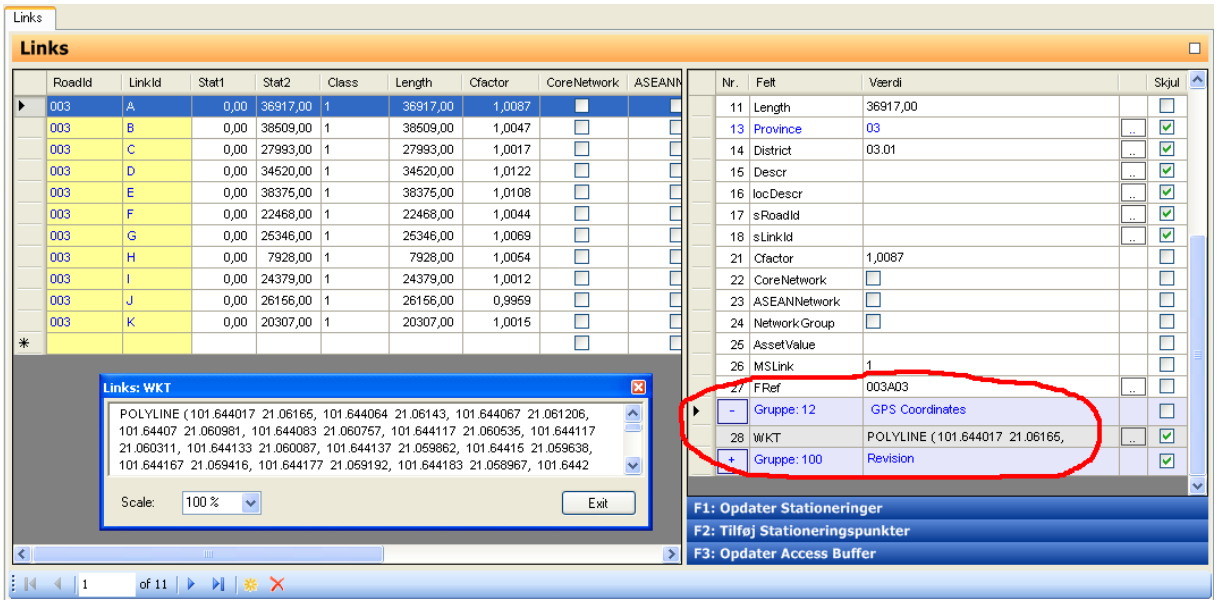


Figure: GPS alignment data in WKT format attached to road links, so data easily may be exported to GIS.

The GIS export functions are called from the shortcut menu:

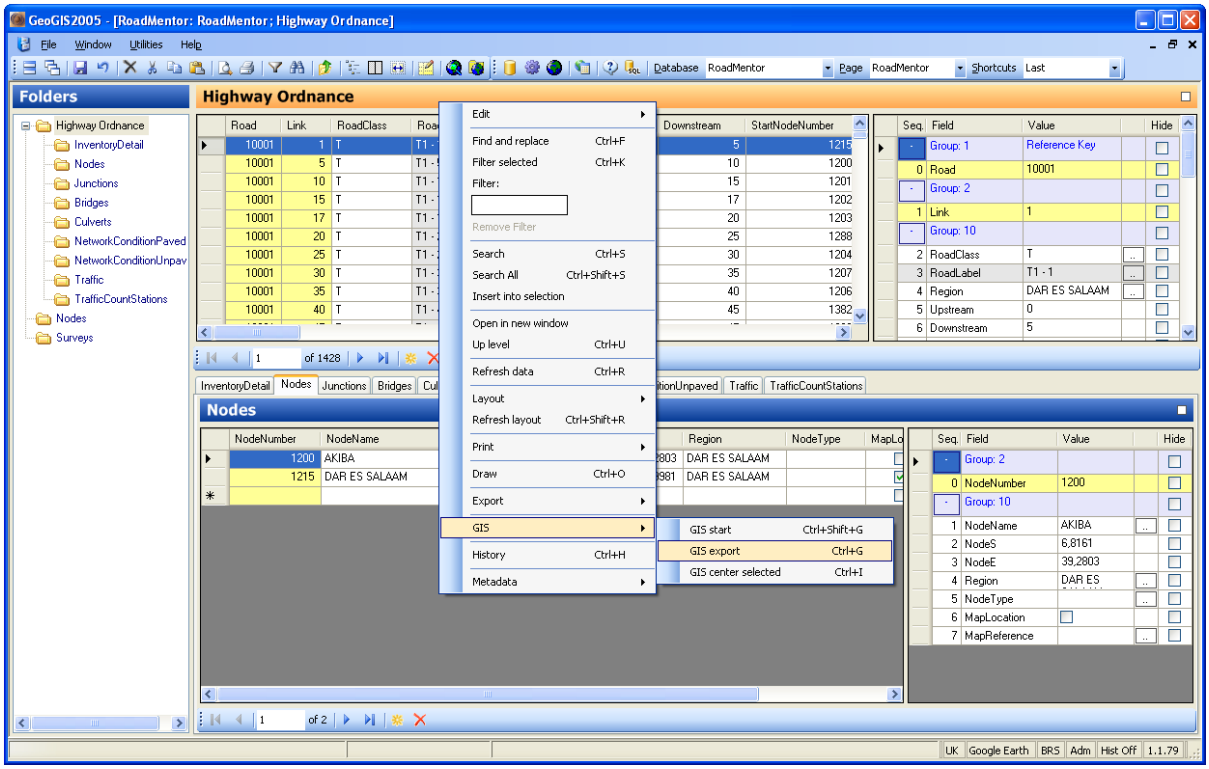


Figure: GIS Export functions.

GIS Export functions:

- GIS start – Starts the selected GIS system. As most GIS systems have a long start-up procedure, it is more convenient to start the GIS system before you send data from GeoGIS2005. The corresponding icon is:

  The easiest way to select the current GIS system is by clicking the button in the system's status bar:

- GIS export – Starts the GIS Export function. The corresponding icon is:

- GIS centre selected – The current GIS window, which has focus is centred on the coordinates in the selected rows. Markers are drawn, but data are not exported. The corresponding icon is:

The workflow for exporting to GIS is:

1. Select the data table to export to GIS using the data folder menu. You may use the data search function to expand the data table:

2. Start the GIS Export function using the shortcut menu or the icon:

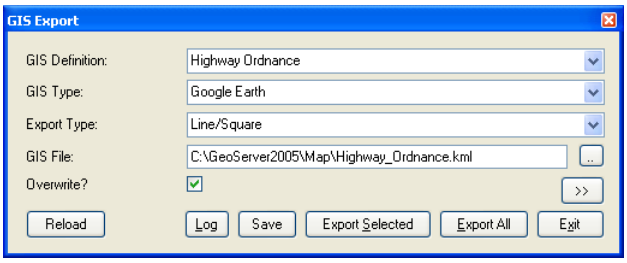
   

   Figure: GIS Export function – Simple view

   Select the GIS definition to use for the export. The programme automatically suggests, that you use one named correspondingly to the data folder.

   To toggle between simple and detailed view use the button:

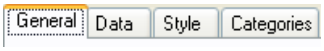
   

   The settings are stored for each GIS definition, why they may be reused between sessions.

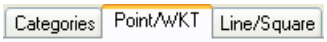
3. Select your preferred GIS Type:
   - Shape
   - ArcGIS
   - MapInfo
   - GISViewer
   - Google Earth

4. Select the Export type based on the geometry information available:
   - Point: Given by X, Y, (Z) coordinates
   - Line: Given by two points
   - WKT: Complex geometry as Polyline or Polygon
   - Other: Circles and Cylinders

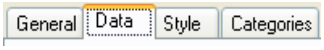
   In the detailed view enter the parameters for the selected geometry type:



   and e.g.



5. Select the database information for labels and tables in GIS systems



6. Enter styling information for all objects or by category

7. Do the export:

   For selected (hilited) rows only use the button:

   For all rows use the button:

The following pages contain a detailed description of GIS Export parameters. Because of the different capabilities of the various GIS types the GIS Export programme enables and disables the corresponding parameters. In the following parameters lists the GIS types are divided into:

Basic GIS File Format

1.	Shape Files	**Sh**

Desktop GIS Systems

2.	ArcGIS	**GS**
3.	MapInfo	**GS**
4.	*GeoMedia (Not supported)*	**GS**
5.	GISViewer	**GS**

Virtual Globe

6.	Google Earth	**GE**

3.1 Simple View

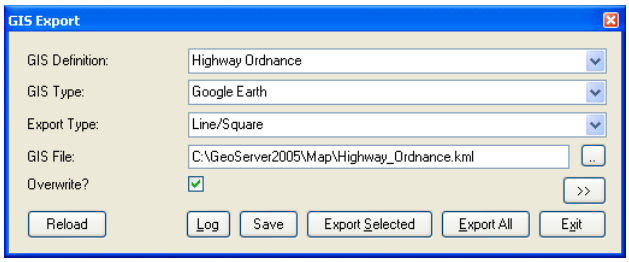


Figure: GIS Export programme in simple view.

Field / Button	Description	Sh	GS	GE
GIS Definition	This field contains the name of the GIS Definition. First tim	X	X	X
GIS Type	This field defines the GIS system to receive the exported data: • Google Earth • GISViewer • MapInfo • ArcGIS • Shape	X	X	X
Export Type	This field defines the geometry: • Point/WKT • Line/Square • Polyline • Circle • Cylinder (Google Earth only)	X	X	X
GIS File	The output filename. The file extension is determined by the GIS type. If the GIS type is Google Earth the user may change the extension from kml to kmz, the output is then a kml file in zip format.	X	X	X
Overwrite	Check if existing GIS files may be overwritten with out warning	X	X	X
Reload	Button used for reloading data from the database form. This will cause all the parameter fields to be overwritten by default values.	X	X	X
Log	Button used for display of log file. The log file is produced during the export of the data table to the GIS.	X	X	X
Save	Button used to save the GIS definition. The GIS definitions are saved in the GeoGIS map directory in the file GISDef.xml	X	X	X
Export Selected	Button used to export the selected rows in the database form to GIS	X	X	X
Export All	Button used to export all rows in the database form to GIS	X	X	X
Exit	Button used to close the GIS Export function	X	X	X

Well-known text (WKT) is a text mark up language for representing vector geometry objects on a map. The formats are regulated by the Open Geospatial Consortium (OGC) and described in their Simple Feature Access and Coordinate Transformation Service specifications.

The following are some example geometric WKT strings supported by the GIS Exporter

POINT(6 10)
LINESTRING(3 4,10 50,20 25)
POLYGON((1 1,5 1,5 5,1 5,1 1),(2 2, 3 2, 3 3, 2 3,2 2))
MULTIPOINT(3.5 5.6,4.8 10.5)
MULTILINESTRING((3 4,10 50,20 25),(-5 -8,-10 -8,-15 -4))
MULTIPOLYGON(((1 1,5 1,5 5,1 5,1 1),(2 2, 3 2, 3 3, 2 3,2 2)),((3 3,6 2,6 4,3 3)))

3.2 Folder - General Information

This folder contains information on how to read data from the database form

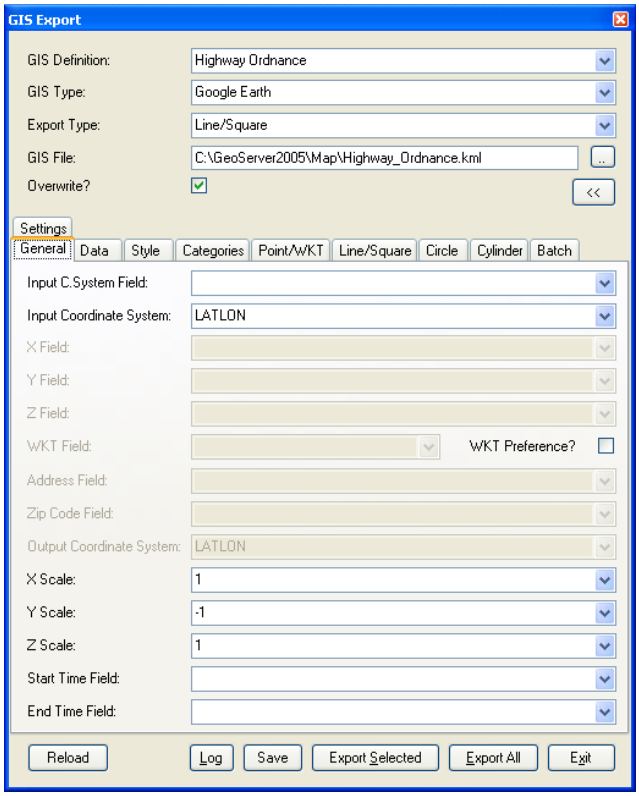


Figure: Folder General

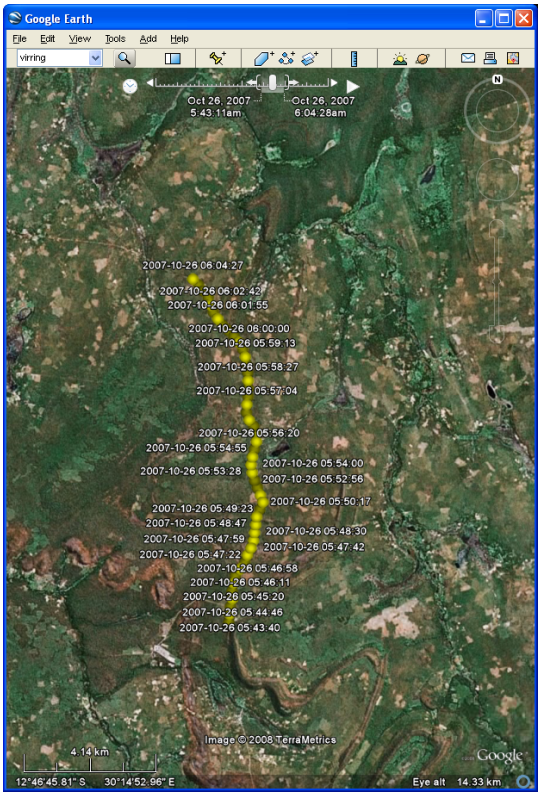


Figure: Data with time information displayed using the Google Earth Time slider.

Field	Description	Sh	GS	GE
Input C. System Field	The name of the field containing input coordinate system.	X	X	X
Input Coordinate System	The input coordinate system, if not stated in the database table.	X	X	X
X Field	The name of the field containing X-coordinates or Easting coordinates.	X	X	X
Y Field	The name of the field containing Y-coordinates or Northing coordinates.	X	X	X
Z Field	The name of the field containing Z-coordinates or Level coordinates.	X	X	X
WKT Field	The name of the field containing coordinates in WKT format.	X	X	X
Address Field	The name of the field containing address information, which may be used in Google Earth to geocode information.			X
Zip Code Field	The name of the field containing the Zip Code / Postal Code. The code is added to the address information.			X
Output Coordinate System	The output coordinate system. For Google Earth this is always LATLON (WGS84) – For other systems, this is always equal to the input coordinate system.	X	X	
X Scale	Scale on X or Easting coordinates	X	X	X
Y Scale	Scale on Y or Northing coordinates. If input coordinates are South-	X	X	X

	ing, then enter -1.			
Z Scale	Scale on Z or Level coordinates	X	X	X
Start Time Field	The name of the start time field used for Google Earth's timer function.			X
End Time Field	The name of the end time field used for Google Earth's timer function.			X

3.3 Folder - Data

This folder contains information on how to format data in the GIS system.

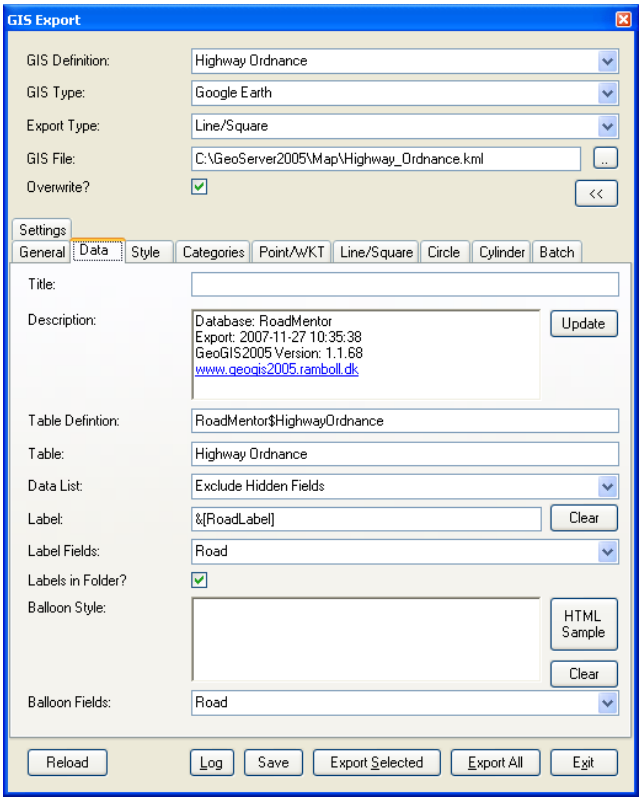


Figure: Folder Data

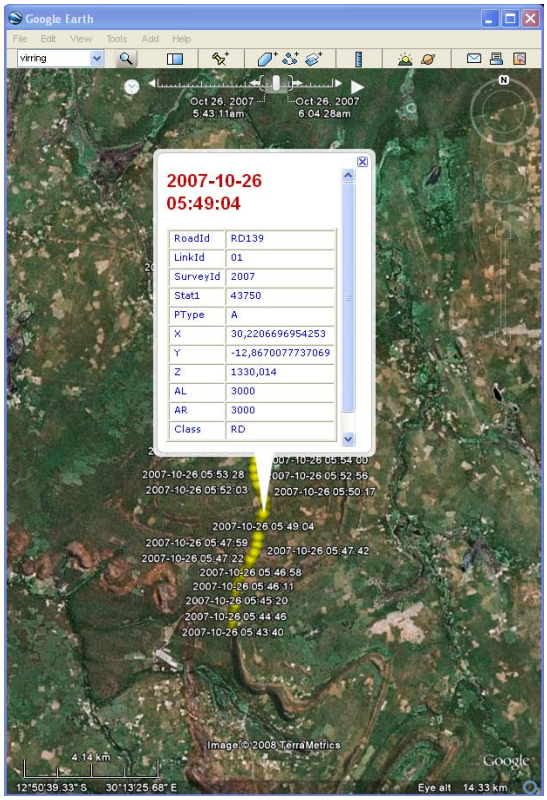
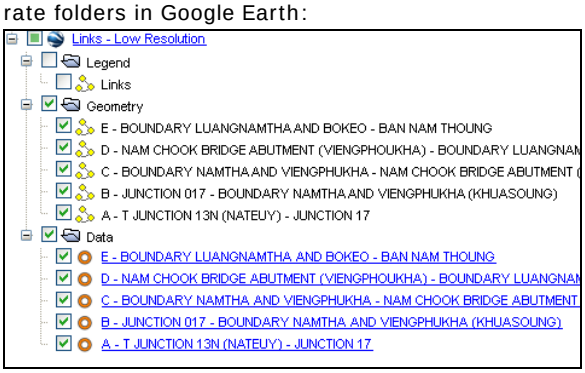


Figure: Default balloon style displaying information in table.

Field	Description	Sh	GS	GE
Title	Short title for	X	X	X
Description	Description of the export. The *Update* button inserts a standard description based on the current database, but the user may enter any description.			X
Table Definition	Table definition used to generate headings in the exported GIS table.	X	X	X
Table	The name of the data table in the GIS system.	X	X	X
Data List	This code describes how database tables are exported to GIS tables: • All Fields • Exclude Hidden Fields • Key Fields Only • No Fields	X	X	X

Label	Text string defining the label. Table fields in brackets are substituted when the map layer is displayed. The *Clear* button clears the content of the label.			X
Label Fields	List for selection of table fields into the label text string.			X
Labels in Folder?	Check – If geometry data and label data are to be placed in separate folders in Google Earth:  Placing geometry and data in separate folders enables the user to switch of the visibility of e.g. the map labels independently of the geometry layer.			X
Balloon Style	This field contains the Google Earth Balloon Style definition in html format. Click on the *HTML Sample* button gives an example of the format. The *Clear* button clears the content of the Balloon Style. If the Balloon Style definition is empty the system generates a simple style displaying all fields in a table.			X
Balloon Fields	List for selection of table fields into the Balloon Style text string.			X

3.4 Folder – Style

This folder contains information on how to style geometry objects in the GIS system. The styling may be changed, when the exported files are loaded into the various GIS systems.

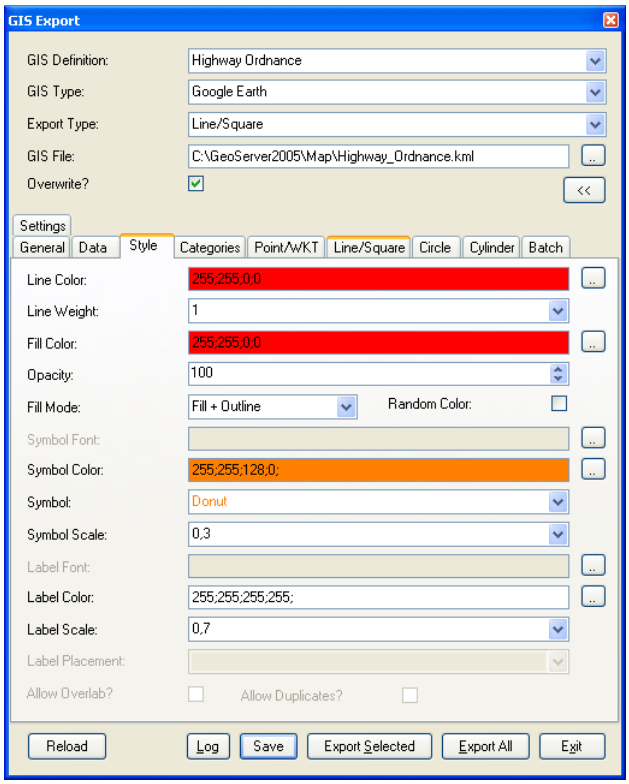


Figure: Folder Style

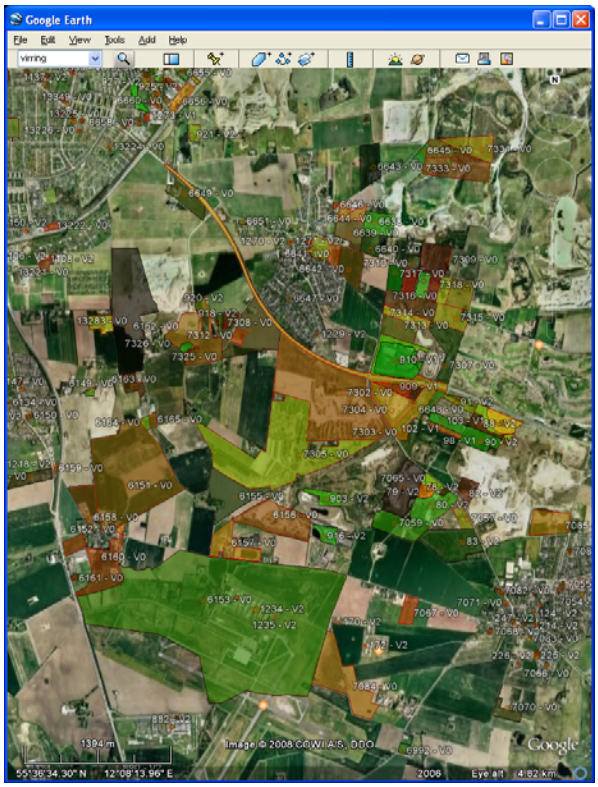


Figure: Polygons styled with random fill color, opacity < 100, red line color and white labels.

Field	Description	Sh	GS	GE
Line Color	The color definition for lines. Click on button to the right to get the color dialog.		X	X
Line Weight	The line weight (thickness) in pixels.		X	X
Fill Color	The color definitions for regions. Click on button to the right to get the color dialog.		X	X
Opacity	The opacity for regions (0 – 100).		X	X
Fill Mode	Definition of how regions are displayed.		X	X
Random Color?	If checked regions are given a random color.			
Symbol Font	Symbol font for display of point features		X	
Symbol Color	The color definition for display of symbols. Click on button to the right to get the color dialog.		X	X
Symbol	The selected symbol			
Symbol Scale	The symbol scale		X	X
Label Font	Label Font		X	X
Label Color	The color definition for display of labels. Click on button to the right to get the color dialog.		X	X
Label Scale	The label scale		X	X
Label Placement	Label placement		X	

Allow Overlap?	Check – To allow overlapping labels.		X	
Allow Duplicates?	Check – To allow duplicating labels.		X	

3.5 Folder – Categories

This folder contains information on how to style geometry depending on data categories. This function is especially useful in connection with Google Earth, because it has no corresponding functionality, while ArcInfo, MapInfo and GeoMedia have many built-in corresponding functions.

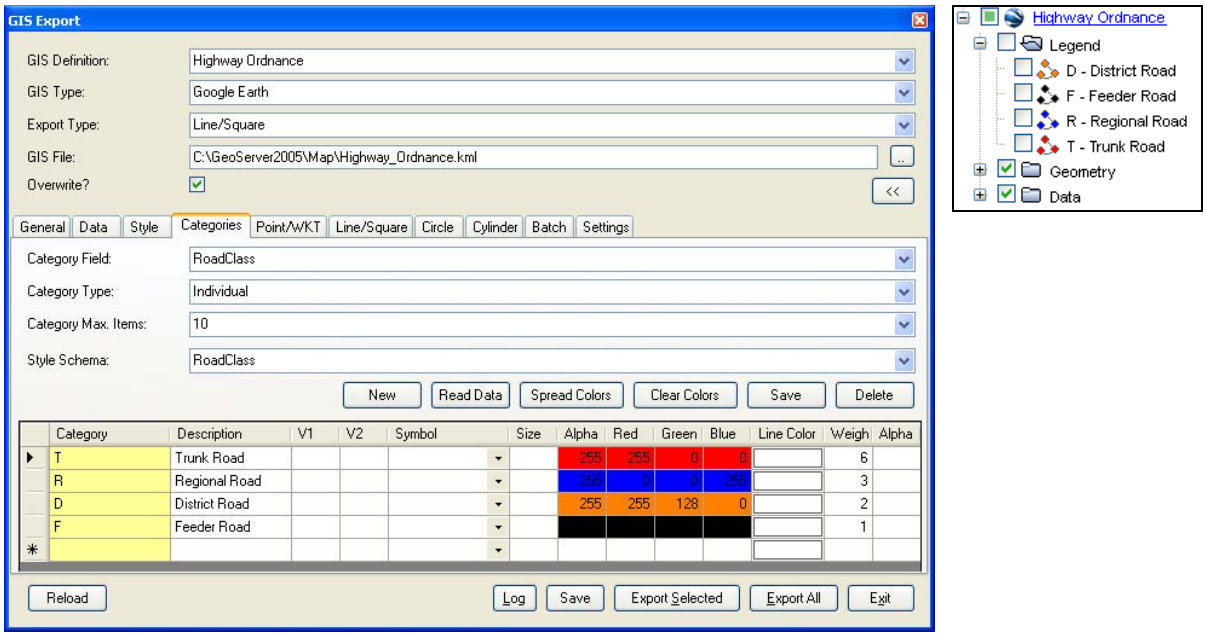


Figure: Defining Categories for Road Classes. The categories are displayed in the Google Earth legend folder.

Field	Description	Sh	GS	GE
Category Field	This name of the field containing the categories.			X
Category Type	The category type: • Individual – Category field contains a limited number of text or number values. Click on *Read Data* button generates a category corresponding to each value. • Range – Equal Intervals – Category field contains numeric values. Click on *Read Data* button generates categories with equal sized intervals. • Range – Equal Count – Category field contains numeric values. Click on *Read Data* button generates categories with intervals containing an equal number of data rows. The automatically generated category items may be modified by the user.			X
Category Max. Items	The max. number of categories to be created.			X
Style Schema	The name of the style schema. The same style schema may be applied to different data tables / category fields. The *New* button creates a new style schema. The *Read Data* button created the various categories corresponding to the Category Type / Category Max. Items settings. The *Spread Colors* button creates colors between user defined colors, i.e. the user enters the first color and the last color and the button may be used to generate the			X

	colors between. The *Save* button saves the Style Schema. The *Delete* button deletes the current Style Schema. Style Schema files are stored in the GeoGIS map directory as StyleSchema_*Name*.XML			
Category	The category values to match the content in the category field in the data table			X
Description	User defined description of the various categories			X
V1 / V2	Lower / Upper interval values – Numeric category types only			X
Symbol	Symbol			X
Size	Symbol size / scale			X
Line Color	Alpha/Red/Green/Blue - Click on button to the right to get the color dialog.			X
Weight	Line weight (thickness)			X
Fill Color	Alpha/Red/Green/Blue - Click on button to the right to get the color dialog.			X
Count	Number of data rows in the category – Calculated when the Read Data button is used.			X
Active?	Uncheck – If the category should be disabled.			X

3.6 Folder – Point / WKT

This folder contains information on how to interpreted geometry data when given as single point data (x, y, z fields) or as WKT data (Well Known Text format).

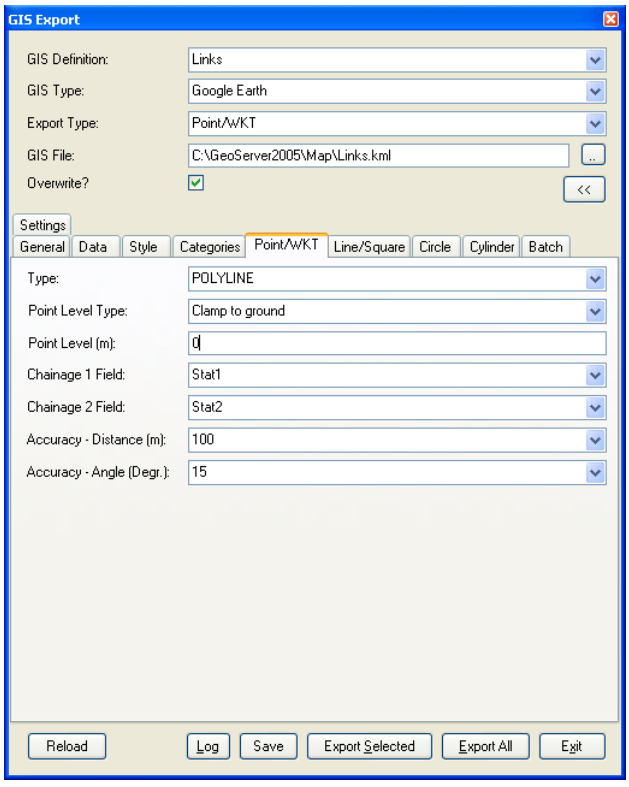


Figure: Folder Point/WKT

Figure: Road link exported using different accuracy settings.

Road sections given by alignment data in a WKT field may be delimited by start and end chainages. A point feature, e.g. a bridge, may be defined by a chainage.

Field	Description	Sh	GS	GE
Type	Indicate the geometry type of the WKT data – This field is automatic filled by the system when data is loaded.	X	X	X
Level Type	This code is used by Google Earth to determine how level information is displayed: • Clamp to ground – The geometry is projected on the terrain independent of any level information. • Absolute – The geometry is displayed at the level given in the data rows. • Relative – The geometry is displayed relative to the terrain.			X
Level (m)	This field may be used to enter a fixed level (absolute or relative) to replace e.g. missing level information.			X
Chainage 1 Field	The name of the field containing start chainages. This is used if only a fraction of a Polyline or Linestring should be displayed. If only chainage 1 field and not chainage 2 field is entered, the output is a point.	X	X	X
Chainage 2 Field	The name of the field containing end chainages – This is used if only a fraction of a Polyline or Linestring should be displayed.	X	X	X
Accuracy – Distance (m)	Polylines and Polygons may be thinned out by entering a min. distance between points.	X	X	X
Accuracy – Angle (Degree)	Polylines and Polygons may be thinned out by entering a min. angle between points.	X	X	X

3.7 Folder – Line / Square

This folder contains information on how to interpreted geometry data when given as two point line or square data.

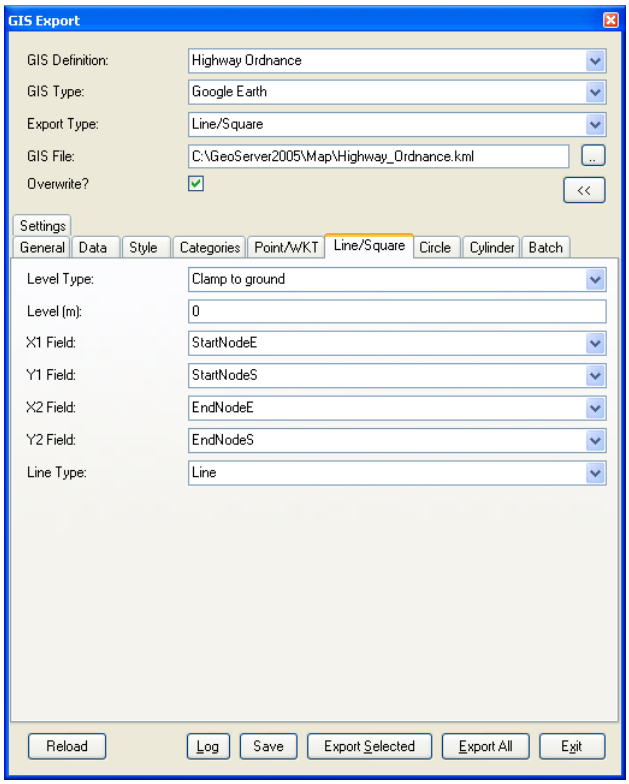


Figure: Folder Line/Square

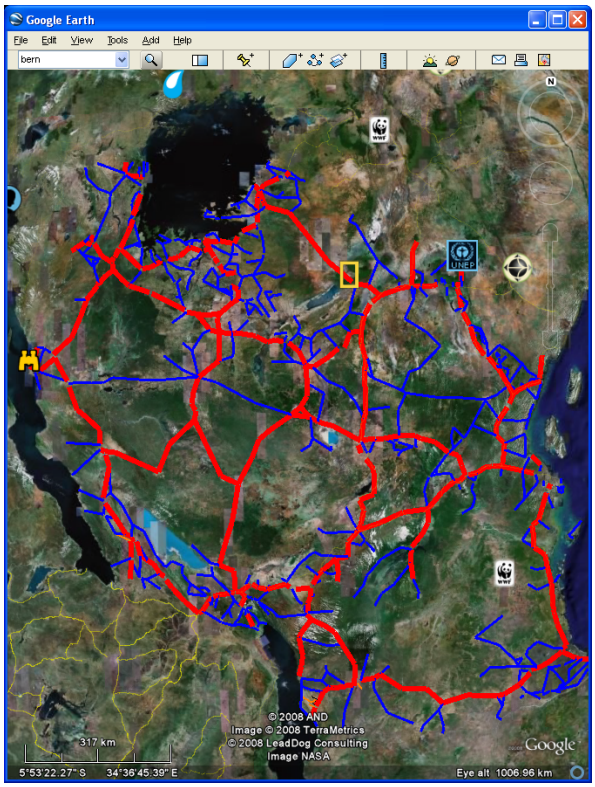


Figure: Tanzania roads displayed using the two point method.

Field	Description	Sh	GS	GE
Level Type	This code is used by Google Earth to determine how level information is displayed: • Clamp to ground – The geometry is projected on the terrain independent of any level information. • Absolute – The geometry is displayed at the level given in the data rows. • Relative – The geometry is displayed relative to the terrain.			X
Level (m)	This field may be used to enter a fixed level (absolute or relative) to replace e.g. missing level information.			X
X1 Field	The name of the field containing X-coordinate or Easting coordinate for the first point.	X	X	X
Y1 Field	The name of the field containing Y-coordinate or Northing coordinate for the first point.	X	X	X
X2 Field	The name of the field containing X-coordinate or Easting coordinate for the second point.	X	X	X
Y2 Field	The name of the field containing Y-coordinate or Northing coordinate for the second point.	X	X	X
Line Type	The output type: Line or Square	X	X	X

3.8 Folder – Circle

This folder contains information on how to interpreted geometry data when given as circle data (x, y, z, radius fields).

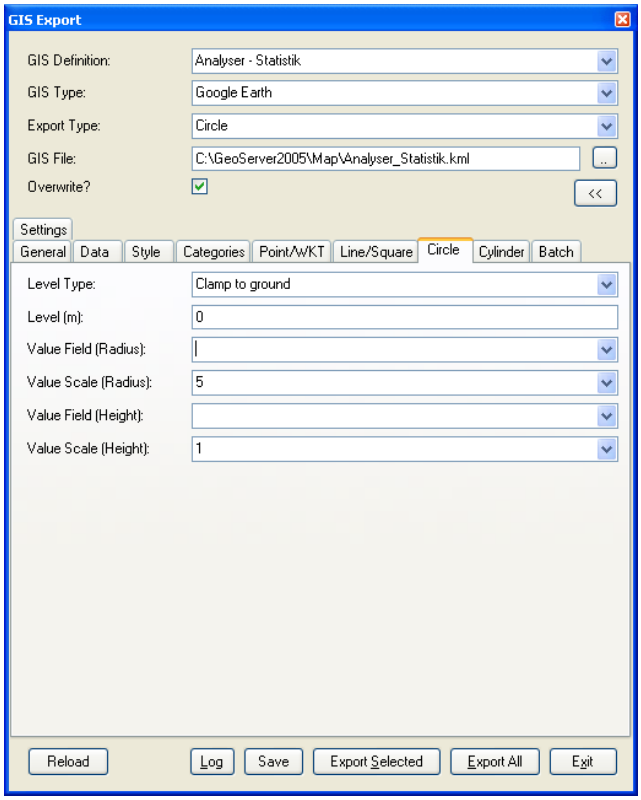


Figure: Folder Circle

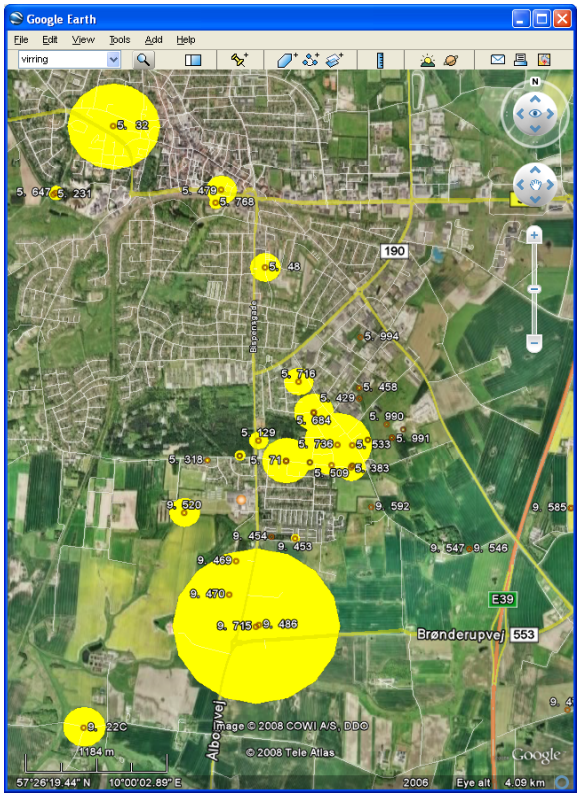


Figure: Distribution of a chemical compound

Field	Description	Sh	GS	GE
Level Type	This code is used by Google Earth to determine how level information is displayed: • Clamp to ground – The geometry is projected on the terrain independent of any level information. • Absolute – The geometry is displayed at the level given in the data rows. • Relative – The geometry is displayed relative to the terrain.			X
Level (m)	This field may be used to enter a fixed level (absolute or relative) to replace e.g. missing level information.			X
Value Field (Radius)	The field containing values used as circle radii.	X	X	X
Value Scale (Radius)	The scale between database values and circle radii.	X	X	X
Value Field (Height)	The field containing values used as cylinder height.			X
Value Scale (Radius)	The scale between database values and cylinder heights.			X

3.9 Folder – Cylinder

This folder contains information on how to interpreted geometry data when given as cylinder data (point and levels).

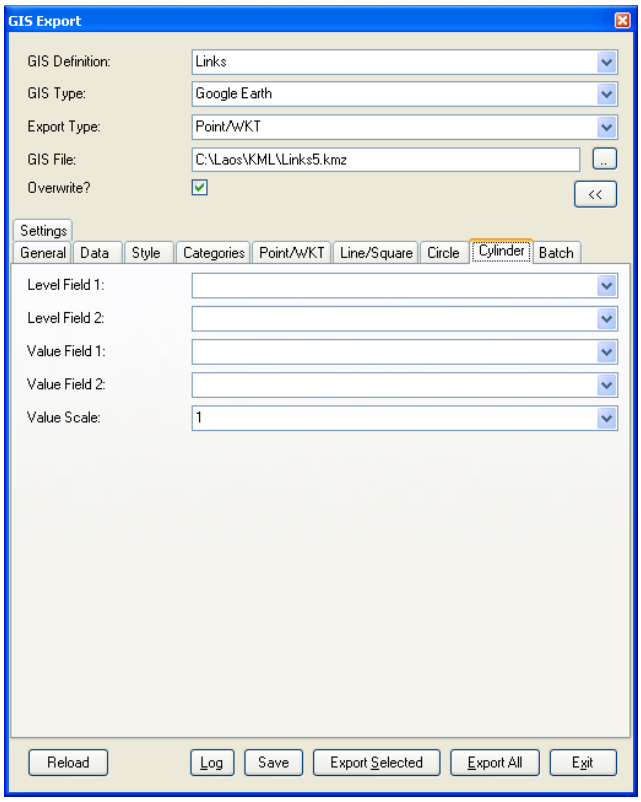


Figure: Folder Cylinder

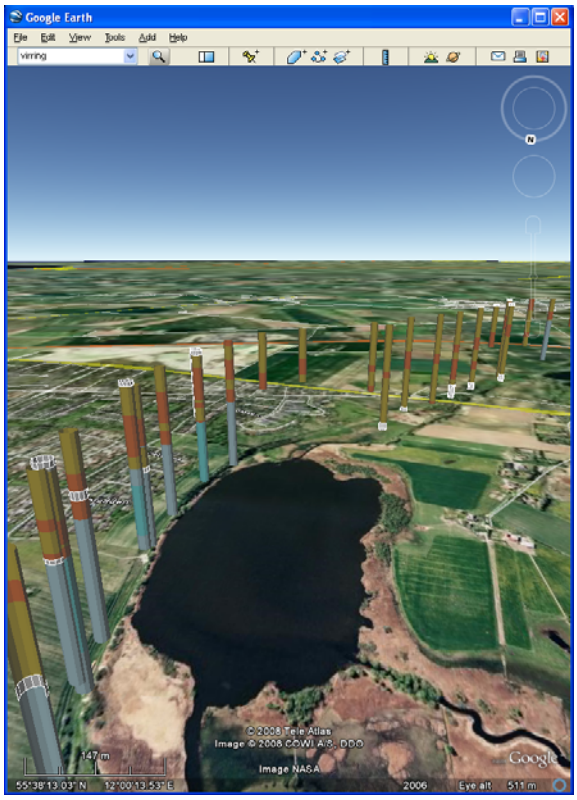


Figure: Boreholes. Note that Google Earth cannot display object below terrain.

Field	Description	Sh	GS	GE
Level Field 1:	The name of the field containing top level coordinates.			X
Level Field 2:	The name of the field containing bottom level coordinates.			X
Value Field 1:	The name of the field containing values used as top cylinder radii.			X
Value Field 2:	The name of the field containing values used as bottom cylinder radii.			X
Value Scale:	The scale between database values and cylinder radii.			X

3.10 **Folder – Batch**

The GIS Export – Batch programme is used export large datasets and to automate frequently used GIS exports. The user may group together the exports by *GIS Group* and by *GIS Id*.

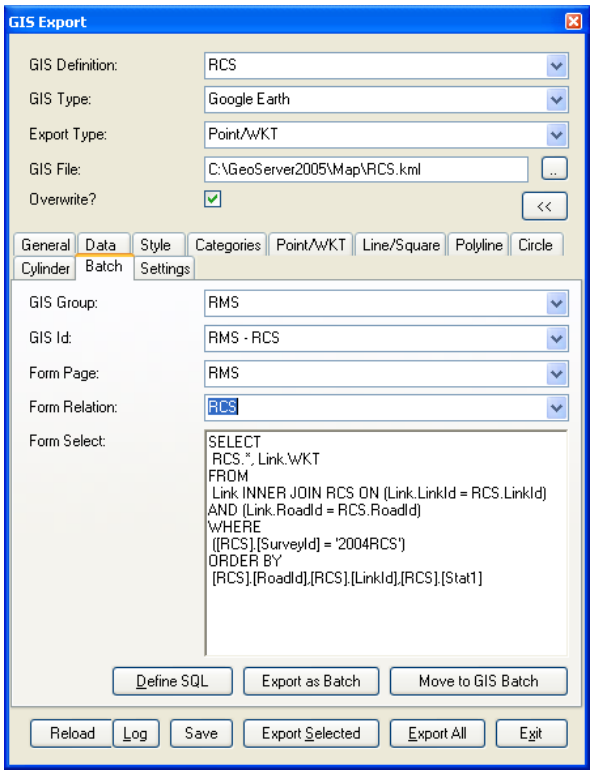


Figure: Folder Batch

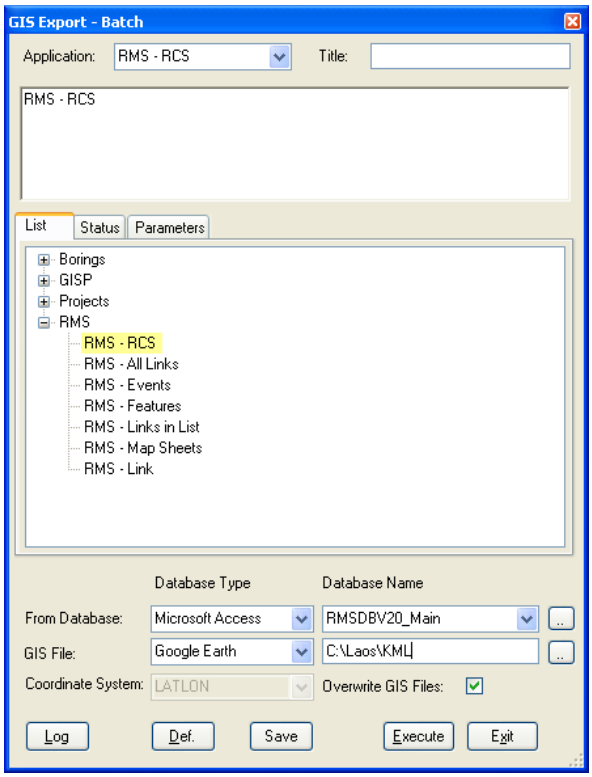


Figure: GIS Export - Batch

Field	Description	Sh	GS	GE
GIS Group:	The GIS Group is used to divide the GIS exports into various groups.	X	X	X
GIS Id:	The GIS Id is used to identify each GIS export.	X	X	X
Form Page:	The Form Page. Each GIS Export belongs to a Form Page.	X	X	X
Form Relation:	The Form Relation or Form Folder. Each GIS Export belongs to a Form Relation.		X	
Form Select:	The SQL Select statement used to create the export database table. The SQL Select statement may be edited by hand or using the *Define SQL* button.	X	X	X
Form Where:	The Where part of the Select statement to retrieve a single row in the export database table. When the user click on one single GIS feature, this may be used to display the attached.		X	

Large datasets may exceed the memory size of the computer. These datasets may be exported by entering the corresponding SQL Select statement and either use the *Export as Batch* button or *Move to GIS Batch* button for later export in the *GIS Export – Batch* programme.

Large datasets may be exported using the following steps:

- Define the export and styling using a small dataset
- Modify the SQL Select expression corresponding to the full desired dataset. You may use the *Define SQL* button.
- Use the *Export as Batch* button or
- Use the *Move to GIS Export – Batch* button for later export in the *GIS Export – Batch* programme

The user may consider dividing large dataset into smaller datasets, e.g. when exporting to Google Earth because the size may also cause problems here.

The *GIS Export – Batch* programme may be started using the icon:

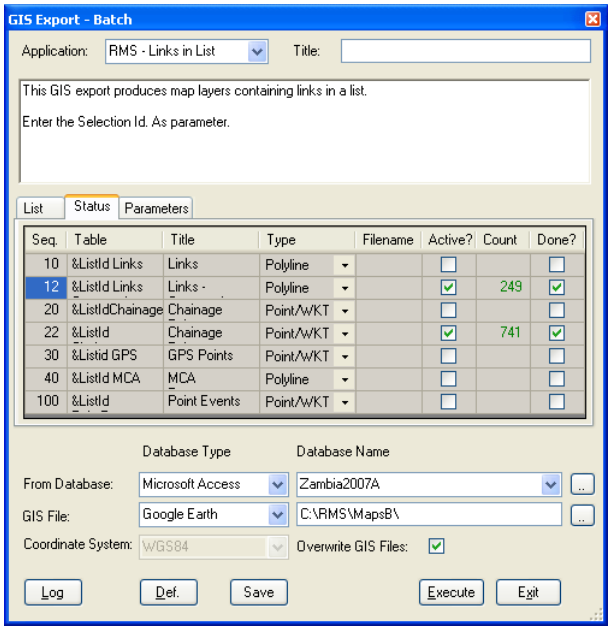


Figure: GIS Export – Batch – Status folder

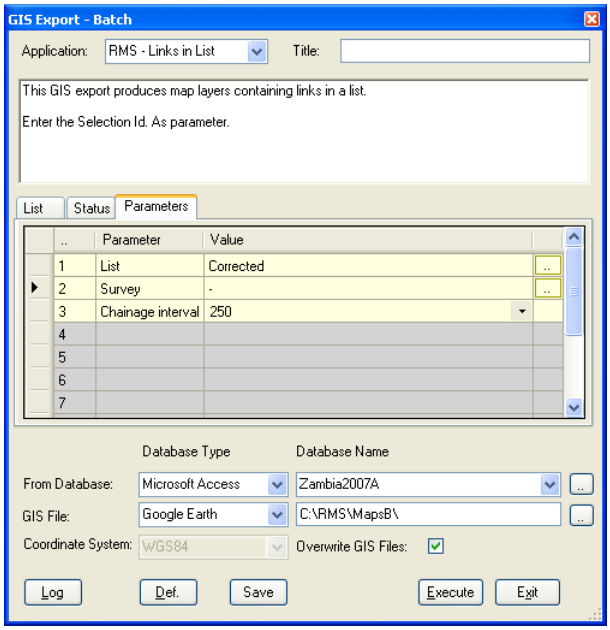


Figure: GIS Export – Batch – Parameters folder

Field / Button	Description	Sh	GS	GE
Application:	The GIS Group is used to divide the GIS exports into various groups.	X	X	X
Title:	The GIS Id is used to identify each GIS export.	X	X	X
List Folder:	This folder contains a treeview of the available exports	X	X	X
Status Folder:	This folder contains a list of the various export steps. Each step corresponds to a GIS Export session and exports a single GIS file. As default the table name is used as the GIS file name, if not the filename column is used. Only steps checked as active are exported.	X	X	X
Parameters Folder:	This folder contains export parameters. The parameters may be used in the SQL statements.	X	X	X
From Database:	The database to export from. Select between the databases attached to GeoGIS2005.	X	X	X
GIS File:	The first part of the GIS file names. Typical the directory where the	X	X	X

	GIS files are exported to.			
Coordinate System:	The output coordinate system for the GIS files.	X	X	
Overwrite GIS Files:	The Where part of the Select statement to retrieve a single row in the export database table. When the user click on one single GIS feature, this may be used to display the attached.	X	X	X
Log	Button used for display of log file. The log file is produced during the export of the data table to the GIS.	X	X	X
Def	Button used for editing the database defining the GIS exports.	X	X	X
Save	Button used to save the GIS definition. The GIS definitions are saved in the ..\GeoGIS2005\Access\GS05GIS.mdb file.	X	X	X
Execute	Button used to start the active GIS exports	X	X	X
Exit	Button used to close the GIS Export – Batch function.	X	X	X

When output is directed to Google Earth (kml) the GIS Export – Batch programme creates a network file:

```
<?xml version="1.0" encoding="UTF-8"?>
<kml xmlns="http://earth.google.com/kml/2.2">
<Folder>
 <name>Lao Road Maps</name>

 <LookAt>
  <longitude>103.893169787057</longitude>
  <latitude>18.2073012021013</latitude>
  <altitude>0</altitude>
  <range>1265000.965953808</range>
  <tilt>0</tilt>
  <heading>0</heading>
 </LookAt>

 <Folder>

  <name>Road Network</name>

  <NetworkLink>
   <name>Links - Low Resolution</name>
   <visibility>1</visibility>
   <Link>
    <href>Links2.kmz</href>
   </Link>
  </NetworkLink>

  <NetworkLink>
   <name>Links - High Resolution</name>
   <visibility>0</visibility>
   <Link>
    <href>Links1.kmz</href>
   </Link>
  </NetworkLink>

 </Folder>

</Folder>
</kml>
```

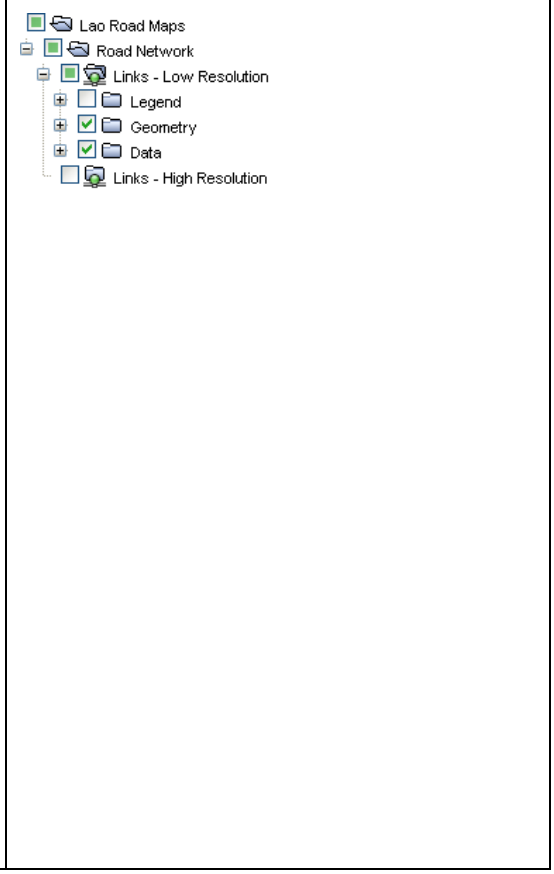


Figure: NetworkLink file for Google Earth and the resulting menu tree in Google Earth

The NetworkLink file may be edited in e.g. notepad.

The main elements are:

<Folder></Folder>	This tag defines the folder structure
<name></name>	This tag defines the name of folders and links
<visibility></visibility>	This tag defines the initial visibility of folders and links in the map:

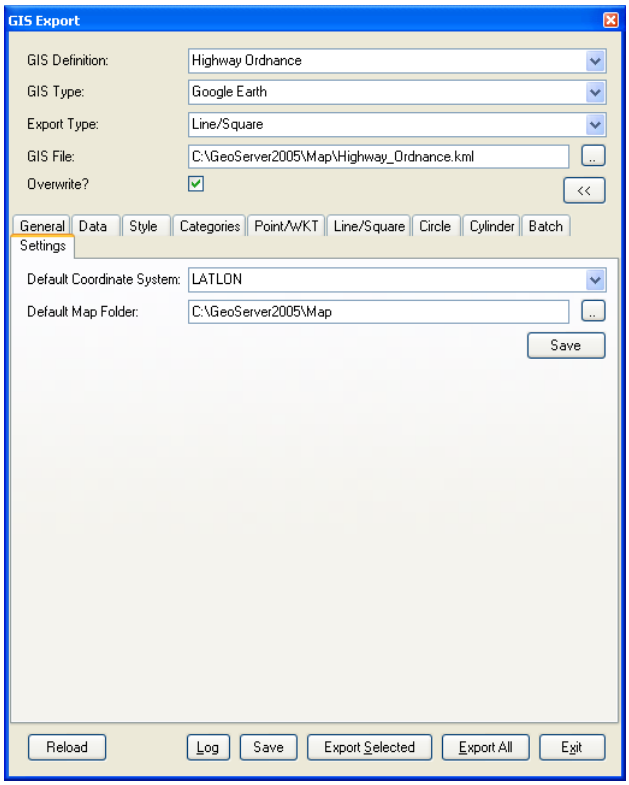
	0 = invisible 1 = visible
<NetworLink><NetworkLink>	This tag defines a single network link entry
<Link></Link>	This tag defines the location of a single kml/kmz file. Use the full internet url address when the NetworkLink file is used in an Internet environment.
<LookAt></LookAt>	This tag defines the initial view

Detailed information about the kml format may be viewed at:

http://code.google.com/apis/kml/documentation/kmlreference.html

3.11 Folder – Settings

This folder contains information on GIS settings.



Field	Description	Sh	GS	GE
Default Coordinate System:	The default coordinate system is the assumed input coordinate system when no coordinate system is assigned in the data table. The default coordinate system may be overwritten in the *General* Folder.	X	X	X
Default Map Folder:	The default output file folder for map files. The user may change the output GIS File including the folder in the GIS File field.	X	X	X