NavisWorks Roamer

User Manual

NavisWorks Roamer: User Manual

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Chapter 1. Overview

The basis of NavisWorks Roamer is its ability to walk through any size model in real time. NavisWorks guarantees a user-defined frame rate using a unique algorithm which automatically calculates which items to render first during navigation, based on the size of items and distance from the viewpoint. Items which NavisWorks does not have time to render are therefore sacrificed or "dropped out" in the name of interactivity. These items are, of course, rendered when navigation ceases. The amount of drop-out depends on several factors including: hardware (in particular graphics card and driver performance - for a list of recommended graphics cards, visit www.navisworks.com [http://www.navisworks.com]), as well as the size of the NavisWorks navigation window and the size of the model. If you wish to reduce drop-out during navigation, you have the option to reduce frame rate and therefore trade it off against drop-out.

NavisWorks is sold as a base product, Roamer, and a set of plugins that "plug-in" to it for additional functionality such as for file publishing, photo-realistic rendering, and clash detection. This set of user guides is organized by product, so there is a book for base Roamer, and one for each plugin.

To start Roamer, double click on the Roamer icon on the desktop, or go to **Start, Programs, NavisWorks, Roamer**. The following chapters will describe the interface in more detail.

NavisWorks contains full context sensitive Help. Click  and click over the toolbar button or menu command to display the appropriate Help topic. Or alternatively go to the **Help** menu.

For more hints, tips and answers to frequently asked questions, see Chapter 17 or alternatively, go to the NavisWorks website at www.navisworks.com [http://www.navisworks.com].

Chapter 2. File Management

With NavisWorks Roamer you can open a wide variety of native 3D CAD file types without having to have the CAD application on your machine. See Chapter 3 for more detailed information on these file formats and their options. File management all happens with the **File** menu and the **Standard** toolbar.

2.1. File Menu

The **File** menu includes the following items:

- New
- Open
- Append
- Save
- Save As
- Publish
- Print
- Print Preview
- Print Setup
- Delete File
- Send
- Export
- Recently opened files
- Exit

2.2. New Files

This option resets NavisWorks and closes existing files.

To create a new file

- Go to **File, New**

or

-

 on the **Standard** toolbar.

2.3. Opening Files

With NavisWorks Roamer you can open a wide variety of native CAD file types without having to have the CAD application on your machine. See Chapter 3 for more detailed information on these file formats and their options. To open a model file

- Go to **File, Open...**

or

- Click **Open**  on the **Standard** toolbar.

Note

The standard **Open** dialog use of **Shift** and **Control** keys allows multiple files to be selected and appended to the current set of models.

2.4. Appending Files

NavisWorks enables you to build up a complex scene from smaller models by appending, or uniting, multiple model files together, which can be of any type that NavisWorks Roamer supports. (See Chapter 3 for more detailed information on these file formats and their options).

Each file has its own units and when appending more files to the scene, each file is automatically scaled to match the units of the first file loaded into the scene. Each file type has a default unit associated with it that it uses when loading files of that type. You can change this associated unit in the **Units** tab of the **Global Options** dialog (see Section 14.7 for more detailed information). However, once a file is loaded, you can change its unit scaling using the **Edit, File Transform** function. See Section 8.9 for more information.

The combined set of models may be published as a single NavisWorks .nwd file using the NavisWorks Publisher plugin. These models can then be viewed with NavisWorks Freedom™ free viewer. See Section 4.1 for more information.

You can also save the combined set of models as an .nwf file. No geometry is saved in this format, but a list of appended files, along with their path relative to the .nwf file is saved, along with any overrides, comments, redlines, viewpoints or other NavisWorks specific information. See Section 2.5 for more information on saving files.

To append a file

- Go to **File, Append...**

or

- Click **Append**  on the **Standard** toolbar.

Note

The standard **Open** dialog use of **Shift** and **Control** keys allows multiple files to be selected and appended to the current set of models.

2.5. Saving Files

When you have finished reviewing a model or a set of models and are exiting NavisWorks, you are prompted to save. When saving to a NavisWorks .nwf file, only a list with pointers to the files currently loaded is saved, along with the scene's environment, the current view, clash results (if available) and viewpoints. If you want to take a snapshot of the scene, including all geometry, then you need to publish an .nwd file. See Section 2.7 for information on how to do this.

Saving a file

1.

- Go to **File, Save**

or

- Click **Save**  on the **Standard** toolbar.

2. Enter a name and location for the file, if you wish to change the existing name.

3. Click **Save** to save the file or **Cancel** to return to NavisWorks without saving.

2.6. Saving and Renaming Files

This is exactly the same as the **Save** function (see Section 2.5, but it gives you the opportunity to rename the file that you are saving.

Saving a file with a new name

1. Go to **File, Save As...**

2. Enter a new name and location to store the file.

3. Click **Save** to save the file or **Cancel** to return to NavisWorks without saving.

2.7. Publishing Files

Publishing a NavisWorks .nwd file takes a snapshot of the current scene that cannot then be changed (i.e. files cannot be deleted from a published .nwd file). The file can also be used with the NavisWorks Freedom™ free viewer. This command is only available if you have the NavisWorks Publisher plugin.

See Section 4.1 for more information.

2.8. Printing

As you would expect, you can print a hard copy of the current viewpoint to any printer or plotter.

2.8.1. Printing the Current Viewpoint

When the print option is selected it prints the current viewpoint scaled to fit and centered on the page.

Printing the current viewpoint

1.

- Go to **File, Print...**

or

- Click **Print**  on the **Standard** toolbar.

2. Check the printer settings are as required and click **OK** to print the viewpoint or **Cancel** to return to NavisWorks without printing anything.

Note

The maximum image size is 2048x2048 pixels.

The **Properties** button controls printer-specific ink and paper settings.

2.8.2. Previewing Printouts

Before you print out a copy of the model you are working on, you may wish to see how it will appear.

Previewing a model before printing

1. Go to **File, Print Preview...**.
2. Use **Zoom In** and **Zoom Out** to do just that with the preview image.
3. Click **Print, OK** to confirm and print the image, or click **Close** to return to NavisWorks.

2.8.3. Setting up printouts

This option enables the setting up of paper size and orientation options.

Changing the print setup

1. Go to **File, Print Setup...**.

   The print setup dialog box is displayed.
2. Make changes as required to the paper, orientation and click on **Properties** to change printer-specific settings.
3. Click **OK** to print the image, or click **Cancel** to return to NavisWorks.

2.9. Deleting Files

This command deletes the selected file from the scene. It is only available when a single model file is selected and there are more than one files appended in the scene.

Note

You cannot delete files from within a "published" NavisWorks .nwd file (see Section 2.7. You can only delete appended files, whether they were appended manually, or within an .nwf file.

To delete a file

- Go to **File, Delete File**

Note

It is not possible to **undo** this command.

2.10. Emailing Files

NavisWorks is a communication tool and the **Send** feature makes it easy for you to send your current

model along with its viewpoints. The **Send** command uses your current mail exchange service and will prompt you to set one up if it cannot find one.

Sending a mail will first save the current working file, so you are guaranteed to always send the latest review.

To send a file by email from within NavisWorks

- Go to **File, Send...**

or

- Click **Send**  on the standard toolbar.

This accesses your mail package and sends the current file as an email attachment.

Receiving 3D Mail

If an .nwf file is received, NavisWorks will search for the appended files first using the absolute path that the sender originally saved the file with. This is useful if a team is on a local network and the files can be found using the Universal Naming Convention (UNC). Otherwise, a team not sharing a server can organize a project using the same file hierarchy and drive letter and NavisWorks can find the files this way.

If NavisWorks is unable to find the files, then the recipient can save the attached .nwf in a directory where all the appended files are located. The .nwf can then look for these files relative to its own location.

This way, you are able to move a whole sub-directory from your projects directory to a completely new location. Save the .nwf file in this new place and it will be able to search for the files from here.

2.11. Exporting Files

The export option outputs the current viewpoint in one of three ways:

- Windows bitmap (.bmp)
- JPEG format (.jpg)
- Piranesi Epix format (.epx)

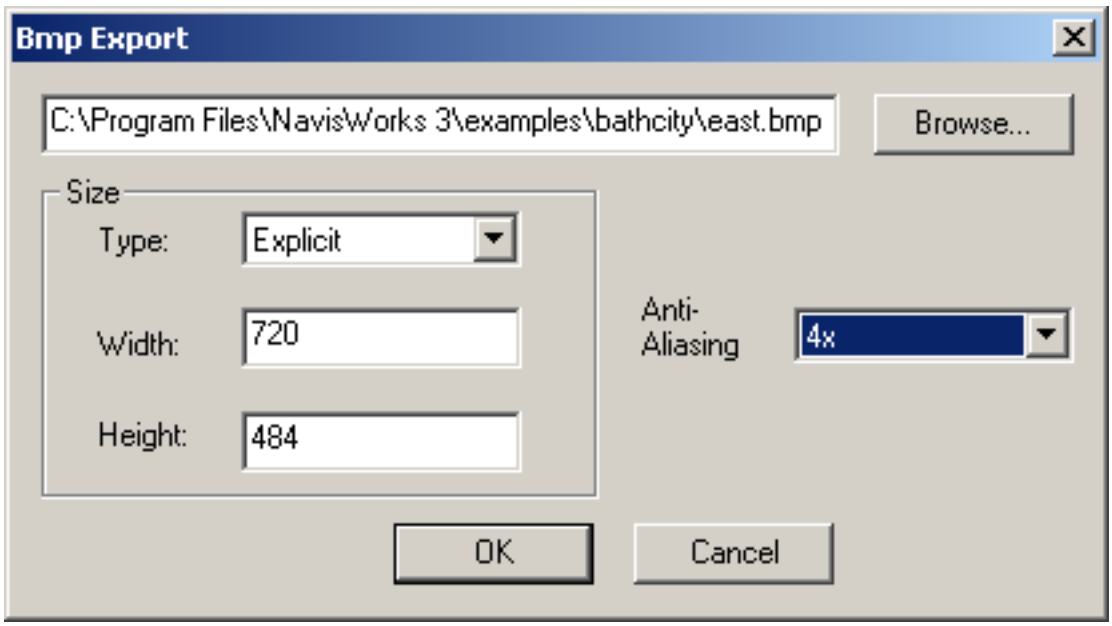
It is also possible to export an animation to an .avi file.

2.11.1. Exporting to a Bitmap

Exporting the current viewpoint to a bitmap

1. From the **File** menu, choose **Export, Windows Bitmap...**

   The **BMP Export** dialog box is displayed:



2. Enter a new file name to export, if you wish to change from the existing filename.

3. Select the required type, width and height options and set the required anti-aliasing from drop down list.(see Section 2.11.5 for more details).

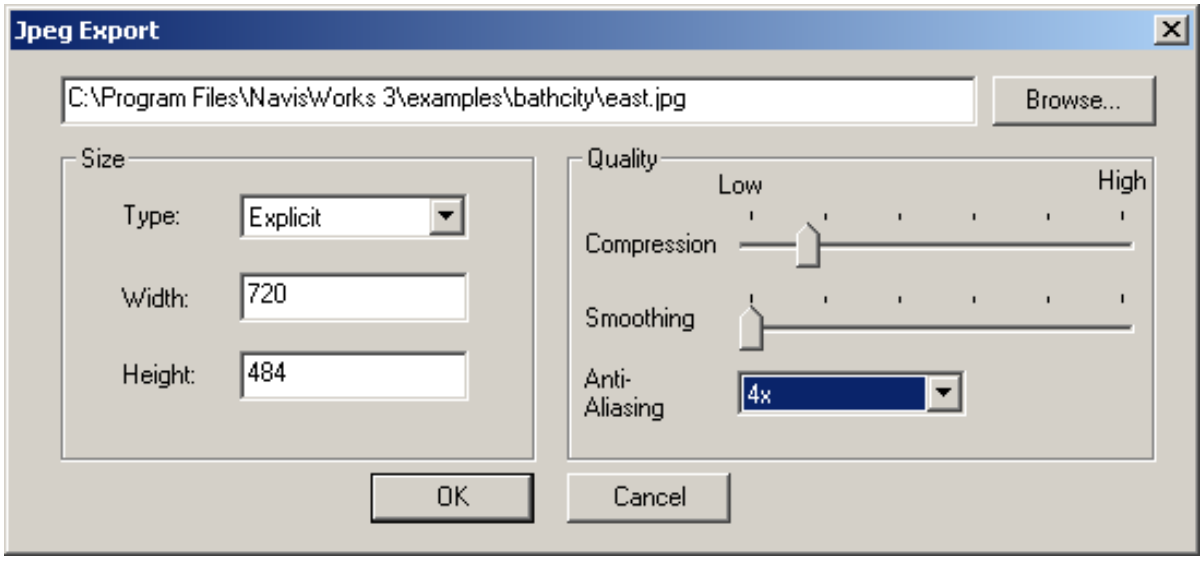
4. Click **OK** to export the file, or **Cancel** to return to NavisWorks.

2.11.2. Exporting to a JPEG

Exporting the current viewpoint to a JPEG

1. From the **File** menu, choose **Export, Jpg...**

   The **JPEG Export** dialog box is displayed:



2. Enter a new file name to export, if you wish to change from the existing filename.

3. Select the required type, width and height options and set the required anti-aliasing from drop down list.(see Section 2.11.5 for more details). With a JPEG file, you can also trade off compression against quality. The higher the compression (and therefore smaller the file), the worse the image quality is and vice-versa.

4. Click **OK** to export the file, or **Cancel** to return to NavisWorks.

2.11.3. Exporting to a Piranesi Epix format

Exporting an .epx file for rendering in Informatix's Piranesi

1. From the **File** menu, choose **Export, Piranesi EPiX...**

2. Enter a new file name to export, if you wish to change from the existing filename.

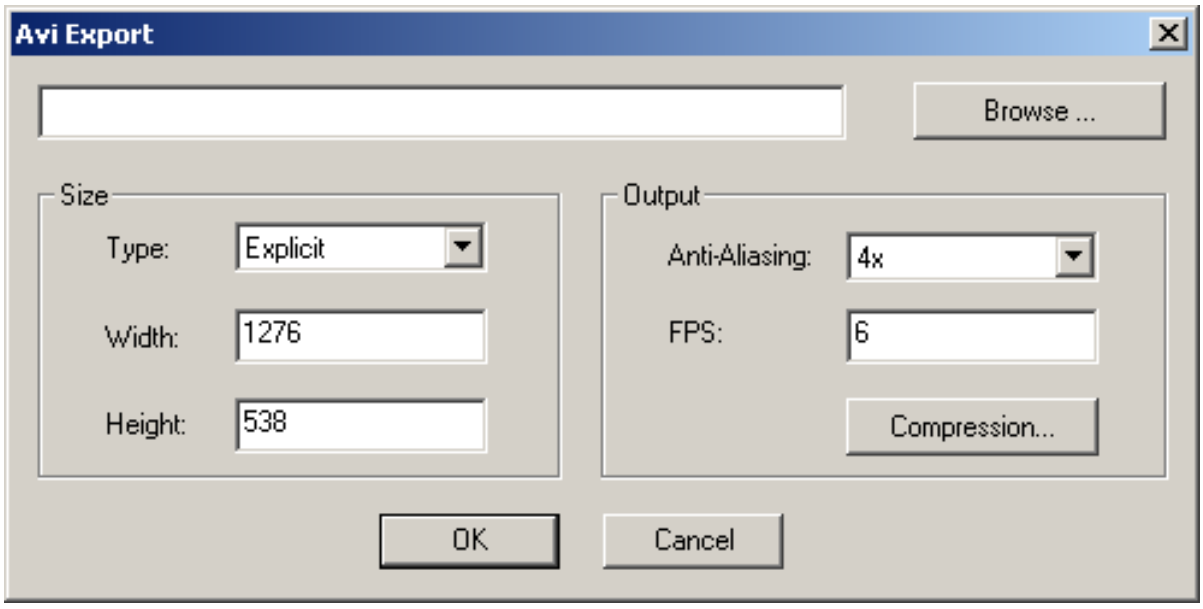
3. Click **Save** to export the file, or **Cancel** to return to NavisWorks.

2.11.4. Exporting to a an .avi

Exporting an animation to an .avi file

1. With an animation selected, from the **File** menu, choose **Export, Avi...**

2. The **AVI Export** dialog box is displayed:



3. Enter a new file name to export, if you wish to change from the existing filename.

4. Select the required type, width and height options and set the required anti-aliasing from drop down list.(see Section 2.11.5 for more details). For animations, you should also enter frames per second (FPS) values, and any file compression required.

Note

Clicking **Compression** will open a standard Windows™ dialog box that allows you to choose which codec to use, as well as its configuration. Only those codecs currently installed will be shown and the PC that the .avi file will be run on will also need the same codec installed.

5. Click **OK** to export the file, or **Cancel** to return to NavisWorks.

2.11.5. Controlling the size of an image

The size of the exported image/animation can be set in various ways:

Explicit allows you full control of the width and height (the dimensions are in pixels).

Aspect Ratio allows you to set the height, and the width is automatically calculated from the aspect ratio of your current view.

Current View takes the width and height of your current view.

Anti-Aliasing smoothes the edges of the exported images. The higher the number, the smoother the im-

age, but the longer they take to export. *4x* should be adequate for most situations.

Note

There is a maximum size of 2048 x 2048 pixels.

2.12. Quitting NavisWorks

Quitting NavisWorks

1. Go to **File, Exit**
2. If the model has been changed since opening it, NavisWorks will ask you whether you want to save any changes. Respond appropriately and NavisWorks will then close.

Chapter 3. Converting Files

With NavisWorks Roamer you can open a wide variety of native CAD file types without having to have the CAD application on your machine. Files read by NavisWorks include .dwg, .dgn, .dxf, SolidWorks, Solid Edge and Inventor. For a full list of CAD files that NavisWorks can open, please refer to the web site www.navisworks.com [http://www.navisworks.com]. This site will also explain which entities are read by NavisWorks and which are ignored, as well as any object property information that is converted. It is possible to load multiple files of different formats into the same scene in NavisWorks and set their units and origins appropriately. There are also a number of options to help optimize native CAD file reading.

In addition to these native CAD files, NavisWorks Roamer also reads its own native .nwc (NavisWorks Cache), .nwf (NavisWorks File review) and .nwd (published NavisWorks Data) file formats.

Some file formats, such as those from Autodesk's Viz and Graphisoft's ArchiCAD cannot be read directly by NavisWorks Roamer but there are exporters available to export to the NavisWorks .nwc file format from these applications. See Section 3.2 for more details.

3.1. File Readers

As well as the NavisWorks file formats, .nwf, .nwd and .nwc, Roamer can open a variety of native CAD applications' formats:

- .dwg
- .dxf
- .3ds
- .dgn
- .man
- .iges
- .step
- SolidWorks parts & assemblies
- Inventor parts & assemblies
- Solid Edge parts & assemblies

3.1.1. NWF Files

.nwf files can be saved by NavisWorks Roamer in order to save a current review of the scene. No geometry is saved in this format, but a list of appended files, along with their path relative to the .nwf file is saved, along with any overrides, comments, redlines, viewpoints or other NavisWorks specific information. .nwf files are useful when the CAD files are still changing throughout the design period, as the latest files are loaded each time the .nwf file is opened.

3.1.2. NWD Files

.nwd files are files published by NavisWorks Publisher and are snapshots of the model at a certain time. See Section 4.1 for more information on this.

3.1.3. NWC Files

Cache files (.nwc) are used when reading native CAD files, such as files from AutoCAD or MicroStation. By default, when NavisWorks Roamer opens a native CAD file, it first checks in the same directory whether there is a NavisWorks cache file present with the same name as the CAD file but with a .nwc extension. If there is, and this cache file is newer than the native CAD file, then NavisWorks will open this file instead as it has already been converted to NavisWorks format and therefore will open much quicker. If, however, there is no cache file present, or the cache file is older than the native CAD file, then NavisWorks will have to open the CAD file and convert it. At this point, it will by default write a cache file in the same directory and with the same name as the CAD file, but with the .nwc extension, for speeding up the opening of this file in future.

See Section 3.2 for more information on why you might want to use the .nwc file exporters, what CAD applications you can support from and how.

Caching Options

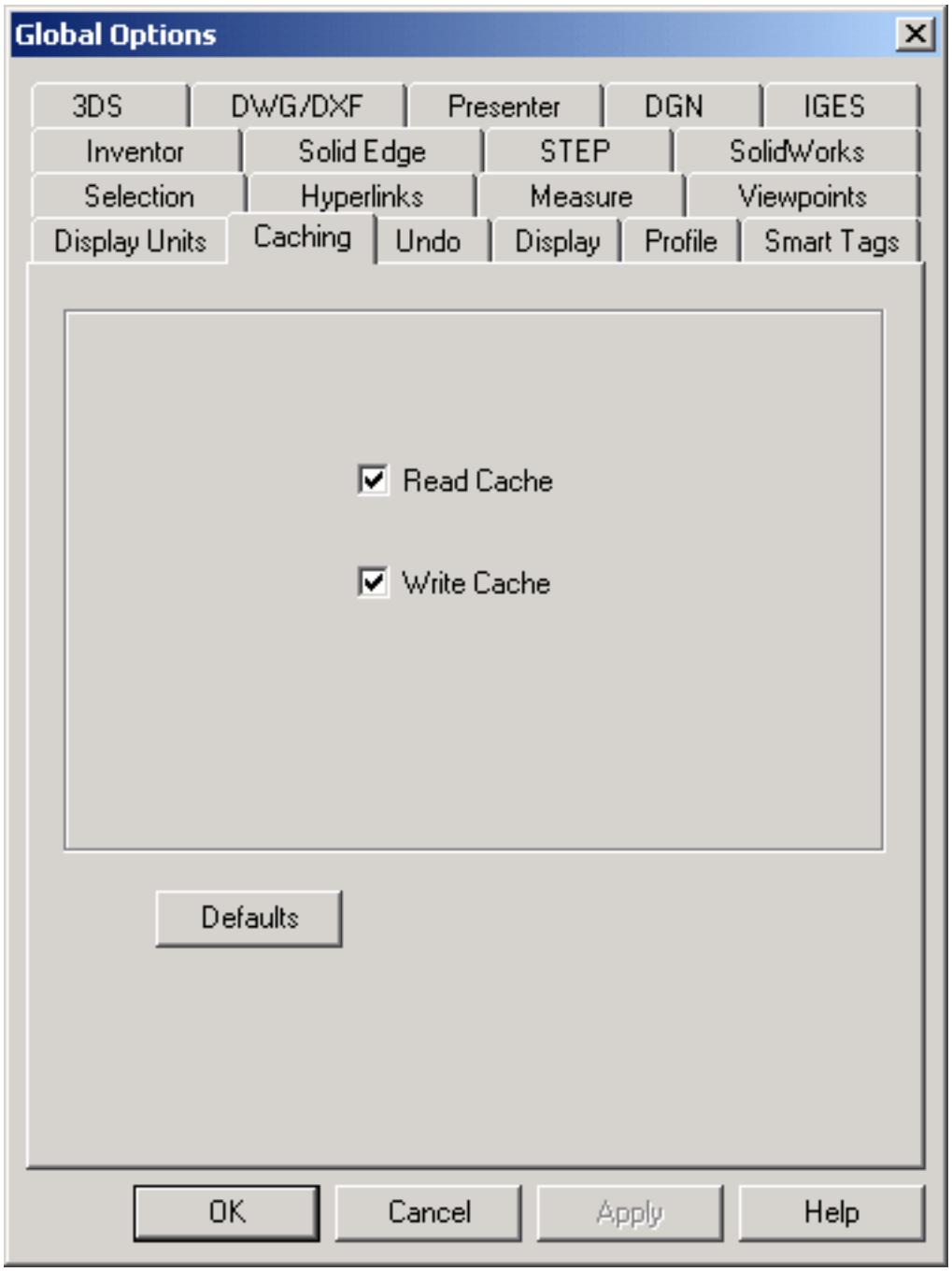
NavisWorks allows you to enable and disable the reading and writing of cache files.

This describes the default process. The options here enable you to enable and disable the reading and writing of cache files. For example, you may want to disable reading cache files to ensure that NavisWorks converts every native CAD file each time it is read, even though this is a slower process. Also, you may want to disable the writing of cache files in order to save on disk space and clutter, even though the cache files are generally many times smaller than the original native CAD files.

Setting caching options

1. Go to **Tools, Global Options**, and select the **Caching** tab.

   The Caching dialog box is displayed.



2. Uncheck the **Read Cache** box if you wish to ignore any existing caches when opening a native CAD file.

3. Uncheck the **Write Cache** box if you do not wish to write a cache file the next time a native CAD file is loaded.

4. Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

3.1.4. DWG and DXF Files

NavisWorks Roamer's .dwg and .dxf file reader uses Autodesk's ObjectDBX™ technology and so is guaranteed to read all object geometry and information for those third party applications that utilize the Object Modelling Framework.

The reader currently supports all surface (shaded) entities (3D faces, rectangular meshes, polyface meshes, circles, extruded lines and so on), including Proxy Graphics and custom objects such as ACIS based entities (3D Solid, Region), lines, points and snap points. Complex entities (shapes, dimensions, text) are not supported. The structure of the drawing is preserved including xrefs, blocks, inserts, AutoCAD color index, layers, views and active viewpoint. Entities are colored using the AutoCAD Color Index (ACI), so will match those in an AutoCAD "shaded" view.

There is also an .nwc file exporter for AutoCAD - see Section 3.2.1 for more details.

Note

The reader supports files from all products based on AutoCAD 2004 and earlier.

Supported Entities

- All 2D and 3D geometry, including arcs, lines, polylines with non-zero thickness, ACIS objects (regions and solids), polygon and polyface meshes, 3D faces and surfaces.
- Points and snap points
- Lines, polylines, circles, arcs with zero thickness.
- Named views.
- Layers.
- Colors.
- Blocks, inserts and multiple inserts.
- Groups.
- External references (xrefs).
- Hyperlinks.
- Entity handles.
- Attributes.
- File properties.

Unsupported Entities

- Lights.
- Textures.
- Splines.

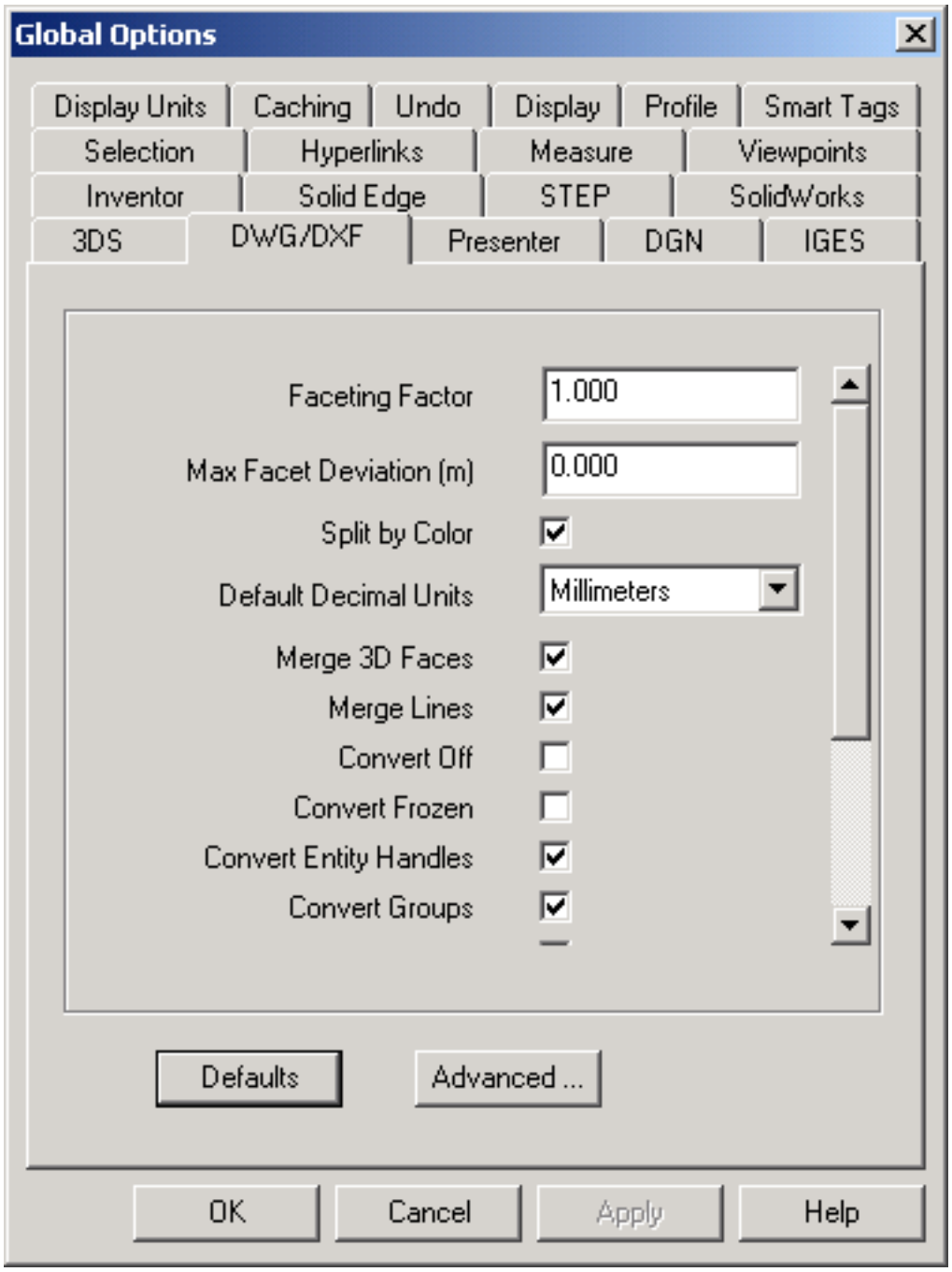
- Multi-lines.
- Linetypes.
- Dimensions and leaders.
- Raster bitmaps.
- Text or multi-line text.
- Construction lines (xlines and rays).
- Hatching.

DWG and DXF File Reader Options

Setting the .dwg and .dxf file reader options

1. Go to **Tools, Global Options, DWG/DXF**

   The **DWG/DXF** dialog is displayed



2. Enter the **Faceting Factor** (the value must be greater than 0). The higher the value, the more Navis-Works will facet rounded entities and therefore the smoother they will appear. See Faceting Factor for more information.

3. Enter the **Max Faceting Deviation**. This will facet entities to within the specified tolerance). This number uses the units of the model. See Max Deviation Factor for more information.

4.

Check the **Split by Color** check box if you want to be able to select parts of compound entities in NavisWorks. For example, a window object from Architectural Desktop may be split into a frame and a pane. If this check box is not checked, then you will only be able to select the window object as a whole, whereas if you check this check box, you will be able to select the individual pane and frame. However, the names of the pane and frame will be based on their color.

5. From the **Default Decimal Units** drop-down, choose the type of units that NavisWorks will use when opening .dwg and .dxf files. Note that NavisWorks cannot If the units turn out to be wrong, the model can be easily rescaled using the **File Transform** function (see Section 8.9 for more details).

6. Check the **Merge 3D Faces** check box if you want to reduce the complexity of the model as seen in the selection tree by interpreting ajoining faces with the same color, layer and parent as a single item. Leaving unchecked leaves these entities as separate items in NavisWorks.

7. Check the **Merge Lines** check box if you want to reduce the complexity of the model as seen in the selection tree by interpreting ajoining lines with the same color, layer and parent as a single item. Leaving unchecked leaves these entities as separate items in NavisWorks.

8. Check the **Convert Off** check box if you want to read layers that are switched off in .dwg and .dxf files. They will be converted but hidden in NavisWorks.

9. Check the **Convert Frozen** check box if you want to read layers that are frozen in .dwg and .dxf files. They will be converted but hidden in NavisWorks.

10. Check the **Convert Entity Handles** check box if you want to read entity handles as a property attached to the item in NavisWorks.

11. Check the **Convert Groups** check box if you want to retain the groups from .dwg and .dxf files, adding another selection level to the selection tree. See Chapter 6 for more information on selecting objects and the selection tree.

12. Check the **Convert Xrefs** check box if you want to convert any external reference files contained within the .dwg file. Unchecking this will give you more control over which files you append into NavisWorks.

13. Check the **Convert Views** check box if you want to convert the named views from the file into NavisWorks viewpoints.

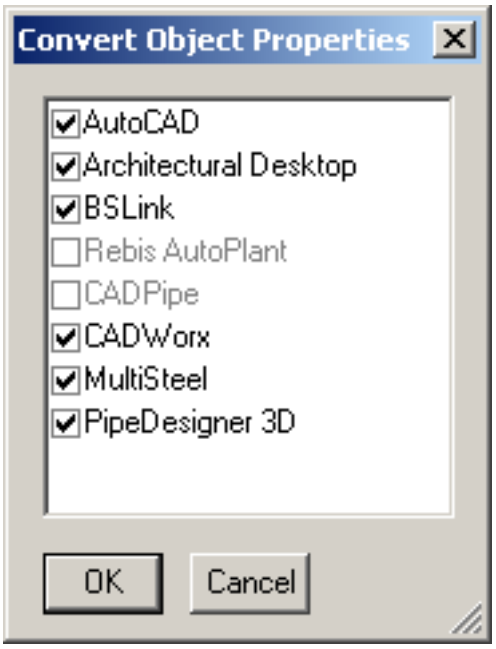
14. Check the **Convert Points** check box if you want to read any points from .dwg and .dxf files. See Section 9.4 for more information on how to display these in NavisWorks.

15. Check the **Convert Lines** check box if you want to read any lines and arcs from .dwg and .dxf files. See Section 9.4 for more information on how to display these in NavisWorks.

16. Check the **Convert Snap Points** check box if you want to read any snap points from .dwg and .dxf files. See Section 9.4 for more information on how to display these in NavisWorks.

17. Check the **AutoCAD 2000 Compatibility** check box if you want to read AutoCAD 2000 .dwg files - this provides support for any AutoCAD 2000 based object enablers that may be in use. If unchecked, ObjectDBX 2004 is used to read all files. You should use AutoCAD 2000 compatibility mode until you've upgraded your Autodesk products and/or object enablers to AutoCAD 2004 based ones.

18. Clicking the **Advanced** button will open a dialog which giving you the option to read object information from various third party applications that are built on AutoCAD.



Check those applications you wish to read information from.

19. Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

3.1.5. 3DS Files

3DS is a common file format that is supported by many CAD applications. The NavisWorks file reader reads all 2D and 3D geometry as well as texture maps. The hierarchy defined by the keyframe data from keyframe 0 is preserved, including instancing. Entities are positioned based on keyframe 0.

NavisWorks Roamer does not read .max files, but instead has exporters for Viz and Max versions 3 and 4. Entity support is the same as for the 3ds reader. See Section 3.2.3 for more information.

Textures from .3DS files come through into NavisWorks Presenter, though you should bear in mind that .3DS files contain file names in the 8.3 DOS format only and that various formats are not yet supported in Presenter (see below).

Supported Entities

- All 2D and 3D geometry

- Cameras
- Groups
- Texture maps in the formats: 8-bit color-mapped, 16-bit and 24-bit true color, uncompressed or Run Length Encoded .tga, .bmp, .jpg, .lwi (LightWork Image).
- Colors (from material color, not wireframe color - ambient, diffuse,shininess, transparency and self illumination)

Unsupported Entities

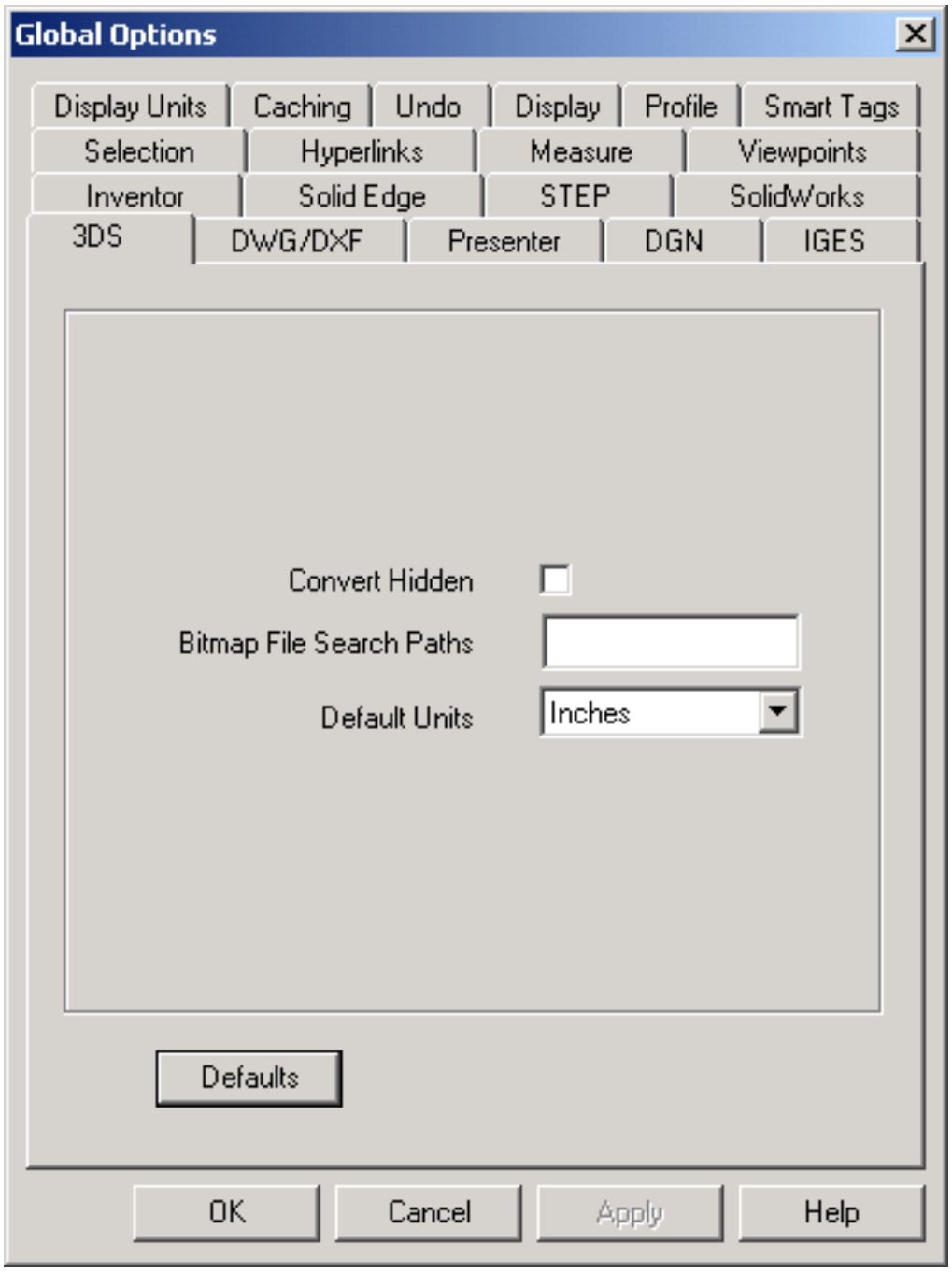
- Keyframes (objects are currently taken from keyframe 0)
- Texture maps in the formats: gray-scale .tga, .tif, .gif, .png.
- Other maps (e.g. bump maps, opacity maps, reflections etc.)
- Wireframe meshes
- Lines, splines
- Points
- Background images

3DS File Reader Options

Setting the .3ds file reader options

1. Go to **Tools, Global Options, 3DS**

   The **3DS** dialog is displayed



2. Check the **Convert Hidden** check box if you want to read hidden entities from the .3ds file. They will be converted but hidden in NavisWorks.

3. The paths of texture map files are not stored with the texture maps in the model so enter a semi-colon separated list of paths in **Bitmap File Search Paths** that the reader will search in when it finds texture maps in the model.

4.

From the **Default Units** drop-down, choose the type of units that NavisWorks will use when opening .3ds files. If the units turn out to be wrong, the model can be easily rescaled using the **File Transform** function (see Section 8.9 for more details).

5. Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

3.1.6. DGN and PRP Files

NavisWorks Roamer can read 3D .dgn and .prp files from Bentley's MicroStation, but does not support .cel files or 2D .dgn files. Reference files and instances of cells are respected and the selection tree reflects this file structure.

There is also an .nwc file exporter for MicroStation - see Section 3.2.2 for more details.

Note

The reader supports files from MicroStation SE, 95 and /J. It does not support MicroStation v8, MicroStation Modeller and any versions of MicroStation before SE.

Supported Entities

- All 2D and 3D geometry including shapes, complex shapes, meshes, cones, surfaces, B-spline boundaries, solids and SmartSolids, lines, arcs and ellipses.
- Splines and B-spline curves.
- Lights.
- Saved views.
- Levels.
- Cells and shared cells and their instancing.
- Colors and ambient, diffuse and shininess properties of materials from .pal and .mat palette and material files.
- Texture maps.
- Reference files including aliases.
- Text will be converted into hyperlink tags (see Section 13.4 for details on hyperlinks).
- Family and Part information from TriForma and PDS object information from .drv files.
- DMRS and database linkage and association ID's.

Unsupported Entities

- Raster bitmaps.

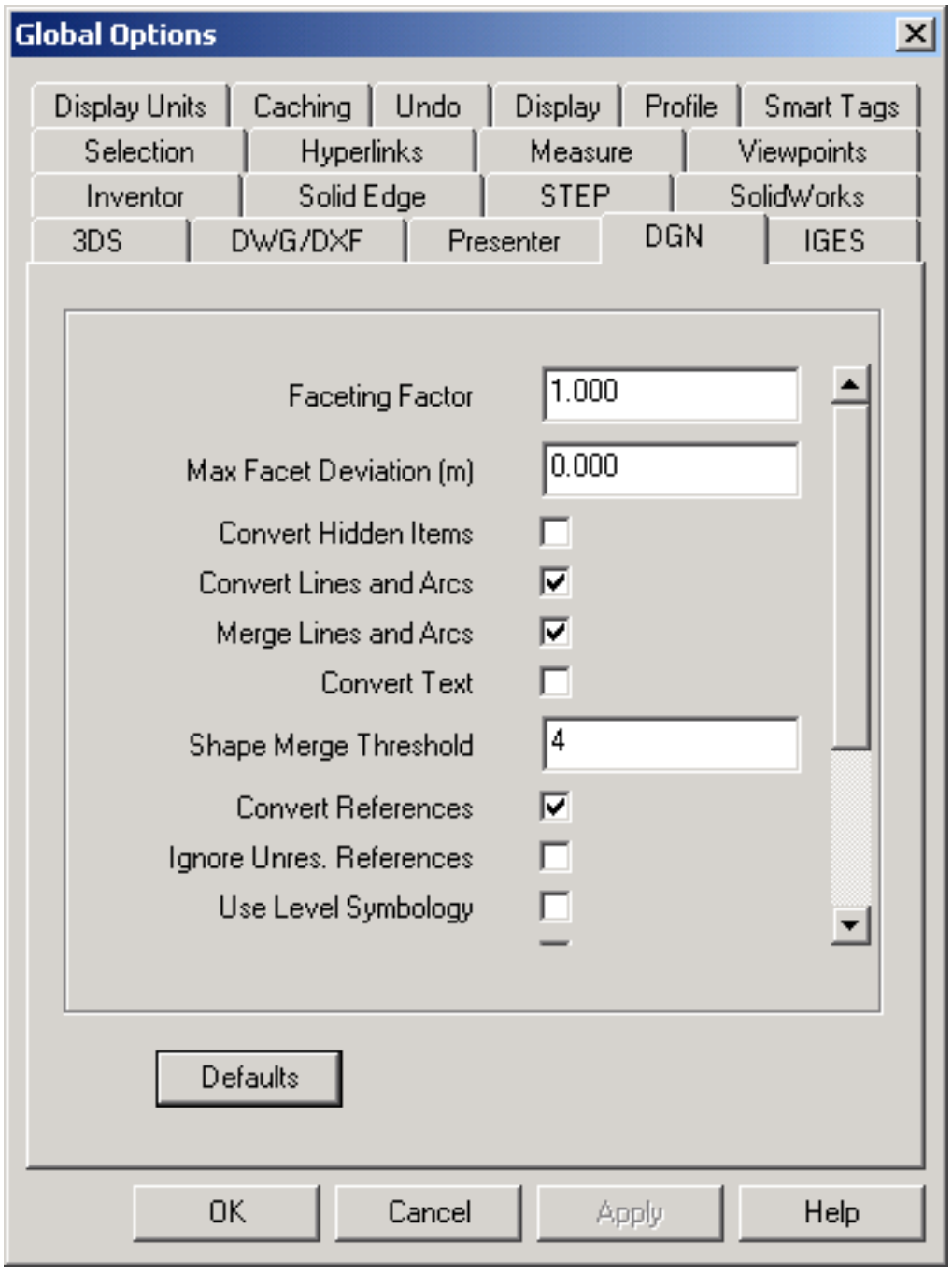
- Dimensions and leaders.

DGN File Reader Options

Setting the .dgn file reader options

1. Go to **Tools, Global Options, DGN**

   The **DGN** dialog is displayed



2. Enter the **Faceting Factor** (the value must be greater than 0). The higher the value, the more Navis-Works will facet rounded entities and therefore the smoother they will appear. See Faceting Factor for more information.

3. Enter the **Max Faceting Deviation**. This will facet entities to within the specified tolerance). This number uses the units of the model. See Max Deviation Factor for more information.

4.

Check the **Convert Hidden Items** check box if you want to read hidden entities from the .dgn file. They will be converted but hidden in NavisWorks.

5. Check the **Convert Lines and Arcs** check box if you want to read lines, splines, curves, arcs, circles or ellipses from the .dgn file.

6. Check the **Merge Lines and Arcs** check box if you want to reduce the complexity of the model as seen in the selection tree by interpreting ajoining lines etc. with the same color, level and parent as a single item. Leaving unchecked leaves these elements as separate items in NavisWorks.

7. Check the **Convert Text** check box if you want to read text from the .dgn file. Text will be converted into smart tags in NavisWorks.

8. Enter the **Shape Merge Threshold** into the box. See Shape Merge Threshold for more information on Shape Merge Threshold.

9. Check the **Convert References** check box if you want to read reference files from the .dgn file.

10. Check the **Ignore Unres. References** check box if you want to ignore unresolved reference files from the .dgn file. If this check box is unchecked, then you will be presented with a dialog to find any unresolved reference files at run time.

11. Check the **Use Level Symbology** check box if you want to use the level symbology from MicroStation so that items in NavisWorks take their color from level rather than the default element color in MicroStation.

12. Check the **Use Materials** check box if you want to use MicroStation's materials in place of its colors in NavisWorks. If you choose not to export materials, NavisWorks will assign the same colors as in the MicroStation scene. Assigning materials will assign the same textures, diffuse, ambient and specular colors to the elements as in the MicroStation scene.

13. Enter a semi-colon separated list of paths in **Material Search Path** that the reader will search in for MicroStation palette (.pal) and material (.mat) files in order to convert its materials.

14. Check the **Convert PDS** check box if you want to read object information from Intergraph's Plant Design System™ while reading the .dgn files.

15. Check the **Convert TriCAD** check box if you want to read object information from Triplan's TriCAD™ while reading the .dgn files.

16. Check the **Convert Triforma** check box if you want to read object information from Bentley's Triforma™ while reading the .dgn files.

17. Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

3.1.7. MAN Files

NavisWorks Roamer can read .man files from Informatix's MicroGDS™ version 6.0 or later. MicroGDS™ projects are not supported. The workaround is to first export the desired project window as a .man file.

Supported Entities

- Clump primitives.
- Light styles.
- Material styles.
- Views.
- Layers.
- Instances.
- Object data structure.

Unsupported Entities

- Line primitives.
- Text primitives.
- Photo primitives.

3.1.8. IGES Files

NavisWorks Roamer uses the Open CASCADE libraries to read and tessellate .igs and .iges files up to and including IGES 5.3.

Supported Entities

- Groups.
- Colors.
- Planes.
- Parametric spline, ruled, B-spline, offset, bounded, trimmed and plane surfaces and surfaces of revolution.
- Tabulated cylinders.
- Solids and manifold solids.
- Shells.
- Faces.

Unsupported Entities

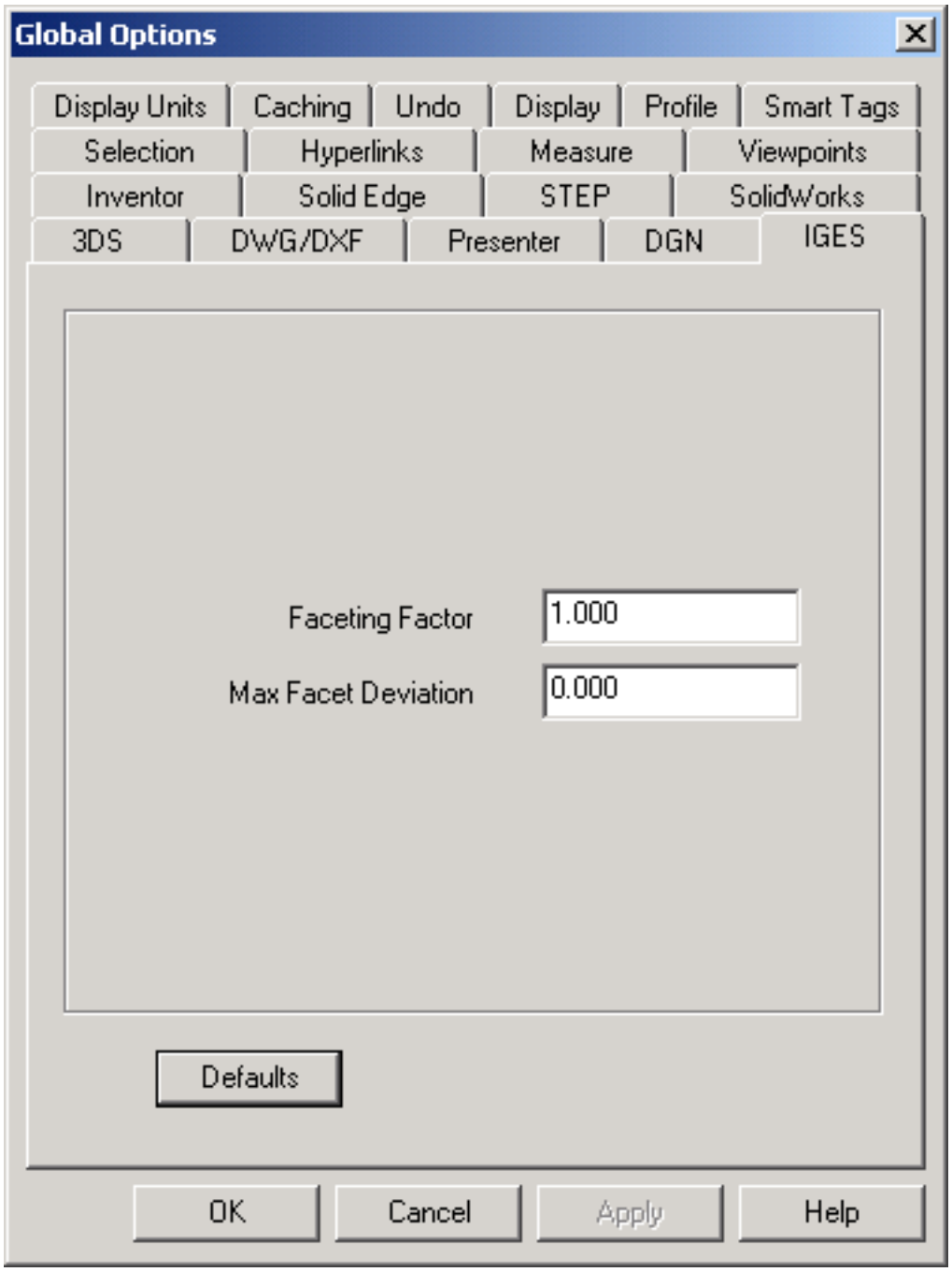
- Points.
- Lines.
- Circular or conic arcs.
- Compsite, parametric spline, B-spline, or offset curves.
- Boundaries.
- Attributes.

IGES File Reader Options

Setting the IGES file reader options

1. Go to **Tools, Global Options, IGES**

   The **IGES** dialog is displayed



2. Enter the **Faceting Factor** (the value must be greater than 0). The higher the value, the more Navis-Works will facet rounded entities and therefore the smoother they will appear. See Faceting Factor for more information.

3. Enter the **Max Faceting Deviation**. This will facet entities to within the specified tolerance). This number uses the units of the model. See Max Deviation Factor for more information.

4.

Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

3.1.9. STEP Files

NavisWorks Roamer uses the Open CASCADE libraries to read and tessellate .stp and .step files up to and including AP214 CC2 and AP203.

Supported Entities

- Assemblies.
- Colors.
- Planes.
- B-spline and rational B-spline, Bezier, conical, cylindrical, offset, rectangular trimmed, linear extrusion, bounded, manifold, spherical, toroidal, uniform and quasi-uniform, surfaces.
- Shells.
- Advanced and facetted boundary representations (BReps)

Unsupported Entities

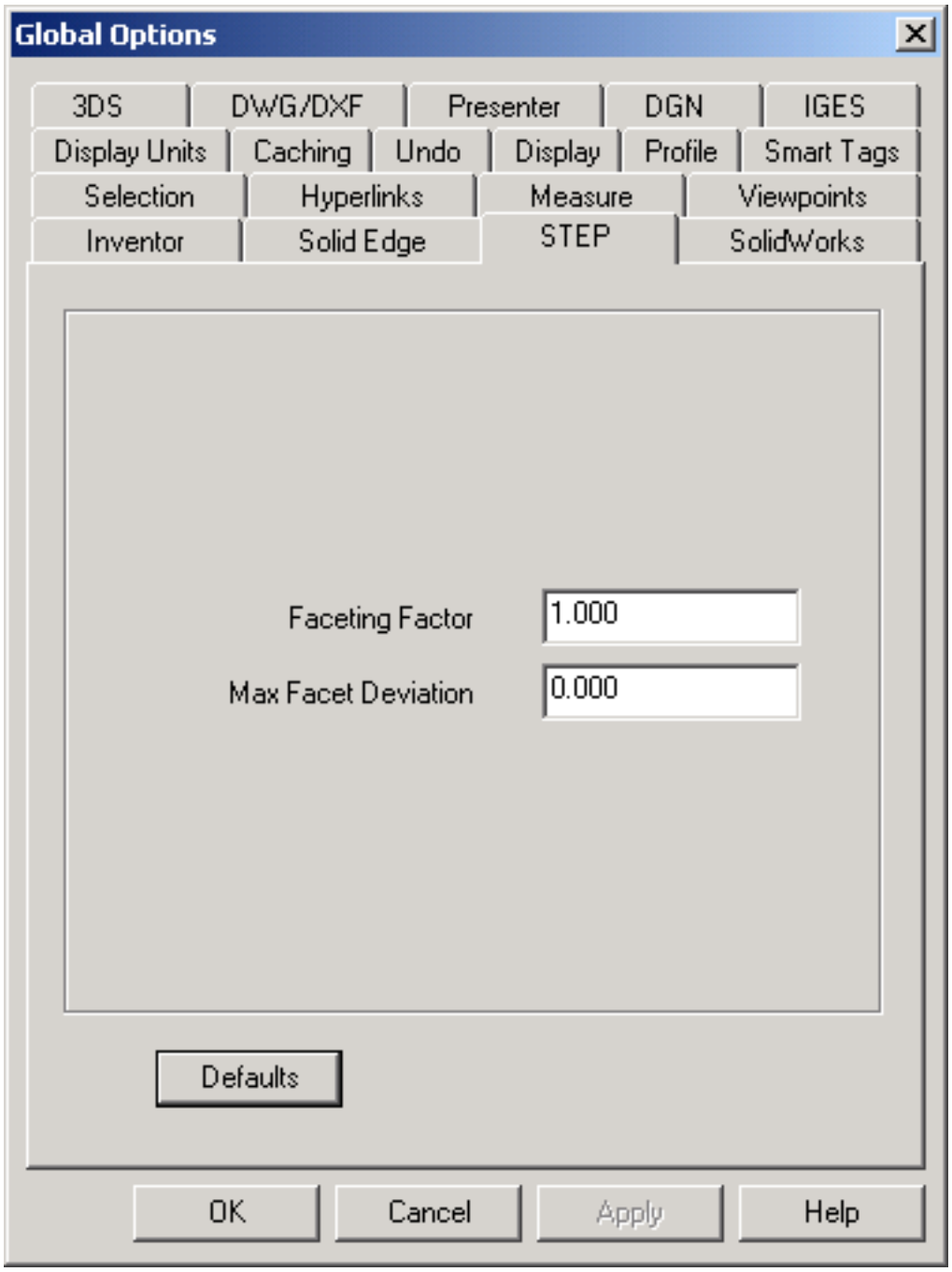
- Points.
- PCurves, B-spline, rational B-spline, Bezier, trimmed, uniform or quasi-uniform curves.
- Circles or ellipses.
- Hyperbola.

STEP File Reader Options

Setting the STEP file reader options

1. Go to **Tools, Global Options, STEP**

   The **STEP** dialog is displayed



2. Enter the **Faceting Factor** (the value must be greater than 0). The higher the value, the more Navis-Works will facet rounded entities and therefore the smoother they will appear. See Faceting Factor for more information.

3. Enter the **Max Faceting Deviation**. This will facet entities to within the specified tolerance). This number uses the units of the model. See Max Deviation Factor for more information.

4.

Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

3.1.10. SolidWorks Files

The SolidWorks file reader reads SolidWorks display lists directly from SolidWorks part (.sldprt) and assembly (.sldasm) files. This is the same technique as SolidWorks' own viewer and has the same limitations. The SolidWorks files must contain valid and up-to-date display lists. The faceting level of the data is determined by the faceting level in SolidWorks when the display lists were created.

Note

Part and Assembly files from SolidWorks 97 plus to SolidWorks 2003 are supported.

Supported Entities

- Parts and assemblies.
- Faces.
- Bodies.
- Current view.
- Model space lights and directional paper space lights.
- Ambient, diffuse, specular, emission, shininess and transparency material properties.

Unsupported Entities

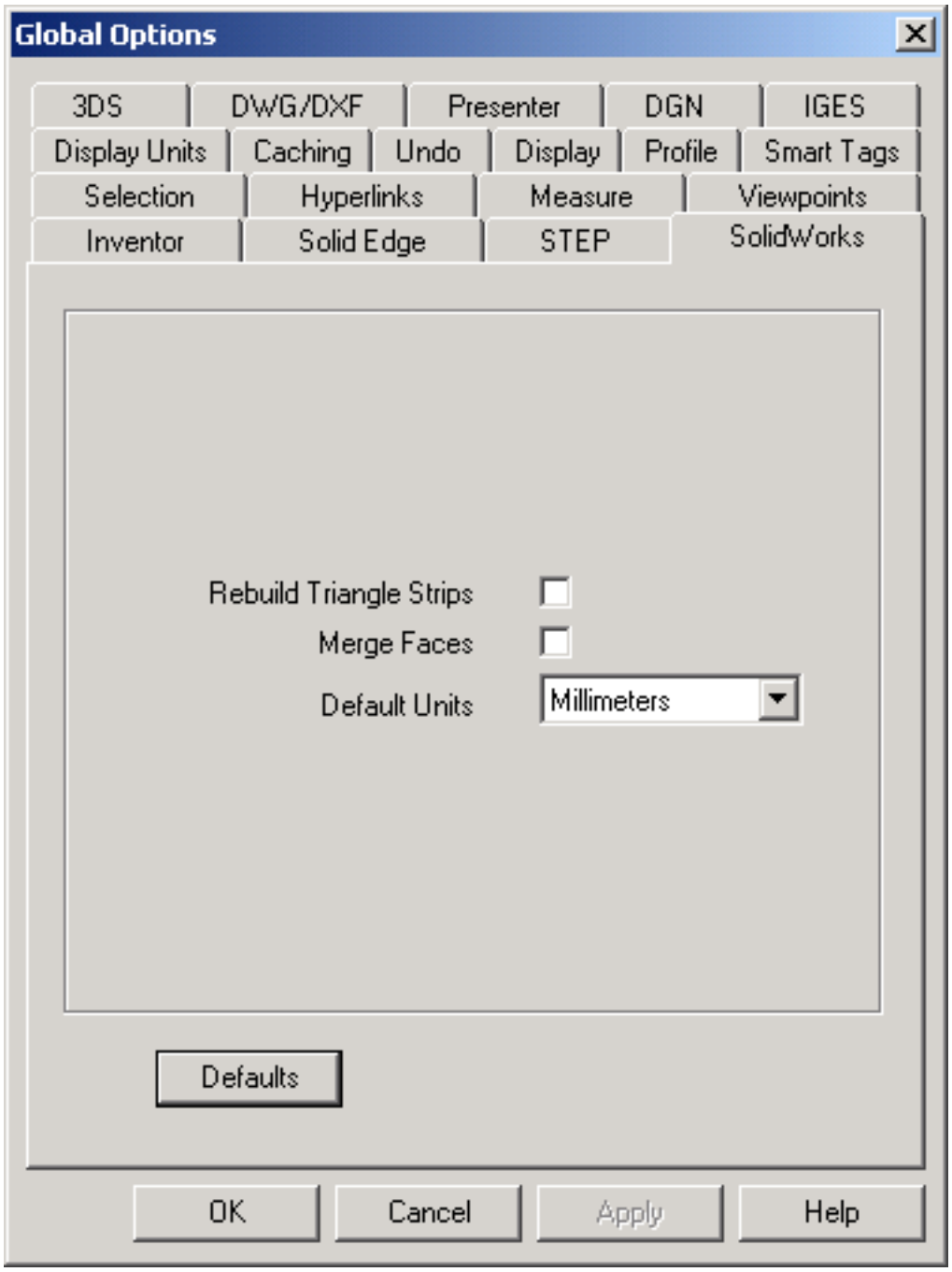
- Saved views.
- Non-directional paper space lights..
- Configurations.
- PhotoWorks textures.

SolidWorks File Reader Options

Setting the SolidWorks file reader options

1. Go to **Tools, Global Options, SolidWorks**

   The **SolidWorks** dialog is displayed



2. Check the **Rebuild Triangle Strips** check box if you want to interpret the triangle strips in SolidWorks models in a form more suitable for NavisWorks. The model will take longer to import but may result in a slightly smaller file size.

3. Check the **Merge Faces** check box if you want to reduce the complexity of the model as seen in the selection tree by interpreting a body as a single item consisting of a group of faces. Leaving unchecked leaves the faces as separate items in NavisWorks.

4. From the **Default Units** drop-down, choose the type of units that NavisWorks will use when opening 3ds files. If the units turn out to be wrong, the model can be easily rescaled using the **File Transform** function (see Section 8.9 for more details).

5. Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

3.1.11. Inventor Files

Autodesk Inventor™ part (.ipt), assembly (.iam) and project (.ipj) files can be read by NavisWorks Roamer. Drawing (.idw) files cannot be read.

Note

The reader supports files from Autodesk Inventor™ v6 and earlier.

Supported Entities

- All geometry.
- Assembly structure.
- Materials.

Unsupported Entities

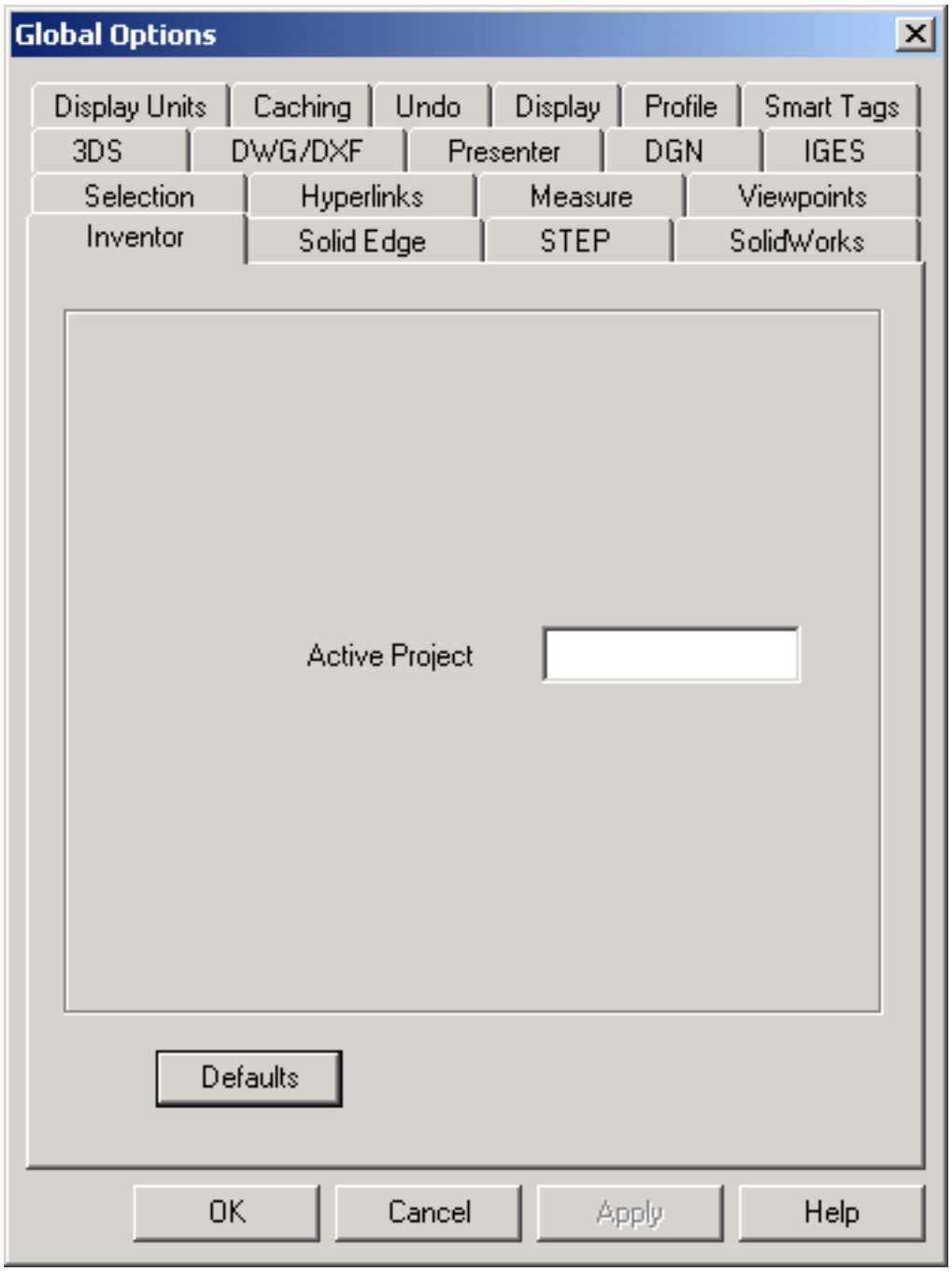
- Material names.

Inventor File Reader Options

Setting the Inventor file reader options

1. Go to **Tools, Global Options, Inventor**

   The **Inventor** dialog is displayed



2. The **Active Project** text box displays the path of the current Inventor project. To change project, open the corresponding project file or enter the path to it here.

3. Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

3.1.12. Solid Edge Files

EDS Solid Edge™ part (.prt) and assembly (.asm) files can be read by NavisWorks Roamer.

Note

The reader supports files from Solid Edge™ v14 and earlier.

Supported Entities

- All geometry.
- Assembly structure.
- Materials.

Unsupported Entities

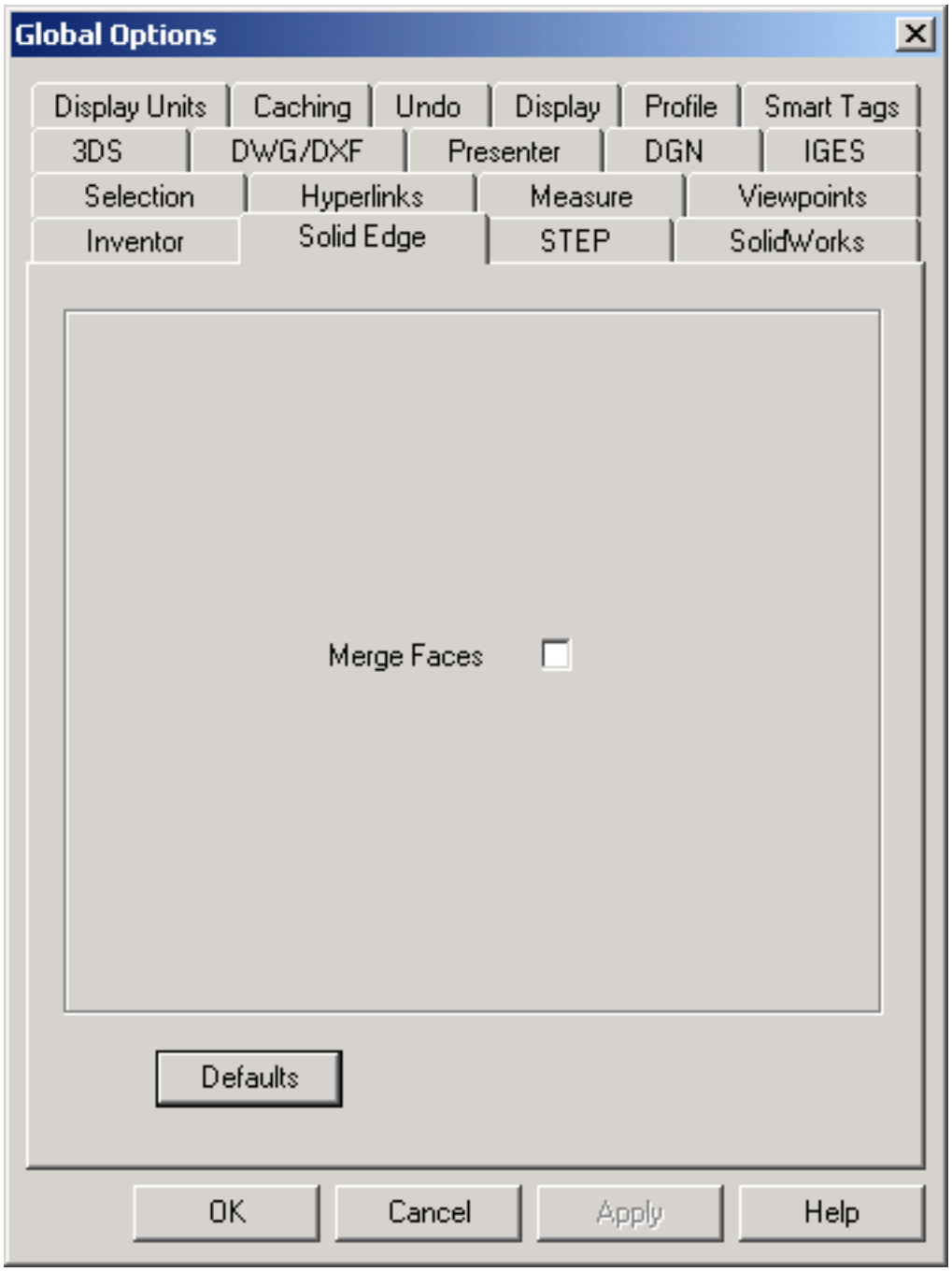
- Material names.

Solid Edge File Reader Options

Setting the Solid Edge file reader options

1. Go to **Tools, Global Options, Solid Edge**

   The **Solid Edge** dialog is displayed



2. Check the **Merge Faces** check box if you want to reduce the complexity of the model as seen in the selection tree by interpreting a body as a single item consisting of a group of faces. Leaving unchecked leaves the faces as separate items in NavisWorks.

3. Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

3.2. File Exporters

Cache files can in some cases be exported from the CAD application itself. Currently, they can be written directly from AutoCAD, MicroStation, ArchiCAD and Viz. There are two reasons you may want to use cache files in this way:

1. NavisWorks Roamer cannot read the native CAD file directly, in the case of ArchiCAD and Viz, but you wish to view the files created in these applications.
2. You wish to get a better quality file into NavisWorks. Although the direct file readers are adequate the majority of the time, the exporters can get a better quality. So if you are missing some items, or some items are being read wrongly by reading the native CAD files directly, then try exporting to a .nwd file and reading this into NavisWorks Roamer instead. See Section 3.2 for more information.

There are .nwc file exporters for the following CAD applications:

- Autodesk's AutoCAD
- Bentley's MicroStation
- Discreet's Viz and Max
- Graphisoft's ArchiCAD

3.2.1. AutoCAD .nwc Exporter

NavisWorks Roamer comes with ARX plugins for any AutoCAD™ based product, such as Architectural Desktop™, that enable you to export an .nwc file directly from the CAD application in which it was created. As long as AutoCAD is already installed on the computer when NavisWorks is installed, the ARX plugin is installed with NavisWorks on a **Custom Install** or **Full Install** and ready for use.

Note

If you install AutoCAD after NavisWorks, then install NavisWorks again, choosing the **Custom Install** option and choose the relevant version of AutoCAD. The NavisWorks installer will find the right place for the plugin and set up all relevant registry entries for you.

The .nwc exporter is available for any AutoCAD based product between AutoCAD 14 and 2004 releases.

You can also publish .nwd files directly from AutoCAD™ if you have the Publisher plugin. For more details, refer to Section 4.2.

Exporting .nwc files from AutoCAD

1. Type **nwcout** at the command line.
2. The standard Windows™ **Save As** dialog is displayed, so choose the location and name of the .nwc file to be exported.

3. Click **OK** to export the file or **Cancel** to return to AutoCAD without exporting it.

See Section 3.1.4 for what entities are and are not supported by the AutoCAD exporter.

If, on typing **nwcout** at the command line, you get an error, you probably have to load the ARX plugin manually. You should only have to do this once.

Loading the NavisWorks ARX Plugin

Loading the ARX plugin manually

1. Type **ARX** (followed by return) at the command line.

2. Then type the letter **l** (followed by return) at the command line, for "Load".

3. The **Select ARX file** dialog will be displayed, so browse to the ARX plugin. By default, for AutoCAD R14, this will be `C:\Program Files\NavisWorks 3\NWExport\AutoCAD_R14_Plugin_Files\nwexport.arx`, for AutoCAD 2000 based applications, this will be `C:\Program Files\NavisWorks 3\NWExport2000\AutoCAD2000_Plugin_Files\nwexport2000.arx`, and for AutoCAD 2004 based applications, `C:\Program Files\NavisWorks 3\NWExport2004\AutoCAD2004_Plugin_Files\nwexport2004.arx`.

4. Click **OK** to load the ARX plugin.

5. You should now be able to use the **nwcout** command from AutoCAD to export an .nwc file.

The NavisWorks Partial Menu for AutoCAD

If you prefer to work from menus, there is a partial menu available to run this export command from, along with the other NavisWorks ARX plugins.

Loading the NWExport partial menu

1. At the command line, type **menuload** (followed by return).

2. The **Menu Customization** dialog will be displayed, so change the **Files of type** to **Menu Template (*.mnu)** and browse to the partial menu. By default, for AutoCAD R14, this will be `C:\Program Files\NavisWorks 3\NWExport\Eng\LwNw_Export.mnu`, for AutoCAD 2000 based applications, this will be `C:\Program Files\NavisWorks 3\NWExport2000\Eng\LwNw_Export.mnu`, and for AutoCAD 2004 based applications `C:\Program Files\NavisWorks`

.

3. Click **Load** and than **Yes** to the dialog that appears.

You should now have a **NavisWorks** menu just before the **Help** menu and this will be reloaded into future AutoCAD sessions. This menu contains 4 items:

- Publish .nwd

  See Section 4.2 for more details.

- Export .nwc

  See Section 3.2.1 for more details.

- NavisWorks Export Options

  See Section 3.2.1 for more details.

- Navigator

  See Section 3.3.1 for more details.

AutoCAD .nwc Exporter Options

Available from the NavisWorks menu, or by typing **nwopt** at the command prompt, this enables you to configure various elements of the exported file to your choosing.

See Section 3.1.4 for details on what each of the options does.

Once you have set the options, future exports of .nwc and publishes of .nwd files will use these settings.

3.2.2. MicroStation .nwc Exporter

NavisWorks Roamer comes with MDL plugins for MicroStation™ SE, 95, /J and v8 that enable you to export .nwc files directly from the CAD application in which it was created. As long as MicroStation is already installed on the computer when NavisWorks is installed, the MDL plugin is installed with NavisWorks on a **Custom Install** or **Full Install** and ready for use.

Note

If you install MicroStation after NavisWorks, then install NavisWorks again, choosing the **Custom Install** option and choose the relevant version of MicroStation. The NavisWorks installer will find the right place for the plugin and set up all relevant registry entries for you.

You can also publish .nwd files directly from MicroStation™ if you have the Publisher plugin. For more details, refer to Section 4.3.

There are two steps to exporting .nwc files from MicroStation - first you have to load the MDL plugin into MicroStation and then you have to export the file.

Loading the NavisWorks MDL Plugin

Loading the NWExport MDL plugin manually

1. Go to the **Utilities, Key-in** dialog box to load the application manually.
2. Type "**mdl load nwexport**" (without the quotes) and press return.
3. An options dialog can be opened from this export dialog to configure the file output.

If you regularly export .nwc files from MicroStation, then you will not want to load the NWExport plugin manually each time, so do the following:

Loading the NWExport MDL plugin automatically

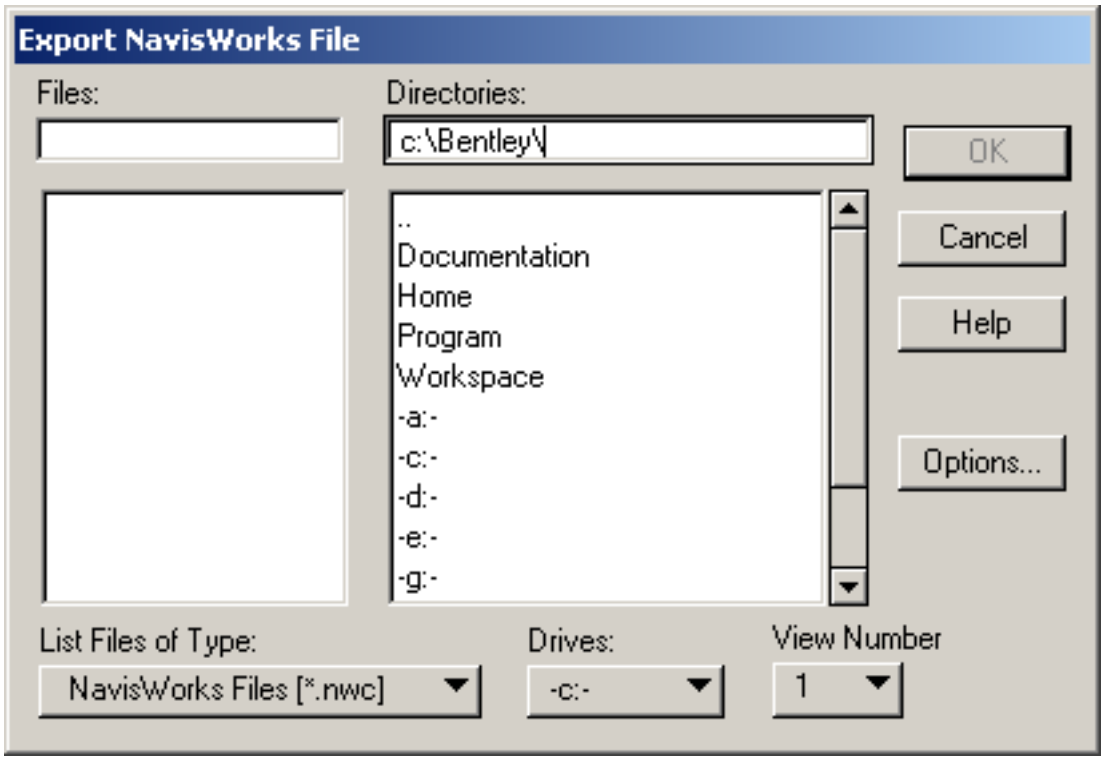
1. Go to **Workspace, Configuration**.
2. Choose **Design Applications** under **Category**.
3. Choose **NWExport** under **Available Applications**.
4. Click **Add** and confirm that you want NWExport added to your default configuration.
5. MicroStation will then automatically load NWExport in future sessions.
6. Click **OK**.

Once NWExport plugin is loaded, you can export to .nwc using the **nwcout** command from the key-in command line.

Exporting .nwc files from MicroStation

1. Type **nwcout** at the key-in prompt.

   The MicroStation export dialog is displayed.



2. Enter the file name if it is to be different to the existing MicroStation file.

3. Enter the location you wish the file to be exported to.

4. Select the view number you wish to the model to be exported from.

5. Click on the **Options** button if you want to change the export configuration. See Section 3.2.2 for more information on these options.

6. Click **OK** to export the file or **Cancel** to return to MicroStation without exporting it.

Note

MicroStation can also be customized to add NWExport commands to the menu bar using the **Workspace, Customize** dialog.

See Section 3.1.6 for what entities are and are not supported by the MicroStation exporter.

NavisWorks colors are derived from either MicroStation cell colors or MicroStation materials, depending on the export options set during **nwcout**. The appearance of objects in Publisher will match the appearance of a MicroStation shaded render.

The view number chosen for export determines the initial view in NavisWorks, whether level symbology is used and which levels are hidden.

Note

The exporter only exports from 3D dgn files - 2D files are not supported.

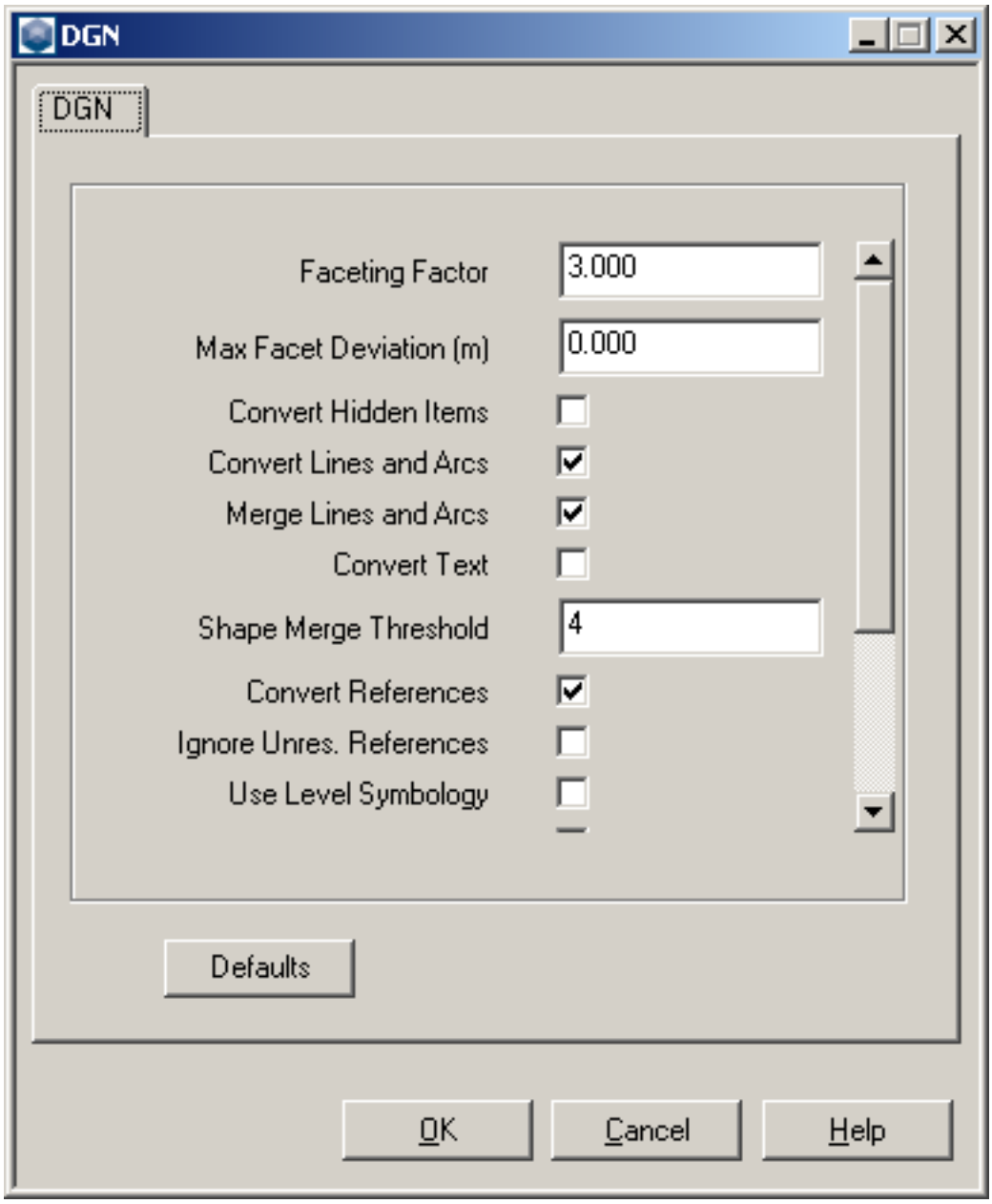
MicroStation .nwc Exporter Options

Available from the NWExport dialog box, this enables you to configure various elements of the exported file to your choosing.

Setting MicroStation Export Options

1. Choose **Options** from the NWExport dialog box.

   The **MicroStation Export Options** dialog is displayed



2. Enter the **Faceting Factor** (the value must be greater than 0). The higher the value, the more NavisWorks will facet rounded entities and therefore the smoother they will appear. The smoother the entities, the larger the file and the longer the export will take. See Faceting Factor for more information.

3. Check the **Convert Hidden Items** check box if you want to export hidden elements. They will be exported but hidden in the NavisWorks file.

4. Check the **Use Materials** check box if you want to use MicroStation's materials in place of its colors in NavisWorks. If you choose not to export materials, NavisWorks will assign the same colors as in the MicroStation scene. Assigning materials will assign the same textures, diffuse, ambient and spec-

ular colors to the elements as in the MicroStation scene.

5. Check the **Convert PDS** check box if you want to export object information from Intergraph's Plant Design System™ while exporting the .dgn files.

3.2.3. Viz .nwc Exporter

While NavisWorks Roamer cannot directly read .max files, there is a plugin for Viz and Max versions 3 and 4 that will export the model to an .nwc cache file that can then be read into Roamer. Viz will be outlined here, although the process is exactly the same for Max.

As long as Viz is already installed on the computer when NavisWorks is installed, the plugin is installed with NavisWorks on a **Custom Install** or **Full Install**and ready for use.

Note

If you install Viz after NavisWorks, then install NavisWorks again, choosing the **Custom Install** option and choose the relevant version of Viz. The NavisWorks installer will find the right place for the plugin and set up all relevant registry entries for you.

See Section 3.1.5 for information on the supported and unsupported entities for the Viz exporter.

Exporting .nwc files from Viz and Max

1. Go to **File, Export**.

   The **Export** dialog is displayed.

2. Set the **File Type** to "NavisWorks File (*.nwc)" and choose the location and name of the .nwc file to be exported.

3. Click **OK** to export the file or **Cancel** to return to Viz without exporting it.

Note

Any textures applied to the Viz model will be saved in a directory with the same name as the exported file, but with a "_presenter" suffix. All textures will be converted into .bmp files and saved into this directory for use with Roamer.

Viz and Max .nwc Exporter Options

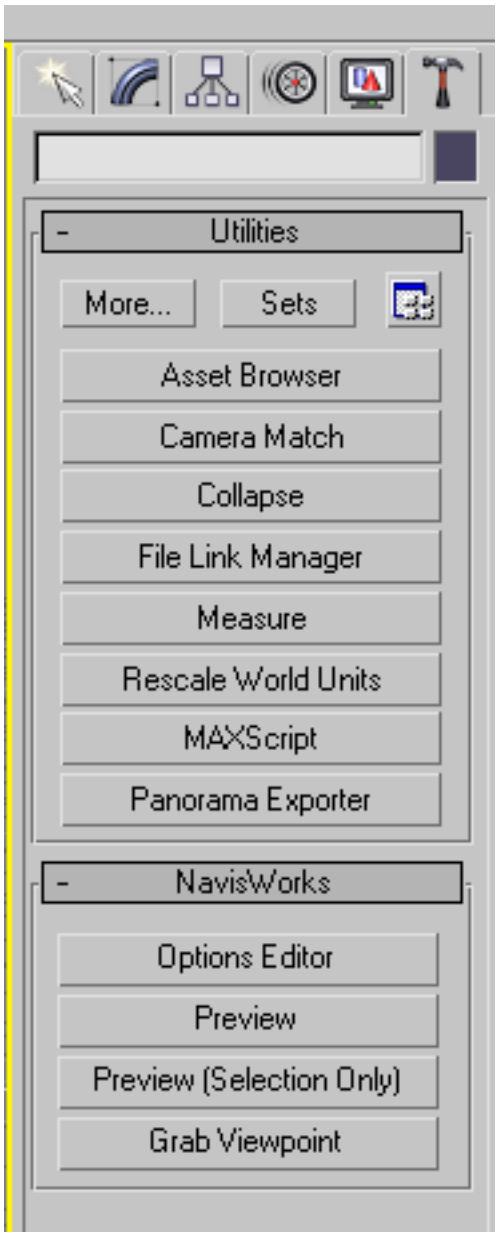
You have some control over the items that are exported from Viz to NavisWorks.

Setting the Viz and Max exporter options

1. Go to the **Utilities** tab and click on **More...**

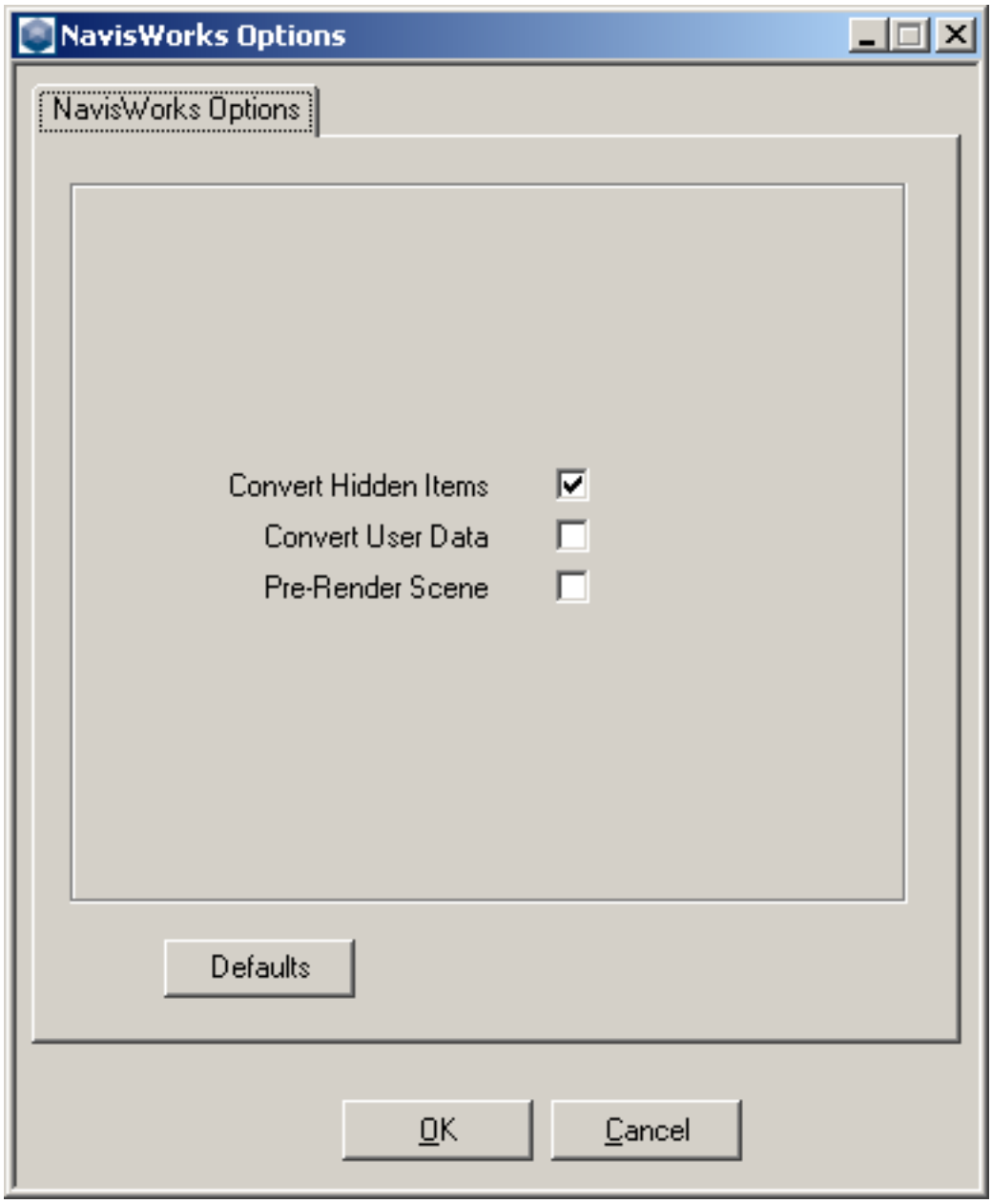
2. Select **NavisWorks** from the list and click **OK**.

3. The NavisWorks command panel containing four buttons will open.



4. Click on **Options Editor**

   The **NavisWorks Options** dialog is displayed



5. Check the **Convert Hidden Items** check box if you want to export hidden entities from the Viz scene. They will be exported but hidden in NavisWorks.

6. Check the **Convert User Properties** check box if you want to attach any user properties you have defined in Viz to the converted NavisWorks items.

7. Check the **Pre-Render Scene** check box if you want to ensure that all texture maps are exported with the model. In some rare cases, they can be missed, so if you experience this, try checking this box. It will force Viz to do an internal render and so catch all texture maps.

3.2.4. ArchiCAD .nwc Exporter

While NavisWorks Roamer cannot directly read ArchiCAD files, there is an addon for ArchiCAD v6.5, v7.0 and v8.0 that will export the model to an .nwc cache file that can then be read into Roamer. The export add-on for ArchiCAD is available from both the 2D and 3D windows. All standard ArchiCAD elements and library parts can be exported as long as they have a 3D representation, and any others will be ignored. The exporter will save both standard materials and custom GDL script materials.

Note

Only the plugin for the currently active version of ArchiCAD (the one that runs when you double-click on an ArchiCAD file) is installed. If you have multiple versions of ArchiCAD installed, use the custom install option to force installation of the other versions.

When saving from the 2D window the current story will be exported by default. An option may be set so that the whole model will be exported. A default view will be determined from the bounding box of the model.

When saving from the 3D window the view will become the default NavisWorks view (including window settings such as cutaway planes).

Note

Only visible layers will be exported.

Cutaway plane settings does not set the NavisWorks section plane, but exports items that are physically reduced by the plane. It is advised to turn off the Enable library part instancing option since all instances will show the same sectioning as the original item (usually the first library part in the file), and this may lead to unexpected effects.

Exporting an .nwc file from ArchiCAD

1. With a model loaded choose **File, Save As**. An options dialog will allow you to change settings before the export process begins.
2. Select "NavisWorks (*.nwc)" as the file type and type in a file name.
3. Click **OK** to advance to the options dialog.
4. Click **OK** on the options dialog to export the file or click **Cancel** to return to ArchiCAD without saving anything.

Supported Entities

- Global Unique Identifiers (GUIDs).
- Custom parameters for library parts defined by GDL scripts .
- Storeys.

- Library part instances.
- Cameras.
- Hotlinks.
- Sun attributes.
- Materials.

Unsupported entities

- Section planes.
- Points.
- Lines.
- Textures.

ArchiCAD .nwc Exporter Options

The export options appear after choosing **OK** from the **File, Save As** menu.

Setting the ArchiCAD exporter options

1. Check the **Export GUIDs** check box if you want to attach a Globally Unique IDentifier as a property to each item in the model. This is mainly useful for clash detection to track clashes.

2. Check the **Enable library part instancing** check box if you want to make instances of library parts rather than creating new items. This is only possible when multiple library part elements within the ArchiCAD model have exactly the same properties. Instancing these parts means a smaller .nwc file, and shorter export times.

3. Library parts defined in GDL scripts may have a number of user defined custom parameters. Check the **Export library part parameters** check box if you want to save library part parameter values as item properties in NavisWorks.

4. Check the **Export current story only** check box if you want to only export the current story. Otherwise all stories will be exported. This is only applicable to exports from 2D views, as 3D views will export everything contained within the view.

3.3. CAD Previewing

NavisWorks Roamer comes with plugins for AutoCAD 2000 and above and Viz and Max for quick and simple previewing of the models that are being built in those applications. These previews help in setting up viewpoints within the CAD application, and also for previewing what the model will look like inside NavisWorks Freedom™ once published.

3.3.1. NavisWorks Navigator for AutoCAD

NavisWorks Roamer comes with an ARX plugin for products based on AutoCAD 2000™ and above that enables you to walk through your model in real time inside a dockable dialog in the AutoCAD interface. Not only that, but it enables you to easily import and export viewpoints between Navigator and AutoCAD so that you can quickly and easily get to where you want in the model.

Note

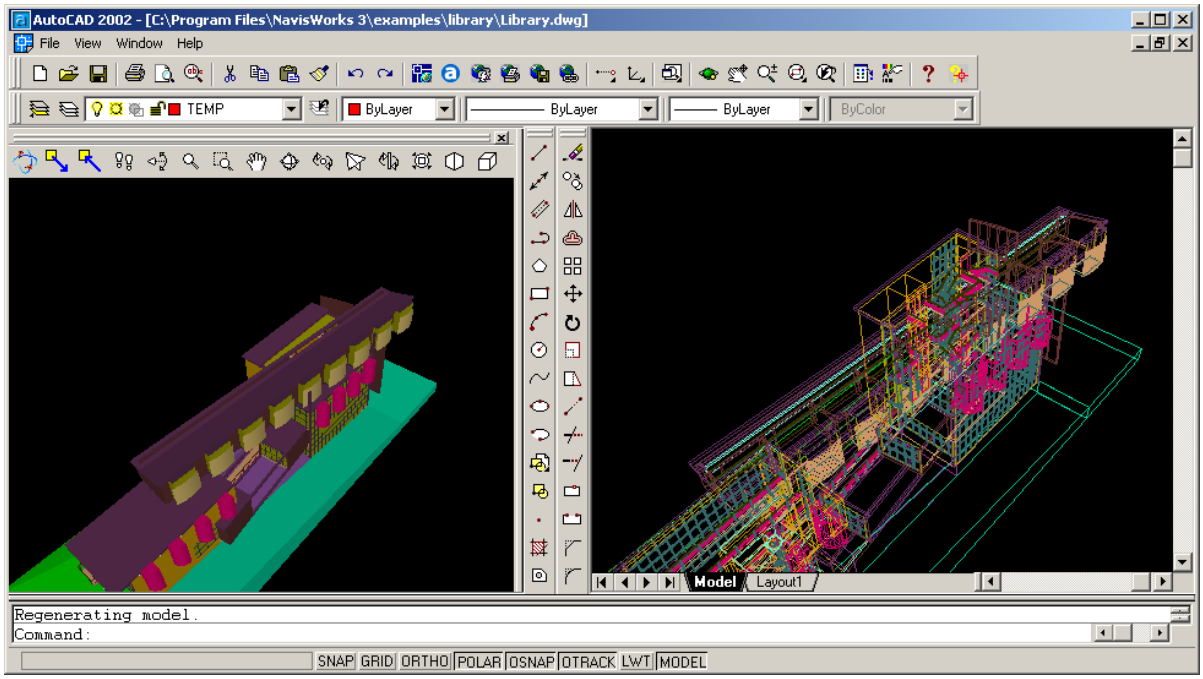
NavisWorks Navigator is not available for AutoCAD R14 or previous versions.

If you install AutoCAD after NavisWorks, then install NavisWorks again, choosing the **Custom Install** option and choose the relevant version of AutoCAD. The NavisWorks installer will find the right place for the plugin and set up all relevant registry entries for you.

Navigating AutoCAD models in real time

1. Type **nwnavigator** at the command line, or go to **NavisWorks, Navigator**.

   The Navigator dockable dialog is displayed.



2. Navigator is very similar to NavisWorks Freedom™ (see Section 4.4, except that it has three extra buttons on the interface.

3. Click on the NavisWorks™ button  to update the Navigator window with what's in the AutoCAD window.

Note

The Navigator window is not updated automatically when the AutoCAD model changes, so you have to click on this button manually every time you want to navigate around the latest model.

4. Click on the **Export Viewpoint** button  to update the current AutoCAD viewpoint with that in the Navigator window.

5. Click on the **Import Viewpoint** button  to update the Navigator viewpoint with that in the current AutoCAD window.

If, on typing **nwnavigator** at the command line, you get an error, you probably have to load the ARX plugin manually. See Section 3.2.1 for details on how to do this. You should only have to do this once.

If you prefer to work from menus, there is a partial menu available to run this command from, along with the other NavisWorks ARX plugins. See Section 3.2.1 for more information on how to use this menu.

3.3.2. NavisWorks Preview for Viz and Max

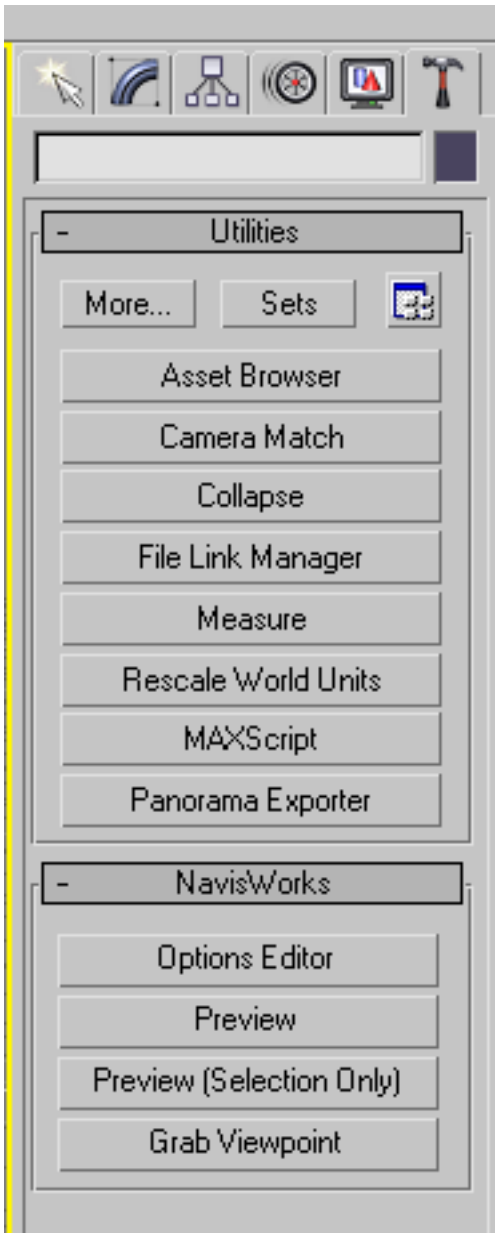
NavisWorks Preview for Viz and Max gives you a quick preview of the model and allows you to walk through it in real time inside a NavisWorks Freedom window launched from Viz.

Note

If you install Viz after NavisWorks, then install NavisWorks again, choosing the **Custom Install** option and choose the relevant version of Viz. The NavisWorks installer will find the right place for the plugin and set up all relevant registry entries for you.

Previewing a model from Viz or Max

1. Go to the **Utilities** tab and click on **More...**
2. Select **NavisWorks** from the list and click **OK**.
3. The NavisWorks command panel containing four buttons will open.



4. The **Options Editor** button allows you to control some aspects of the exported geometry from the scene. See Section 3.2.3 for more details on these.

5. Click on **Preview** to launch NavisWorks Freedom™ and walk through the whole model in real time. There will be a short delay while the geometry is exported into Freedom.

6. Click on **Preview (Selection Only)** to launch NavisWorks Freedom™ and walk through the selected geometry in real time. There will be a short delay while the geometry is exported into Freedom.

7. Click on **Grab Viewpoint** to set the Viz camera to simulate the viewpoint within the NavisWorks

Freedom™ window.

Chapter 4. Publishing

NavisWorks Roamer has an optional plugin called NavisWorks Publisher, a plugin that enables you to take a snapshot of the model at a certain time for issuing for use by other members of the design team, who perhaps are not CAD users, but who have a need to view the 3D model. NWD files published by NavisWorks Publisher can be read by NavisWorks Roamer for full design review, or by the NavisWorks Freedom free viewer for simple real time walk through. You can publish files directly from NavisWorks Roamer or by exporting from AutoCAD™ or MicroStation™.

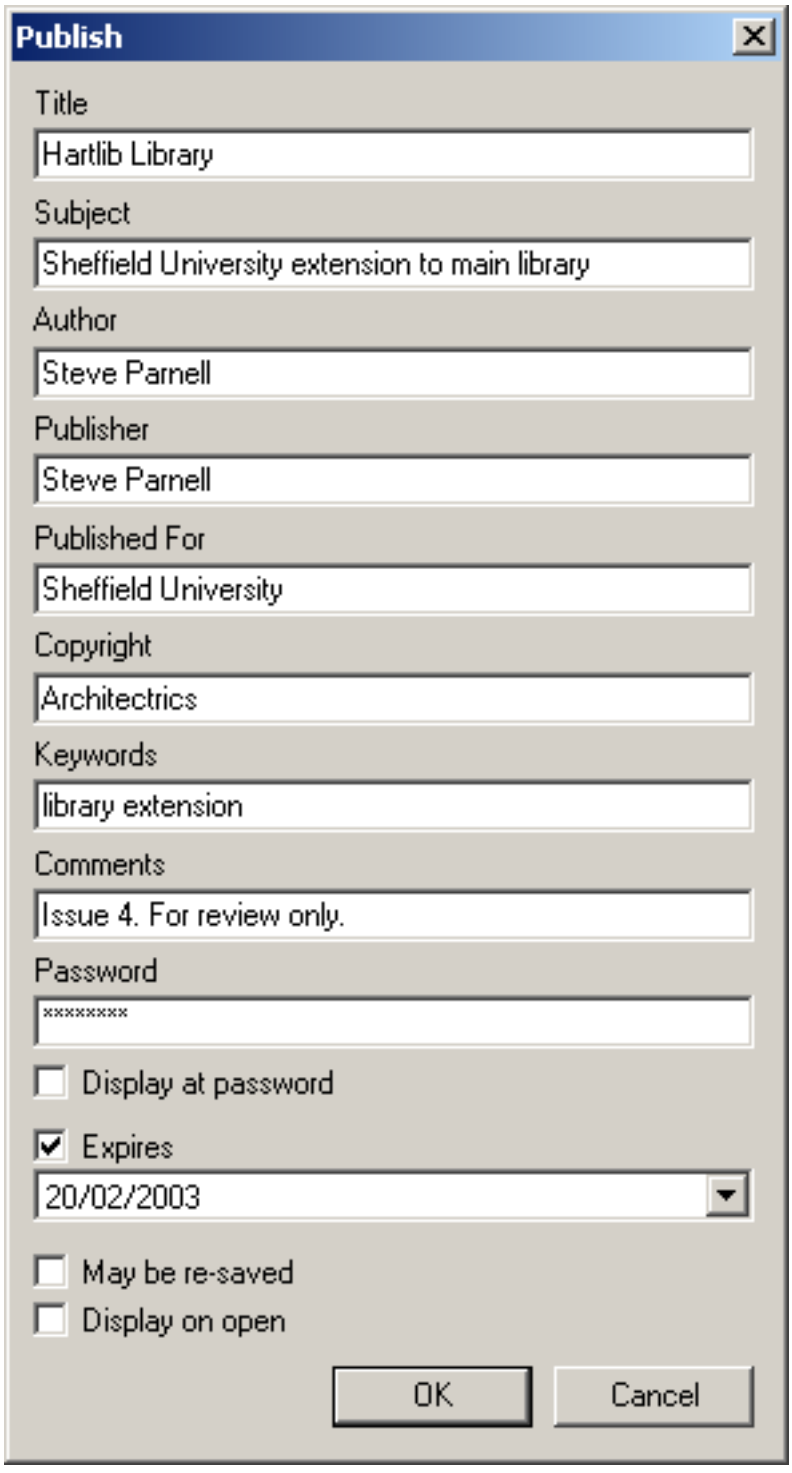
4.1. Publishing from Roamer

NavisWorks Publisher .nwd files are files published by NavisWorks Publisher and are snapshots of the model at a certain time.

Publishing a NavisWorks .nwd File

1. Go to **File, Publish...**

   The **Publish** dialog box is displayed



2. Complete as much information in as you wish. **Title, Subject, Author, Publisher, Published For, Copyright, Keywords** and **Comments** are all optional text boxes to be completed by you.

3. **Password** gives you the opportunity to password protect nwd files. On clicking **OK**, you will be asked

to re-enter the password to ensure you have not mis-typed it.

4. If the **Display at password** checkbox is checked, this will force NavisWorks to display the publication entries in a dialog on asking for the password so that the recipient is able to know whose password to enter.

5. If the **Expires** checkbox is checked, this will "time-bomb" the file so that it will not be openable in NavisWorks or NavisWorks Freedom™ after the date set.

6. If the **May be re-saved** checkbox is checked, this will allow NavisWorks to re-publish the file with new publication information. If this checkbox is not checked, the publication information in the nwd file will never be changeable.

7. The checkbox **Display on open**, if checked, will force NavisWorks to display the publication entries in a dialog on opening the file.

8. Click **OK** to go to the **File Save** dialog where you can type in the name and location of the published file, or **Cancel** to return to NavisWorks.

4.2. Publishing from AutoCAD ™

NavisWorks Publisher comes with ARX plugins for any AutoCAD™ based product, such as Architectural Desktop™, that enable you to publish an .nwd file directly from the CAD application in which it was created.

Note

If you install AutoCAD after NavisWorks, then install NavisWorks again, choosing the **Custom Install** option and choose the relevant AutoCAD. The NavisWorks installer will find the right place for the plugin and set up all relevant registry entries for you.

The .nwd publisher is available for any AutoCAD based product between AutoCAD 14 and 2004 releases.

Publishing .nwd files from AutoCAD

1. Type **nwdout** at the command line, or go to **NavisWorks, Publish .nwd**.

2. The standard Windows™ **Save As** dialog is displayed, so choose the location and name of the .nwd file to be published.

3. Click **OK** to export the file or **Cancel** to return to AutoCAD without exporting it.

See Section 3.2.1 for more information on publishing options, what to do if the menu is not already loaded or you get an error on typing **nwdout** at the command line.

4.3. Publishing from MicroStation ™

NavisWorks Publisher comes with MDL plugins for MicroStation™ SE, 95, /J and v8 that enable you to publish .nwd files directly from the CAD application in which it was created. As long as MicroStation is already installed on the computer when NavisWorks is installed, this MDL plugin is installed with NavisWorks and ready for use.

Note

If you install MicroStation after NavisWorks, then install NavisWorks again, choosing the **Custom Install** option and choose the relevant MicroStation. The NavisWorks installer will find the right place for the plugin and set up all relevant registry entries for you.

There are two steps to publishing .nwd files from MicroStation - first you have to load the MDL application into MicroStation and then you have to publish the file.

Loading the NWExport MDL plugin manually

1. Go to the **Utilities, Key-in** dialog box to load the application manually.
2. Type "**mdl load nwexport**" (without the quotes) and press return.
3. An options dialog can be opened from this export dialog to configure the file output.

If you regularly publish .nwd files from MicroStation, then you will not want to load the NWExport plugin manually each time, so do the following:

Loading the NWExport MDL plugin automatically

1. Go to **Workspace, Configuration**.
2. Choose **Design Applications** under **Category**.
3. Choose **NWExport** under **Available Applications**.
4. Click **Add** and confirm that you want NWExport added to your default configuration.
5. MicroStation will then automatically load NWExport in future sessions.
6.

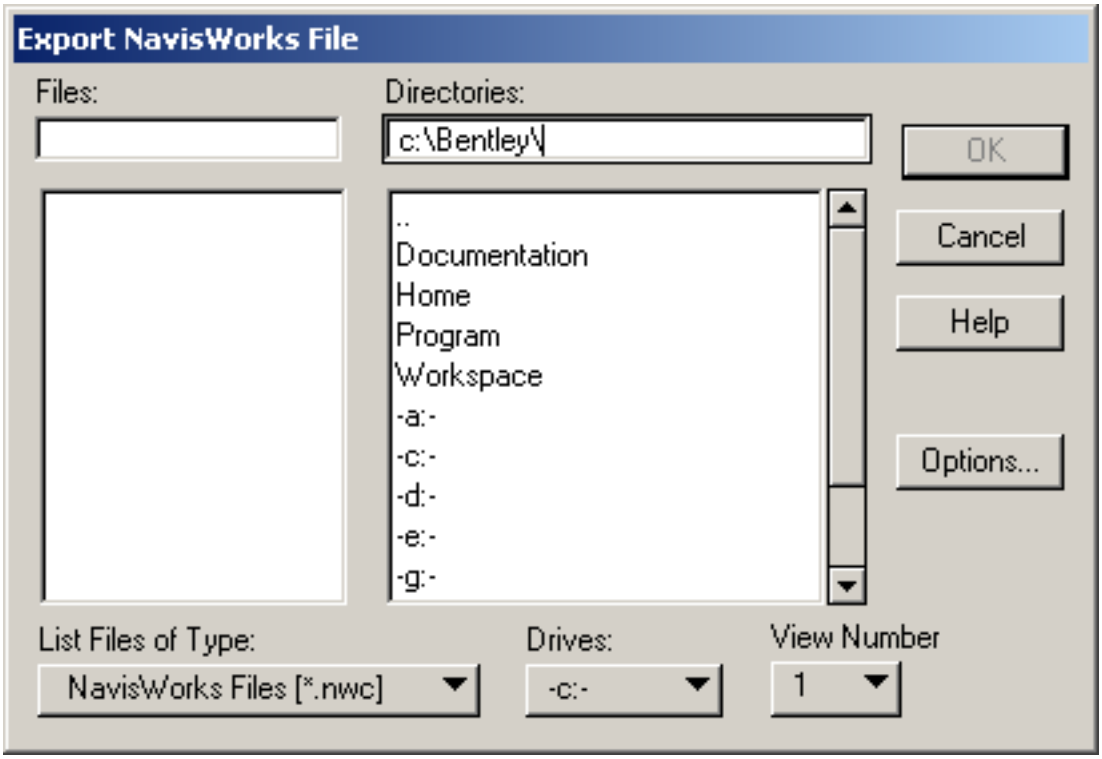
Click **OK**.

Once NWExport plugin is loaded, you can publish to .nwd using the **nwdout** command from the key-in command line.

Publishing .nwd files from MicroStation

Type **nwdout** at the key-in prompt.

The MicroStation export dialog is displayed.



1. Enter the file name if it is to be different to the existing MicroStation file.
2. Enter the location you wish the file to be published to.
3. Select the view number you wish to the model to be published from.
4. Click on the **Options** button if you want to change the export configuration. See Section 3.2.2 for more information on these options.
5. Click **OK** to publish the file or **Cancel** to return to MicroStation without publishing it.

Note

MicroStation can also be customized to add NWExport commands to the menu bar using the **Workspace, Customize** dialog.

See Section 3.1.6 for what entities are and are not supported by the MicroStation exporter.

NavisWorks colors are derived from either MicroStation cell colors or MicroStation materials, depending on the export options set during **nwdout**. The appearance of objects in Publisher will match the appearance of a MicroStation shaded render.

The view number chosen for export determines the initial view in NavisWorks, whether level symbology is used and which levels are hidden.

Note

The exporter only exports from 3D dgn files - 2D files are not supported.

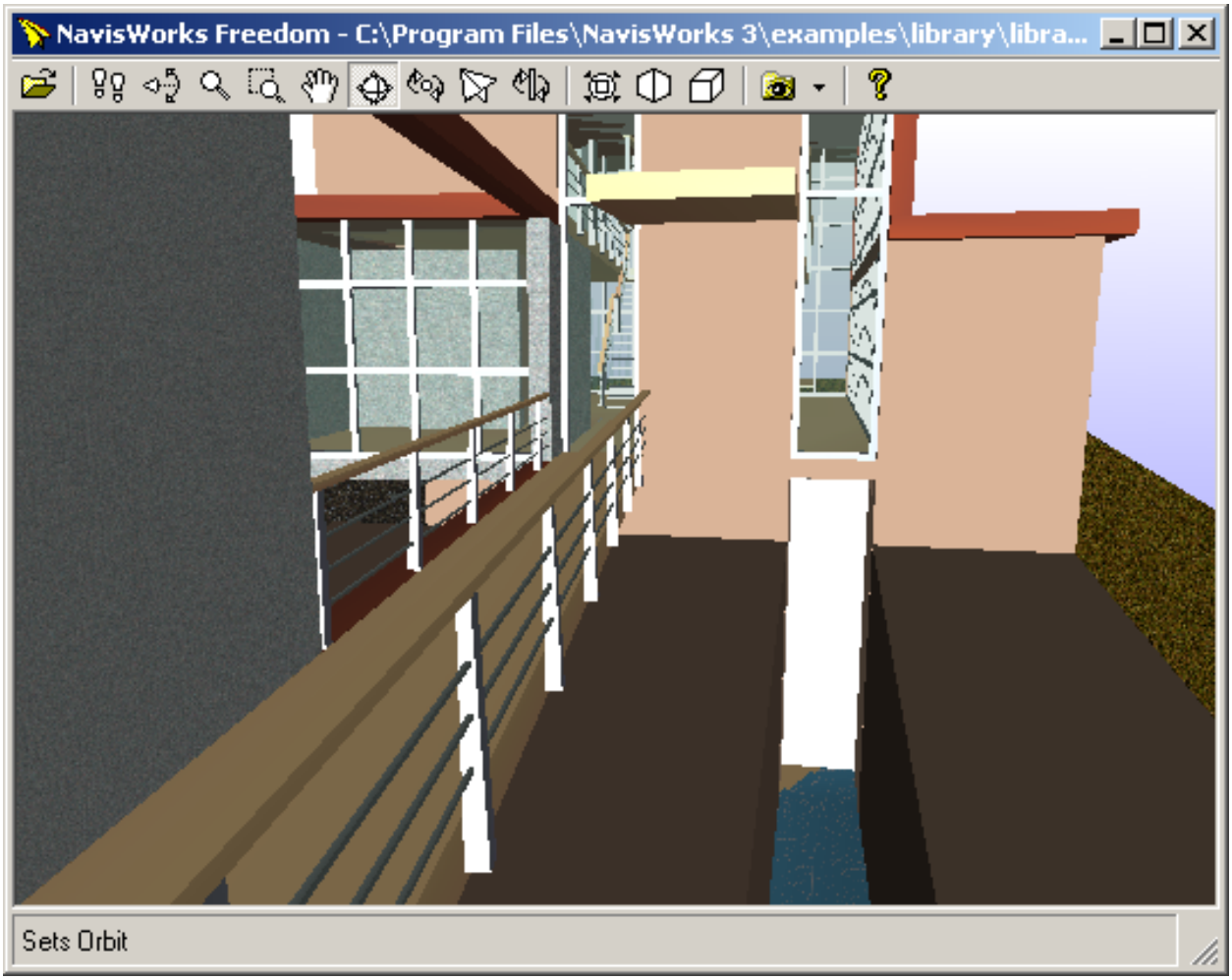
4.4. NavisWorks Freedom

NavisWorks Freedom™ is a cut down free version of NavisWorks Roamer. It is designed to work with NavisWorks Publisher by allowing you to distribute published .nwd files to your clients and other non-CAD users for free and easy viewing of your models. Simply publish the .nwd file, give them Freedom, and let them walk around your model.

Note

Only NavisWorks v3 .nwd files will work with Freedom.

It is available as a stand-alone viewer, or as an ActiveX control for insertion into web pages. Once installed, Freedom looks like this:



Functionality is limited to the navigation modes, the view all, perspective and orthographic modes and restoring viewpoints.

The buttons on the Freedom interface work in the same way as the NavisWorks buttons:

- Open 

  Simply opens the standard Windows™ **Open** dialog for you to choose an .nwd file to open into Freedom.

- Walk 

  Puts Freedom into **Walk** navigation mode.

- Look Around 

  Puts Freedom into **Look Around** navigation mode.

-

Puts Freedom into **Zoom** navigation mode.

- Zoom to Box 

  Puts Freedom into **Zoom to Box** navigation mode.

- Pan 

  Puts Freedom into **Pan** navigation mode.

- Orbit 

  Puts Freedom into **Orbit** navigation mode.

- Examine 

  Puts Freedom into **Examine** navigation mode.

- Fly 

  Puts Freedom into **Fly** navigation mode.

- Turntable 

  Puts Freedom into **Turntable** navigation mode.

- View All 

  Zooms to extents so that the whole model is visible in the Freedom window.

- Perspective 

  Puts the Freedom view into perspective viewing mode. This is mutually exclusive with orthographic mode.

- Orthographic 

  Puts the Freedom view into orthographic viewing mode. This is mutually exclusive with perspective mode.

- Viewpoints 

  This drop down shows all the viewpoints that have been set up and published with the .nwd file. Click on one of the viewpoints from the drop down to recall that viewpoint into the Freedom window.

- About 

  Shows the **About** box, offering a link to the NavisWorks web site.

Chapter 5. Navigating

NavisWorks enables intuitive and interactive navigation around your 3D models at a guaranteed frame rate. The nine navigation modes give you complete flexibility to navigate around the model in real time. In addition to these navigation modes, there are selection and measuring tools, which are mutually exclusive to the navigation modes so that when you're navigating you can't select or measure and when your measuring you can't navigate or select.

The navigation tools allow you to do things such as focus on objects and change the view parameters. There are also options to look from predefined views, set the world up vector to a direction different than the one brought through from the CAD model.

The tilt bar enables you to tilt the model, or the camera (depending on if the navigation mode is camera-centric or model-centric) and has the same effect as spinning the wheel on a mouse. Two thumbnail views also give you a good overall view of the scene, allowing you to see whereabouts you are in the whole model and quickly jump from one end to the other.

5.1. Navigation Modes

There are nine navigation modes to control how you move around the main navigation view - six camera-centric modes and three model-centric modes. In a camera-centric mode, the camera moves within the scene, whereas in a model-centric mode, model moves inside the scene. For example, the **Orbit** and **Examine** modes essentially do the same thing, except that **Orbit** moves the *camera* around the focal point and **Examine** moves the *model* around the focal point. Movement in each mode is based on the cursor keys, the **Shift** and **Control** keys and mouse drags. The mouse wheel is also supported, allowing quick and easy zooming or tilting, depending on the current navigation mode.

Note

Dragging with the left mouse button while holding down the **Control** key performs the same actions as dragging with the middle mouse button, which is useful if you only have a two-button mouse.

The **Shift** and **Control** keys modify the movement, for example holding down **Shift** in **Walk** mode speeds up movement, and holding down **Control** in this mode, glides the camera left/right and up/down.

Note

Gliding the camera is opposite to panning the model. Gliding is a camera-centric motion and panning is a model-centric motion.

Right clicking on any item in the main navigation view or selection tree displays a context menu that shows a list of commands relevant to a particular item.

The **Navigation Mode** toolbar also includes the **Select** tools, as they are mutually exclusive to navigation just as redlining and measuring are. See Section 6.2.1 for more information on the selection tools. Below is shown the **Navigation Mode** toolbar and the navigation modes available:

Walk 

Look Around 

Zoom 

Zoom Box 

Pan 

Orbit 

Examine 

Fly 

Turntable 

5.1.1. Walking

Walk mode enables you to walk through the model on a horizontal plane ensuring that "up" is always "up".

To walk through a model

- Go to **Viewpoint, Navigation Mode, Walk**

or

- Click **Walk**  on the **Navigation Mode** toolbar.

Dragging the left mouse button, or using the cursor keys, spins the camera left and right and moves it forwards and backwards.

Holding down the **Shift** key speeds up this movement.

Holding down the **Control** key glides the camera left and right and up and down. As walk mode is camera-centric, this mode differs from the normal pan mode in that the camera is moved rather than the model.

Spinning the mouse wheel tilts the camera up and down.

5.1.2. Looking Around

Look around mode enables you to look around the model from the current camera position and gives the effect that you are moving your head around.

To look around a model

- Go to **Viewpoint, Navigation Mode, Look Around**

or

- Click **Look Around**  on the **Navigation Mode** toolbar.

Dragging the left mouse button, or using the cursor keys, looks left, right, up or down.

Holding down the **Shift** key speeds up this movement.

Holding down the **Control** key rotates the camera around its viewing axis.

5.1.3. Zooming

Zoom mode enables you to zoom into and out of the model. Cursor up zooms in and cursor down zooms out.

To zoom

- Go to **Viewpoint, Navigation Mode, Zoom**

or

- Click **Zoom**  on the **Navigation Mode** toolbar.

Dragging the left mouse button up and down, or using the up and down cursor keys, zooms in and out respectively.

5.1.4. Zooming to a Box

The zoom-to-a-box mode enables you to drag a box so that the contents of the box fill the view.

To use the zoom box

- Go to **Viewpoint, Navigation Mode, Zoom Box**

or

- Click the **Zoom Box**  on the **Navigation Mode** toolbar.

Dragging a box with the left mouse button over the main navigation view fills the view with the contents of the box.

Holding down the **Shift** or **Control** keys, or spinning the mouse wheel, temporarily puts this mode into normal **Zoom** mode.

5.1.5. Panning

The pan mode enables you to pan the model rather than the camera.

To pan a model

- Go to **Viewpoint, Navigation Mode, Pan**

or

- Click **Pan**  on the **Navigation Mode** toolbar.

Dragging the left mouse button pans the model up, down, left and right.

Holding down the **Shift** or **Control** keys, or spinning the mouse wheel, temporarily puts this mode into normal **Zoom** mode.

5.1.6. Orbiting

The orbit mode enable you to orbit the camera around the model, ensuring that "up" is always "up". The camera always orbits around the focal point of the model.

To orbit a model

- Go to **Viewpoint, Navigation Mode, Orbit**

or

- Click **Orbit**  on the **Navigation Mode** toolbar.

Dragging the left mouse button, or using the cursor keys, rotates the camera around the model.

Holding down the **Shift** key or spinning the mouse wheel, temporarily puts this mode into normal **Zoom** mode.

Holding down the **Control** key glides the camera left and right and up and down. As walk mode is camera-centric, this mode differs from the normal pan mode in that the camera is moved rather than the model.

5.1.7. Examining

The examine mode enables you to rotate the model about.

To examine a model

- Go to **Viewpoint, Navigation Mode, Examine**

or

- Click **Examine**  on the **Navigation Mode** toolbar.

Dragging the left mouse button, or using the cursor keys, rotates the model about.

Holding down the **Shift** key or spinning the mouse wheel, temporarily puts this mode into normal **Zoom** mode.

Holding down the **Control** key, temporarily puts this mode into normal **Pan** mode.

If the mouse is moving when you let go of the button, the model keeps spinning! Click on it to stop. Holding the Shift key allows you to zoom in and out.

5.1.8. Flying

The fly mode enables you to fly around the model like in a flight simulator.

To fly through a model

- Go to **Viewpoint, Navigation Mode, Fly**

or

- Click **Fly**  on the **Navigation Mode** toolbar.

Holding down the left mouse button moves forward. As in a flight simulator, the left mouse button banks left/right when dragged left or right and tilts up/down when dragged up or down.

The up and down cursor keys will zoom in and out respectively and the left and right cursor keys will spin the camera left and right respectively.

Holding down the **Shift** key speeds up this movement.

Holding down the **Control** key rotates the camera around its viewing axis, while still moving forward.

5.1.9. Spinning on a Turntable

The turntable mode enables you to spin the model around the up vector. This navigation mode behaves as though the model is sitting on a turntable, ensuring that "up" is always "up".

To use the turntable

- Go to **Viewpoint, Navigation Mode, Turntable**

or

- Click **Turntable**  on the **Navigation Mode** toolbar.

Dragging the left mouse button left and right, or using the left and right cursor keys, spins the turntable left and right respectively.

Holding down the **Shift** key or spinning the mouse wheel, temporarily puts this mode into normal **Zoom** mode.

Holding down the **Control** key, temporarily puts this mode into normal **Pan** mode.

Spinning the mouse wheel, or using the up and down cursor keys, tilts the turntable up and down, like the tilt bar.

5.2. Navigation Tools

Navigational tools are a number of handy tools for altering, resetting or changing the type of the camera, and the viewpoint displayed. These tools can be accessed from the **Viewpoint, Navigation Tools** menu, or from the **Navigation Tools** toolbar:

Navigation Tools comprises the following functions:

View All 

View Selected 

Focus 

Hold 

Perspective Camera 

Orthographic Camera 

Align With X-Axis 

Align With Y-Axis 

Align With Z-Axis 

Straighten Camera 

Set World Up to Current View 

Note

The **Straighten** and **Set Up** buttons are not on the toolbar by default, but can be added by customizing it (see Section 14.3).

5.3. Viewing Everything

This function dollies and pans the camera so that the entire model is in view, which is very useful if you get lost inside a model or lose it completely.

Sometimes on doing a **View All**, you seem to just get a blank view. This is usually because there are items that are very small in comparison to the main model located a long way away from the main model. In these cases, it is best to click on an item in the selection tree and do a **View Selected** to at least find your way back to the model before trying to figure out which items are "lost".

To view everything

- Go to **Viewpoint, Navigation Tools, View All**.

or

- Click **View All**  on the **Navigation Tools** toolbar.

5.4. Viewing Selected Items

This function zooms the camera so that the selected item fills the main navigation view.

To view a selected item

- Go to **Viewpoint, Navigation Tools, View Selected**.

or

- Click **View Selected**  on the **Navigation Tools** toolbar.

5.5. Focusing

This function puts the main navigation view into focus mode until the next click. Left click on an item and the view swivels so that the point clicked is in the center of the view. The point clicked becomes the focal point for **examine**, **orbit**, **turntable** navigation modes.

To focus the camera

- Go to **Viewpoint, Navigation Tools, Focus**

or

- Click **Focus**  on the **Navigation Tools** toolbar

5.6. Perspective Camera

Uses a perspective camera to view with.

To select a perspective camera

- Go to **Viewpoint, Navigation Tools, Perspective Camera**

or

- Click **Perspective**  on the **Navigation Tools** toolbar.

5.7. Orthographic Camera

Uses an orthographic camera to view with.

To select an orthographic camera

- Go to **Viewpoint, Navigation Tools, Orthographic Camera**

or

- Click **Orthographic**  on the **Navigation Tools** toolbar.

Note

Orthographic cameras are not available with **Walk** and **Fly** navigation modes.

5.8. Straighten

This function straightens the camera to align with the world up vector when it is already close to the world up vector.

To straighten the camera

- Go to **Viewpoint, Navigation Tools, Straighten**

or

- Click **Straighten**  on the **Navigation Tools** toolbar.

Note

This button is not on the toolbar by default, but can be added by customizing it (see Section 14.3).

5.9. Set World Up

These functions set the world up vector to align with the selected orientation.

To set the world up vector to the current view

- Go to **Viewpoint, Set World Up, Current View**.

or

- Click **Set Up**  on the **Navigation Tools** toolbar.

Alternatively, to set the world up vector to one of the orthogonal axes

- Go to **Viewpoint, Set World Up** and choose one of the pre-defined axes (**+X Axis**, **-X Axis**, **+Y Axis**, **-Y Axis**, **+Z Axis**, or **-Z Axis**).

Note

Navigation modes Walk, Turntable and Orbit all use the World Up vector, so navigation will occur at whatever angle is set using this function.

This button is not on the toolbar by default, but can be added by customizing it (see Section 14.3).

5.10. Preset Viewpoints

The orthogonal viewpoints are preset inside NavisWorks and can be accessed from the **Navigation Tools** toolbar and the **Viewpoints** menu.

5.10.1. Aligning With The X-Axis

This function toggles between **Look From, Front** and **Look From, Back** views.

To align the viewpoint with the x-axis

- Go to **Viewpoint, Navigation Tools, Align X**

or

- Click **Align X**  on the **Navigation Tools** toolbar.

5.10.2. Aligning With The Y-Axis

This function toggles between **Look From, Left** and **Look From, Right** views.

To align the viewpoint with the y-axis

- Go to **Viewpoint, Navigation Tools, Align Y**

or

- Click **Align Y**  on the **Navigation Tools** toolbar.

5.10.3. Aligning With The Z-Axis

This function toggles between **Look From, Top** and **Look From, Bottom** views.

To align the viewpoint with the z-axis

- Go to **Viewpoint, Navigation Tools, Align Z**

or

- Click **Align Z**  on the **Navigation Tools** toolbar.

5.10.4. Looking From a Preset Viewpoint

When this option is chosen the model is displayed from this viewpoint in the main navigation view. This is equivalent to toggling the **Align X**, **Align Y** and **Align Z** buttons on the **Navigation Tools** toolbar.

Looking from a preset viewpoint

1. Go to **Viewpoint, Look From**
2.

Choose any direction from **Top**, **Bottom**, **Front**, **Left**, **Back** and **Right**.

5.11. Tilt

The slider on this control bar provides direct control over the tilt angle of the camera, in degrees below (negative) or above (positive) the horizontal at the base of the tilt bar.

This is particularly useful in walk mode to look up and down.

To switch the tilt bar on and off

- Click on **View, Toolbars, Tilt**.

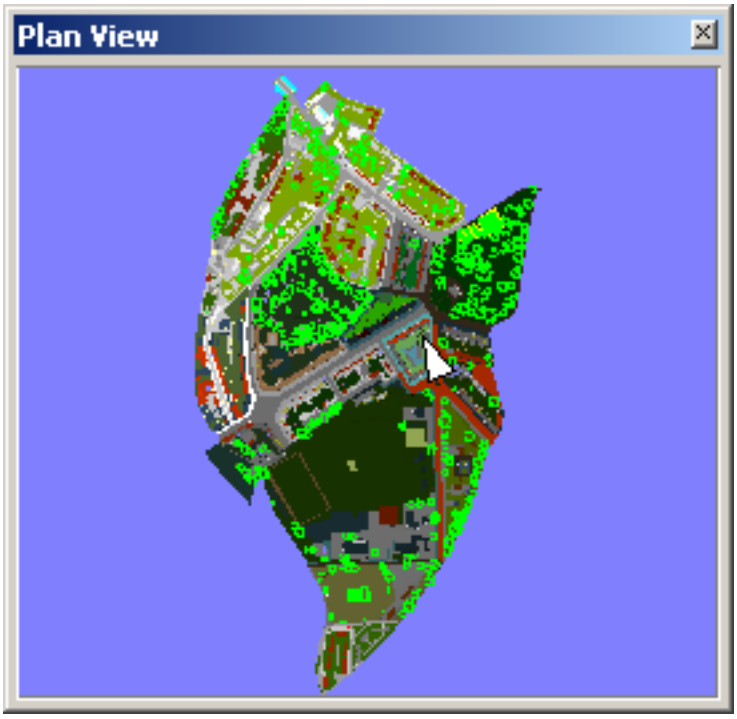
The **Tilt** control bar is displayed

5.12. Thumbnail Views

Thumbnails are useful to get an overall view of where you are in the whole scene and to quickly move the camera to a location in a large model. There are two thumbnails available in NavisWorks so you can have one showing a section and another showing a plan view if you wish. The thumbnails show a fixed view of the model, with a triangular marker representing your current viewpoint. This marker moves as you navigate, showing the direction of your view. The marker may also be dragged by holding the left mouse button over it and dragging to move the camera in the main navigation view.

Note

The marker changes to a small dot when the thumbnail view is in the same plane as the camera view.



By default the **Section Thumbnail** shows the view from the front of the model and the **Plan Thumbnail** shows a plan view. The thumbnail view can be manipulated by right clicking on the view. You can select from the following options: **Look From**, **Edit Viewpoint**, **Update Viewpoint**, **Lock Aspect Ratio** and **Refresh**.

Manipulating a thumbnail's view

1. Right click on the thumbnail to open the context manu.

2. Use the **Look From** menu item and choose from **Top**, **Bottom**, **Front**, **Back**, **Left** or **Right** to set the thumbnail view to any of these pre-set viewpoints. You can also choose **Current Viewpoint** to set the thumbnail view to the active navigation viewpoint.

3. Choose **Update Current Viewpoint** to set the current active navigation viewpoint to be the same as that of the thumbnail.

4. Choose **Edit Viewpoint** if you want to set up the thumbnail's viewpoint by hand using the **Edit Viewpoint** dialog (see Section 10.5 for more information on this).

5. Choose **Lock Aspect Ratio** if you want the aspect ratio of the thumbnail to match that of the main navigation view and remain matching even when the thumbnail dialog is resized. This will usually give gray strips either to the top and bottom, or to either side of the thumbnail view. See Aspect Ratio for more information on aspect ratio.

6.

Choose **Refresh** to redraw the thumbnail based on the current setting. Thumbnail drawing uses software OpenGL and so can take a couple of seconds for large models.

Chapter 6. Selecting Items

With large models it is potentially a very time consuming process to select items of interest. NavisWorks makes this a much simpler task by providing a range of functions for quickly selecting items both interactively and by searching the model manually and automatically. The main groups of functionality concerned with selecting items are:

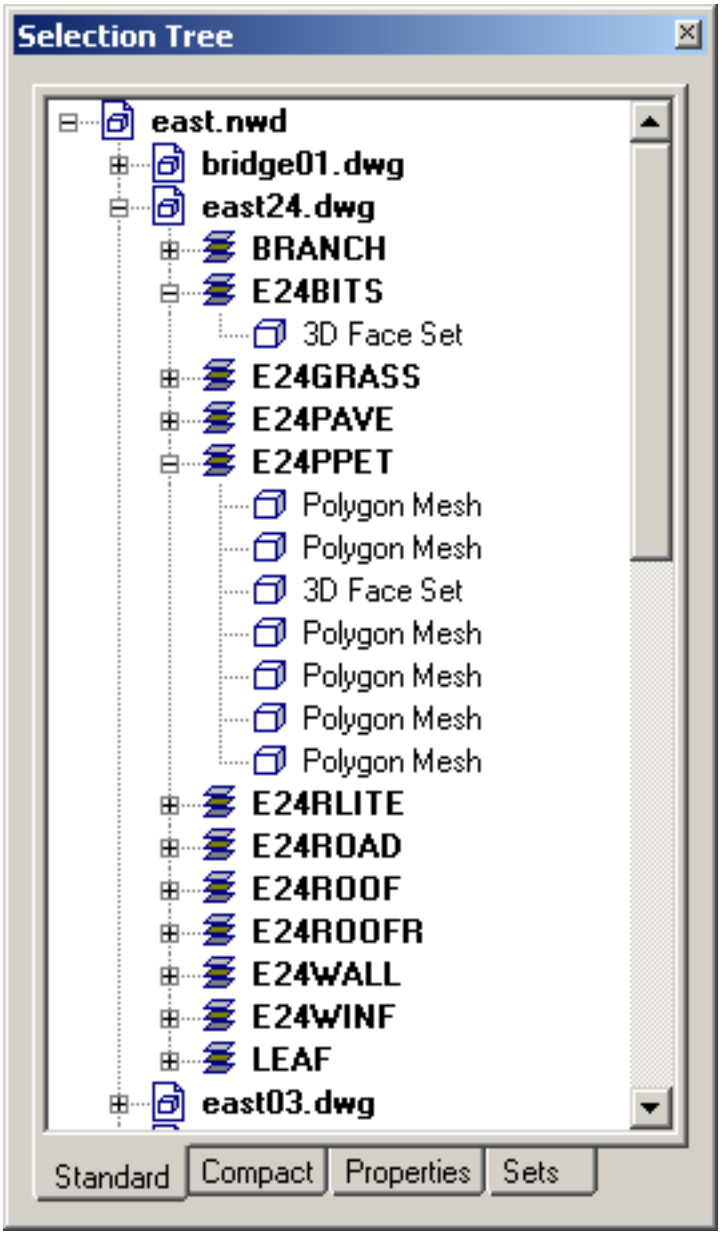
- The selection tree
- Interactive selection
- Selection sets

Also connected with selecting items is finding items, which is covered in Chapter 7.

In NavisWorks there is the concept of an active selection set (the currently selected items, or the current selection) and saved selections sets. Selecting and finding items makes them part of the current selection, so you can hide them or override their colors. At any time, the current selection can be saved saved and named for retrieval in later sessions.

6.1. Selection Trees

The selection tree is a tabbed control bar which displays a variety of hierarchical views of the structure of the model, as defined by the CAD application in which the model was created.



By default there are four tabs, called **Standard**, **Compact**, **Properties** and **Sets**:

- "Standard" displays the default tree hierarchy, including all instancing.
- "Compact" displays a simplified version of the "Standard" hierarchy, omitting various items. You can control the level of complexity of this tree using the **Select** options (see Section 6.5 for more information).
- "Properties" displays the hierarchy based on the items' properties. This enables simple manual searching of the model by item property. See Chapter 7 for a much more powerful way of searching the model for items with certain properties.
- "Sets" simply shows the same view as the selection sets control bar.

Naming of items reflects the names from the original CAD application, wherever possible.

There are several different tree icons representing the types of item that make up the structure of a model:

 A model, such as a drawing file or design file.

 A layer or level.

 A group, such as a block definition from AutoCAD or cell definition from MicroStation.

 An instanced group, such as an inserted block from AutoCAD or cell from MicroStation. If in the imported file the instance was unnamed, NavisWorks names the instance to match its child's name.

 An item of geometry, such as a polygon.

 An instanced item of geometry, such as an instance from 3D Studio.

 A search. Behind the scenes, NavisWorks is searching the model for all items with a property of this type and sets up the find specification to repeat this search if the selection set is saved. See Section 6.3 for more information on this.

Each of these item types can be Hidden (gray), Unhidden (dark blue) or Required (red).

Note

If a group is selected as hidden or required then all instances of that item will be hidden or required. If you wish to operate on a single occurrence of an item then you should make the instanced group (the level above, or the "parent", in the hierarchy) hidden or required.

You can use the selection tree in combination with the main navigation window to select items into the current selection, which is highlighted in both the selection tree and the main navigation window.

Note

Using the **Shift** and **Control** keys while selecting items in a selection tree will do the standard Windows™ multiple selection: **Control** allows multiple selection item by item and **Shift** allows multiple selection between the first and last items selected.

If you have the Clash Detective plugin, the selection trees will be used for selecting items for the clash tests.

The selection trees are also used inside the **Find Items** control bar for the ability to refine your searches better. See Section 7.2 for more information.

Note

Additional customised selection tree tabs can be added by using the NavisWorks API.

6.2. Interactive Selection

NavisWorks provides several methods to interactively select items into the current selection. You can use the tabs in the selection tree, select items in the main navigation window with select and select box modes and you can select other items with similar properties to an existing selection using the selection

commands.

Note

Right clicking on any item in the tree view or main view temporarily selects the item click on and displays a context menu. You can click on the topmost menu item to permanently select the item.

6.2.1. Select Mode

This mode is mutually exclusive to the navigation modes so that when you are selecting, you cannot navigate and vice versa. Select mode allows you to click on an item in the main navigation window to select it. Once a single item is selected, its properties will be shown in the Properties control bar.

You can select multiple items in the main navigation window using the familiar Windows™ methods of holding down the **Control** key while selecting items. This will add them to the current selection. na-Altertively, if the items are already in the current selection, holding down **Control** while selecting them again will remove them from the current selection.

Holding the **Shift** key whilst selecting items in the main navigation window will cycle through the selection resolution, allowing you to get more specific with your selections. See Selection Resolution for more information on this.

To select an item

- Go to **Viewpoint, Navigation Mode, Select**

or

- Click **Select**  on the **Navigation Mode** toolbar.

6.2.2. Select Box Mode

This mode, which can be used in conjunction with the normal select mode allows you to drag a box in the main navigation window to select multiple items at once. This mode is also mutually exclusive to the navigation modes so that when you are selecting, you cannot navigate and vice versa.

Dragging the box will select all items within the box. Holding down the **Shift** key while dragging the box will select all items within and that intersect the box.

You can select multiple items in the main navigation window using the familiar Windows™ methods of holding down the **Control** key while selecting items. This will add them to the current selection. Alternatively, if the items are already in the current selection, holding down **Control** while selecting them again will remove them from the current selection.

To select multiple items using a draggable box

- Go to **Viewpoint, Navigation Mode, Select Box**

or

- Click **Select Box**  on the **Navigation Mode** toolbar.

6.2.3. Selection Commands

Selection commands enable you to quickly alter the current selection using logic. You can select multiple items based on the currently selected items' properties, or quickly invert the set, select everything or nothing.

Selecting items with selection commands

1. Go to **Edit, Select**
2. Choose the required selection command.

Standard selections are:

- Select All

  All items contained within the model are selected.

- Select None

  Deselects everything in the model.

- Select Invert

  Every selected item becomes deselected and vice versa.

- Select Multiple Instances

  Selecting an item then selecting **Multiple Instances** will select all instances (sometimes called insertions) of that geometry group that occur in the model.

- Select Same Name

  Every item with the same name as the selected item will also be selected.

- Select Same Type

  Every item of the same type as the selected item will also be selected.

- Select Same (property)

  Every item with the same property as the selected item will also be selected. The property can be anything from **Material**, **Hyperlink** or any other searchable property attached to the item.

Note

Selecting **Same** (property) works by comparing items' properties. If you have multiple items se-

lected when you perform a selection command of same name or type etc., all the types, names and properties of the items in the current selection are compared with all items properties in the scene. Those matching any of the current items selected will be selected.

6.3. Selection and Search Sets

Selection sets are useful for saving a group of items that you might want to regularly perform some action on, such as hiding or changing transparency. They simply store a group of items for later retrieval. There is no intelligence behind this set - if the model changes at all, the same items will be selected (assuming they are still available in the model) when recalling the selection set.

Search sets work in a similar way, except that they save search criteria instead of the results of a selection, so that you can re-run the search at a later date as and when the model changes. See Chapter 7 for information on searching the model for items.

Selection and search sets can be named and contain comments. They can also be highlighted with icons in the main navigation window, so that when you click on one, the selection set is restored to the active set and all the items within it are re-selected.

6.3.1. Saving Selection and Search Sets

Saving a selection set

1. Select all the items you want saving.
2.
   - Go to **Edit, Select, Selection Sets, Save Current Selection**.

   or

   - Right click on the **Selection Sets** control bar and choose **Save Current Selection**.

Saving a search

1. Set up a search as explained in Section 7.2.
2.
   - Go to **Edit, Select, Selection Sets, Save Current Search**.

   or

- Right click on a blank space on the **Selection Sets** control bar and choose **Save Current Search**.

New selection sets and search sets are named "Selection SetX" where 'X' is the next available number added to the list. A selection set is identified by this icon:  and a search set by this icon: 

Note

Saved selection and search sets can be renamed by slow clicking (clicking and pausing without moving the mouse) on the set, or clicking on it and hitting **F2**.

6.3.2. Recalling Selection Sets

To re-select items from a selection set

- Go to **Edit, Select, Selection Sets** and choose the saved selection set from the list.

or

- In the **Selection Sets** control bar, simply click on the selection set from the list.

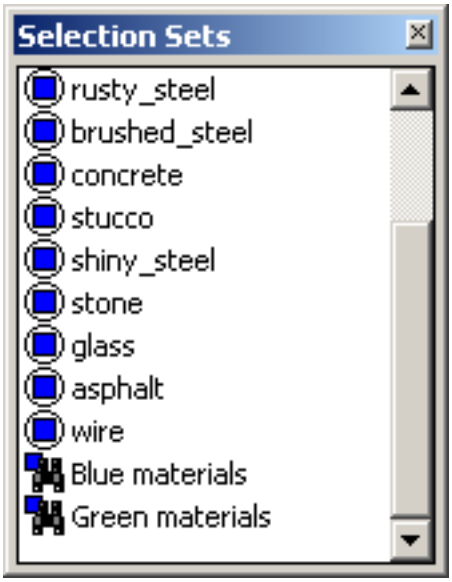
Note

On recalling a selection set, all the items that were selected when the set was saved are re-selected into the current selection.

On recalling a search set, the search that was saved into the set is re-run and any items matching the specification are selected into the current selection.

6.3.3. Managing Selection Sets

As well as a tab on the selection tree, there is also a control bar dedicated to selection sets. To activate it, click on  in the **Workspace** toolbar or go to **View, Control Bars, Selection Sets**:



This is the main management center for selection sets. All actions concerning selection sets are available by right clicking on this control bar.

Right clicking on a blank space in the **Selection Sets** control bar opens a context menu with the options to **Save Current Selection** or **Save Current Search**, as outlined in Section 6.3.1.

Managing Selection Sets

1. Right click on a selection set.

2. Choose **Save Current Selection** to save the current selection as a selection set in the list. This set will contain the currently selected items.

3. Choose **Save Current Search** to save the current search as a selection set to the list. This set will contain the current search criteria.

4. Choose **Add Comment** to add a comment to the selection set. This command will bring up the comments text edit dialog. See Section 13.1 for more information on comments.

5. Choose **Add Copy** to create a copy of the selection set to the list. The copy will be named the same as the selection set clicked on, but with a " - copy" suffix.

6. Choose **Update** to set the selected selection set to the currently selected items, or if it's a search set, it will update it with the current search.

7. Choose **Delete** to delete the selected selection set.

6.4. Selection Resolution

Selection resolution affects what geometry you select when selecting items in the main navigation window using **Select mode**.

When you click on an item in **Select** mode, NavisWorks doesn't know what level of item to start selecting at - do you mean the whole model, or the layer, or the instance, or group, or just the geometry? The selection resolution tells NavisWorks what level in the selection tree to start selecting items at by default. The options are:

- First Object

  Selects the first item in the selection tree path that isn't a layer. This is the default selection resolution setting.

- Geometry

  Selects the last item in the selection tree path (most specific, but may be multiply instanced).

- Last Object

  Selects the most specific item (furthest along the selection tree path) that is marked as a composite object. If no composite object is found, the geometry is selected.

- Last Unique

  Selects the most specific item (furthest along the selection tree path) that is unique (not multiply instanced).

- Layer

  Selects all items on a layer.

- Model

  Selects the whole model.

If you find you have selected the wrong level of item, you can interactively "cycle" through the selection resolution, without having to go to the options dialog or the selection tree. You do this by holding down the **Shift** key when selecting an item. This selects an item one level more specific each time you select the item until the resolution gets to "geoemtry", at which point it will revert back to "model". The selection resolution remains as set in options for the next selection.

As well as being able to set the default selection resolution in the **Selection** options tab in **Global Options**, a quicker way is to right click on any item in the selection tree and choose the menu item **Set Selection Resolution to X**, where X is one of the above selection resolutions.

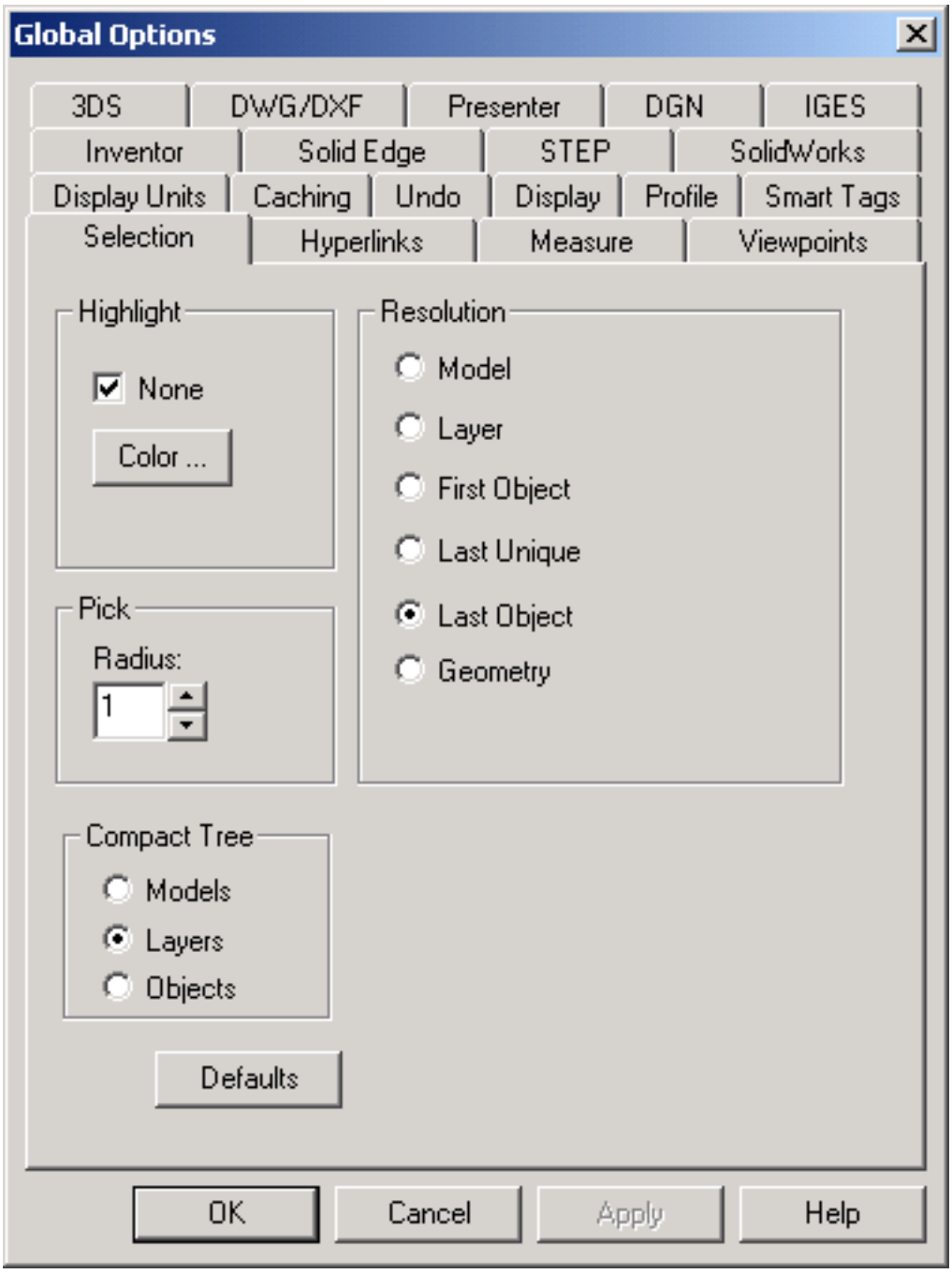
6.5. Selection Options

Use the **Selection** options to configure how you select items in the NavisWorks scene. You can set the level at which you select items (selection resolution), the distance from an item you have to be for it to be selected (useful for lines and points) and also the color in which selected items are displayed.

Setting selection options

Go to **Tools, Global Options, Selection**.

The **Selection** dialog is displayed



1. To set the color that selected items are displayed in, click the **Color** button. The default highlight color is blue. Alternatively, check the **None** check box to disable selected item highlighting (items won't change color when selected).

2.

Enter the radius, in pixels, that an item has to be within in order for it to be selected in the **Radius** box.

3. Choose the level of selection that you wish to use as the default selection resolution.

4. Choose what level of detail you wish to see in the **Compact** selection tree. **Models** will restrict the tree to just displaying model files, **Layers** will restrict it down to the layer level and **Objects** will show a similar tree to the **Standard** tree, but without the levels of instancing inserted above an inserted block.

5. Click **OK** to set the options or **Cancel** to exit the dialog without setting them.

Chapter 7. Finding

Finding is a quick and powerful way of selecting items into the current selection based on items' properties. These "searches" can then be saved (see Section 6.3.1) and re-run in later sessions.

You can also find text inside comments using the Find Comments functionality.

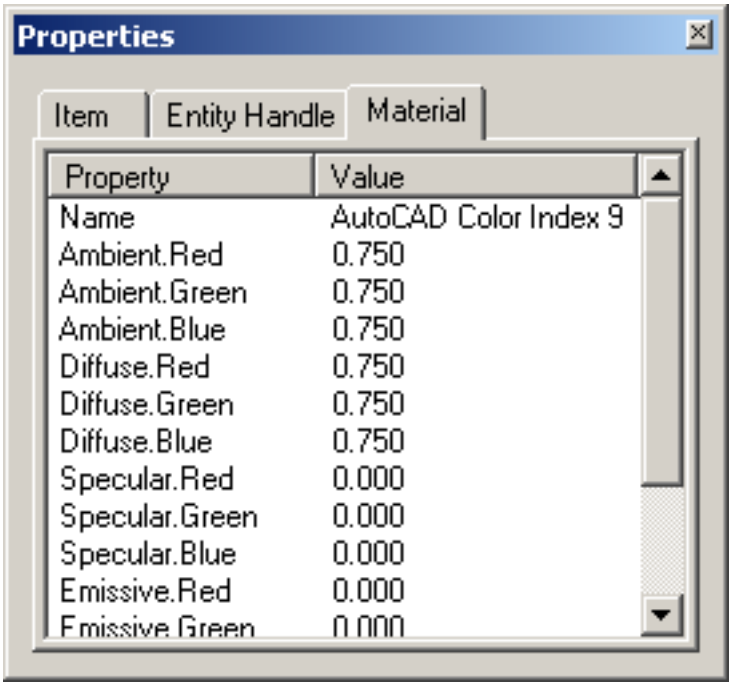
7.1. Properties

The **Properties** control bar shows all the properties of an item selected. Properties are categorized into categories such as **Item** and **Material** and this control bar has a tab for each property category of the selected item. Whenever a single item is selected, this dialog will be updated to show the properties of that item.

Note

If more than one item is selected the **Properties** bar will only show the number of items selected and won't show any property information.

The **Properties** control bar looks like this:



To activate it, click on the **Properties** button  on the **Workspace** toolbar, or go to **View, Control Bars, Properties**.

Hyperlinks are also classed as a property category and so can be added and edited from this control bar using the context menu. See Section 13.4 for more details on hyperlinks.

NavisWorks will also convert many different CAD application object properties, such as those from Architectural Desktop™ or MicroStation Triforma™.

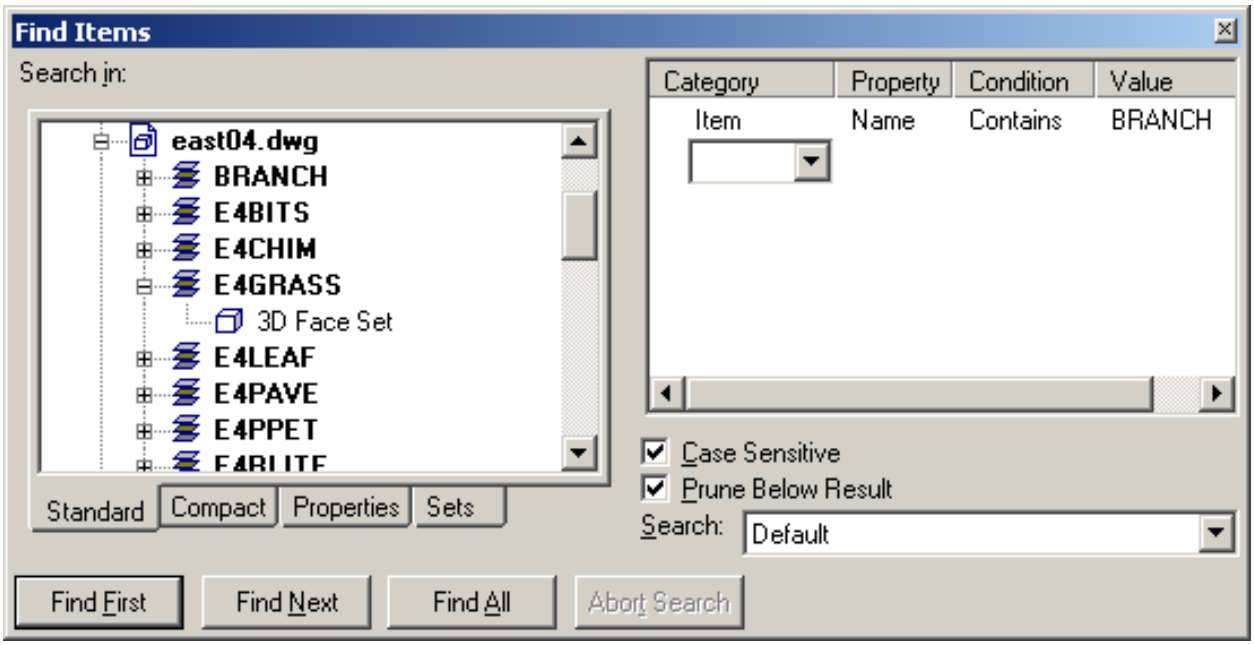
Every property has a type associated with it, for example, an item's **Name** is a string, and so on. Some

properties are dependent on the current profile, so if you are more technically oriented and wish to see more detailed property information, such as a file's transform check the profile level in **Global Options, Profile**.

7.2. Finding Items

In NavisWorks, searching the model for items based on their properties is quick and simple using the **Find Items** control bar. This bar is also a dockable bar accessed as usual through the **View, Control Bars** menu, or from the **Workspace** control bar by pressing the **Find Items** button  . Alternatively, go to **Edit, Find Items**.

The **Find Items** control bar looks like this:



Notice that the selection trees occupy the left half of this bar, allowing you to refine your searches further within a specific hierarchy. See Section 6.1 for more information on the selection trees. Simply click on the selection tree tab that best suits your current search.

Finding items based on properties

1. If it's not already open, open the **Find Items** control bar as outlined above.

2. Choose the selection tree tab that best suits your search. For example, if you know you are limiting your find to within a specific selection set, then choose the **Sets** tab.

3. Choose the items where you want to start the find from. For example, if you know you want to search the whole model, then choose the file or files from the **Standard** tab that comprise the model. You could also select several selection sets to limit your find to these items in the sets.

Note

You can right click on the selection tree and choose from **Import Current Selection** to quickly select the items currently selected for the search, or conversely, **Set As Current Selection** to set the current selection to that you have already selected in the find selection tree.

4. The right hand side of the bar contains a list box with four columns, **Category**, **Property**, **Condition**, and **Value**. This is where the find specification is set up. In this list box, you define a series of conditions which are, by default, logically ANDed together as follows:

   - Each condition is started by clicking on the next available line under the **Category** column and from the ensuing drop down, choosing which category the property you wish to search for is in. Only the categories that are contained in the scene are available in the drop down.
   - After choosing the category, then choose the property you wish to test for in the **Property** drop down which will then be available. Again, only the properties in the scene within the category chosen will be available.
   - Then, from the following **Condition** drop down, choose the condition you wish to test for. This will depend on the type of property you are searching for. For example, you can choose **Contains** to search for a series of letters within a string. **Wildcard** means any series of characters in a string can match. The symbol **=** means "exactly equals" and can be used for any type of property. The mathematical symbols, **<**, **>**, **<=** and **>=** apply to number types and mean "less than", "greater than", "less than or equal to", and "greater than or equal to" respectively. Also available are **Defined** and **Undefined** to mean "anything" (in other words, it's there) and "nothing" (in other words, it's not there) respectively.
   - Finally, if you didn't choose either **Defined** or **Undefined** in the **Condition** column, you have to define the **Value** you want to match in the find. You can either type in a value freely in the text box, or choose a pre-defined value from the drop down which shows all values in the model available within the category and property you defined earlier.

5. Continue to add conditions to the find specification. Each condition you add will by default be logically ANDed with the others. See the example below for a better explanation of the logic.

6. You can logically negate any condition by selecting the condition, then right clicking on the list box and choosing **Negate Condition**. See the example below for a better explanation of the logic.

7. Instead of the condition being logically ANDed, you can also logically OR a condition by selecting the condition, then right clicking on the list box and choosing **Or Condition**. All conditions following this condition are logically ANDed together and will be logically ORed with all conditions preceding this condition (which are in turn logically ANDed together). A small "plus" will appear next to an ORed condition. See the example below for a better explanation of the logic.

8. To delete the selected condition, right click on the list box and choose **Delete Condition** from the context menu. Alternatively, to delete all the conditions in the find specification, choose **Delete All Conditions** from the context menu.

9. The context menu that appears when right clicking on the list box also contains several **Ignore Cate-**

gory ... and **Ignore Property ...** options. See User Name and Internal Name for details on what these mean.

10. Check the **Match Case** check box if you want the find to respect the upper and lower case letters in strings. You can also define case sensitivity at the condition level by selecting the condition, right clicking on the list box and choosing **Ignore String Value Case** from the context menu. This will then ignore that condition's case when making comparisons. The **Match Case** check box should gray out, showing that some conditions are case sensitive and other are not.

11. Check the **Prune Below Result** check box if you want to stop searching a branch of the selection tree as soon as an item that matches the find specification is found.

12. From the **Search** drop down, select the type of search you want to perform.

    - **Default** searches all items selected in the selection tree, along with the paths below these itesm, for matches with the search.
    - **Below Selected Paths** only searches below the items selected in the selection tree for matches with the search.
    - **Selected Paths Only** only searches within the items selected in the selection tree for matches with the search.

13. Click **Find First** for the first item in the selection tree to match any of the find specification, **Find Next** to find the next item in the tree, and **Find All** to find all items matching the specification.

14. You can click on **Abort Search** at any time during a lengthy search to cancel the search.

15. Any items found will be selected in the selection tree and main navigation window.

Note

A small "star" will appear next to any condition that does not have the default settings, such as if you negate the condition or check one of the **Ignore...** items on the context menu.

Find Item Example

Say you have set up four conditions in the search called C1, C2, C3 and C4. If you want to search for (C1 AND C2) OR (C3 AND NOT C4), then you would select condition 3 and choose **Or Condition** from the context menu, and then select condition 4 and choose **Negate Condition** from the context menu. So all conditions following the OR are ANDed together and this group of conditions is ORed with the first group of conditions, which are also ANDed together. In other words, in geek-speak, the precedence is NOT, then AND, then OR.

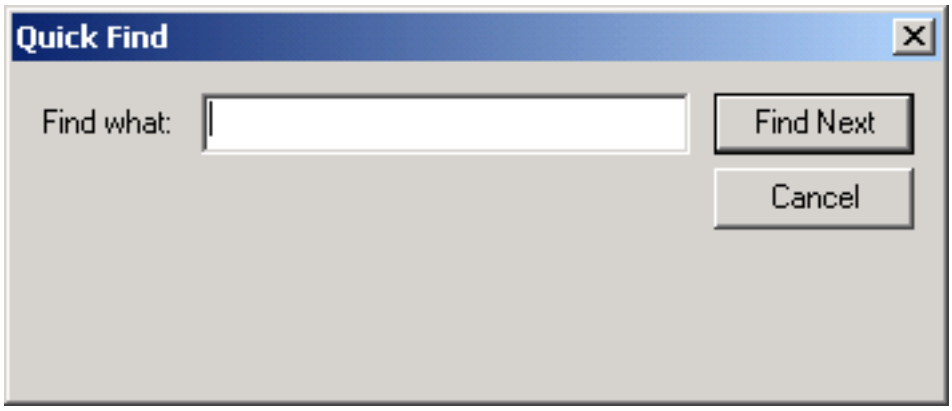
7.3. Quick Find

As well as the more comprehensive and powerful **Find Item** feature (see Section 7.2), NavisWorks also offers a simpler and quicker **Quick Find**. This simply searches for a string (case insensitive) in all prop-

erty names and values attached to items in the scene.

Quickly finding items from a string

1. Go to **Edit, Quick Find** or press **Ctrl-F**. The **Quick Find** dialog will appear:



2. Type in the string you want to search for in all items' properties. This search is not case sensitive.

3. Click **Find Next** to find the next item in the selection tree containing this string or **Cancel** to return to NavisWorks.

4. If any items contain properties with the string being searched for, the next one in the selection tree will be highlighted and the search stopped.

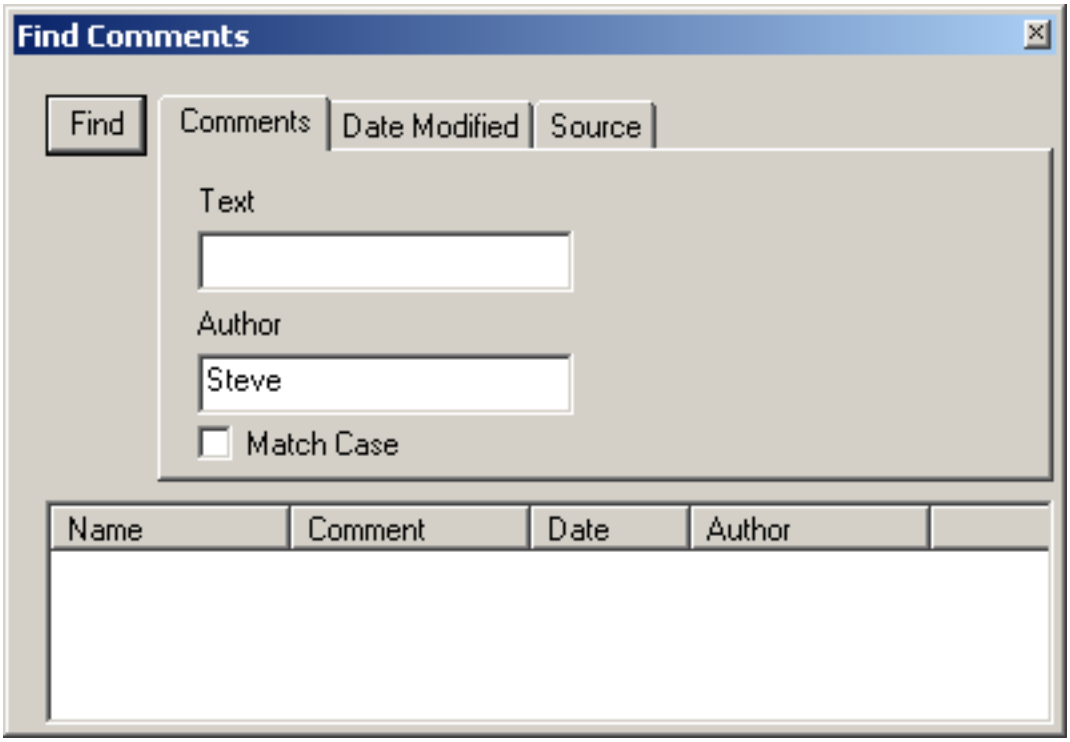
5. To repeat the search, simply press **F3** or go to **Edit, Quick Find Next**. If any more items contain properties with the string, the next one in the selection tree will be highlighted and the search stopped.

7.4. Finding Comments

As well as finding items by property, you can also search the comments attached to items, clash results and selection sets using the **Find Comments** control bar. For more information on what comments are and how to attach them to items, see Section 13.1. Alternatively, go to **Edit, Find Comments**.

As usual in NavisWorks, the **Find Comments** control bar is a dockable bar accessed through the **View, Control Bars** menu, from the **Review, Comments, Find Comments** menu or from the **Workspace** control bar by pressing the **Find Comments** button  .

The **Find Comments** control bar looks like this:



Finding comments

1. If it's not already open, open the **Find Comments** control bar as outlined above.

2. Type in the text that you want to search for in the **Text** box.

   ## Note

   You should use the "*" wildcard (without the quotes) to match an arbitrary series of letters either before or after the text you enter here. For example, if you want to find all comments containing the word "redline", you should enter "*redline*" in the text box, otherwise you will only find comments that contain only the "redline" word, which probably won't be many!

3. If you want to restrict your search to comments made by a single author, then type in the name of that author in the **Author** text box.

4. Check the **Match Case** check box if you want the search to respect lower and upper case characters in the search.

5. You can refine the search further by clicking on the **Date Modified** tab to select a date range within which the comment must have been made.

6. Clicking on the **Source** tab and check the relevant check boxes for **Clash Detective Selection Sets**

or **Viewpoints** to restrict the search by the source that the comment is attached to.

Note

If the **Text** and **Author** fields are left empty, the search will return all comments within the **Date Modified** and **Source** restrictions.

7. Click **Find** to search for the comments.

8. If any comments are found, they will be listed in the box at the bottom of the control. Selecting a comment will also select the source of the comment. For example, selecting a comment which originated from a saved viewpoint will select that viewpoint.

If new comments are added, the results list will be cleared.

Chapter 8. Editing

As NavisWorks is a design review tool, editing is restricted to simple temporary "overrides" of items' properties, so that they can always be reset to the state they were in when imported from the CAD file. You can override an item's position by holding onto the item while navigating and then dropping it in a new position, as well as color, transparency, and hyperlinks. In addition, you can hide and reveal items and make them required and unrequired to control their drop out during navigation. Finally, you can also edit a file's transform, or in other words, its origin location, scale, rotation and so on, so that it fits within the scene when appending multiple models from potentially different sources and CAD applications.

Most editing is done from the **Edit** menu, which includes the following items:

- Undo
- Redo
- Select
- Hide Item
- Item Required
- Hide Unselected Items
- Override Item
- Reset Item
- Reset All
- File Units and Transform

The two main editing functionalities not available from the **Edit** menu are hyperlinks and moving items.

8.1. Holding and releasing objects

When navigating around a model in NavisWorks it is possible to "pick up" or hold selected items and move around with them in the model. For example you may be viewing a plan for a factory and would like to see different configurations of machine layouts.

Holding and releasing items

1. Select the item(s) to be held for moving.
2.
   - Go to **Viewpoint, Navigation Tools, Hold Selected**

   or

- Click **Hold Selected**  on the **Navigation Tools** toolbar.

3. The selected item(s) are now held and will move with you through the model.

4. Use the normal navigation modes i.e. Walk, Fly etc. as normal.

5. To release the held item simply click **Hold Selected**  on the **Navigation Tools** toolbar again.

To reset the item to its original position, see Section 8.7.3.

8.2. Undo/Redo

You can undo or redo your actions in NavisWorks. The **Edit, Undo** and **Edit, Redo** menu item states what type of action you will undo/redo.

To undo an action

- Go to **Edit, Undo**

or

- Press **Ctrl-Z**

or

- Click **Undo**  on the **Standard** toolbar

Repeat as many times as required or your options allow.

To redo an action

- Go to **Edit, Redo**

or

- Press **Ctrl-Y**

or

- Click **Redo**  on the **Standard** toolbar

Repeat as many times as required, or your options allow.

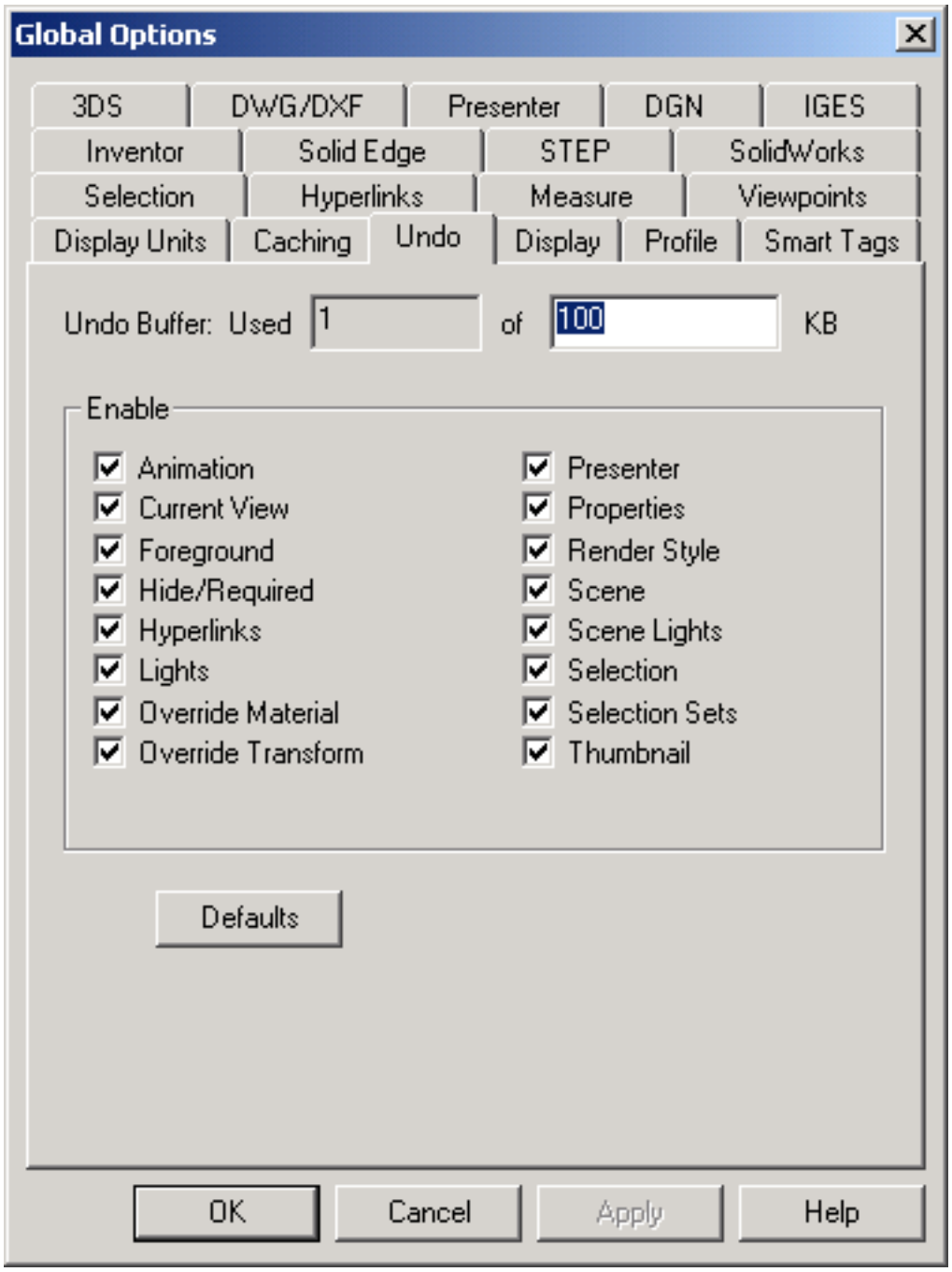
Undo Options

The **Undo** tab of the **Global Options** dialog box allows you to tailor how you wish the **Undo** and **Redo** commands in NavisWorks to function. The check boxes select the types of actions to undo and redo with the undo/redo actions in NavisWorks. You can also set the amount of space you wish to allocate to the undo buffer. The more undo commands you allow the more space that is required. The default settings should be adequate for most normal usage.

Setting undo options

1. Go to **Tools, Global Options** and select the **Undo** tab.

   The **Options** dialog box is displayed:



2. Select the **Undo** tab.

3. Set the amount of space you wish to allocate for saving these actions.

4. Check the actions you wish to be able to undo/redo.

5.

If you want to return to the system default values, click **Defaults**.

6. Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

8.3. Hiding Items

This command hides the current selection and allows you hide and reveal items by toggling on and off.

Note

In the selection tree the object will appear gray when hidden.

Hiding an item

1. Select the item(s) that you want to hide (see Chapter 6 for more information on how to do this).
2.
   - Go to **Edit, Hide Item**

   or

   - Click **Hidden**  on the **Standard** toolbar.

8.4. Item Required

This option makes the current selection required for rendering which means that they will always be rendered during navigation and not drop out. The command allows you make an item required or unrequired by toggling on and off.

Note

A *Required* item may also be *Hidden*. In the selection tree the object will appear red when required.

Making an item required

1. Select the item(s) that you want to make required (see Chapter 6 for more information on how to do this).

2.

- Go to **Edit, Item Required**

or

- Click **Hidden**  on the **Standard** toolbar.

8.5. Hiding Unselected Items

This command hides all items except those currently selected so that they are not drawn in the main view. The command allows you hide and reveal the hidden items by toggling on and off.

Note

In the selection tree the items will appear gray when hidden.

Hiding all non-selected items

1. Select the item(s) that you want to remain visiable (see Chapter 6 for more information on how to do this).

2.

- Go to **Edit, Hide Unselected Items**

or

- Click **Unselected Hidden**  on the **Standard** toolbar.

8.6. Overriding Item Properties

Various item properties, such as material (color and transparency) and hyperlinks, can be temporarily overridden in the scene for design review. These overrides are saved into .nwf files for future use and any material overrides can be optionally saved into viewpoints (see Section 10.6).

8.6.1. Overriding Color

This option allows a user-defined color to be added to an item in the scene. The old color is saved in case it needs to be reset later.

Overriding an item's color

1. Go to **Edit, Override Item, Color**
2. Select a color from the color-chooser and click **OK**.

8.6.2. Overriding Transparency

This option allows a user-defined transparency to be added to an item in the scene. The old color is saved in case it needs to be reset later.

Overriding an item's transparency

1. Go to **Edit, Override Item, Transparency**
2. Use the slider to select level between opaque and transparent and click **OK**.

8.6.3. Overriding Hyperlinks

As well as hyperlinks being converted from the native CAD files you open in Roamer, you can also "override" an item's hyperlinks by attaching multiple additional hyperlinks to it. Because hyperlinks are treated as such a property by NavisWorks, they can be searched on with the **Find Items** tool and displayed in the **Properties** bar. They are also saved into NavisWorks files so that as the model changes, the links remain for you and others to view.

See Section 13.4 for more information on overriding hyperlinks.

8.7. Resetting Overriden Properties

Once an override has been applied to an item, you simply reset that override to return it to the value that it had when the file was originally converted from the native CAD file.

8.7.1. Resetting Materials

This option restores the original items' color *and* transparency to the selected items.

Note

You cannot reset an item's color separately from its transparency - they are always reset together.

To reset color and transparency

- Go to **Edit, Reset Item, Colors and Transparencies**

8.7.2. Resetting Hyperlinks

This option restores the original items' hyperlinks to the selected items and removes any hyperlinks that have been added in the model since.

To reset hyperlinks

- Go to **Edit, Reset Item, Hyperlinks**

8.7.3. Resetting Items' Positions

This option restores the original items' positions to the selected items, after it has been moved using the Hold Item command.

To reset a held item's position

- Go to **Edit, Reset Item, Held Item**

8.8. Resetting All Overriden Properties

Once an override has been applied to several items, you can reset them all at once to return them to the values that they had when the file was originally converted from the native CAD file.

8.8.1. Resetting All Colors and Transparencies

This option restores to all items in the scene their original colors and transparencies.

Note

Items' colors cannot be restored separately from their transparencies.

To reset all materials

- Go to **Edit, Reset All, Colors and Transparencies**

8.8.2. Resetting All Items' Hyperlinks

This option restores all items hyperlinks to the original state that they were in when the model was imported into NavisWorks

To restore all items hyperlinks

- Go to **Edit, Reset All, Hyperlinks**

8.8.3. Revealing All Items

This option reveals (unhides) all items

To reveal all items

- Go to **Edit, Reset All, Hidden Items**

8.8.4. Making All Items Unrequired

This option makes all items unrequired so that no items are forced to be rendered during navigation

To make all items unrequired

- Go to **Edit, Reset All, Required Items**

8.8.5. Resetting All Items' Positions

This option restores the original positions of any items that have previously been held and moved around the model.

To restore all items position

- Go to **Edit, Reset All, Held Items**

8.9. Setting a File's Units and Transform

Probably the only time you will need to use this feature is if you append several models from different sources into the same scene and the scale, rotation and origin of some models need amending to match the other models.

The first thing to try, however, before attempting to manually adjust the file's transform, is to check that the units are ok. See Section 14.7 for a discussion of units and how to adjust them.

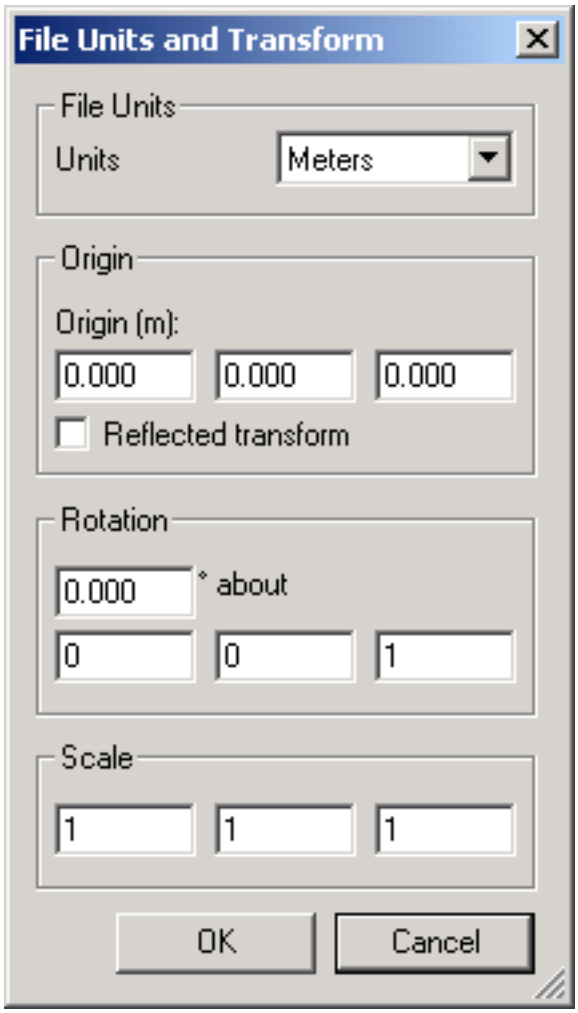
Note

The transform properties can only be set for a whole file. If you select an item that is inside the file and do a **File Transform** on it, the whole file will be transformed - not just the item selected. Also, only single files can be transformed at one time - this command is not available if multiple files/ items are selected.

Setting a file's transform

1. In the selection tree, select the file that you wish to transform the scale, origin or rotation of.
2. Go to **Edit, File Units and Transform...**

   The **File Units and Transform** dialog will appear:



3. Move the model's location by entering model units for the x, y and z axis in **Origin**.

4. The **Reflected Transform** checkbox only needs to be checked if a negative scale has been set.

5. Change the rotation of an object by entering an angle of rotation and selecting the axis to rotate about (by entering a value greater than 0). The object rotates about its origin point.

6. Amend the size of the object by entering values greater than 0 (to proportionally scale an object ensure the x, y and z scale values are equal). A negative value will in effect flip the object inside out.

7. Choose **OK**

Chapter 9. Display Modes

The **Rendering Styles** toolbar controls the appearance of the model in the main navigation window. From this you can control the lighting effect, the rendering type and enable or disable the different types of primitives drawn. Linked with the display options (see Section 9.4 later in this chapter) and file options (see Section 16.1, this enables you to fully control the appearance of the NavisWorks main navigation window.

9.1. Rendering Styles

The rendering process interactively draws the scene's items in the main navigation window. You have a choice of one of four interactive lighting modes (full lights, scene lights, head light, or no lights), four rendering modes (full render, shaded render, wireframe or hidden line) and you can individually turn each of the four primitive types (surfaces, lines, points and snap points) on and off.

The **Rendering Style** toolbar looks like this:

If it is not already displayed, you can display it from the **View, Control Bars, Rendering Style** menu.

9.1.1. Lighting

Lights come through from various CAD file formats as scene lights. The intensity of the head light and scene lights can be set using the **File Options** under the **Tools** menu (see Section 16.1 for details on this).

9.1.1.1. No Lights

This option turns off lighting. The models are shaded with flat rendering.

To turn off all lights

- Go to **Viewpoint, Lighting, No Lights**

or

- Click **No Lights**  on the **Rendering Style** toolbar.

9.1.1.2. Head Light

This option uses a single directional light located at the camera that always points in the same direction as the camera. You can set the head lights properties using Head Light options.

To turn on the head light

- Go to **Viewpoint, Lighting, Head Light**

or

- Click **Head light**  on the **Rendering Style** toolbar.

9.1.1.3. Head Light options

Sliders are available to change the intensity of the scene's ambient light and headlight.

The **Ambient** slider controls the general overall brightness of the scene while the **Headlight** slider controls the brightness of the light located at the viewpoint.

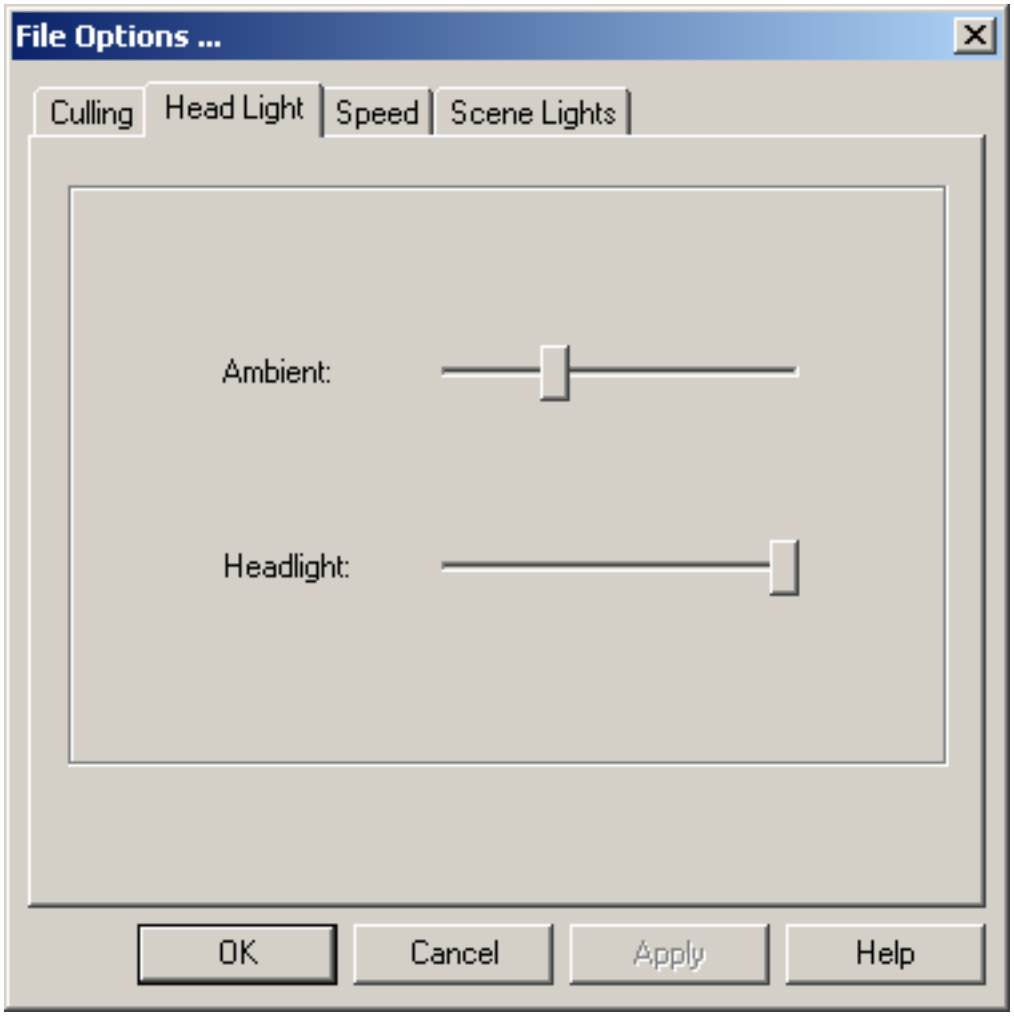
Note

Changes made in Head Light options will not be visible unless you have selected the **Head Light** rendering style.

Changing head light intensity

1. Go to **Tools, File Options, Head Light**.

   The **Head Light** dialog is displayed:



2. Move the sliders to affect the ambient and head light intensities. You will see the effect your changes have on the scene in the main navigation window, as long as head light is selected as the rendering style.

3. Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

9.1.1.4. Scene Lights

This option uses whatever lights are defined in the model, or two default opposing lights, if none are available. You can set the scene lights properties using Scene Lights options.

To turn on scene lights

- Go to **Viewpoint, Lighting, Scene Lights**

or

- Click **Scene lights**  on the **Rendering Style** toolbar.

9.1.1.5. Scene Lights Options

Sliders are available to change the intensity of the scene's lights.

The **Ambient** slider controls the general overall brightness of the scene when scene lights is selected as the rendering style.

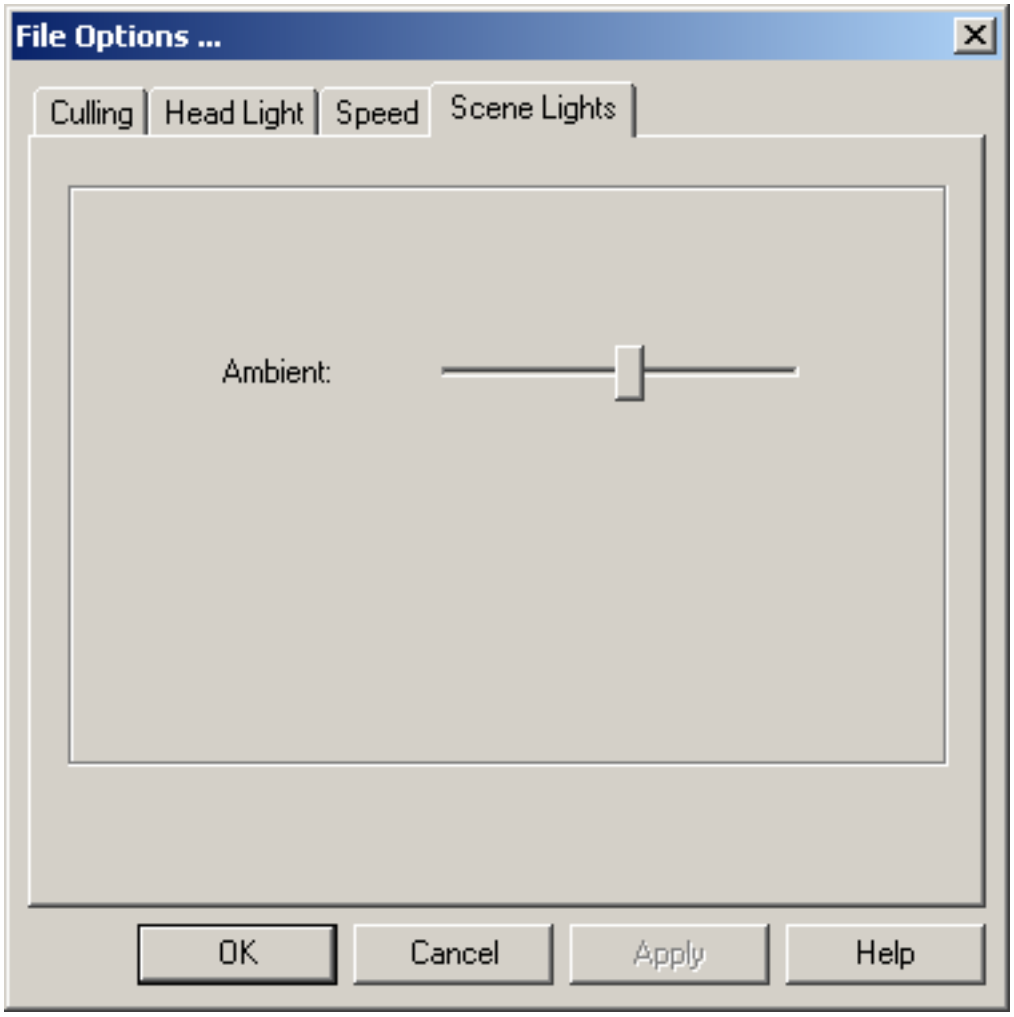
Note

Changes made in Scene Lights options will not be visible unless you have selected the **Scene Lights** rendering style.

Changing scene light intensity

1. Go to **Tools, File Options, Scene Lights**.

   The **Scene Lights** dialog is displayed:



2. Move the slider to affect the ambient intensity. You will see the effect your changes have on the scene in the main navigation window, as long as scene lights is selected as the rendering style.

3. Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

9.1.1.6. Full Lights

This option uses lights that have been defined with the Presenter plugin.

To turn on full lights

- Go to **Viewpoint, Lighting, Full Lights**

or

- Click **Full lights**  on the **Rendering Style** toolbar.

9.1.2. Render Modes

The four render modes affect how the items are rendered in the main navigation window.

9.1.2.1. Full Render

This option renders the model with smooth shading including any Presenter materials that have been applied using NavisWorks Presenter or have been brought through from the native CAD file (although NavisWorks does not convert all native CAD file's textures - see Chapter 3 for more details).

To select full render

- Go to **Viewpoint, Rendering, Full**

or

- Click **Full Render**  on the **Rendering Style** toolbar.

9.1.2.2. Shaded Render

This option renders the model with smooth shading and without textures.

To select shaded render

- Go to **Viewpoint, Rendering, Shaded**

or

- Click **Shaded**  on the **Rendering Style** toolbar.

9.1.2.3. Wireframe Render

This option renders the model in wireframe. As NavisWorks uses triangles to represent surfaces and solids, all triangle edges are visible in this mode.

To select wireframe render

- Go to **Viewpoint, Rendering, Wireframe**

or

- Click **Wireframe**  on the **Rendering Style** toolbar.

9.1.2.4. Hidden Line Render

This option renders the model in hidden line. This requires a two pass rendering algorithm so is equivalent to rendering shaded and wireframe at the same time. The output is low quality as all the facet edges in the model are visible.

To select hidden line render

- Go to **Viewpoint, Rendering, Hidden Line**

or

- Click **Hidden Line**  on the **Rendering Style** toolbar.

9.1.3. Display Primitives

The second part of the rendering style toolbar allows you enable and disable the drawing of surfaces, lines, points and snap points. Points are "real" points in the model, whereas snap points mark locations on other primitives, for example the center of a circle, and are useful for snapping to when measuring.

9.1.3.1. Surfaces

Surfaces are the triangles that make up the 2D and 3D items in the scene.

To toggle the rendering of surfaces on or off

- Go to **Viewpoint, Display, Surfaces**

or

- Click **Surfaces**  on the **Rendering Style** toolbar.

9.1.3.2. Lines

As well as turning all lines on and off, it is possible to change the width of the lines. See Section 9.4 for details on how to do this.

To toggle the rendering of lines on or off

- Go to **Viewpoint, Display, Lines**

or

- Click **Lines** on the **Rendering Style** toolbar.

9.1.3.3. Points

Points are real points in the model, for example, the points in a point cloud from a laser scan. As well as turning all points on and off, it is possible to change the number of pixels used to draw them. See Section 9.4 for details on how to do this.

To toggle the rendering of points on or off

- Go to **Viewpoint, Display, Points**

or

- Click **Points**  on the **Rendering Style** toolbar.

9.1.3.4. Snap Points

Snap points are implied points in the model, for example, the center point of a sphere or end points of a pipe. As well as turning all snap points on and off, it is possible to change the number of pixels used to draw them. See Section 9.4 for details on how to do this.

To toggle the rendering of snap points on or off

- Go to **Viewpoint, Display, Snap Points**

or

- Click **Snap Points**  on the **Rendering Style** toolbar.

9.1.4. Background Color

This option allows you to select or mix a background color for the main view. Setting the background color is equivalent to setting a **Plain Color** in the **Background** tab of the Presenter dialog. This option is only available if you have the NavisWorks Presenter plugin.

Setting the background color

1. Go to **Tools, Background Color**
2. Select the color from the Windows™ color palette.

3. Click **OK** to set the background color or **Cancel** to exit the dialog without setting it.

9.2. Culling Options

There are three methods of culling objects in NavisWorks: backface, by area, and by near or far plane. All of these options are configurable using the **Culling** options tab.

Backface culling only draws the front face of every polygon in NavisWorks, which is clearly faster. Sometimes, however, the conversion process mixes up the front and back face of polygons and so you have to tell NavisWorks to draw both sides in order to not see right through some objects.

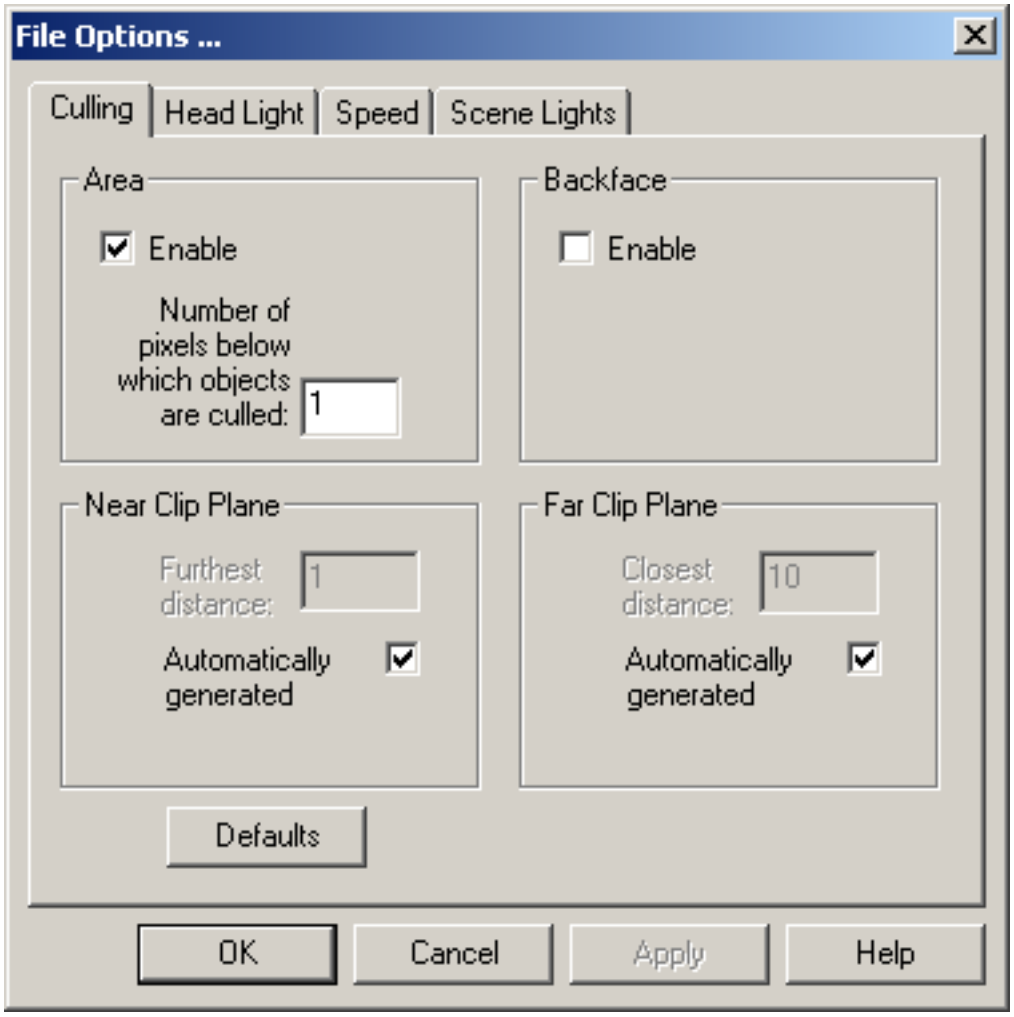
Area culling options allow you to set the size of objects within a model that will not be displayed. For example, if you were to set the value to 100 pixels any object within the model that would be drawn less than 10x10 pixels in size will not be displayed.

Culling options by near and far plane allows some degree of control over the resolution of the axis perpendicular to the screen. NavisWorks uses the near and far clip plane to maximize the resolution of the model on screen. The near and far clip plane boxes dictate constraints for the near and far culling planes.

Setting culling options

1. Go to **Tools, File Options, Culling**

   The **Culling** dialog is displayed



2. Check the **Area, Enable** check box to enable the definition of the screen area (in pixels) below which objects are culled and type in the number of pixels in the text box.

3. In the **Near Clip Plane** area, check the **Automatically generated** check box to tell NavisWorks to constrain the near plane to give the best view of the model it possibly can. Alternatively, uncheck this box to manually constrain the near clip plane. NavisWorks will put the near clip plane no further than the value you type into the **Furthest distance** text box.

4. Similarly, in the **Far Clip Plane** area, check the **Automatically generated** check box to tell Navis-Works to constrain the far plane to give the best view of the model it possibly can. Alternatively, uncheck this box to manually constrain the far clip plane. NavisWorks will put the far clip plane no closer than the value you type into the **Closest distance** text box.

5. Check the **Backface, Enable** check box to enable backface culling. If you find that parts of items are missing in the NavisWorks scene, you might want to disable this option.

6. Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

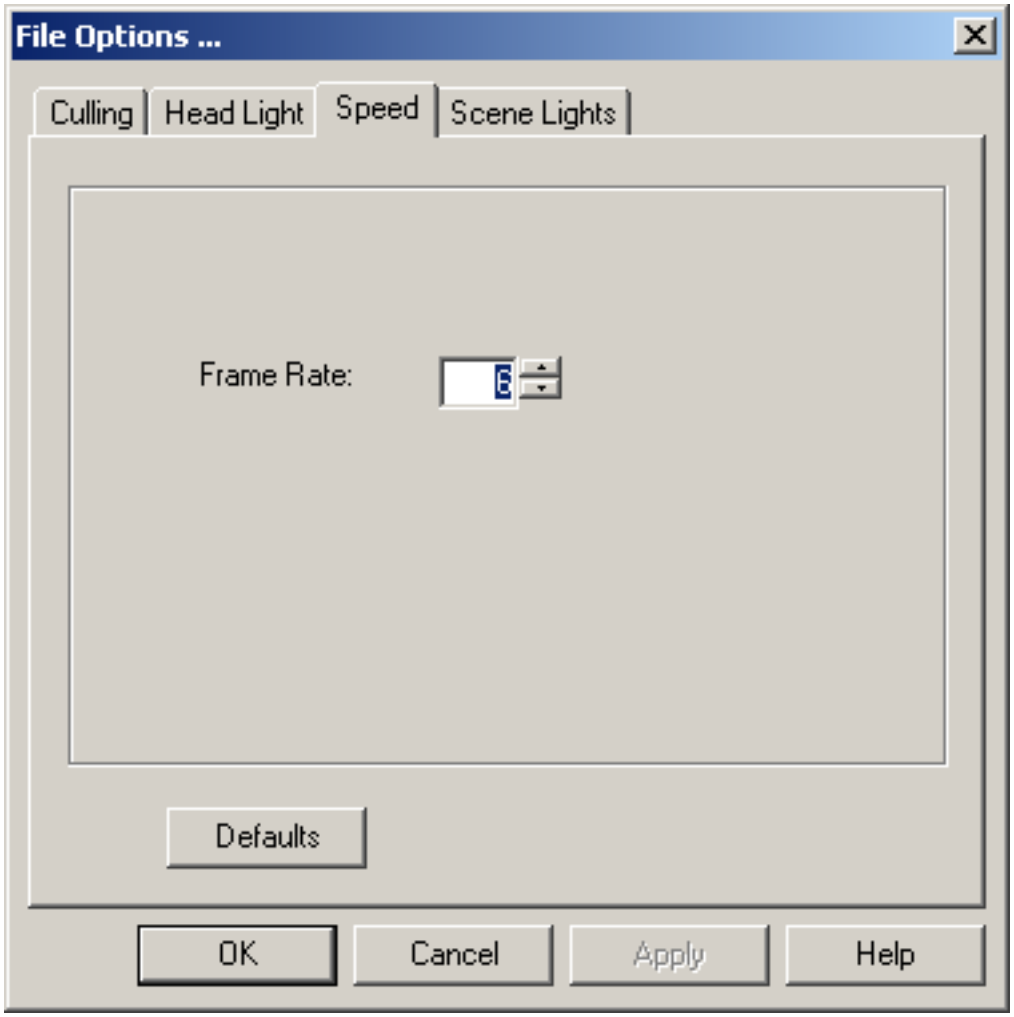
9.3. Speed Options

The basis of NavisWorks Roamer is its ability to walk through any size model in real time. NavisWorks guarantees a user-defined frame rate using a unique algorithm which automatically calculates which items to render first during navigation, based on the size of items and distance from the viewpoint. Items which NavisWorks does not have time to render are therefore sacrificed or "dropped out" in the name of interactivity. These items are, of course, rendered when navigation ceases. The amount of drop-out depends on several factors including: hardware (in particular graphics card and driver performance - for a list of recommended graphics cards, visit www.navisworks.com [http://www.navisworks.com]), as well as the size of the NavisWorks navigation window and the size of the model. If you wish to reduce drop-out during navigation, you have the option to reduce frame rate and therefore trade it off against drop-out. You can set the frame rate anywhere between 1 and 60 frames per second.

Setting the frame rate

1. Go to **Tools, File Options, Speed**.

   The **Speed** dialog is displayed:



2. Select the number of frames per second to be applied to the rendered display of the model.

3. Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

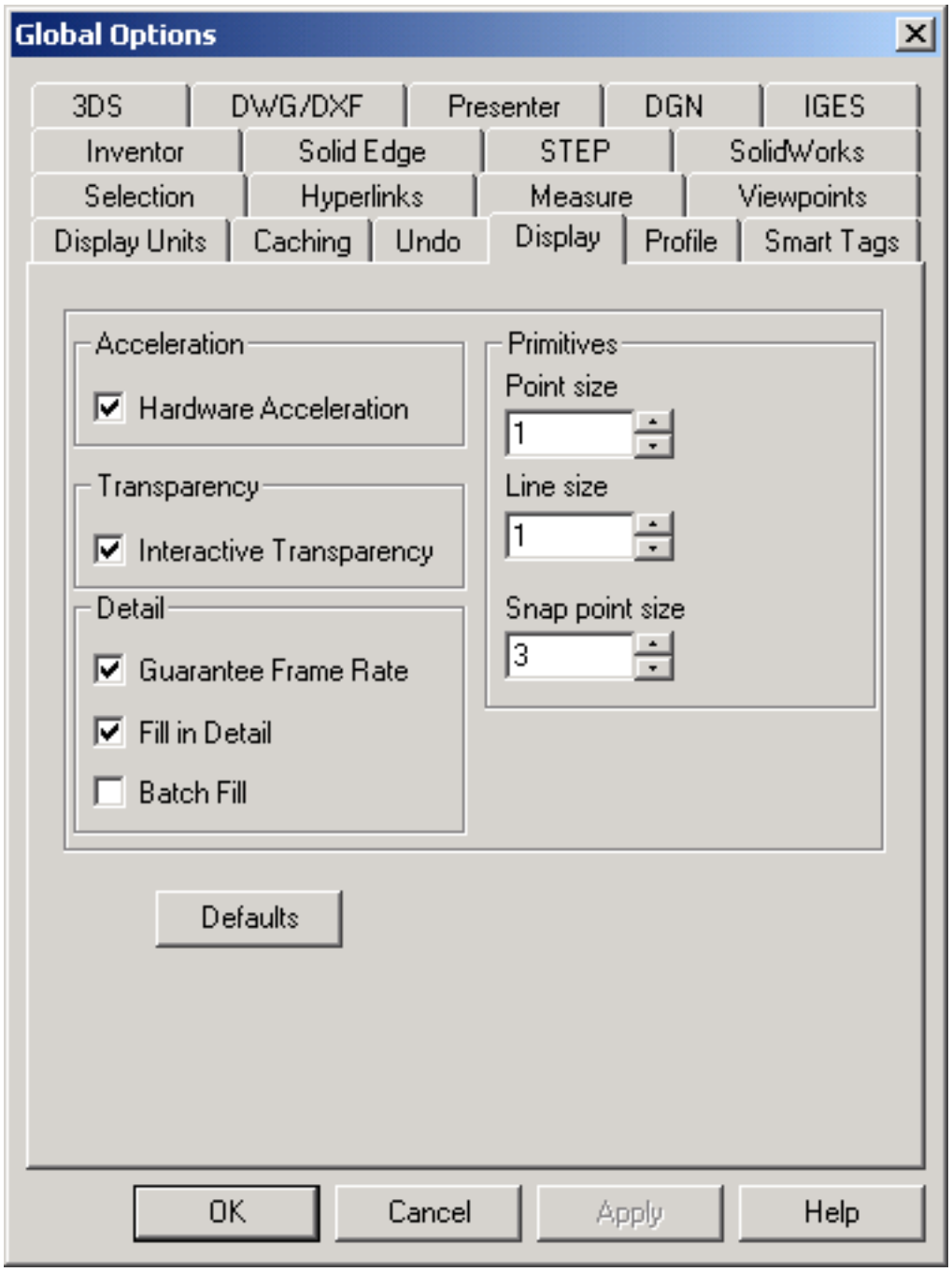
9.4. Display Options

This dialog enables you to control several aspects of the NavisWorks main navigation window display to suite your preferences and setup.

Setting display options

1. Go to **Tools, Global Options, Display**

   The **Display** dialog is displayed



2. Check the **Hardware Acceleration** check box to allow NavisWorks to utilize any available OpenGL hardware acceleration on your video card. If your video card drivers do not function well with NavisWorks, then you may wish to disable this option. You have to restart NavisWorks in order for this option to take effect. This option is grayed out if your video card does not support OpenGL hardware acceleration.

3. Check the **Interactive Transparency** check box to allow the rendering of transparent items during interactive navigation. This may have an effect on performance - especially if your video card does not

support hardware accelerated OpenGL - and so by default transparent items are only drawn when interaction has ceased.

4. Check the **Guarantee Frame Rate** check box to enable the NavisWorks engine to maintain the user defined frame rate set in **Tools, File Options, Speed** (see Section 9.3). By default the target rate is maintained while moving. When movement stops the complete model is rendered. If guarantee frame rate is disabled the complete model is always rendered during navigation, no matter how long it takes.

5. Check the **Fill In Detail** check box if you want NavisWorks to fill in any discarded detail when navigation has ceased.

6. Check the **Batch Fill** check box if you want NavisWorks to fill in detail in chunks rather than gradually. By default this is disabled as gradual rendering is generally better but some video cards may work better with batch fill enabled.

7. In the **Point Size**text box, enter a number between 1 and 9 to set the size (in pixels) of points drawn in the main window. See Section 9.1.3.3 for more information on points.

8. In the **Line Size** text box, enter a number between 1 and 9 to set the width (in pixels) of lines drawn in the main window. See Section 9.1.3.2 for more information on lines.

9. In the **Snap Point Size** text box, enter a number between 1 and 9 to set the size (in pixels) of snap points drawn in the main window.

10. Click **OK** to set these options or **Cancel** to exit the dialog without setting them. See Section 9.1.3.4 for more information on snap points.

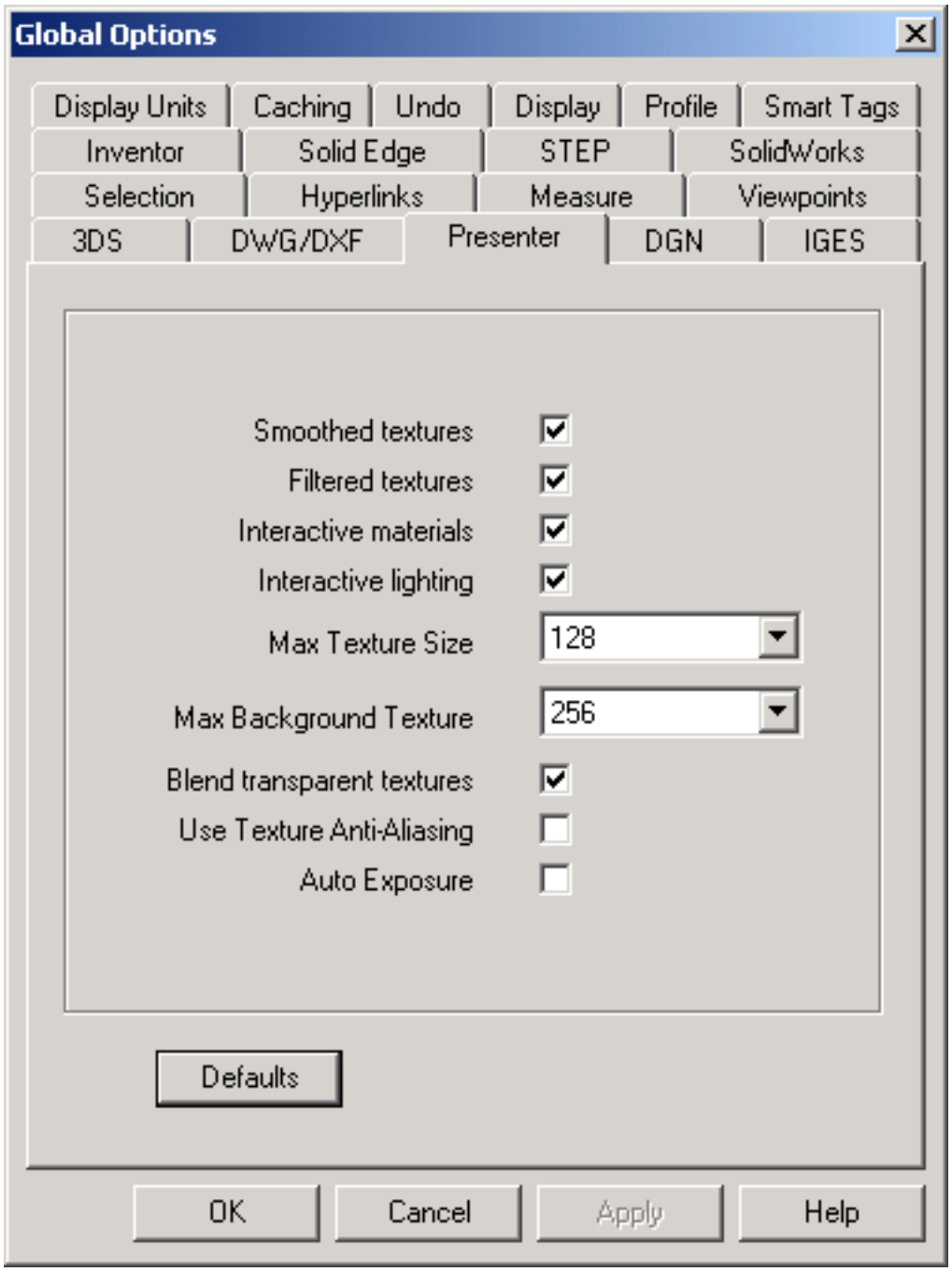
9.5. Presenter Options

This dialog is used to control the appearance of Presenter materials in the main navigation window during navigation. You may want to adjust these settings to get optimum performance from your graphics card when navigating around heavily textured scenes. For a list of recommended graphics cards, visit www.navisworks.com [http://www.navisworks.com].

Setting Presenter options

1. Go to **Tools, Global Options, Presenter**

   The **Presenter** dialog is displayed



2. Check the **Smoothed Textures** check box if you want textures to look smooth but take longer to render. Uncheck it if you want textures to appear pixelated but render faster.

3. Check the **Filtered Textures** check box if you want to turn on mipmapping. This will improve the appearance of textures in the distance.

4. Check the **Interactive Materials** check box if you want to turn off texture display during navigation.

The materials reappear automatically when navigation ceases, as long as the **Full Render** rendering style is on. Unchecking this will ease the load on less capable graphics cards and give less drop out in heavily textured scenes.

5. Use the **Max Texture Size** drop down to set the maximum size that any texture can be. The higher the value, the more memory will be taken and thus performance could be affected on less capable graphics cards.

6. Similarly, use the **Max Background Texture** drop down to set the maximum size that the background texture can be. The higher the value, the more memory will be taken and thus performance could be affected on less capable graphics cards.

7. Check the **Blend Transparent Textures** check box if you want better quality but slower rendering of transparent items in the main navigation window. With this option off, items with transparency of more than 50% are treated as completely transparent and not rendered at all.

8. Check the **Use Texture Anti-Aliasing** check box if you want procedural materials (such as some bricks and tiles - you can tell a procedural material in Presenter because it has a ball style preview icon) to be rendered using anti-aliasing. With this option on, it will take longer to open files containing procedural textures, but the quality will be better.

9. Check the **Auto Exposure** check box if you want the final render to give a nice brightness and contrast balance. The render will then render twice - firstly to establish the render's intensities and then with the adjusted final render.

10. Click **OK** to set the options or **Cancel** to exit the dialog without setting them.

Chapter 10. Viewpoints

Viewpoints are an important feature of NavisWorks. They not only allow you to save and return to views of the model which are of importance, but they can also be used for design review audit trails and for setting up animations of the model.

10.1. Saving Viewpoints

Viewpoints contain more than just the camera information - each viewpoint can also contain redlines and comments. In fact, you can use viewpoints as a design review audit trail. They can be used as hyperlinks in the main navigation window to click on and zoom to the viewpoint, which will also bring up the redline and comments associated with it. The viewpoints, redlines and comments are all saved into an .nwf file from NavisWorks Roamer, so even if the native CAD files are changing, the saved viewpoints remain the same over the top, so you can see how the design has evolved. See Chapter 13 for more information on hyperlinks, comments and redlines and Section 3.1.1 for more information on the .nwf file format.

Viewpoints also retain the section planes active at the time of viewpoint creation, which can be useful in animating sliding sections. See Section 11.1 for more information on sections. Viewpoints can optionally retain saved attributes too, so that on returning to a viewpoint, overridden colors, transparencies and hidden items are reinstated. This can be used to great effect to create animations where items appear and disappear from the scene in time. See Section 10.6 for more information on options and Section 12.1 for more information on animations.

To save a viewpoint

- Go to **Viewpoint, Saved Viewpoints, Save Viewpoint**.

or

- Right click on the **Viewpoints** control bar and choose **Save Viewpoint**.

New viewpoints are named "ViewX" where 'X' is the next available number added to the list. This new viewpoint will take all the attributes of the current viewpoint in the main navigation window.

10.2. Recalling Viewpoints

To return to a viewpoint

- Go to **Viewpoint, Saved Viewpoints** and choose the saved viewpoint from the list.

or

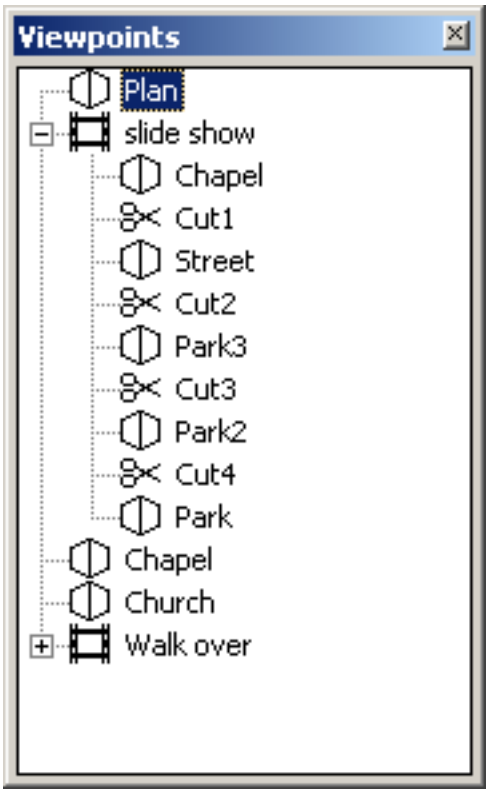
- In the **Viewpoints** control bar, simply click on the viewpoint from the list.

Note

On recalling viewpoints the navigation mode that was active when the viewpoint was created will be re-selected. Any redlines and comments associated with the viewpoint will also be reinstated.

10.3. The Viewpoints Control Bar

Viewpoints allow you to keep a record of all the different views of a model so that you can jump to preset viewpoints without having to navigate each time to reach an item. Animations are also saved with the viewpoints, as they are simply a list of viewpoints treated as key frames of the animation. In fact, animations can be made by simply dragging preset viewpoints onto an empty animation. See Section 12.1 for more information on animations. You can also organize your animations and viewpoints using folders.



The **Viewpoints** control bar is shown above. To open it,

- Go to **View, Control Bars, Viewpoints**

or

- Click **Viewpoints**  on the **Workspace** toolbar.

Icons are used to represent different elements:

 represents a folder which may contain all other elements (including other folders).

 represents a viewpoint saved in orthographic mode.

 represents a viewpoint saved in perspective mode.

 represents an animation clip.

 represents a cut inserted into an animation clip.

You can select more than one viewpoint by either holding down the **Control** key and left clicking, or by left clicking on the first item, and then clicking on the last item while holding down the **Shift** key. You can drag viewpoints around the viewpoints control bar, and reorganize into folders or animations.

There are no buttons on this control bar, and commands are actioned through context menus. Through these menus, you can save and update viewpoints, create and manage animations and create folders to organize these viewpoints and animations. You can also drag and drop viewpoints or animations onto animations or folders, and holding down the **Control** key during this operation will copy the element being dragged. This allows fairly complex hierarchies of animations and folders to be easily composed.

Viewpoints, folders and animations can all be renamed by slow clicking (clicking and pausing without moving the mouse) on the element, or clicking on it and hitting **F2**. Right clicking on an element in the **Viewpoints** control bar gives you a different context menu, depending on the element, or if you've right clicked in a blank space. The following section explains the different context menus.

10.4. The Viewpoint Context Menus

You get a different context menu, depending on what element you right click on in the **Viewpoints** control bar:

- Blank space
- A saved viewpoint
- An animation
- A folder

10.4.1. The Viewpoints Control Bar Context Menu

Saving viewpoints, adding animations and folders

1. Right click on a blank space in the **Viewpoints** control bar.
2. Choose **Add Folder** if you want to add another folder. A new folder will be created with its default name ("FolderX") editable.
3. Choose **Save Viewpoint** if you want to save the current viewpoint. A new viewpoint will be created with its default name ("ViewX") editable.

4. Choose **Add Empty Animation** if you want to create a new animation, ready for dragging viewpoints onto. A new animation will be created with its default name ("AnimationX") editable. See Section 12.1 for more information on animations.

10.4.2. Viewpoints

Managing Viewpoints

1. Right click on the viewpoint in the **Viewpoints** control bar.
2. Choose **Edit** to manually edit the viewpoint's attributes (see Section 10.5).
3. Choose **Add Copy** to create a copy of the viewpoint in the saved viewpoints list. The copy will be named the same as the viewpoint clicked on, but with a " - copy" suffix. The main navigation window will jump to this viewpoint.
4. Choose **Add Comment** to add a comment regarding this viewpoint. See Section 13.1 for more information on comments.
5. Choose **Update** to make the saved viewpoint the same as the current viewpoint.
6. Choose **Delete** to remove the viewpoint from the list of saved viewpoints.

10.4.3. Animations

Managing Animations

1. Right click on the animation, or any of the animation's key frames, in the **Viewpoints** control bar.
2. Choose **Add Frame** to add the current viewpoint as the last key frame in the selected animation.
3. Choose **Add Cut** to add a cut to the end of the animation. Cuts are pauses in the animation and are 1 second long by default.
4. Choose **Add Copy** to add a copy of the element. If you've right clicked on an animation, the whole animation will be copied and named the same but with a "- copy" suffix. If you've right clicked on a cut or a frame, then the cut or frame will be copied.

5. Choose **Add Comment** to add a comment regarding this viewpoint. See Section 13.1 for more information on comments.

6. Choose **Edit** to edit the element. Editing a frame will open the Edit Viewpoint dialog. See Section 12.2 for more information on editing animations, frames and cuts.

7. Choose **Update** to update all frames in the animation with the current render style, lighting and navigation mode. Choosing **Update** on a single frame will only update that frame with the current modes.

8. Choose **Delete** to remove the animation from the list of saved viewpoints, or in the case of a frame or cut, to remove the frame or cut from the animation.

9. If you've right clicked on a frame, you can also choose **Update** to make the frame the same as the current viewpoint.

10.4.4. Folders

Managing Folders

1. Right click on the folder in the **Viewpoints** control bar.

2. Choose **Save Viewpoint** if you want to save the current viewpoint. A new viewpoint will be created in the folder with its default name ("ViewX") editable.

3. Choose **Add Animation** if you want to create a new animation, ready for dragging viewpoints onto, in this folder. A new animation will be created with its default name ("AnimationX") editable. See Section 12.1 for more information on animations.

4. Choose **Add Copy** to create a copy of the folder in the saved viewpoints list. The copy will be named the same as the folder clicked on, but with a " - copy" suffix.

5. Choose **Add Folder** if you want to add another folder underneath the selected folder. A new folder will be created with its default name ("FolderX") editable.

6. Choose **Add Comment** to add a comment regarding this folder. See Section 13.1 for more information on comments.

7. Choose **Update** to update all viewpoints in the folder with the current render style, lighting and navigation mode. Choosing **Update** on a single viewpoint will only update that viewpoint with the current modes.

8.

Choose **Delete** to remove the folder and all its contents from the list of saved viewpoints.

10.5. Editing Viewpoints

You can edit by hand any viewpoints attributes, including camera position, field of view, speed of motion and saved attributes. All entries are measured in scene units (see Section 14.7).

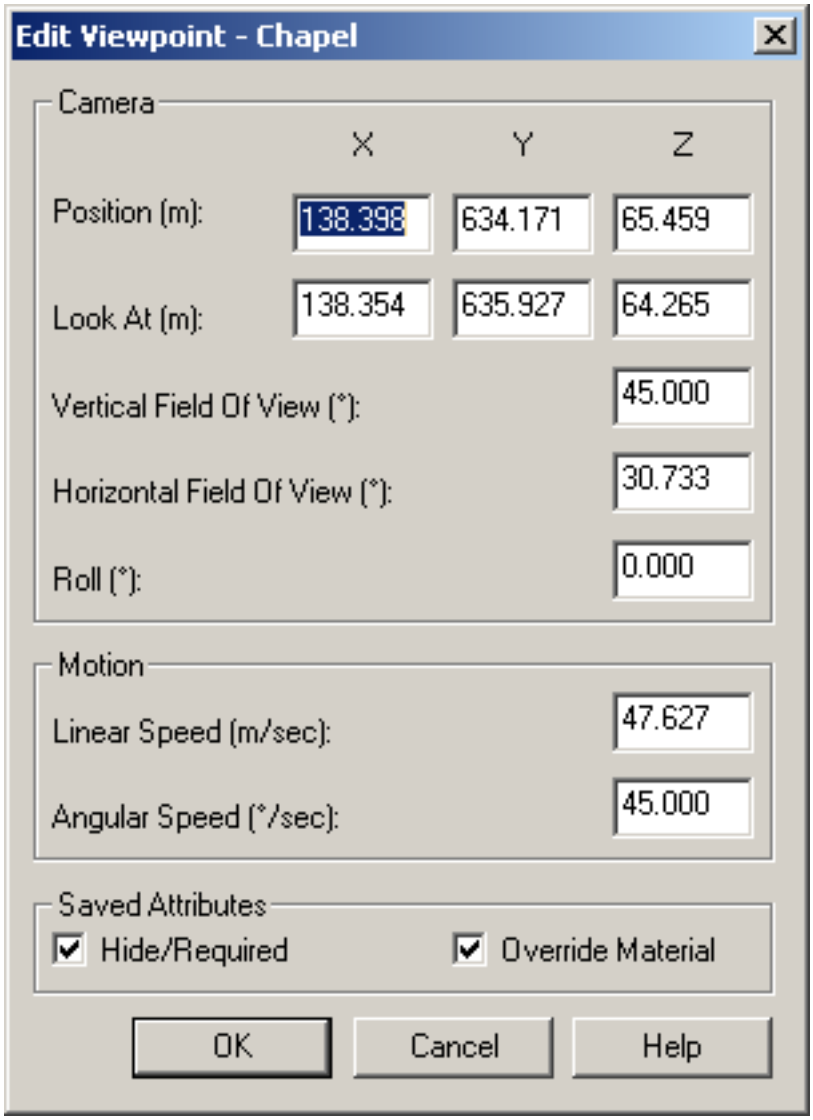
If accessed from **Viewpoint, Edit Current Viewpoint**, the **Edit Viewpoint**dialog box allows editing of the current viewpoint's attributes. Alternatively, if accessed via the saved viewpoints list by right-clicking on a viewpoint or animation frame and choosing edit, this dialog allows editing of the currently selected viewpoint's or frame's attributes as outlined below:

Editing a viewpoint

1.

- To edit a saved viewpoint, right click on the viewpoint in the **Viewpoint** dialog and choose **Edit** from the context menu.
- Alternatively, to edit the current main navigation viewpoint, go to **Viewpoint, Edit Current Viewpoint**.
- Or to edit a thumbnail's viewpoint, right click on the thumbnail and choose **Edit Viewpoint** from the context menu.

The Edit Viewpoint dialog box is displayed.



2. Set the camera position's x-, y- and z- coordinates using the **Position** boxes.

3. Set the focal point's x-, y- and z- coordinates of the camera using the **Look At** boxes.

   Enter the **Vertical Field Of View** and **Horizontal Field Of View**. If the units are set to degrees, then these numbers should be between 0.1 and 90 and if in radians, between 0.002 and 3.124. See Field Of View for more details on what field of view means.

4. Enter the **Roll** of the camera about its viewing axis. This value is not editable where the world up vector stays upright (i.e. in walk, orbit and turntable modes).

5. Enter the speed of motion in a straight line for the viewpoint in the **Linear Speed** box (the minimum value is 0 and the maximum is based on the size of the scene's bounding box).

6. Enter the speed of turning for the viewpoint in the **Angular Speed** box.

7. If the viewpoint being edited is a saved viewpoint (i.e., selected from the **Viewpoint** dialog) , checking the check box of a saved attribute will store that attribute with the viewpoint. See Section 10.6 for more details.

8. Click **OK** to set the viewpoint or **Cancel** to exit the dialog without setting it.

10.6. Viewpoints Options

Two view attributes can be saved with a viewpoint:

- Hide/Required - whether items are hidden or required.
- Override Materials - the color and transparency of items.

You can set a viewpoint to save either attribute by editing the viewpoint. To update changes to overridden material or hide/required, use **Update** in the viewpoints context menu. Be careful, though, as this also updates the point of view as well, which may disrupt any redline information stored with the viewpoint.

By default these attributes are not stored with new saved viewpoints. If you do wish them to be saved by default, then this can set in the **Viewpoints Options**.

Setting the viewpoints options

1. Go to **Tools, Global Options, Viewpoints**

   The **Viewpoints** dialog is displayed

2. Check the **Hide/Required** check box if you want to save the hidden and required items with the viewpoints you save. This means that when returning to those viewpoints, the items that were hidden when the viewpoint was saved will be hidden again and those that were drawn will be drawn again. The default is unchecked as it requires a relatively large amount of memory to save this state information with each viewpoints. See Section 8.3 for more information on hidden items and Section 8.4.

3. Check the **Override Material** check box if you want to save the material overrides with the viewpoints you save. This means that when returning to those viewpoints, the material overrides set when

the viewpoint was saved will be reinstated. The default is unchecked as it requires a relatively large amount of memory to save this state information with each viewpoints. See Section 8.6 for more information on overriding materials.

4. Click **OK** to set the profile or **Cancel** to exit the dialog without setting it.

Chapter 11. Sectioning

Sectioning allows you to make up to 6 sectional cuts in any plane while still being able to navigate around the scene, enabling you to see inside models without hiding any item. Section planes are stored inside viewpoints and so can also be used within animations to show a dynamically sectioned model. See Section 10.3 for more information on viewpoints and Section 12.1 for more information on animations.

Slices can also be created using two opposing section planes and linking them. In this way you can move a slice through the scene in real time and can again link this to animations and viewpoints.

11.1. Sectioning a model

There are up to 6 section planes enabled at one time, but there is only one that is active. The section plane that is active is numbered in the drop down box. However, you can link section planes together to form slices.

The **Sectioning** toolbar is shown above. To open it,

- Go to **View, Control Bars, Sectioning**

or

- Click **Sectioning**  on the **Workspace** toolbar.

Manipulating the active section plane

1. Choose the plane that you wish to manipulate using the numbered drop down. In this drop down, there will always be one more than the number of enabled section planes in the scene, up to a maximum of 6.
2. Switch this plane on or off by clicking the section toggle button. 
3. Once switched on, choose one of the 7 planes that this section plane will cut. You have the choice of

    - **Align Viewpoint**  This will align the plane parallel with the current viewpoint.

    - **Align Bottom** 

- **Align Top** 
- **Align Front** 
- **Align Back** 
- **Align Left** 
- **Align Right** 

Note

Each plane for each section remembers its position, so the slider will move when you choose another plane.

4. Move the slider to interactively position the section plane to the required location. The number in the edit box shows the position of the section plane from the origin and will be updated when moving the section plane. You can also type in the location of the origin in this edit box for exact positioning of the plane.

Note

You can also use the cursor keys and mouse wheel for simple sliding of the section plane through the model.

5. Clicking on the **Set Range** button  helps you to set a finer resolution for sectioning large models.

   What this button does is limit the range of the section planes to the bounding box limits of the currently selected items. For more information on selecting items, see Chapter 6. Clicking this button with nothing selected reset the section range to the limits of the whole model, which is the default.

6. If you have more than one section plane enabled, you can delete this active plane using the delete button  . The next enabled plane will then become the active plane.

11.2. Linking Sections

You can add up to 6 section planes to the scene at once using the above procedure. Once more than one plane is enabled, you can then link them together. This becomes particularly effective when opposing planes such as top and bottom are linked. Sliding the plane through the model then gives a "slice". The following is an example of creating a horizontal slice using the top and bottom section planes:

Slicing the model

1. Set up the bottom plane as described in Section 11.1.

2. Choose **2** in the drop down.

3. Enable this with the section toggle and select the **Align Top** plane.

   Note

   The model may disappear completely at this stage. If so, just slide the slider until it becomes apparent where the plane is.

4. Keep switching between planes 1 and 2 using the drop down and configure the planes' position to how far you want them separated in the slice.

5. When happy with their separation, select section plane 2 and click on the **Link** button  This links planes 2 and 1 together to form the slice.

6. Use the slider bar to move the horizontal slice through the model.

7. If you want, you can save this slice configuration into a viewpoint. See Section 10.1 for more information on how to do this.

Thinking about linked sections and slices can be confusing. Just remember that when linking sections together, the section plane direction currently in operation effectively moves the whole "box" around the scene, keeping the other section planes relative to it.

Chapter 12. Animating

NavisWorks allows the recording, playing and editing of both your movement through the model and views of the model. An animation toolbar is provided for the recording and playback of animations and this is linked to the **Viewpoints** control bar, which can be used to make animations from scratch by building up an animation frame by frame (viewpoint by viewpoint). The **Viewpoints** control bar can then be used to save, edit, rearrange and manage your animations in folders, including inserting cuts and dragging and dropping animations onto other animations to build up a more complex animation from simpler ones. At any time during an animation playback, you can stop the animation and have a real time look around before restarting it. Once you are happy with the animation, you can export it as an .avi file.

It is worth remembering that you can hide items in viewpoints, override colors and transparencies and set multiple section planes and these will all be respected by an animation. This way you can very simply create powerful animations.

12.1. Creating Animations

There are two ways to create animations in NavisWorks. You can either simply record your real time walk through, or you can assemble specific viewpoints for NavisWorks to interpolate into an animation later for a more controlled animation.

All animation is controlled through the **Tools, Animation** menu, the **Viewpoints** control bar and the **Animation** toolbar, which is shown below.

Creating an animation in real time

1. Click on the **Record** button  on the **Animation** toolbar.

2. Navigate around in the main navigation window while NavisWorks records your movement. You can even move the section plane(s) through the model during your navigation and this will be recorded into the animation too.

3. At any point during the navigation, you can click on the **Pause** button  . This will pause the recording while you maneuver into a new position. Click on the **Pause** button again to continue recording the animation. The resulting animation will contain a cut for the duration of the pause.

4. When finished, click on the **Stop** button  .

5. A new animation called "AnimationX", where 'X' is the latest available number, will be added to the **Viewpoints** control bar. The name will be editable at this point if you want to name it yourself. This animation will also become the current active animation in the **Animation** toolbar's drop down.

While the above method is useful for creating quick animations on the fly, sometimes you need more control over the animation camera. To do this in NavisWorks, you need to set up several viewpoints and add them to an empty animation. When playing back the animation, NavisWorks will then interpolate between these viewpoints.

Creating an animation frame by frame

1. Right click on the **Viewpoints** control bar and select **Add Emtpy Animation** from the context menu.

2. A new animation called "AnimationX", where 'X' is the latest available number, will be added to the **Viewpoints** control bar. The name will be editable at this point if you want to name it yourself. There will be no plus sign next to the animation, showing that the animation is indeed empty.

3. Create the viewpoints where you want the camera to move through during the animation and save these into the **Viewpoints** control bar. These will become the frames for the animation. The more frames you have, the smoother and more predictable the animation will be. See Section 10.1 for more information on creating viewpoints.

4. When you have all the viewpoints, simply drag them onto the empty animation you just created. You can drag them on one by one, or select multiple viewpoints using the **Control** and **Shift** keys and drag several on at once. If you drop them onto the animation icon itself, then the viewpoints will become frames at the end of the animation, but you can drop the viewpoints anywhere on the expanded animation to put them where you wish.

5. At this point, you can use the slider bar on the **Animation** toolbar to move backward and forward through the animation to see how it looks.

6. You can edit any of the viewpoints inside the animation (see Section 10.5 for details on this), or you can add more viewpoints, delete them, move them around, add cuts and edit the animation itself (see Section 12.2) until you are happy with the animation.

7. Once you have several animations, you can drag and drop them onto a master animation to compose more complex combinations of animations, just like dragging and dropping viewpoints onto an animation as a frame.

12.2. Editing Animations

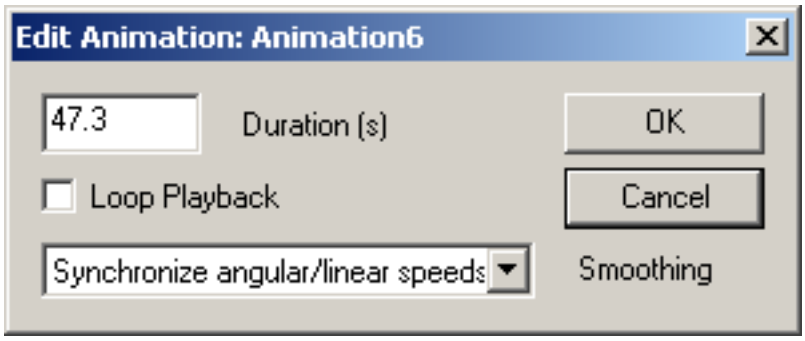
Once an animation is recorded, you can edit it to set the duration, the type of smoothing and whether it loops or not.

Editing an animation

1.

Right click on the animation you want to edit in the **Viewpoints** control bar.

The **Edit Animation** dialog is displayed



2. Type in the duration in seconds in the **Duration** edit box.

3. If you want the animation to play back continuously, check the **Loop Playback** check box.

4. From the **Smoothing** drop down, select the type of smoothing you want the animation to use. **None** means that the camera will move from one frame to the next without any attempt at smoothing out the corners. The speed of movement between frames of an animation is dictated by the angular and linear speeds of the individual frames and so choosing **Synchronise angular/linear speeds** will smooth the differences between the speeds of each frame in the animation, resulting in a less jerky animation.

5. Click **OK** to set these options, or **Cancel** to return to NavisWorks leaving the animation as it was.

There is also nothing to stop you copying animations (hold down the **Control** key when dragging an animation in the **Viewpoints** control bar), dragging frames off the animation into a blank space on the **Viewpoints** control bar to remove them from the animation, editing individual frames attributes, inserting cuts or dragging other viewpoints or animations onto the existing one, to continue developing your animations.

12.3. Animation Cuts

Cuts in an animation are simply points where the camera pauses for a while. They are inserted automatically when you click on **Pause** during the interactive recording of an animation, or you can insert them manually into an existing animation.

Inserting pasues into an animation

1. Right click on the frame below where you want to insert the cut.

2. Choose **Add Cut** from the context menu.

3. Type in the name of the cut, or hit **Enter** to accept the default name, which will be "CutX", where 'X' is the next available number.

4. This default duration of a cut is 1 second. To alter the duration of this pause, right click on the cut and choose **Edit**.

   The **Edit Animation Cut** dialog is displayed

5. Type in the duration of the pause in seconds.

6. Click **OK** to set the duration or **Cancel** to return o NavisWorks without setting it.

12.4. Playing Back Animations

You can choose any one of the animations saved in the **Viewpoints** control bar to play back in real time in the main navigation window. Playing back an animation in real time means that the NavisWorks engine is still attempting to maintain the guaranteed frame rate and so some drop-out may still occur, just as in real time navigation. However, you can export the animation to an .avi file for playback with Windows Media Player™ and this will render each frame without any drop out. Of course, you don't have the option of pausing the playback half way through to look around the mode using this method! See Section 2.11.4 for details on how to export an animation to .avi.

Playing back an animation

1. Select the animation you wish to play back from either the **Viewpoints** control bar, or from the drop down on the **Animation** toolbar.

2. You can use the slider to quickly move forwards and backwards through the animation. Full left is at the beginning and full right is at the end. The text box next to the slider shows the point in time (in seconds) through the animation that the camera is. You can type a number into this box to set the camera at a certain point in the animation and play back from that point.

3. Notice how the frame in the animation in the **Viewpoints** control bar is highlighted when the animation is playing. You can click on any frame to set the camera to that point in time in the animation and continue playing back from there.

4.

Use the buttons on the **Animation** toolbar to step and play forwards and backwards through the animation:

- **Rewind**  will rewind the animation back to the beginning.
- **Step Back**  will step back a single frame.
- **Reverse Play**  will play the animation backwards.
- **Pause**  will pause the animation at the frame you press it at. You can then look around and wonder off in the model, or step forwards and backwards through the animation. To continue playing from where you paused, just press **Play** again.
- **Stop**  will stop the animation playing and rewind back to the beginning.
- **Play**  will play the animation from the currently selected frame.
- **Step Forwards**  will step one frame forwards.
- **Forward**  will fast forward the animation to the end.

Chapter 13. Reviewing

NavisWorks offers several design review tools to help you review a model and communicate those reviews to others. Any reviewing you save in the model can also be saved into an .nwf file so that you can reload the reviews into a later session when the model has changed, or to pass onto colleagues to communicate design intent or problems.

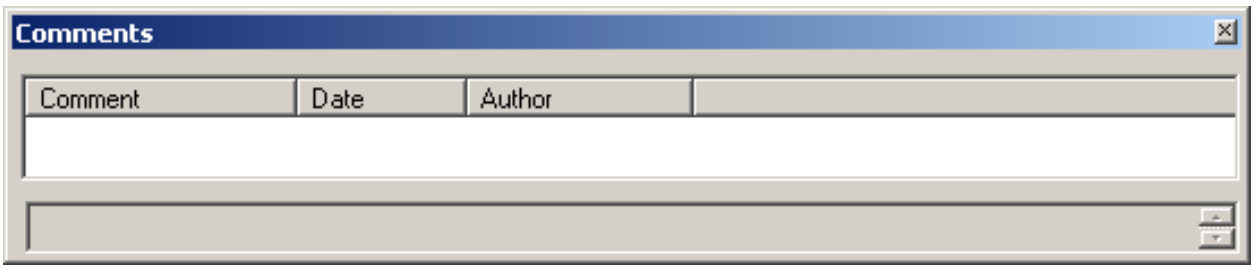
The reviewing tools available in NavisWorks are:

- Commenting
- Redlining
- Measuring
- Hyperlinks

13.1. Commenting

Multiple comments can be attached to any item in the **Viewpoints** control bar (see Section 10.3), or to any item in the **Selection Sets** control bar (see Section 6.3), or to Clash Detective results.

The **Comments** control bar allows you to view all comments attached to one of these sources. Click on  in the **Workspace** toolbar or go to **View, Control Bars, Comments** to toggle the **Comments** control bar on and off.



When the source of the comments is recalled, such as a viewpoint, all comments attached to it appear in the **Comments** control bar, showing the time, date and author of each comment. The icon on the far left represents the source type:

 Selection set.

 Search set.

 or  or or  Clash Detective result.

 or  Viewpoint.

With many comments attached to many sources in a model, you may want to find a particular comment without having to manually search each possible source. See Section 7.4 for details on how to achieve this.

Note

The first line of a comment is what is displayed in the top half of the **Comments** control bar and can be treated like its "subject". To get multiple lines in a comment, hold down **Control** and press **Enter**. This will give you a carriage return in the text box, rather than simulating a press of the **OK** button.

Once a comment is added, it cannot be edited, although it can be deleted.

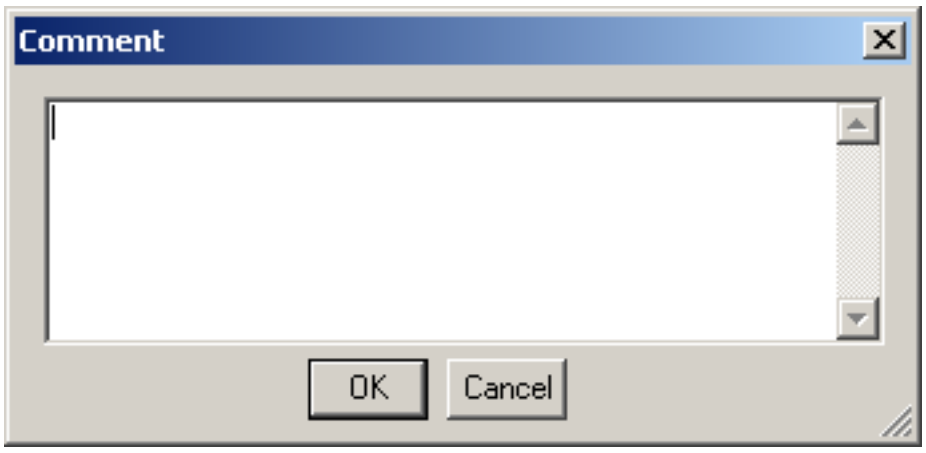
Adding and Deleting Comments

You can add and delete as many comments as you wish to a source, either from the **Comments** control bar, or from the source itself.

Adding a comment from the Comments control bar

1. Go to the source of the comment, be it a viewpoint, selection set or Clash Detective result.
2. Ensure the **Comments** control bar is open, as outlined above.
3. Right click on the **Comments** control bar and choose **Add Comment** from the context menu.

   An empty **Add Comment** resizeable dialog is displayed.



4. Type in the comment.
5. Click **OK** to save it or **Cancel** to return to NavisWorks without saving it.

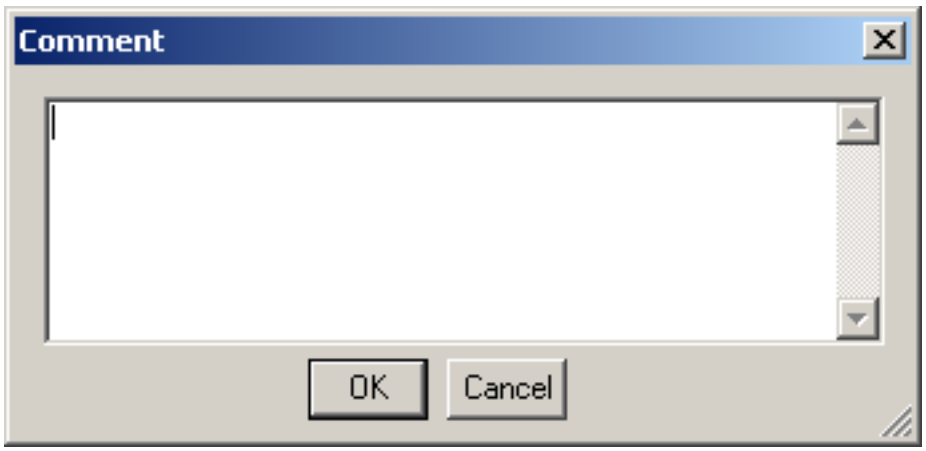
Adding a comment from the source (viewpoint, selection set or Clash Detective result)

1. Go to the source of the comment, be it a viewpoint, selection set or Clash Detective result.
2.
   - Right click on the source and choose **Add Comment** from the context menu.

   or

   - Go to **Review, Comments, Add Comment**.

   An empty **Add Comment** resizeable dialog is displayed.



3. Type in the comment.
4. Click **OK** to save it or **Cancel** to return to NavisWorks without saving it.

Deleting a comment

1. Go to the source of the comment, be it a viewpoint, selection set or Clash Detective result.
2. Ensure the **Comments** control bar is open, as outlined above.
3.
   - Right click on the comment and choose **Delete Comment** from the context menu.

   or

   - Go to **Review, Comments, Delete Comment**.

13.2. Redlining

Redlining allows you to add annotation directly over a viewpoint. It is mutually exclusive to the navigation modes so that when you are redlining, you cannot navigate and vice versa.

The redline tools, which can all be accessed from the **Redline Tools** control bar or from the **Review, Redline** menu, are:

 Pen

 Line

 Line String

 Ellipse

 Cloud

 Erase

13.2.1. Adding Redlines

The **Redline Tools** control bar is a dockable bar like all others in NavisWorks. It can be accessed by clicking  on the **Workspace** control bar or by going to **Tools, Redline**.

Note

Redlines can only be added to a saved viewpoint or to a clash result which has a saved viewpoint. If a viewpoint is not selected, a warning is given if a redline tool is selected.

Adding a redline to a saved viewpoint

1. Go to a saved viewpoint, or a Clash Detective result with the **Save Viewpoint** check box checked.
2. Ensure the **Redline Tools** control bar is displayed as outlined above.

3. Type the thickness of the redlines into the **Thickness** edit box. The thickness applies to the redlines you are about to draw and will not change any existing redline thicknesses.

4. To change the color of the redline (they don't have to be red!), click on the **Color** button to open the standard Windows™ color chooser. This color applies to the redlines you are about to draw and will not change any existing redline colors.

5. Choose the **Pen**  redline tool to sketch over the viewpoint. Simply click and drag the left mouse button in the main navigation window to interactively sketch a redline.

6. Choose the **Line**  redline tool to draw single lines over the viewpoint. Alternately click the start and end points of lines with the left mouse button in the main navigation window.

7. Choose the **Line String**  redline tool to draw a string of lines over the viewpoint. Clicking the left mouse button in the main navigation window to add a new point in the line string. When the string is complete, click the right mouse button to end the line and you can then start a new line string.

8. Choose the **Ellipse**  redline tool to draw ellipses over the viewpoint. Click and drag a box in the main navigation window with the left mouse button to outline the ellipse.

9. Choose the **Cloud**  redline tool to draw clouds over the viewpoint. With the left mouse button, click points in the main navigation window in a clockwise direction to draw the arcs of the cloud (if you go counter-clockwise, the arcs will be inverted!). Right click with the mouse button to automatically close the cloud.

10. Choose the **Erase**  redline tool to erase all redlines from the viewpoint.

Note

You can also access all the redline tools from the **Review, Redline** menu.

13.3. Measuring

Measuring allows you to measure between points on items in the model. All measurements are made in the scene's units. For information on how to set the units, see Section 14.7.

Like redlining and selecting, it is mutually exclusive to the navigation modes so that when you are measuring, you cannot navigate and vice versa.

The measure tools, which can all be accessed from the **Measure Tools** control bar or from the **Review, Measure** menu, are:

 Point to point

 Point to multiple points

 Point line

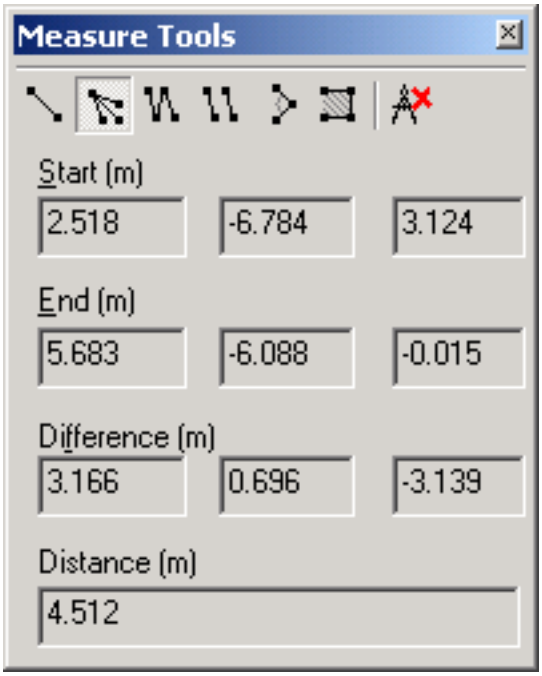
 Accumulate

 Angle

 Area

13.3.1. Measuring Tools

The **Measure Tools** control bar is a dockable bar like all others in NavisWorks. It can be accessed by clicking  on the **Workspace** control bar or by going to **Tools, Measure**.



Use the buttons at the top select the type of measurement you want to do.

For all measurements, the x-, y-, and z- coordinates of the **Start** point and **End** point are displayed in the text boxes underneath the buttons, as are the **Difference** and the absolute **Distance**. If an accumulative measure is being used, such as **Point Line** or **Accumulate**, **Distance** will show the accumulated distance for all points registered in the measurement. All these measurements are shown in scene units. All points will be represented in the main navigation window with a small cross, and all lines being measured, by a simple line between points. You can use the Measure Options to choose how these are displayed.

Note

It goes without saying that you must click on a point on an item to register a point - clicking on the background will not register anything, but it is worth noting that you can *snap* to certain points on items - see Section 13.3.1 for more details.

You can reset a measure command at any time by right clicking instead of left clicking on the main navigation window. This will start the measure command again with a no points registered, just as if you had chosen a new measurement type.

Measuring between points on items

1. Ensure the **Measure Tools** control bar is displayed as outlined above.

2. To simply measure the distance between two points, choose the **Point to Point** measurement type  on the **Measure Tools** control bar and click on the start point and then the end point with the left mouse button.

3. To lock the start point and then click on multiple different end points, choose the **Point to Multiple Points** measurement type  on the **Measure Tools** control bar and click on the start point. Every other click after the start point will then register a new end point, but you can right click to reselect a start point.

4. To measure the distance along a path or route, choose the **Point Line** measurement type  on the **Measure Tools** control bar and simply click on a series of points along the path. The **Distance** will display the total distance along the path from the start point. Right clicking will enable you to select a new start point.

5. To calculate the sum total of several point-to-point measurements, choose the **Accumulate** measurement type  on the **Measure Tools** control bar and click on start and end points alternately. The **Distance** will show the sum of all point-to-point measurements since the first start point. Right clicking will enable you to reset the distance to zero and restart the calculation.

6. To calculate an angle between two lines, choose the **Measure Angle** measurement type  on the **Measure Tools** control bar and click on a point on the first line, followed by the intersection of the two lines, followed by a point on the second line. The **Angle** will show the angle between the three points. Right clicking will enable you to select a new first point.

7. To calculate an area on a plane, choose the **Measure Area** measurement type  on the **Measure Tools** control bar and simply click on a series of points to describe the perimeter of the area you wish to calculate. The **Area** will show the area of the perimeter described since the first point, as projected

onto the plane of the viewpoint. This means that all your points should lie on the same plane for your area calculation to be perfectly accurate. Right clicking will enable you to select a new first point.

8. To clear the view of all measurement lines and restart the measurement, choose the **Clear** button  on the **Measure Tools** control bar. This is the same as right clicking during a measurement.

Snapping

The measure options dialog allows you to set the cursor to snap to the nearest vertex, edge or line end. Points and snap points are automatically snapped to. Different cursors feed back what is being snapped to:

 No snap, but a point on a surface is found.

 A vertex, point, snap point or line end is found to snap to.

 An edge is found to snap to.

Note

The geometry in NavisWorks is tessellated with triangles, and therefore the cursor will snap to edges that may appear to be in the middle of a face. Viewing the model in hidden line mode will make it clear which vertex or edge the cursor is snapping to.

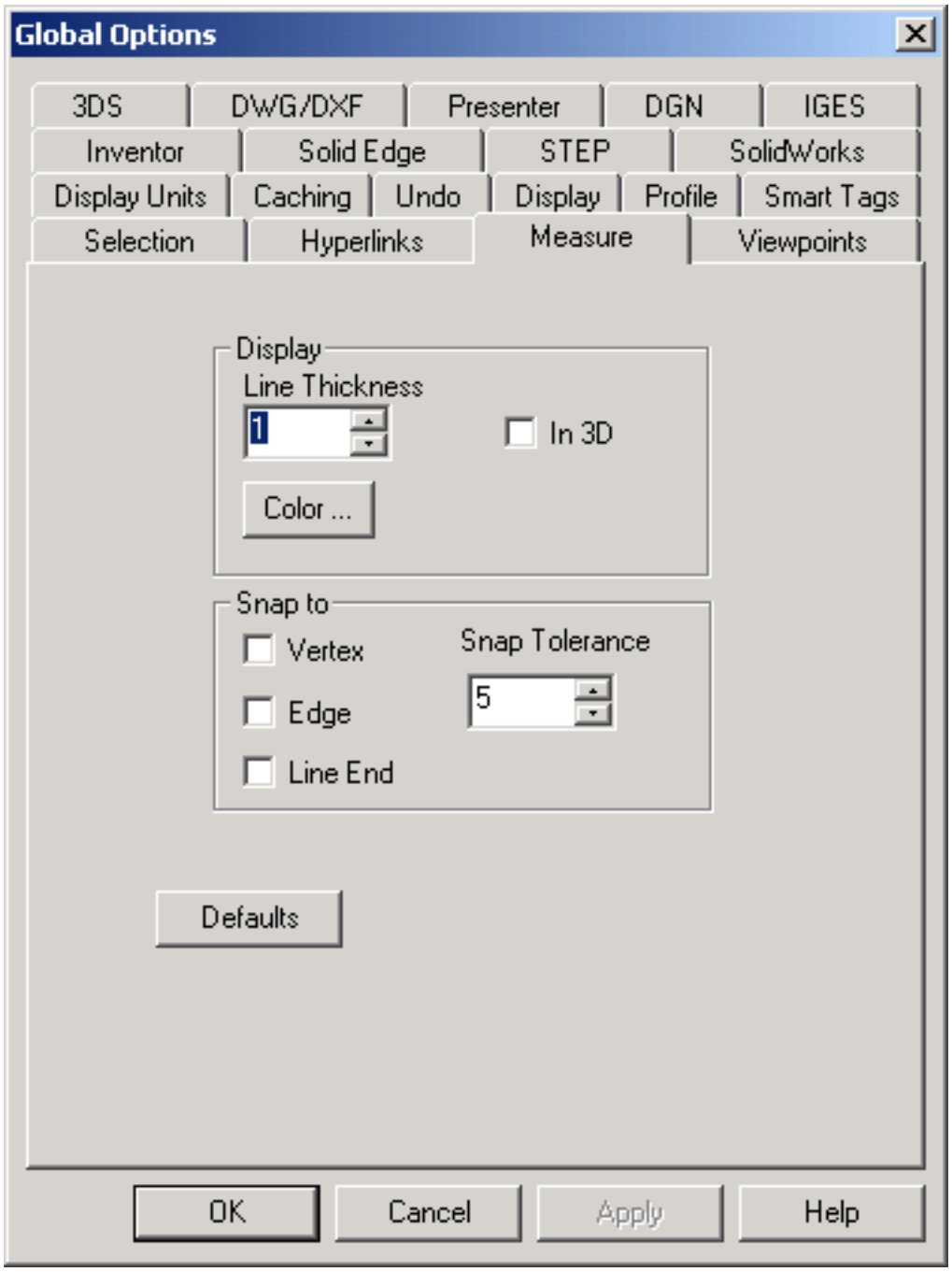
13.3.2. Measure Options

NavisWorks allows you to configure the appearance and selection style of the measure tools and the measurement drawing in the main navigation window.

Setting measure options

1. Go to **Tools, Global Options, Measure**

   The **Measure** dialog is displayed



2. Set the **Color** and **Line Thickness** of the measure lines.

3. Check the **In 3D** check box if you want to draw the measurements in 3D in the main view. They then act as 3D lines in the scene which can be obscured by other geometry. If this box is unchecked, then all measurement lines are drawn in 2D over the top of the all geometry.

4. Set the measure picking style by checking the **Vertex**, **Edge** and/or **Line End** check boxes. The cur-

sor will snap to the nearest vertex, triangle edge or line end respectively, depending on the options chosen.

5. Set the **Snap Tolerance**. The smaller the tolerance, the closer the cursor needs to be to a vertex or edge before it snaps to it.

6. Click **OK** to set the options or **Cancel** to exit the dialog without setting them.

13.4. Hyperlinks

Hyperlinks are an extremely useful review tool to allow you to access non-graphical information through the graphical interface of NavisWorks. As well as hyperlinks being converted from the native CAD files you open in Roamer, you can also "override" an item's hyperlinks by attaching multiple additional hyperlinks to it. Because hyperlinks are treated as such a property by NavisWorks, they can be searched on with the **Find Items** tool and displayed in the **Properties** bar. They are also saved into NavisWorks files so that as the model changes, the links remain for you and others to view.

Hyperlinks are categorized so that you can switch them on and off by category, and they can be anything internal (such as a viewpoints or selection set) or external (such as a web page, script, or spreadsheet) to NavisWorks. By turning on hyperlinks in the main navigation window, you can simply click on the link to activate it. Hyperlinks can be displayed as a text description, or as an icon and can also optionally have leader lines pointing to points on the item to help you identify which item has the link attached.

To turn on hyperlinks

- Click **Hyperlinks**  on the **Workspace** toolbar.

or

- Go to **Tools, Hyperlinks**

13.4.1. Adding Hyperlinks

An item can have multiple hyperlinks attached to it, although only the default hyperlink (the one at the top of the list) can be displayed in the navigation window at one time. The default is the link that will be followed when clicked.

Adding hyperlinks to an item

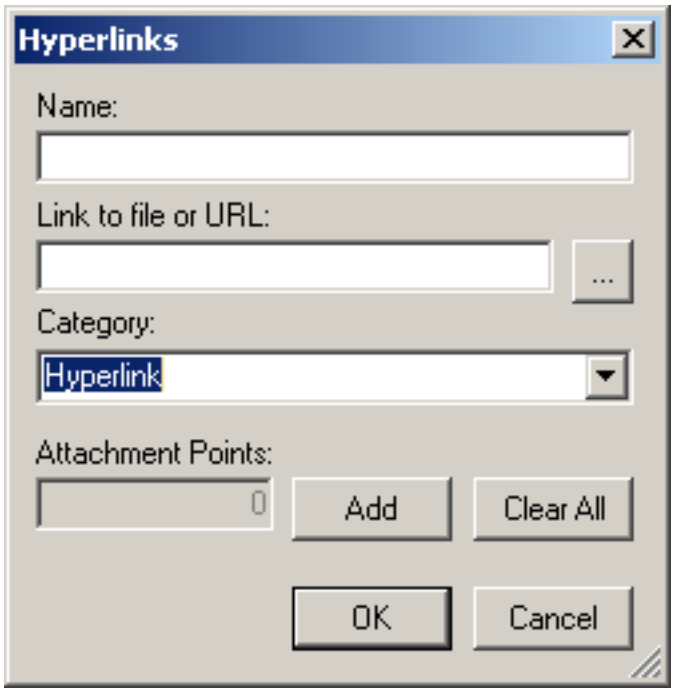
1. Either

   - Select a single item (see Chapter 6 for more details on how to do this) on which you want to attach a hyperlink and go to **Review, Hyperlinks, Add Hyperlink**.

or

- Right click on the item on which you want to attach a hyperlink and choose **Hyperlinks, Add Hyperlink** from the context menu.

The **Add Hyperlink** resizeable dialog is displayed



2. Type in the name of the hyperlink into the **Name** text box.

3. Type in, or browse to, the actual hyperlink value in the **Link to file or URL**. This is what will be linked to when the hyperlink is clicked on.

4. Choose the category that the hyperlink will belong to from the **Category** drop down. You can add more categories than the default **Hyperlink** and **Tag** categories by simply typing in the name of your category into this box. See Section 13.4.1 for more information on categories.

5. If you want the hyperlink to be attached to a specific point on the item, instead of the default center of the item's bouding box, then click on **Add**. A cross-hair cursor will appear in the main navigation window, allowing you to select a point on the item where the hyperlink will be attached to. See Section 13.4.2 for more information on attachment points.

6. Click on **Clear** if you want to delete all attachment points associated with this hyperlink and revert to the hyperlink being attached to the center of the item's bouding box.

7. Click **OK** to add this hyperlink to the item or **Cancel** to return to NavisWorks without attaching any-

thing.

Hyperlinks Categories

Hyperlinks can be categorized so that you can group them to distinctly display or not display in the main navigation window at one time. The five default categories are:

- **Hyperlink**
- **Tag**
- **Viewpoint**
- **Clash Detective**
- **Selection set**

Tags are just hyperlinks that are displayed by name rather than by icon in the navigation window. The last three of these categories are defined by NavisWorks and so you cannot assign a hyperlink to one of these categories, other than by setting up a viewpoint, a selection set, or a Clash Detective result.

Use the Hyperlinks Options to select which categories are displayed when hyperlinks are turned on.

To add a new category, simply type in the name of the category into the **Category** box on the **Add Hyperlink** dialog when you are adding or editing a hyperlink.

13.4.2. Displaying Hyperlinks

To turn on hyperlinks

- Click **Hyperlinks**  on the **Workspace** toolbar.

or

- Go to **Tools, Hyperlinks**

Hyperlinks are drawn as icons in the main navigation window and tags as text. Clicking on a hyperlink in the main navigation window will follow the link and right clicking on it will open a context menu offering you the options of **Follow Hyperlink**, **Edit Hyperlink** (see Section 13.4.4) or **Select item containing hyperlink**, which will select the item onto which the hyperlink is attached.

Attachment Points

Hyperlinks and tags are by default attached to the center of their owner's bounding box, but you can override this with more convenient attachment points. When adding or editing a hyperlink, you have the option of adding attachment points, as described in Section 13.4.1. If you add more than one attachment point, the hyperlink will be displayed attached to the *closest* attachment point to the camera during navigation. This allows you to set up hyperlinks so that they are always available for following when drawn in 3D mode during navigation, rather than disappearing behind objects. Leader lines will be drawn from the attachment point to the hyperlink. The size of these lines can be defined in Hyperlinks Options.

13.4.3. Following Hyperlinks

To follow a hyperlink, simply click on it in the main navigation window. If multiple hyperlinks are attached to an item, the default hyperlink will be followed.

You can also follow one of the none-default hyperlinks attached to an item by selecting the item and going to **Review, Hyperlinks** and selecting the hyperlink from the list.

The default hyperlink can also be followed from the Properties control bar by selecting the item, right clicking on any tab in the bar and choosing **Follow Default Hyperlink** from the context menu.

13.4.4. Editing Hyperlinks

Editing a hyperlink

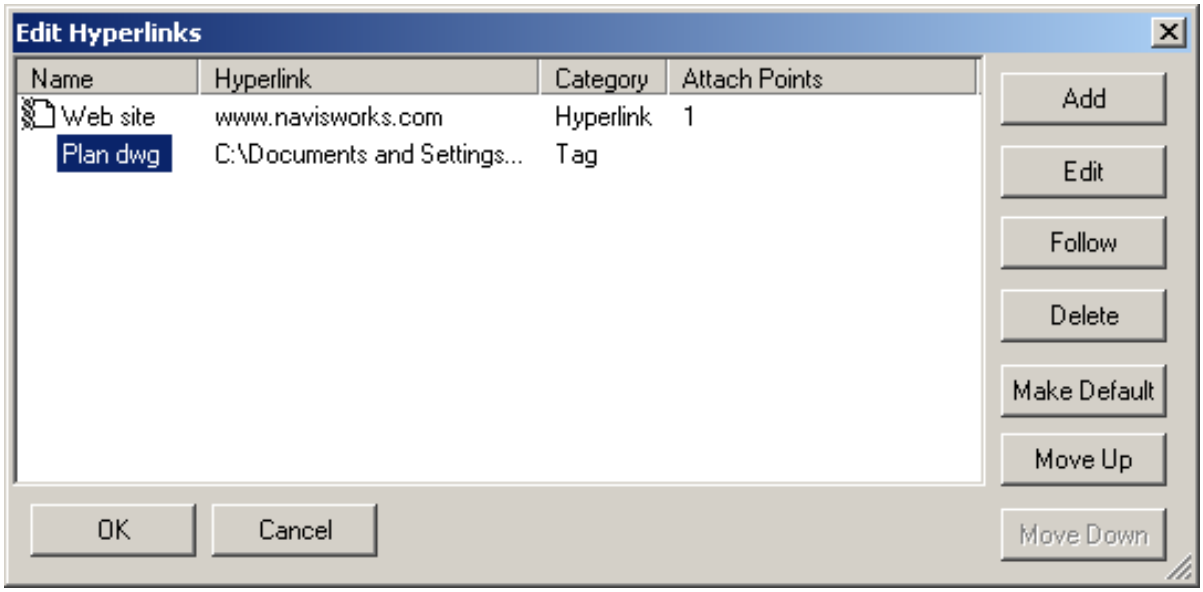
1. Either

   - Select a single item (see Chapter 6 for more details on how to do this) from which you want to edit a hyperlink and go to **Review, Hyperlinks, Edit Hyperlinks**.

   or

   - Right click on the item from which you want to edit a hyperlink and choose **Hyperlinks, Edit Hyperlinks** from the context menu.

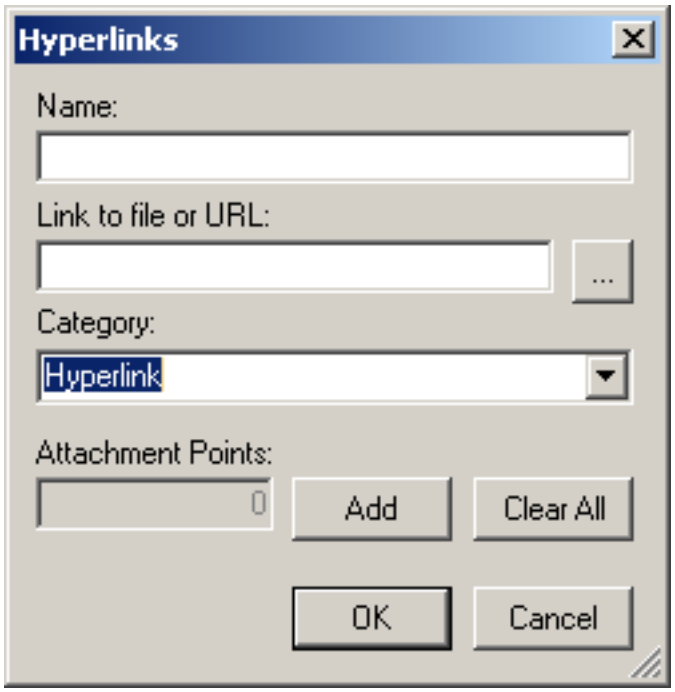
   The **Edit Hyperlinks** dialog is displayed.



2. Select the hyperlink under the **Name** column.

3. Click on **Edit**

   The **Edit Hyperlink** dialog is displayed



4. Complete this dialog as outlined in Section 13.4.1.

5. Move hyperlinks up and down the list using the **Move Up** and **Move Down** buttons, or by dragging them to their new position in the list. This way you can prioritize a hyperlink to become the default hyperlink that is followed when click on in the main navigation window.

6. Click **OK** to confirm the edit or **Cancel** to return to NavisWorks leaving the hyperlink as it was.

Note

You can also edit any original hyperlinks that have been converted from the native CAD files. If you do this, save in an .nwf, then change the hyperlink in the original CAD file, and reopen the .nwf file in NavisWorks, then your edit "overrides" will remain. If you haven't edited the hyperlinks in NavisWorks, however, the updated links from the CAD file will appear.

13.4.5. Deleting Hyperlinks

You can delete *all* hyperlinks from an item by right clicking on any tab in the Properties control bar and choosing **Delete Hyperlinks** from the context menu.

You can reset all the hyperlinks on an item to those that were originally converted from the CAD file, by going to **Edit, Reset Item, Hyperlinks** with an item selected. Likewise, you can reset all the hyperlinks on *all* items in the scene to their original state by going to **Edit, Reset All, Hyperlinks**.

Deleting a single hyperlink from an item

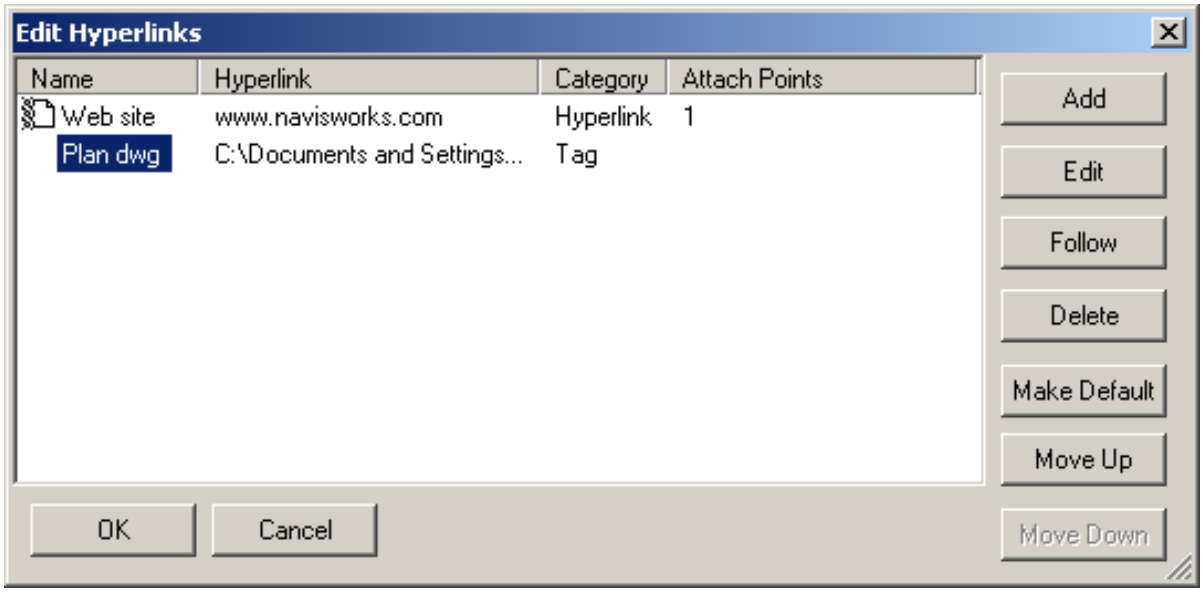
1. Either

   - Select a single item (see Chapter 6 for more details on how to do this) from which you want to delete a hyperlink and go to **Review, Hyperlinks, Edit Hyperlinks**.

   or

   - Right click on the item from which you want to delete a hyperlink and choose **Hyperlinks, Edit Hyperlinks** from the context menu.

   The **Edit Hyperlinks** dialog is displayed.



2. Select the hyperlink under the **Name** column.

3. Click on **Delete**

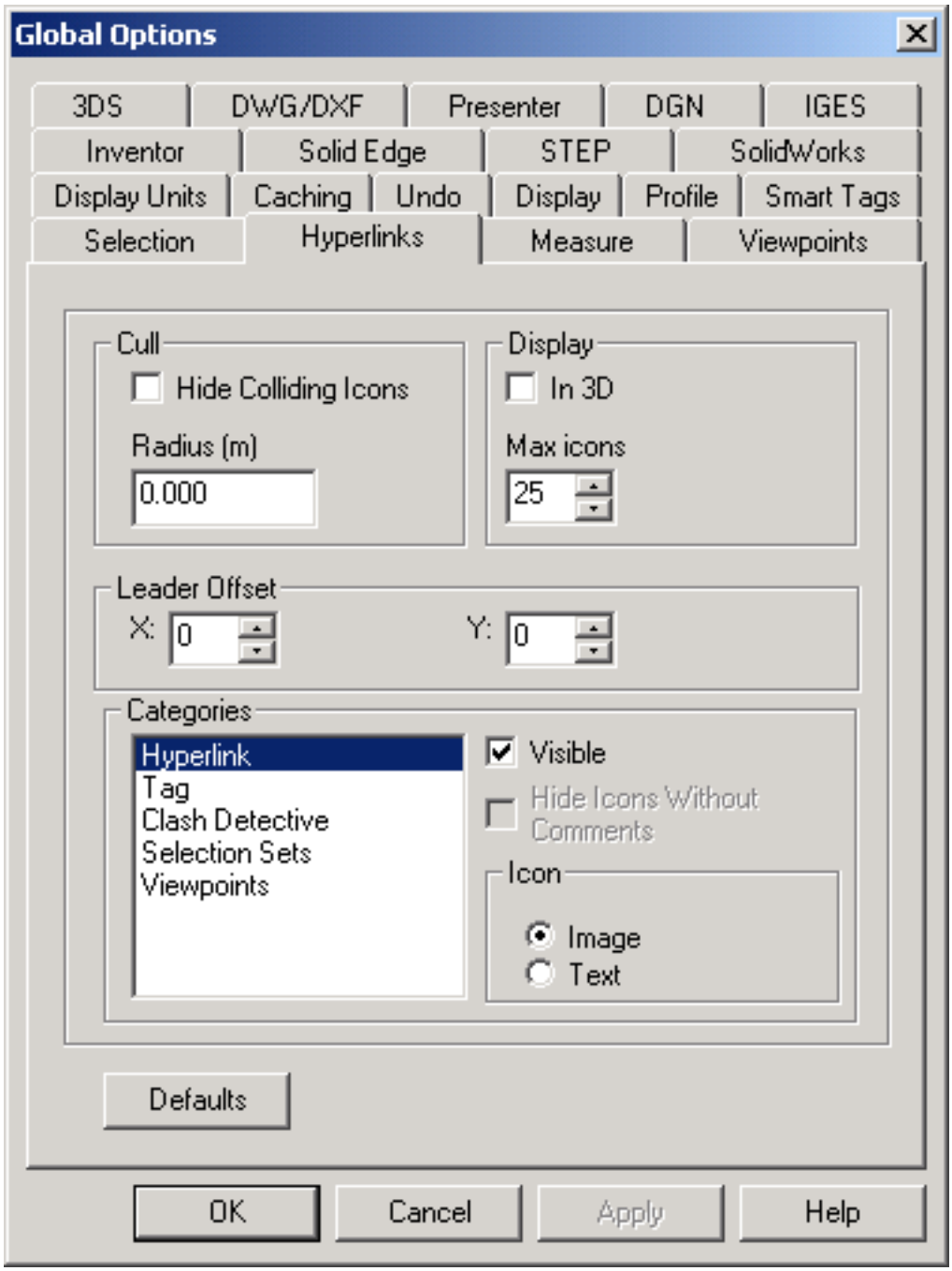
4. Click **OK** to confirm deletion or **Cancel** to return to NavisWorks without the hyperlink deleted.

13.4.6. Hyperlinks Options

Setting hyperlinks options

1. Go to **Tools, Global Options, Hyperlinks**.

   The **Hyperlinks** dialog is displayed



2. Icons that appear overlapped in the main view can be hidden if the **Hide Colliding Icons** check box is checked.

3. Enter the distance in the **Radius** box for how close hyperlinks have to be in order to be drawn in the

main view. Any hyperlinks further away than this distance will not be drawn. The default value of 0 means that all hyperlinks will be drawn.

4. Check the **In 3D** check box if you want to draw the hyperlinks icons in 3D in the main view. They then float in 3D space just in front of their attachment points to the items. If this box is unchecked, then all hyperlink icons are drawn in 2D over the top of the all geometry.

5. Enter the maximum number of icons to draw in the main view in the **Max Icons** box.

6. Hyperlinks can be drawn with leader lines (arrows) pointing to the attachment point on the item that the hyperlink is attached to. Enter the X- and Y- distance in **Leader Offset** for the number of pixels to the right and up that these leader lines will use.

7. Each hyperlink is a member of a category. This enables you to easily manage sets of hyperlinks. Use the **Visible** check box to switch a category on or off in the main view. Some categories also have comments associated with them. Use the **Hide Icons Without Comments** check box, if available, to do eactly that - only draw hyperlinks that have a comment attached to it, so that you can see any areas of issue in the model. See Section 13.1 for more information on comments.

8. Use the **Image** and **Text** radio buttons for each category to tell NavisWorks how to draw that category of hyperlinks. If text is drawn rather than the icon, the hyperlinks description is used as a toolitp style text box in the main view instead of an icon.

9. Click **OK** to set the options or **Cancel** to exit the dialog without setting them.

13.5. Smart Tags

Smart tags pop up information on the item hovered over by the cursor in a tooltip style window, without having to select the item itself. The smart tag will disappear after a few seconds. This is a useful way to quickly get information about an item in the main navigation window when navigation has ceased. The default information shown is the name and type of the item, but you can define which properties to show using the smart tags options.

Note

If the item hovered over doesn't have the property requested, smart tags will search up the selection tree for a parent that does, so maximising the useful information you get.

To turn on smart tags

- Click **Smart Tags**  on the **Workspace** toolbar.

or

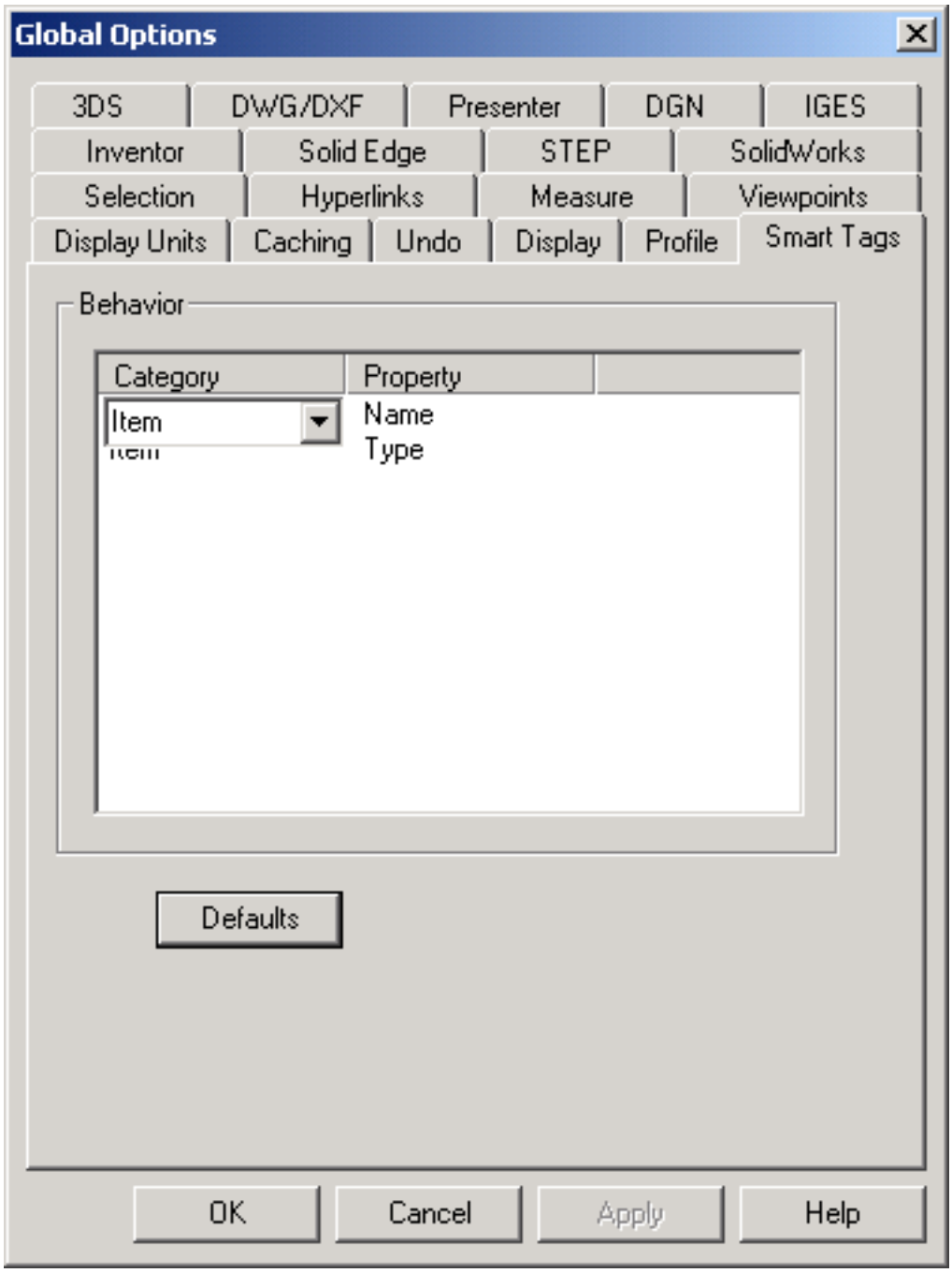
- Go to **Tools, Smart Tags**

13.5.1. Smart Tags Options

Setting smart tags options

1. Go to **Tools, Global Options, Smart Tags**

   The **Smart Tags** dialog is displayed



2. For every item in the list, you can change the **Category** and **Property** by clicking on the item and choosing the relevant entry from the drop-down.

3. To add another row, simply click on the row underneath the last row, in the **Category** column to get a new drop-down, or right click on some blank space in the list and choose **Add Row** from the context menu.

4. To delete a row or all rows, right click on some blank space in the list and choose **Delete Row** or **Delete All** from the context menu.

5. Right clicking on some text in the list offers four extra options: **Ignore Category User Name**, **Ignore Category Internal Name**, **Ignore Property User Name**, and **Ignore Property Internal Name**. For explanations of the terms User Name and Internal Name, see the Glossary. You might use **Ignore User Name**, for example, if you wanted to match something irrespective of which localized version was being used.

6. Click **OK** to set the options or **Cancel** to exit the dialog without setting them.

Chapter 14. Interface

The NavisWorks interface is fairly simple. Most features are accessible from the control bars, which can be turned on or off from either the **View, Control Bars** menu, or by right clicking on any of the displayed toolbars. All the control bars are dockable and a useful hint is to hold down the **Control** key when moving a dialog if you do not want the dialog to dock. It is also a good idea to right click on dialogs to discover features that are not at first glance obvious.

NavisWorks has the concept of what unit the scene is presented in. This is most useful when measuring items, setting tolerances for clash detection, or sizes of textures. There is a single scene unit that is set from **Tools, Global Options, Units** and this unit is used throughout the interface whenever appropriate.

You can also set a profile to determine how complex the interface is and which parts are available to the user. See Section 14.8 for more information on this feature.

The view menu gives you control over the NavisWorks interface. It allows you to hide or reveal control bars, customize the toolbars and status display, and split the current view into several smaller views. It also allows you to display statistics about the currently loaded scene.

14.1. View Menu

The **View** menu includes the following items:

- Control Bars
- Customize
- Split Vertical
- Split Horizontal
- Split
- Scene Statistics

14.2. Viewing Control Bars

A control bar is checked when it is displayed and unchecked when not displayed.

To display a control bar

Go to **View, Control Bars** or right click on a displayed toolbar

Click any of Standard, Workspace, Rendering Style, Navigation Mode, Navigation Tools, Animation, Tilt, Section Plane, Plan Thumbnail, Section Thumbnail, Viewpoints, Selection Tree, Selection Sets, Find Items, Comments, Find Comments, or Properties.

Alternatively, use the **Workspace** toolbar.

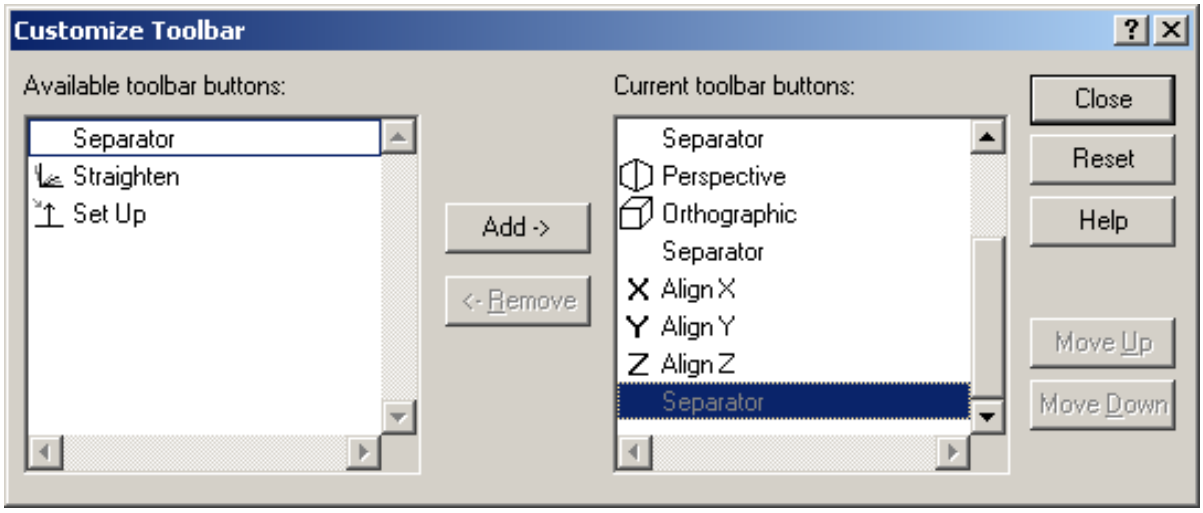
14.3. Customizing toolbars

The layout of several toolbar buttons can be re-arranged, additional spacers can be inserted and buttons can be deleted.

Editing toolbars

1. Go to **View, Customize**

   The **Customize Toolbar** dialog is displayed



2. Click any of Standard, Workspace, Rendering Style, Navigation Mode, Navigation Tools.

3. The relevant dialog box appears depending on which toolbar you selected.

4. Edit the layout of the toolbar as required by selecting buttons and clicking **Add** and **Remove** to add and remove buttons to the toolbar respectively.

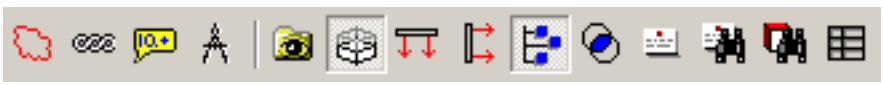
Note

Reset enables the default layout of the toolbar to be restored.

On the **Navigation Tools** toolbar there are 2 buttons not used by default: Straighten, and Set Up.

14.4. Workspace Toolbar

The Workspace toolbar gives you control over the NavisWorks interface. Each button will toggle on and off a different control bar. Alternatively the control bars can also be toggled on and off by right clicking on the NavisWorks frame and using the context menu, or selecting from **View, Control Bars**.



 Redline

 Hyperlinks

 Measure

 Viewpoints

 Sectioning

 Plan Thumbnail

 Section Thumbnail

 Selection Tree

 Selection Sets

 Comments

 Find Comments

 Find Items

14.5. Splitting the main view

The current view may be split horizontally, vertically or both. The model can then be navigated independently in each view, with a white border indicating the active view.

To split the main navigation window

- Go to **View, Split Horizontal** or **Split Vertical** (to divide the main view in half horizontally or vertically respectively).

or

- Go to **View, Split** and use the mouse to click where the split on the main view is required.

To remove the splitter bars

- Double click on the bar you wish to remove.

or

- Drag a vertical bar to one side of the view, or a horizontal bar to the top or bottom.

Note

The recording and playback of animations will occur in the most recently used view. Each separate view remembers the navigation mode being used.

14.6. Scene Statistics

This displays a list of the files contributing to the scene, and the different graphic elements that make up the scene, along with which of these have been processed or ignored when loaded.

Other useful statistics are the bounding box of the entire scene and the total number of primitives (triangles, lines, points) in the scene.

To view scene statistics

- Go to **View, Scene Statistics** to display all the statistics about the current scene.

The number of each type of element is listed together with which have been ignored or processed in creating the scene.

14.7. Units

NavisWorks has the concept of what unit the scene is presented in. This is most useful when measuring items, setting tolerances for clash detection, or sizes of textures. There is a single scene unit that is set from the **Global Options** dialog and this unit is used throughout the interface whenever appropriate.

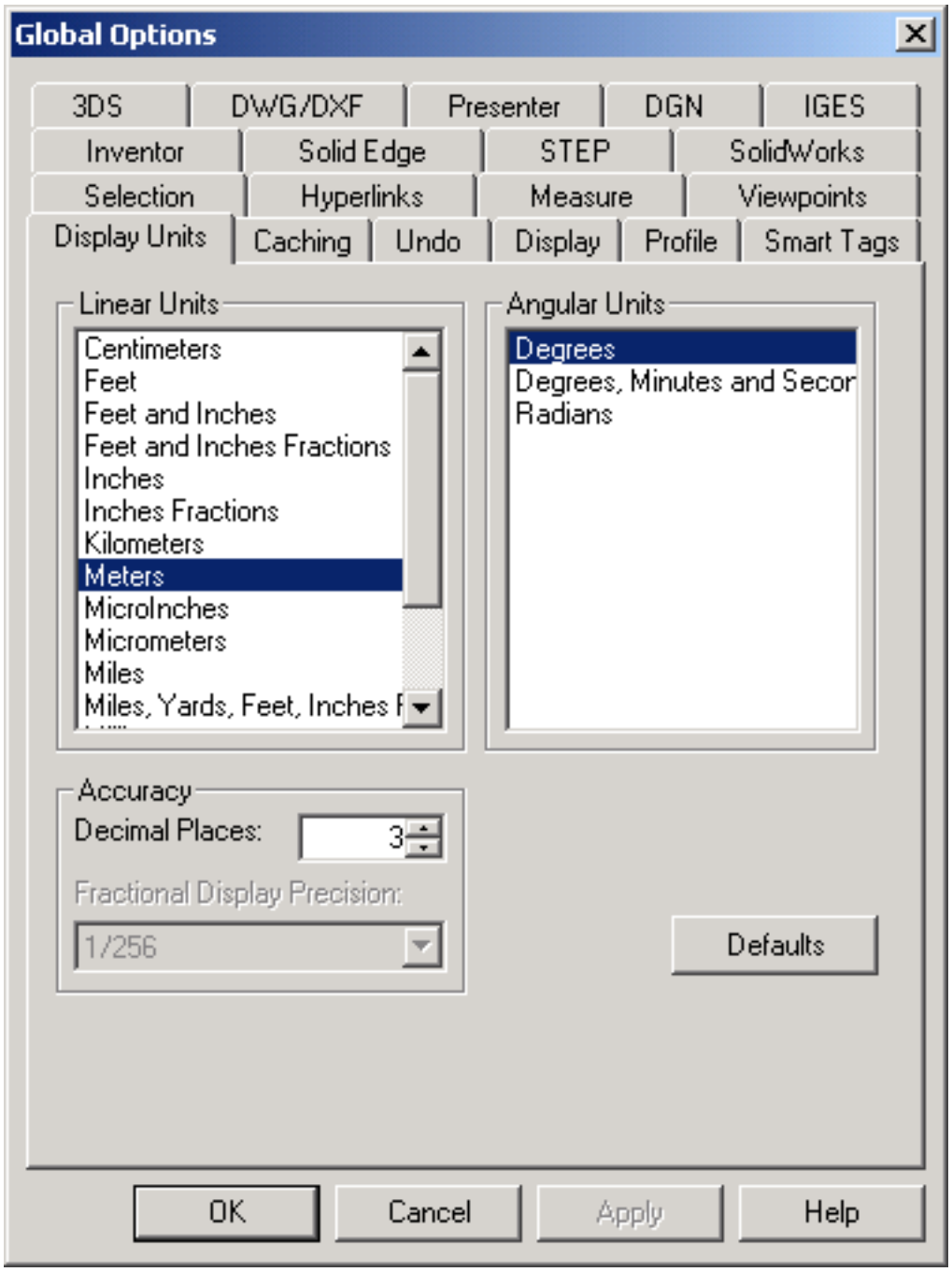
There is a default unit setting for each file type so that when files are opened, they are scaled appropriately to the scene's units. They can, of course, be rescaled after if the units turn out to be wrong for the scene.

Units Options

Setting units options

1. Go to **Tools, Global Options, Units**

   The **Units** dialog is displayed



2. Choose the **Linear Units** from the list. You should be able to choose the exact format you wish.

3. Choose the **Angular Units** from the list.

4. Enter the number of decimal places you want to see throughout the interface for your units in the **Decimal Places** box. If the unit chosen is a fractional unit, rather than decimal unit, then you have the choice of what level of fraction to display the units from the **Fractional Display Precision** drop

down.

5. Click **OK** to set the options or **Cancel** to exit the dialog without setting them.

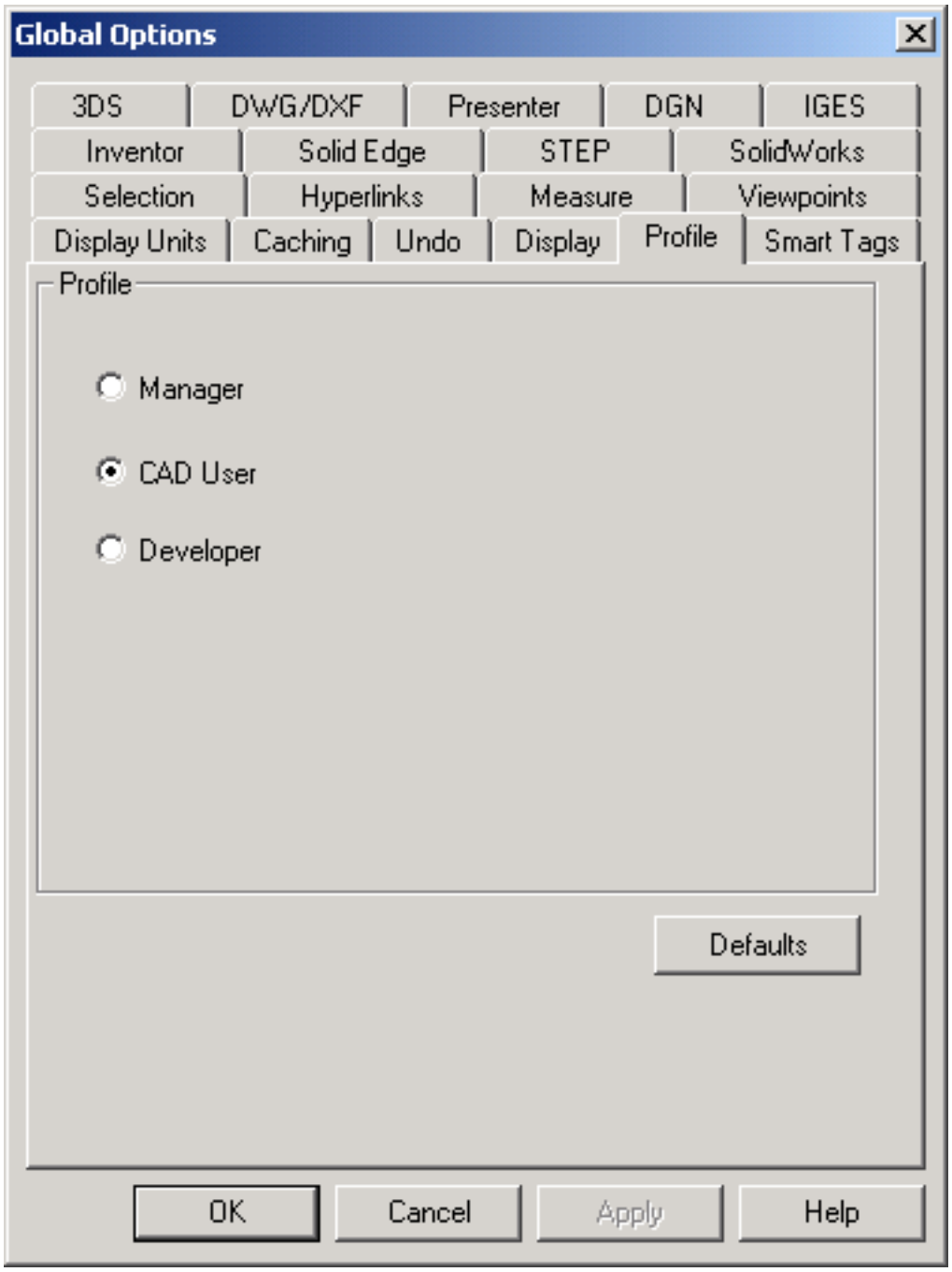
14.8. Profiles

You can select a profile that best fits your level of CAD technical knowledge. There are 3 levels of profile: **Manager**, **CAD User** or **Developer**. This option controls the number of properties that are visible and whether the more technically oriented parts of the interface are available. The default level is **CAD User**. **Developer** gets most information and the most complex interface whereas **Manager** gets the least.

Setting the user profile

1. Go to **Tools, Global Options, Profiles**

   The **Profiles** dialog is displayed



2. Select the level of profile, from **Manager** (least technical) to **Developer** (most technical).

3. Click **OK** to set the profile or **Cancel** to exit the dialog without setting it.

Chapter 15. Tools

The **Tools** menu in NavisWorks gives access to a series of useful tools, plugins and options. If you have purchased the Presenter or Clash Detective plugins, they will be available under this menu.

The **Tools** menu consists of:

- Clash Detective
- Presenter
- Compare
- Redline
- Hyperlinks
- Smart Tags
- Measure
- Animation
- Background Color
- File Options
- Global Options

All items on this menu are explained in other chapters, except for the **Compare** tool, which is described below.

15.1. Comparing Models

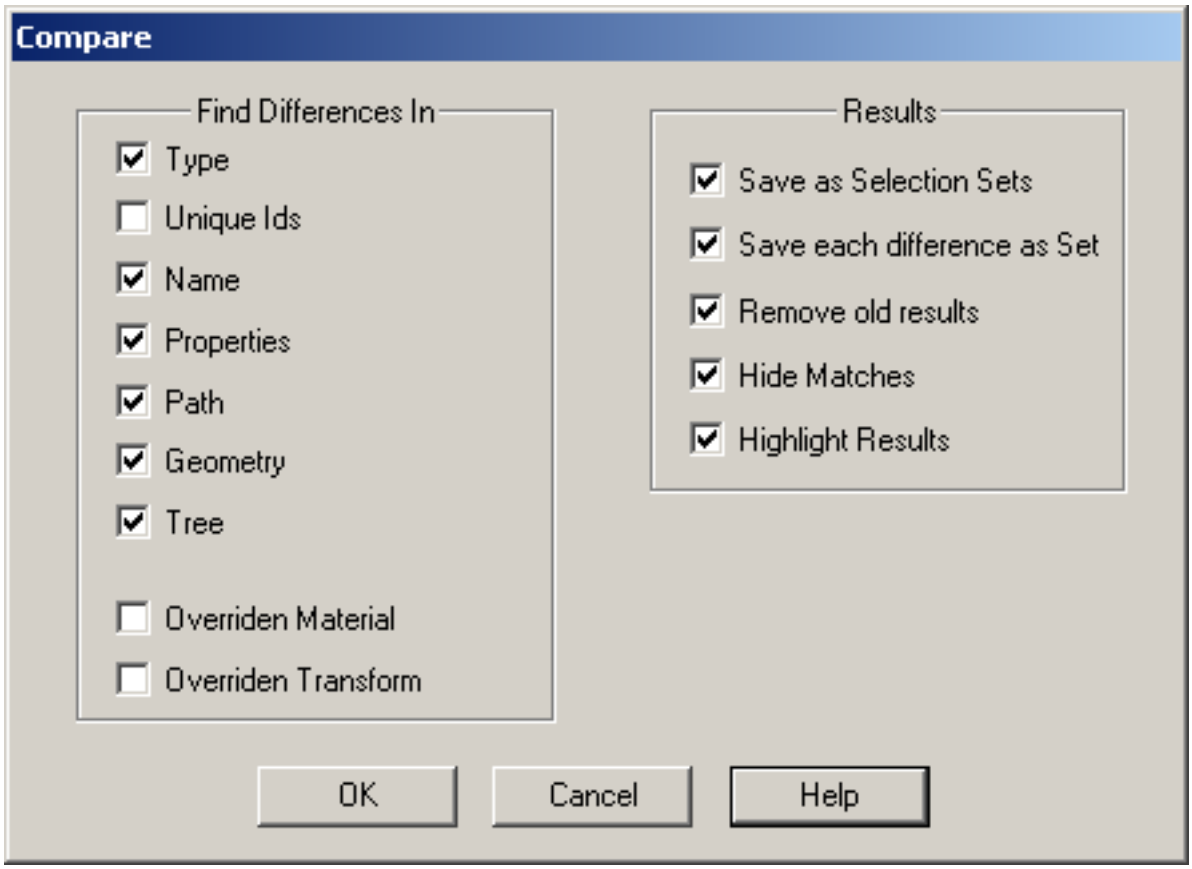
The **Compare** tool becomes available when *exactly* two items are selected. These can be any types of item, but the compare tool is most useful when comparing two versions of the same model. During the comparison, NavisWorks will start at each item and recursively travel down each path, as seen in the standard selection tree, comparing each item it comes across in terms of the criteria requested.

When the comparison has finished, you have the option of saving the differences as Selection Sets with comments describing the differences in more detail.

Comparing two items

1. Select exactly two items in the scene (see Chapter 6 for more information on how to do this).
2. Go to **Tools, Compare**

   The **Compare** dialog is displayed



3. In the **Find Differences In** section of the dialog, check all the boxes of the criteria that you want NavisWorks to compare for differences between the two items. **Overridden Material** and **Overridden Transform** relate to changing the color and/or transparency in NavisWorks and changing a file's origin, scale or rotation since loading into NavisWorks, so these are unchecked by default. All the other criteria relate to properties of items from the original CAD model.

4. Check **Save as selection set** if you want to save the selected items the you are comparing between as a selection set. You can then use this for later comparisons between the same items.

5. Check **Save each difference as set** if you want to save the resulting differences found in the comparison between the two items as a selection set for later analysis. The selection set will also have a comment attached detailing the differences in more depth.

6. Check **Remove old results** if you want to remove any selection sets resulting from a previous comparison, in order to reduce confusion when looking at the results.

7. Check **Hide matches** if you want to hide all items that turn out to be the same in the comparison, when the comparison finishes. To show them again, reset all hidden items.

8. Check **Highlight results** if you want to highlight each resulting difference with a color override, when the comparison finishes. Reset the color using the reset material command.

9. Click **OK** to start the comparison, or **Cancel** to return to NavisWorks without making any comparison. At any time during the comparison, you can click on **Cancel** on the **Exporting** dialog to abort the comparison.

The colors of the resulting highlights are as follows:

- White for items that match;
- Red for differences between items;
- Yellow for things found in the first item that aren't in the second;
- Cyan for things found in the second item that aren't in the first;

Chapter 16. Options

There are two types of options: File Options and Global Options. These are both accessed from the **Tools** menu. File options are saved in NavisWorks files (.nwf or .nwd) and reinstated when opening it. Global options, on the other hand, are set for *all* NavisWorks sessions.

This chapter simply links to other chapters where the functionality is described in more detail.

16.1. File Options

These options are saved into NavisWorks files and re-loaded when opening these files into NavisWorks. They are predominantly concerned with the appearance of the model and the speed of navigation around it.

To get to the File Options dialog, go to **Tools, File Options**. You will get a tabbed dialog box offering one of the following four file options:

- Culling. See Section 9.2.
- Speed. See Section 9.3.
- Head light. See Section 9.1.1.3.
- Scene lights. See Section 9.1.1.5.

16.2. Global Options

These options are persistent across NavisWorks sessions and are not saved into NavisWorks files.

To get to the global options dialog, go to **Tools, Global Options**. In addition to a tab for each file format that is read by NavisWorks Roamer, there are distinct sets of functionality that are controlled by the following options:

- Undo. See Section 8.2.
- Display. See Section 9.4.
- Profile. See Section 14.8.
- Smart Tags. See Section 13.5.1.
- Selection of items. See Section 6.5.
- Hyperlinks. See Section 13.4.6.
- Measure tools. See Section 13.3.2.
- Saved Viewpoints. See Section 10.6.
- Units. See Section 14.7.
- Caching of files. See Section 3.1.3.
- Textures. See Section 9.5

The reading of native CAD file formats is also configured from this dialog using the following tabs:

- DWG/DXF. See Section 3.1.4.
- 3DS. See Section 3.1.5.
- DGN. See Section 3.1.6.
- IGES. See Section 3.1.8.
- STEP. See Section 3.1.9.
- SolidWorks. See Section 3.1.10.
- Inventor. See Section 3.1.11.
- Solid Edge. See Section 3.1.12.

Chapter 17. Getting Help

The **Help** menu gives you access to useful resources about your system, your product and the documentation. NavisWorks comes with full context sensitive help as well as user guides in Adobe Acrobat™ .pdf format. The **Help** menu consists of:

- Help Topics
- What's This?
- Online help for the NavisWorks range of plugins.
- License
- System Info
- About NavisWorks

If the online documentation and help does not answer your query, try the **Support** area on www.navisworks.com [http://www.navisworks.com]. The next port of call would be the reseller from whom you purchased the software.

The NavisWorks Bond is an optional subscription program and gives you access to support via your reseller after 30 days after purchase. You also gain access to the Bond web site bond.navisworks.com [http://bond.navisworks.com] where you can download the latest patches and upgrades for you product, get useful tips and tricks about NavisWorks and join the online forum.

17.1. What's This?

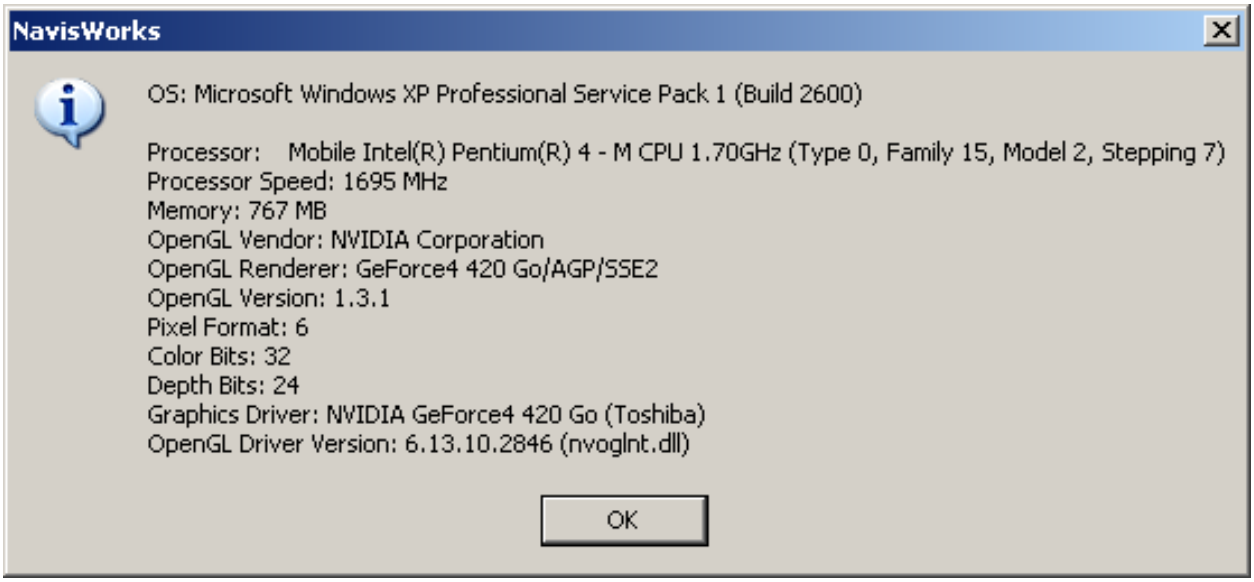
NavisWorks contains full context sensitive help. If you want to find out more about any item in the interface. Click  and click over the toolbar button, window or menu command that you want to know more about. The appropriate **Help** topic will then be displayed.

17.2. License

Opens the NavisWorks License Manager, where all licensing operations are done. For more information on this, see the book called `LicMan.pdf` in the `manuals` directory.

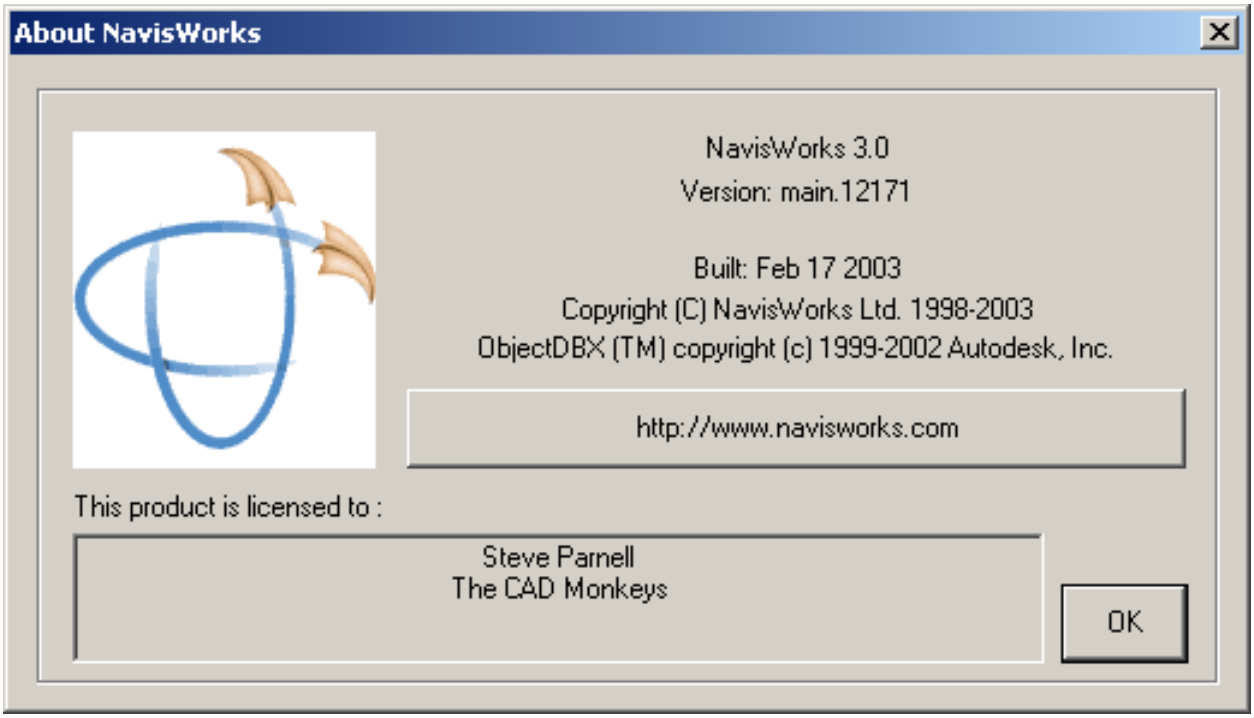
17.3. System Info

Opens a dialog giving you detailed information about your system, which can be helpful in support situations.



17.4. About NavisWorks

Opens a dialog giving you information about your product, including version and build number, which can be helpful in support situations.



Glossary

Glossary of technical terms relating to NavisWorks Roamer.

Display Terminology

Average Frame Rate

This shows the current measured frame rate, averaged over the last second.

Average Frame Time

This shows the time taken to render the last frame.

Average Triangle Rate

This shows the rate at which triangles are being rendered and is a measure of how well your graphics card is working.

Culling

Culling is a process for determining items *not* to draw during the render of a scene. NavisWorks does a level of prioritized culling with the drop-out method of rendering interactive scenes, but you have a certain level of control over other aspects of culling such as backface, near and far planes.

Drop-Out

In order to maintain interactivity and guarantee a user-defined frame rate, NavisWorks only renders what it can in the fraction of a second it has. The remainder is "dropped out", or not rendered. However, NavisWorks prioritizes what is rendered and what is dropped out based on size of the item's bounding box, distance from viewer and size on screen, so only the less significant items in the scene are dropped out. Once navigation has ceased, the scene continues rendering until all items are visible.

Frame Rate

The frame rate is the number of frames per second (FPS) that are rendered in the main navigation window. NavisWorks guarantees a user-defined frame rate in order to maintain interactivity.

Export Terminology

These are terms specific to NavisWorks that are used in relation to exporting.

Codecs

Codec stands for "COmpression-DECompression" and is a program that compresses and decompresses animations when creating and playing back .avi files. Codecs are installed independently of NavisWorks and are available when installed on your Windows™ system and the same codec that was used to create an .avi file is required to play it back.

File Terminology

.nwc Cache Files

When any native CAD file file is opened or appended, NavisWorks Roamer creates a cache file (.nwc) if the write cache option is set. When the file is next opened or appended, NavisWorks Roamer will read data

from the corresponding cache file rather than re-converting the original data if the cache is newer than the original file. If the original file is altered, NavisWorks Roamer will re-create the cache file when it is next loaded. Cache files speed up access to commonly used files. They are particularly useful for models made up of many files of which only a few are changed between viewing sessions. Cache files can also be exported from some CAD applications where a native file reader is not available with NavisWorks Roamer. Cache options can be edited from the **Global Options** dialog box under the **Tools** menu.

.nwd Published Data Files

Published .nwd files are useful when wanting to take a snapshot of the model at a certain time. All the geometry and review information is saved into the .nwd file and cannot then be changed. Published .nwd files can also contain information about the file, as well as being able to be password protected and time-bombed for security. These files are also very small, compressing the CAD data by up to 80% of the original size.

Published .nwd files are useful when issuing models for viewing by others with the NavisWorks Freedom free viewer, as well as being appendable themselves into Roamer to build up a larger scene.

.nwf Review Files

Review files are useful when using the native CAD files appended into NavisWorks Roamer. They store the location of the appended files, along with any design reviews made in NavisWorks, such as comments, redlines, viewpoints, animations and so on.

If a group of files is appended into a NavisWorks scene, and saved as an .nwf file, then on re-opening this .nwf file later, once the original CAD files have been changed, the updated CAD files will be loaded into the scene for review.

External References

External references (sometimes called reference files or "xrefs") are shown in Roamer selection tree as an inserted group. Roamer looks for the externally referenced files in the same place as AutoCAD or MicroStation would.

If the **Unresolved xref** dialog box is shown, then this link has somehow been broken and the referenced files need to be relocated to where AutoCAD or MicroStation would expect them to be.

If these xrefs are not important for the current session, then you can **Ignore** the reference and the file will load without that xref inserted. Similarly, **Ignore All** will load the file without any unresolved xrefs.

You can also use the **DWG/DXF** and **DGN** options in the **Tools, Global Options** dialog to set whether external references are loaded or not, giving you more control over file appending into NavisWorks.

Faceting Factor

During an export from a CAD package to .nwc, or while Roamer is reading a native CAD file, decisions must be made as how a curved surface is reduced to flat facets. For most applications and file formats, you have control over the level of faceting that takes place.

All items, no matter what their size, will use the same faceting factor and

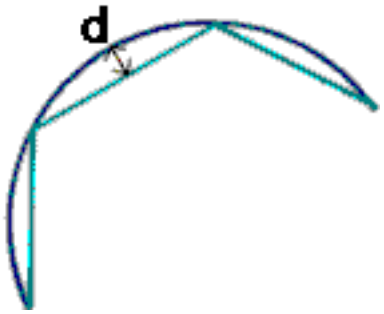
so have the same number of sides to curved entities. Therefore, you need to experiment a little with different values to account for the size that these items will appear on screen.

The faceting factor must be greater or equal to 0, where 0 results in the faceting factor being turned off. The default value is 1, if you double the value you get twice the number of facets, if you halve the value you get half as many facets. Larger faceting factors will result in more polygons to a model and larger NavisWorks files. There is little point having a large faceting factor if these curved entities are golf balls viewed from 200 yards!

For AutoCAD exports, the faceting factor is set from the NWCOPT command, MicroStation's faceting factor is set from **Options**, which is available from the NWCOUT export dialog, and the option to set the faceting factor on reading CAD files is found by choosing **Tools, Global Options**, and the relevant options tab.

Max Faceting Deviation

Maximum faceting deviation is used in conjunction with faceting factor to ensure that larger objects, with too large a deviation from the original, have additional facets added. If a difference greater than the entered value is found in a model it adds more facets. The values are measured in the model units.



Where *d* is greater than the maximum faceting deviation value, more facets are added to the object.

If the max faceting deviation is set to 0, then this function is ignored and just the faceting factor is used.

Shape Merge Threshold

MicroStation shapes are polygons that can have 3 or more vertices. They're often used to model more complex objects which can waste memory. So, NavisWorks merges all shapes on the same level or in the same cell and with the same color into a "Shape Set" if these shapes have less than or equal to the number of vertices given by the *Shape Merge Threshold*.

Selection Terminology

These are terms specific to NavisWorks that are used in relation to selecting items.

Composite Objects

A composite object is a group of geometry that is considered a single object in the selection tree. For example, a window object might be made up of a frame and a pane. If a composite object, the window object would be both the frame and the pane and be selected all at once.

Instances

An instance is a single object, which is referred to several times within a model, for example a tree. This has the advantage of cutting down on file size by not unnecessarily repeating an object.

Item Name

The original CAD or NavisWorks assigned identifier. Any item can have a name and this name will usually come from the original CAD package that the model was created in.

Item Type

Every item in NavisWorks has a type. Examples of types are reference files, layers, instances (sometimes called inserts) and groups. Every CAD package also has a number of geometry types, for example, polygons, 3D Solids and so on.

Selection Resolution

The selection resolution is the level in the selection tree you start selecting at. You can cycle through items in the tree by holding down the shift key during a selection.

User Name and Internal Name

Each category and property name has two parts - a user visible string which is localized and an internal string which isn't and is mainly used by the API. By default when matching names in the Smart Tags and Find Items dialogs, both parts must be the same, but you can use the flags to match only on one part. You might use **ignore user name** if you wanted to match something irrespective of which localized version was being used.

Viewpoint Terminology

Angular Speed

The speed that the camera moves when turning right and left in any navigation mode.

Aspect Ratio

Aspect ratio is the proportion of x-axis to y-axis size. For example, in exporting a bitmap of a viewpoint, maintaining the aspect ratio would keep the proportion of the view even if the number of pixels was different.

Anti-aliasing

Anti-aliasing improves image quality by softening the jagged edge appearance of sharp lines. 2x to 64x refers to the extra number of frames that are required for the anti-aliasing process. The greater the number of frames, the finer the effect, (with the consequent increase in rendering time).

Camera-Centric

Navigation modes in which the camera is moved around the model (c.f. model-centric).

Field of View

The field of view of a camera is the angle that the camera can see. A large field of view will fit more into the view, but will look distorted and a small field of view will tend to make the view more flat, tending towards an orthographic view. There are two fields of view in NavisWorks - vertical and horizontal. Editing one will change the other and the two are related by the viewpoint's aspect ratio.

Focal Point

The focal point is the position in 3D space that the camera will rotate around or zoom into in examine, orbit, turntable and zoom modes.

Model-Centric

Navigation modes in which the model is moved in front of the camera (c.f. camera-centric).

Roll

The roll of the camera is its angle around the viewing axis. This cannot be edited in a navigation mode where the world up vector stays upright (walk, orbit and turntable).

Saved Attributes

Each viewpoint can optionally save the state of its hidden and "required" items, as well as any material (color and transparency) overrides. Then, on recalling the viewpoint, those same items are re-hidden, re-made required, and the materials reinstated. This can be useful in the creation of animations when dragging on viewpoints onto an empty animation.

Tilt Angle

This is indicated in the scene's units below (negative) or above (positive) horizontal (0) at the base of the tilt bar.

World Up Vector

The direction that NavisWorks considers "up" is called the "world-up vector". This is maintained in the walk, orbit and turntable modes.

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