



# **CAD+GIS** Pythagoras

The ultimate CAD + GIS application

## ***Pythagoras 12.00***

**What's new?**



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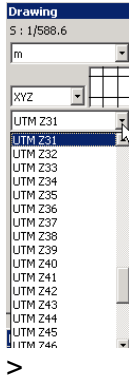
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# 1. Basic Module

## Control panel

The control panel at the left side of the screen is slightly redesigned. Besides Local and Global coordinate systems, Coordinate Reference Systems (see further) can be selected.

<TODO: screendump

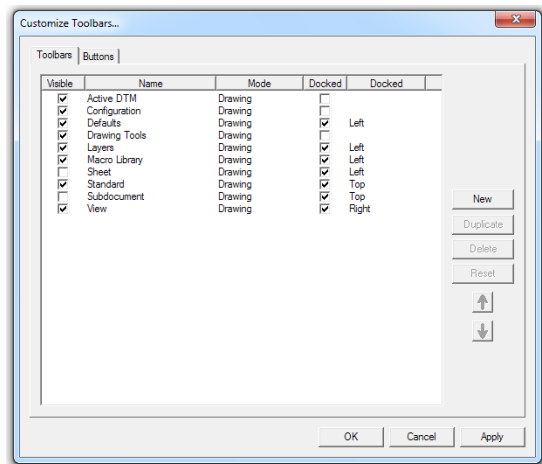


## Snapping info Toolbox

A toolbox that allows to view and change the status of snapping to specific object types can be activated.

## Customising toolbars

User toolbars can be created:



The toolbars can:

- be docked or be floating
- when docked be placed on top, bottom, left or right of the screen.

## **Named Find**

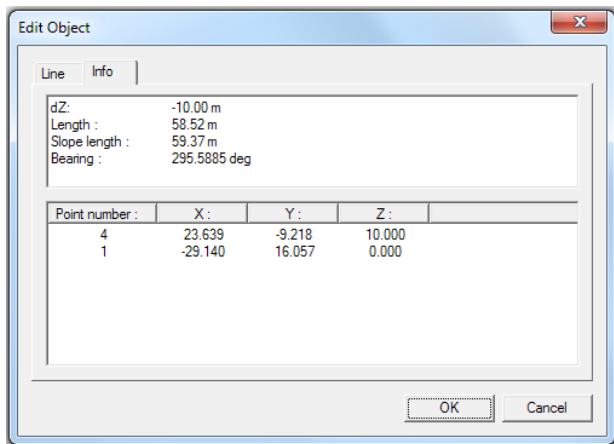
In the *Find* dialog a Search/Select operation can be given a name and saved. The names together with their parameters will be stored in the .DEF file. Those *Named Finds* can be invoked directly from the *Edit* menu or from the *Find* dialog.

## **Show comments**

The comments of all types of objects, not only lines can be shown and/or printed.

## **Info of objects**

Besides graphical attributes, the *Edit Object* dialog shows additional information of all object types. This feature was already provided for polygons and paths in Pythagoras 11.



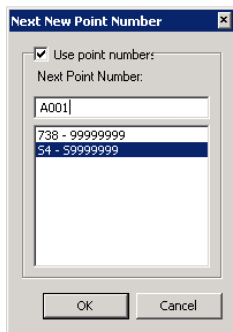
## **Indication of hotspot in Symbol Manager**

The position of the hotspot(s) is indicated in the preview of symbol / line style / hatching.

## **Creation of Patterns**

Elements of a pattern may be lines in any direction, arcs and circles. In the real hatch pattern, arcs and circles are split up in polylines with small segments.

## Next pointnumber



Incrementing the point number can be done in multiple ways:

- a) Only numeric: 100, 101, 102, ...
- b) Starting with letter(s): ST1, ST2, ST3, ...
- c) Ending letters: SA, SB, SC, ...
- d) Letters, Digits, letters: REF15PNT, REF16PNT, REF17PNT, ...
- e) Digits preceded by zero: 0010, 0011, 0012, S001, S002...

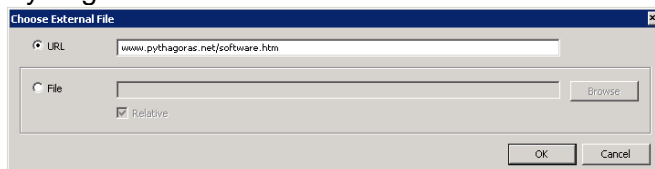
## Viewports and scaling

Besides the scale factor of a viewport, already available in Pythagoras 11, a scaling factor can be allocated to the viewport. In Pythagoras 11, a viewport always behaved as an optical enlarging or reducing of the document for all attributes. With the scaling factor user can affect this behaviour.

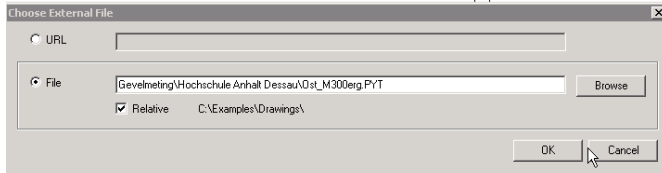
The scaling factor only affects the size/width of scale independent objects in the viewport. For example if the scale factor of a drawing is 1:500 and the scale factor of a viewport is 1:250, than line width in the viewport will be the double of the line width of the same line in the drawing if scaling factor is 100%. The same for texts: a text of 12 point will become 24 point in the viewport. If the scaling factor is 50%, sizes will remain the same. Any scaling factor is valid, and will affect the scale independent attributes accordingly.

## Link to external file

The link to external file may be an URL. This allows to open directly a website from within Pythagoras.



The link to external file is by default "Relative". When relative, the name of the link is relative to the path name of the document that contains the link



## **Non-linear scaling of symbols when zooming in/out**

When zooming in, symbols are by default magnified by the zooming factor. The amount of magnification can be set from 0 = no magnification to 100 = linear magnification.

TBD:

- Format
- Copy/paste attributes.

## **Export Coordinate List / Object List**

Coordinates list and Object List can be exported in the following formats:

- RTF-file (.RTF)
- Webpage (.HTML)
- Comma separated text file (.csv)
- Semicolon separated text file (.txt)
- Tab separated text file (.txt)

## **Scaling of Rich Text**

All selected Rich Texts can be scaled with a given percentage.

## **Tables in Rich Text**

Rich Texts may contain tables.

Copy and paste of tables between many other Windows applications is possible while retaining many or all attributes of the tables and the styles of the texts in the cells of the table. Some tables are generated by other functions of Pythagoras:

- Coordinate list
- Tables selected from "Table View" (see Databases)
- Object list

CountryName	CountryCode	Population
Belgium	32	10
Holland	31	15

Name	Population	Country
Antwerpen	1	Belgium
Namur	1	Belgium
Brussels	1	Belgium
Amsterdam	2	Holland
Utrecht	1	Holland
Breda	0	Holland

Name	Population
Antwerpen	1
Namur	1
Brussels	1

Screen dump of table in Rich Text Editor.

### **Coordinate List on drawing** *Menu Format - Operation - Coordinate List*

The coordinate list on the drawing will be a table in a rich text.

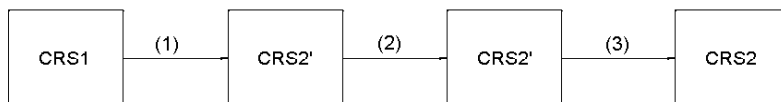
### **Polygon List on drawing** *Menu Format - Operation - Polygon List*

The polygon list on the drawing will be a table in a rich text.

## **Coordinate Reference Systems**

Coordinates in a particular Coordinate Reference System (given Elipsoid, Datum and Projection parameters) can be converted to another Coordinate Reference System that is applicable in the same area. The conversions can be very precise if a set of tie points is defined in both systems.

Principles:



- (1)
- Conversion to geographic coordinates (Fi, Lamda, h)
  - Conversion to geocentric coordinates (X, Y, Z)
  - Datum conversion CRS1 -> CRS2
  - Conversion to geographic coordinates CRS2
  - GeoCentric to CRS2 (projection)
- (2)
- Transformation of source points (CRS1) to CRS2
  - Helmert Transformation between source (CRS2) to destination (CRS2)
  - Apply transformation
- (3)
- Define natural neighbours using tie points
  - Smooth out residuals based on natural neighbours

Pythagoras 12.00 will support:

- Belgian Lambert 72
- Belgian Lambert 2008
- UTM (all zones)
- GK (Germany) all zones
- RD (Netherlands)

Other CRS's will become available depending on demand.

## **Transformation of n-points**

The transformation of n-points is extended by:

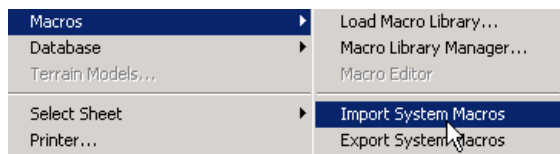
1. Unlimited number of points
2. Affine transformation
3. Reading points from a file
4. Reporting: generation of result in Rich Text table.

## **Management of System Files**

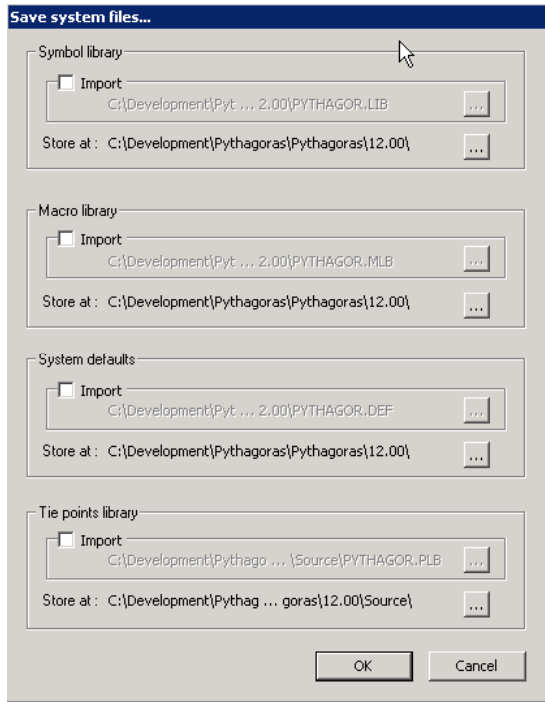
### 1. Import/Export Symbols System Library



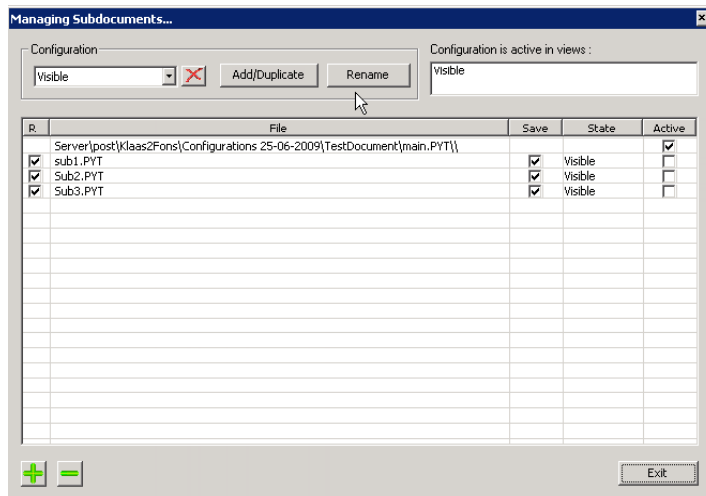
### 2. Import/Export Macro System Library



### 3. Support tool

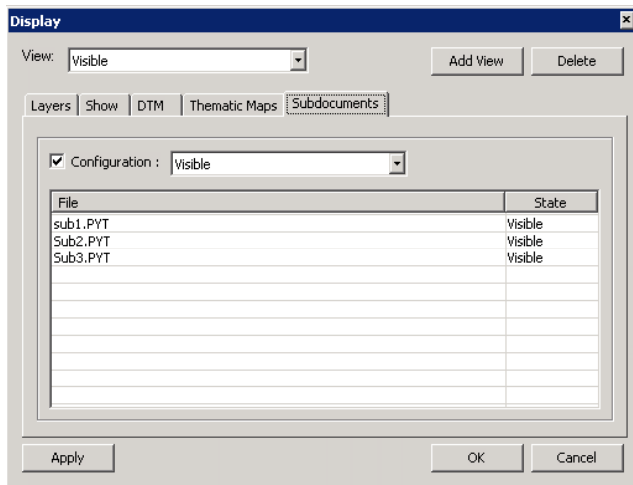


## Subdocument Manager & Configurations



1. Documents can be set relative
2. Tooltips
3. Definition of configurations
4. Use of configurations and relation with Views
5. Switching of configurations

## View Manager



1. Subdocument configurations can be included
2. Layers/Show/DTM/Thematic Maps: optional.

## DWG Import/Export

All AutoCAD versions up AutoCAD 2010 to are supported both in import and export.

Multiple improvements: (incomplete list)

- True Color
- Export of images
- Export of Sheets (to DWG Layouts), viewports and Page objects
- Import of most AutoCAD spline types
- Import of Layouts (become Sheets).

## Open of DWG/DXF and Shape files ????

From the "Open" menu, DWG, DXF and Shape files can be selected.

## Preferences / Settings

Preferences dialog has been redesigned:

- Subdivision in groups
- More settings
- Settings from menu "Defaults/Configure" moved to Preferences dialog
- Text files (CDF, Standard Texts, ...) can be opened and edited directly from Preferences dialog.

## Layer Manager

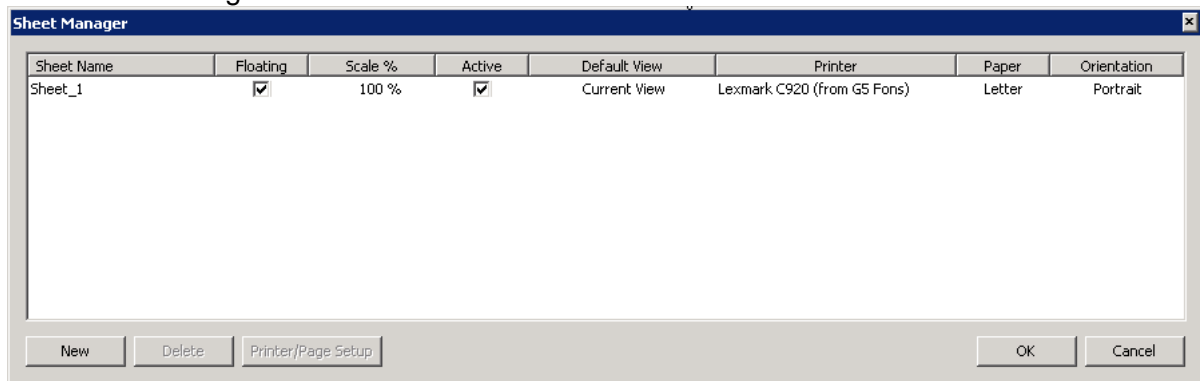
- Review of dialog box
- Multiple layers can be added to group
- Layer can be set active

## System Layer

When creating a polygon by clicking in a region, it happens that new points and/or arcs need to be created. In Pythagoras 11 those objects were created in the active layer. Pythagoras 12 will create the objects in a System Layer that remains invisible.

## Sheet Manager

- Review of dialog box



## ***2. Importing Data Collector***

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### **Data collectors**

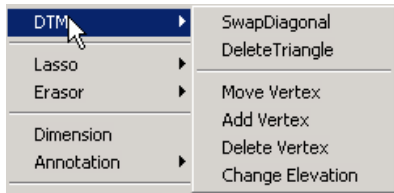
All know data collector formats are supported

### 3. DTM

#### Editing DTM

*Menu Tools*

Tools for editing DTM:



#### Copy/Paste DTM

*Menu Tools*

The active DTM can be moved to the Pythagoras clipboard and pasted in another drawing.

#### Volume Calculations

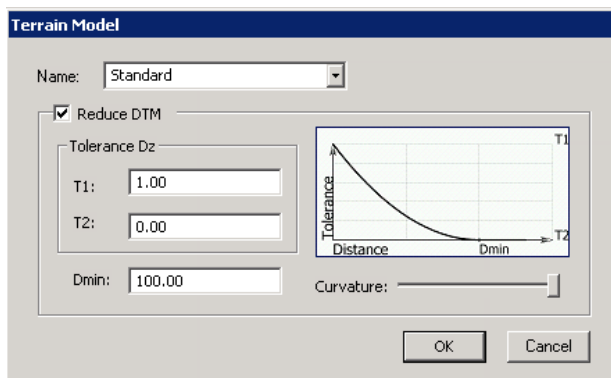
*Menu Calculations*

If polygon indicating the region in which Volume must be calculated is partly outside DTM(s), the DTM is extrapolated.

#### Calculating DTM - Smaller DTMs

*Menu Calculations*

The complexity of a DTM (the number of triangles) can be reduced if a certain error is acceptable. The tolerance (error) can be given and is a function of the distance of the point to the endpoints of the triangle the point lies in.



### **Calculating DTM - Conflicting data**

***Menu Calculations***

The conflicting data, for example points at same location but different elevation, can be indicated on the screen by zooming in on the position where there is a conflict.

### **Calculating DTM - Adjust Elevation**

***Menu Calculations***

The elevation of all vertexes of the DTM is changed with the same value.

### **Calculating DTM - Make Delauney**

***Menu Calculations***

The active DTM is recalculated so that the resulting DTM is a Delauney triangulation.

## **4. Road Design**

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### **Profile of Road Design: From - To**

***Menu File - Make Profile***

Partial sections of profile can be generated. This allows to subdivide the profile drawing of a large road over multiple drawings or multiple sheets.

### **Profile**

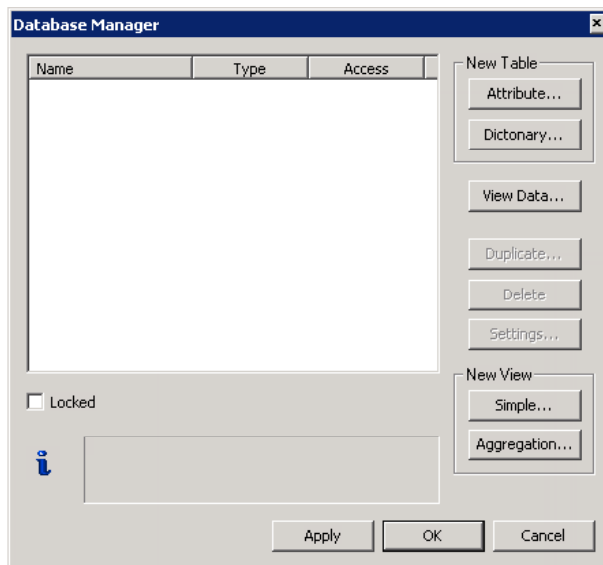
Text positioning in the profile is improved so that texts don't overlap.

## 5. Pythagoras GIS

### Databases

*Menu File - Database*

The database manager is completely redesigned in order to allow creation of *Dictionaries* and (Database) *Views*. A view is a database concept that allows a.o. to get a subset of a table or a combination of 2 tables. More information on View in the following paragraph.



### Views

*Menu File - Database ...*

The new Database manager allows to define Views.

A new view can be either a Simple Views, mostly a subset of a table, or an Aggregation View that is made up of a combination of two tables. Aggregation views also allow for making views that based on spatial relations between objects. For examples, objects that lie in a polygon.

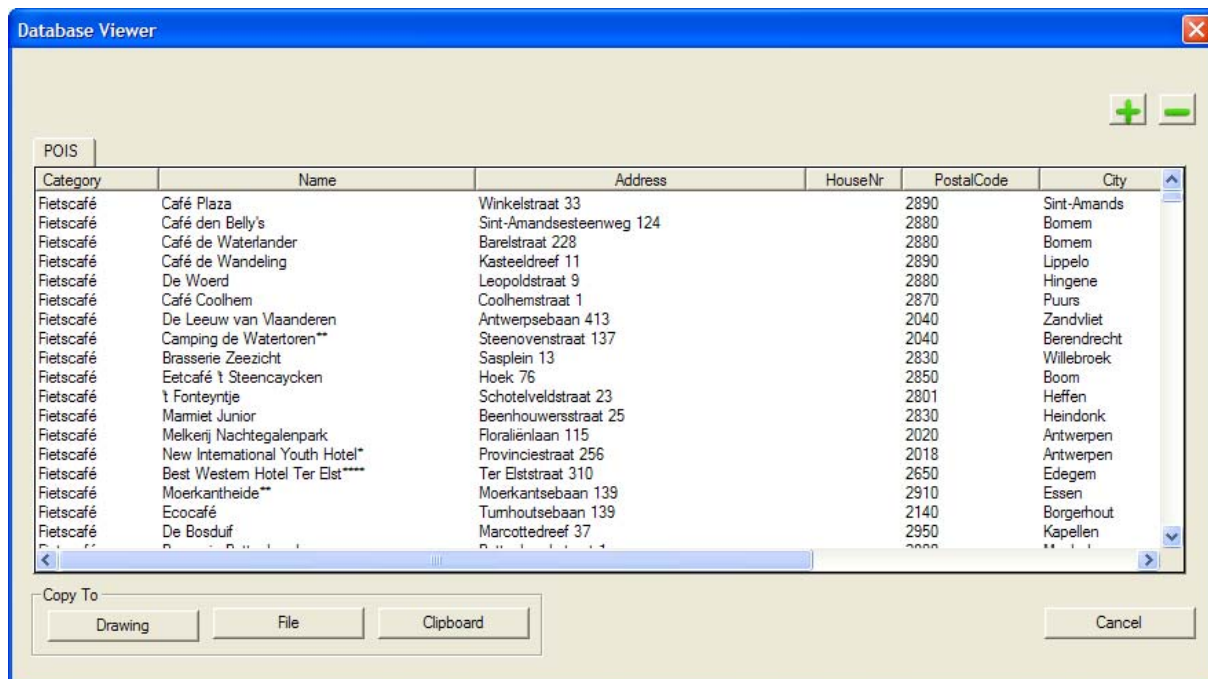
### Databases

*Menu File - Database - Table Viewer*

The Table Viewer displays tables and database views in tabular form.

Some features:

1. setting width of columns
2. sequence of columns
3. columns can be hidden
4. sorting in ascending or descending order per column



The data in the table can be copied to the drawing (see "Tables in Rich Text"), to file (HTML, RTF or TXT) and to clipboard, taking into account column width, sequence of columns and sorting.

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## 6. Raster images

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### Display

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Nicer display of images when image is reduced.



### Images relative

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By default images linked to file are stored with relative path name.

### Importing multiple images

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When requesting Import/Image: multiple images can be selected. If the images are georeferenced (GeoTIFF or world files exist) all selected images will be georeferenced.

### Exporting images

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Images can be exported and retaining the Georeferencing by generating a BMPW or JPW file.

## 7. VBA

### Moving libraries from System to Document

Macro libraries can be moved from the Macro System Library to the active Document.

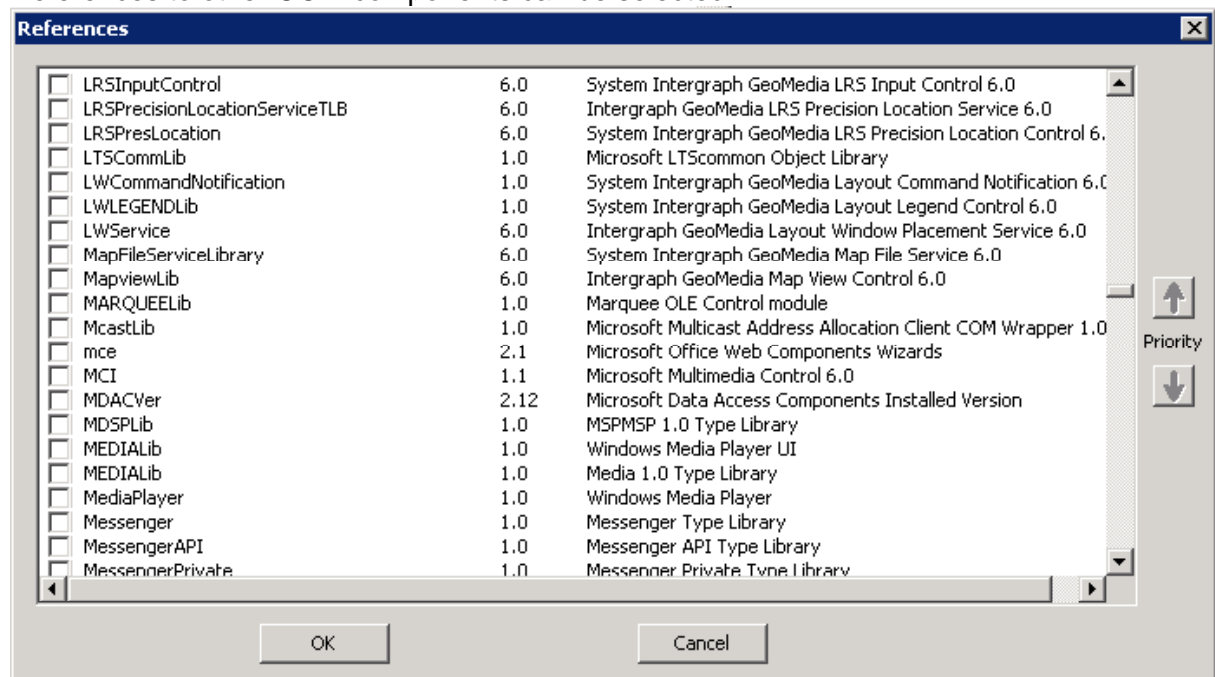
### Importing and Exporting of System Macros

A complete set of macro libraries (PYTHAGOR.MLB file) can be imported and exported. This allows:

1. To exchange PYTHAGOR.MLB libraries easily with other users
2. To make backup of PYTHAGOR.MLB
3. To switch between sets of macro libraries.

### Interface with COM components

References to other COM components can be selected:



The objects defined in the selected COM components will become available in Pythagoras VBA. This feature allows reference to Types, Subs, Functions, and other components of a COM-application.

## **GeoMath - GeoObject - GeoPoint - ...**

A set of mathematical functions on geometric objects.

- Distance
- Projection
- ....

## **Applying Thematics on Flagged objects**

Thematics can be created and temporarily applied to Flagged objects. Useful for showing results without affecting the attributes of object or affecting any other part of the drawing.

## **Link name relative**

The link (reference to external file) can be set relative or absolute.

## **Import images embedded in Document**

In Pythagoras 12, images can now be embedded in the document.

## **IntersectingLines - Undershoot - Overshoot**

The type of objects this method works on is extended with curves (curvature = 0). For curves, the individual elements will be evaluated not the curve as a whole. Under- and Overshoot can also have a polygon as parameter. All elements of the outer boundary of a polygon will be evaluated.

## **CoordinateReferenceSystem - CoordinateReferenceSystems**

Allows to get information about the CRS's and transform data between CRS's

## **TiePointsSet - TiePointsSetCollection**

Allows to get information about the Tie Points Sets