

NavisWorks JetStream v5

User Manual

Autodesk, Inc.

NavisWorks JetStream v5 : User Manual

Autodesk, Inc.

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JetStream is a revolutionary technology and software product range for the real time design review of the largest 3D models. JetStream products enhance 3D CAD navigation, collaboration and coordination to liberate the benefit of designing in 3D. This book includes documentation on the entire NavisWorks JetStream v5 product range, including :

- License Manager
- Roamer
- Publisher
- Presenter
- Clash Detective
- TimeLiner

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Contains a modified version of Open CASCADE libraries. See the license file "OpenCascadeLicense.txt" in the JetStream installation directory. Source code is available from www.navisworks.com/files/OpenCascade.zip.

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Part I. NavisWorks License Manager

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Chapter 1. Introduction

The NavisWorks License Manager User Manual is divided into 3 chapters: Essential, Useful and Interesting Reading.

Essential reading explains the installation and licensing of fixed, networked and floating NavisWorks licenses. It covers the registration process, and how to recover or transfer licenses. If you read nothing else in these user manuals, read this section! Systems administrators and power users are recommended to read all sections.

Useful reading describes the tabs of the License Manager in more detail. This will be useful should you wish to know more information on your NavisWorks setup and for alternative ways of working with your NavisWorks licenses..

Interesting reading covers more advanced topics. This will be useful for more advanced network setups, increased understanding of the licensing system and may be of further assistance when troubleshooting.

Chapter 2. Essential Reading

This section describes the most essential aspects of the NavisWorks License Manager. Standard users are recommended to read this chapter, if nothing else. System Administrators are recommended to read all chapters of the License Manager book, to fully understand the licensing system and its available features.

2.1. Installing JetStream

Insert the JetStream CD into your computer's CD-ROM drive. The JetStream Installation Menu should start automatically. If the Menu does not launch automatically, double click on `Menubox.exe` at the root of the JetStream CD. Follow the instructions on the menu to install and license JetStream.

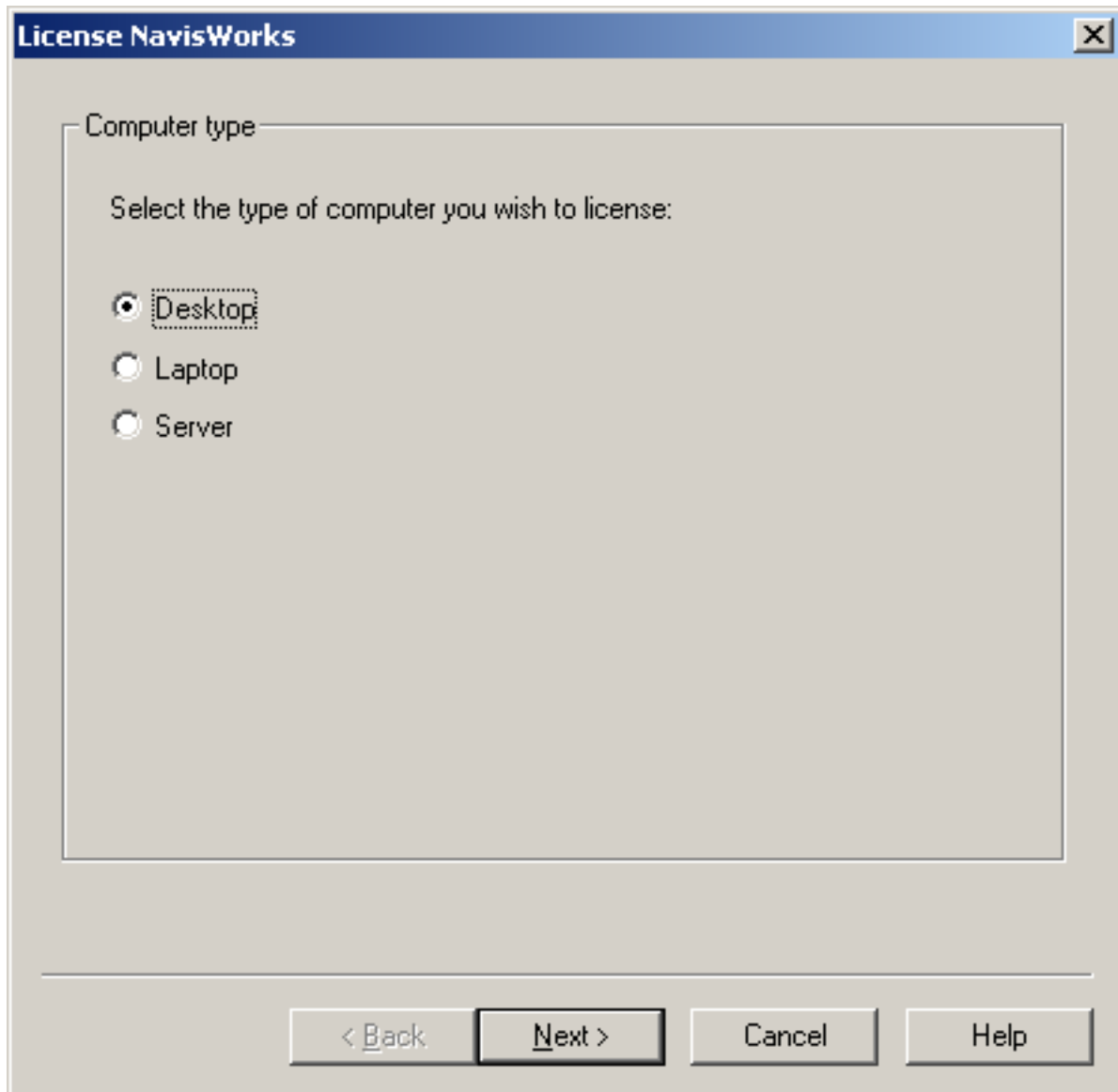
The installer will load all supported languages and then automatically run in the language that best matches the settings on your computer. To run JetStream in another of the supported languages, you simply need to add one of the following arguments to the desktop shortcut. To do this, right click on the JetStream desktop shortcut and choose **Properties** from the context menu. In the **Target** field, after `..\roamer.exe` enter a space, then one of the following:

Language selector

-lang enu	Enter this for English localization
-lang deu	Enter this for German localization
-lang jpn	Enter this for Japanese localization
-lang rus	Enter this for Russian localization
-lang chs	Enter this for Chinese (PRC) localization

2.2. First Steps

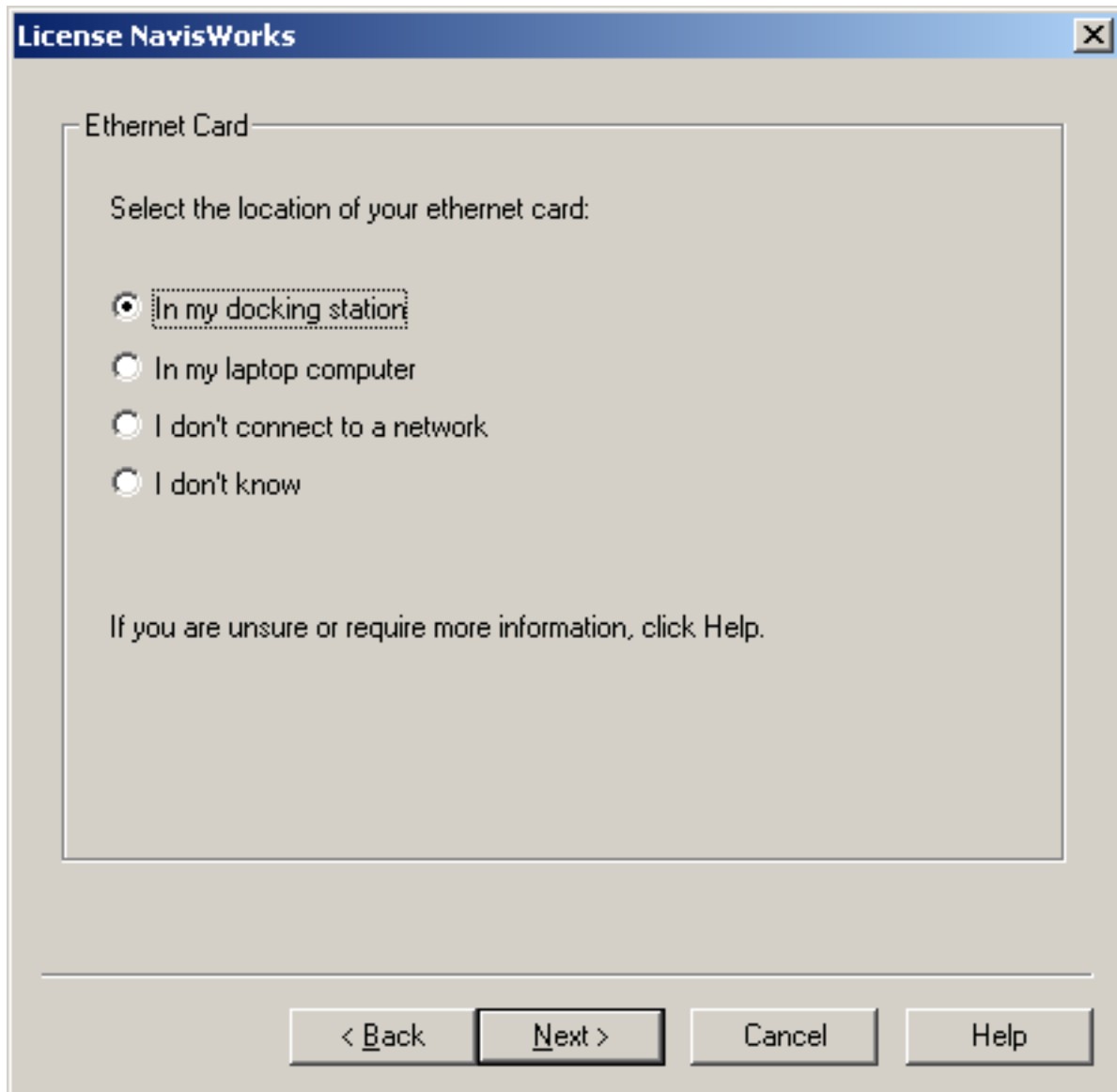
The JetStream License Manager is a separate application used to manage everything concerning your JetStream licenses. It is installed along with JetStream, or you can install it on its own for setting up License Servers (for more details on this, see Section 2.7, " Served licenses "). You can access the License Manager from Start, Programs, JetStream JetStream, License Manager, but for your convenience, on first installing JetStream, it will open automatically and start the license wizard, which looks like this:



You must first select the type of computer you are running the license wizard on. Here you have three options:

- "Desktop". Select this if you have a normal desktop computer or workstation.
- "Laptop". Select this option if you use a portable computer such as a laptop or notepad machine.
- "Server". Select this option if you are installing on a server machine, or if your computer does not fall into any of the above categories.

If you check the "Laptop" option, you will be taken to another screen asking you about the ethernet card in your laptop computer.



Note

In order for your JetStream product to work correctly when you are both in and out of the office, it is important that you select the correct option on this screen.

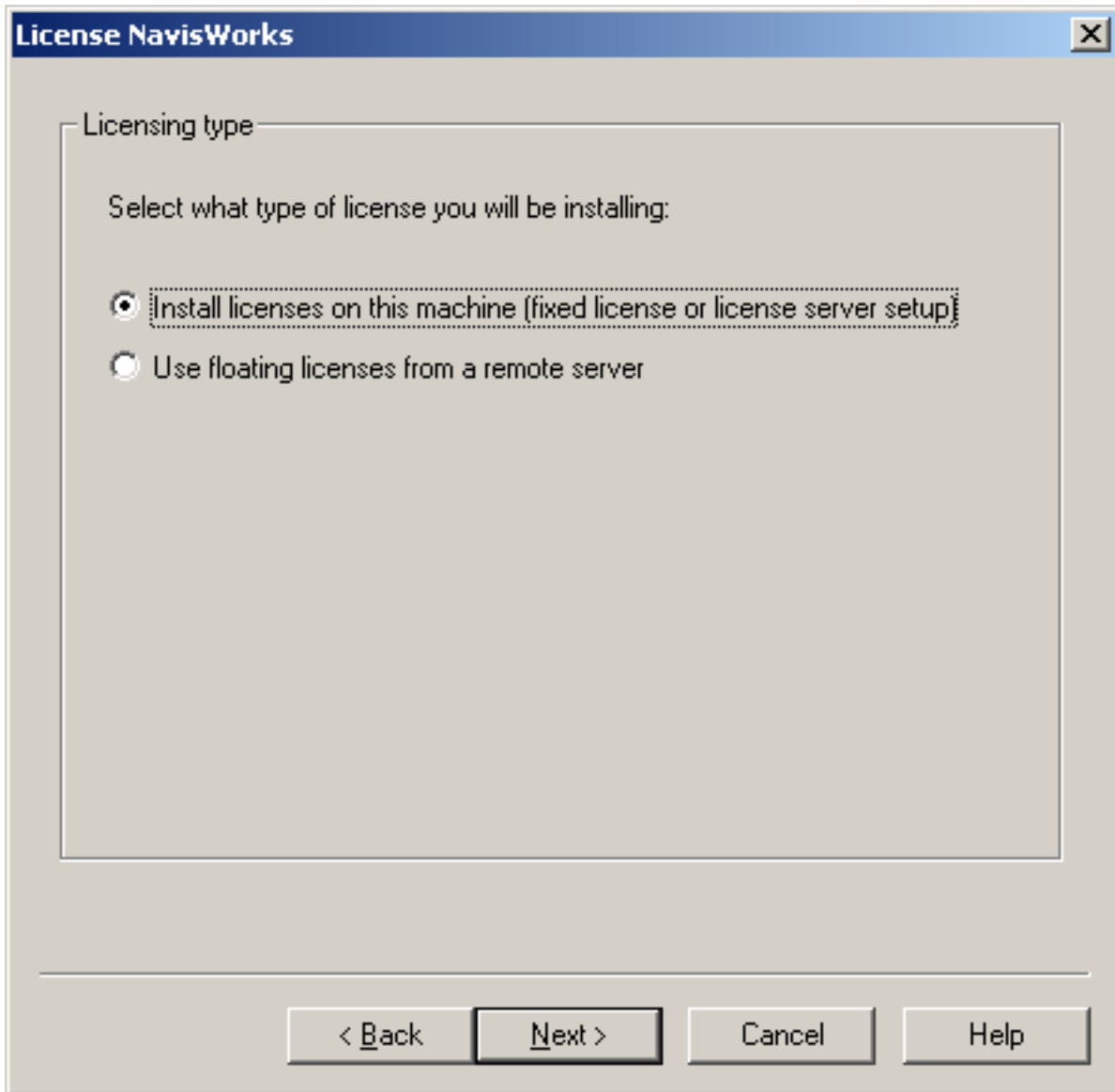
- "In my docking station". Select this option if you connect your network cable into a docking station.
- "In my laptop computer". Select this option if you plug your network cable directly into your laptop computer.
- "I don't connect to a network". Select this option if you do not connect your computer to a network.
- "I don't know". Select this option if you are not sure where your ethernet card is located.

If you use multiple cards (e.g. a standard LAN card at work and a wireless card at home) select the "I

don't connect to a network" option, as you will need to disable Ethernet ID locking to ensure JetStream JetStream works when using either card.

The license wizard uses this information to set up the options related to Ethernet card ID locking (see Section 4.3.3, "Options").

After the pages to determine your computer type, you will be asked what sort of license you want to install on your machine.



To install a fixed license on a stand-alone machine, or floating licenses on a server, choose the first option, "Install licenses on this machine" and follow the instructions in Section 2.3, "Requesting and installing a JetStream license" or Section 2.7.2, "Setting up the server" respectively.

Otherwise, if you are setting up a client to take its licenses from a server, then choose the second option, "Use floating licenses from a remote server" and follow the instructions in Section 2.7.3, "Setting up a client".

Requesting, Recovering and Returning licenses work the same way, whether you're installing them on a

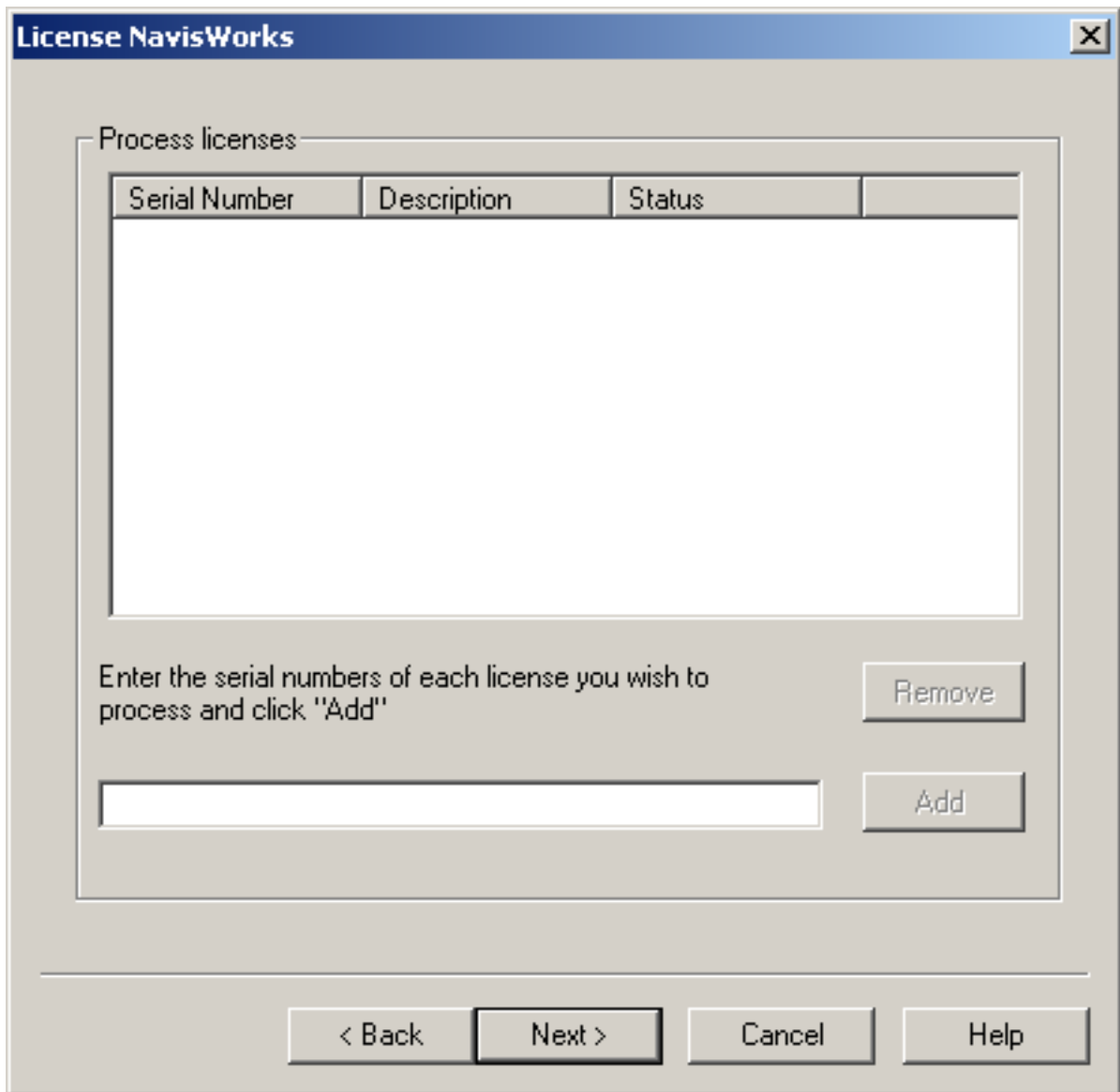
stand-alone PC or for licenses to be served from a server.

Note

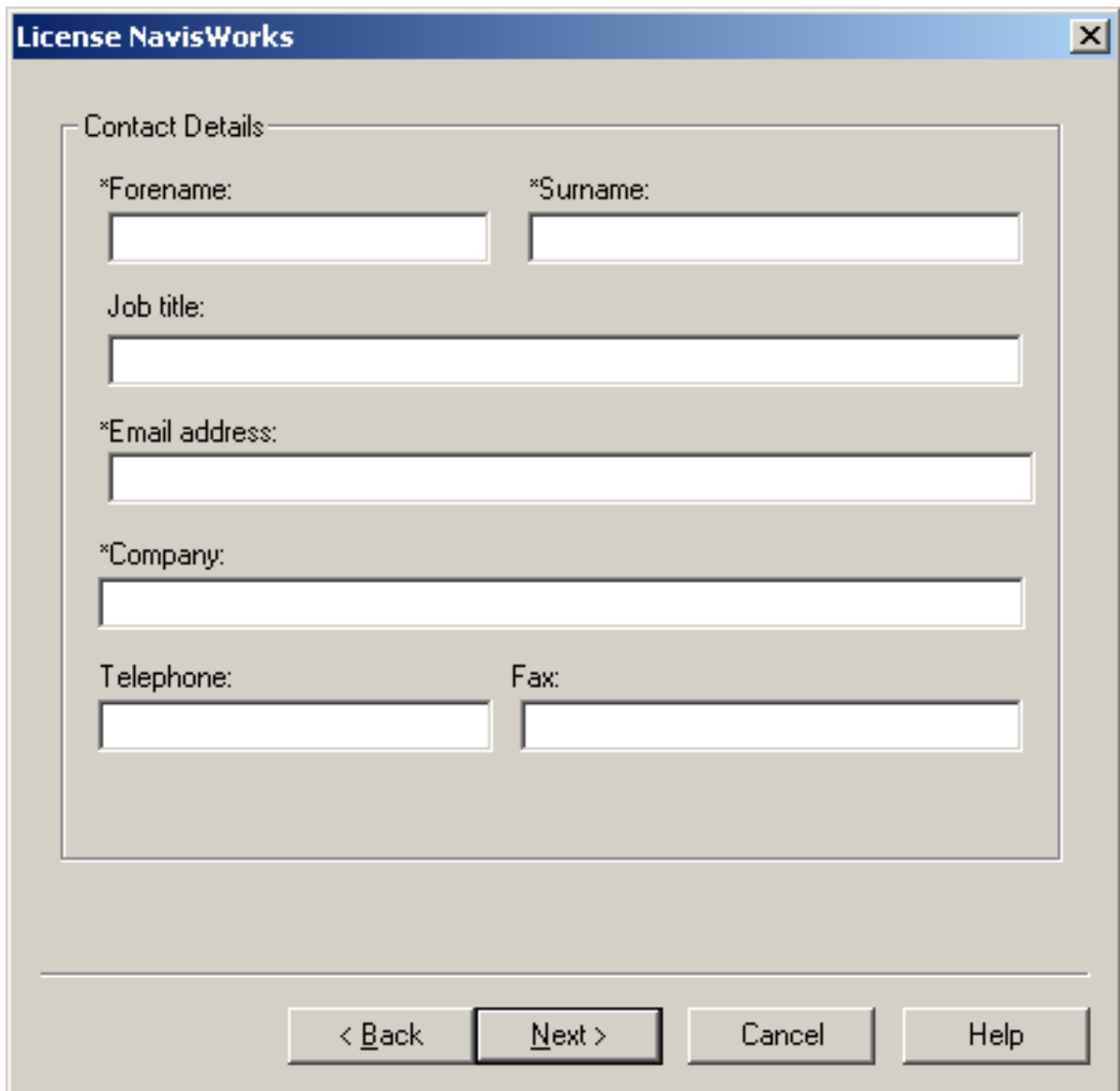
As with most software, you need to have administrator privileges on the PC that you are installing JetStream.

2.3. Requesting and installing a JetStream license

- To install a new license, or to add more modules to your existing licenses, select **Request License** from the **License Wizard** menu. The **Request License** Wizard will be displayed:



- One by one, enter the serial numbers of your JetStream modules and click **Add** after each. This will add the products to the list box. Once all of your products are entered, click **Next**.

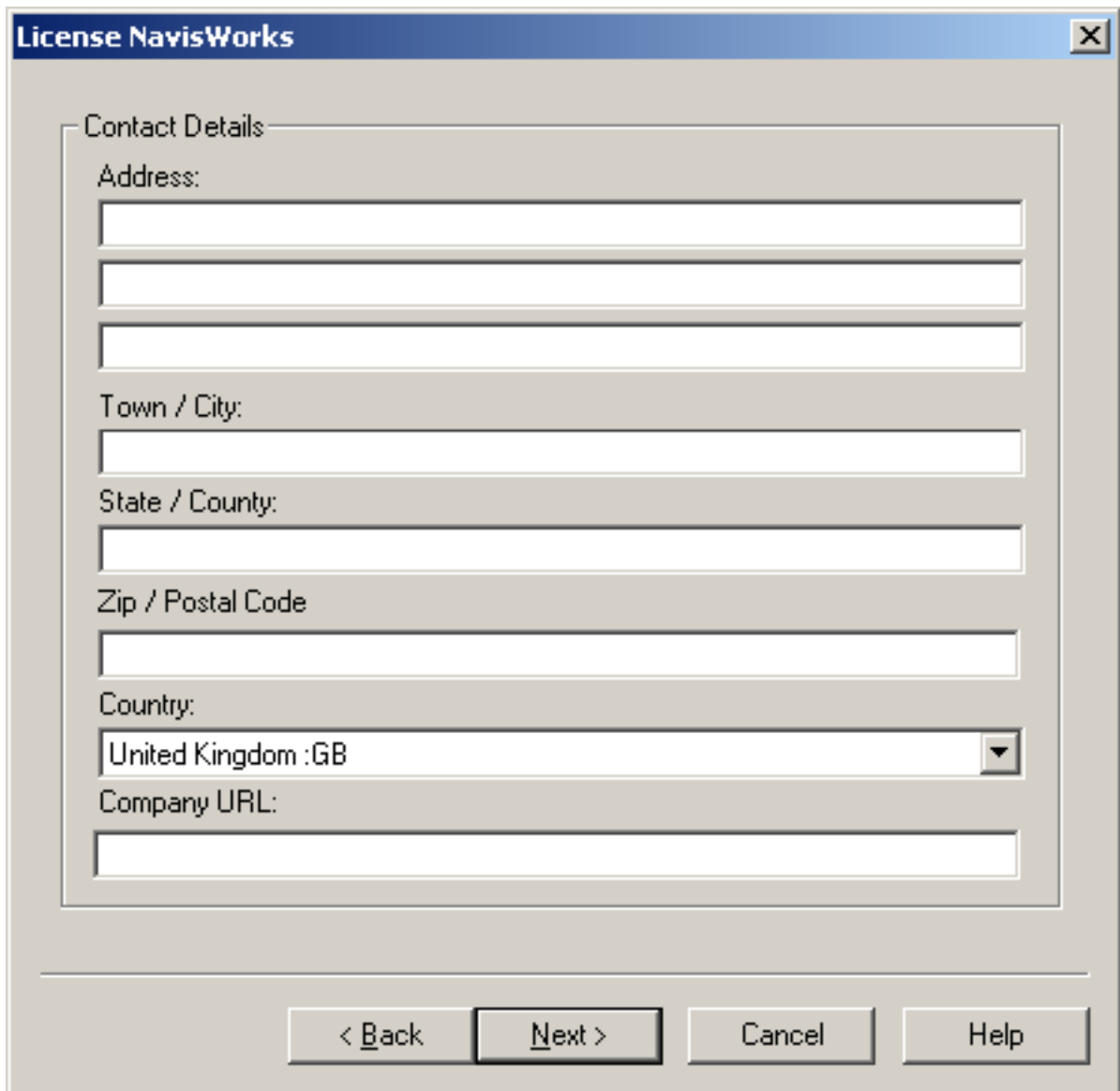


The image shows a dialog box titled "License NavisWorks" with a close button (X) in the top right corner. The dialog box contains a "Contact Details" section with several input fields. The fields are arranged as follows: "*Forename:" and "*Surname:" are side-by-side; "Job title:" is below them; "*Email address:" is below "Job title:"; "*Company:" is below "Email address:"; "Telephone:" and "Fax:" are side-by-side at the bottom of the input section. At the bottom of the dialog box, there are four buttons: "< Back", "Next >", "Cancel", and "Help".

- Enter your personal contact details, then click **Next**.

Note

The starred items (*) are required, whereas the others are optional.

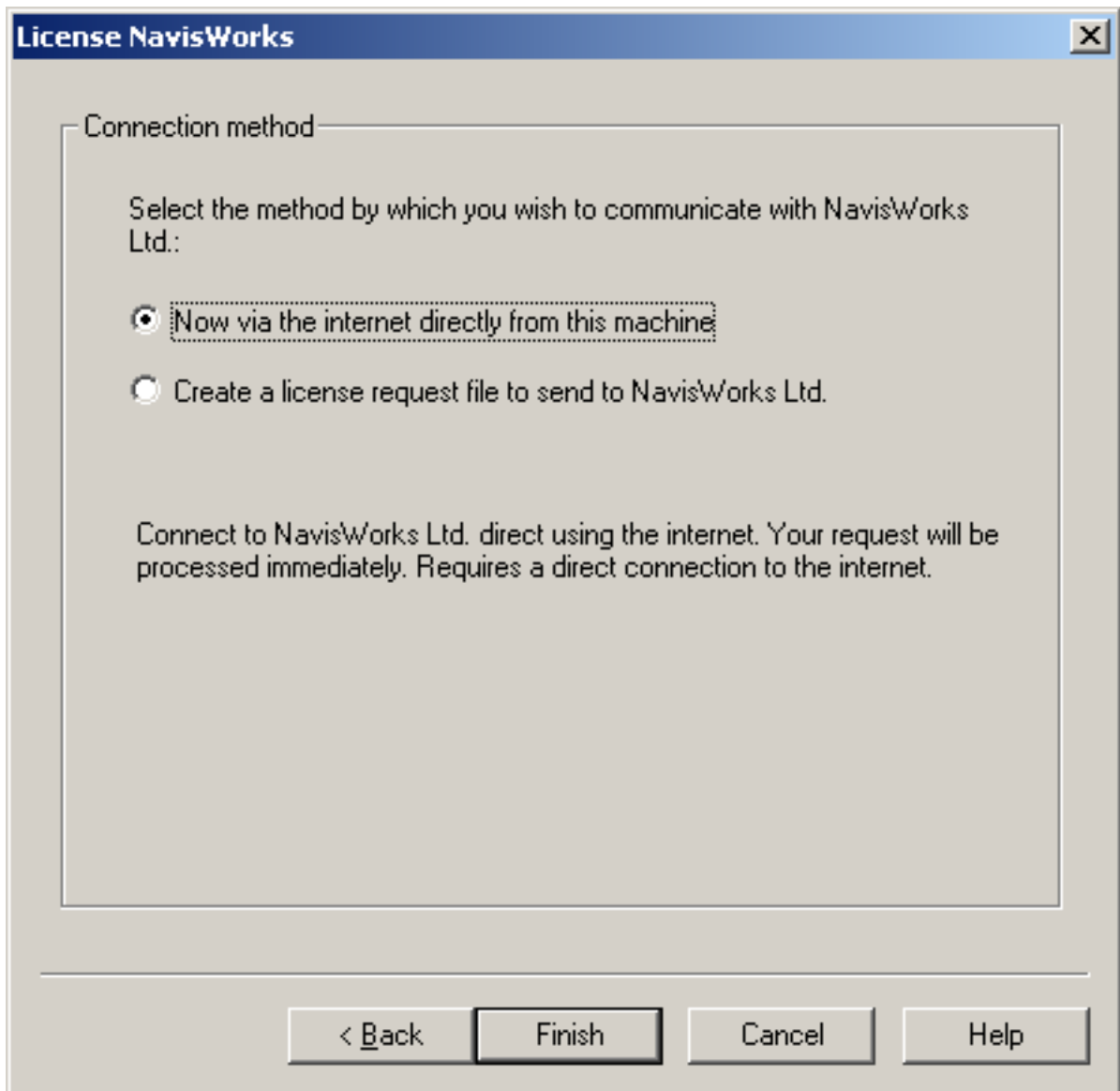


The image shows a dialog box titled "License NavisWorks" with a close button (X) in the top right corner. The dialog contains a "Contact Details" section with the following fields:

- Address: Three stacked text input fields.
- Town / City: One text input field.
- State / County: One text input field.
- Zip / Postal Code: One text input field.
- Country: A dropdown menu currently showing "United Kingdom :GB".
- Company URL: One text input field.

At the bottom of the dialog, there are four buttons: "< Back", "Next >", "Cancel", and "Help".

- Enter your company's contact details, then click **Next**.



- The final wizard dialog offers you two options to register your product:
 1. **Now via the Internet directly from this machine.** This option is recommended if you have a direct Internet connection.

Click **Finish** and the License Manager will link to NavisWorks Ltd.'s system, register your products and install your license file. When the License Manager informs you of success, your products are licensed and you can use NavisWorks.
 2. **Create a license request file to send to NavisWorks Ltd..** If you have no internet connection from your machine, or your firewall does not permit connection, then you will need to select this option and manually process the license.

Click **Finish** and the license request file will be created. You will be advised in a message box where this file is located, (by default C:\Program Files\NavisWorks

Licensing\Transfer\send_to_navisworks.txt).

Note

Once the license request file is created, it can be sent to NavisWorks Ltd. from any machine, either by email or uploaded on the NavisWorks website. If you do not have email on your machine therefore, copy the file and take it to any machine that does have email or Internet access.

Whilst manually processing this request, your existing licenses will be killed. This will prevent JetStream from functioning until the new license has been accepted.

Attach the **send_to_navisworks.txt** file to an email and send it to <autolicense@navisworks.com>. A license file will be sent by return email.

(This email address is an automated address and should not be emailed with anything other than the send_to_navisworks.txt file.)

or

Upload it to the website <https://register.navisworks.com/autolic.htm> [https://register.navisworks.com/autolic.htm]. Once processed (this should only take a few seconds), you will be prompted to download a license file.

Save the license file to a temporary location on the machine that created the license request file, preferably the original Transfer directory. The file should be named **accept_new_license.lic** when saved. If the file is named differently, JetStream may not recognise it.

Start the License Manager (Start, Programs, JetStream JetStream, License Manager), then go to **License Wizard, Accept License**. Browse to the license file in the temporary location, then choose **Open** and then **Finish**. This will install the license on your machine.

2.4. Recovering a license

If you lose your JetStream license for whatever reason, there is a good chance you can recover it by doing the following:

- Go to **Recover License** from the **License Wizard** menu and check the **Confirm** box before clicking on **Next**.
- Your serial numbers and contact details should have been remembered by the License Manager, but if not, complete the next two forms again and click **Next**.
- You have two methods by which to recover your license, which are the same as the registration methods. See Connection Methods for more information on these options in order to choose how you would like to recover your license.

There are certain situations where recovering may not work. These are outlined in Section 4.4, “Situations when Recovering and Returning Licenses Fails”.

2.5. Returning a license

You cannot directly transfer a license from one PC to another, but you can return your licenses to NavisWorks Ltd. in order to Request them from another PC. Returning a license effectively kills it on one PC and gives you a credit in NavisWorks Ltd.'s system so that you can request the same license from another PC. Please note that you cannot return just some modules and leave others on the PC. If you wish to transfer just some of your JetStream modules, then you have to return them all and request them individually again from the PC's on which you want to use them.

To return your license:

- Go to **Return License** from the **License Wizard** menu and check the **Confirm** box before clicking on **Next**.
- Your serial numbers and contact details should have been remembered by the License Manager, but if not, complete the next two forms again and click **Next**.
- You have two methods by which to return your license, which are the same as the registration methods. See Connection Methods for more information on these options in order to choose how you would like to return your license.

Note

If you return your licenses via a license request file, the license file returned to you (by email or download) will need to be Accepted (see the section called Accepting a License) on the machine returning the licenses, to complete the return license process. If successful, you will receive a message advising "License Returned".

Once your licenses have been returned, JetStream will no longer run on your PC, but you will be able to Request them again from any other PC in your organisation (note that the JetStream End User License Agreement forbids you to "loan, rent, sell, sublicense or otherwise transfer the Software Product and/or documentation to third parties"). To install your licenses again, follow the steps in Section 2.3, "Requesting and installing a JetStream license".

2.6. License Types

There are two types of JetStream license: Fixed and Floating.

1. Fixed licenses. These are licenses locked to a single machine and sometimes called stand-alone licenses. Each client PC must be individually licensed.
2. Floating licenses. These are concurrent licenses served from a server. A license is needed for each client PC that will access a floating license *at the same time*. For example, if you have 10 floating licenses installed on the server, then any 10 client PCs can be running JetStream at the same time.

2.7. Served licenses

2.7.1. Served licenses overview

JetStream served (floating) licensing allows you to set up and manage all or some of your licenses on a server and access them from client PCs, giving you simpler, more central management of NavisWorks licenses. Setting up NavisWorks served licenses is a two stage process - first you have to install the licenses on the server and then you have to connect to the server from the client PCs that will be using

JetStream.

Note

The JetStream License Server will only run on Windows NT, Windows 2000, Windows XP or Windows Server 2003.

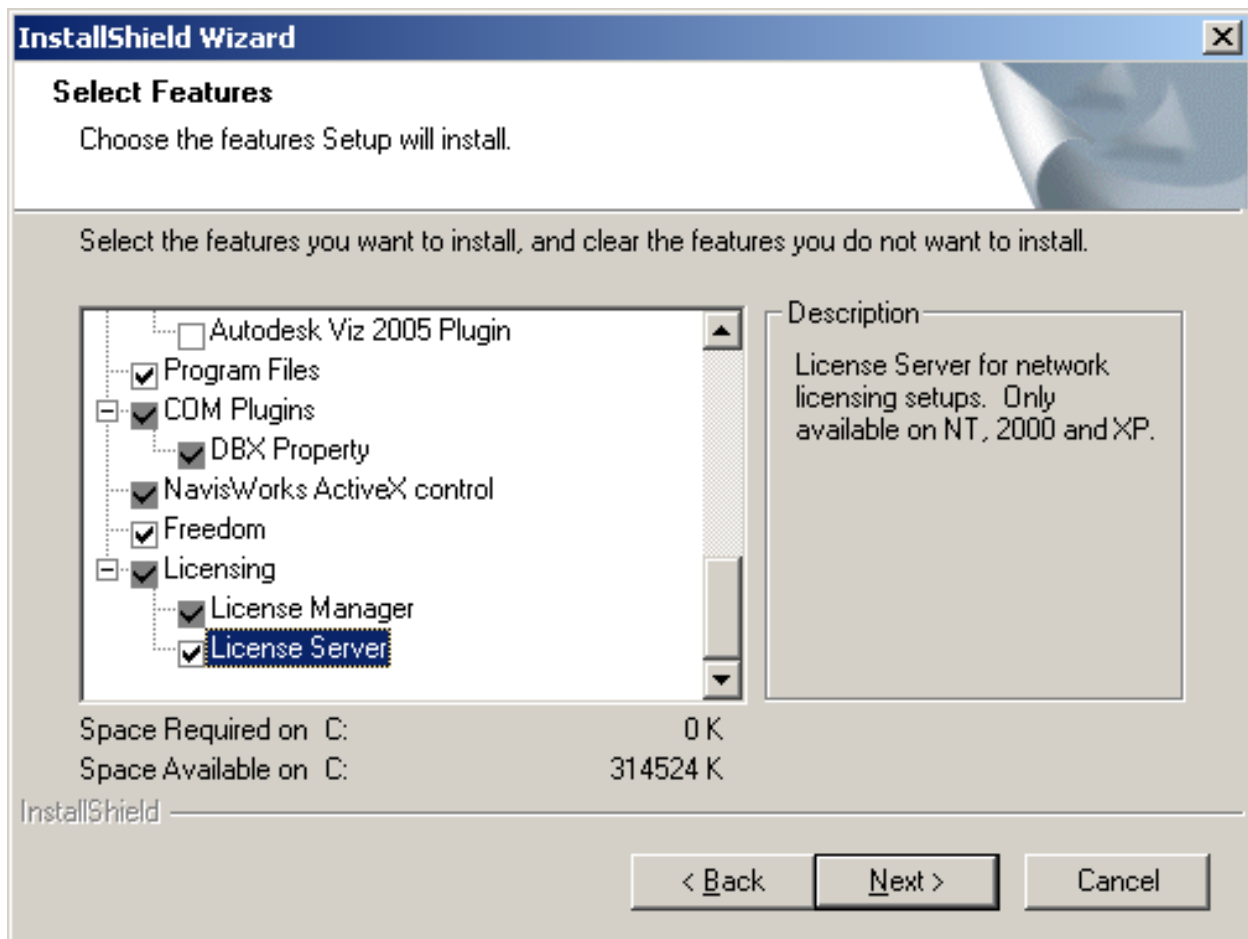
It is not possible to float **Fixed** licenses on a network server.

2.7.2. Setting up the server

The server installation works in the same way as a fixed installation, except that it installs a service that constantly runs in the background to serve the licenses from the server. Make sure that you use either the **Server** or **Custom** install method to install the JetStream License Server for server installations - served licenses will not work without this service.

Note

The **Server** install option will not install the JetStream program files. If you wish to run JetStream itself on the server machine (and not just the License Server), select the **Custom** install and ensure the **License Server** option is selected.



You can install the License Manager independently of the full NavisWorks program for minimal installs on the server. The minimum you need to install is the JetStream License Server and the NavisWorks License

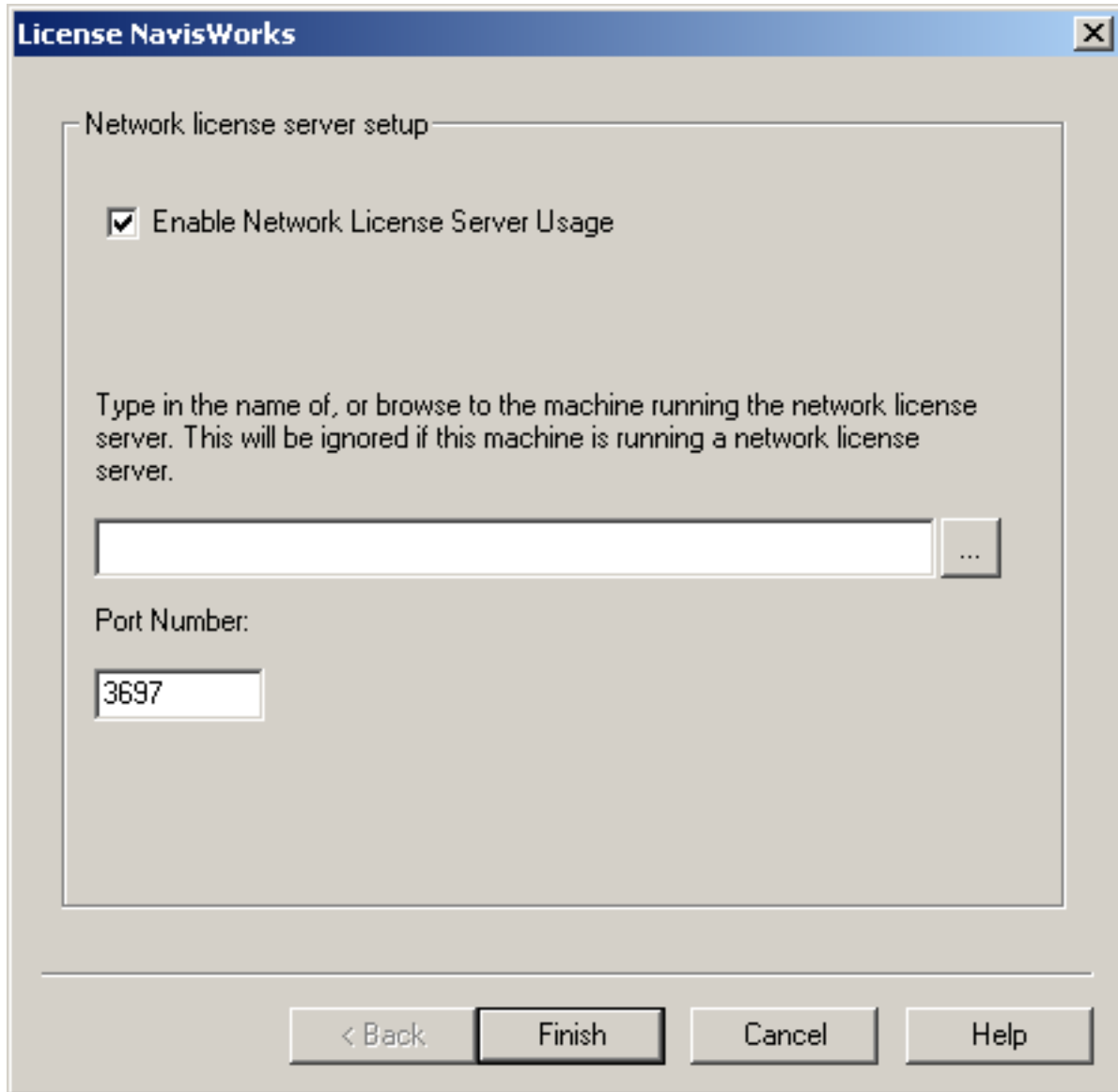
Manager. Once running, you should see a **JetStream Licensing** service in the **Services** section of your administration tools in Windows.

If JetStream has just been installed on the machine, the Installation Wizard will automatically run. When asked for what type of license you wish to set up, choose "Install licenses on this machine". If you are returning to this machine to set up the license, you can choose **Request License** from the **License Wizard** menu.

Finally, use the License Manager in exactly the same way as for a stand-alone installation to enter the serial numbers of all the products you have purchased and register them with NavisWorks Ltd. See Section 2.3, "Requesting and installing a JetStream license" for full details on how to do this. When your licenses are installed on the server, start the **JetStream licensing** service from the **Services** section of your administration tools in Windows. You can then set up the client machines.

2.7.3. Setting up a client

On the client PC, install JetStream as if installing a fixed license (you do NOT install the License Server option for the clients). If JetStream has just been installed on the machine, the License Wizard will automatically run. When asked for what type of license you wish to set up, choose "Use licenses from a remote server". If you are returning to this machine to set up the client license, you can choose **Network Server** from the **License Wizard** menu. The following dialog is displayed:



If active, check the "Enable Network License Server Usage" check box. In the upper text box type in, or browse to, the server where your JetStream Licenses are installed and being served from. This should be the fully qualified domain name (FQDN) or IP address of the server. If only the name of the server is supplied, the default domain for the client PC will be used to create a fully qualified domain name. The Server FQDN is displayed in the Machine Name field of the Advanced tab on the Server machine.

The lower text box shows the port number that will be used to communicate with the server. You should only change this if instructed to do so by your server administrator. See the section called "Setting the Network Server Port" for more information.

Click **Finish** to complete the process. The **Network Modules** tab will be displayed, listing all licenses being served from the Server you're connected to and identifying those licenses **Accessible** from your client machine. See the section called "Network Modules" for more information.

When JetStream now starts, it should get its licenses from the Server.

Chapter 3. Useful Reading

This section describes in more detail the operation of the NavisWorks License Manager.




3.1. The License Manager tabs explained

The five tabs on the License Manager allow you to view and manage your licenses.

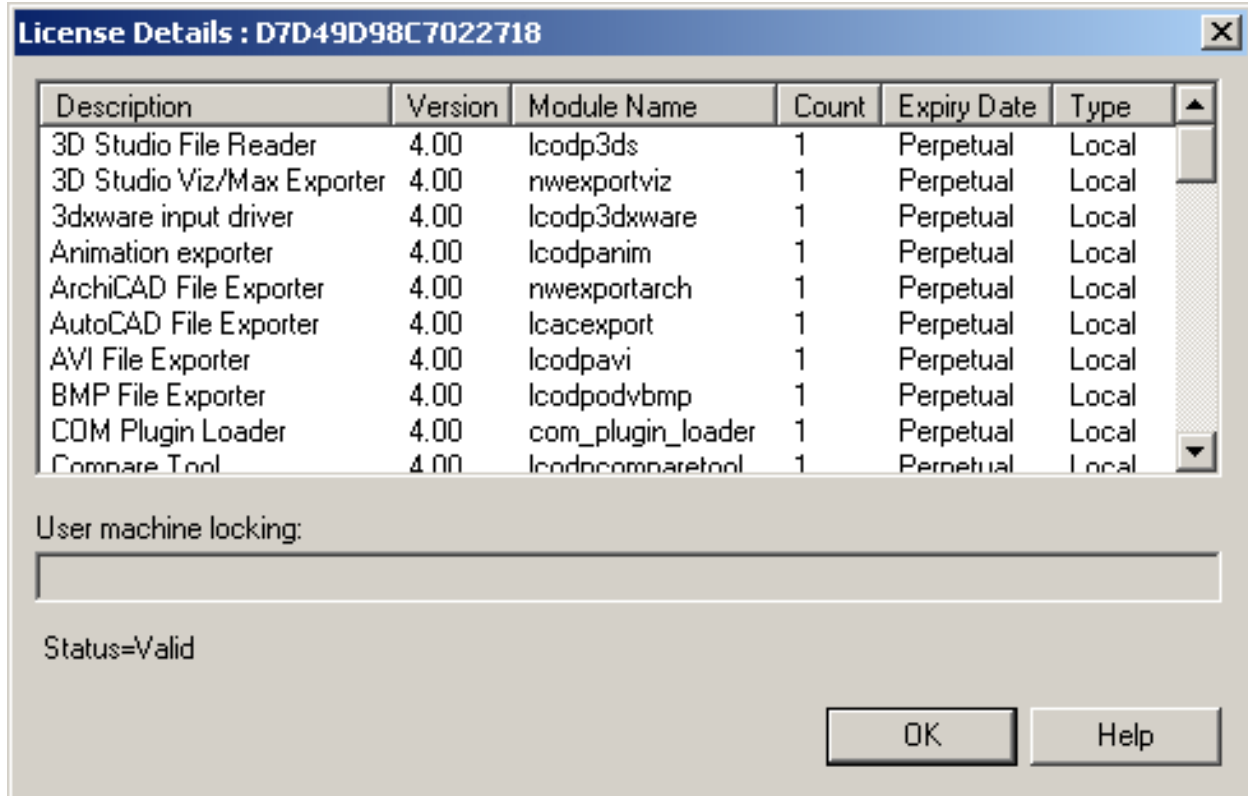
3.1.1. Current Licenses

This tab shows all the products that are installed on the PC by serial number and product description.

To the left of each serial number is an icon, signifying the current status of the license:

- A **Green tick**  signifies that the license is valid and working correctly.
- An **Exclamation mark**  signifies that a module within the license has expired. For full licenses this is most likely to be **Bond**, in which case the license is still valid, (however you will need to renew your Bond subscription to continue to receive support and upgrades. See the JetStream website, <http://www.navisworks.com/bond.htm> [<http://www.navisworks.com/bond.htm>]). See License Properties for more information on finding out which module has expired.
- A **Red cross**  signifies that the license is invalid and not working. If this license has been valid and working on this machine previously, it may have been invalidated by a change to the machine. See License Properties for more information on invalid licenses.

If you click on a **serial number** in the **Current Licenses** tab and then click on the **Properties** button, the **License Details** dialog will be displayed:



The **License Details** dialog shows all of the internal modules that come with the selected product license. This provides a description of the module; the version number; the Module name; the count (number of licenses); the expiry date (when the module expires); and the license type. The license type will either be **Local**, if it is a fixed license, or **Float**, if it's a floating license. Evaluation licenses are time limited and they will have an expiry date, shown in this dialog. Full JetStream licenses do not expire and will therefore be identified as **Perpetual**.

Note

JetStream Bond is an annual subscription and therefore has an expiry date. The **Bond** module in the **License Details** dialog displays this expiry date. This is read by the NavisWorks License Manager and you will be prompted from 30 days prior to expiry, that your subscription needs renewing. If you choose not to renew your Bond subscription, **your license will continue to work as normal**, though you will no longer be eligible for support and upgrades. See the JetStream website, <http://www.navisworks.com/bond.htm> [<http://www.navisworks.com/bond.htm>] for more information on the JetStream Bond.

If you have renewed your Bond subscription, the NavisWorks Ltd. system will be updated accordingly. You will then need to **Request** your licenses again in order to update them on your machine, with this new information. As you are already using the licenses, you should not need to enter any of your details or serial numbers again, simply go to **License Wizard, Request License**, (provided your details are listed) click **Next** three times to get to the connection screen. Connect to NavisWorks Ltd. via your chosen method (see the section called license connection methods for more information).

The **User machine locking** text box on the **License Details** dialog is enabled if the product is a networked or floating product. It shows a semi-colon (;) separated list of machines that are allowed to use these licenses. If the product is networked, new machines are automatically added to the list on first connection, up to the maximum number of licenses available. It can also be used to restrict the use of floating licenses.

Finally, at the bottom of the **License Details** dialog there is a status for the selected license. If your license is invalid, there will be a reason for this stated here, which may provide an idea as to what is causing the problem. For example, **Invalid Block Machine ID : ID:123ABC+ET123456ABCDEF**. The **ID:** value is the CrypKey ID in the license file and the **ET:** value is the Ethernet ID in the license file (Note: CrypKey is the security software used by the NavisWorks License Manager). Both of these values (from the license file) must correspond to the **Machine ID** on the **Advanced** tab. If the CrypKey ID has changed on your machine (possibly due to reinstalling JetStream), then you may be able to **Recover** your license. If the Ethernet ID has changed, then the network card being used/detected now is different from that when first licensed. If you can use the original card again, the license should be validated. Once valid, you will then be able to **Return** your license, then **Request** it again with the new network card (or, if using multiple cards, disable Ethernet ID Locking before requesting the license. See License Manager Options).

3.1.2. Local Modules

Displays a list of modules that are installed and available locally on the PC, along with their version number, and expiry date (if any). Note that JetStream Bond is treated as a module and will have the Bond renewal date as the expiry date (see JetStream Bond).

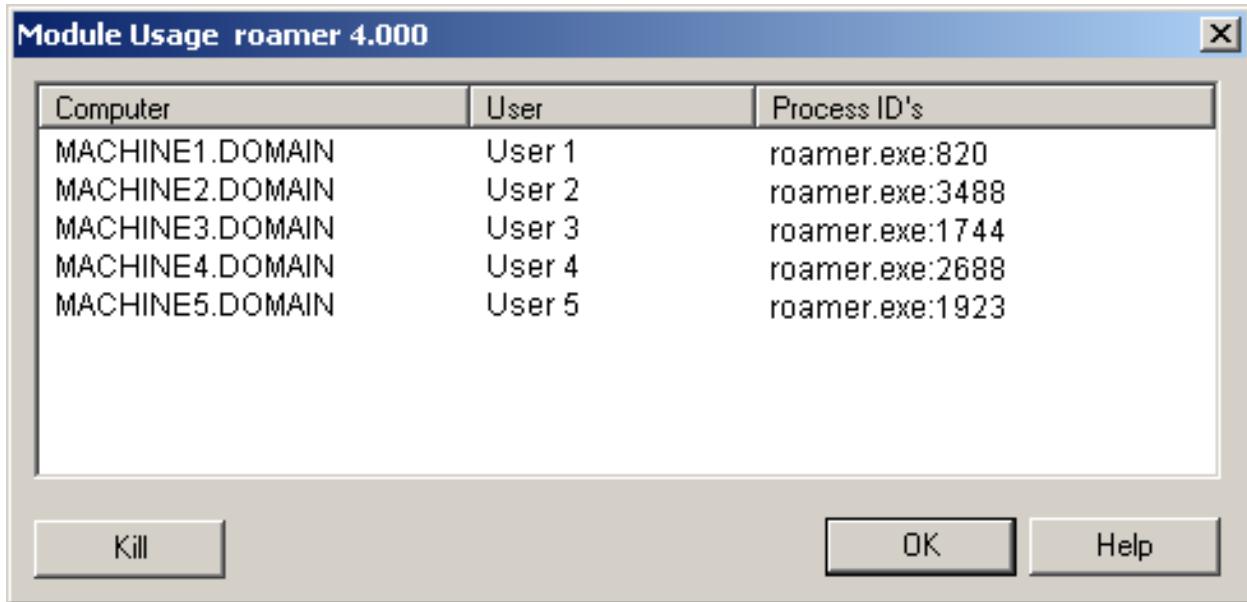
Each module has an icon to the left, signifying the status of that module. These statuses are the same as those on the **Current Licenses** tab.

3.1.3. Network Modules

Similar to Local Modules, this tab displays a list of modules that are being served from the server that the PC is pointing to (see the section called Client set up). The **Description** column advises which modules are being served; the **Version** column advises which version the licenses are; the **Total** column shows the total number of licenses that are installed on the server; the **Accessible Total** shows the total number of licenses that are available to you from your PC (this is not necessarily the number of licenses available to you now); The **Used Elsewhere** column shows the number of licenses that are currently in use by other users; and the **Used Here** column shows the number of licenses that are currently in use on your PC. The number of licenses currently available for you to use is the **Accessible Total** less the **Used Elsewhere** total.

Each network module has an icon to the left, signifying the status of that module. These statuses are the same as those on the **Current Licenses** tab.

If you click on a network module and then click the **Usage** button, the **Module Usage** dialog is displayed:



Computer	User	Process ID's
MACHINE1.DOMAIN	User 1	roamer.exe:820
MACHINE2.DOMAIN	User 2	roamer.exe:3488
MACHINE3.DOMAIN	User 3	roamer.exe:1744
MACHINE4.DOMAIN	User 4	roamer.exe:2688
MACHINE5.DOMAIN	User 5	roamer.exe:1923

This shows which PCs and users are currently using the selected module. This information can be seen from any PC that is connected to the License Server (see the section called Client set up). This is useful if you have run out of licenses and wish to tell somebody that you wish to take their license to use.

Killing a user's session

Administrators on the Server machine can use the **Module Usage** dialog to kill a users session and take back the licenses they were using.

To **Kill** a user's session:

1. As an Administrator on the server machine, go to the **Network Modules** tab of the License Manager.
2. Click on the **Description** of the license you require, then click the **Usage** button.
3. Click on the **Computer** whose licenses you wish to kill, then click the **Kill** button.
4. You will receive a warning message, advising that this will kill all licenses for this computer/user. Click **OK** to kill the licenses or **Cancel** to return to the License Manager

Note

If the user (whose session has just been killed) is still using JetStream at the time the licenses were killed, they will be advised that their connection to the server has been lost. See Lost connection with License Server for more information.

3.1.4. Advanced

This tab provides **Advanced** details an options, which should not be necessary for most users. Please see Section 4.3, "Advanced tab" for more details on this.

3.1.5. Startup Preferences

This tab shows which licenses will be collected when JetStream starts. For each module that is checked, JetStream will attempt to collect a license, looking first on the local machine for the license and then to any server that the PC is pointed to. If JetStream can't find a Roamer license either locally or from a server, then it will warn you of this when the program starts. You will not be advised if any of the plugin licenses cannot be collected.

This tab is most useful when collecting licenses from the server. If you want to use JetStream but not take a specific plugin license from the server, simply uncheck the modules you wish to leave for other users. For example, uncheck the Clash Detective module if you wish to leave this for others. The results of unchecking boxes in the startup tab don't become apparent until the JetStream application itself is restarted.

Alternatively, you can create desktop shortcuts that define your startup preferences, thereby enabling you to collect any combination of JetStream licenses.

If you look at the **Properties** of the standard JetStream desktop shortcut, the **Target** by default is pointing to "C:\Program Files\NavisWorks 5\roamer.exe".

The startup preferences are defined in the shortcut target as a combination of exclusion arguments. For example, the default (above) has *no* arguments and therefore excludes *no* license modules. To exclude a Clash Detective license (i.e. start JetStream, trying to collect all licenses except Clash Detective), the shortcut target would be "C:\Program Files\NavisWorks 5\roamer.exe" -nomodule lcodpclash.

The exclusion arguments for each license module are as follows:

- No Publisher license, **-nomodule nw_publish**
- No Presenter license, **-nomodule lcodplw**
- No Clash Detective license, **-nomodule lcodpclash**
- No TimeLiner license, **-nomodule lcodptimeliner**

Note

Roamer cannot be excluded as this is the base license required to start JetStream and any combination of its plugins.

Any combination of the above can be added as arguments to the default JetStream shortcut target. You can copy the default shortcut on your desktop (as many times as necessary), rename it and add arguments accordingly.

Below is an example of the shortcut for only Roamer:

```
Target = "C:\Program Files\NavisWorks 5\roamer.exe" -nomodule lcodpclash -nomodule nw_publish -nomodule lcodplw -nomodule lcodptimeliner
```

3.2. Reassigning networked licenses to other clients

If you have run out of networked licenses for all the client PCs that want to claim them from the server, then you need to delete one or more PC names from the list. To do this:

1. First, as the NavisWorks License server will need to be restarted, get everybody who is accessing the server to close JetStream and go to the **Services** dialog (from Administration Tools) and stop the **NavisWorks Licensing** service.
2. In the License Manager, go to the **Current Licenses** tab, click on the serial number of the networked product and click **Properties**.
3. There should be a semi-colon (;) seperated list of all the PCs that have access to the networked licenses in the text box called **User machine locking**. Delete the PC name that you want to prevent from accessing networked license.
4. Click **OK** on the dialog to close it and close the License Manager.
5. Restart the **NavisWorks Licensing** service in the Windows Services panel, on the server.
6. Before any other JetStream client requests licenses from the server, set up the client that couldn't previously access a license from the server, as described in Setting up a client.

3.3. Restricting use of floating licenses

If you have a small number of floating licenses for a particular product and a large number of JetStream users, you may want to restrict use of these floating licenses to a small group of users. To do this:

1. First, as the NavisWorks License server will need to be restarted, get everybody who is accessing the server to close JetStream and go to the **Services** dialog (from Administration Tools) and stop the **NavisWorks Licensing** service.
2. In the License Manager, go to the **Current Licenses** tab, click on the serial number of the floating product and click **Properties**.
3. There should be a a semi-colon (;) seperated list of all the PCs that have access to the floating licenses in the text box called **User machine locking**. If no names are listed, then the floating licenses are available to all users. If any names are listed, the floating licenses are only available to the listed PCs. You can list more PC names than you have floating licenses.
4. Click **OK** on the dialog to close it and close the License Manager.
5. Restart the **NavisWorks Licensing** service in the Windows Services panel, on the server.

3.4. Combining fixed and networked licenses

It is possible to combine fixed licenses and networked licenses if, for example, you have a docked laptop that needs to be taken on-site and still have access to your JetStream Roamer license. To achieve this, simply install and license those JetStream products that you need to be accessible at all times as fixed licenses. Then, to get access to any plugins from the server when the laptop is docked on the network, simply point the laptop to the server as described in Setting up a client. NavisWorks License Manager will collect the local fixed licenses first and try to collect any other licenses available from the server, as shown in the **Network Modules** tab and based on your **Startup Preferences**.

3.5. Refreshing the license manager

Most useful if working in a networked and floating license environment. Occasionally, the License Manager needs to be refreshed in order to get a snapshot of current license usage. To achieve the latest view of the licenses, simply click on **Refresh** from the **View** menu.

Chapter 4. Interesting Reading

This section covers some other interesting topics relating to the NavisWorks License Manager.

4.1. Setting the networker server port

You should only change the server port number if the default port number clashes with another port in use on your server. The default port number (3697) is registered with the Internet Assigned Names Authority (IANA) for use by the JetStream License Server, so is unlikely to clash with other services.

To change the default port number that the server uses to serve its JetStream licenses, do the following:

1. Make sure that no JetStream clients are connected to the server.
2. Stop the **NavisWorks Licensing** service from the **Services** dialog (from Administration Tools) on the server.
3. Open the NavisWorks License Manager and choose **Network server** from the **License Wizard** menu.
4. You should now be able to change the **Port Number**.
5. Click **Finish** to save the new Port number, or **Cancel** to return to the License Manager.
6. Restart the **NavisWorks Licensing** service from the **Services** dialog (from Administration Tools) on the server.
7. Make sure that any client PCs accessing licenses from the server now have the same port number that the server is using. This is changed from the client PC, again from the **Network Server** dialog under the **License Wizard** menu in the NavisWorks License Manager.

4.2. Situations when Connection with License Server is Lost

When using floating and networked licenses, Client machines must maintain a network connection with the License Server. Once a Client machine has collected a license from the License Server, the Server will send out a "heartbeat" every two minutes, to check the connection with the Client and whether the license is still in use.

If a situation arises, whereby the connection is lost, (whether there is a network problem or the license has been killed by the server) then the following may be expected:

- **On the License Server**, every two minutes the "heartbeat" will be sent out to the Client. If after eight minutes the connection has not been re-established, then the License Server will automatically take back the license.
- **On the Client machine**, if after two minutes a "heartbeat" has not been received from the License Server, a message will be displayed advising the connection has been lost and recommend you save any work. At this time you will continue to have the full functionality of the license. If after eight minutes

the connection has not been re-established, JetStream will be unlicensed and therefore automatically close.

4.3. Advanced tab

From this tab you can manage your JetStream license in detail.

4.3.1. Machine Information

The text boxes in the Machine Information section may be useful when resolving licensing issues and communicating licensing information with NavisWorks Ltd.

- **Machine name** is the name of the machine the license manager is running on, complete with its domain or workgroup name - this is its fully qualified domain name (FQDN).
- **Machine ID** is a series of coded characters used to uniquely identify the machine. The first part of this, **ID:**, is the CrypKey ID used for CrypKey ID Locking. The second part of this, **ET:**, is the Ethernet ID used for Ethernet ID Locking.
- **Crypkey ID expiry** is the date that a time-limited license will expire, for example when using JetStream during an evaluation, or grace period.
- **Crypkey site code** is the software code required by NavisWorks Ltd. for emergency licensing. See Emergency Licensing for more information.

4.3.2. License State

You can actually view the license file in Notepad by clicking on the **View License File** button. This will show all the licenses and codes that make JetStream work, but be warned that changing this file can seriously damage and invalidate your JetStream licenses. The **View Last Message** button is useful in case you need to re-view the last message information, such as if licensing fails and you need to pass on the information to your support provider.

4.3.3. Options

The **Display server console message window** can only be used on a JetStream License Server machine. Check this option if you wish a DOS window to open each time the **NavisWorks Licensing** service is started on the server. This DOS box can give useful information about what is actually happening in this background service. This may be of particular use when trying to identify a connection problem between the License Server and a Client machine.

Note

Closing the DOS window will **stop** the **NavisWorks Licensing** service (although the Windows Services panel will still report it to be started). If you don't require the message window any longer, uncheck the option in the **Advanced** tab, then manually **Restart** the **NavisWorks Licensing** service.

Crypkey ID locking and **Ethernet ID locking** are the two methods that JetStream uses to lock a license to a machine. Crypkey ID locking is the JetStream method of software locking and Ethernet ID locking is the JetStream method of hardware locking. At least one of these should be checked and by default, both

are and should remain checked.

If there is no Ethernet card inside your PC (or you use multiple cards), you cannot use Ethernet ID locking and should instead use only Crypkey ID locking. This will mean, though, that you will not be able to use the Recover license functionality if you were to lose your license later.

Sometimes the CrypKey service can be problematic to run on PCs of certain configurations, particularly when a RAID disk subsystem is in use. Un-checking this option and relying instead only on Ethernet ID locking can make it easier to install licenses in these circumstances. However, this will mean that you will not be able to Return licenses for transferring to another PC.

These options matter if your machine changes configuration for whatever reason between first installing your licenses and accessing them. Two specific situations are:

1. If you have to recover a license when, for example, a machine crashes, make sure that you have the same combination of Crypkey/Ethernet ID locking options checked as when you first licensed the machine.
2. If your laptop PC uses a docking station in the office that contains the Ethernet card and it cannot access the Ethernet card when undocked, then you should not check the Ethernet ID locking option when requesting your license, if you want to access the licenses when undocked.

4.4. Situations when Recovering and Returning Licenses Fails

As explained in the License Manager Options, it is important to use the same combination of Crypkey ID locking and Ethernet ID locking when first licensing your machine as when recovering or returning licenses. In addition, the following conditions should be understood:

- If you only use Crypkey ID locking, then you cannot recover a license. Contact <support@navisworks.com> if you need to recover a license that is locked using only Crypkey ID locking.
- If you only use Ethernet ID locking, then you cannot return a license. Contact <support@navisworks.com> if you need to return a license that is locked using only Ethernet ID locking.

4.5. Emergency Licensing

In certain situations it may not be possible to license your JetStream product by any of the standard methods. There is therefore, an emergency licensing procedure that can be performed by NavisWorks Ltd. This method will only be used as a last resort.

Using the **CrypKey Site Code** from the **Advanced** tab on your PC, NavisWorks Ltd. will generate and return a **CrypKey Site Key**. Enter this into the **Emergency licensing** box and then click the **License** button. This will unlock the licenses on your PC.

Part II. JetStream Roamer

User Manual

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Chapter 5. Overview

The basis of JetStream Roamer is its ability to walk through any size model in real time. JetStream 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 JetStream 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 JetStream 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.

When working with truly large "supermodels" in JetStream, you will require a sufficient amount of RAM to load and review the data. JetStream employs JetStream technology which optimizes the usage of the available RAM. Before running out of memory, JetStream will page unnecessary data to the hard disk, freeing up space for loading to continue. JetStream technology also enables the user to commence navigating the supermodel, before it has completely loaded into memory.

JetStream is large address aware, utilizing any additional memory assignment following the 3GB switch available on Windows XP systems.

JetStream 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, clash detection and construction sequencing. 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, JetStream, Roamer**. The following chapters will describe the interface in more detail.

JetStream 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 21, *Getting Help* or alternatively, go to the JetStream website at www.navisworks.com [http://www.navisworks.com].

Chapter 6. File Management

With JetStream 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 7, *Converting Files* for more detailed information on these file formats and their options. File management all happens with the **File** menu and the **Standard** toolbar.



6.1. File Menu

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

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


6.2. New Files

This option resets JetStream and closes existing files.

To create a new file

- Go to **File, New**

or

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

6.3. Refreshing Files

When working in JetStream, it is possible that others may be working on the CAD files you are currently reviewing. For example, if you are coordinating various disciplines on a project, then you may have an overall .nwf file referencing numerous design files. During the iterative stages of the project, any member of the design team could potentially be modifying their CAD files. To ensure the data you are reviewing is current, JetStream provides a refresh function to reload any files that have been modified since commencing the review session. This feature does not reload all of the files you have loaded, merely those modified since last opening them.

To refresh your scene with the latest versions of the currently loaded model files

- Go to **File, Refresh...**

or


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

6.4. Opening Files

With JetStream Roamer you can open a wide variety of native CAD file types without having to have the CAD application on your machine. See Chapter 7, *Converting Files* 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.

6.5. Opening Files via URL

With JetStream Roamer you can open JetStream published .nwd files via the Internet. Having uploaded your .nwd file to a web server, this file can then be opened directly from within JetStream. Utilizing JetStream technology, it will not be necessary for the entire file to be downloaded before navigation can commence - between 10% and 50% will be sufficient for this, depending on the file structure. (The greater the hierarchical structure of the model, the closer to 50% will be required for navigation to commence. Similarly, the lesser the hierarchical structure of the model, the closer to 10% will be required).

To open a file via a URL:

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

6.6. Appending Files

JetStream 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 JetStream Roamer supports. (See Chapter 7, *Converting Files* 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 17.10, “Units Options” for more detailed information). However, once a file is loaded, you can change its unit scaling using the **Edit, File Units and Transform** function. See Section 11.10, “Setting a File's Units and Transform” for more information.

The combined set of models may be published as a single JetStream .nwd file using the JetStream Publisher plugin. These models can then be viewed with NavisWorks Freedom™ free viewer. See Section 22.1, “Publishing from Roamer” 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 JetStream specific information. See Section 6.8, “Saving Files” 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.

6.7. Merging Files

When merging multiple .nwf files, that each comprise the same reference files, JetStream will only load a single set of the combined models, along with all review markup (such as tags, viewpoints or comments) from each .nwf file. Any duplicate geometry or markup will be removed when merged. See Section 7.1.1, “NWF Files” for more information on .nwf files.


To merge a file:

- **Open** the first file to be merged, (see Section 6.4, “Opening Files” for information on how to do this).

Then

- Go to **File, Merge...**

or

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

Finally

- Browse to and select the file, or files, to be merged.

Note

The standard **Open** dialog use of **Shift** and **Control** keys allows multiple files to be selected and merged with the currently loaded model.

Merging TimeLiner Data

If a TimeLiner license is available, and two or more merged files contain TimeLiner data, limited merging can be done with this data. Three scenarios are handled.

- If the two TimeLiner data sets are identical, then merging of files can occur without issue.
- If the two TimeLiner data sets are completely unrelated, merging of data in this context will not be successful
- If the two TimeLiner data sets contain the same Primary link then the data set with the most recent link (i.e. the newest file date) is chosen over the other. If the Primary links are different, then the data set with the highest number of tasks will be used, and links will be re-attached wherever possible.

For more information on TimeLiner, see the TimeLiner book.

6.8. Saving Files


When you have finished reviewing a model or a set of models and are exiting JetStream, you are prompted to save. When saving to a JetStream .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 6.10, “ Publishing Files ” 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 JetStream without saving.

6.9. Saving and Renaming Files

This is exactly the same as the **Save** function (see Section 6.8, “ Saving Files ”, 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 JetStream without saving.

6.10. 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 JetStream Publisher plugin.

See Section 22.1, “ Publishing from Roamer ” for more information.

6.11. Printing

You can print a hard copy of the current viewpoint to any printer or plotter.

6.11.1. Printing the Current Viewpoint

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

Note


If you would prefer to export an image for printing, see Section 6.15.2, “Exporting an image” for more information.

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 JetStream without printing anything.

Note

The maximum image size is 2048x2048 pixels.

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

6.11.2. 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 JetStream.

6.11.3. 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 JetStream.

6.12. Deleting Files

This command deletes the selected files from the scene. It is only available when more than one file is appended in the scene.

Note

You cannot delete files from within a "published" NavisWorks .nwd file (see Section 6.10, "Publishing Files"). 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.

6.13. Emailing Files

JetStream 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 JetStream

- 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, JetStream 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 JetStream can find the files this way.

If JetStream 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.

6.14. Importing Files

The import option inputs Intergraph PDS review data, including:

- PDS Tags (.tag)
- PDS Display Sets (.dst)

It is also possible to import data that has been exported from previous JetStream sessions, including:

- Viewpoints XML (.xml)
- Search XML (.xml)
- Search Set XML (.xml)
- Clash Test XML (.xml)

See Section 6.15, “Exporting Files ” for more information on exporting data from JetStream.

Note

Clash test .xml files can only be imported if you have a valid license for the Clash Detective plugin. See the Clash Detective user guide for more information on importing clash test criteria.

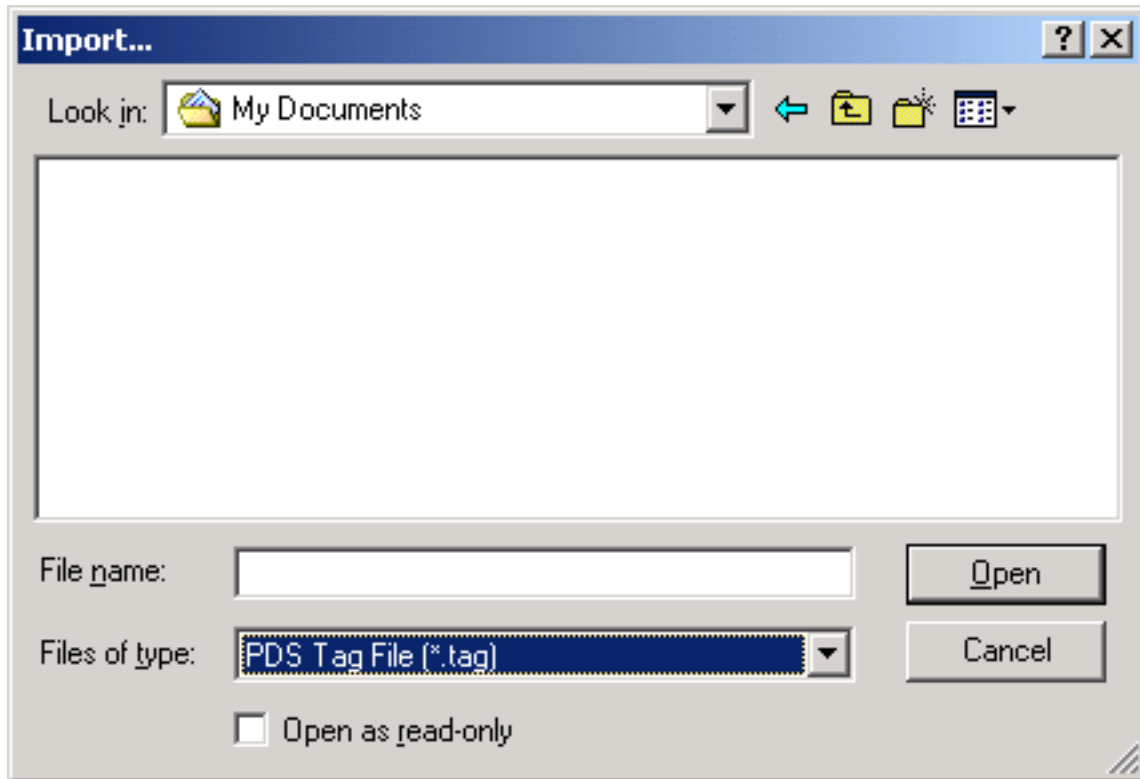
6.14.1. Importing PDS Tags

Tag information from Intergraph PDS contains a unique ID, saved viewpoint and corresponding comments. Tag information created in JetStream may also be exported to be used in Intergraph PDS. See Section 6.15, “Exporting Files ” for more information.

Importing PDS tag files

1. From the **File** menu, choose **Import, PDS Tags...**

The **Import** dialog is displayed:



2. Locate and **Open** the .tag file to import the PDS tag data, or click **Cancel** to return to JetStream without importing a file.

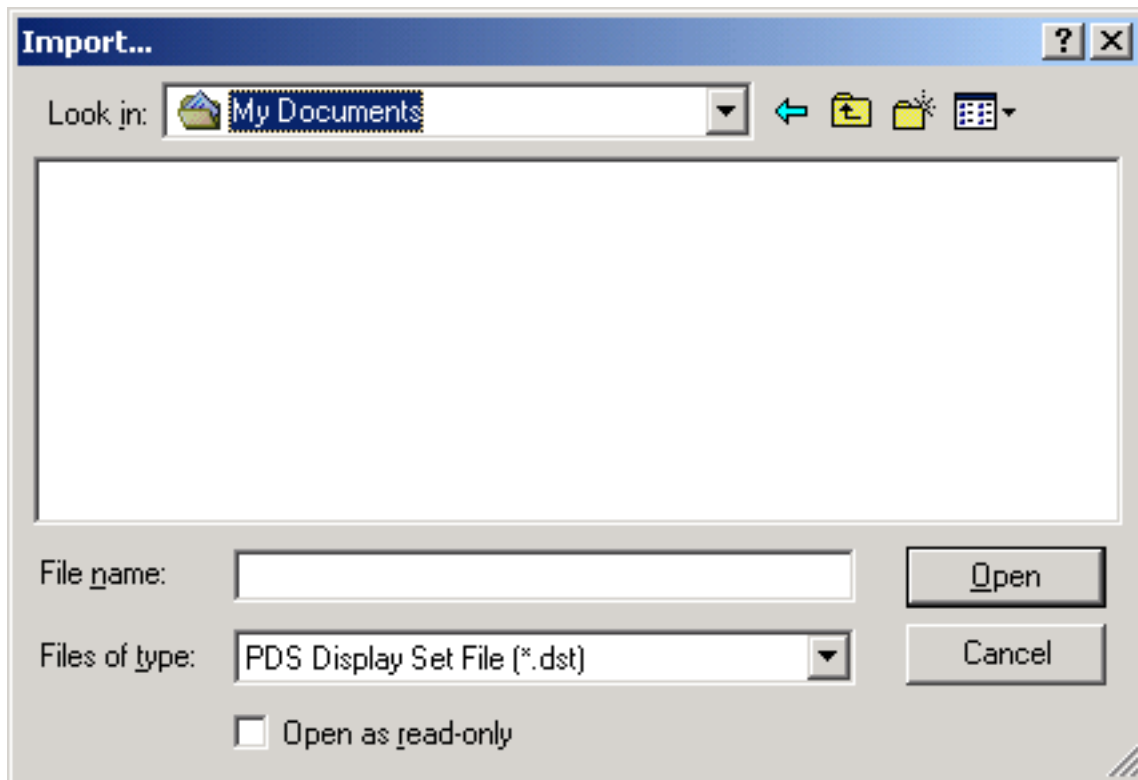
6.14.2. Importing PDS Display Sets

Display sets from Intergraph PDS contain detailed criteria, defining item selections. When imported into JetStream, .dst files create search sets in the Selection Sets control bar. See Section 9.3, " Selection and Search Sets " for more information on search sets.

Importing PDS display sets to create search sets

1. From the **File** menu, choose **Import, PDS Display Sets...**

The **Import** dialog is displayed:



2. Locate and **Open** the .dst file to import the PDS display sets, or click **Cancel** to return to JetStream without importing a file.

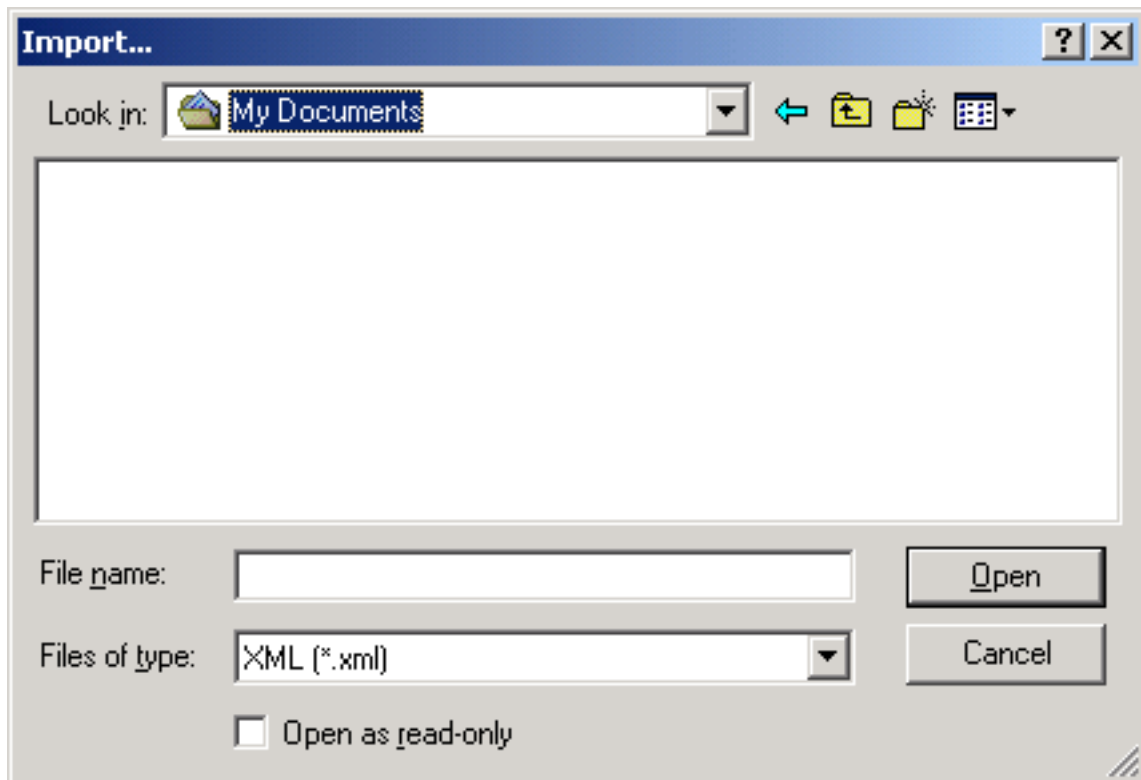
6.14.3. Importing Viewpoints XML

Viewpoints can be imported into JetStream via an .xml file, enabling you to bring viewpoints into the current scene from another model file. For example, if you are working on different versions of the same model, you can save viewpoints in one version of the file, export them and then import them into the other version. See Section 13.1, " Saving Viewpoints " for more information on saving viewpoints and Section 6.17, " Exporting Viewpoints " for more information on exporting viewpoints to an .xml file.

Importing viewpoints and associated data

1. From the **File** menu, choose **Import, Viewpoints XML...**

The **Import** dialog is displayed:



2. Locate and **Open** the viewpoints .xml file to import the viewpoints, or click **Cancel** to return to JetStream without importing a file.

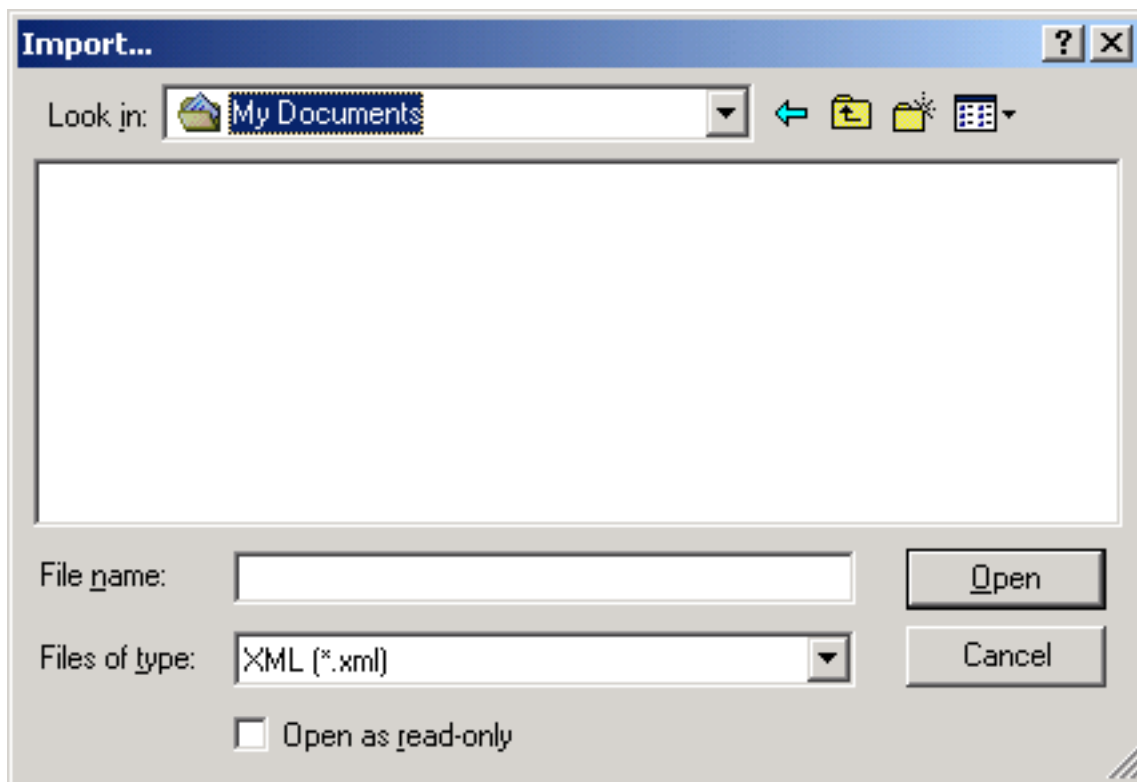
6.14.4. Importing Search XML

Search criteria can be imported into JetStream which populates the Find Items control bar. The search can then be run on the current model, finding any items that match the specific criteria. See Section 10.2, “Finding Items” for more information on searching the model for items based on their properties.

Importing search criteria into the Find Items control bar

1. From the **File** menu, choose **Import, Search XML...**

The **Import** dialog is displayed:



2. Locate and **Open** the search .xml file to import the search criteria into the Find Items control bar, or click **Cancel** to return to JetStream without importing a file.

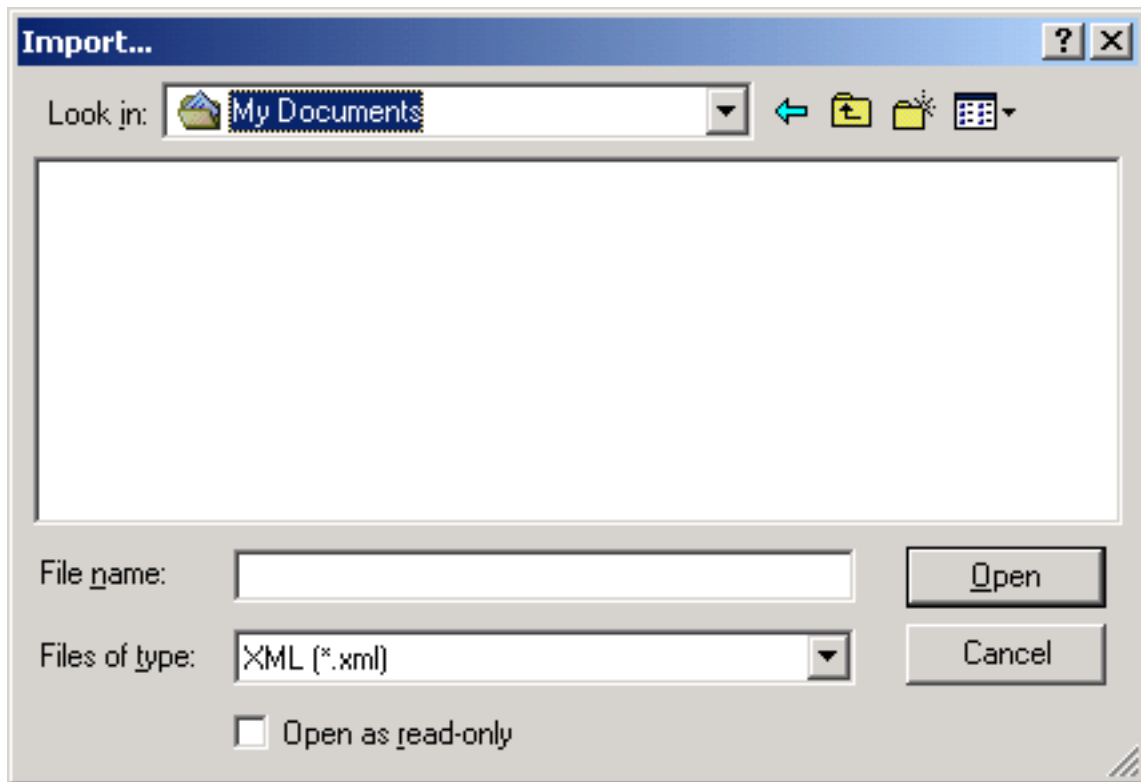
6.14.5. Importing Search Sets XML

Search sets can be imported into JetStream which populates the Selection Sets control bar with pre-defined search sets. Selecting an imported search set will define the current Find Items criteria and search the current model accordingly. See Section 10.2, " Finding Items " for more information on searching the model for items based on their properties.

Importing search sets into the Selection Sets control bar

1. From the **File** menu, choose **Import, Search Sets XML...**

The **Import** dialog is displayed:



2. Locate and **Open** the search sets .xml file to import the search sets into the Selection Sets control bar, or click **Cancel** to return to JetStream without importing a file.

6.15. Exporting Files

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

- Piranesi EPix format (.epx)
- Windows Bitmap (.bmp)
- Portable Network Graphics format (.png)
- JPEG format (.jpg)
- Rendered image formats (various)

Note

Rendered image files can only be exported if you have a valid license for the Presenter plugin. See the Presenter user guide for more information on exporting rendered images.

It is also possible to export an animation, or a TimeLiner sequence to:

- Windows AVI (.avi)

Or, as a sequence of individual frames to:

- JPEG format (.jpg)
- Portable Network Graphics format (.png)
- Windows Bitmap (.bmp)

Note

TimeLiner sequences can only be exported if you have a valid license for the TimeLiner plugin. See the TimeLiner user guide for more information on exporting TimeLiner sequences.

The export option additionally outputs a variety of review data, including:

- PDS Tags (.tag)
- Viewpoints XML (.xml)
- Current Search XML (.xml)
- Search Sets XML (.xml)
- Clash Test XML (.xml)
- Viewpoint Report HTML (.html)

Note

Clash test .xml files can only be exported if you have a valid license for the Clash Detective plugin. See the Clash Detective user guide for more information on exporting clash test criteria.

The export option outputs a number of additional review file types:

- Autodesk DWF (.dwf)
- Google Earth KML (.kml)

6.15.1. 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. Use the **Browse...** button to locate a destination and enter a new filename to export, if you wish to change from the existing filename and location.

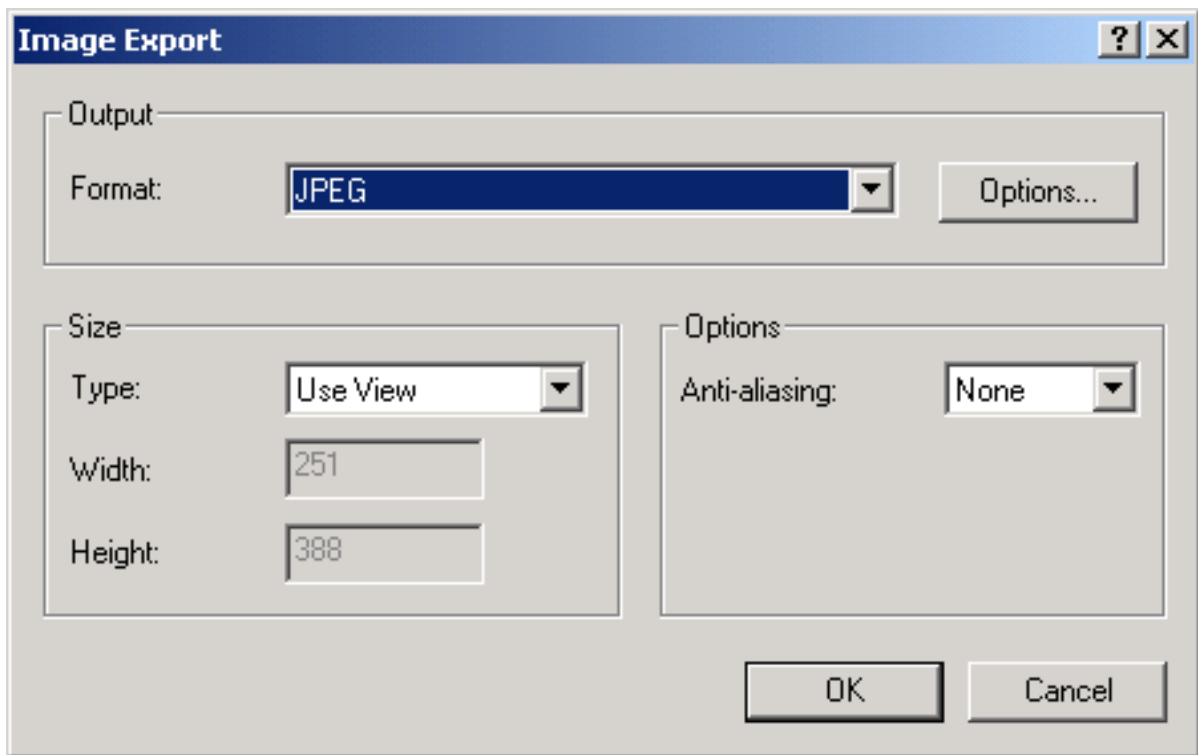
3. Select the sizing options for the file to be exported. (See Section 6.15.4, “ Controlling the size of an image ” for more details).
4. Click **Save** to export the file, or **Cancel** to return to JetStream.

6.15.2. Exporting an image

Exporting to a Bitmap, PNG or JPEG

1. With the view to be exported in the main navigation window, from the **File** menu choose **Export, Image....**

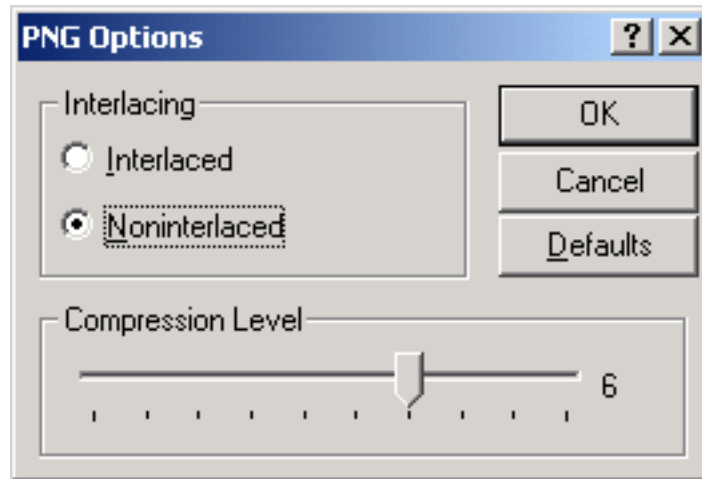
The **Image Export** dialog box is displayed:



2. Select the format of the image you wish to export:

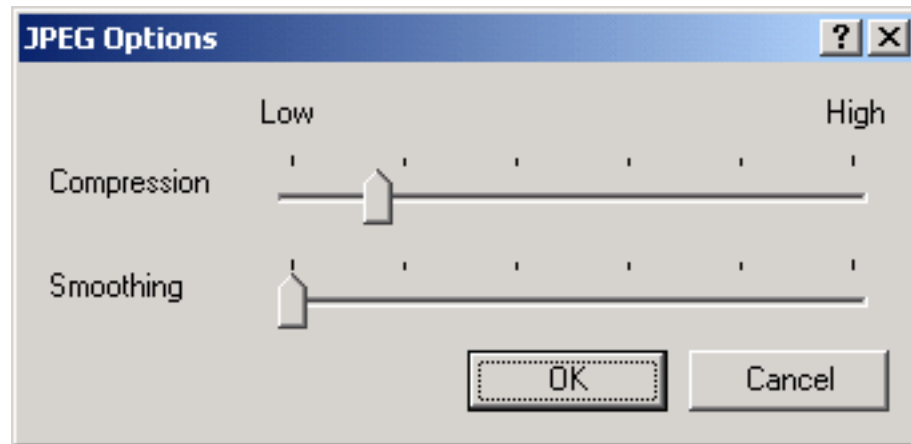
- Windows Bitmap
- Portable Network Graphics (PNG)

Select **Interlacing** and **Compression** options from the **PNG Options** dialog box:



- JPEG

Select **Compression** and **Smoothing** options from the **JPEG Options** dialog box:



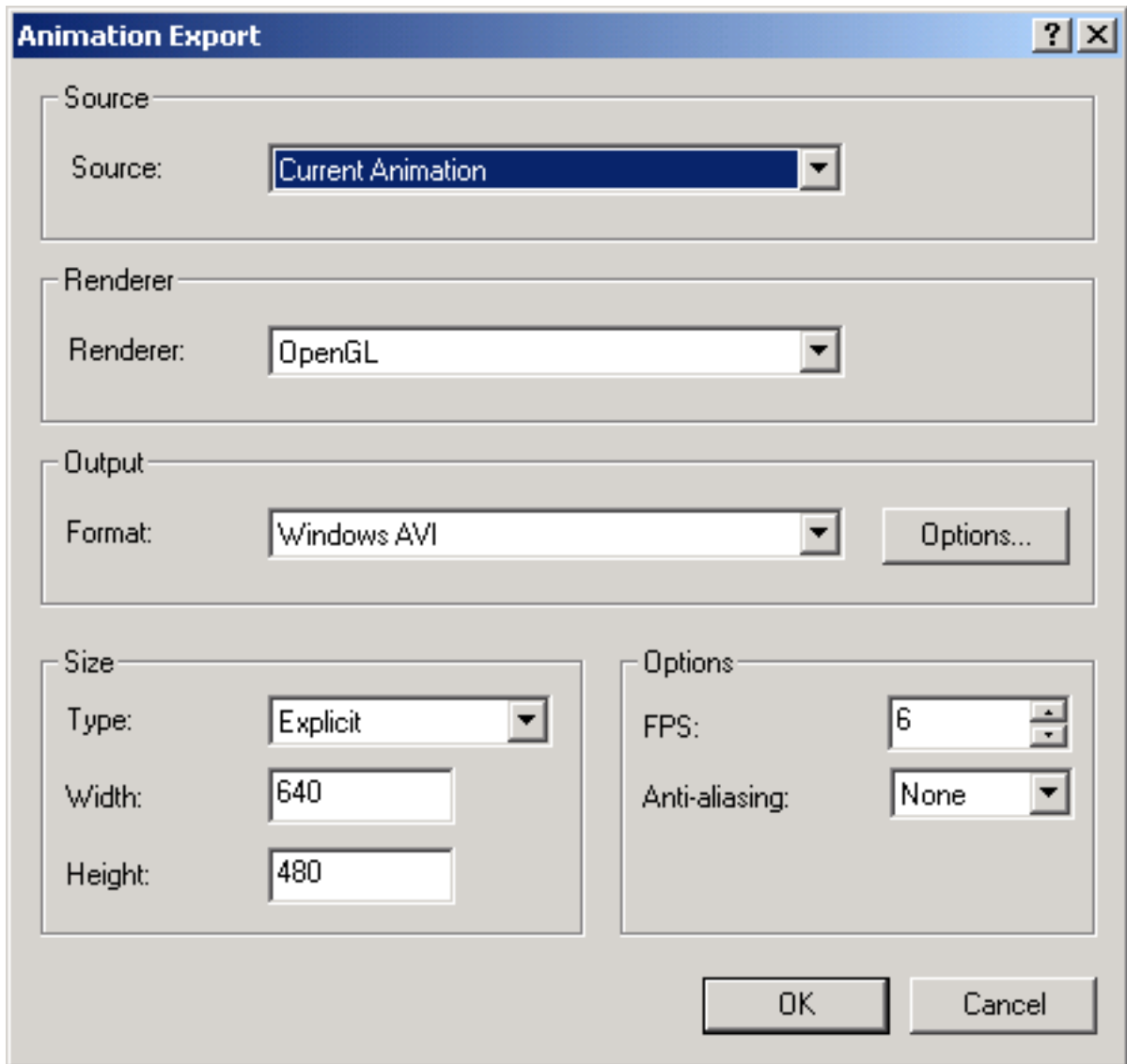
3. Select the sizing options for the file to be exported. (See Section 6.15.4, “Controlling the size of an image” for more details).
4. Click **OK** to continue, or click **Cancel** to return to JetStream without exporting an image.
5. Enter a new name and location to store the file.
6. Click **Save** to export the file, or **Cancel** to return to JetStream.

6.15.3. Exporting an animation

Exporting an animation to an .avi file, or a sequence of image files

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

The **Animation Export** dialog box will be displayed:



2. Select the **Source** from which you wish to export the animation.

Note

This can either be the Roamer default, **Current Animation** (the currently selected animation), or, provided that you have a valid license for the TimeLiner plugin, a **TimeLiner Simulation**.

3. Select the **Renderer** with which you wish to render the exported animation.

Note

This can either be the Roamer default, **OpenGL**, or, provided that you have a valid license for the Presenter plugin, **Presenter**.

4. Select the **Format** in which you wish the output to be exported in:

- Windows AVI

Click **Options...** to select the **Video Compression** you require.

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.

- JPEG (sequence of static images, taken from individual frames)

Click **Options...** to set the **Compression** and **Smoothing** levels you require.

- PNG (sequence of static images, taken from individual frames)

Click **Options...** to set the **Interlacing** and **Compression** levels you require.

- Windows Bitmap (sequence of static images, taken from individual frames)

5. Select the sizing options for the file to be exported. See Section 6.15.4, “Controlling the size of an image” for more details.

For animations, you should also enter the number of frames per second (FPS) you require.

6. Click **OK** to continue, or **Cancel** to return to JetStream.

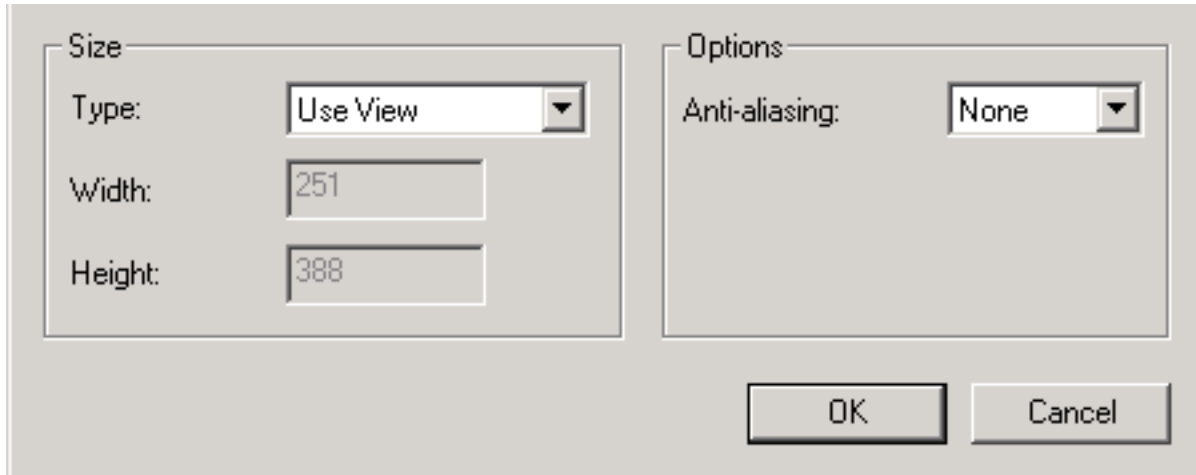
7. Enter a new name and location to store the file(s).

Note

For image sequences, the name will contain the first integer of a 'counter', e.g. 001. Subsequent frames will be automatically incremented by one, e.g. 002, 003, 004 and so on.

8. Click **Save** to export the file(s), or **Cancel** to return to JetStream.

6.15.4. 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 image, 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, for Roamer OpenGL output.

6.16. Exporting PDS Tags

1. From the **File** menu, choose **Export, PDS Tags...**
2. Enter a new filename and location, if you wish to change from those suggested.
3. Click **Save** to export the .tag file, or **Cancel** to return to JetStream.

6.17. Exporting Viewpoints

Viewpoints can be exported from JetStream to an .xml file. These viewpoints contain all associated data, including camera positions, sections, hidden items and material overrides, redlines, comments, tags and collision detection settings.

Once the viewpoint data is exported to this text-based file format, it can either be imported into other JetStream sessions, or it can be accessed and used in other applications. For example, you may want to set up the same viewpoints in your CAD application.

1. From the **File** menu, choose **Export, Viewpoints XML...**
2. Enter a new filename and location, if you wish to change from those suggested.
3. Click **Save** to export the .xml file, or **Cancel** to return to JetStream.

6.18. Exporting Current Search

The search criteria specified in the Find Items dialog box can be exported to an .xml file. This can then be imported into other JetStream sessions. For example, if you have specified a complicated search criteria, containing various logic statements, that relates to all projects you work on, then this feature allows you to specify it once and use it on all projects.

1. From the **File** menu, choose **Export, Current Search XML...**
2. Enter a new filename and location, if you wish to change from those suggested.
3. Click **Save** to export the .xml file, or **Cancel** to return to JetStream.

6.19. Exporting Search Sets

Saved search sets can be exported from JetStream as an .xml file. These can then be imported into other JetStream sessions and re-used. For example, if you have a number of generic searches that you perform on all of your projects, this feature allows you to specify the searches once and use them on all projects.

1. From the **File** menu, choose **Export, Search Sets XML...**
2. Enter a new filename and location, if you wish to change from those suggested.
3. Click **Save** to export the .xml file, or **Cancel** to return to JetStream.

6.20. Exporting Viewpoints Report

An .html file can be exported containing a JPEG of all of the saved viewpoints and associated data, including camera position and comments.

Note

To customize the appearance or layout of the html file, you will need to edit the `viewpoints_report_lang.xsl` file, where `lang` is a code representing your language. The installed file is located in the `stylesheets` subdirectory of the JetStream install directory. You can copy the edited file to the `stylesheets` subdirectory of any of the JetStream search directories. See Section 17.12, “ Search Directories ” for more information.

1. From the **File** menu, choose **Export, Viewpoints Report HTML...**
2. Enter a new filename and location, if you wish to change from those suggested.
3. Click **Save** to export the report, or **Cancel** to return to JetStream.

6.21. Exporting to Autodesk DWF

Autodesk DWF files can be exported from JetStream if a valid Publisher license is available. The exporter creates a .dwf file containing:

- All geometry
- All materials
- Per-vertex colors
- Properties (where available)

To export a DWF file:

1. From the **File** menu, choose **Export, Autodesk DWF...**
2. Enter a new filename and location, if you wish to change from those suggested.
3. Click **Save** to export the file, or **Cancel** to return to JetStream.

6.22. Exporting to Google Earth KML

Google Earth KML files can be exported from JetStream. The exporter creates a compressed KML file with the extension .KMZ and supports the export of:

- Triangles
- Lines
- Materials (colour and flat transparency only)
- Viewpoints (adjustments may occur due to Google Earth limitations)
- Model Hierarchy
- Hyperlinks (currently only URLs work correctly in Google Earth)

1. From the **File** menu, choose **Export, Google Earth KML....** This brings up the following dialog.

KML Options

Options

Export model relative to terrain height

Collapse on export:

Limit number of polygons

Enable

Number of polygons:

Origin

	Longitude (°)	Latitude (°)	Altitude (m)	
Google Earth	-1.55971211056774	53.37260121243420	0.0000000000000000	Import...
JetStream	X (m)	Y (m)	Z (m)	Pick...
	23.860	-45.189	-121.754	

Second reference point:

Enabled

	Longitude (°)	Latitude (°)	Altitude (m)	
Google Earth	-1.55949849612061	53.37265556134116	0.0000000000000000	Import...
JetStream	X (m)	Y (m)	Z (m)	Pick...
	1.000	0.000	0.000	

Third reference point:

Enabled

	Longitude (°)	Latitude (°)	Altitude (m)	
Google Earth	-1.55978958050800	53.37240640022555	0.0000000000000000	Import...
JetStream	X (m)	Y (m)	Z (m)	Pick...
	0.000	0.000	1.000	

OK Cancel

2. Select **Export model relative to terrain height** to put Google Earth in a mode where all heights are measured from the surface of the ground. When this is off all heights are measured from sea-level.

Note

When positioning a model relative to sea level, the height of the Google Earth reference points must also be measured relative to sea level. When positioning a model relative to the ground, the Google Earth reference points must be measured relative to the ground.

Google Earth always places new placemarks at an altitude of zero, irrespective of whether that is relative or absolute.

3. **Collapse on export** allows different levels of collapsing parts of the model hierarchy in the exported file.
 - **None** ensures the whole heirarchy is exported
 - **All objects** collapses everything into one node

- **Files** collapses each file into one node
 - **Layers** collapses each layer into one node
4. **Limit number of Polygons** should be enabled to restrict the amount of geometry exported into the output file. Geometry is selected on the basis of taking the most obvious objects in preference to the fine detail. If the exported file is too large for Google Earth to display, try enabling this and reducing the number of polygons. **View, Scene Statistics** in JetStream shows the number of triangles and/or lines in the current project. By setting a polygon limit you are choosing to export only some of these items.

Note

Google Earth's ability to handle large numbers of polygons is far more limited than JetStream. Hence it is worth noting that currently Google Earth will consider 1,000,000 polygons as being a big model.

5. The **Origin** position values are the first pair of reference points on the Google Earth surface, and must always be defined. The JetStream reference point will always be positioned to exactly overlay the Google Earth reference point.

Second and **Third** reference points can be used, and if enabled then the position and orientation of the model can be more accurately defined.

6. Use the **Import** buttons to read-in saved placemark locations from KML files exported from Google Earth.

The Origin **Import** button differs slightly from the other two; if the KML file contains multiple placemarks, this button will offer the user the choice of importing second and third reference points if available. The other two buttons will only import a single reference point.

7. The **Pick** buttons allow the reference point locations to be selected in the main 3D view.

These points must be visible in the main 3D view prior to exporting, as once the KML Options dialog is open you will not be able to navigate before picking.

Note

You may wish to use **View, Split** to split the main 3D view enabling you to have separate views of each reference point.

6.23. Quitting JetStream

Quitting JetStream

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

Chapter 7. Converting Files

With JetStream 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 JetStream include .dwg, .dgn, .dxf and Inventor. For a full list of CAD files that JetStream 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 JetStream 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 JetStream 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, JetStream 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 JetStream Roamer but there are exporters available to export to the NavisWorks .nwc file format from these applications. See Section 7.2, "File Exporters" for more details.

7.1. File Readers

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

- .dwg
- Bentley AutoPLANT .dwg, .mdb
- .dxf
- .dwf
- .3ds
- .dgn
- .man
- .iges
- .step
- Inventor parts & assemblies
- VRML world files (.wrl;.wrz)
- Riegl Scan data (.3dd)
- Faro Scan data (.fls, .flw, .iQscan;.iQmod;.iQwsp)
- Leica Scan data (.pts;.ptx)
- Z+F Scan data (.zfc;.zfs)
- ASCII Laser Scan data (.asc;.txt)
- STL Stereolithography data (.stl)

- AVEVA Review (.rvm)
- IFC files (.ifc)
- Sketchup (.skp)

7.1.1. NWF Files

.nwf files can be saved by JetStream 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 JetStream 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.

7.1.2. NWD Files

.nwd files are files published by JetStream Publisher and are snapshots of the model at a certain time. See Section 22.1, “Publishing from Roamer” for more information on this.

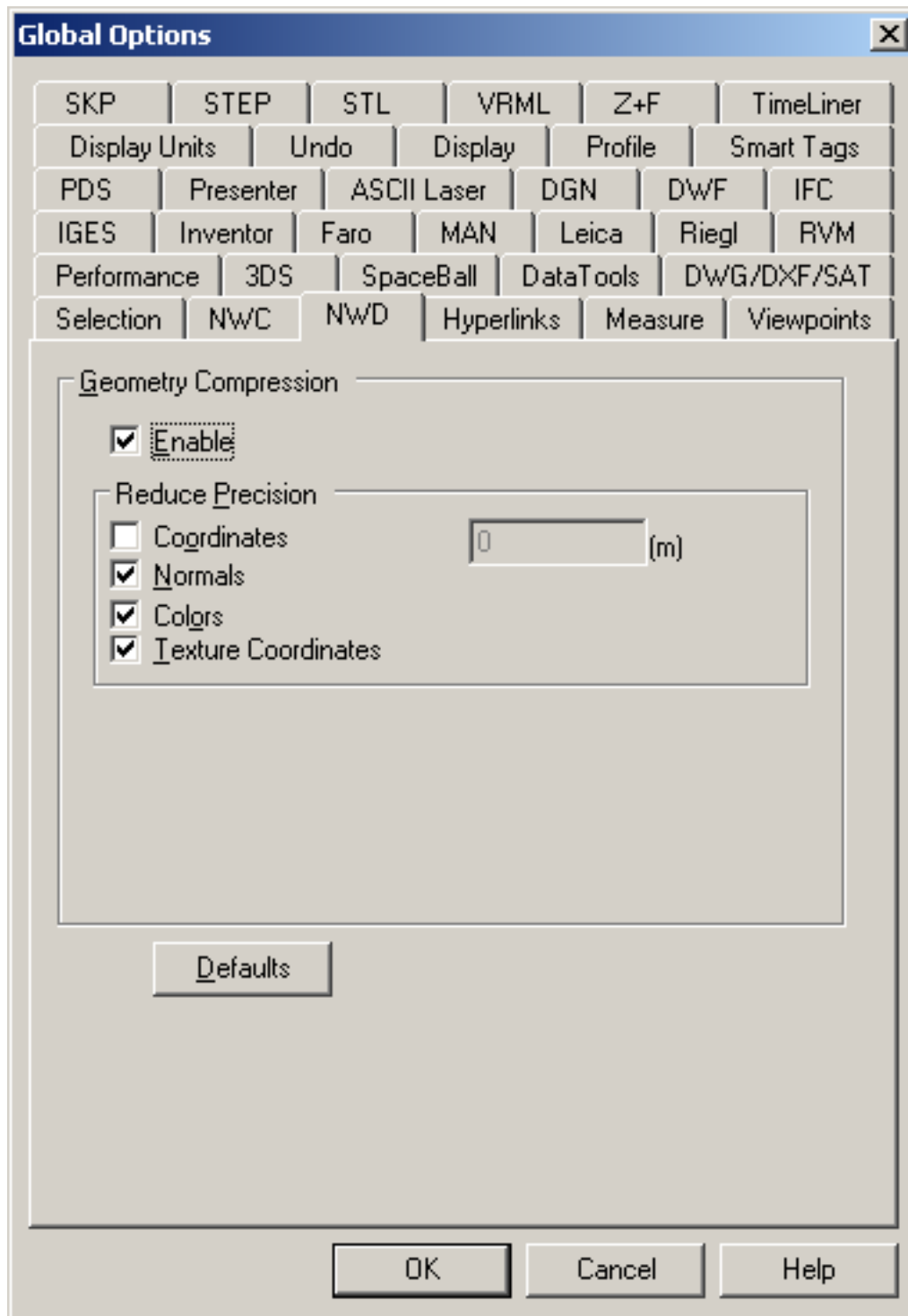
NWD Options

JetStream allows you to enable and disable geometry compression and select whether the precision of certain options should be reduced when saving (or publishing) .nwd files. Geometry compression results in less memory being required and therefore smaller .nwd files.

Setting NWD options

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

The NWD dialog box is displayed.



2. Uncheck the **Enable** check box if you wish to have no geometry compression.
3. Check the **coordinates** check box if you wish to reduce the precision of coordinates.

Enter the value to which you wish coordinates to be precise to. The larger the value, the less precise coordinates will be and the smaller the .nwd will be.

4. Check the **normals** check box to reduce the precision of normals.
5. Check the **colors** check box to reduce the precision of colors.
6. Check the **texture coordinates** check box to reduce the precision of texture coordinates.
7. Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

7.1.3. NWC Files

Cache files (.nwc) are used when reading native CAD files, such as files from AutoCAD or MicroStation. By default, when JetStream Roamer opens a native CAD file, it first checks in the same directory whether there is a JetStream 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 JetStream will open this file instead as it has already been converted to JetStream 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 JetStream 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 7.2, “ File Exporters ” for more information on why you might want to use the .nwc file exporters, which CAD applications you can export from and how.

NWC Options

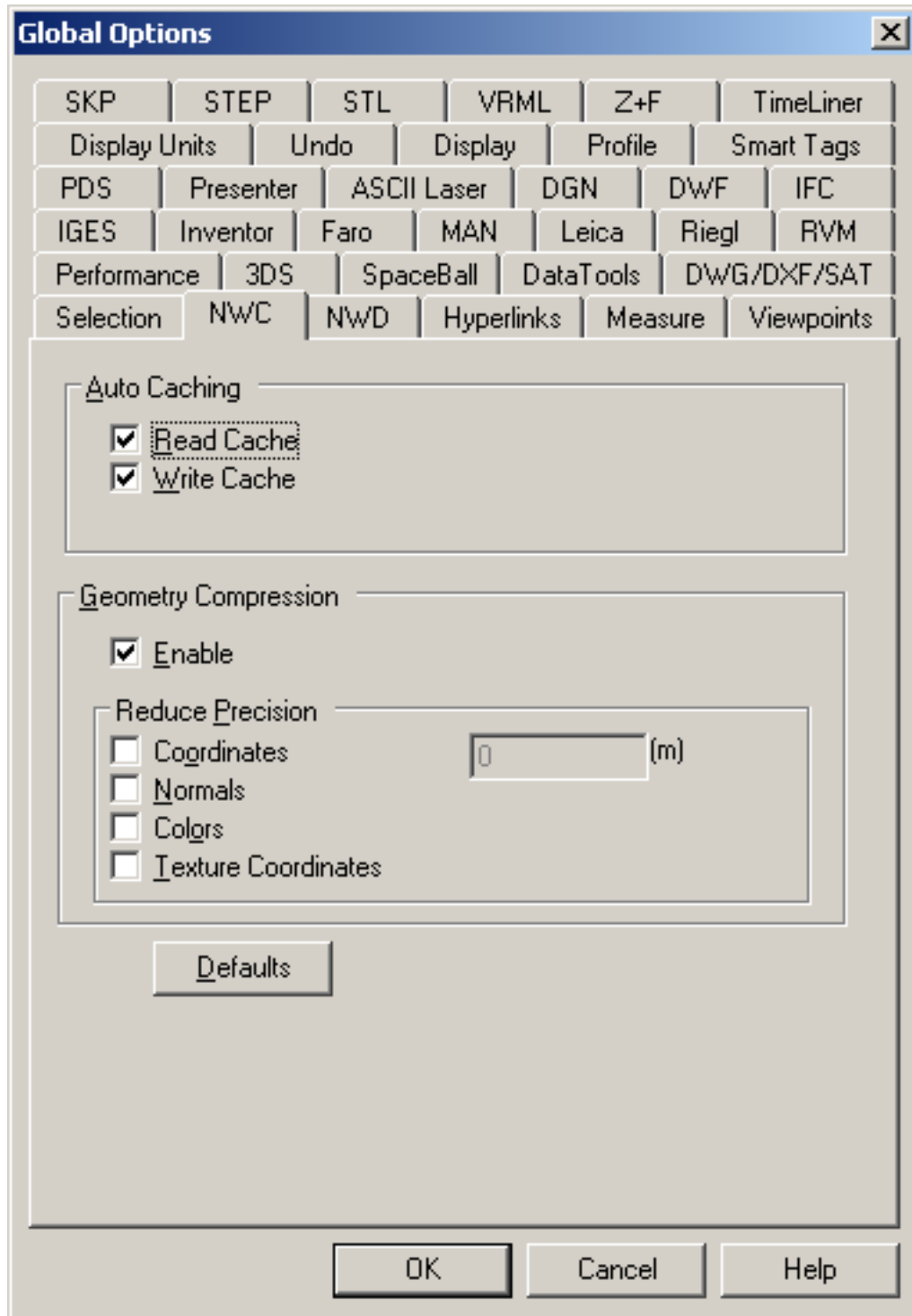
JetStream allows you to enable and disable the reading and writing of cache files.

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 JetStream 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 NWC options

1. Go to **Tools, Global Options**, and select the **NWC** 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. Uncheck the **Enable** box if you wish to have no geometry compression when .nwc files are written.
5. Check the **coordinates** box if you wish to reduce the coordinate precision.
Enter the value to which you want coordinates to be precise to.
6. Check the **normals** box...
7. Check the **colors** box...
8. Check the **texture coordinates** box...
9. Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

7.1.4. DWG and DXF Files

JetStream 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 ObjectDBX 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 7.2.1, " AutoCAD .nwc Exporter " for more details.

Note

The reader supports files from all products based on AutoCAD 2007 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.
- Textures (requires a valid JetStream Presenter license).
- File properties.

Unsupported Entities

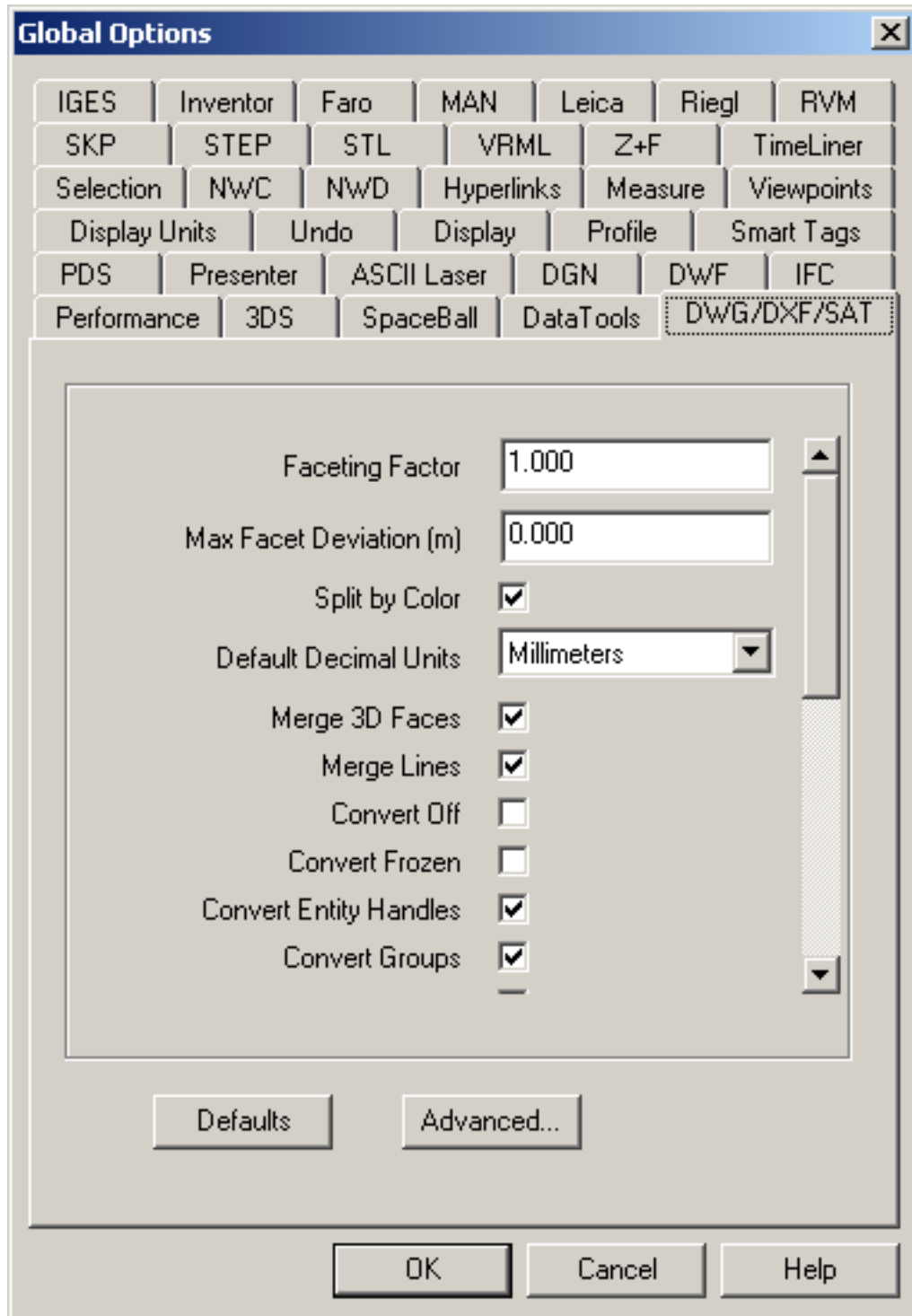
- Lights.
- Splines.
- Multi-lines.
- Linetypes.
- Dimensions and leaders.
- Raster bitmaps.
- Text or multi-line text.
- Construction lines (xlines and rays).
- Hatching.

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 JetStream will facet rounded entities and therefore the smoother they will appear. See Faceting Factor for more information.
3. Enter the **Max Facet Deviation**. This will facet entities to within the specified tolerance. See Max

Facet Deviation for more information.

4. Check the **Split by Color** check box if you want to be able to select parts of compound entities in JetStream. 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 JetStream will use when opening .dwg and .dxf files that were created with decimal drawing units. Note that .dwg and .dxf files do not specify the units they were created in. If the units turn out to be wrong, they can be easily changed using the **File Units and Transform** function (see Section 11.10, “ Setting a File's Units and Transform ” 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 adjoining faces with the same color, layer and parent as a single item. Leaving unchecked leaves these entities as separate items in JetStream.
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 adjoining lines with the same color, layer and parent as a single item. Leaving unchecked leaves these entities as separate items in JetStream.
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 JetStream.
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 JetStream.
10. Check the **Convert Entity Handles** check box if you want to read entity handles as a property attached to the item in JetStream.
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 9, *Selecting Items* 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 JetStream.
13. Check the **Merge XRef Layers** check box if you wish to merge the layers of external reference files into those of the main .dwg file. Leaving this unchecked will keep the external reference file separate within the selection hierarchy of JetStream.
14. Check the **Convert Views** check box if you want to convert the named views from the file into JetStream viewpoints.
15. Check the **Convert Points** check box if you want to read any points from .dwg and .dxf files. See Section 12.5, “ Display Options ” for more information on how to display these in JetStream.
16. Check the **Convert Lines** check box if you want to read any lines and arcs from .dwg and .dxf files. See Section 12.5, “ Display Options ” for more information on how to display these in JetStream.
17. Check the **Convert Snap Points** check box if you want to read any snap points from .dwg and .dxf files. See Section 12.5, “ Display Options ” for more information on how to display these in JetStream.
18. The **Loader for 2004 dwg** combo box allows selection of which version of ObjectDBX is used when loading AutoCAD 2004 .dwg files. This allows you to select support for the correct version of object

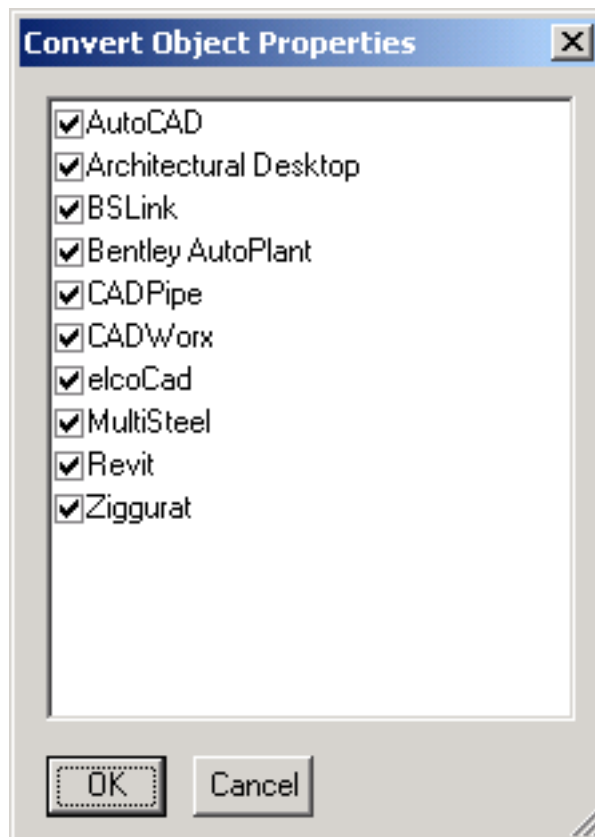
enablers that may be used within the file. Please note that once any particular version of ObjectDBX is loaded, which occurs during reading of a .dwg or .dxf file, that the version in use will not change until JetStream is restarted.

19. Check the **Load Material Definitions** check box if you want to load material definitions into JetStream from Autodesk Architectural Desktop .dwg files.
20. Check the **Use ADT Standard Configuration** check box to force reading of Autodesk Architectural Desktop .dwg files using the Standard display configuration. If unchecked, geometry and materials will be read in according to whether they are displayed in the currently saved display configuration.
21. Check the **Convert Hidden ADT Spaces** check box to perform conversion of space objects that lack any visible 3D geometry in ADT (for example if they lack floor or ceiling thicknesses). This will result in corresponding hidden objects appearing in JetStream Roamer. The normal behaviour for space objects that have visible 3D geometry in ADT is unaffected.
22. The **Material Search Paths** edit box may contain file paths in a semi-colon separated list that will be searched for texture files used in Autodesk Architectural Desktop materials. Default Autodesk paths are automatically searched and need not be entered.

Note

For Autodesk Architectural Desktop materials to be read into JetStream Roamer, a valid Presenter license is required.

23. 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.

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

7.1.5. DWF Files

Autodesk's DWF (Design Web Format) was specifically developed by Autodesk as a file format for architects, engineers, and GIS professionals to share design data. The JetStream file reader reads all 3D geometry, as well as textures and properties. A full list is given below.

Supported Entities

- All 3D geometry
- Texture maps (Requires a valid JetStream Presenter license)
- Texture coordinates
- Colors (per-vertex, per-face)
- Property fields
- Categories

Unsupported Entities

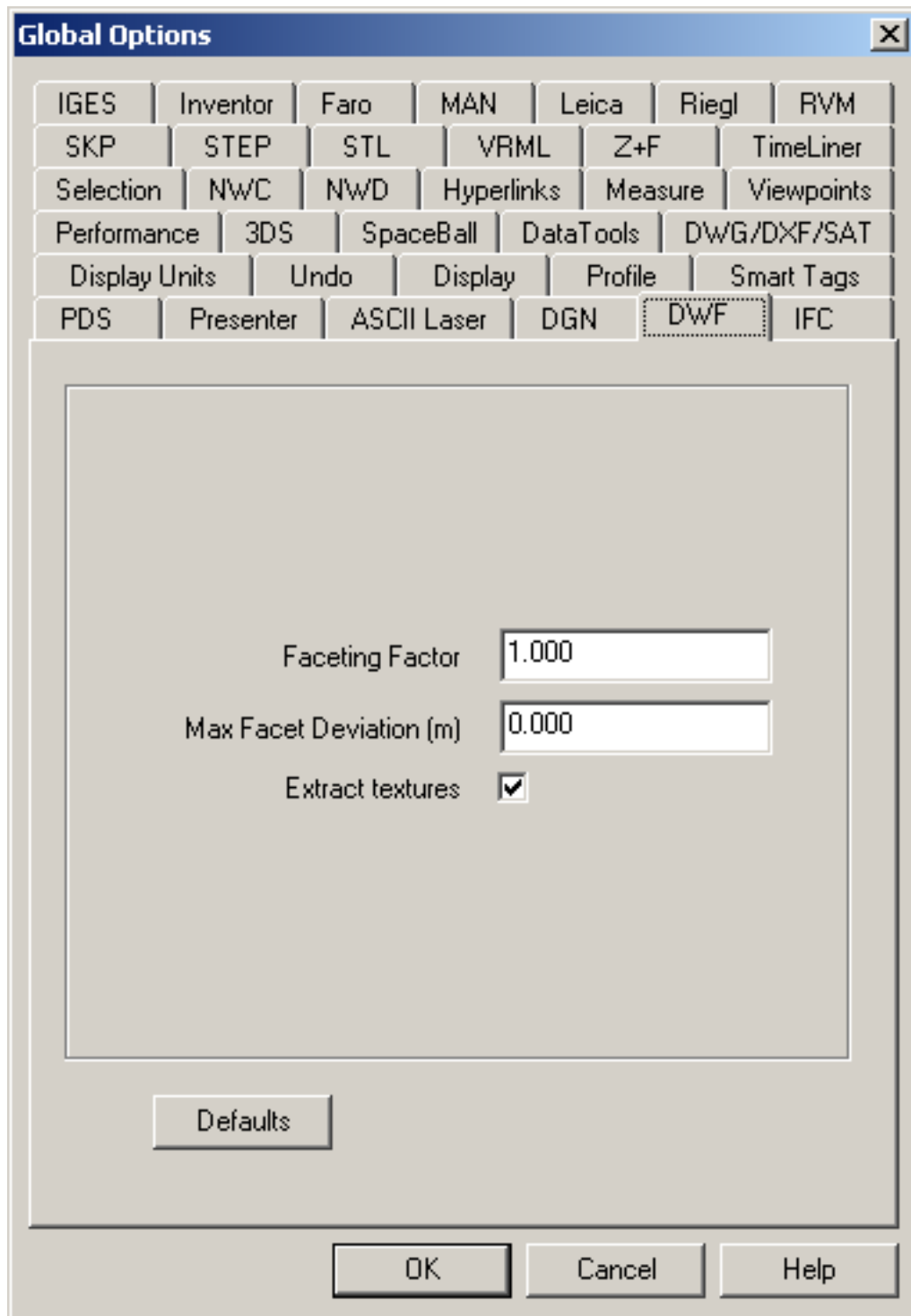
- 2D lines/plot sections
- Thumbnails
- Marked-up sketches
- More than one 3D section per file (any others are ignored)
- NURBS Surfaces
- Cameras

DWF File Reader Options

Setting the .dwf file reader options

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

The **DWF** dialog is displayed



2. Enter the **Faceting Factor** (the value must be greater than 0). The higher the value, the more JetStream will facet rounded entities and therefore the smoother they will appear. See Faceting Factor for more information.
3. Enter the **Max Facet Deviation**. This will facet entities to within the specified tolerance. See Max

Facet Deviation for more information.

4. Check the **Extract textures** check box to load in textures and environment maps associated with the file. Environment maps will not automatically be set in the scene, and will need to be manually set up in Presenter.

Note

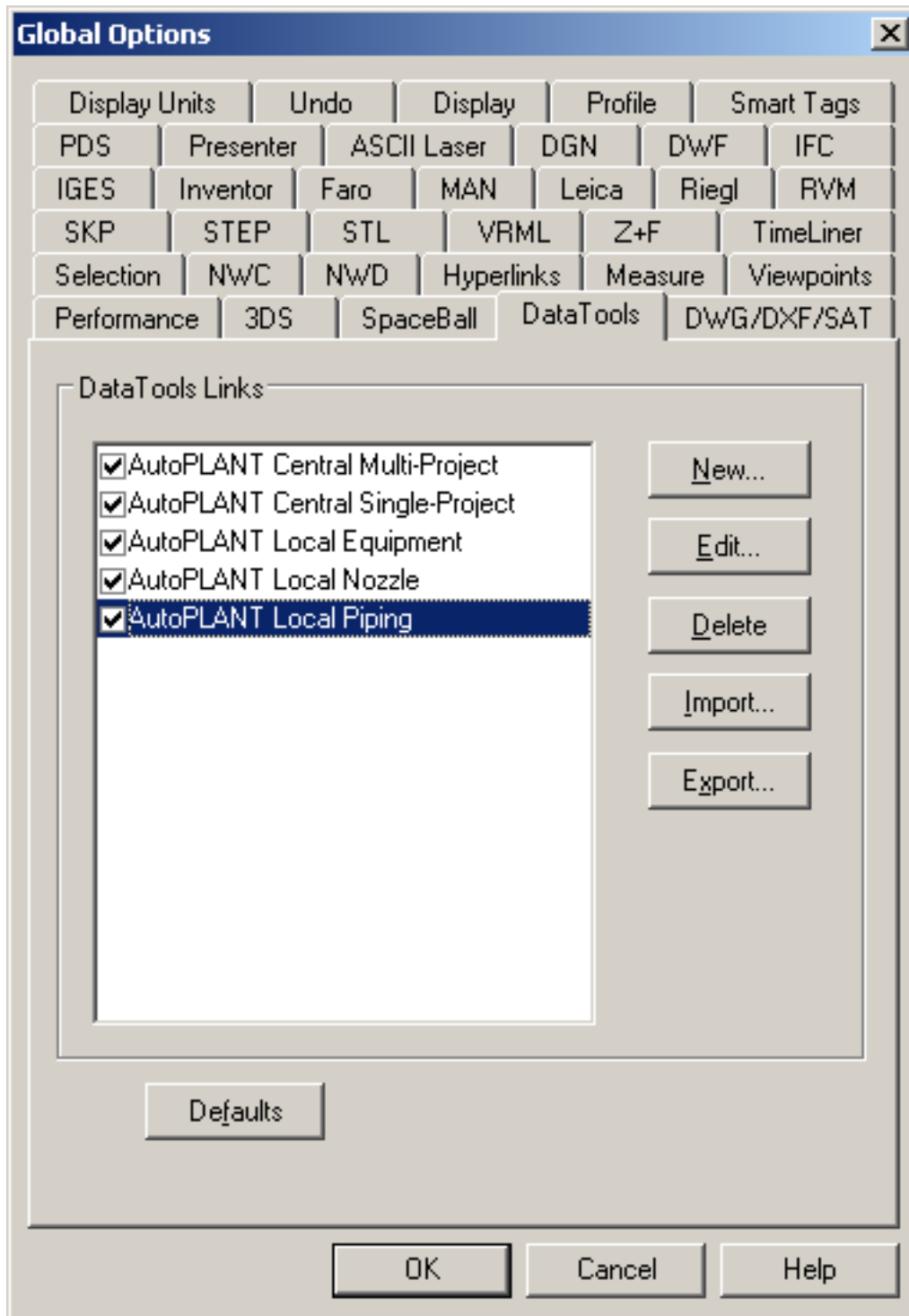
For DWF texture maps to be read into JetStream Roamer, a valid Presenter license is required.

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

7.1.6. Bentley AutoPLANT Files

Bentley AutoPLANT is based on AutoCAD and as such uses the .dwg file format to store model geometry. Any settings related to the .dwg file format also affect files from AutoPLANT.

AutoPLANT Object Properties can be stored in external database .mdb files, and JetStream supports these files through the **DataTools** functionality. By default JetStream and DataTools are both set up to support AutoPLANT .dwg and .mdb files, and will be looking for Equipment, Nozzle and Piping Data.



The settings for these three sets of data can be edited by selecting the appropriate item in the list and clicking on the **Edit** button. See Chapter 20, *DataTools* for more information.

For AutoPLANT properties to be loaded correctly an .mdb file must be located in the same directory as the .dwg file, with the same filename followed by the .mdb extension. If this file exists, JetStream will automatically pick it up and use it to show appropriate properties in the Properties window.

Note

JetStream does not currently support per-project properties.

7.1.7. 3DS Files

3DS is a common file format that is supported by many CAD applications. The JetStream 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.

JetStream Roamer does not read .max files, but instead has exporters for Viz and Max. Entity support is the same as for the 3ds reader. See Section 7.2.4, “Viz and Max .nwc Exporter” for more information.

Textures from .3DS files come through into JetStream 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). (Requires a valid JetStream Presenter license).
- Colors (from material color, not wireframe color - ambient, diffuse, shininess, transparency and self illumination)

Unsupported Entities

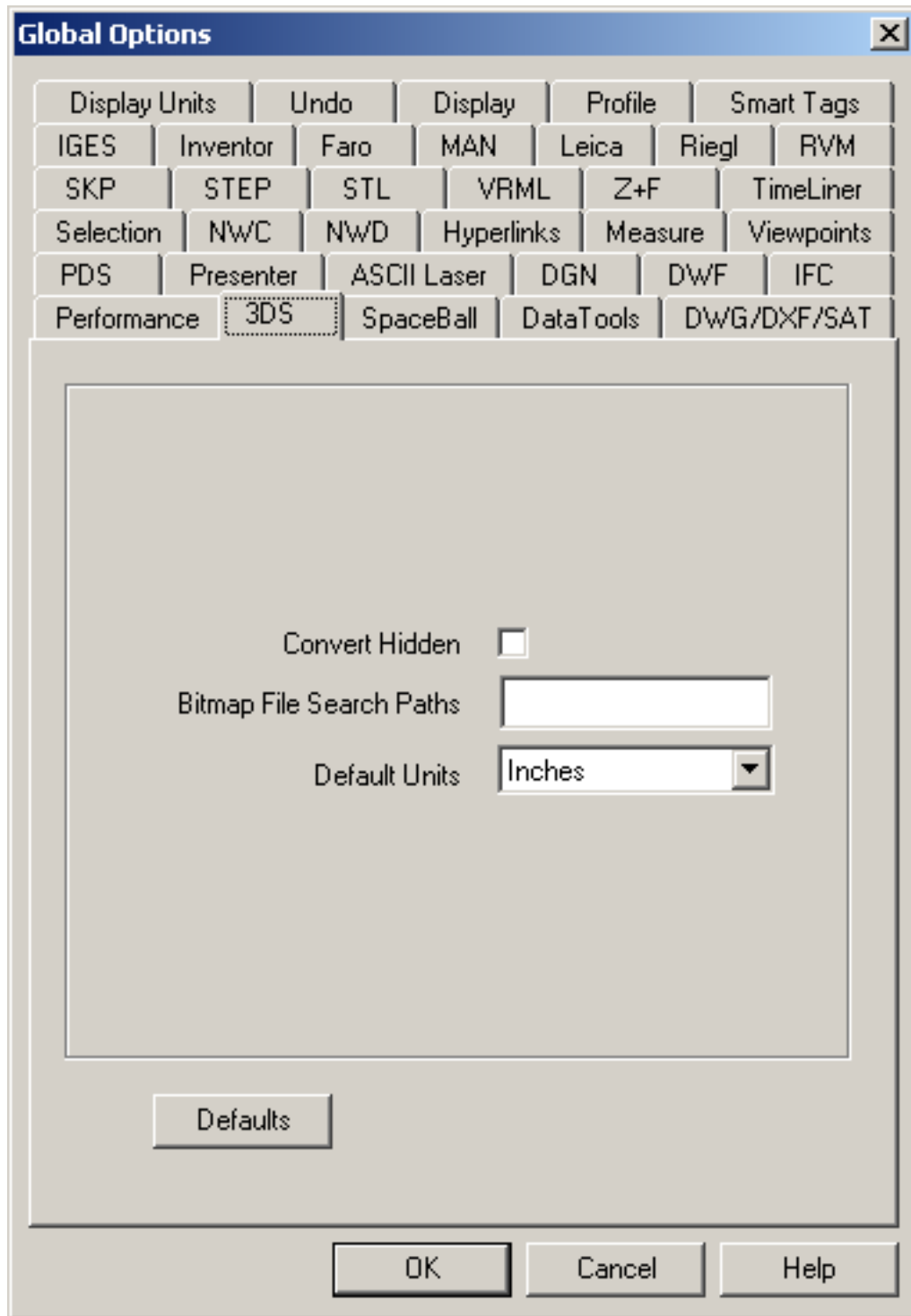
- Keyframes (objects are currently taken from keyframe 0)
- Texture maps in the formats: gray-scale .tga, .tif, .gif, .png.
- Other maps (e.g. opacity maps, reflections etc.)
- Wireframe meshes
- Lines, splines
- Points
- Background images

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 JetStream.

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.

Note

For 3DS texture maps to be read into JetStream Roamer, a valid Presenter license is required.

4. From the **Default Units** drop-down, choose the type of units that JetStream 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 11.10, "Setting a File's Units and Transform" for more details).
5. Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

7.1.8. DGN and PRP Files

JetStream 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 7.2.3, "MicroStation .nwc Exporter" for more details.

Note

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

The DGN reader additionally does not support auxiliary coordinate systems.

Supported Entities

- All 2D and 3D geometry including shapes, complex shapes, meshes, cones, surfaces, B-spline boundaries, solids, SmartSolids and Feature Solids, lines, arcs and ellipses.
- Splines and B-spline curves.
- Lights.
- 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 (requires a valid JetStream Presenter license).
- Reference files including aliases.
- Text will be converted into hyperlink tags (see Section 16.4, "Hyperlinks" for details on hyperlinks).
- Family, Part and Texture information from TriForma, and PDS object information from .drv files.

- DMRS and database linkage and association ID's.

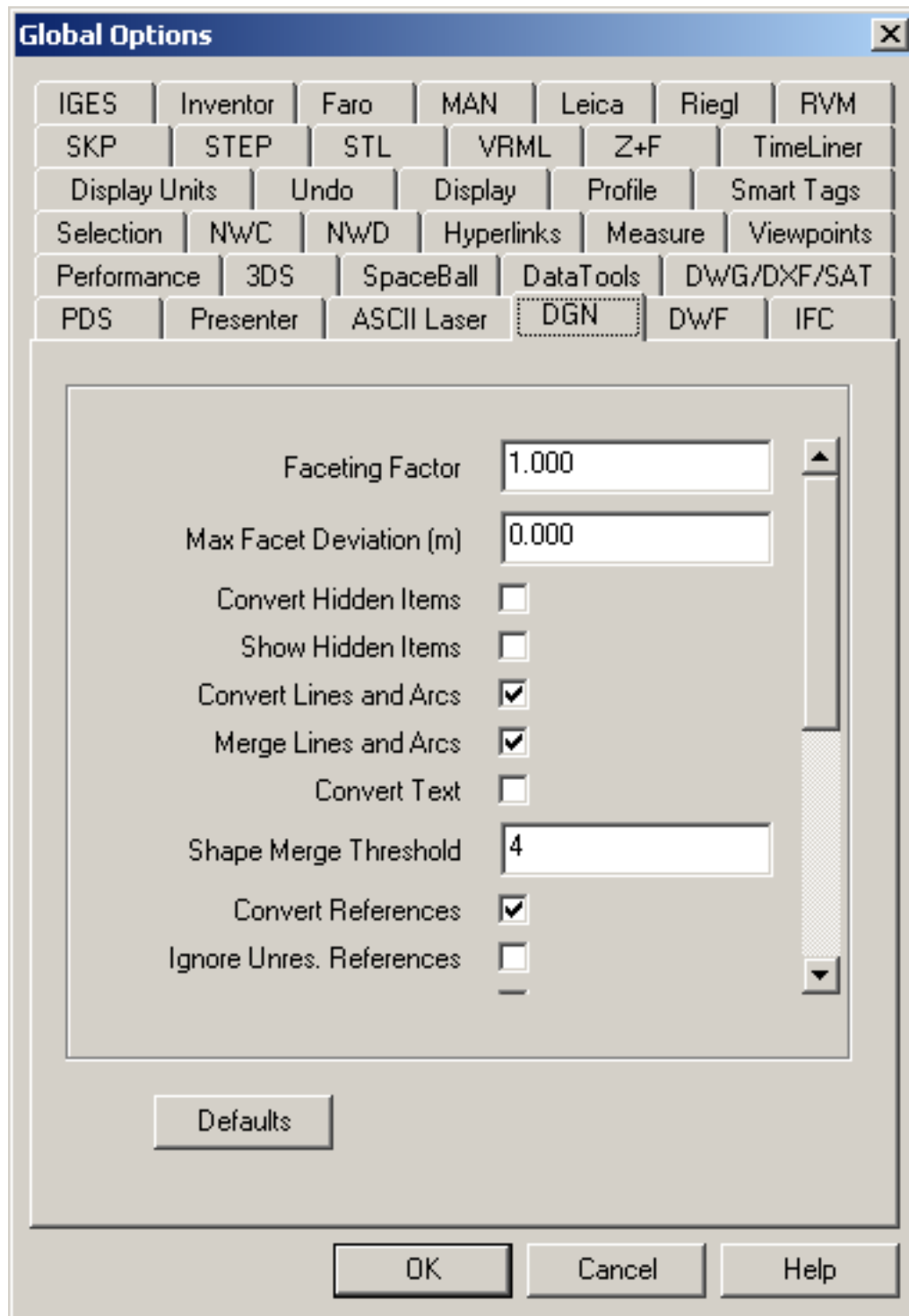
Unsupported Entities

- 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 JetStream will facet rounded entities and therefore the smoother they will appear. See Faceting Factor for more information.
3. Enter the **Max Facet Deviation**. This will facet entities to within the specified tolerance. See Max

Facet Deviation 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 JetStream.
5. Check the **Show Hidden Items** check box if you want to show all entities in the .dgn file whether they are set as hidden or not. This option will only work if **Convert Hidden Items** is also checked.
6. Check the **Convert Lines and Arcs** check box if you want to read lines, splines, curves, arcs, circles or ellipses from the .dgn file.
7. 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 adjoining lines etc. with the same color, level and parent as a single item. Leaving unchecked leaves these elements as separate items in JetStream.
8. Check the **Convert Text** check box if you want to read text from the .dgn file. Text will be converted into smart tags in JetStream.
9. Enter the **Shape Merge Threshold** into the box. See Shape Merge Threshold for more information on Shape Merge Threshold.
10. Check the **Convert References** check box if you want to read reference files from the .dgn file.
11. 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.
12. Check the **Use Level Symbology** check box if you want to use the level symbology from MicroStation so that items in JetStream take their color from level rather than the default element color in MicroStation.
13. MicroStation has the concept of a "global origin", which is where (0, 0, 0) is located (assuming there are no active ACSs). Changing this global origin in MicroStation doesn't actually move anything; it simply changes the reporting of coordinates. However, when attaching references in MicroStation, you can tell it to align global origins.

Check the **Align Global Origins** check box if you want to use this functionality when loading DGN files into JetStream. When two DGN files are appended together with this check box checked, their global origins will be in the same place.

14. Check the **Use Materials** check box if you want to use MicroStation's materials in place of its colors in JetStream. If you choose not to export materials, JetStream 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.

Note

For MicroStation materials to be read into JetStream Roamer, a valid Presenter license is required.

15. Enter a semi-colon separated list of paths in **Material Search Paths** that the reader will search in for MicroStation palette (.pal) and material (.mat) files in order to convert its materials.
16. Check the **Convert PDS Data** check box if you want to read object information from Intergraph's Plant Design System™ while reading the .dgn files. PDS information is read from Intergraph's .drv files. JetStream looks for a .drv file with the same base name as the .dgn file in the same directory.
17. Check the **Convert TriCAD Data** check box if you want to read object information from Triplan's

TriCAD™ while reading the .dgn files.

18. Check the **Convert TriForma Data** check box if you want to read object information from Bentley's TriForma™ while reading the .dgn files.
19. Enter a semi-colon separated list of paths in **TriForma Dataset Search Paths** that the reader will search for TriForma data set files. User defined datasets will need their directories adding to this list.
20. Enter a **View Number** if you want to use a specific view for loading. The loader will use the level visibility of this view when converting items. If you want to use the first active view, set this value to 0.
21. Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

7.1.9. MAN Files

JetStream 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.

MicroGDS Renderer materials are shown in their flat-shaded colors in JetStream Shaded display. In Full Render or Presenter rendering, the full shaders are used. Only the standard LightWorks shaders are available - those which are unique to MicroGDS are not available inside JetStream - a compromise is made for shaders which are not available inside JetStream.

- **height band** color shader is treated as plain grey
- **wrapped random** color shader is treated as a plain color using the flat-shaded color from MicroGDS.
- **wrapped stencil** transparency is ignored
- **undulate**, **wrapped brick**, **wrapped grid** and **wrapped ripple** displacement shaders are ignored
- **object axis** texture space is equivalent to the JetStream **Box** texture space
- **auto axis** and **object xy axis** texture spaces are treated as a **Box** texture space
- **grid** background is treated as a plain background using the **background color** - no grid lines will show.
- Foreground and Environment shaders are ignored.
- All other shaders, as of MicroGDS 7.2, are correctly imported into JetStream.
- Note that MicroGDS materials are specified in millimetres, and are converted into metres to make JetStream materials, dividing distance parameters by 1000. Windows with Perspective Views are read into JetStream as View objects.

Windows with Perspective Views are read into JetStream as Saved Viewpoints.

Supported Entities

- Clump primitives.
- Line primitives. The color of line primitives is determined by the first phase in which they appear in the

Principal Window. If they are not included in the Principal Window, they will have a color determined by their style.

- Light styles. Projector lights are treated as a Spot light without the transparent image.
- Material styles, both plain and most LightWorks Renderer materials. Materials using wrapped images locate their image files using the "Texture Path" specified below.
- Views. Perspective Views are read in as if 3-point Perspective; parallel Views are not read. A Section Plane in a MicroGDS View is set in the corresponding JetStream View.
- Layers. All layers are read, and made visible according to their status in the Principal Window of the MAN file.
- Instances.
- Object data structure.

Unsupported Entities

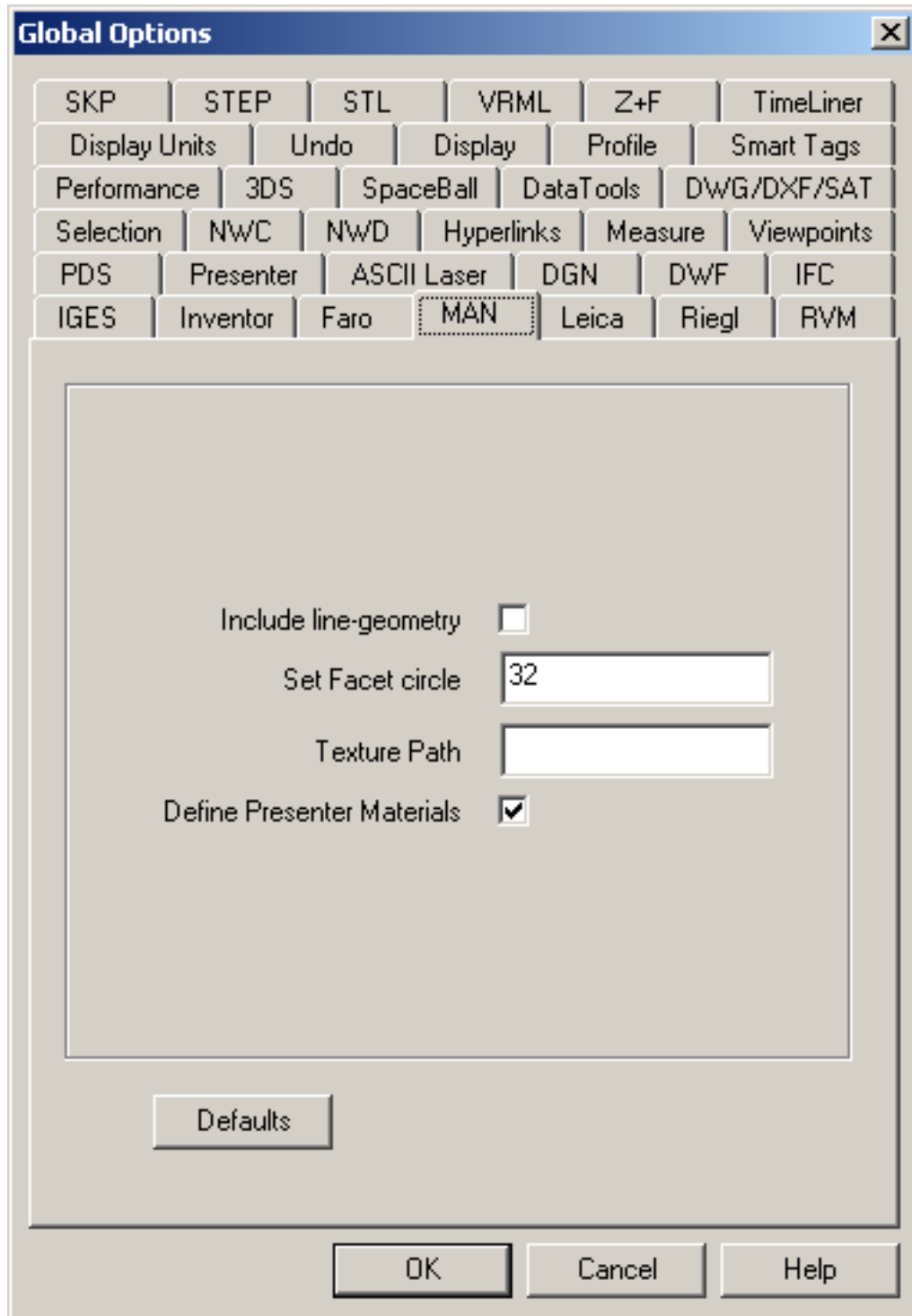
- Text primitives.
- Photo primitives.

MAN File Reader Options

Setting the MAN file reader options

1. Go to **Tools, Global Options, MAN file**

The **MAN file** dialog is displayed



2. Check the box **Include line-geometry** to include MicroGDS line-primitives into JetStream
3. **Set Facet circle.** Adjust the number of facets used for arcs - enter the number of straight line segments to facet a whole circle. (This corresponds to the MicroGDS **Set Facet** preference.)
4. **Texture Path.** Enter the path to the folder containing images used in MicroGDS Materials. Materials

using image files will use this string as the base for relative paths. (This corresponds to the MicroGDS **Renderer Textures** preference.)

5. Check the box **Define Presenter Materials** if you wish MicroGDS material-styles to be defined as JetStream Presenter materials.
6. Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

7.1.10. IGES Files

JetStream 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

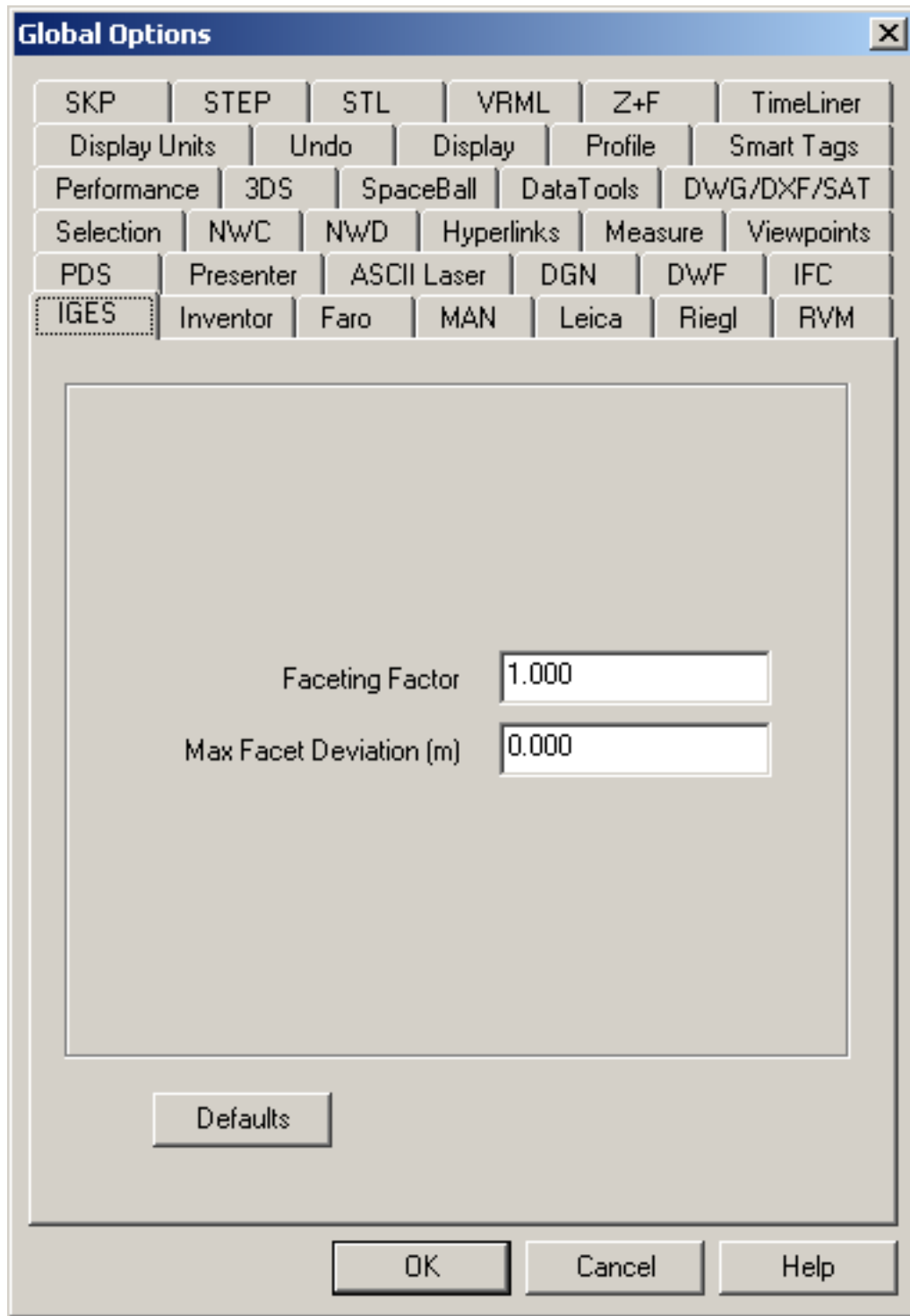
- Points.
- Lines.
- Circular or conic arcs.
- Composite, parametric spline, B-spline, or offset curves.
- Boundaries.
- Attributes.

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 JetStream will facet rounded entities and therefore the smoother they will appear. See Faceting

Factor for more information.

3. Enter the **Max Facet Deviation**. This will facet entities to within the specified tolerance. See Max Facet Deviation for more information.
4. Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

7.1.11. STEP Files

JetStream 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 faceted boundary representations (BReps)

Unsupported Entities

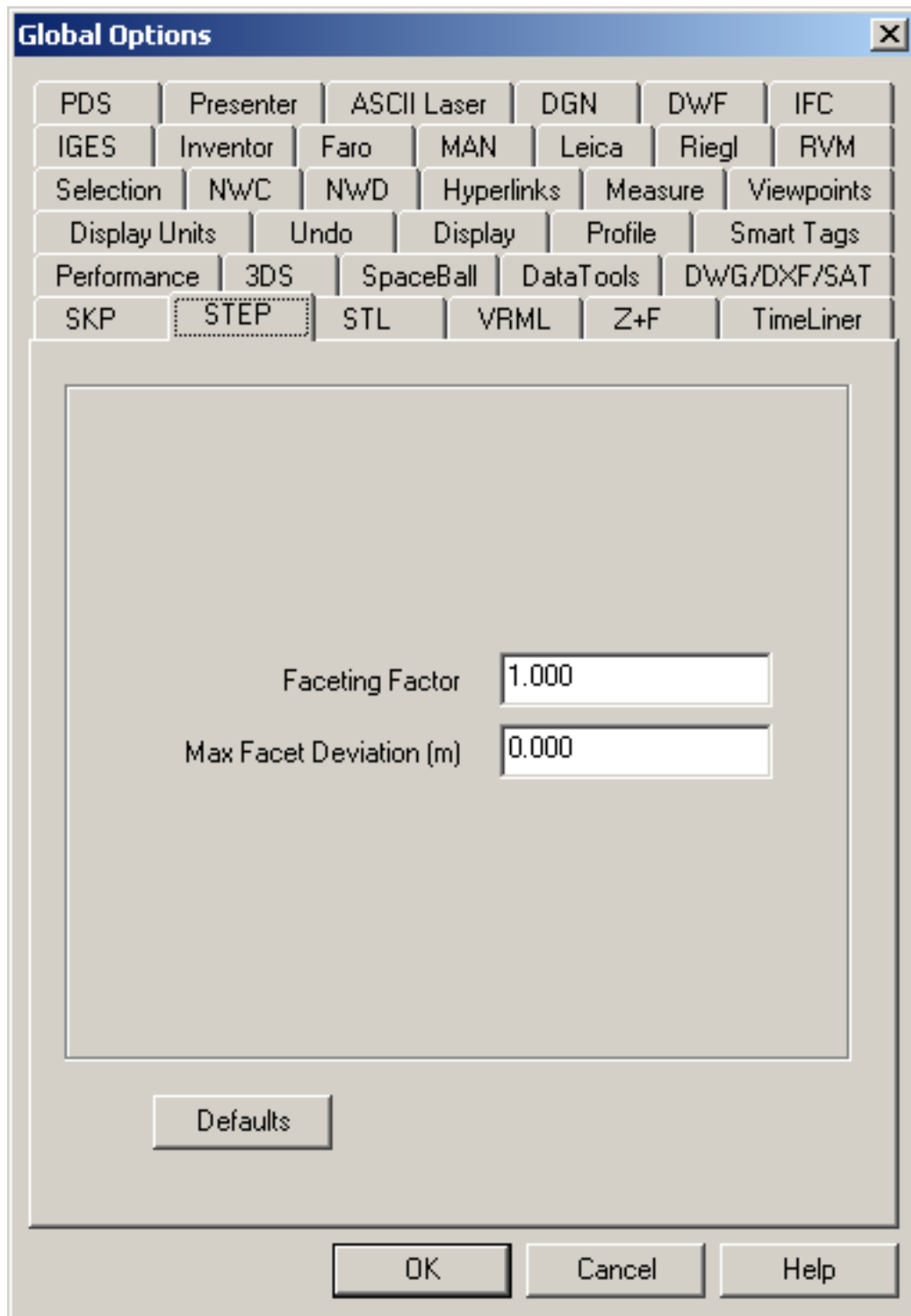
- Points.
- PCurves, B-spline, rational B-spline, Bezier, trimmed, uniform or quasi-uniform curves.
- Circles or ellipses.
- Hyperbola.

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 JetStream will facet rounded entities and therefore the smoother they will appear. See Faceting Factor for more information.
3. Enter the **Max Facet Deviation**. This will facet entities to within the specified tolerance. See Max

Facet Deviation for more information.

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

7.1.12. Inventor Files

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

Note

The reader supports files from Autodesk Inventor 9™ and earlier. Later versions should also work, but haven't been tested. Autodesk Inventor 5™ (or higher) or Autodesk Inventor Design Tracking 5™ (or higher) must be installed. Autodesk Inventor Design Tracking™ can be downloaded from support.autodesk.com [<http://support.autodesk.com>].

Supported Entities

- All geometry.
- Assembly structure.
- Materials (requires a valid JetStream Presenter license).

Unsupported Entities

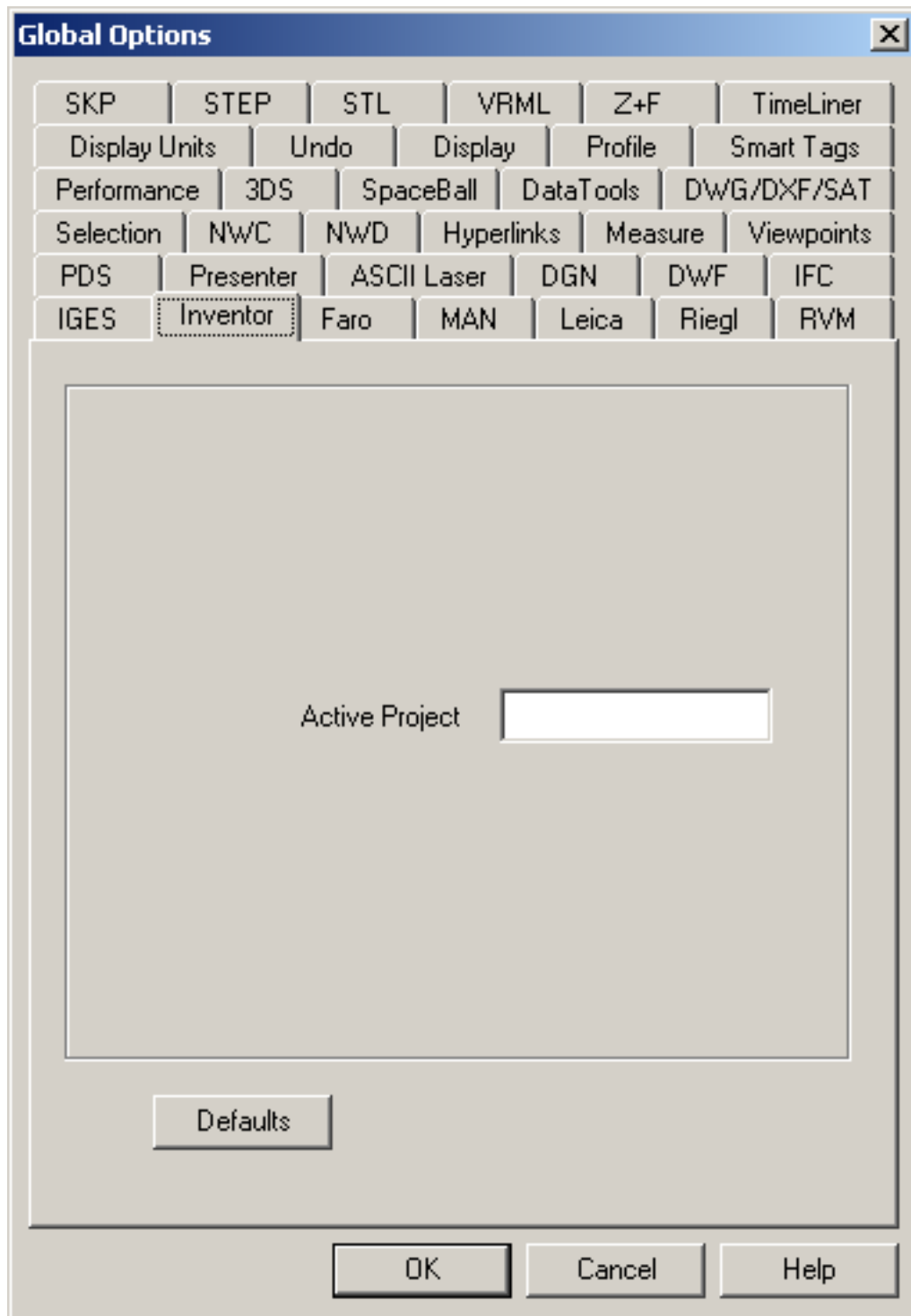
- Material names.

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.

7.1.13. VRML world files

VRML world files can be read by JetStream Roamer.

Note

The reader supports files in both VRML1 and VRML2 file formats.

Supported Entities

- All 3D geometry including cuboids, cylinders, cones, spheres, elevation grids, extrusions, face and line sets, and points.
- All grouping nodes - however some limitations exist on certain types of group node (see below).

Partially Supported Entities

- VRML2 Billboard nodes - children will be loaded but no billboarding will take place.
- VRML2 Collision nodes - children will be loaded but no specification of collision detection occurs.
- VRML1 WWWAnchor and VRML2 Anchor nodes - children will be loaded but any referenced VRML world will not be loaded upon clicking objects.
- VRML1 and VRML2 LOD nodes - the most detailed (i.e. first) child will always be loaded.

Unsupported Entities

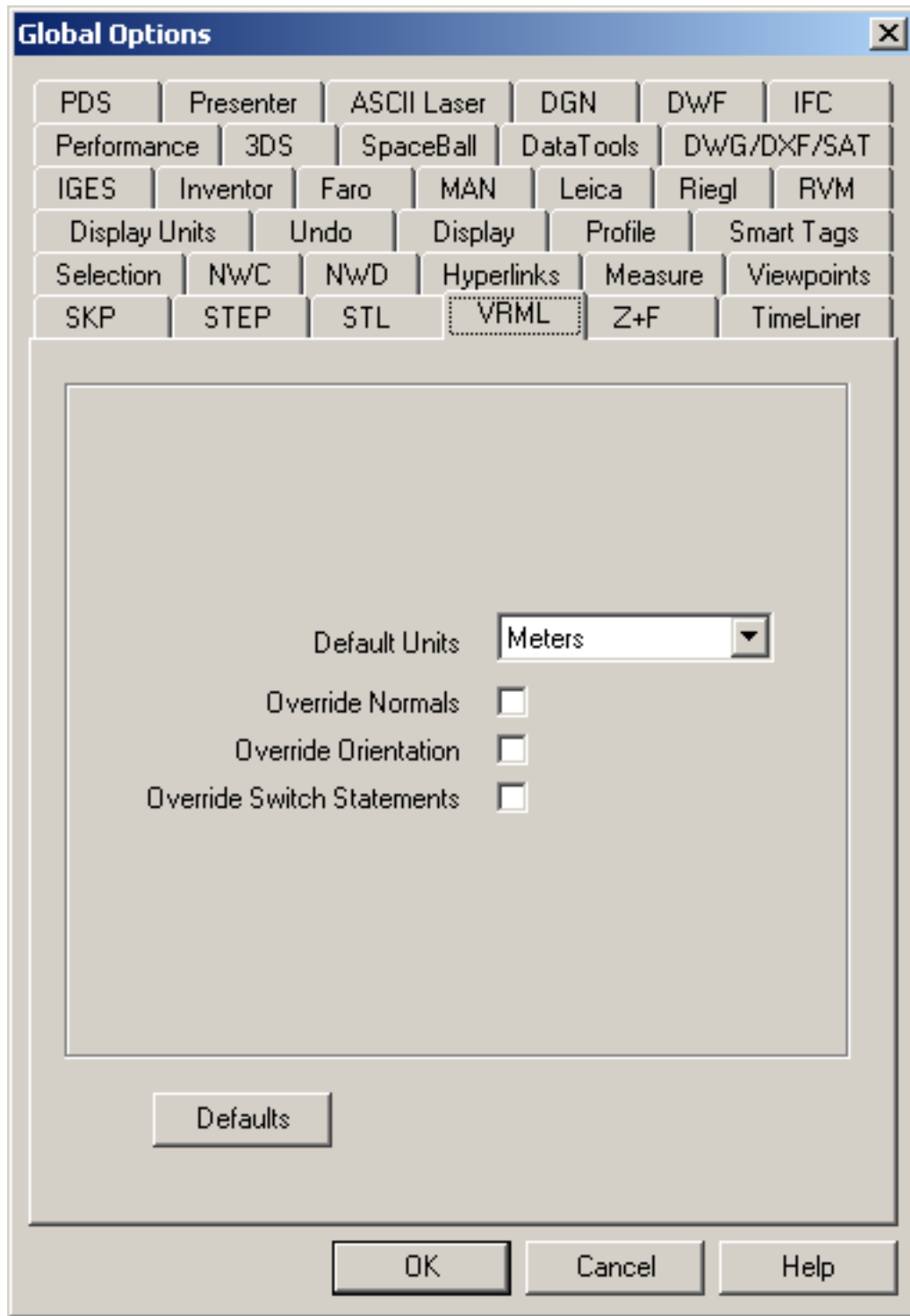
- All ROUTE definitions.
- All sensor nodes.
- All interpolator nodes.
- Textures specified within the VRML file (VRML2 PixelTexture nodes and the image component of VRML1 Texture2 nodes).
- VRML2 Script nodes.
- VRML2 MovieTexture nodes.
- VRML2 Fog nodes.
- VRML2 AudioClip and Sound nodes.
- All text-related nodes (VRML1 AsciiText and VRML2 Text nodes, and FontStyle nodes).

VRML File Reader Options

Setting the VRML file reader options

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

The **VRML** options dialog is displayed



2. Select the **Default Units** dropdown combo box to alter the default units for any loaded VRML world.
3. Check the **Override Normals** check box if you want to override any provided normals and force

auto-generation within JetStream Roamer.

4. Check the **Override Orientation** check box if you want to override any specified orientation of vertices and force all to be assumed to be counter-clockwise.
5. Check the **Override Switch Statements** check box if you want to override the standard behaviour of switch statements. Often VRML authors will use switch statements to contain geometry selectable by scripts. Since Navisworks has no support for scripting, this option will allow some aspect of that geometry to be exposed, although results are unlikely to be precisely as the author intended.
6. Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

7.1.14. Riegl Scan Files

Riegl™ scan files can be read by JetStream Roamer.

Note

The reader supports files from all Riegl™ LMS scanners.

Supported Entities

- Points.
- Triangles.

Unsupported Entities

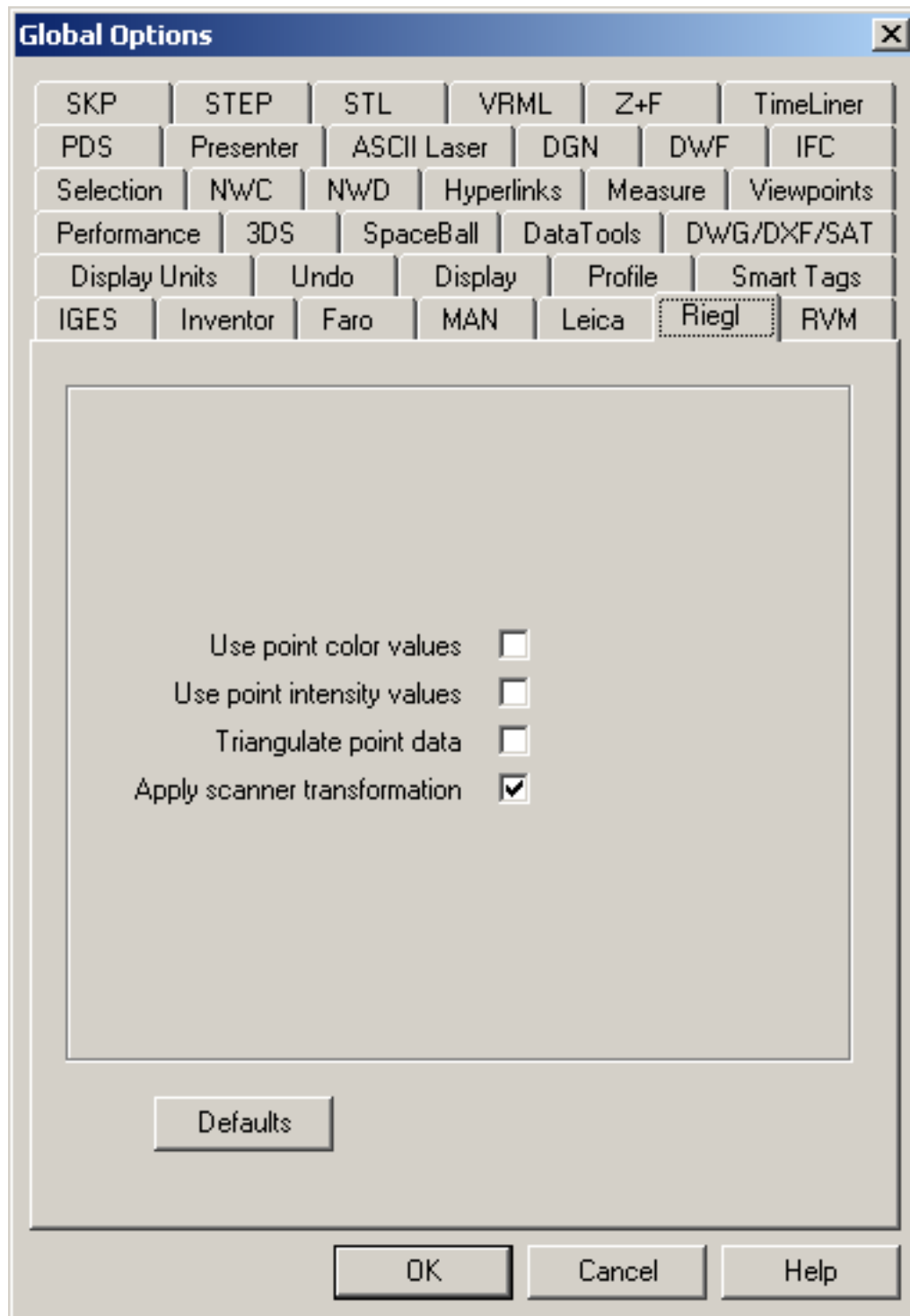
- No other entities are supported.

Riegl Scan File Reader Options

Setting the Riegl Scan file reader options

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

The **Riegl** dialog is displayed



2. Check the **Use point color values** check box if you want to extract color values from the input file.
3. Check the **Use point intensity values** check box if you want to extract intensity values from the input file.
4. Check the **Triangulate point data** check box if you want to extract triangles from the input file. The

file will take much longer to load.

5. Check the **Apply scanner transformation** check box if you want to display the image in global coordinates (necessary when the file contains more than one frame) or in local coordinates, relative to the scanner.
6. Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

7.1.15. Faro Scan Files

Faro™ scan files can be read by JetStream Roamer. iQmod and iQwsp files are workspace files that contain a list of one or more associated iQscan files. The iQscan files must be located in a folder called 'Scans', located in the same directory as the workspace file.

Note

The reader supports files from all Faro™ scanners.

Supported Entities

- Points.

Unsupported Entities

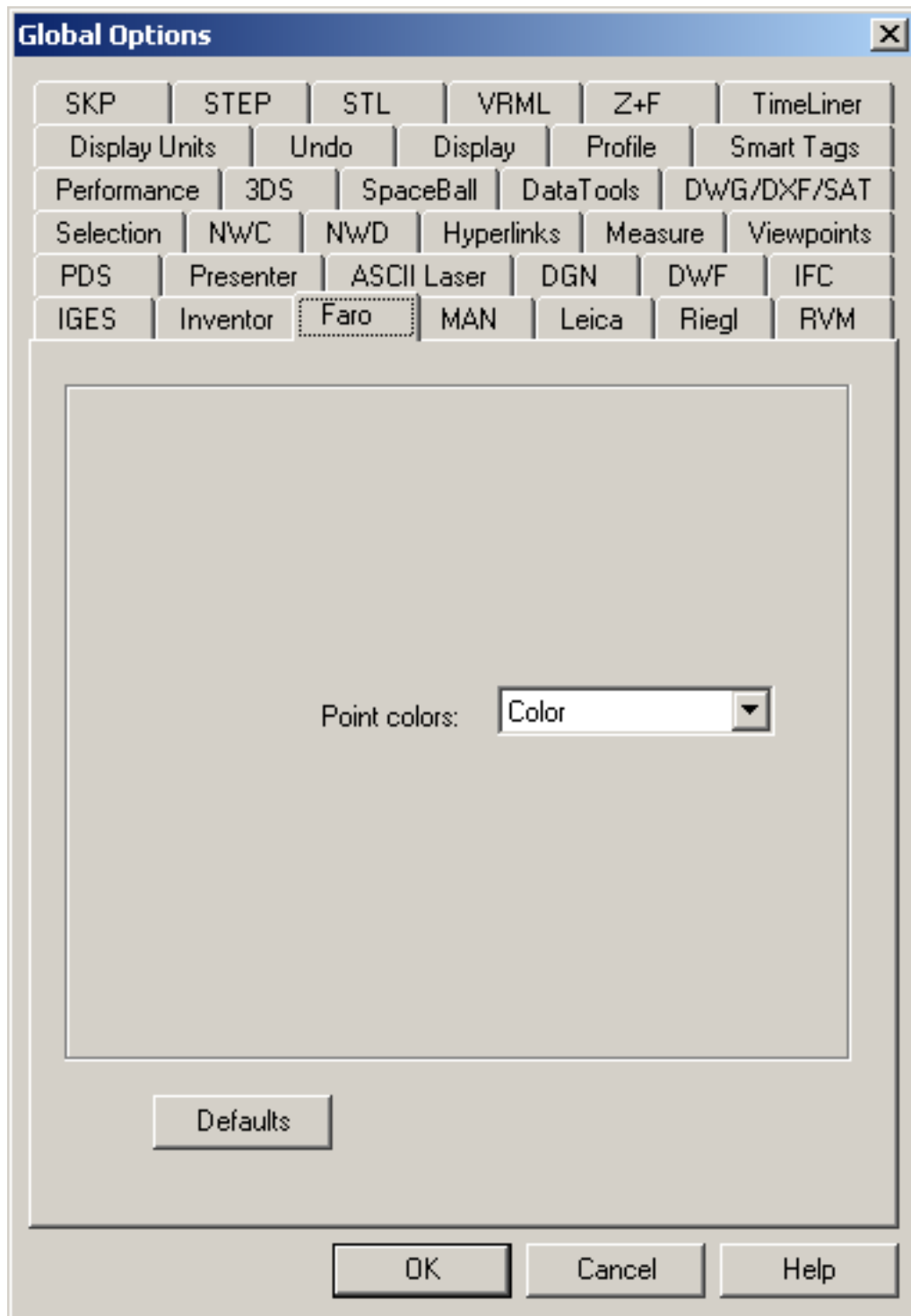
- No other entities are supported.

Faro Scan File Reader Options

Setting the Faro Scan file reader options

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

The **Faro** dialog is displayed



2. **Point colors** for Faro files can be set to **None** where the points come through as white, and **Intensity** and **Color** where the points use the intensity or color values stored in the file.

It should be noted that if Point colors is set to a higher level in the Global Options than are available in the file, then it will default to the highest available within the file. So for example if the Global

Options are set to color, but only intensities are available in the file, intensities will be shown in the main view.

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

7.1.16. Leica Scan Files

Leica™ scan files can be read by JetStream Roamer.

Note

The reader supports files from all Leica™ HDS scanners.

Supported Entities

- Points.

Unsupported Entities

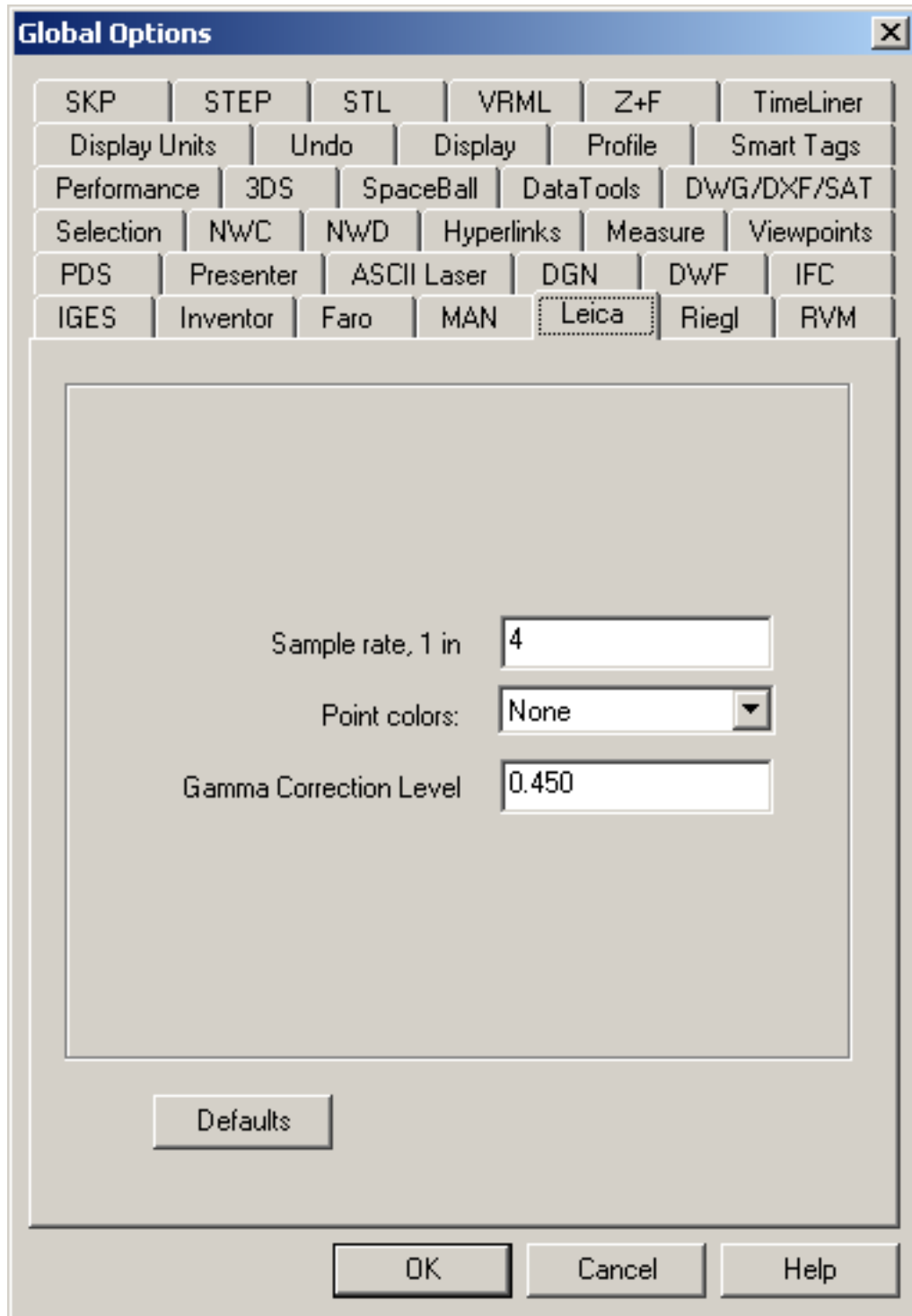
- No other entities are supported.

Leica Scan File Reader Options

Setting the Leica Scan file reader options

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

The **Leica** dialog is displayed



2. Set the value in the **Sample rate** edit box if you want to adjust the frequency of points extracted from the input file. By increasing the rate, the number of points extracted will be reduced. This will have the effect of reducing the image resolution, but increasing the speed with which the file is loaded.
3. From the **Point colors** drop-down, choose how the points are brought through when opening Leica

files. **None** brings through the points set to white. **Raw Intensities** uses the intensities set in the file. **Color** uses the color settings in the file. **Color-Mapped Intensity** transforms point intensity values to a spectrum of RGB colors. The **Gamma Correction Level** is used to alter the gamma correction values whilst using the point intensities set in the file. Gamma values can range between 0.0 and 1.0 are useful to correct weighting of intensity values at the lower end of the intensity range.

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

7.1.17. Z+F Scan Files

Z+F™ scan files can be read by JetStream Roamer.

Note

The reader supports files from all Z+F™ IMAGER scanners.

Supported Entities

- Points.

Unsupported Entities

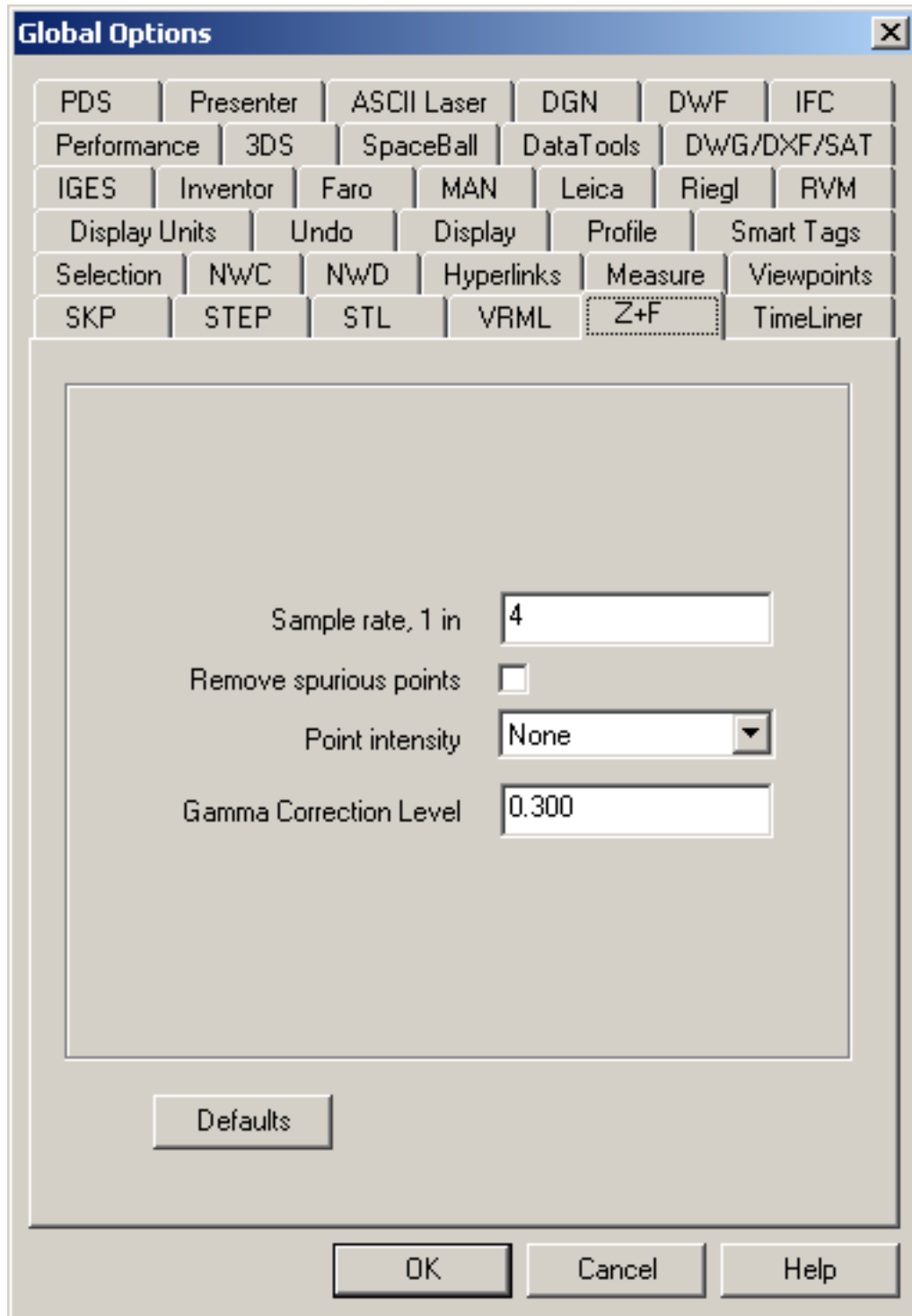
- No other entities are supported.

Z+F Scan File Reader Options

Setting the Z+F Scan file reader options

1. Go to **Tools, Global Options, Z+F**

The **Z+F** dialog is displayed



2. Set the value in the **Sample rate** edit box if you want to adjust the frequency of points extracted from the input file. By increasing the rate, the number of points extracted will be reduced. This will have the effect of reducing the image resolution, but increasing the speed with which the file is loaded.
3. Check the **Remove spurious points** check box if you want to ignore spurious points in the input file.

4. From the **Point intensity** drop-down, choose how the points are brought through when opening Z+F files. **None** brings through the points set to white. **Raw Intensities** uses the intensities set in the file. **Color-Mapped Intensity** transforms point intensity values to a spectrum of RGB colors. The **Gamma Correction Level** is used to alter the gamma correction values whilst using the point intensities set in the file. Gamma values can range between 0.0 and 1.0 are useful to correct weighting of intensity values at the lower end of the intensity range.
5. Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

7.1.18. ASCII Laser Scan Files

ASCII Laser Scan files can be read by JetStream Roamer.

Note

Most scanner software allows the user to export the point data in an ASCII text file. Providing that the data is saved in the correct format, this data can be read by JetStream Roamer.

Supported formats for ASCII laser scan data are listed below. The data must be separated using one of the following characters: comma, tab or space. The character used to signify a decimal must be a point (period).

- X, Y, Z
- X, Y, Z, Intensity
- X, Y, Z, Red, Green, Blue
- X, Y, Z, Intensity, Red, Green, Blue

Intensity values are integers in the range 0-255 (Note: These will not be gamma corrected). Red, Green and Blue values are also integers in the range 0-255.

Supported Entities

- Points.

Unsupported Entities

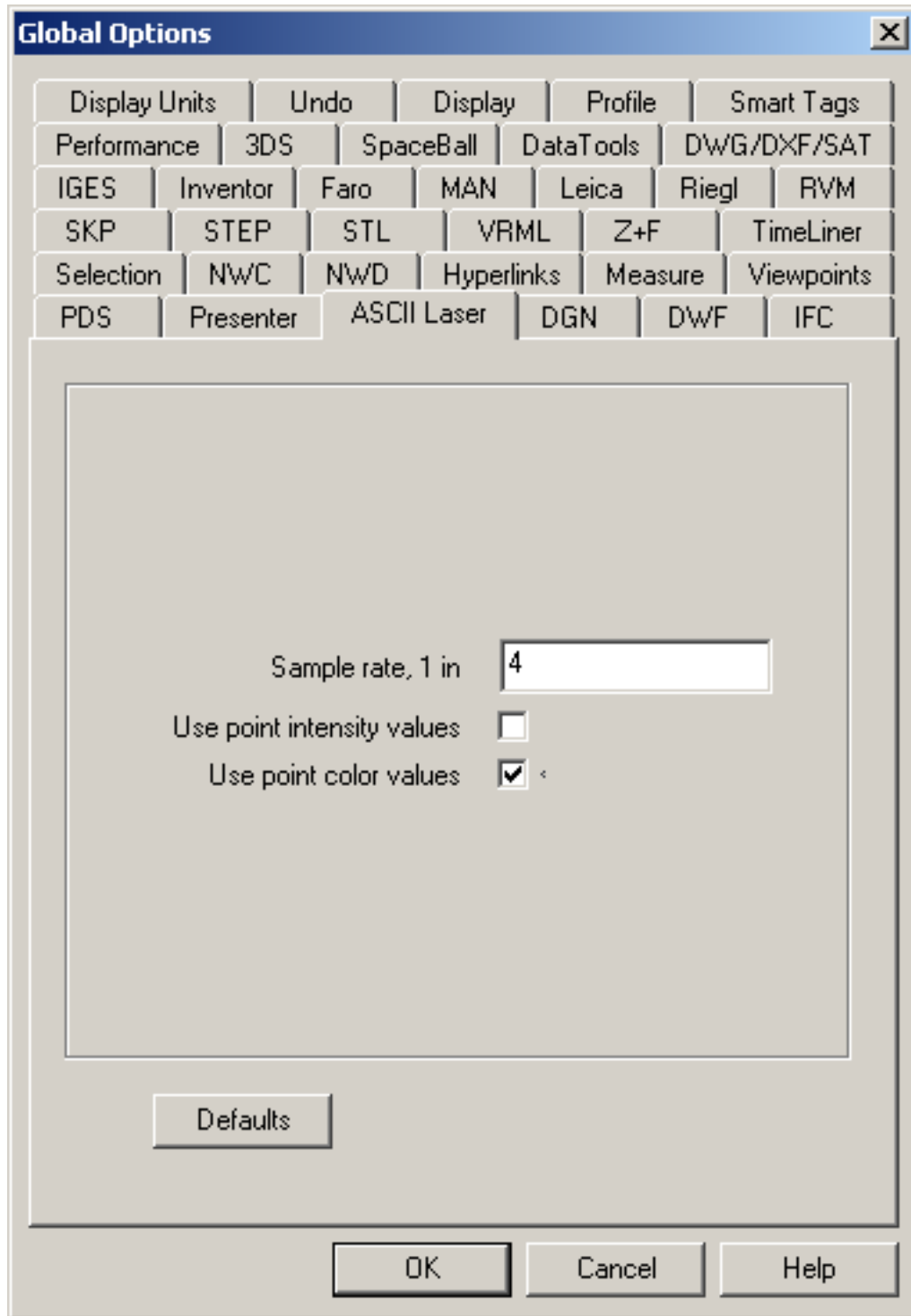
- No other entities are supported.

ASCII Laser Scan File Reader Options

Setting the ASCII Laser Scan file reader options

1. Go to **Tools, Global Options, ASCII Laser**

The **ASCII Laser** dialog is displayed



2. Set the value in the **Sample rate** edit box if you want to adjust the frequency of points extracted from the input file. By increasing the rate, the number of points extracted will be reduced. This will have the effect of reducing the image resolution, but increasing the speed with which the file is loaded.

3. Check the **Use point intensity values** check box if you want to extract intensity values from the input file.
4. Check the **Use point color values** check box if you want to extract color values from the input file.
5. Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

7.1.19. STL Stereolithography files

STL™ stereolithography files can be read by JetStream Roamer.

Note

The reader only supports binary files. ASCII versions are unsupported.

Supported Entities

- Triangles.

Unsupported Entities

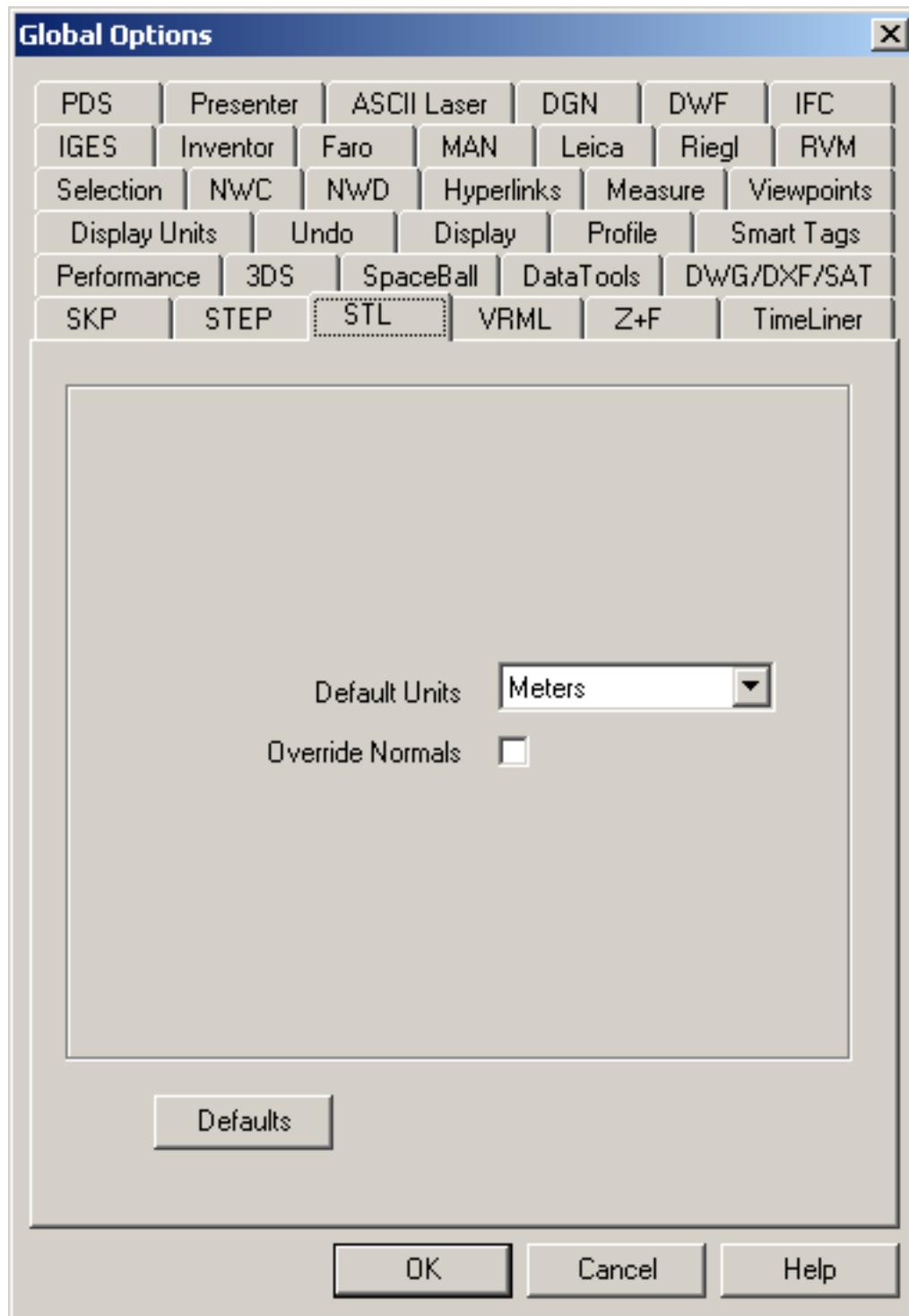
- No other entities are supported.

STL File Reader Options

Setting the STL file reader options

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

The **STL** dialog is displayed



2. Select the **Default Units** dropdown combo box to alter the default units for any loaded STL solid.
3. Check the **Override Normals** check box if you want to override any provided normals and force auto-generation within JetStream Roamer.
4. Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

7.1.20. AVEVA Review™ RVM and RVS files

The JetStream RVM Reader can read both binary and ASCII .rvm files exported from AVEVA's PDMS™ product. Attribute files are supported, output using either the "Dump Attributes" or "Data" (also called "OUTPUT") formats, with the file extensions .att, .attrib and .txt. RVS files are also supported.

Note

The JetStream RVM Reader requires a separate **RVM Reader license**. If this is not present, the RVM Reader will not be available for use.

Supported Entities

- All geometry.
- Attributes stored on groups.
- Textures (via RVS file).
- Cameras and camera tracks (via RVS file).
- Clip planes (via RVS file).
- Signs (via RVS file).
- Tags (via RVS file).
- Labels (via RVS file)
- Translucency (via RVS file)

Unsupported Entities

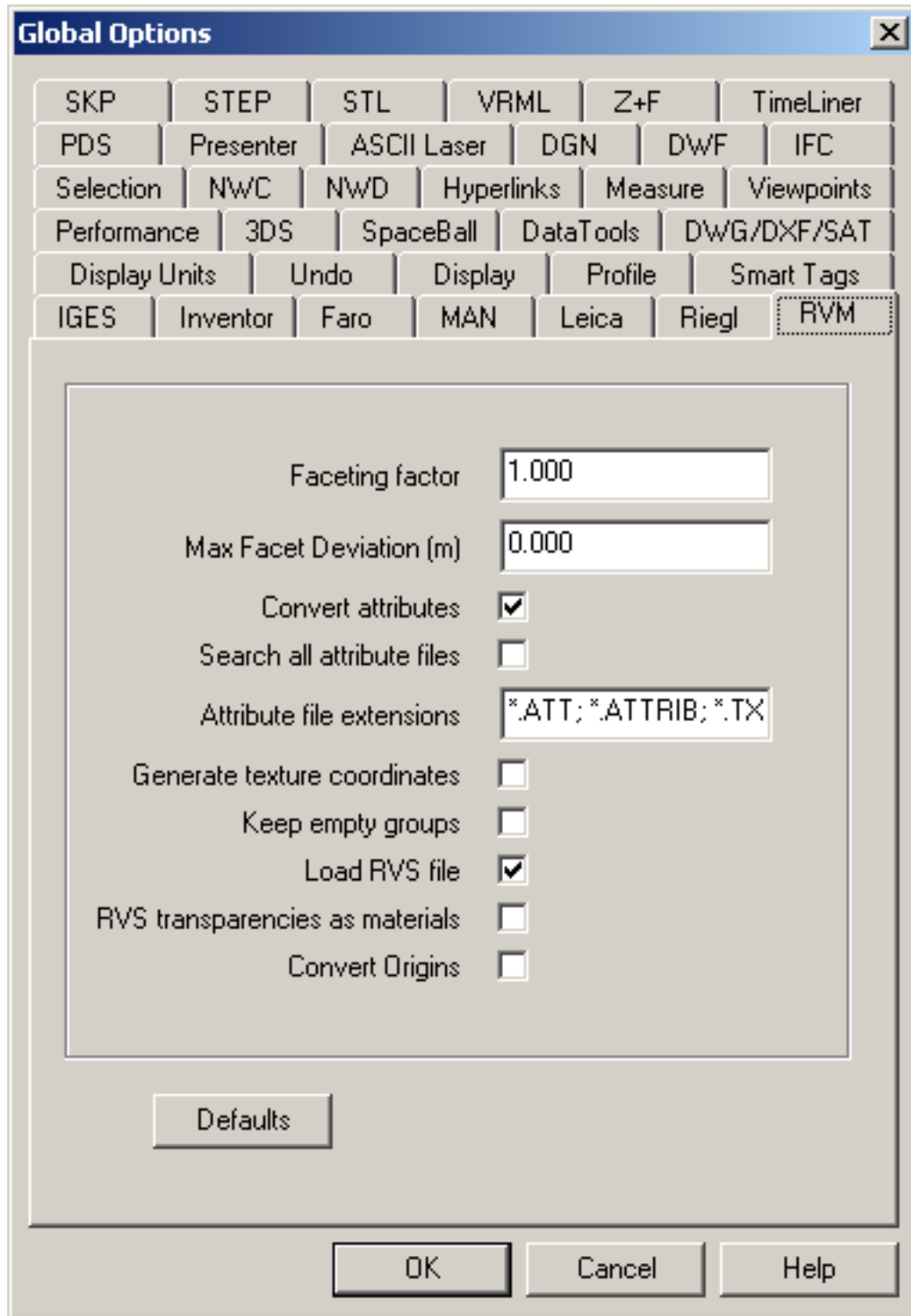
- Attributes stored on primitives
- Lights.
- Object Animation.
- Smooth Animation.
- Groups
- Autotags

RVM File Reader Options

Setting the RVM file reader options

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

The **RVM** dialog is displayed



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

3. Enter the **Max Facet Deviation**. This will facet entities to within the specified tolerance. See Max Facet Deviation for more information.
4. Check the **Convert attributes** box to attempt to load attribute files.
5. Check the **Search all attribute files** box to affect how attribute files are looked for and loaded.

If unchecked, the reader firstly looks for an attribute file with the same name as the RVM file in the same directory, followed by all attribute files contained within any subdirectory with the same name as the RVM file. The attribute file extensions searched are listed in the **Attribute file extensions** box.

If the **Search all attribute files** box is checked, the reader looks for a file using the method above, but also tries all attribute files in the same directory as the RVM irrespective of filename.

6. **Attribute file extensions** lists all extensions that will be considered for attribute conversion. This can be edited and added to where necessary.

Note

Using **Dump Attributes** may not bring through all attribute data. If more than one database is used in the project, it is recommended that attributes be exported using the **Datal** method.

7. Check the **Generate texture coordinates** check box to create texture coordinates for each point in the model. This will affect how textures are applied to the geometry.
8. Check the **Keep empty groups** check box to keep any groups in RVM file that do not contain geometry. If unchecked, such groups will be discarded.

Note

RVM files do not contain color information beyond a color number on each scene element. As these colors are customisable JetStream provides a color definition file to allow easy color personalisation.

Two examples of this file are located in the RVM subdirectory inside the main JetStream install directory:

colors.txt - these are a set of default Review™ colors (this file is used by JetStream).

PDMS_colors.txt - these are a set of the default PDMS™ colors (example file - this is not used by JetStream)

To use a different set of colors, copy the **colors.txt** file into one of the JetStream search directories, and edit the contents accordingly. The RVM Reader will search these directories on startup and use the first colors.txt file it finds. See Section 17.12, “ Search Directories ” for more information

9. **Load RVS file** should be checked if a corresponding RVS file should be searched for and loaded on loading the RVM file. To work correctly, the RVS file must have the same name as the associated RVM file, but with the .rvs extension.
10. **RVS transparencies as materials** should be checked if it is required to respect transparencies coming through from the RVS files, treating them as materials within JetStream. If this is left unchecked, RVS transparencies are ignored.
11. Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

7.1.21. IFC files

The JetStream IFC Reader reads in stand-alone .ifc files.

Supported Entities

- Faceted BReps.
- Extruded area solids.
- Geometric sets.
- Face-based and surface-based models.
- Simple, trimmed, and composite curves.
- Simple surfaces.
- Simple parametric, arbitrary and derived profiles.
- Boolean clipping results and element-level voiding and projection CSG operations.
- Basic styled and mapped items.
- Property sets, including simple and complex properties.

Unsupported Entities

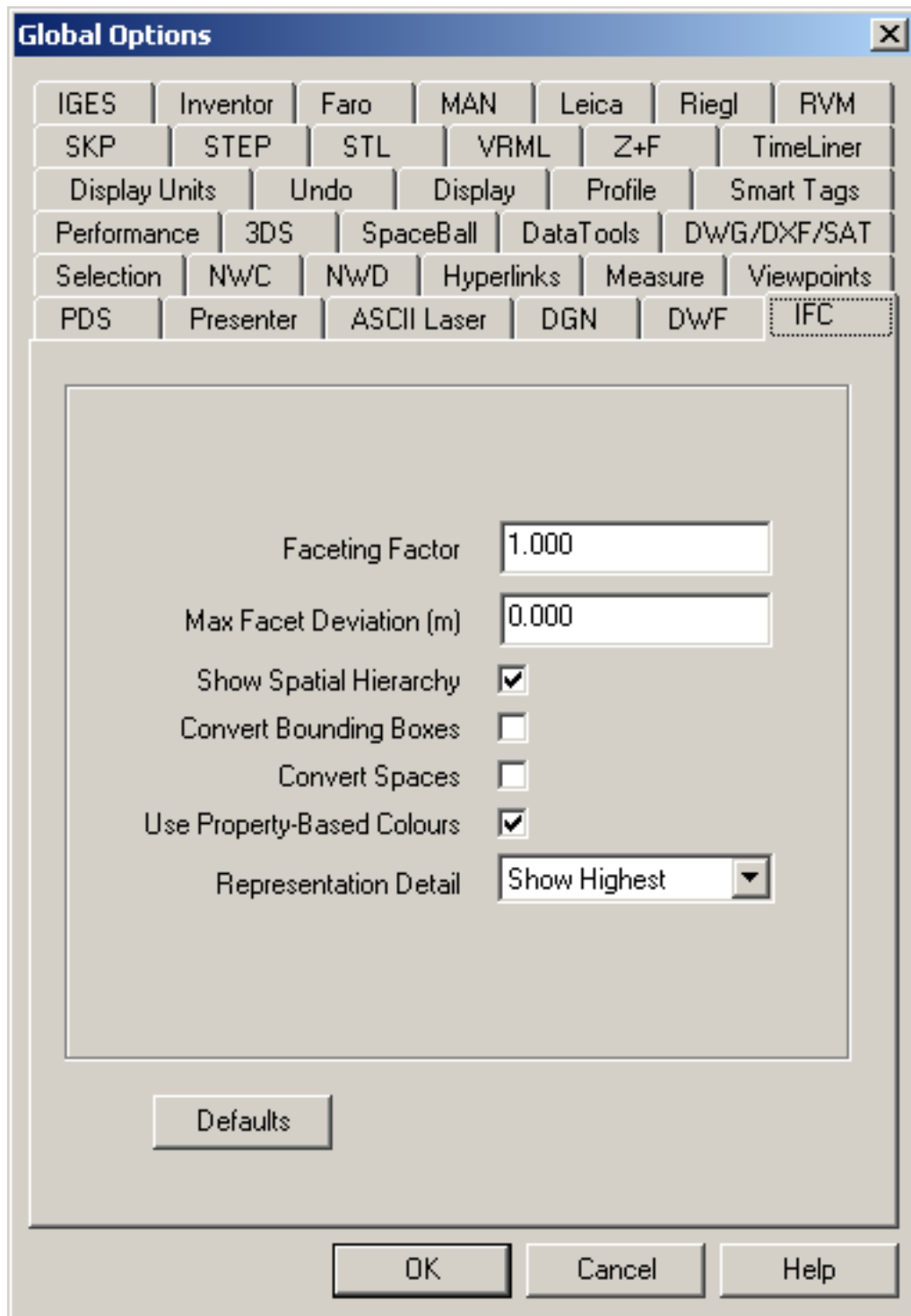
- Voided BReps.
- Bounded half-space solids.
- Complex parametric profiles.
- BSpline curves.
- Curve styles.
- Swept surfaces.
- Textures and complex lighting.
- Loading of server-based IFC models.

IFC File Reader Options

Setting the IFC file reader options

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

The **IFC** dialog is displayed



2. Enter the **Faceting Factor** (the value must be greater than 0). The higher the value, the more JetStream will facet rounded entities and therefore the smoother they will appear. See Faceting Factor for more information.
3. Enter the **Max Facet Deviation**. This will facet entities to within the specified tolerance. See Max

Facet Deviation for more information.

4. Check the **Show Spatial Hierarchy** check box to have the Selection Tree window show the IFC model representation as a tree structure rather than a simple list of elements.
5. Check the **Convert Bounding Boxes** check box to bring through and visualise bounding boxes.
6. Check the **Convert Spaces** check box to bring through and visualise spaces.
7. Check the **Use Property-Based Colours** check box to convert and use property-based colours. If it is found that an ifc file is predominantly black when loaded, uncheck this box to revert back to using ifc-standard colours.
8. IFC elements can have multiple visual representations; bounding boxes (simplest), lines, styled lines, polygons, and styled polygons (most complex). Loading and showing all of these representations can lead to cluttered visuals and memory overheads. To manage this, **Representation Detail** can be set to **Highest Only** to only load and show the most complex level of detail available whilst ignoring simpler ones, **Show Highest** to load all representations, but only show the highest level of detail available, or **Show All** which shows everything available.
9. Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

7.1.22. Sketchup SKP files

JetStream supports Sketchup through its native SKP file format.

Supported Entities

- Geometry
- Materials (face front material only)
- Transparency
- Groups
- Components
- Layers
- Imported images
- Transparency

Unsupported Entities

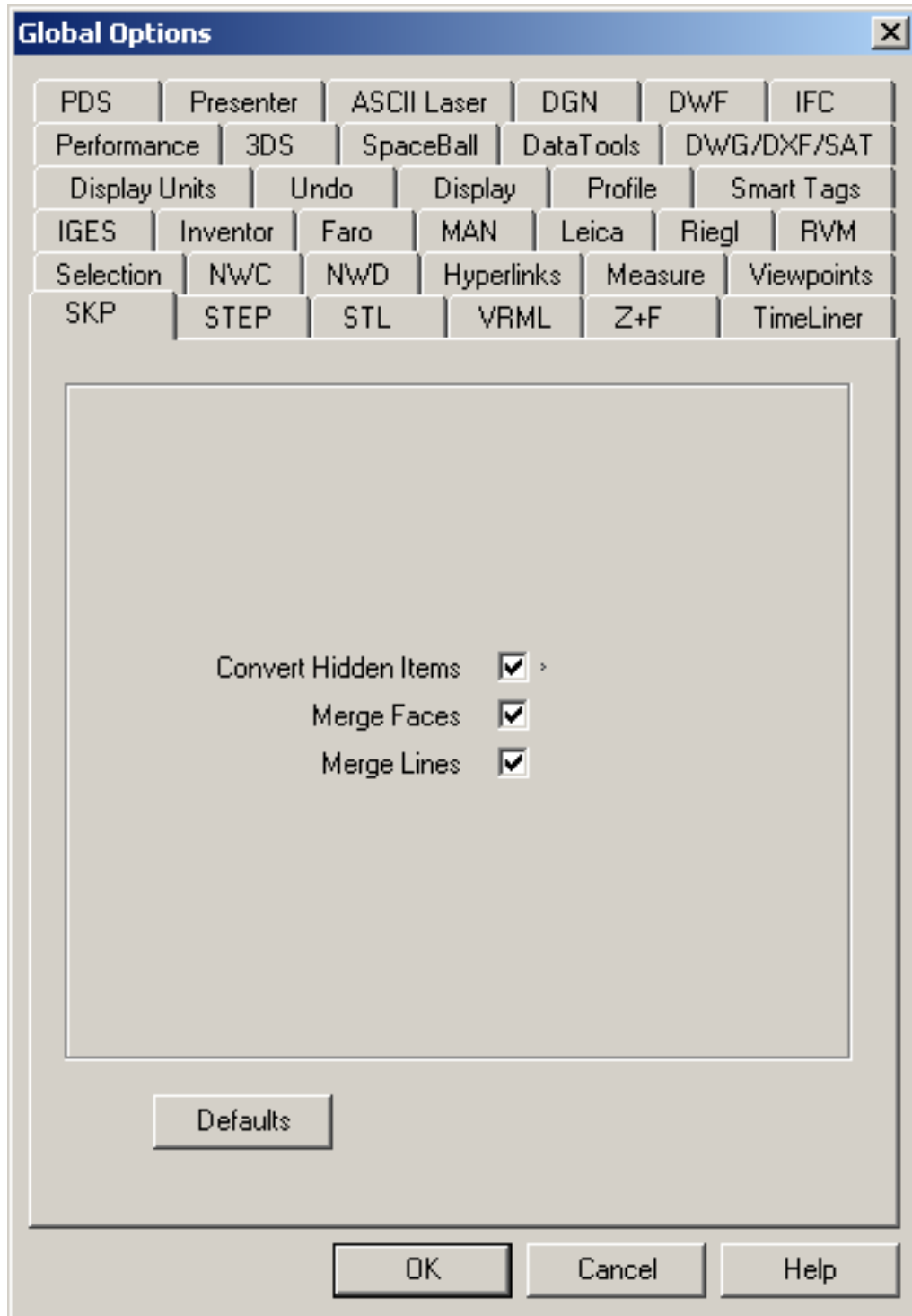
- Text
- Dimensions
- Section planes

Sketchup SKP File Reader Options

Setting the SKP file reader options

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

The **SKP** dialog is displayed



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

4. Check the **Merge Lines** check box if you want to reduce the complexity of the model as seen in the selection tree by interpreting adjoining lines with the same color, layer and parent as a single item. Leaving unchecked leaves these entities as separate items in JetStream.
5. Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

7.2. File Exporters

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

1. JetStream Roamer cannot read the native CAD file directly, in the case of ArchiCAD, Viz and Revit, but you wish to view the files created in these applications.
2. You wish to get a better quality file into JetStream. 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 an .nwc file and reading this into JetStream Roamer instead.

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

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

7.2.1. AutoCAD .nwc Exporter

JetStream 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 JetStream is installed, the ARX plugin is installed with JetStream on a **Custom Install** or **Full Install** and ready for use.

Note

If you install AutoCAD after JetStream, then install JetStream again, choosing the **Custom Install** option and choose the relevant version of AutoCAD. The JetStream 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 2007 releases.

You can also publish .nwd files directly from AutoCAD™ if you have the Publisher plugin. For more

details, refer to Section 22.2, “ Publishing from AutoCAD ”.

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 7.1.4, “ DWG and DXF Files ” 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 **I** (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 5\NWExport\nwexport.arx`, for AutoCAD 2000 based applications, this will be `C:\Program Files\NavisWorks 5\NWExport2000\nwexport2000.arx`, for AutoCAD 2004 based applications, this will be `C:\Program Files\NavisWorks 5\NWExport2004\nwexport2004.arx`, and so on.
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 JetStream 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 JetStream 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 5\NWExport\LwNw_Export.mnu, for AutoCAD 2000 based applications, this will be C:\Program Files\NavisWorks 5\NWExport2000\LwNw_Export.mnu, and for AutoCAD 2004 based applications, this will be C:\Program Files\NavisWorks 5\NWExport2004\LwNw_Export.mnu, and so on.

3. Click **Load** and then **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 22.2, “ Publishing from AutoCAD ” for more details.
- Export .nwc
See Section 7.2.1, “ AutoCAD .nwc Exporter ” for more details.
- NavisWorks Export Options
See Section 7.2.1, “ AutoCAD .nwc Exporter Options ” for more details.
- Navigator
See Section 7.3.1, “ NavisWorks Navigator for AutoCAD ” 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 7.1.4, “ DWG and DXF File Reader Options ” 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.

7.2.2. Revit .nwc Exporter

JetStream Roamer cannot read native Revit files directly, however support for both Revit Building and Revit Structures can be achieved through exporting a JetStream .nwc cache file, which can then be read into Roamer.

Note

The Microsoft .NET Framework is not installed by JetStream and must be installed for JetStream and Revit to work correctly on the same machine. If these components are not installed an error message will be displayed when Revit is started. The version of .NET Framework to install is dependent upon the version of Revit being used.

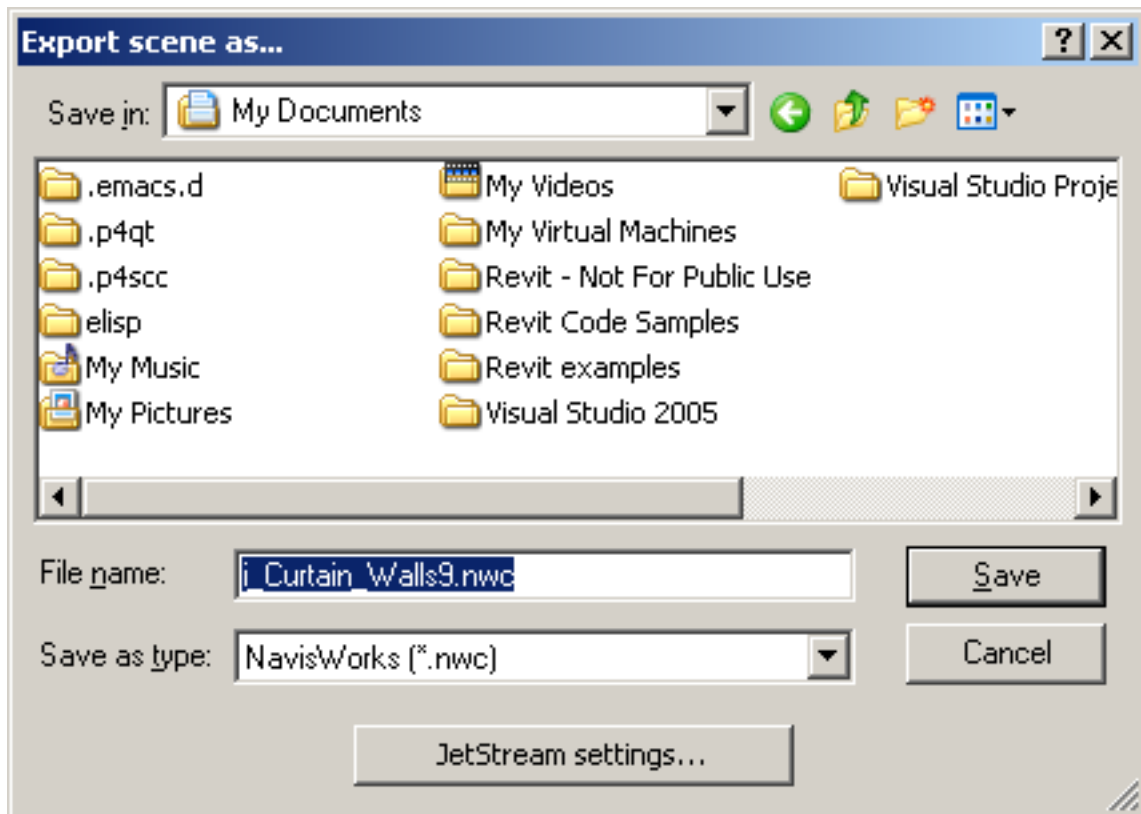
AutoDesk Revit Building 9 / Structure 3 / Systems - Install Microsoft .NET Framework 2.0
[<http://www.navisworks.com/downloads/dotnetframework20.htm>]

AutoDesk Revit Building 8 / Structure 2 - Install Microsoft .NET Framework 1.1
[<http://www.navisworks.com/downloads/dotnetframework11.htm>]

Exporting .nwc files from Revit

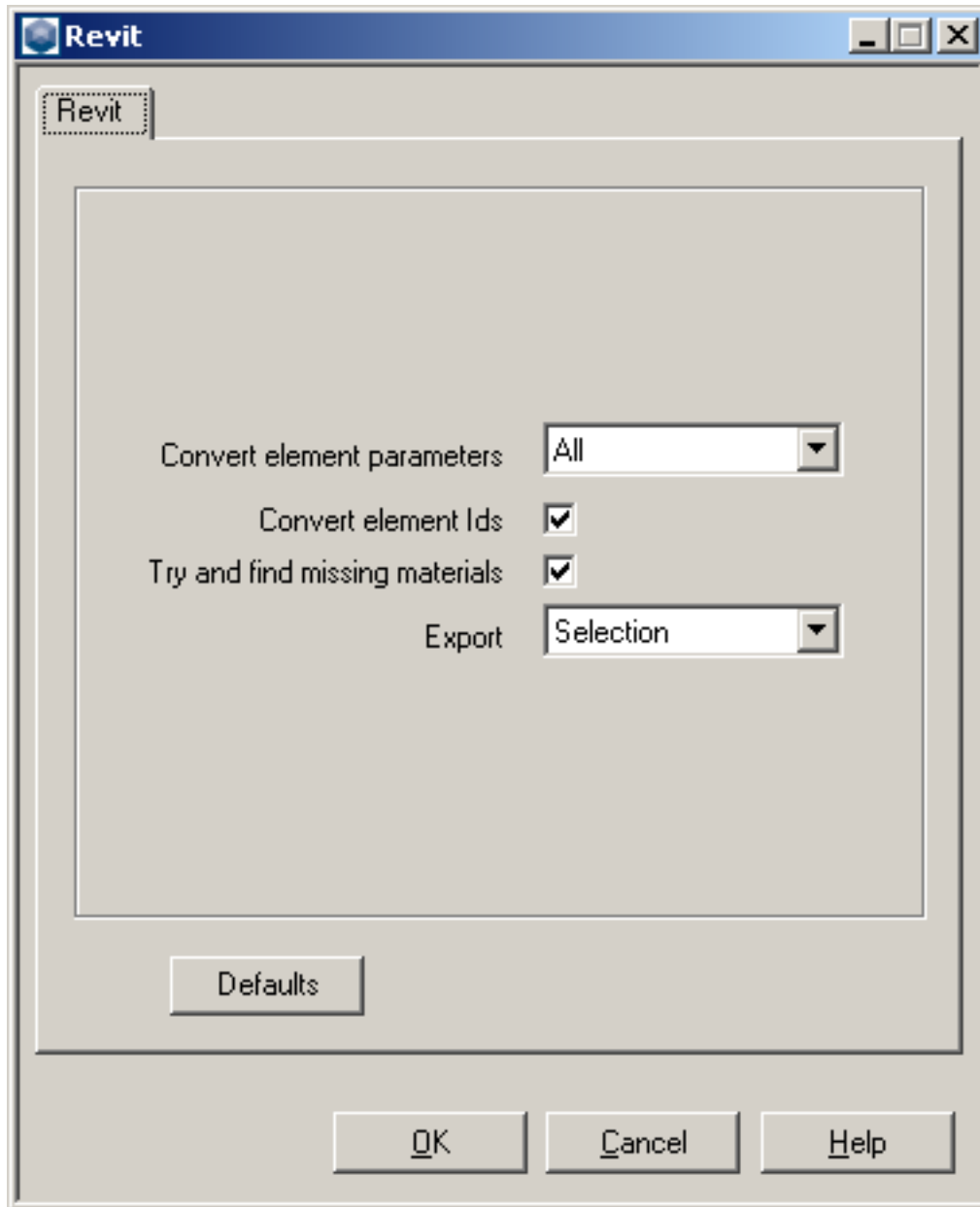
1. Start Revit and load the project.
2. Set the editing view to normal, and make sure the **Modify** tool is selected.
3. Select the **Tools, External Tools, NavisWorks JetStream v5** menu option. If this option is not available, check firstly that the **Modify** tool is selected, and secondly that the Revit license is correct such that the product is not being used in Demo/Viewer mode.

A file selection box dialog is displayed.



4. Select the location and filename you want to export to.
5. Click on the **JetStream settings** button to change the export configuration.

The **Revit Options** dialog is displayed



6. **Convert element parameters** can be set to **None** where none of the parameters are read, **Elements** where all parameter fields are read from all found elements, or **All** where all parameters from all found elements are read, as well as property tabs added for any elements referenced.
7. Check the **Convert element Ids** check box to export the id numbers on each Revit element.
8. Check the **Try and find missing materials** check box to search for an appropriate material where one is expected but not found. This can help to improve the appearance of exported models.
9. **Export** can be set to **Entire scene** where all geometry in the project is exported, **Current view** where everything that is currently visible is exported, or **Selection** where only those items that are currently selected are exported.

10. Click **OK** to export the file or **Cancel** to return to Revit without exporting it.

7.2.3. MicroStation .nwc Exporter

JetStream Roamer comes with MDL plugins for MicroStation™ 95, SE, /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 JetStream is installed, the MDL plugin is installed with JetStream on a **Custom Install** or **Full Install** and ready for use.

Note

If you install MicroStation after JetStream, then install JetStream again, choosing the **Custom Install** option and choose the relevant version of MicroStation. The JetStream 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 22.3, “Publishing from MicroStation”.

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 nwexport5**" (without the quotes) and press return.

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

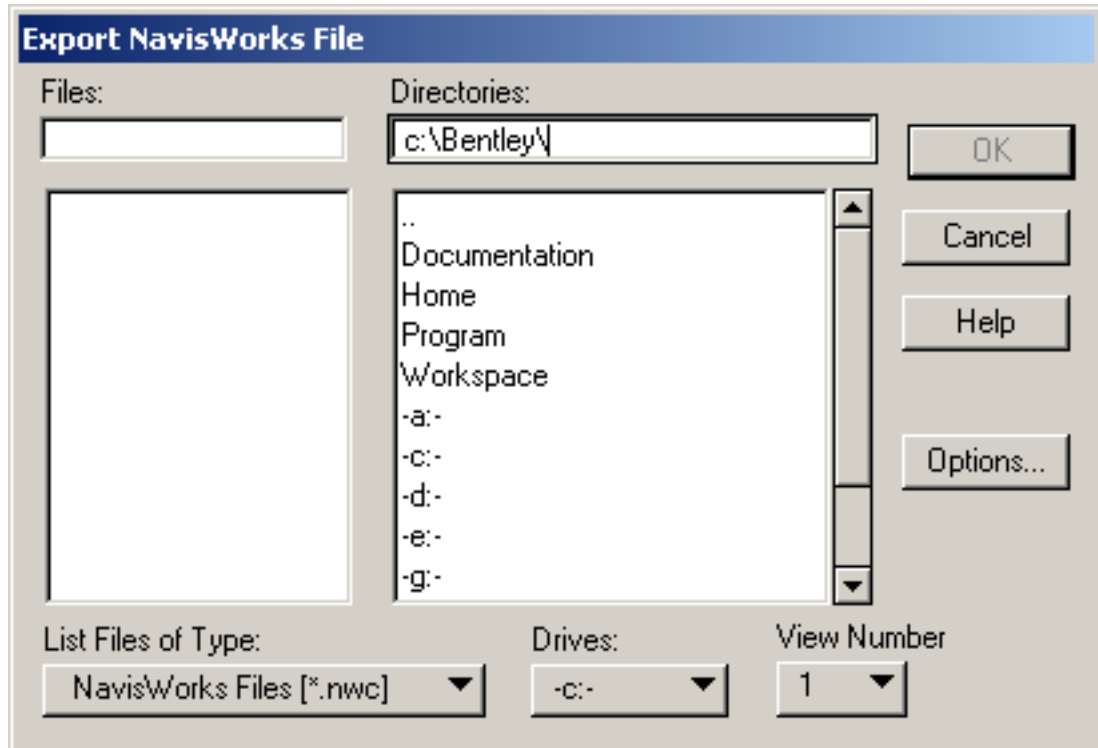
1. Go to **Workspace, Configuration**.
2. Choose **Design Applications** under **Category**.
3. Choose **NWEXPORT5** under **Available Applications**.
4. Click **Add** and confirm that you want NWExport added to your default configuration.
5. MicroStation will then automatically load NWExport in future 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. Select the location and filename you want to export to. The exporter will make a guess at a suitable filename for you.
3. Select the view number you wish to the model to be exported from.
4. Click on the **Options** button if you want to change the export configuration. See Section 7.2.3, “MicroStation .nwc Exporter Options” for more information on these options.
5. 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 7.1.8, “DGN and PRP Files” for what entities are and are not supported by the MicroStation exporter.

JetStream 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 JetStream, whether level symbology is used and which levels are hidden.

Note

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

Quickly exporting files

If you want to export the current design file quickly, you can use the **batchnwcout** key-in. This will not display the export dialog box, and it will not prompt you to overwrite any existing files. It simply replaces the design file extension (usually .dgn) with .nwc when exporting.

Exporting from the command line

The MicroStation exporter can also be run from the command line. This is useful when you want to export lots of files using an automated script.

It uses the **msbatch.bat** batch file that comes with MicroStation. To export a file from the command line, you must first ensure that the MicroStation program directory is in your `PATH` environment variable.

The format of the command line exporter is:

msbatch nwexport5 [-f] FILE [OUTPUT]

FILE is the name of the DGN file you want to export. This is the only required option. If you want, you can specify the name of the output file with the **OUTPUT** argument.

The command line exporter will only convert a file if it has changed since the last time you exported it. This is useful for speeding up exporting of a large number of files. If you want to force the exporter to re-export a file, use the **-f** option.

If the exporter encounters any problems, it will produce an error log in a file called `nwdout.err`.

MicroStation .nwc Exporter Options

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

See Section 7.1.8, “DGN File Reader Options” 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.

7.2.4. Viz and Max .nwc Exporter

While JetStream Roamer cannot directly read .max files, there is a plugin for Viz versions 3, 4 and 2005 and Max versions 5 and 6 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 JetStream is installed, the plugin is installed with JetStream on a **Custom Install** or **Full Install** and ready for use.

Note

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

See Section 7.1.7, "3DS Files" 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_maps" suffix. All textures will be converted into .bmp files and saved into this directory for use with Roamer.

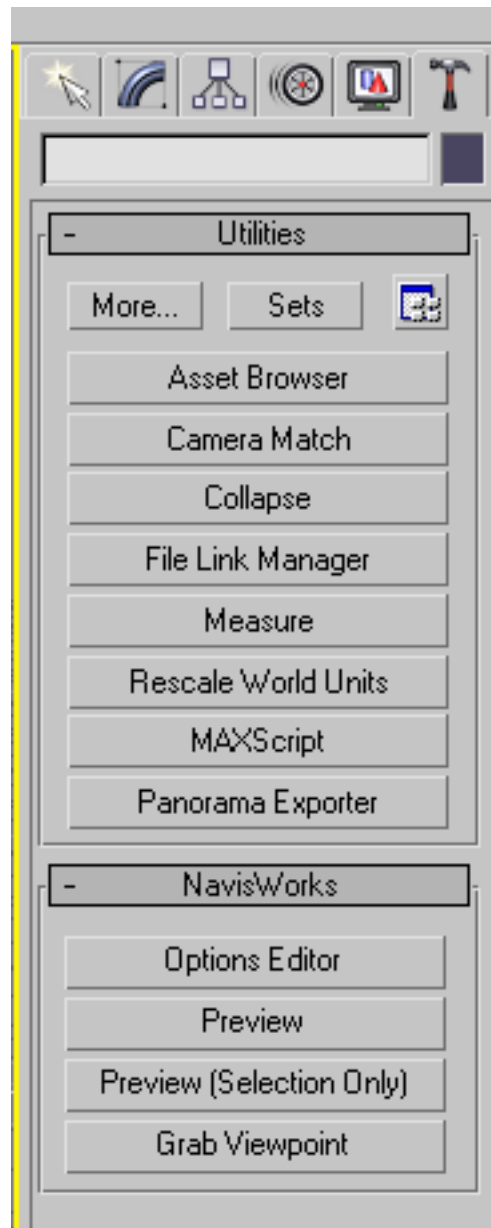
Textures can only be exported provided that you have a valid JetStream Presenter license.

Viz and Max .nwc Exporter Options

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

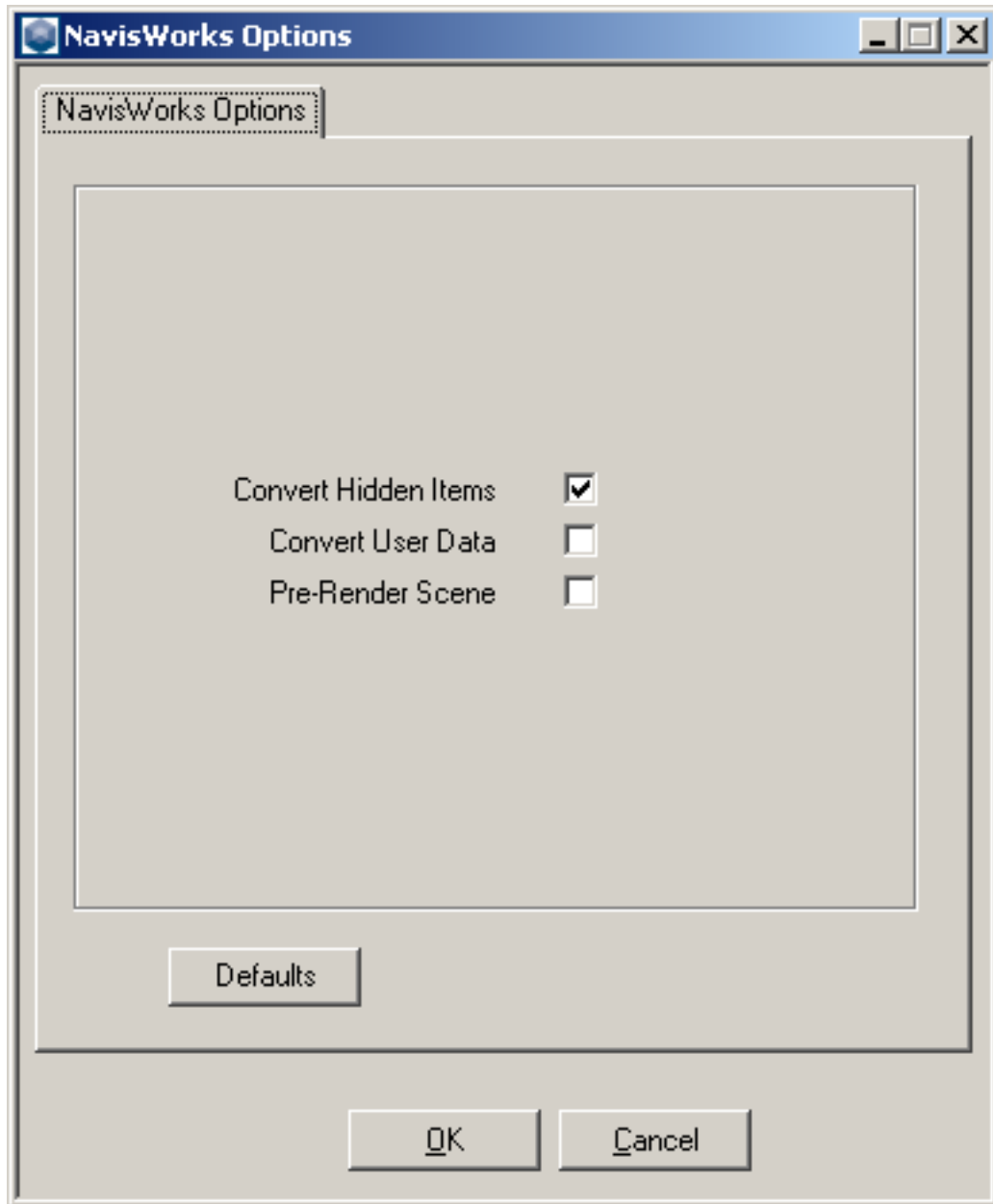
Setting the Viz and Max exporter options

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 JetStream.
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 cache all texture maps.

7.2.5. ArchiCAD .nwc Exporter

While JetStream Roamer cannot directly read ArchiCAD files, there is an add-on for ArchiCAD v6.5, v7.0, v8.0 and v9.0 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.

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 JetStream view (including window settings such as cutaway planes).

Note

Only visible layers will be exported.

Cutaway plane settings does not set the JetStream 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.

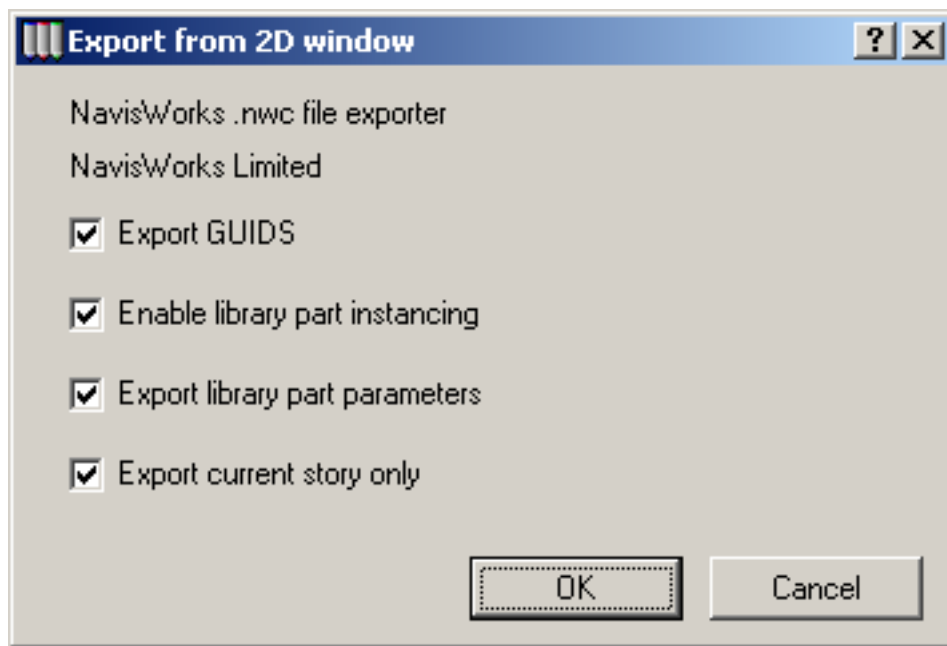
- Materials (requires a valid JetStream Presenter license).

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 JetStream.

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.

7.3. CAD Previewing

JetStream 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.

7.3.1. NavisWorks Navigator for AutoCAD

JetStream 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

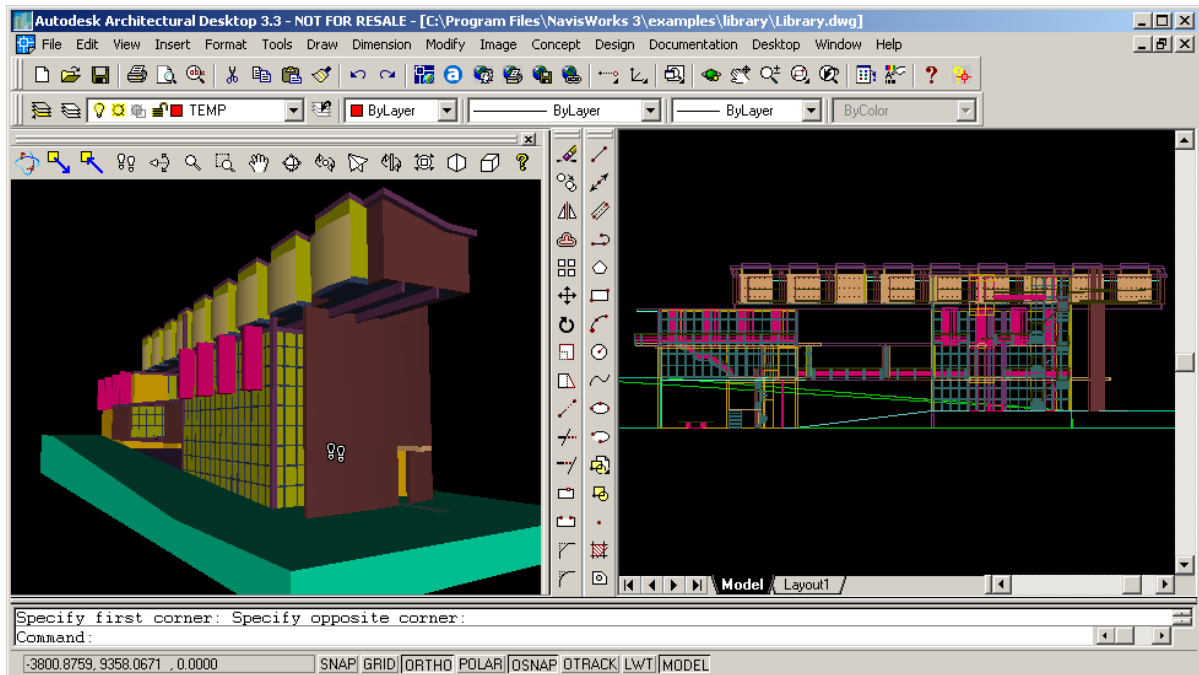
NavisWorks Navigator is not available for AutoCAD R14 or previous versions.


If you install AutoCAD after JetStream, then install JetStream again, choosing the **Custom Install** option and choose the relevant version of AutoCAD. The JetStream 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 22.4, “Freedom”, 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 7.2.1, “Loading the NavisWorks ARX Plugin” 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 JetStream ARX plugins. See Section 7.2.1, “The JetStream Partial Menu for AutoCAD” for more information on how to use this menu.

7.3.2. NavisWorks Preview for Viz and Max

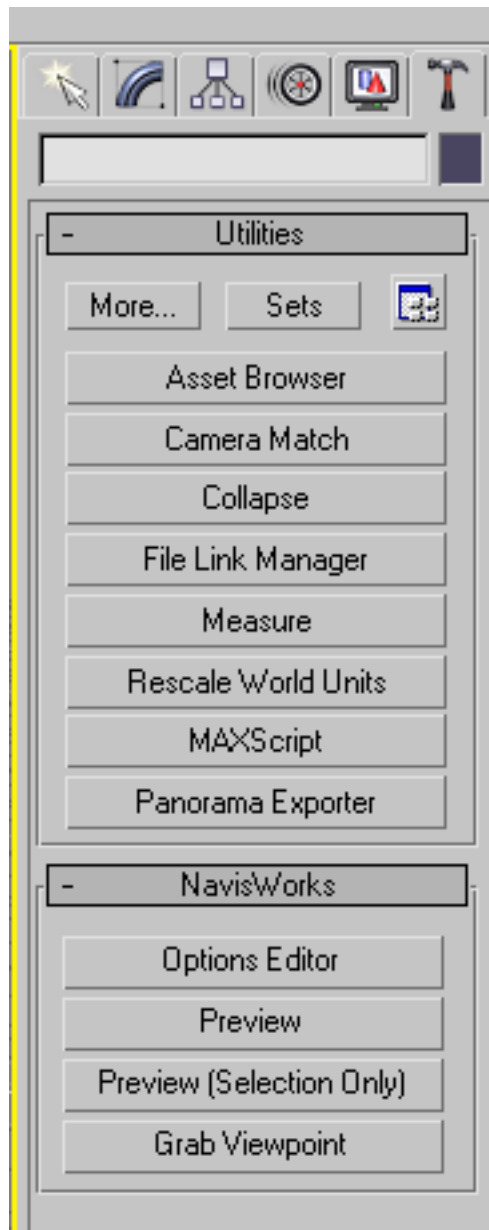
NavisWorks Preview for Viz and Max gives you a quick preview of the model and allows you to walk through it in real time inside a NavisWorks Freedom window launched from Viz.

Note

If you install Viz after JetStream, then install JetStream again, choosing the **Custom Install** option and choose the relevant version of Viz. The JetStream 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 7.2.4, “Viz and Max .nwc Exporter Options” 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 8. Navigating

JetStream 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 that further facilitate the interrogation of model data.

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.

8.1. 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 9.2.1, "Select Mode" 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 


8.1.1. 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.

8.1.2. 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.


8.1.3. 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.


8.1.4. 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.


8.1.5. 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.


8.1.6. 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.


8.1.7. 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.

8.1.8. 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.


8.1.9. 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.


8.2. 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 


Collision Detection 


Gravity 


Crouch 


Third Person 

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 17.3, “Customizing toolbars”).

8.3. 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.

8.4. 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.


8.5. 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

or

- Right click on an item in the JetStream scene or Selection Tree, then choose **Focus on Item** from the context menu.


8.6. 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.


8.7. 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

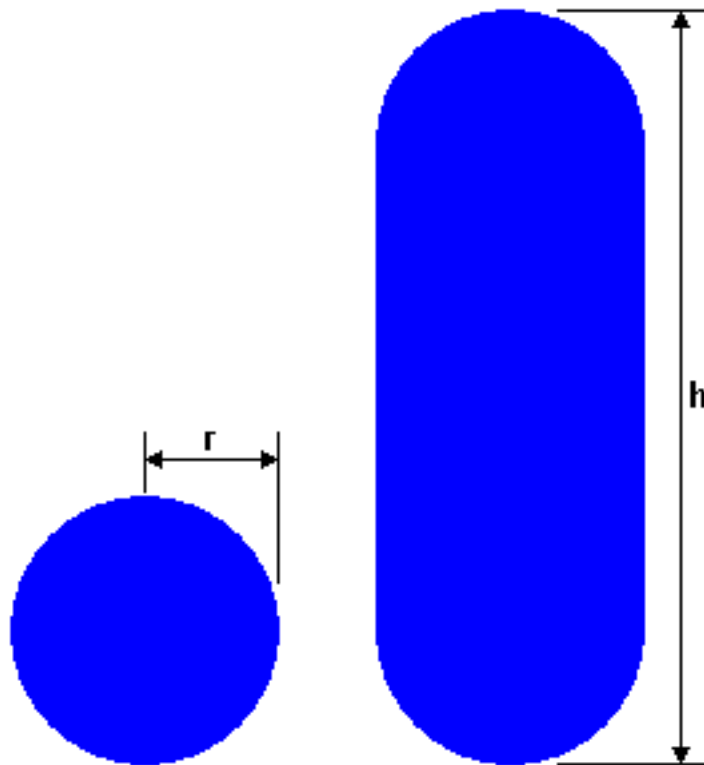
Orthographic cameras are not available with **Walk** and **Fly** navigation modes.

8.8. Collision Detection

This function defines you as a collision volume - a 3D object that can navigate around and interact with the model, obeying certain physical rules that confine you within the model itself. In other words, you have a mass and as such, cannot pass through other objects, points or lines in the scene.

You can walk over, or climb over objects in the scene that are up to half the height of the collision volume, thus allowing you to walk up stairs, for example.

The collision volume, in its basic form, is a sphere (with radius = r), that can be extruded to give it height (with height = $h \geq r$). See diagram below:



The dimensions of the collision volume are user definable settings for the current view or as a global option. See Section 13.5, “ Editing Viewpoints ” and Section 13.6, “ Viewpoints Options ” for more information.

Collision detection is only available when in either the walk or fly navigation mode.

To activate collision detection:

- In **Walk** or **Fly** navigation mode, go to **Viewpoint, Navigation Tools, Collision Detection**

or

- Click **Collision Detection**  on the **Navigation Tools** toolbar.

or

- Press **D** to toggle collision detection on/off.

Note

When Collision Detection is turned on, rendering prioritization is changed so that objects around the camera or avatar are displayed with much higher detail than normal. The size of the region of high detail is based on collision volume radius and speed of movement (needing to see what is about to be walked into).

8.9. Gravity

This function only works in connection with collision detection.


Where collision detection gives you mass, gravity gives you weight. As such, you (as the collision volume) will be pulled downwards whilst walking through the model scene (gravity is only available when in the walk navigation mode).

This allows you to walk down stairs, for example, or follow terrain.

To activate gravity:

- In the **Walk** navigation mode, go to **Viewpoint, Navigation Tools, Gravity**

or

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

or

- Press **G** to toggle gravity on/off.

8.10. Crouching

This function only works in connection with collision detection.

When walking around the model with collision detection activated, you may encounter object that are too low to walk under, a low pipe for example. This function enables you to crouch under any such objects.


With crouching activated, you will automatically crouch under any objects that you cannot walk under at your specified height, thereby not impeding your navigation around the model.

If however, you are using collision detection to identify areas of the model that you cannot walk under, (again, using a low pipe for example) then there is also a temporary crouch function to allow navigation to proceed once the obstacle has been identified.

To activate crouching:

- In the **Walk** or **Fly** navigation mode, go to **Viewpoint, Navigation Tools, Crouch**

or

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

or, if you only want to temporarily crouch

- Hold down the **Space bar** to turn crouching on. Releasing it will turn it off again.

8.11. Third Person View

This function allows you to view from a third person perspective.

When third person is activated, you will be able to see an **avatar** which is a representation of yourself within the 3D model. Whilst navigating you will be controlling the avatar's interaction with the current scene.


Using third person in connection with collision detection and gravity makes this a very powerful function, allowing you to visualize exactly how a person would interact with the intended design.

User definable settings are available for the current view and as global options, including avatar selection and dimensions and third person positioning. See Section 13.5, “Editing Viewpoints ” and Section 13.6, “Viewpoints Options ” for more information.

To view in third person:

- Go to **Viewpoint, Navigation Tools, Third Person**

or

- Click **Third Person**  on the **Navigation Tools** toolbar.

or

- Press **T** to toggle third person view on/off.

Note

When Third Person mode is turned on, rendering prioritization is changed so that objects around the camera or avatar are displayed with much higher detail than normal. The size of the region of high detail is based on collision volume radius, speed of movement (needing to see what is about to be walked into) and the distance of the camera behind the avatar (in order to see what the avatar is interacting with).


8.12. 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 17.3, “Customizing toolbars”).


8.13. 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 17.3, “Customizing toolbars”).

8.14. Preset Viewpoints

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


8.14.1. 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.


8.14.2. 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.


8.14.3. 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.

8.14.4. 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**.

8.15. 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. If your mouse has a wheel, this can be used to adjust the tilt angle.

To switch the tilt bar on and off

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

The **Tilt** control bar is displayed



8.16. 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 JetStream 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.

To turn on the plan thumbnail:

- Go to **View, Control Bars** and select **Plan Thumbnail**.

or

- Click **Plan Thumbnail**  on the **Workspace** toolbar.

The **Plan View** thumbnail is displayed



To turn on the section thumbnail:

- Go to **View, Control Bars** and select **Section Thumbnail**.

or

- Click **Section Thumbnail**  on the **Workspace** toolbar.

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 anywhere in the thumbnail to open the context menu.
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 13.5, “ Editing Viewpoints ” 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.

8.17. Using a SpaceBall

Note

The term **SpaceBall** is used as a generic term for all 3D motion controllers from 3Dconnexion™, including the SpaceBall, SpaceMouse and SpaceTraveler.

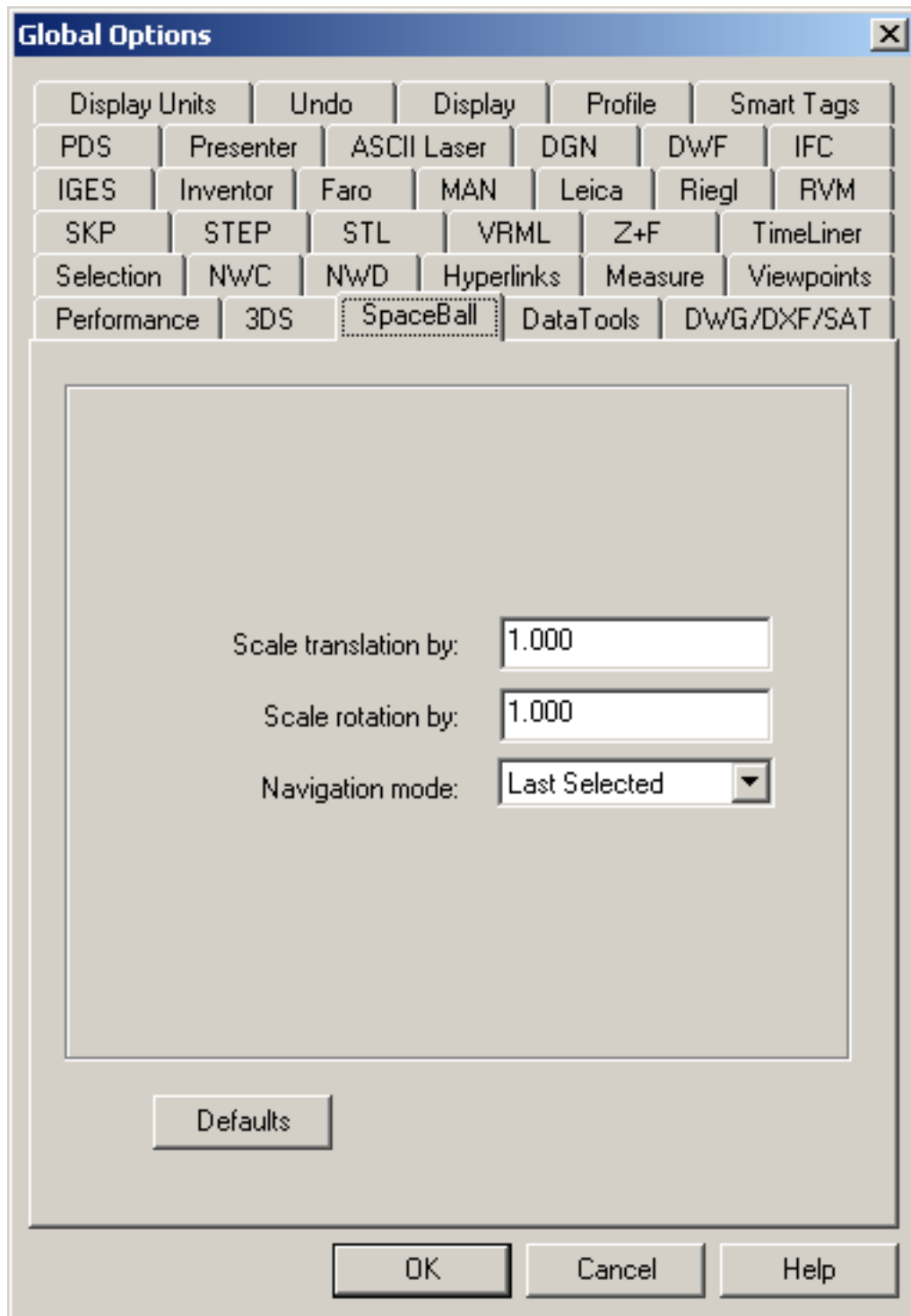
A **SpaceBall** can be used as an alternative to the mouse to move around the main navigation view. The behaviour of the SpaceBall corresponds to the currently selected Navigation Mode. If no mode is selected on the Navigation Mode toolbar or if the selected mode is not a valid mode for the SpaceBall, then a default navigation mode will be used. This enables the user to navigate with the SpaceBall whilst performing other operations with the mouse. The default navigation mode can be set in the Global Options dialog.

The speed of navigation is sensitive to the amount of force applied to the SpaceBall. However, the user can also adjust the speed of translation and rotation by applying a factor to each of these in the Global Options dialog. These options are offered in addition to the adjustments that can be made using the Control Panel for the device which is supplied by the SpaceBall manufacturer with the installation.

Setting the SpaceBall behaviour

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

The **SpaceBall** dialog is displayed



2. Modify the **Scale translation** value if you want to increase or decrease the speed of translation.
3. Modify the **Scale rotation** value if you want to increase or decrease the speed of rotation.
4. Select the **Default navigation mode** from the drop down list. This will be used when no valid navigation mode is currently selected.

Chapter 9. Selecting Items

With large models it is potentially a very time consuming process to select items of interest. JetStream 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:

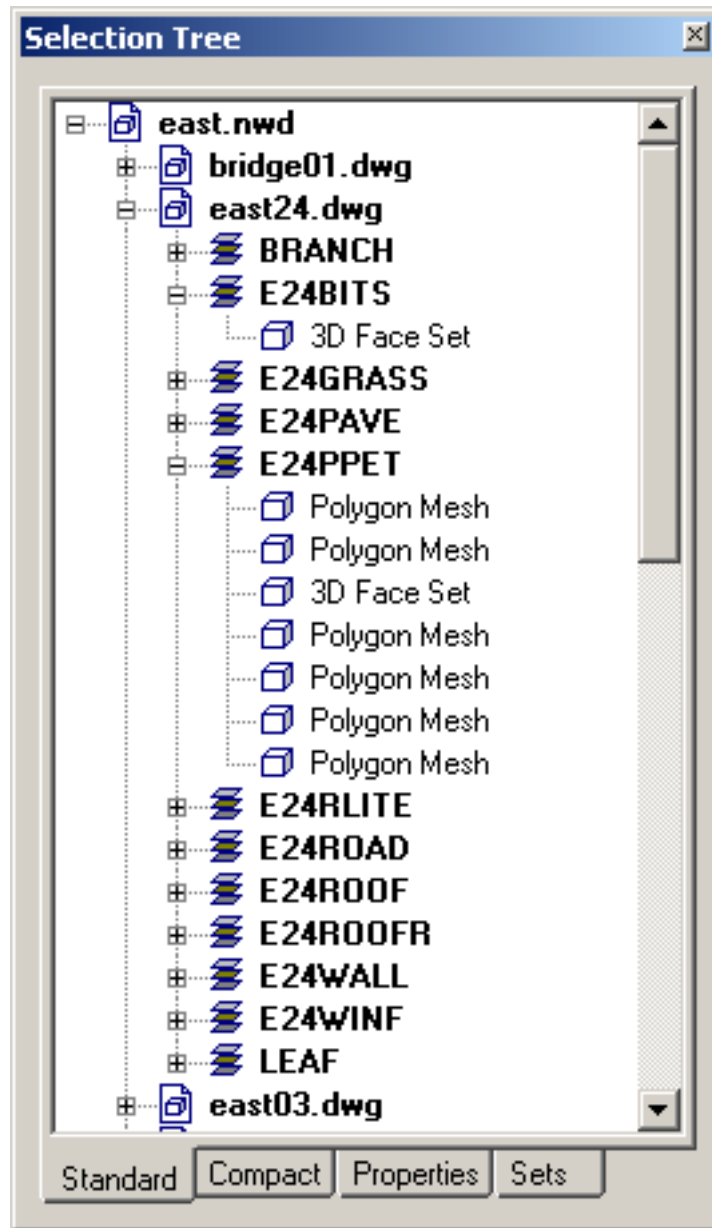
- The selection tree
- Interactive selection
- Selection sets

Also connected with selecting items is finding items, which is covered in Chapter 10, *Finding* .

In JetStream 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 and named for retrieval in later sessions.

9.1. 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. The contents of this tab can be sorted alphabetically by right-clicking on any item in the tree and selecting **Scene->Sort**. It is not possible to undo this action.
- "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 9.5, " Selection Options " 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 10, *Finding* 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, JetStream 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 composite object. A single CAD object that is represented in JetStream by a group of geometry items.

 A search. Behind the scenes, JetStream 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 9.3, "Selection and Search Sets" 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 10.2, "Finding Items" for more information.

Note

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

9.2. Interactive Selection

JetStream 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.

9.2.1. Select Mode

As standard, this mode is mutually exclusive to the navigation modes so that when you are selecting, you cannot navigate and vice versa.

Note

When using a SpaceBall in conjunction with the standard mouse control, the SpaceBall can be configured for navigation and the mouse for selecting. See Section 8.17, “ Using a SpaceBall ” for more information.

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. Alternatively, 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.

9.2.2. 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.

9.2.3. 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.

- **Selection Sets**

Provides you with options to save and recall sets. See Section 9.3, “ Selection and Search Sets ”.

- **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 selected 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.

9.3. 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 10, *Finding* 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.

9.3.1. 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 10.2, “ Finding Items ”.
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**.

9.3.2. Recalling Selection and Search Sets

To re-select items from a selection set

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

or


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

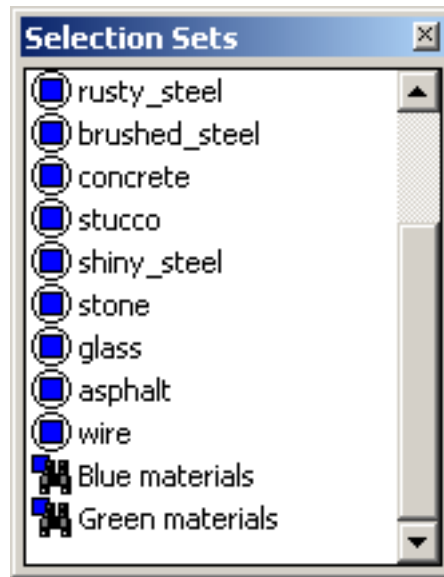
Note

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.

9.3.3. 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 9.3.1, " Saving Selection and Search Sets ". This also gives access to the **Add Folder** and **Sort** options as detailed below.

Managing Selection Sets

1. Right click on a selection set.
2. Choose **Add Folder** to create a new folder above the selected item.
3. Choose **Save Current Selection** to save the current selection as a selection set in the list. This set will contain the currently selected items.
4. Choose **Save Current Search** to save the current search as a selection set to the list. This set will contain the current search criteria.
5. Choose **Make Visible** to make visible the items contained within the selected selection set.
6. Choose **Add Comment** to add a comment to the selection set. This command will display the comments text edit dialog. See Section 16.1, " Commenting " for more information on comments.
7. Choose **Edit Comment** to edit a comment attached to the selected selection set. This command will display the comments text edit dialog. See Section 16.1, " Commenting " for more information on comments.
8. 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.
9. 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.
10. Choose **Delete** to delete the selected selection set.

11. Choose **Rename** to rename the selected selection set.
12. Choose **Sort** to sort the contents of the Selection Sets window alphabetically.

Using Folders to Manage Selection Sets

- Folders in the Selection Sets control bar work in a similar way to how they do in Microsoft Windows. They can be created by right clicking either on a blank space in the **Selection Sets** control, or on any visible item in the list and selecting **Add Folder** from the context menu. If the item selected is a folder, then the new folder will be created inside, otherwise it will be created in the root of the control above the selected item.

Items in the list can also be dragged and dropped into and out of folders, including folders themselves as well as their contents, simply by selecting the item, holding the left mouse button down, moving over to where the item should be placed, and letting go of the left mouse button. In this way it is possible to create a variety of nested folders containing any number of folders, selection and search sets.

9.4. 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, JetStream 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 JetStream what level in the selection tree to start selecting items at by default.

The options are:

- Model
Selects the whole model.
- Layer
Selects all items on a layer.
- First Object
Selects the first item in the selection tree path that isn't a layer.
- Last Unique
Selects the most specific item (furthest along the selection tree path) that is unique (not 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. This is the **Default** selection

resolution setting.

- Geometry

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

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 "geometry", 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.

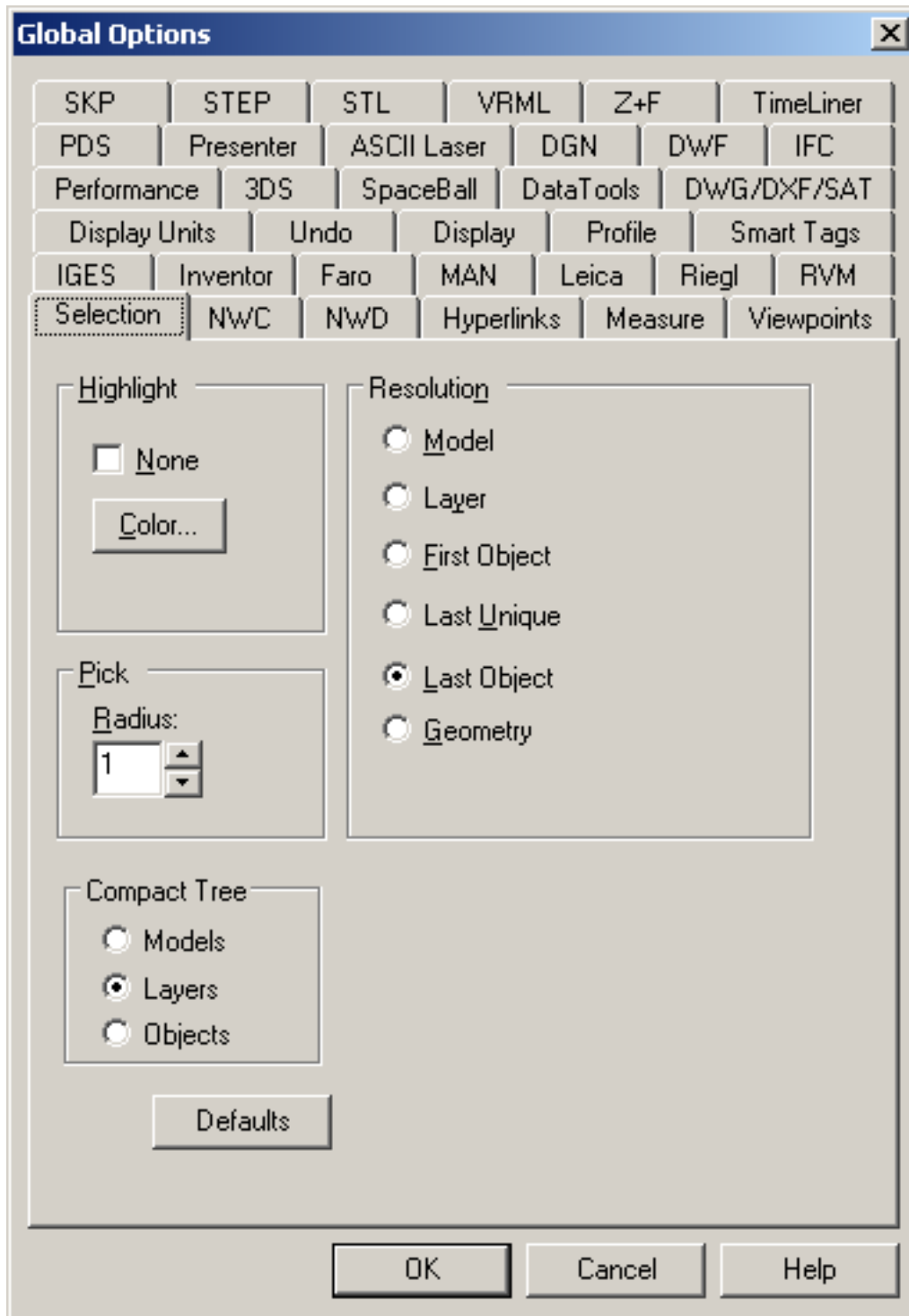
9.5. Selection Options

Use the **Selection** options to configure how you select items in the JetStream 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 10. 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 9.3.1, " Saving Selection and Search Sets ") and re-run in later sessions.

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

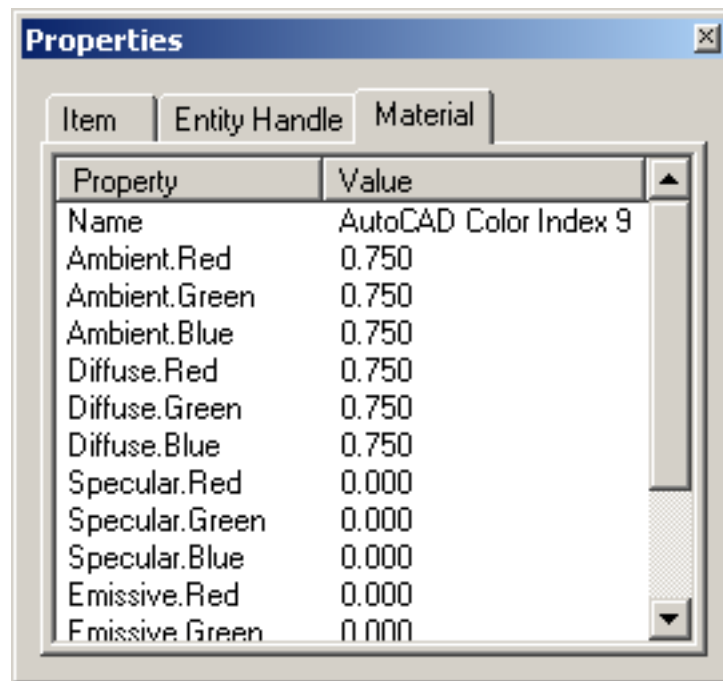
10.1. Properties


The **Properties** control bar shows all the properties of a selected item. 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 16.4, " Hyperlinks " for more details on hyperlinks.

JetStream 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**.

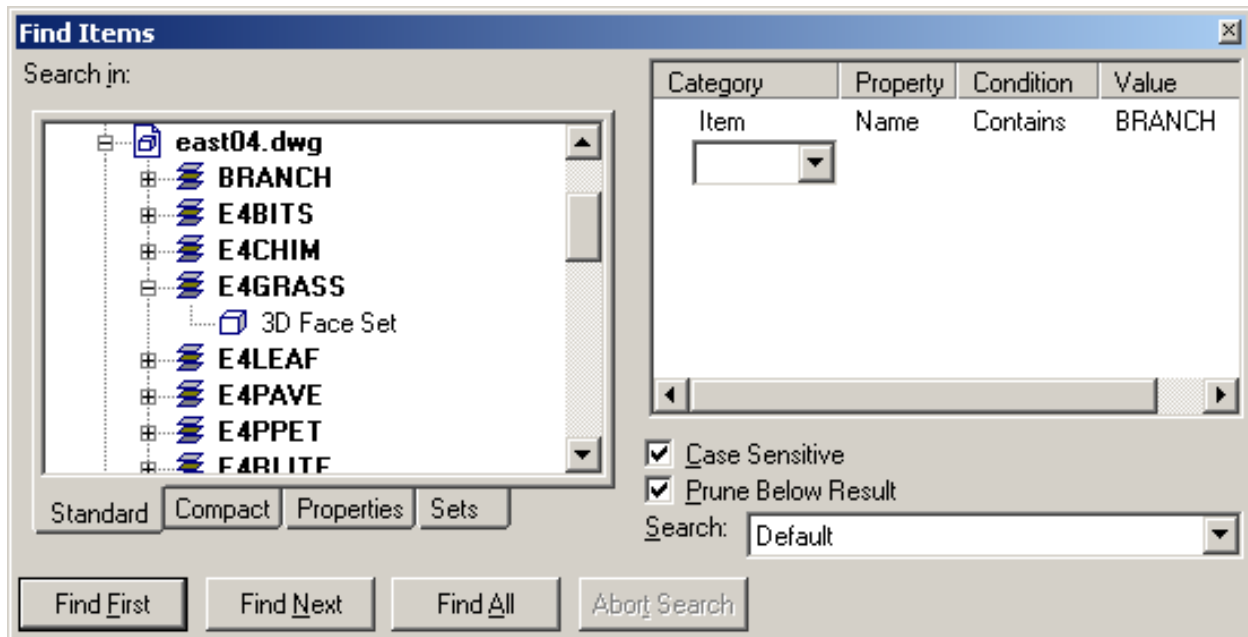
Properties can be brought in from an external database and shown inside database-specific tabs in the Properties control bar. See Chapter 20, *DataTools* for more details on how to bring through object properties using DataTools.

10.2. Finding Items

In JetStream, 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 9.1, “ Selection Trees ” 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 you can use wildcards in the **Value** field to allow matching against any character or an arbitrary sequence of characters. 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. If you chose **Wildcard** in the **Condition** column you can type in a value with wildcards. To match one single unspecified character use the symbol **?**, for example, a **Value** field of "b??ck" will match "brick" and "block". To match any number of unspecified characters, use the symbol *****, for example, a **Value** field of "b*k" will match "bench kiosk", "brick" and "block". Similarly, a **Value** field of "*b*k*" will match "bench kiosk", "brick" and "block" and also "Coarse bricks" and "block 2".
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 Category ...** 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 items, 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

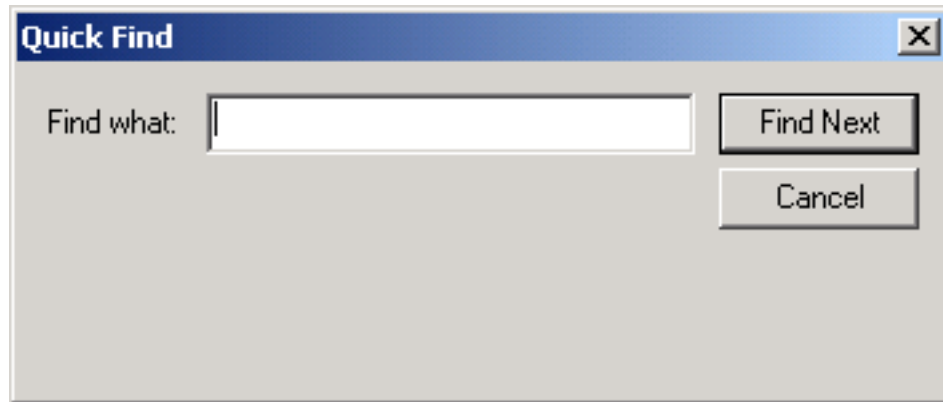
Say you have set up four conditions in the search called C1, C2, C3 and C4. If you want to search for (C1 AND C2) OR (C3 AND NOT C4), then you would select condition 3 and choose **Or Condition** from the context menu, and then select condition 4 and choose **Negate Condition** from the context menu. 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, the precedence is NOT, then AND, then OR.

10.3. Quick Find

As well as the more comprehensive and powerful **Find Item** feature (see Section 10.2, "Finding Items"), JetStream also offers a simpler and quicker **Quick Find**. This simply searches for a string (case insensitive) in all property 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 JetStream.
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.

10.4. 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 16.1, “Commenting”. Alternatively, go to **Edit, Find Comments**.

As usual in JetStream, 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:

Find Comments

Find Comments Date Modified Source

Text
[]

Author
Paul

ID
[]

Status
...

Match Case

Name	Comment	Date	Author	ID	Status
------	---------	------	--------	----	--------

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. If you know the ID of the comment you want to find, enter this in the **ID** text box.
5. If you want to restrict your search to comments of a particular status, select the required status from the **Status** drop-down menu.

6. Check the **Match Case** check box if you want the search to respect lower and upper case characters in the search.
7. 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.
8. Clicking on the **Source** tab and check the relevant check boxes for **Clash Detective**, **TimeLiner**, **Selection Sets**, **Viewpoints** or **Redline Tags** to restrict the search by the source that the comment is attached to. The Clash Detective and TimeLiner options are only available if you have the relevant plugin licenses.

Note

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

9. Click **Find** to search for the comments.
10. 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 11. Editing

As JetStream 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, or move it by overriding its transform. Also you can edit an item's 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
- Quick Find
- Quick Find Next
- Find Items
- Find Comments
- 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 holding items.



11.1. Holding and releasing objects

When navigating around a model in JetStream 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, Pan 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 11.7.3, “Resetting Items' Positions”.

11.2. Undo/Redo

You can undo or redo your actions in JetStream. 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.

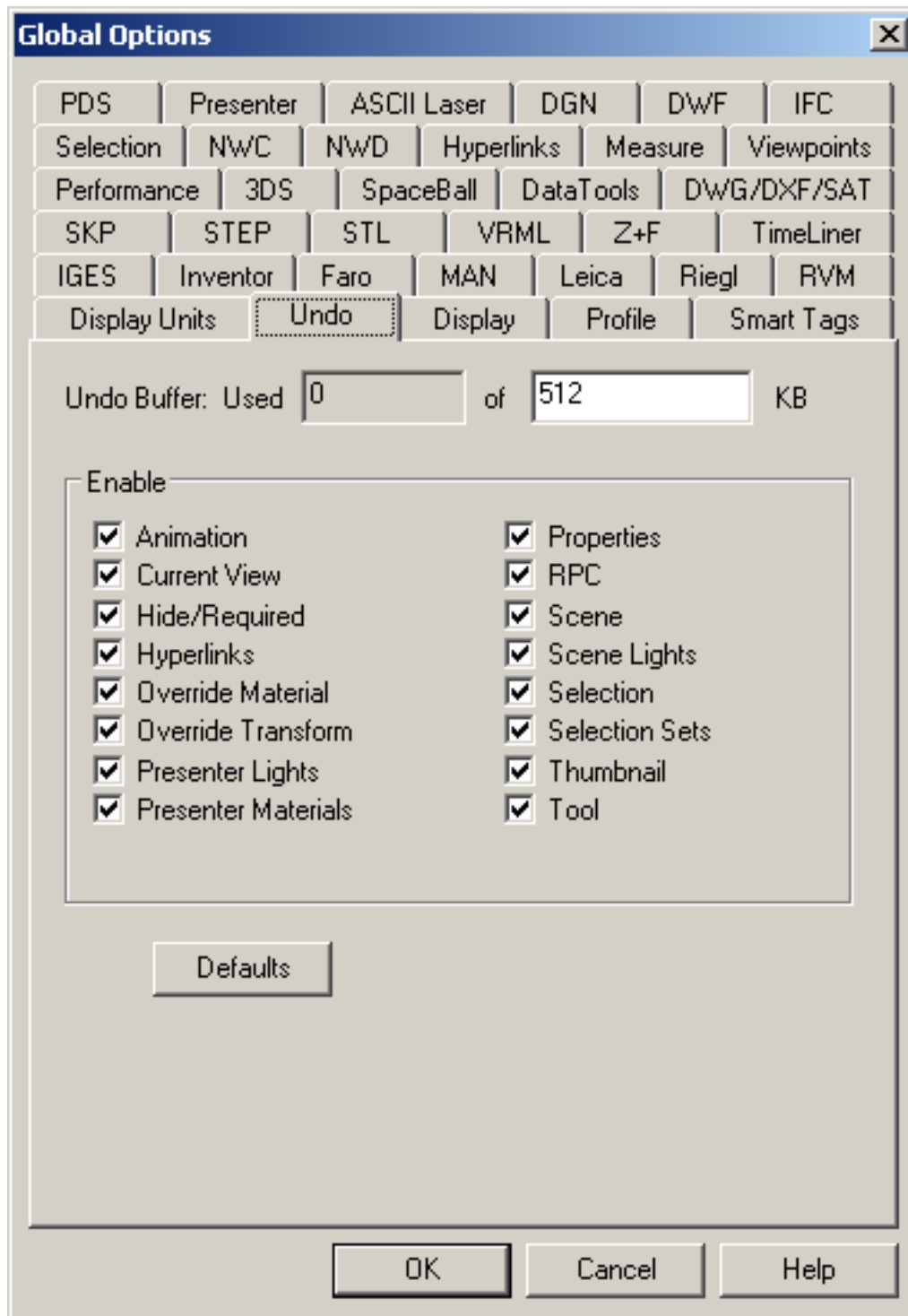
Undo Options

The **Undo** tab of the **Global Options** dialog box allows you to tailor how you wish the **Undo** and **Redo** commands in JetStream to function. The check boxes select the types of actions to undo and redo with the undo/redo actions in JetStream. 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.


11.3. Hiding Items

This command hides the current selection and allows you to 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 9, *Selecting Items* for more information on how to do this).
2.
 - Go to **Edit, Hide Item**or
 - Click **Hidden**  on the **Standard** toolbar.

11.4. 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 to 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 9, *Selecting Items* for more information on how to do this).
- 2.

- Go to **Edit, Item Required**

or

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

11.5. 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 to 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 visible (see Chapter 9, *Selecting Items* for more information on how to do this).
2.
 - Go to **Edit, Hide Unselected Items**

or

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

11.6. 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 13.6, “Viewpoints Options”).

11.6.1. 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**or
 - Right-click on the item and select **Override Color....**
2. Select a color from the color-chooser and click **OK**.

Note

Any materials applied with the Presenter plugin will supersede any color overrides.

11.6.2. 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**or
 - Right-click on the item and select **Override Transparency....**
2. Use the slider to select level between opaque and transparent and click **OK**.

Note

Any materials applied with the Presenter plugin will supersede any transparency overrides.

11.6.3. Overriding Transforms

This option allows a user-defined transform to be applied to the position of an item in the scene. The original position of the item is saved in case it needs to be reset later.

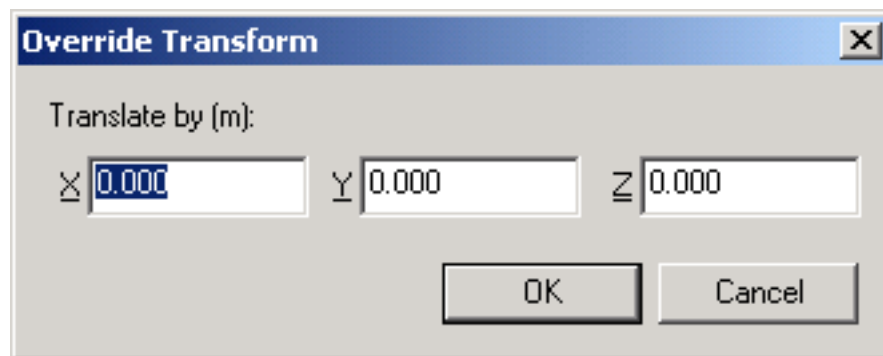
Overriding an item's transform

1. Select the item(s) that you wish the transform to be applied to (see Chapter 9, *Selecting Items* for more information on how to do this).
2.
 - Go to **Edit, Override Item, Transform...**

Or

- Right click on the selected item(s) and select **Override Transform...** from the context menu.

The **Override Transform** dialog is displayed:



3. Enter the XYZ values of the transform to be applied to the item(s). For example, a transform of (0, 0, 1) will reposition an item by one unit in the Z direction
4. Click **OK** to apply the transform, or **Cancel** to return to JetStream without applying it

Also see Section 16.3.2, "Transforming Objects" for more information on interactively transforming objects.

11.6.4. 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 a property by JetStream, they can be searched on with the **Find Items** tool and displayed in the **Properties** bar. They are also saved into JetStream files so that as the model changes, the links remain for you and others to view.

See Section 16.4, "Hyperlinks" for more information on overriding hyperlinks.

11.7. 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.

11.7.1. 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**

11.7.2. 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**

11.7.3. Resetting Items' Positions

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

To reset an item's position

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

Or

- Right click on the item and choose **Reset Transform**.

11.8. 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.

11.8.1. 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**

11.8.2. Resetting All Items' Hyperlinks

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

To restore all items hyperlinks

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

11.8.3. Revealing All Items

This option reveals (unhides) all items

To reveal all items

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

11.8.4. 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**

11.8.5. Resetting All Items' Positions

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

To restore all items positions

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


11.9. Custom Properties

Property information brought into JetStream from a CAD application cannot be edited, with the exception of color, transparency and hyperlinks, as described in the previous section. You can however add your own custom information to any item in the model scene.

11.9.1. Add User Data Tab

This option allows a user-definable tab to be added to the **Properties** control bar.


Adding a new user data tab

1. If it's not already displayed, go to **View, Control Bars, Properties**, or click **Properties**  on the **Workspace** toolbar, to open the **Properties** control bar.
2. Select the item in the JetStream scene to which you wish the new data tab to be associated with.
3. Right-click in the **Properties** control bar and select **Add New User data Tab...**

11.9.2. Rename User Data Tab

This option allows a user-definable tab to be renamed in the **Properties** control bar.


Renaming a user data tab

1. If it's not already displayed, go to **View, Control Bars, Properties**, or click **Properties**  on the **Workspace** toolbar, to open the **Properties** control bar.
2. Select the user data tab you wish to rename.
3. Right-click in the **Properties** control bar and select **Rename Tab**.
4. Enter a new name for the tab, then click **OK**, or click **Cancel** to return to JetStream without renaming the tab.

11.9.3. Add New Property

This option allows a custom property to be added to a user data tab in the **Properties** control bar.

Adding a new property to a user data tab


1. If it's not already displayed, go to **View, Control Bars, Properties**, or click **Properties**  on the **Workspace** toolbar, to open the **Properties** control bar.
2. Select the user data tab you wish to add the new property to.
3. Right-click in the **Properties** control bar and select **Add New Property**, then select the property type you wish to add:

- **String**. Select this property type if the value you wish to add is a string.
- **Boolean**. Select this property type if the value you wish to add is **Yes** or **No**.
- **Float**. Select this property type if the value you wish to add is a decimal value, for example 1.234.
- **Integer**. Select this property type if the value you wish to add is a positive whole number (1, 2, 3,...), a negative whole number (-1, -2, -3,...), or zero (0).

11.9.4. Edit Property Value

This option allows the value of a custom property to be edited in the **Properties** control bar.

Editing the value of a custom property

1. If it's not already displayed, go to **View, Control Bars, Properties**, or click **Properties**  on the **Workspace** toolbar, to open the **Properties** control bar.
2. Select the user data tab containing the custom property whose value you wish to edit.
3. Right-click on the **Property** whose value is to be edited and select **Edit Property Value**.

Note


For **Boolean** properties, select **Set Property Value** then **Yes** or **No** from the list.

4. Enter the new value for the property, ensuring it is valid for the property type.
5. Click **OK** to accept the edit, or **Cancel** to return to JetStream without editing the property value.

11.9.5. Rename Property

This option allows you to rename a custom property added to a user data tab in the **Properties** control bar.

Renaming a custom property


1. If it's not already displayed, go to **View, Control Bars, Properties**, or click **Properties**  on the **Workspace** toolbar, to open the **Properties** control bar.
2. Select the user data tab containing the custom property you wish to rename.
3. Right-click on the **Property** to be renamed and select **Rename Property**.

4. Enter the new name for the property then click **OK**, or **Cancel** to return to JetStream without renaming the property.

11.9.6. Delete Property

This option allows you to delete a custom property added to a user data tab in the **Properties** control bar.


Deleting a custom property

1. If it's not already displayed, go to **View, Control Bars, Properties**, or click **Properties**  on the **Workspace** toolbar, to open the **Properties** control bar.
2. Select the user data tab containing the custom property you wish to delete.
3. Right-click on the **Property** to be deleted and select **Delete Property**.

11.9.7. Delete User Data Tab

This option allows you to delete a user data tab from the **Properties** control bar.

Deleting a user data tab

1. If it's not already displayed, go to **View, Control Bars, Properties**, or click **Properties**  on the **Workspace** toolbar, to open the **Properties** control bar.
2. Select the user data tab you wish to delete.
3. Right-click in the **Properties** control bar and select **Delete User Data Tab**.

11.10. Setting a File's Units and Transform

You may need to use this feature when working with Clash Detective and/or Presenter, where it's important to have the model in the correct units and scale, to ensure clash results are accurate and materials are applied correctly. You may also find this useful 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 17.10, "Units" for a discussion of units and how to adjust them.

Note

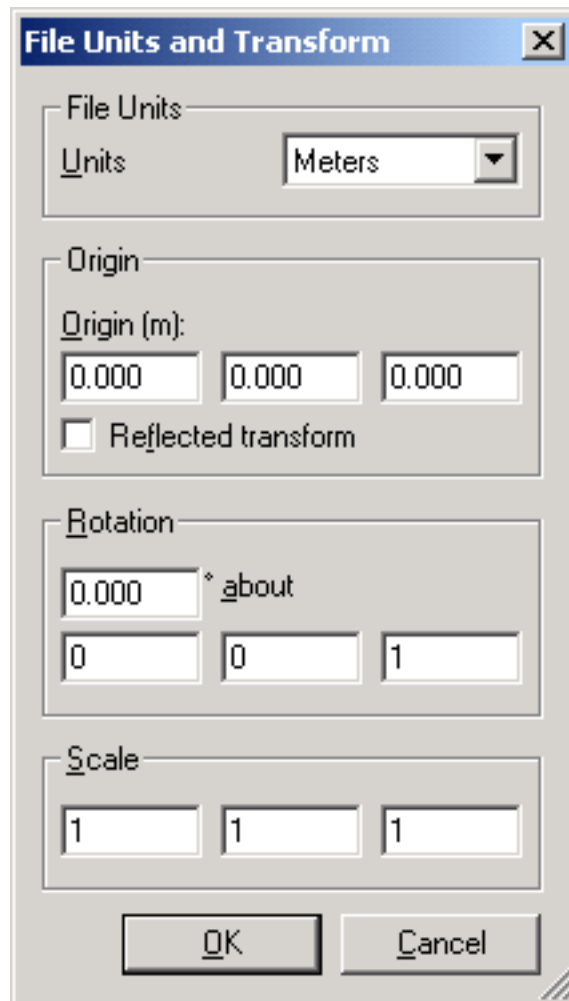
If you select an item that is inside the file and do a **File Transform** on it, the whole file will be transformed - not just the item selected. To transform a specific item within a file you will need to use the **Override Item Transform** function.

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 12. 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 12.5, “ Display Options ” later in this chapter) and file options (see Section 19.1, “ File Options ”, this enables you to fully control the appearance of the JetStream main navigation window.

12.1. 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:

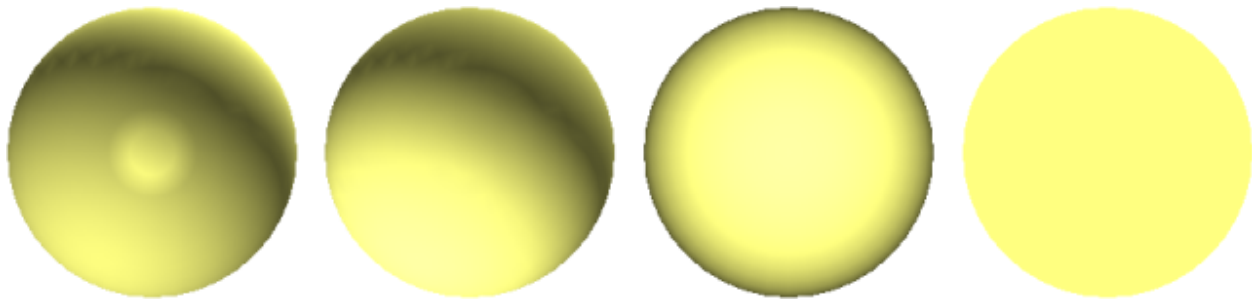


If it is not already displayed, you can display it from the **View, Control Bars, Rendering Style** menu.

12.1.1. 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 19.1, “ File Options ” for details on this).

The spheres below demonstrate the effect the lighting styles have on them. In order from the left, these are full lights, scene lights, head light and no lights.




12.1.1.1. 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.


12.1.1.2. 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.

12.1.1.3. 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.

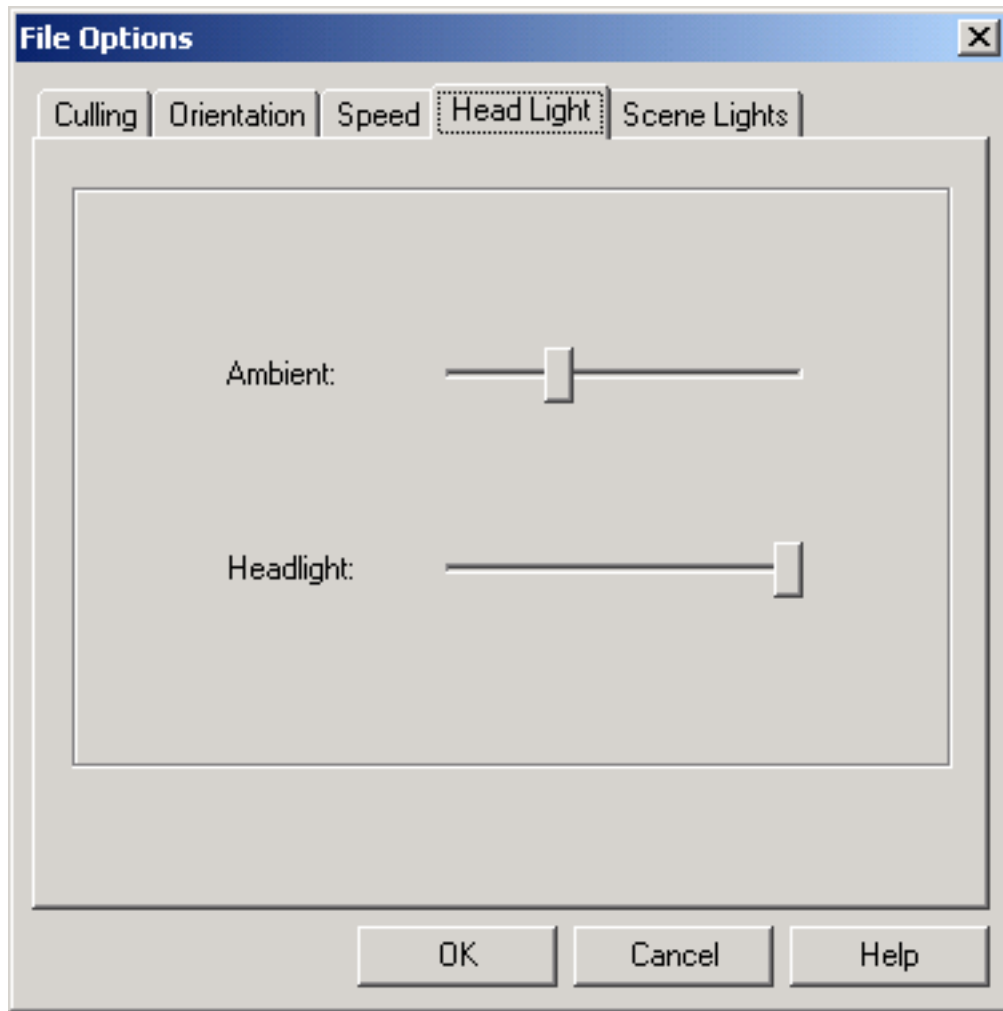
Note

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.


12.1.1.4. 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.

12.1.1.5. 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.

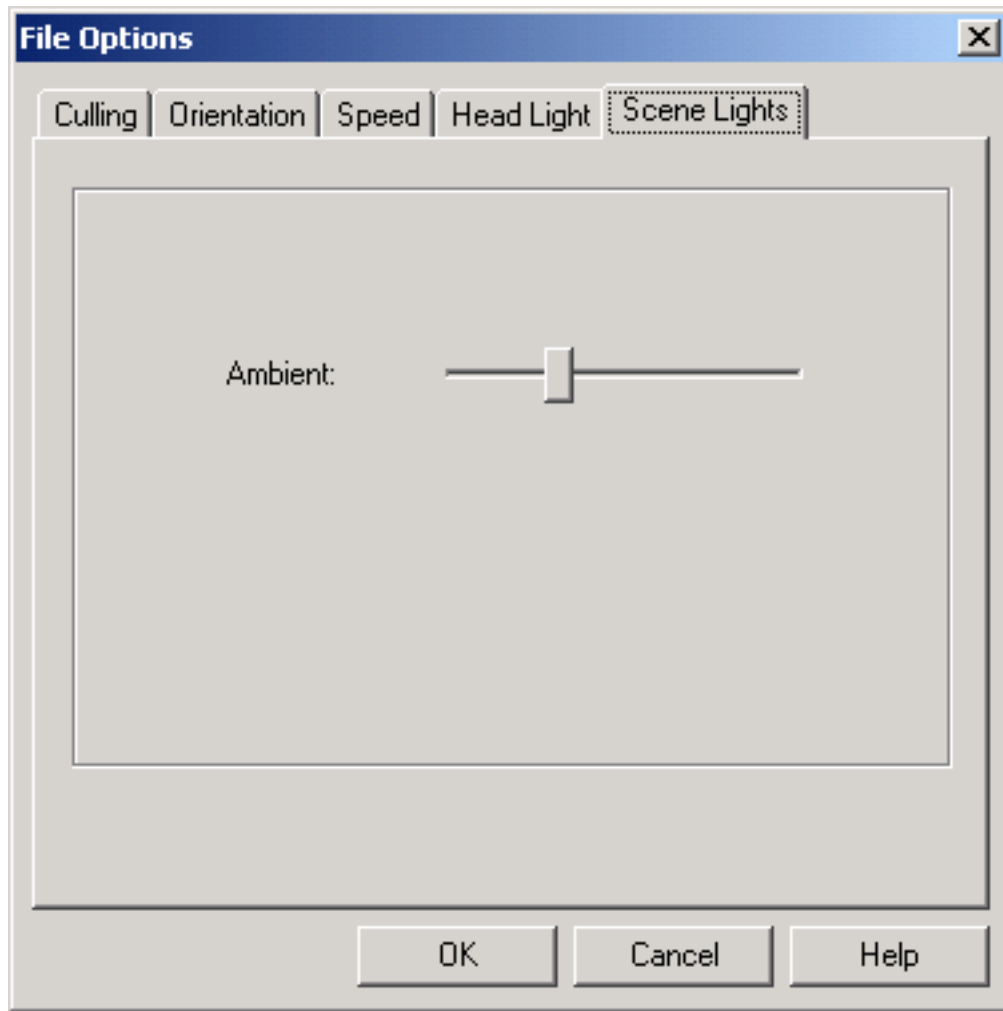
Note

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.


12.1.1.6. 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**

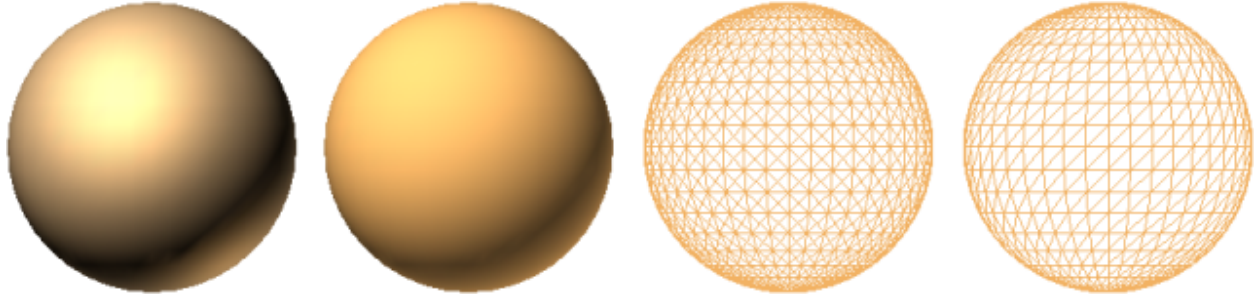
or

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

12.1.2. Render Modes

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

The spheres below demonstrate the effect that the render modes have on their appearance. In order from the left, these are full render, shaded, wireframe and hidden line.




12.1.2.1. Full Render

This option renders the model with smooth shading including any Presenter materials that have been applied using JetStream Presenter or have been brought through from the native CAD file (although JetStream does not convert all native CAD file's textures - see Chapter 7, *Converting Files* for more details).

To select full render

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

or

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


12.1.2.2. 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.

12.1.2.3. Wireframe Render


This option renders the model in wireframe. As JetStream 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.


12.1.2.4. 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.

12.1.3. 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.


12.1.3.1. 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.


12.1.3.2. Lines

As well as turning all lines on and off, it is possible to change the width of the lines. See Section 12.5, “Display Options” 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.


12.1.3.3. 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 12.5, “Display Options” 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.


12.1.3.4. 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 12.5, “Display Options” 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.

12.1.4. 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 JetStream 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.

12.2. Culling Options

There are three methods of culling objects in JetStream: 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 JetStream, which is clearly faster. Sometimes, however, the conversion process mixes up the front and back face of polygons and so you have to tell JetStream to draw both sides in order to not see right through some objects.

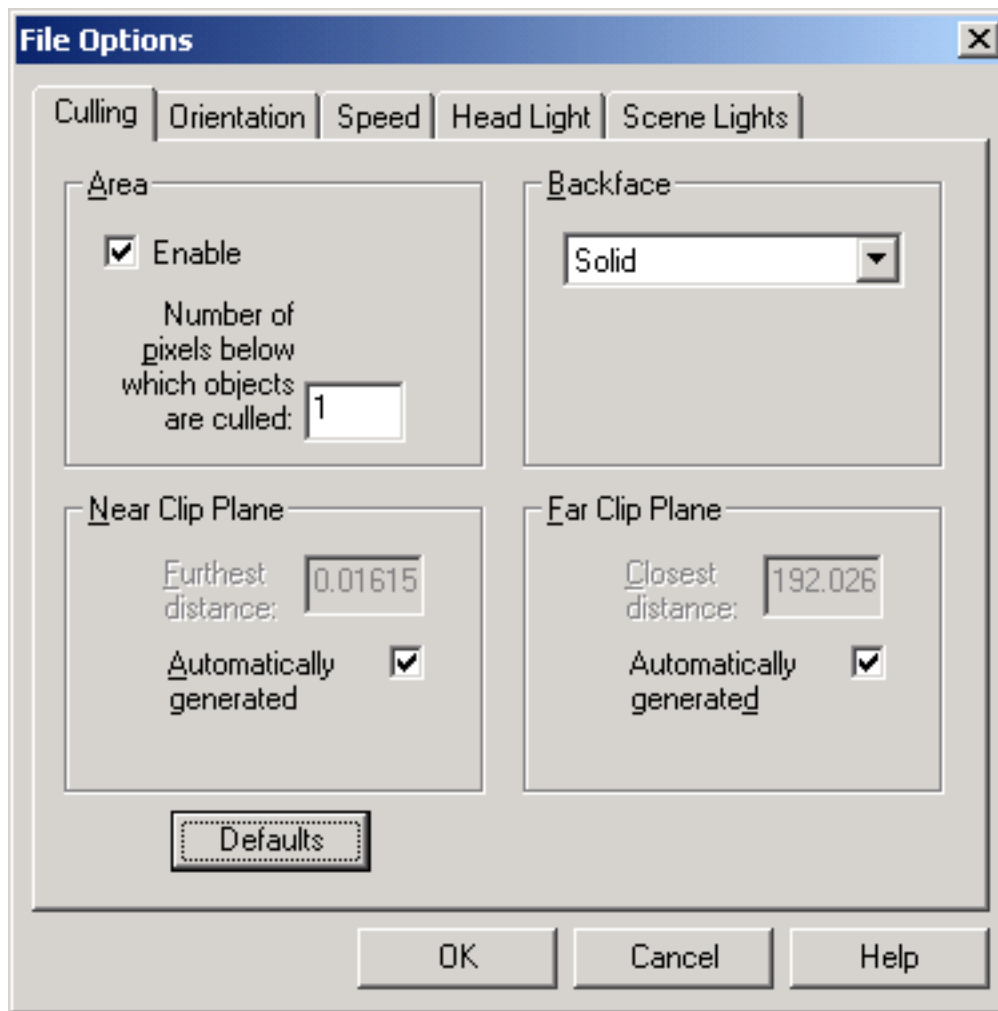
Area culling options allow you to set the size of objects within a model that will not be displayed. For example, if you were to set the value to 100 pixels any object within the model that would be drawn less than 10x10 pixels in size will not be displayed.

Culling options by near and far plane allows some degree of control over the resolution of the axis perpendicular to the screen. JetStream 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



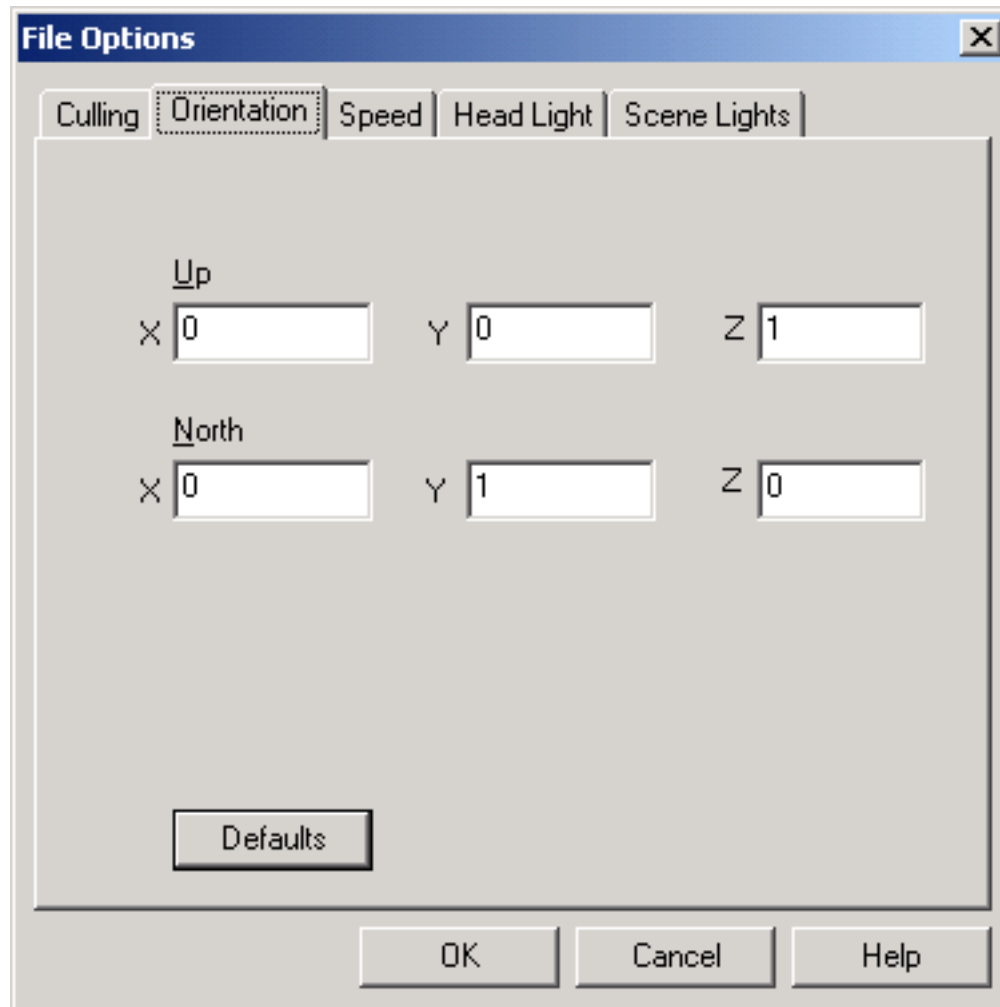
2. Check the **Area, Enable** check box to enable the definition of the screen area (in pixels) below which objects are culled and type in the number of pixels in the text box.
3. In the **Near Clip Plane** area, check the **Automatically generated** check box to tell JetStream to constrain the near plane to give the best view of the model it possibly can. Alternatively, uncheck this box to manually constrain the near clip plane. JetStream 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 JetStream 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. JetStream will put the far clip plane no closer than the value you type into the **Closest distance** text box.
5. From the **Backface** drop-down, select **On** to enable backface culling of all objects. Select **Solid** to cull the backface of solid objects only. This is the **default** option and that which you are most likely to require. If you find that parts of items are missing in the JetStream scene, you might want to disable this option, by selecting **Off**.
6. Click **OK** to set these options or **Cancel** to exit the dialog without setting them.

12.3. Orientation Options

JetStream has a concept of orientation and provides a heads up directional display. For this to work effectively, it is essential that the current model is orientated correctly.

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

The **Orientation** dialog is displayed:



The defaults take the positive Z-axis as **Up** and the positive Y-axis as **North**.

2. If the models orientation is different to the defaults, enter XYZ values to correctly position the Up and North directions.
3. Click **OK** to accept your changes, or **Cancel** to return to JetStream without accepting them.

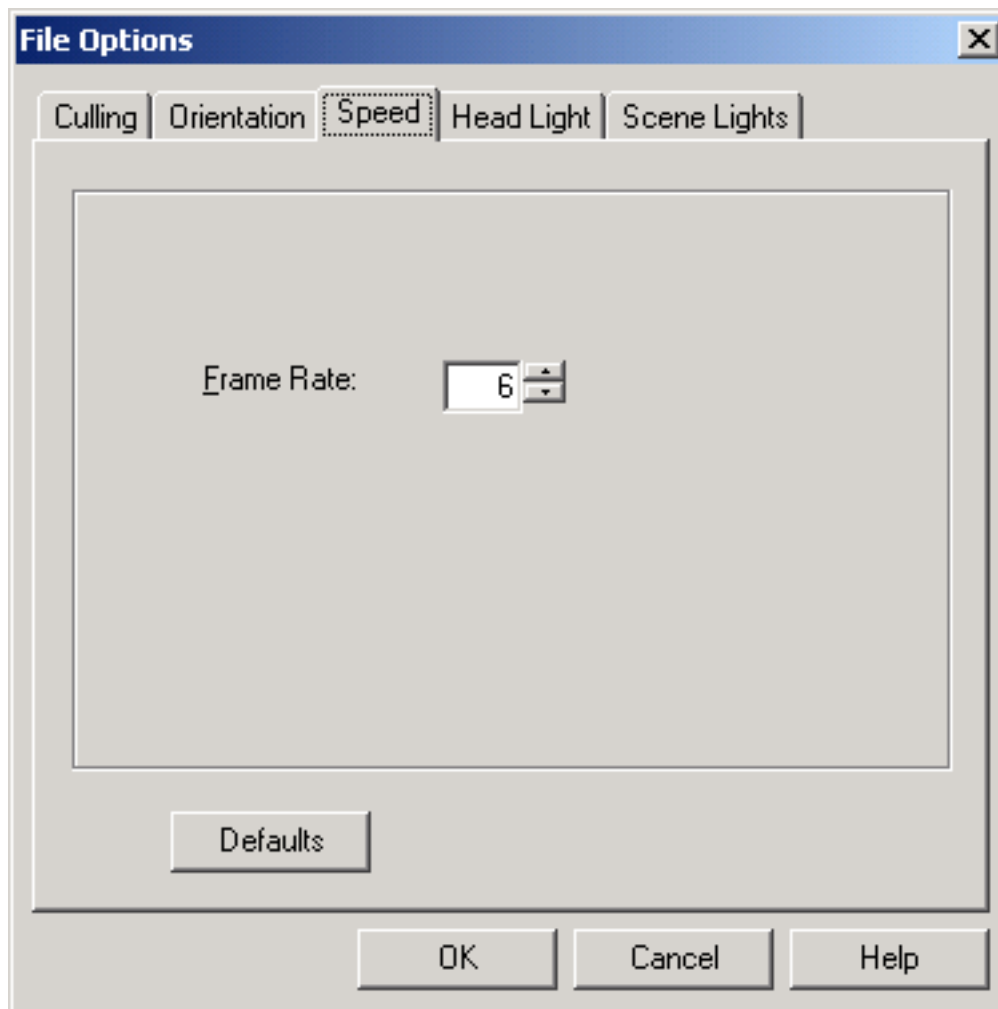
12.4. Speed Options

The basis of JetStream Roamer is its ability to walk through any size model in real time. JetStream 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 JetStream 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 JetStream 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.

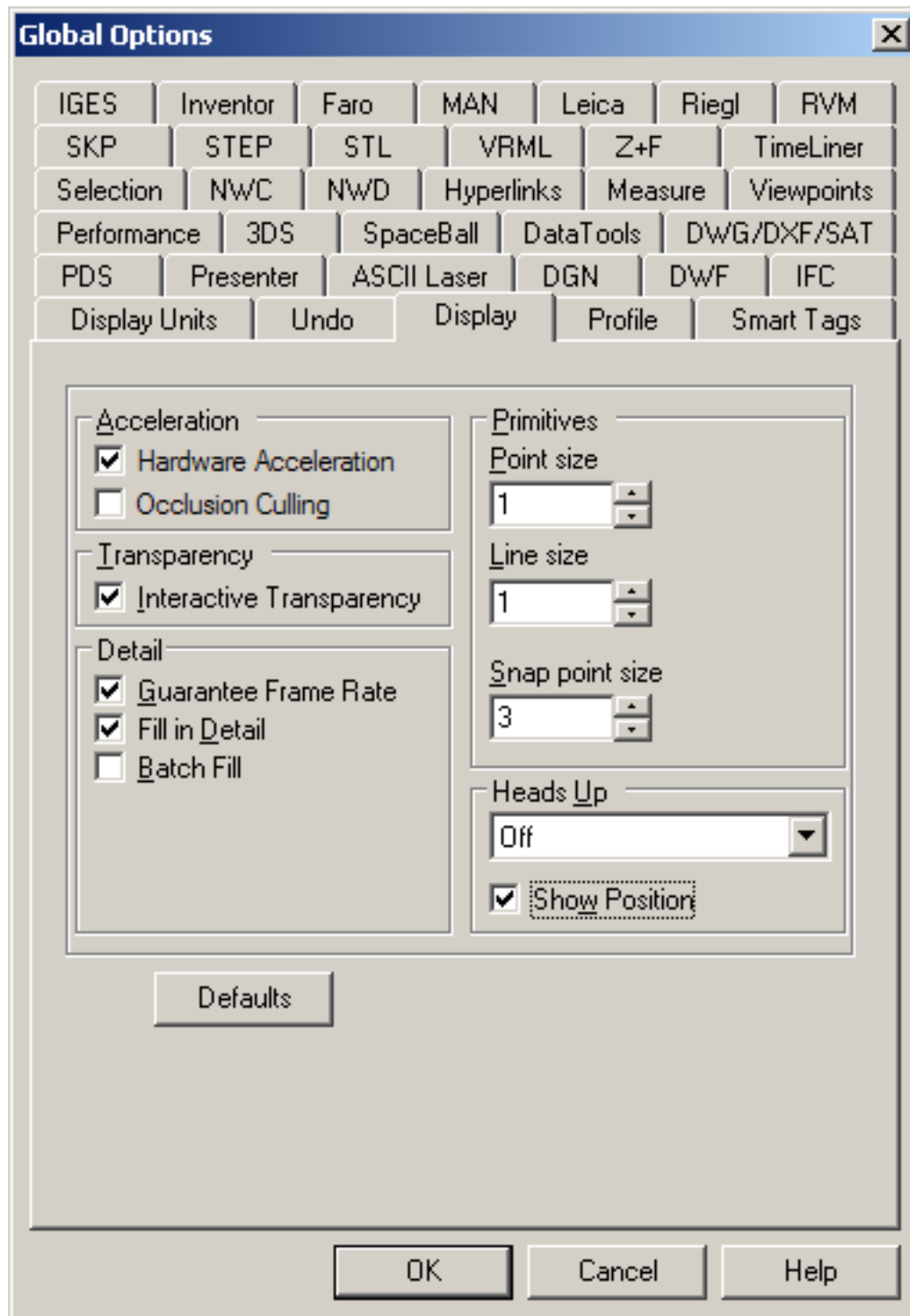
12.5. Display Options

This dialog enables you to control several aspects of the JetStream 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 JetStream to utilize any available OpenGL hardware acceleration on your video card. If your video card drivers do not function well with JetStream, then you may wish to disable this option. This option is grayed out if your video card does not support OpenGL hardware acceleration.

3. Check the **Occlusion Culling** check box to have JetStream only draw visible objects, i.e. ignores objects that are behind other objects. This option will improve the display performance when much of the model is not visible. For example, when you're walking down the corridor of a building. Occlusion culling can only be utilized on a machine with an OpenGL 1.5 compliant graphics card.
4. 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.
5. Check the **Guarantee Frame Rate** check box to enable the JetStream engine to maintain the user defined frame rate set in **Tools, File Options, Speed** (see Section 12.4, " Speed Options "). 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.
6. Check the **Fill In Detail** check box if you want JetStream to fill in any discarded detail when navigation has ceased.
7. Check the **Batch Fill** check box if you want JetStream 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.
8. 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 12.1.3.3, " Points " for more information on points.
9. 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 12.1.3.2, " Lines " for more information on lines.
10. 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.
11. From the **Heads Up** drop-down, select **XYZ** to turn on the XYZ indicator, or **Compass** to turn on the north-south indicator, or **Off** to display neither. Check the **Show Position** check box to show the absolute X, Y, Z position of the camera (or the avatar's eye position if the avatar is visible). These position coordinates are shown at the bottom left of the main view, and can be shown with or without the other Heads Up elements.

Note

See Orientation Options for more information on correctly orientating your model file.

12. Click **OK** to set these options or **Cancel** to exit the dialog without setting them. See Section 12.1.3.4, " Snap Points " for more information on snap points.

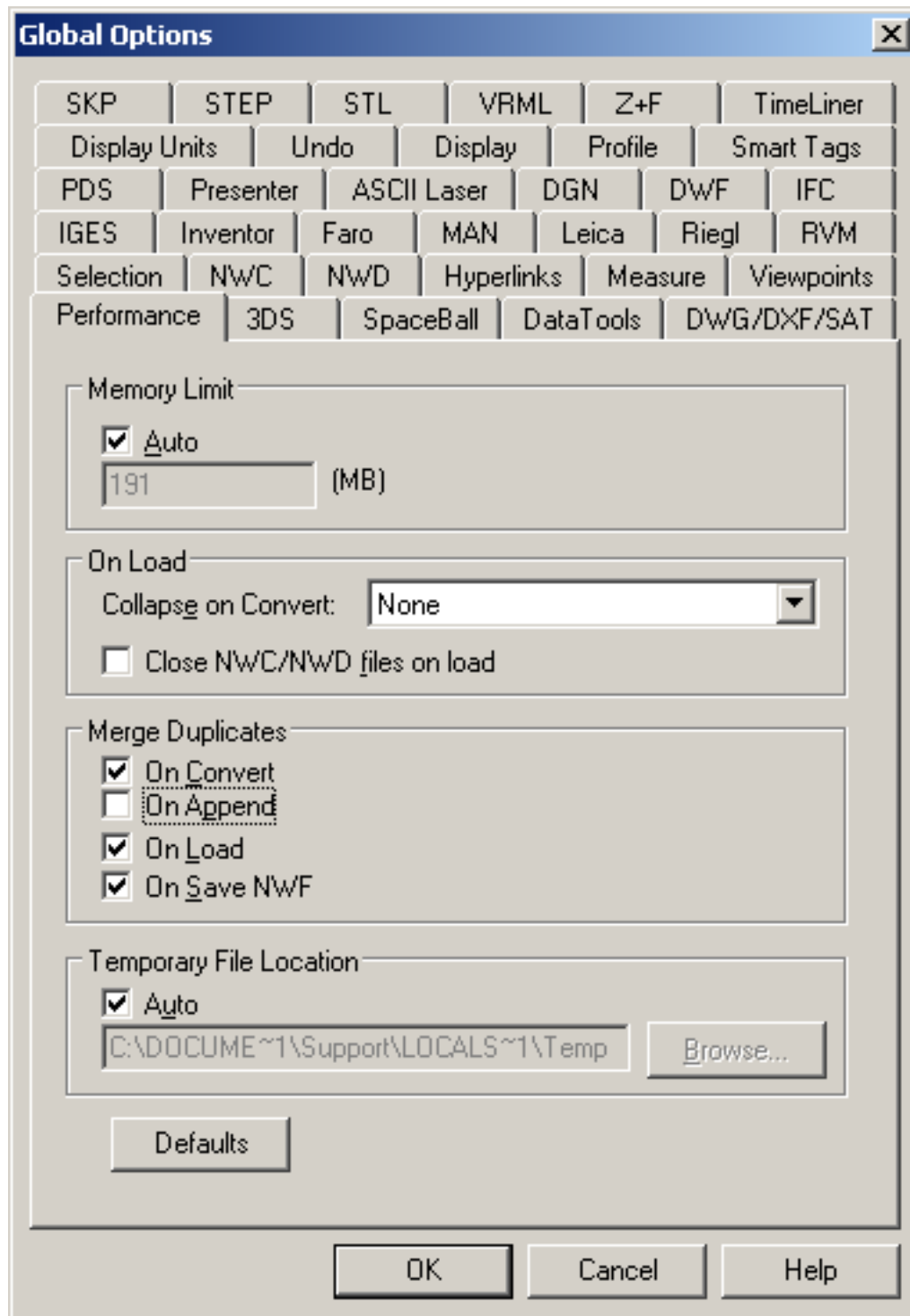
12.6. Performance Options

This dialog allows you to customize the performance of JetStream.

Setting Performance options

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

The **Performance** dialog is displayed:



2. **Memory.** Check the **Auto** check box for JetStream to automatically calculate the maximum memory that may be used. This will take the lowest of your available physical memory or address space, less that required for your Windows operating system.

Alternatively, uncheck this option and manually enter the limit.

3. **On Load.** The **Collapse on Convert** list box can be set to alter layers shown in the Selection Set window on loading native CAD model files. Each type collapses the Selection Set tree up to the specified level. So **None** does not collapse the tree, **Composite Objects** collapses the tree up to the level of composite objects, etc. This enables performance to be prioritized over structure/properties and has the added benefit of improving streaming by cutting down the logical structure.

It should be noted that whilst JetStream will try to collapse items to the fewest number possible, it may be necessary to prevent collapsing in some cases to preserve model fidelity. For example if an item has properties or materials unique to itself, then collapsing would endanger this information, and therefore it will not be collapsed.

The **Close NWC/NWD files on load** check box, if checked, turns off any streaming on loaded NWC and NWD files, loading them into memory in their entirety, and then closing them. This allows other programs to write to these files whilst they are in use.

4. **Merge Duplicates.** These options improve performance by multiply instancing matching items. Rather than storing every item in memory, if any items are the same, JetStream can store one instance of them and 'copy' that instance into other positions. This is of particular benefit on larger models, where there are significant numbers of these duplicate geometries.

The options available determine when JetStream should perform this merging process:

- **On Convert.** Merge duplicates when converting a CAD file.
- **On Append.** Merge duplicates when a new file is appended to the current scene.
- **On Load.** Merge duplicates when loading a file into JetStream.
- **On Save NWF.** Merge duplicates when saving the current scene out to .nwf.

5. **Temporary File Location.** Check the **Auto** check box for JetStream to automatically select your user Temp directory. Alternatively, if you prefer to select another location, unselect this option and enter the path accordingly.

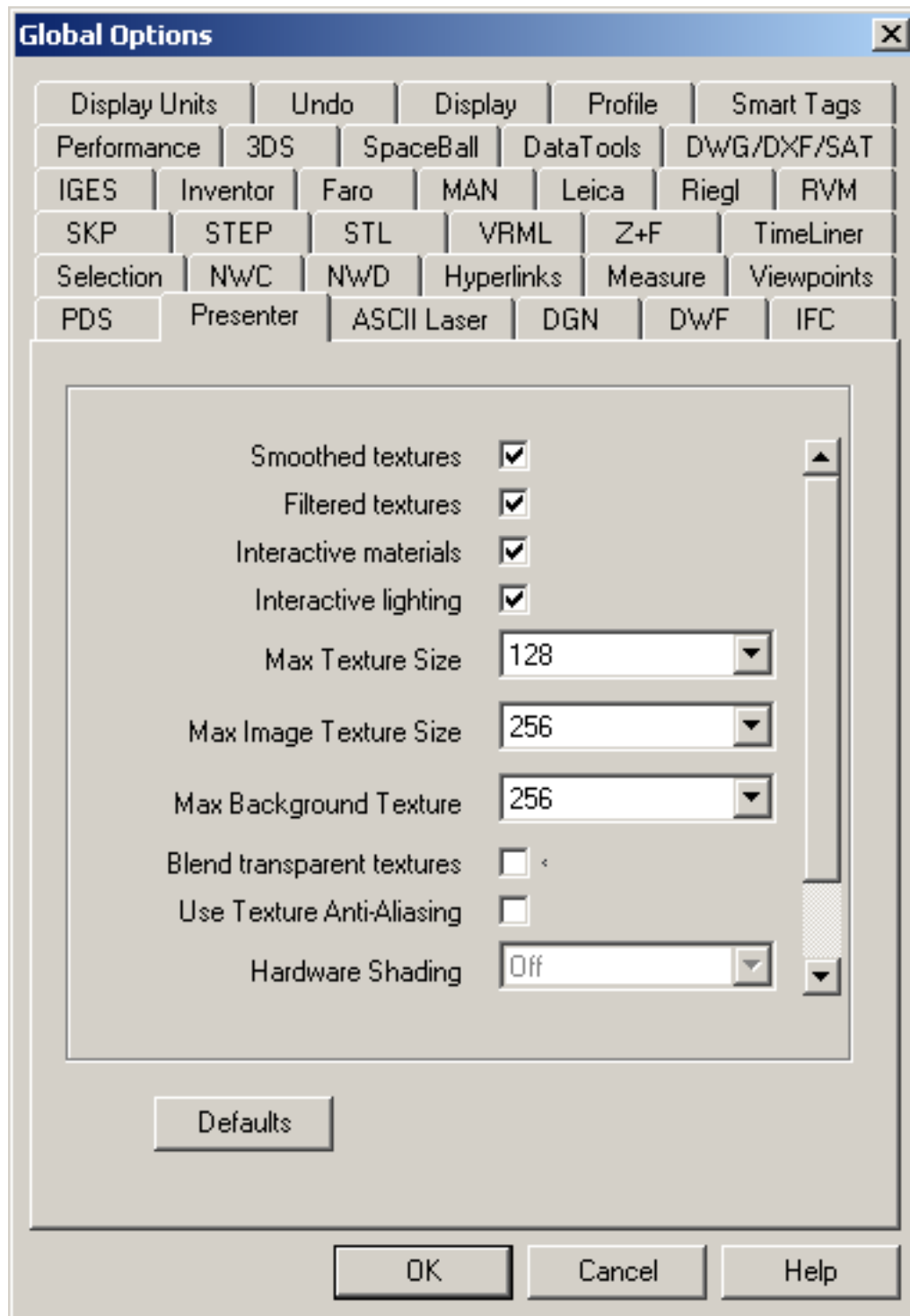
12.7. Presenter Options

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. Uncheck 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. Uncheck the **Interactive Lighting** check box if you want to turn off Presenter lights during navigation. The lights reappear automatically when navigation ceases, as long as the **Full Lights** lighting style is on. Unchecking this option will ease the load on less capable graphics cards and give less drop out in heavily lit scenes.
6. Use the **Max Texture Size** drop down to set the maximum size that any texture can be (in pixels, e.g. 128 is 128 pixels x 128 pixels). The higher the value, the more MB in memory will be taken and thus performance could be affected on less capable graphics cards.
7. Use the **Max Image Texture Size** drop down to set the maximum size that any texture image can be (in pixels, e.g. 256 is 256 pixels x 256 pixels). The higher the value, the more MB in memory will be taken and thus performance could be affected on less capable graphics cards.
8. Similarly, use the **Max Background Texture** drop down to set the maximum size that the background texture can be (in pixels, e.g. 256 is 256 pixels x 256 pixels). The higher the value, the more MB in memory will be taken and thus performance could be affected on less capable graphics cards.
9. 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.
10. 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.
11. **Hardware Shading** can only be utilized on machines with OpenGL 1.5 compliant graphics cards.

From the **Hardware Shading** drop down, select from:
 - **Interactive Shadows**. Select this option to enable lights and shadows whilst navigating.
 - **Passive Shadows**. Select this option to disable lights and shadows whilst navigating, then turn them on when navigation ceases.
 - **Lighting**. Select this option to turn lighting on with no shadows.
 - **Off**. Select this option to have no hardware shading enabled.
12. Check **Hardware Bump Maps** to display bump map textures interactively, whilst navigating. This can only be utilized on a machine with an OpenGL 1.5 compliant graphics card. Hardware Shading also needs to be enabled.
13. Check **Hardware Marble** to display hardware rendered marble materials in realtime. This can only be utilized on a machine with an OpenGL 1.5 compliant graphics card. Hardware Shading also needs to be enabled.
14. Click **OK** to set the options or **Cancel** to exit the dialog without setting them.

Chapter 13. Viewpoints

Viewpoints are an important feature of JetStream. 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.

13.1. 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 JetStream 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 16, *Reviewing* for more information on hyperlinks, comments and redlines and Section 7.1.1, "NWF Files" 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 14.1, "Sectioning a model" 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 13.6, "Viewpoints Options" for more information on options and Section 15.1, "Creating Animations" 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.

13.2. Recalling Viewpoints

To return to a viewpoint

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

or

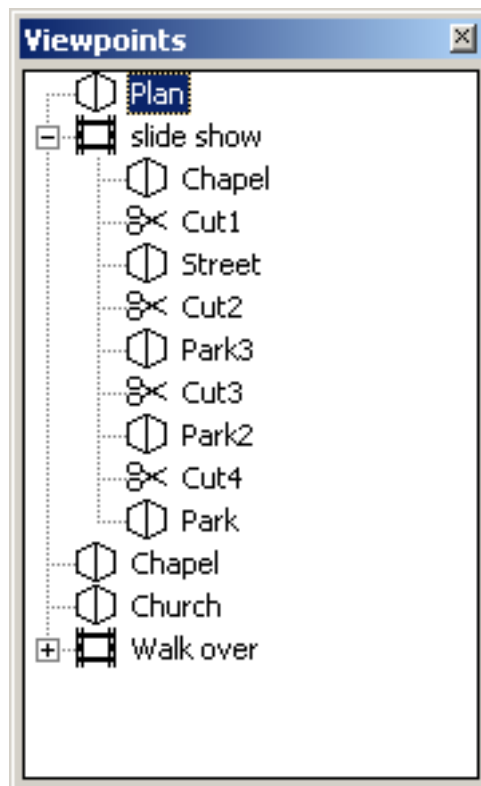
- In the **Viewpoints** control bar, simply click on the viewpoint from the list.

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.

13.3. 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 15.1, “Creating Animations” 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.

13.4. 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

All context menus share the **Sort** option, which sorts the contents of the Viewpoints window alphabetically, including folders and their contents.

13.4.1. 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 15.1, "Creating Animations" for more information on animations.

13.4.2. 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 13.5, "Editing Viewpoints").
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 16.1, "Commenting" 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.

13.4.3. Animations

Managing Animations

1. Right click on the animation, or any of the animation's key frames, in the **Viewpoints** control bar.
2. Choose **Save Viewpoint** 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 16.1, "Commenting" for more information on comments.
6. Choose **Edit** to edit the element. Editing a frame will open the Edit Viewpoint dialog. See Section 15.2, "Editing Animations" 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.

13.4.4. 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 15.1, "Creating Animations" 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 16.1, "Commenting" 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.

13.5. 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 17.10, "Units").

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.

Camera			
	X	Y	Z
Position (m):	138.398	634.171	65.459
Look At (m):	138.354	635.927	64.265
Vertical Field Of View (°):			45.000
Horizontal Field Of View (°):			30.733
Roll (°):			0.000

Motion	
Linear Speed (m/sec):	47.627
Angular Speed (°/sec):	45.000

Saved Attributes	
<input checked="" type="checkbox"/> Hide/Required	<input checked="" type="checkbox"/> Override Material

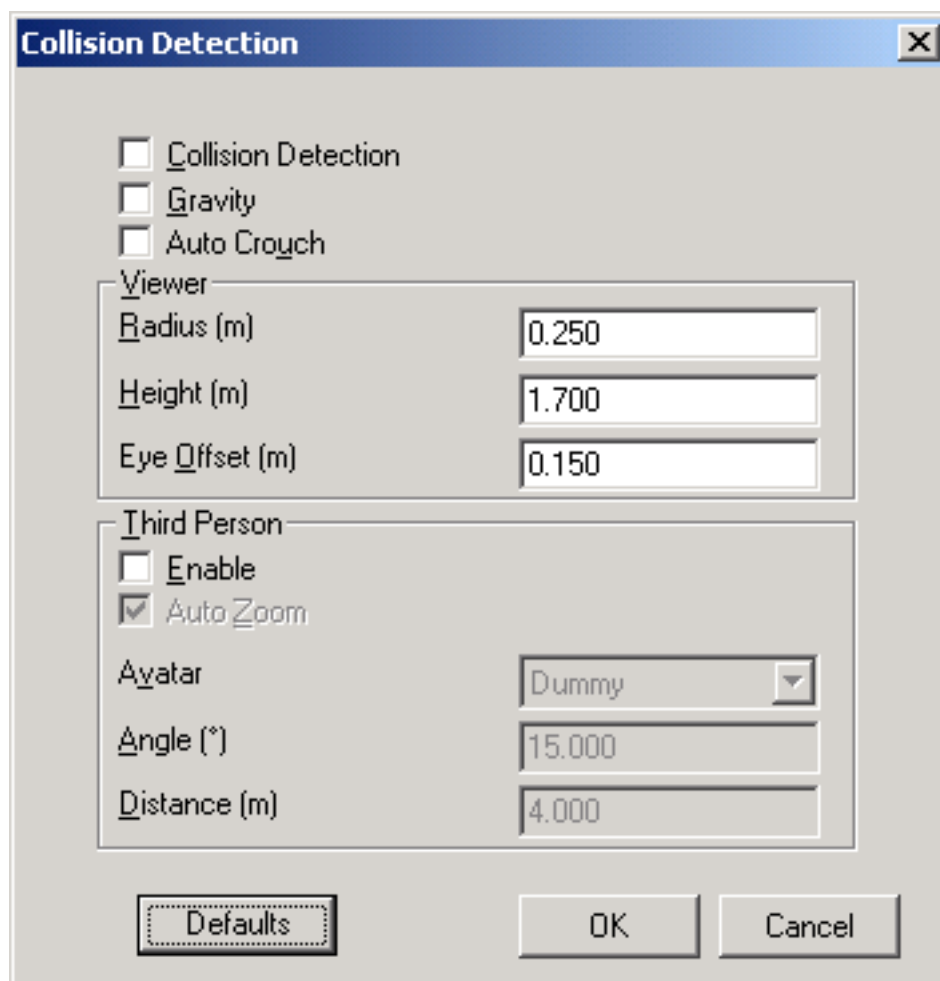
OK Cancel Help

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** control bar), checking the check box of a saved attribute will store that attribute with the viewpoint. See Section 13.6, "Viewpoints Options" for more details.
8. Click on the **Collision Detection, Settings...** button to open the collision detection dialog:



- Check the **Collision Detection** check box to activate collision detection.
- Check the **Gravity** check box to activate gravity.
- Check the **Auto Crouch** check box to activate crouching.

- In the **Viewer, Radius** text box, enter a value for the radius of the collision volume. See Section 8.8, “ Collision Detection ”.
- In the **Viewer, Height** text box, enter a value for the height of the collision volume. See Section 8.8, “ Collision Detection ”.
- In the **Viewer, Eye Offset** text box, enter a value for the distance below the top of the collision volume, where the camera will focus upon when **auto zoom** is activated.
- Check the **Third Person, Enable** check box to view from a third person perspective.
- Check the **Auto Zoom** check box to automatically zoom from third person view into first person view, whenever the line of vision is obscured by an item in the model scene.
- From the **Third Person, Avatar** drop-down, select the avatar you wish to represent yourself as. See Section 8.11, “ Third Person View ”.
- In the **Third Person, Angle** text box, enter the angle at which you wish to look at the avatar. For example, zero degrees will be directly behind and 15 degrees will be looking down on the avatar at a 15 degree angle.
- In the **Third Person, Distance** text box, enter the distance behind the avatar, from which you wish to view from.
- Click **OK** to accept the settings, or **Cancel** to return to the **Edit Viewpoint** dialog without changing the settings.

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

13.6. 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.

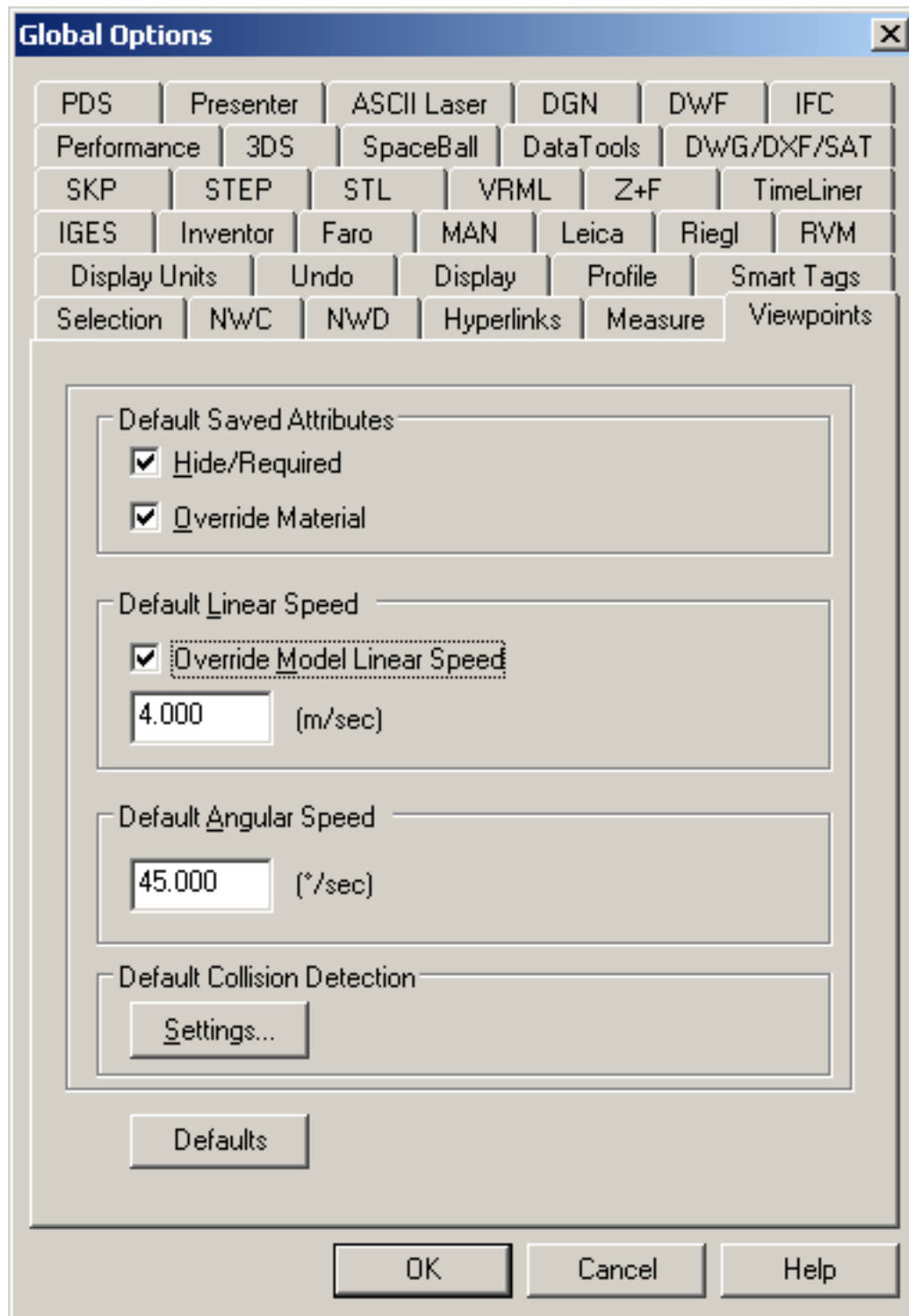
You can set a viewpoint to save either attribute by editing the viewpoint. To update changes to overridden material or hide/required, use **Update** in the viewpoints context menu. Be careful, though, as this also updates the point of view as well, which may disrupt any redline information stored with 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 default 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 viewpoint. See Section 11.3, "Hiding Items" for more information on hidden

items and Section 11.4, “Item Required” for more information on making items required.

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 viewpoint. See Section 11.6, “Overriding Item Properties” for more information on overriding materials.
4. Check the **Override Model Linear Speed** to be able to set a specific speed to navigate on loading a model. Without this checked, the linear navigation speed is directly related to the size of the model loaded.
5. The **Default Angular Speed** can be set to any number of degrees per second. This affects the speed at which the camera turns.
6. Click **OK** to set the profile or **Cancel** to exit the dialog without setting it.

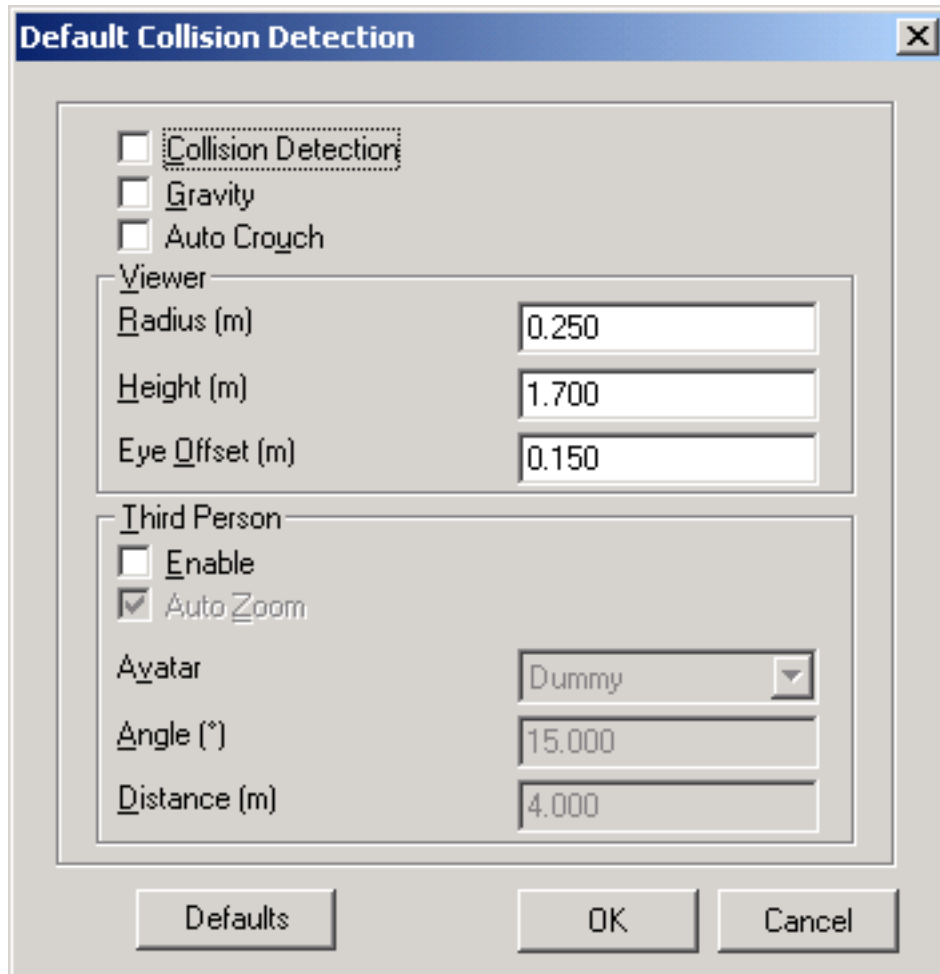
Collision detection settings can also be saved with a viewpoint, including whether collision detection, gravity, crouching and third person view are enabled.

You can set a viewpoint to save any of these settings by editing the viewpoint, in the same way as the view attributes, above.

By default, all of the collision detection settings are disabled. If you wish to save your preferred collision detection setting defaults, which will be used each time you open a model or a new JetStream session, then these can be set in the **Viewpoints Options**.

Setting the default collision detection options

1. Go to **Tools, Global Options, Viewpoints** and click the **Settings...** button.



2. Select the default options you wish JetStream to initialize with. See **Editing Viewpoints** for a description of each of the available options.

Note

These **default** collision detection settings differ from the **current viewpoint** settings, in that these do not alter the current scene. These settings will only be used when starting JetStream, or opening a new model. To edit the collision detection settings in the current scene, see Section 13.5, "Editing Viewpoints".

Chapter 14. 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 13.3, “ The Viewpoints Control Bar ” for more information on viewpoints and Section 15.1, “ Creating Animations ” 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.

14.1. 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. Set the **Step Size** by clicking on the step size button.  This brings up a dialog box allowing a Step Size to be enabled and set to a user-definable size. This size is then used when moving the section planes. If the **Step Size** is disabled, the section planes will move at percentage intervals.
3. Switch this plane on or off by clicking the section toggle button. 
4. 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.


5. 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.

6. 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 9, *Selecting Items*. Clicking this button with nothing selected reset the section range to the limits of the whole model, which is the default.

7. 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.

14.2. 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 14.1, "Sectioning a model".
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 13.1, "Saving Viewpoints" 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 15. Animating

JetStream 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.




15.1. Creating Animations

There are two ways to create animations in JetStream. You can either simply record your real time walk through, or you can assemble specific viewpoints for JetStream 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 JetStream 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 JetStream, you need to set up several viewpoints and

add them to an empty animation. When playing back the animation, JetStream will then interpolate between these viewpoints.

Creating an animation frame by frame

1. Right click on the **Viewpoints** control bar and select **Add Empty 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 13.1, "Saving Viewpoints" 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 13.5, "Editing Viewpoints" for details on this), or you can add more viewpoints, delete them, move them around, add cuts and edit the animation itself (see Section 15.2, "Editing Animations") 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.

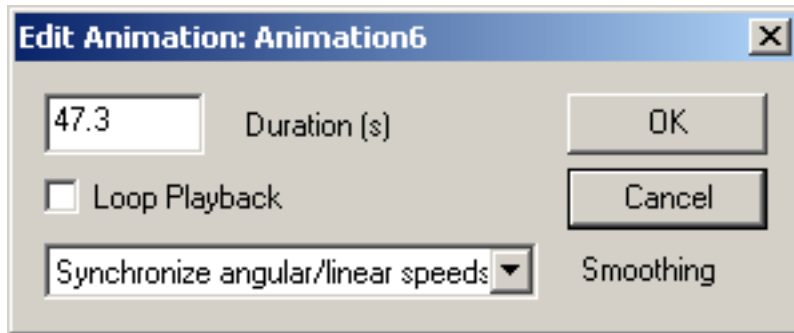
15.2. Editing Animations

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 JetStream 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.

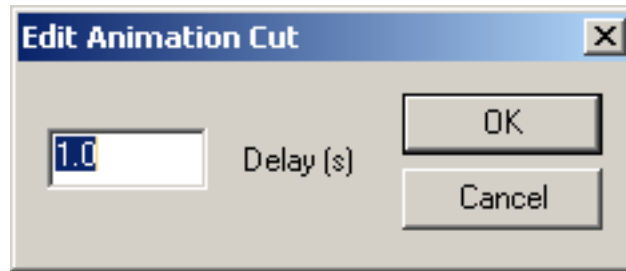
15.3. Animation Cuts

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 JetStream without setting it.

15.4. 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 6.15.3, “Exporting an animation ” 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 16. Reviewing


JetStream 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.

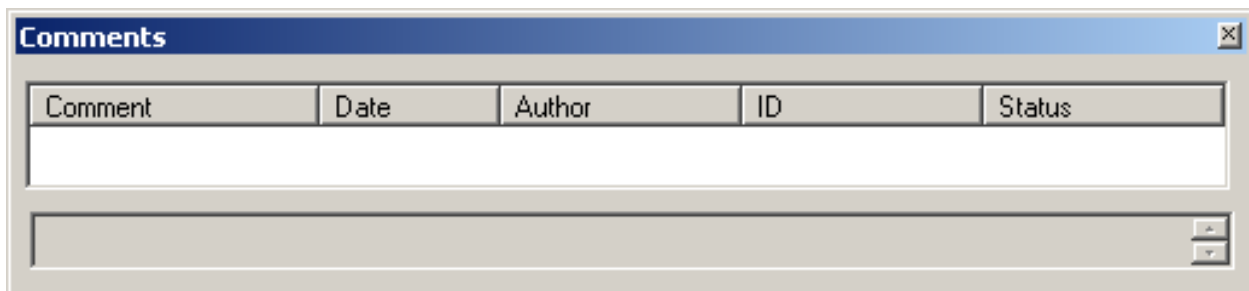
The reviewing tools available in JetStream are:

- Commenting
- Redlining (including tagging)
- Measuring
- Hyperlinks
- Collaboration
- SwitchBack

16.1. Commenting

Multiple comments can be attached to any item in the **Viewpoints** control bar (see Section 13.3, “The Viewpoints Control Bar”), or to any item in the **Selection Sets** control bar (see Section 9.3, “Selection and Search Sets”), or to Clash Detective results, or to TimeLiner tasks.

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 and date, author, ID and status 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.

 Tag.

 TimeLiner.

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 10.4, “ Finding Comments ” 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.

Any new comments will automatically be given a unique ID, along with the date and author of the comment and a status can be set. All of these are searchable criteria.

Once a comment is added, it can be edited or deleted.

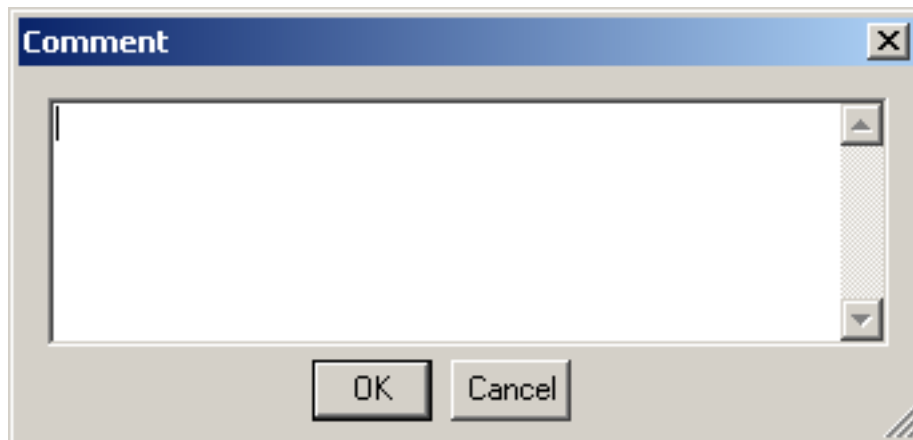
Adding, Editing and Deleting Comments

You can add, edit 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** resizable dialog is displayed.

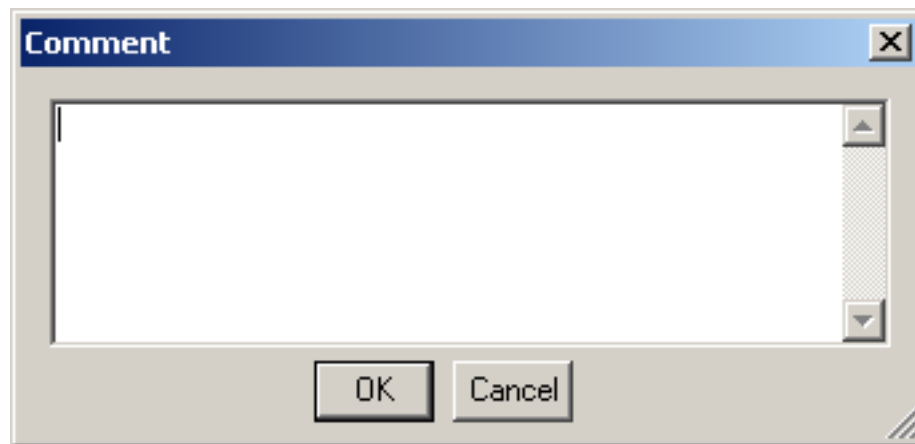


4. Type in the comment.
5. To assign a **status**, select either **New**, **Active**, **Approved** or **Resolved** from the drop-down list.
6. Click **OK** to save the comment or **Cancel** to return to JetStream without saving it.

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** resizable dialog is displayed.



3. Type in the comment.
4. To assign a **status**, select either **New**, **Active**, **Approved** or **Resolved** from the drop-down list.
5. Click **OK** to save the comment or **Cancel** to return to JetStream without saving it.

Editing a comment

1. Go to the source of the comment, be it a viewpoint, selection set or Clash Detective result.
2. Ensure the **Comment** control bar is open, as outlined above.
3.
 - Right click on the comment and choose **Edit Comment** from the context menu.

Or

- Go to **Review, Comments, Edit Comment**.

The **Edit Comment** resizable dialog is displayed.

4. Edit the comment and/or status accordingly.
5. Click **OK** to save the comment or **Cancel** to return to JetStream without saving it.

Renumbering tag and comment IDs

When adding a new tag or comment to a JetStream scene, it will automatically be assigned a unique ID. If however, you are Appending or Merging multiple JetStream files together, then there is the possibility for the same ID to be used more than once. In this situation, you may choose to renumber all of the IDs, making them unique to the scene, once again.

1. To renumber tag IDs:
 - Go to **Review, Renumber Tag IDs**.

Note

There may be a situation where two sessions are merged that contain identically numbered Tags and corresponding Tag Views. In this situation, **Renumber Tag IDs** will also attempt, wherever possible, to rename the associated Tag Views in line with the new tag numbers.

2. To renumber comment IDs:
 - Go to **Review, Renumber Comment IDs**

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**.


16.2. Redlining

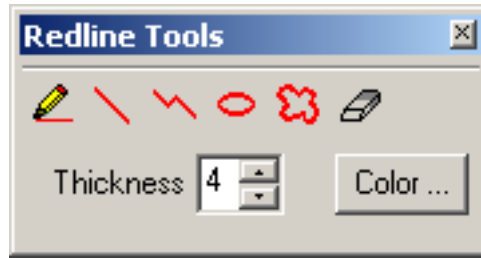
Redlining allows you to add annotation directly over a viewpoint. It is mutually exclusive to the navigation modes so that when you are redlining, you cannot navigate and vice versa.

The redline tools, which can all be accessed from the **Redline Tools** control bar or from the **Review, Redline** menu, are:

-  Text
-  Tag
-  Freehand
-  Line
-  Line String
-  Ellipse
-  Cloud
-  Erase

16.2.1. Adding Redlines

The **Redline Tools** control bar is a dockable bar like all others in JetStream. 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.


Redline Tags are the exception to this rule. If a viewpoint is not already saved, then adding a tag will automatically save a viewpoint. See Section 16.2.2, “ Adding Redline Tags ” for more information.

Adding a redline to a saved viewpoint

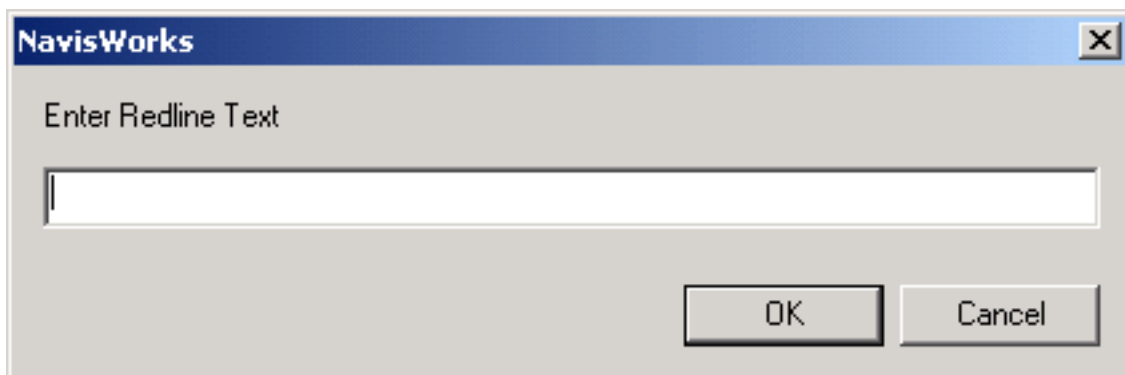
1. Go to a saved viewpoint, or a Clash Detective result with the **Save Viewpoint** check box checked.
2. Ensure the **Redline Tools** control bar is displayed as outlined above.
3. Type the thickness of the redlines into the **Thickness** edit box. The thickness applies to the redlines you are about to draw and will not change any existing redline thicknesses.

Note

Thickness does not effect redline text. This is a default size and weight.

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 **Text**  redline tool to add text over the viewpoint. Click in the main navigation window where you wish to start entering text.








The redline text dialog will be displayed.



Enter the text you wish to add, then click **OK** to add the text, or **Cancel** to return to JetStream without adding it.

Note

Text can only be added in a single line with this redline tool. To display text on multiple lines, you will need to write each line individually.

6. Choose the **Tag**  redline tool to add a tag on the current view. See Section 16.2.2, “ Adding Redline Tags ” for more information.
7. Choose the **Freehand**  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.
8. 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.
9. 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.
10. 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.
11. 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.
12. 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.

16.2.2. Adding Redline Tags

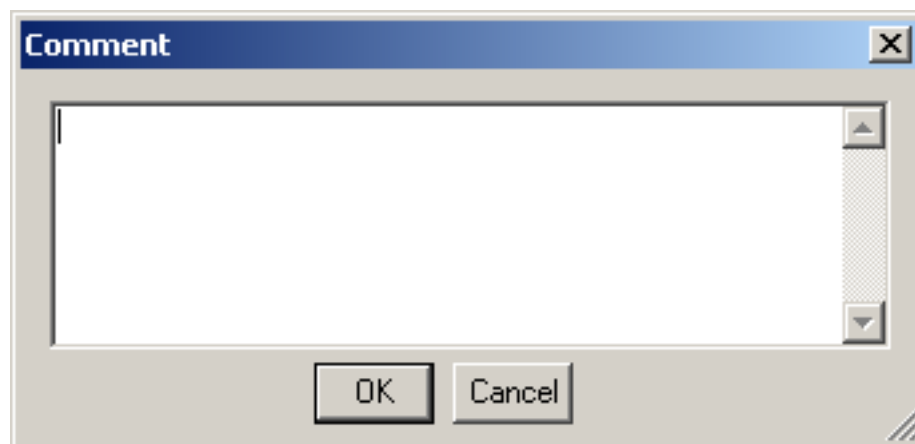
Redline Tags combine the features of redlining, viewpoints and comments into a single, easy to use review tool. This allows you to tag anything you want to identify in the model scene. A viewpoint will be created and you can add a comment and status to the tag. For example, during a review session, you may observe an item in the scene that is incorrectly sized or positioned. You can then tag this item, identifying the problem. This tag information can be saved into a JetStream review file (*.nwf) and distributed to the design team. The design team may then search the file, say for any tags of status 'new'. Once any necessary modifications are made to the drawing files, these can be reloaded into the *.nwf file and the tag status changed accordingly. You can review this latest version of the review file, ensure all tags have been resolved and finally 'approve' them.

Adding a redline tag to the current viewpoint

1. Ensure the **Redline Tools** control bar is displayed as outlined in the previous section.
2. Choose the **Tag**  redline tool.
3. Click in the navigation window where you wish the tag to be attached to.
4. Click again in the navigation window where you wish the tag ID to be positioned. Both points will be joined by a leader line.

If the current viewpoint is not already saved, then it will be saved automatically and named 'Tag View X', where X is the tag ID.

The **Add Comment** dialog will be displayed.



5. Enter the text to be associated with the tag and set the **tag status** from the drop-down list.
6. Click **OK** to save the tag, or **Cancel** to return to JetStream without saving it.

16.2.3. Finding Redline Tags

During a review session you may create tens, or hundreds of tags which are communicated and referred to amongst the review team. It may therefore be necessary to locate tags by ID, status or author.

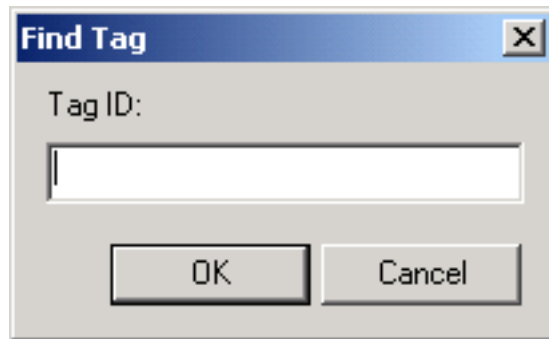
As redline tags utilize the **Comments** dialog, this allows you to use the **Find Comments** dialog to search for tags with specific text or ID, of a particular status, or by author or date created. See Section 10.4, “Finding Comments” for more information on this search method.

JetStream also has additional review features specifically for finding tags.

Quick finding of redline tags

1. Go to **Review, Tags, Find Tag By ID** if you know the ID of the tag you wish to find.

The **Find Tag** dialog will be displayed.



Enter the tag ID, then click **OK** to find the tag, or **Cancel** to return to JetStream.

2. Go to **Review, Tags, Current Tag** to select the current tag.
3. Go to **Review, Tags, First Tag** to find the first tag.
4. Go to **Review, Tags, Last Tag** to find the last tag.
5. Go to **Review, Tags, Previous Tag** to find the tag preceding the current tag.
6. Go to **Review, Tags, Next Tag** to find the tag following the current tag.

16.2.4. Editing Redline Tags

The comments and status assigned to a tag can be edited. As redline tags utilize the **Comments** dialog, editing tags is the same as editing a comment. See [Editing a Comment](#) for more information.

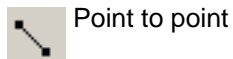
If different users have been reviewing and redline tagging the same model file, each saving their own .nwf, it is likely that some of their tag ID's will be the same. Using the Merge command to merge the different .nwf files together, only one copy of the geometry would be loaded and any tag viewpoints of the same name would be suffixed with the .nwf filename in brackets. All tag ID's however would be retained. In this situation, it is possible to renumber all of the ID's to make them unique. Again, as redline tags utilize the **Comments** dialog, renumbering tag ID's is the same as renumbering comment ID's. See [Renumbering Tag and Comment IDs](#) for more information.

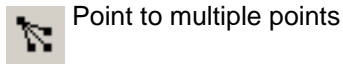
16.3. Measuring

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 17.10, "Units Options"](#).

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 multiple points



Point line



Accumulate



Angle




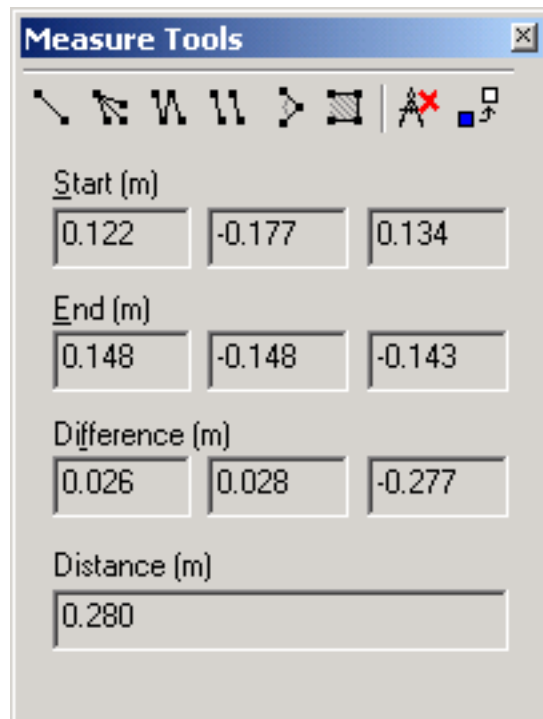
Area



Transform objects

16.3.1. Measuring Tools

The **Measure Tools** control bar is a dockable bar like all others in JetStream. It can be accessed by clicking  on the **Workspace** control bar or by going to **Tools, Measure**.



Use the buttons at the top to 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 16.3.1, “Snapping” for more details.

You can reset a measure command at any time by right clicking instead of left clicking in the main navigation window. This will start the measure command again with 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.



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 JetStream 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.

16.3.2. Transforming Objects

The transform objects tool allows you to reposition or rotate an object, defined by points selected with the measure tools.

Repositioning objects

1. Select the object to be repositioned (see Chapter 9, *Selecting Items* for more information on how to do this).
2. Choose one of the measure tools, from **Point to Point**, **Point Line** or **Accumulate**.
3. Select a **base point** on the selected object. This is the reference point on the object from which the repositioning will be calculated.
4. Select another point in the scene (or multiple points, depending on which measure tool you selected). This is the point (or points) which the **base point** will be repositioned to.

Note

You can only select a point on another object in the scene. Selecting a point in 'space' is not a valid option. To reposition an object into 'space', you can override the items **Transform**. See Section 11.6.3, "Overriding Transforms" for details on how to do this.

5. Click **Transform Objects**




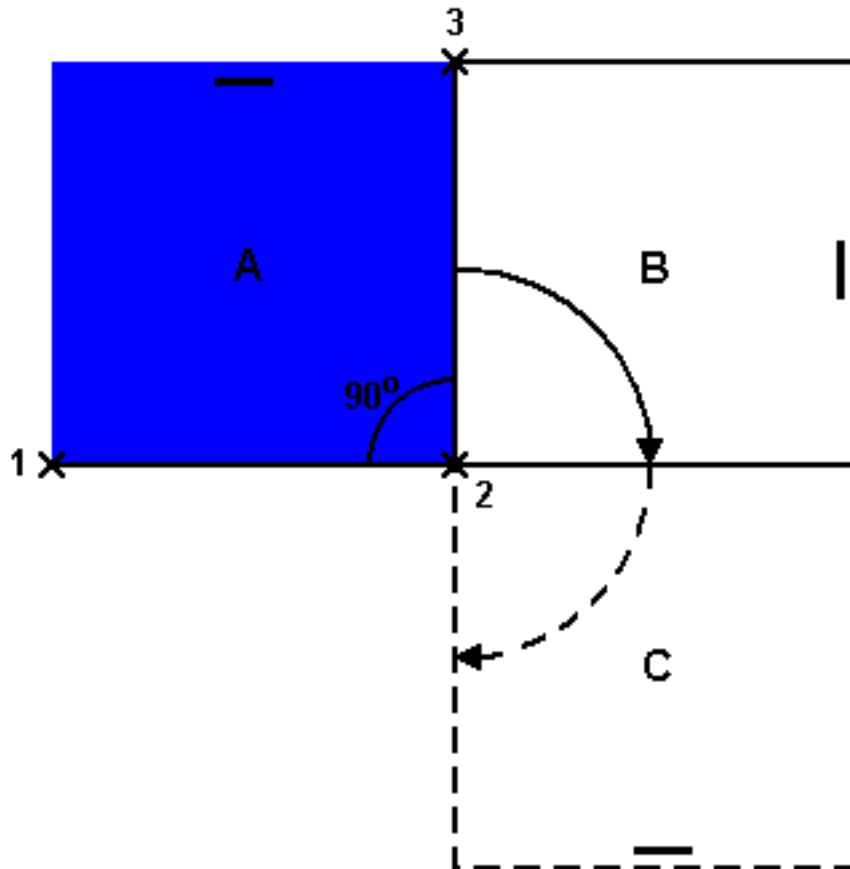
to reposition the object at the second point. If you used one of the

multiple point measure tools and selected multiple points in the scene, clicking **Transform Objects** again will reposition the object to the next point, and so on.


JetStream also provides the ability to rotate an object.

Rotating objects

1. Select the object to be rotated (see Chapter 9, *Selecting Items* for more information on how to do this).
2. Choose the **Measure Angle**  measure tool.
3. See diagram below:



Select three points (1, 2, 3). The second point (2) will be the position about which the selected object (A) will be rotated. Lines from the first to the second point (1 to 2) and from the second to third point (2 to 3) will define the angle by which the object will be rotated (in the above case, 90 degrees).

4. Click **Transform Objects**  to rotate the object about the second point (rotate selected object by

90 degrees about point 2, which results in object rotating from point A to B).

5. Click **Transform Objects** again to continue rotating the object about point 2, by the specified angle (rotate selected object by 90 degrees about point 2 again, which results in object rotating from point B to C).

See Section 11.7.3, “ Resetting Items' Positions ” for information on returning an object back to its original position.

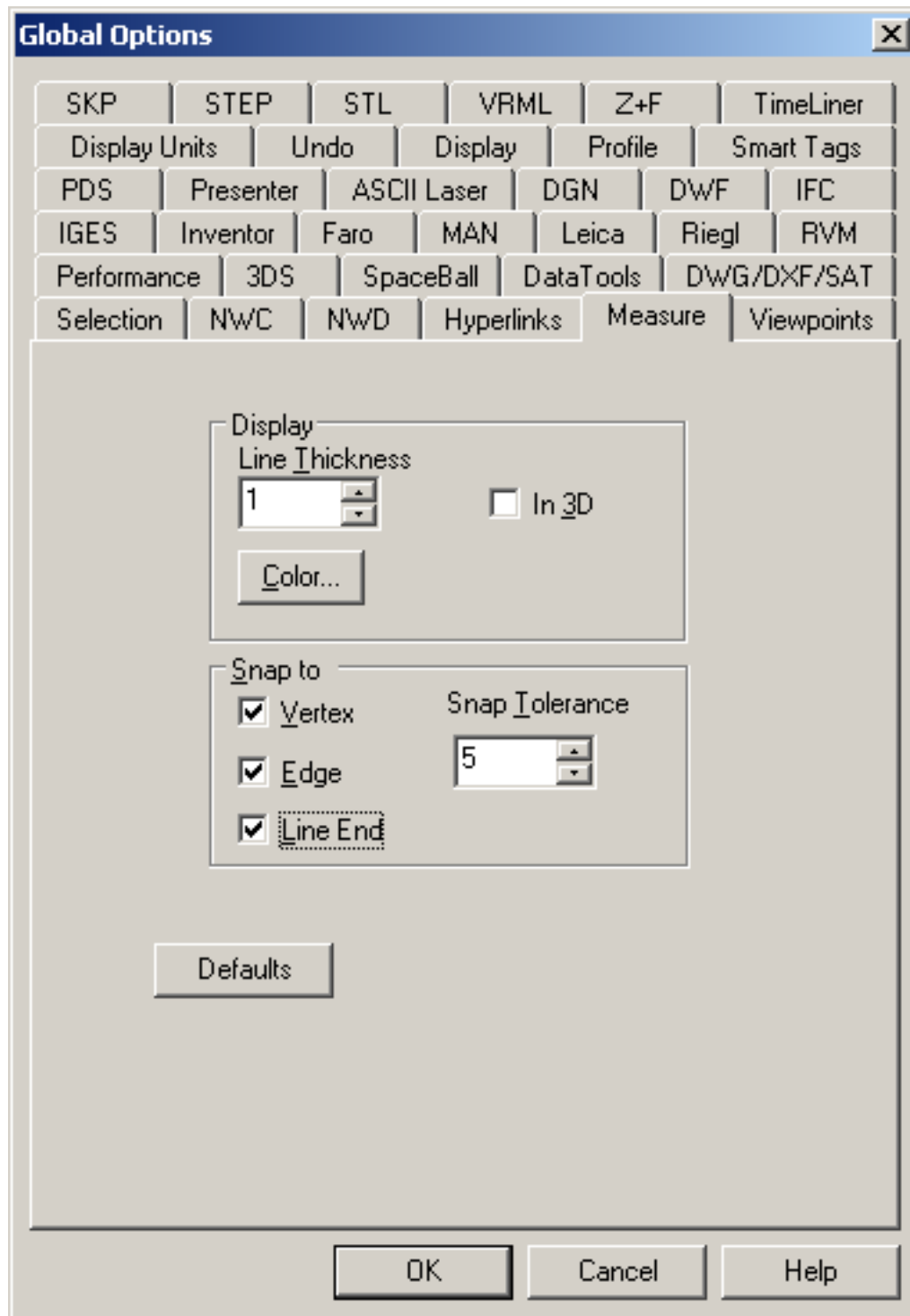
16.3.3. Measure Options

JetStream 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 cursor 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.

16.4. Hyperlinks

Hyperlinks are an extremely useful review tool to allow you to access non-graphical information through the graphical interface of JetStream. 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 a property by JetStream, they can be searched on with the **Find Items** tool and displayed in the **Properties** bar. They are also saved into JetStream 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 JetStream. 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**

16.4.1. 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.

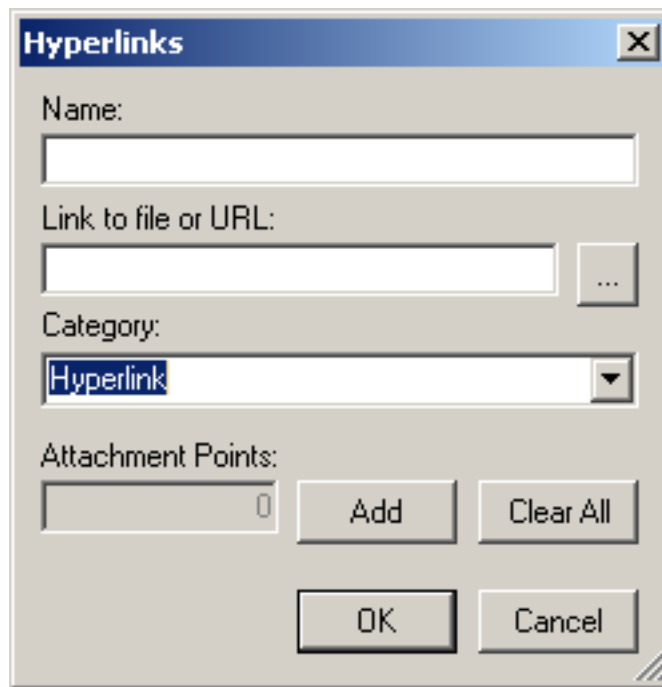
Adding hyperlinks to an item

1. Either
 - Select a single item (see Chapter 9, *Selecting Items* 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** resizable 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 16.4.1, “Hyperlinks Categories” 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 bounding 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 16.4.2, “Attachment Points” 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 bounding box.
7. Click **OK** to add this hyperlink to the item or **Cancel** to return to JetStream without attaching anything.

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 seven default categories are:

- **Hyperlink**
- **Tag**
- **Viewpoints**
- **Clash Detective**
- **TimeLiner**
- **Selection sets**
- **Redline tags**

Note

The Clash Detective and TimeLiner categories are only available if you have a valid license for these plugins.

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 JetStream 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.

16.4.2. 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 16.4.4, “Editing Hyperlinks”) 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 16.4.1, “ Adding Hyperlinks ”. 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.

16.4.3. 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 non-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.

16.4.4. Editing Hyperlinks

Editing a hyperlink

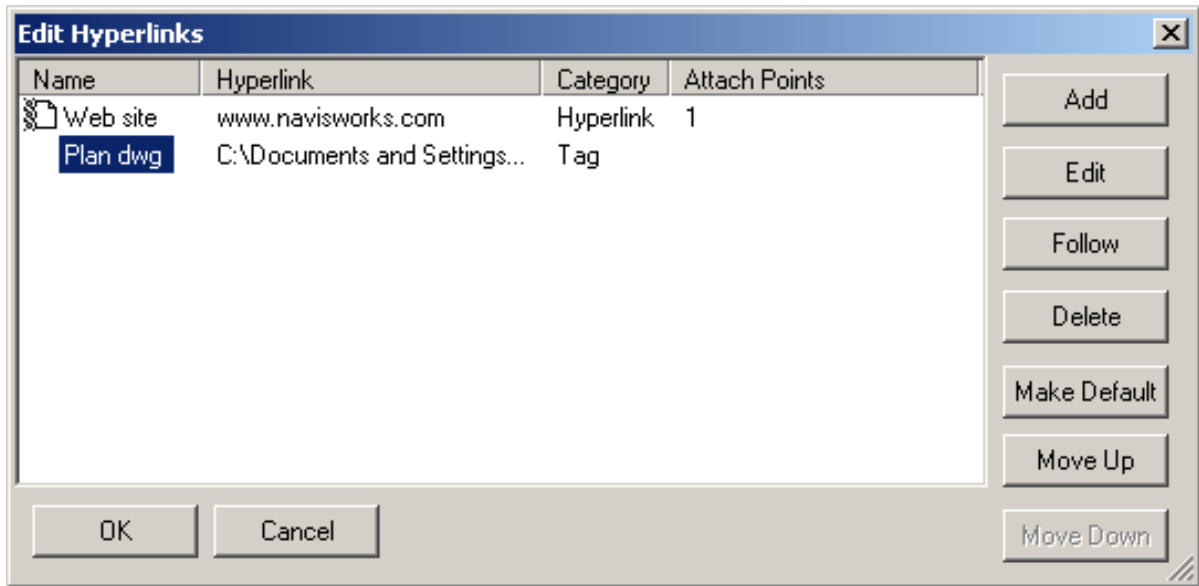
1. Either

- Select a single item (see Chapter 9, *Selecting Items* for more details on how to do this) from which you want to edit a hyperlink and go to **Review, Hyperlinks, Edit Hyperlinks**.

or

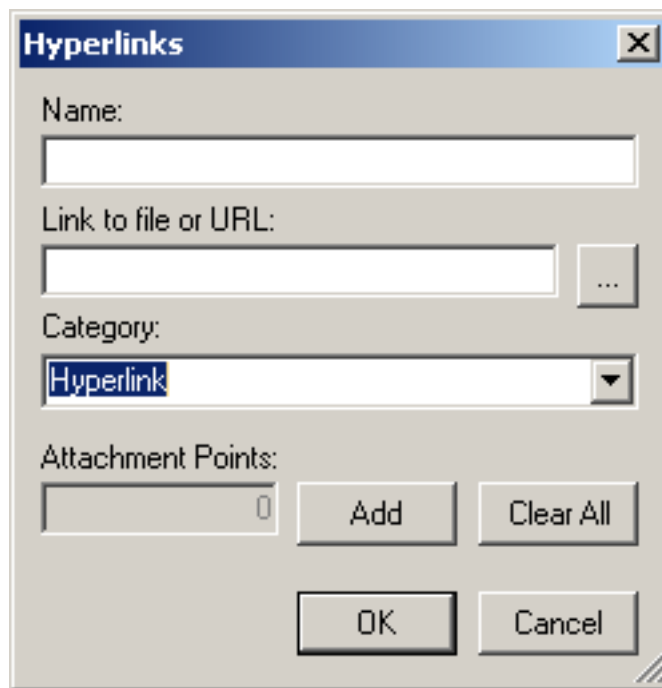
- Right click on the item from which you want to edit a hyperlink and choose **Hyperlinks, Edit Hyperlinks** from the context menu.

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 16.4.1, “ Adding Hyperlinks ”.
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 JetStream 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 JetStream, then your edit "overrides" will remain. If you haven't edited the hyperlinks in JetStream, however, the updated links from the CAD file will appear.

16.4.5. 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

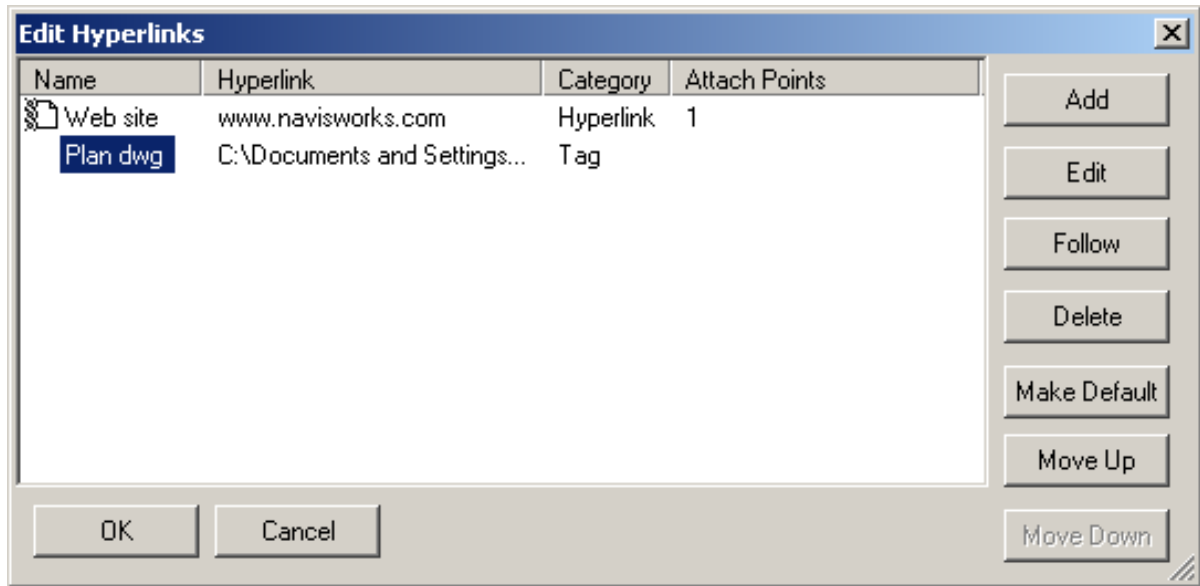
1. Either

- Select a single item (see Chapter 9, *Selecting Items* 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.



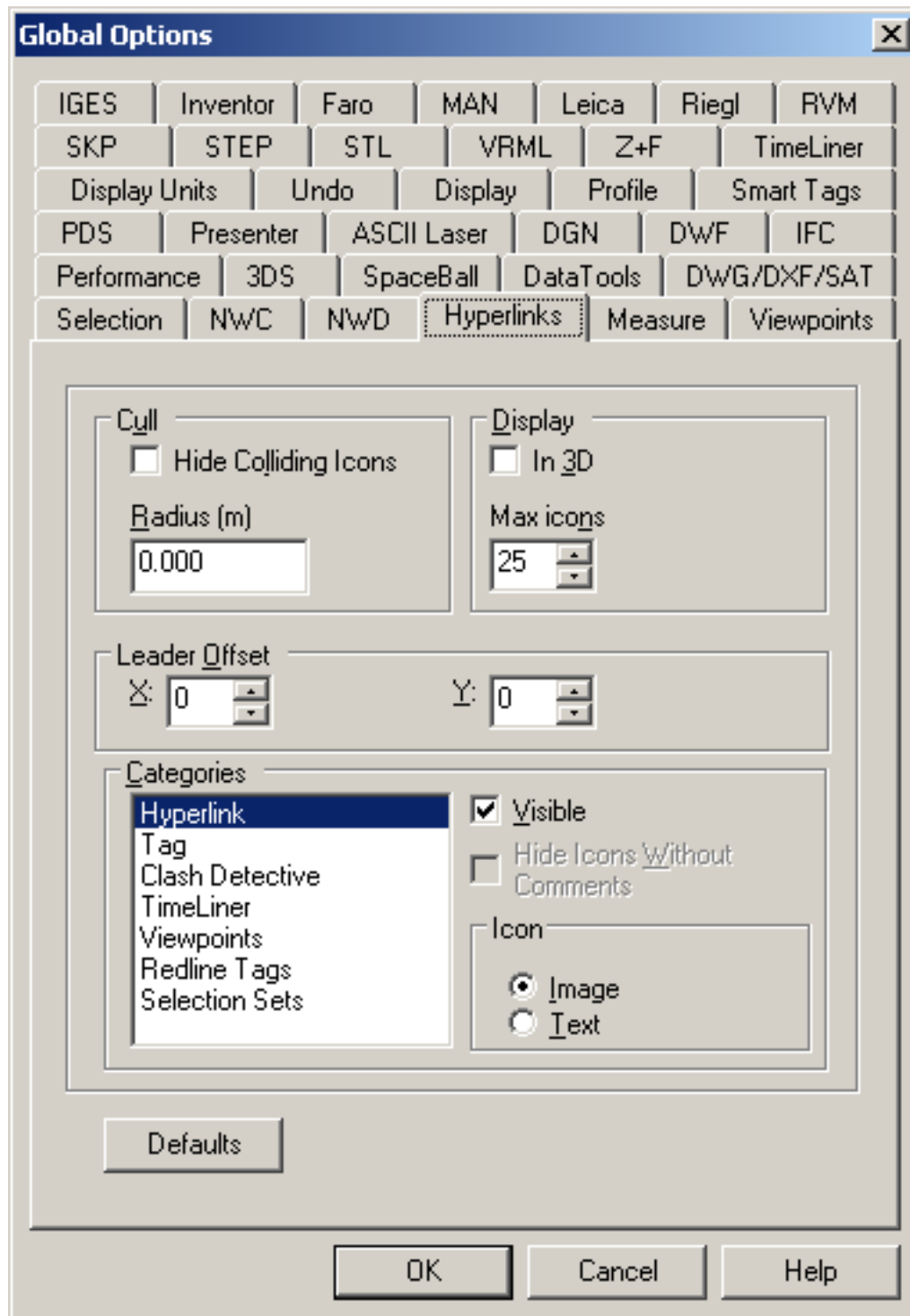
2. Select the hyperlink under the **Name** column.
3. Click on **Delete**
4. Click **OK** to confirm deletion or **Cancel** to return to JetStream without the hyperlink deleted.

16.4.6. 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 exactly 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 16.1, “Commenting ” for more information on comments.
8. Use the **Image** and **Text** radio buttons for each category to tell JetStream how to draw that category of hyperlinks. If text is drawn rather than the icon, the hyperlinks description is used as a tooltip 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.

16.5. 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

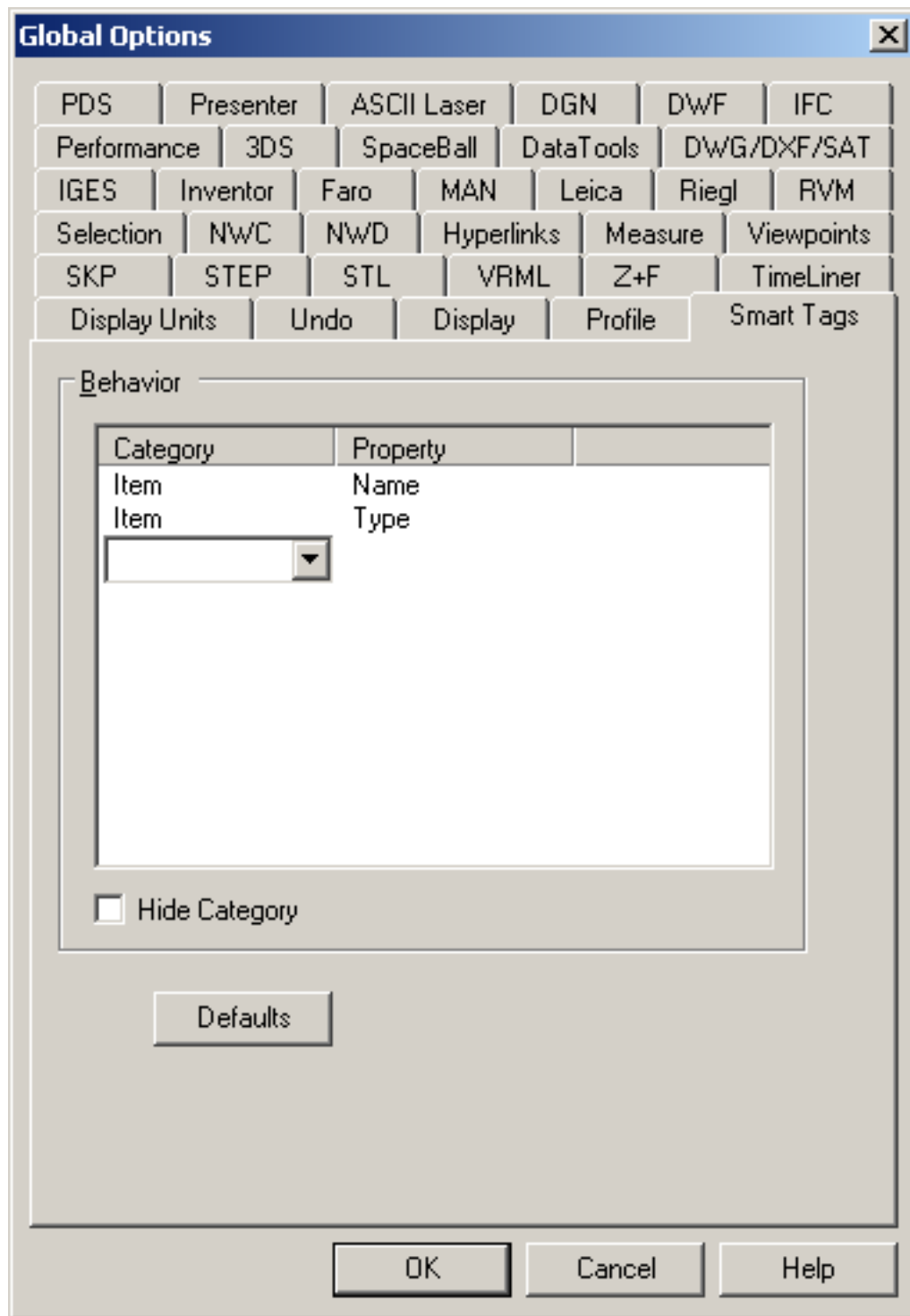
- Go to **Tools, Smart Tags**

16.5.1. 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. Check **Hide Category** if you do not want to see category names included in the smart tags tooltip.
7. Click **OK** to set the options or **Cancel** to exit the dialog without setting them.

16.6. Collaboration


The JetStream **Collaborate** tools enable multiple users to participate in a single design review session across a Local Area Network (LAN). This utilizes the shared program features of Windows NetMeeting, available to all Windows users.

All meeting participants require access to a JetStream .nwf or .nwd file, in a shared location. One of the participants will 'host' the meeting and place a call to invite the others to join the meeting. Any of the participants who have joined the meeting can take control and **drive** the session. All navigation performed by the driver will be displayed in the main JetStream window on each participants machine. Any viewpoints or markup (for example) added during the session can be updated on all participants machines at the click of a button.

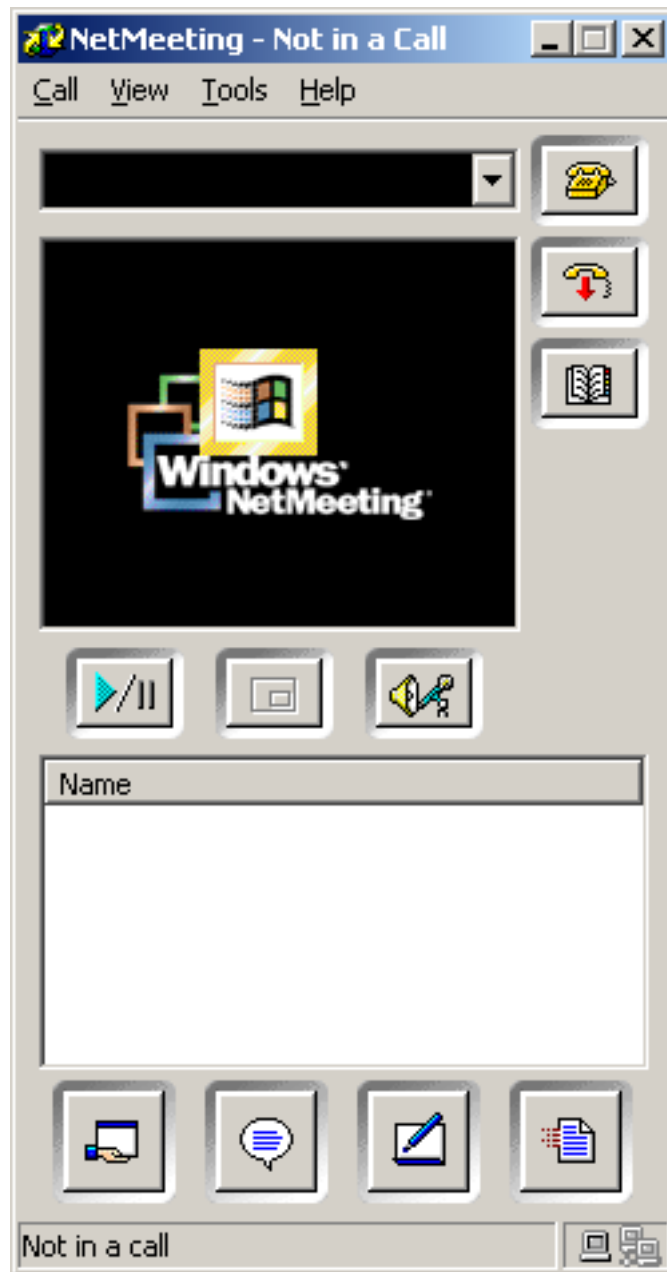
Note

If a collaborative review session, as outlined here, is not conducted in single room, then additional tele-conferencing provisions could be necessary. This may be using the NetMeeting Whiteboard, or your own telephone system.

To start a collaboration session:

- Open the JetStream file that you wish to collaborate on from a shared directory (see Section 6.4, “Opening Files”).
- Click **Collaborate**  on the **Collaborate** toolbar.


This will initialize Windows NetMeeting:



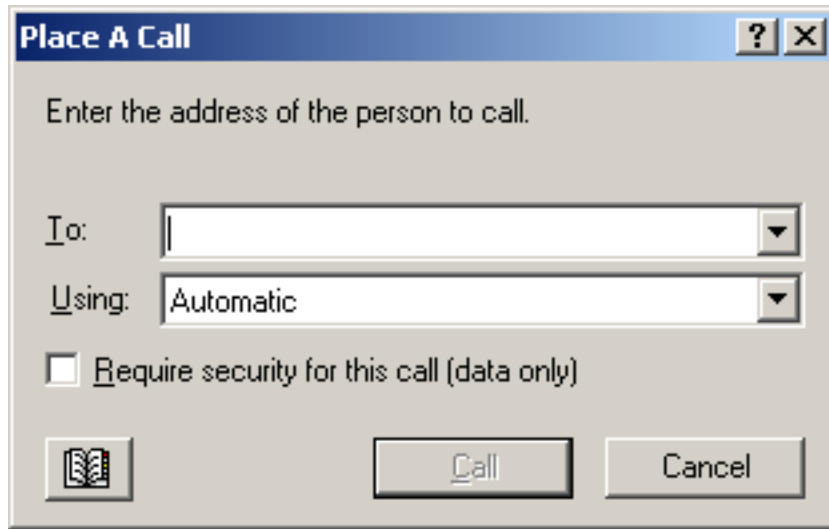
Note

The first time Windows NetMeeting initializes, a setup wizard will take you through the setup process. You will need to enter your name and email address. When using NetMeeting on a LAN you do not need to log onto a directory server, as these will not be available to you.

To place a call, inviting attendees to join:

- Having initialized Windows NetMeeting, click **Call**  on the **NetMeeting** dialog.

The **Place a call** dialog is displayed:



- In the **To:** box, enter the machine name or IP address of the machine you wish to join the meeting, then click **Call** to send the invite, or **Cancel** to return to NetMeeting..

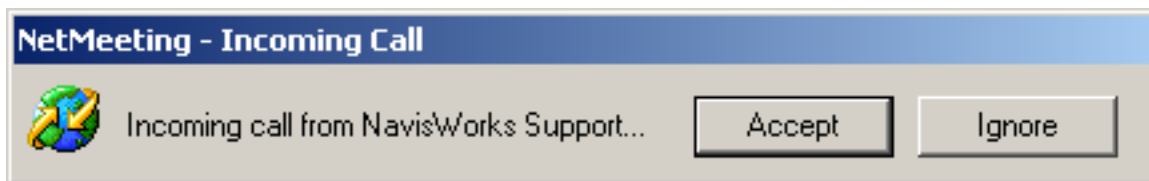
Once the person receiving the invite accepts this, both their name and yours will be listed in the NetMeeting dialog.

Note

The above can be repeated to invite additional people to the meeting.

To accept an invitation:

- When you are invited to join a meeting, the **incoming call** dialog is displayed:




- Click **Accept** to join the meeting, or **Ignore** to decline the invitation.

Note

Once you have accepted a call, you will need to start your own collaboration session. See Section 16.6, " Collaboration " [240] for more information.

During a collaboration meeting, anyone in the call can take control of the session and become the 'driver'. The driver will control navigation of the shared model on all machines in the call.

To become the driver:


- Click **Drive**  on the **Collaborate** toolbar.

Note

Upon clicking the **drive** button, all other users in the call will receive a message advising that you are requesting control. They will have to answer **Yes** to this message if you are to drive JetStream on their machine.

Although realtime navigation in JetStream can be performed on all machines in a call by one user, it is not possible for review data such as saved viewpoints, comments and redlines, to be automatically updated on all users' machines. This information can however be updated on their machines by refreshing the model. This **refresh** process can be performed on one users machine and refresh all machines in the call.

To refresh all attendees machines:

- Click **Refresh**  on the **Collaborate** toolbar.

16.7. SwitchBack

SwitchBack allows the current view of the currently loaded file to be sent back to AutoCAD (version 2004 or later) or MicroStation-based CAD products.

Note

The native CAD package must be installed on the same machine as JetStream for **SwitchBack** to work.

AutoCAD (version 2004 or later)

- For AutoCAD (version 2004 or later) or products based on it, first open the product in the usual manner and load the **nwexport** application. This can be done easily by running the **nwload** command in the command line. If **SwitchBack** needs to be available whenever AutoCAD is run, nwexport can be added to the set of startup applications in AutoCAD.
- Once the CAD package is running, and nwexport has been started, selecting an object in the scene will allow the **SwitchBack** command to be selected either from the **Review** menu, from the right-click context menu of the object, or, if a Clash Detective license is available, via the **SwitchBack** button on the Results tab. Selecting **SwitchBack** then takes the current JetStream camera view back to the CAD package.

Note

See the **Clash Results** section in the Clash Detective documentation for more information on taking clash results back to the originating CAD package.

- **Switching back** to AutoCAD whilst an object is selected will not only set the view in AutoCAD, but also select the object. Selection of objects is done by entity handle, therefore, you must have **Convert Entity Handles** option enabled when files are loaded into JetStream.

- Some objects cannot be selected in AutoCAD (for example, blocks) which may mean that running SwitchBack may be unsuccessful with a given selected object. If this is the case try selecting further up the object tree and trying again.

MicroStation (/J and v8)

- For MicroStation (/J and v8) or products based on it, first prepare MicroStation by loading the JetStream exporter "**mdl load nwexport5**".
- To get nwexport to load automatically when MicroStation is run, add "**nwexport5**" to the list of mdl applications run automatically on startup.
- Once the JetStream exporter has been run, selecting an object in the scene will allow the **SwitchBack** command to be selected either from the **Review** menu, from the right-click context menu of the object, or, if a Clash Detective license is available, via the **SwitchBack** button on the Results tab. Selecting **SwitchBack** then takes the current JetStream camera view back to the first visible view in MicroStation.

Note

See the **Clash Results** section in the Clash Detective documentation for more information on taking clash results back to MicroStation.

- If you wish to override the view used by **SwitchBack**, use the "**nwview <view number>**" key-in where **view number** is the visible window in MicroStation. This view setting is not saved between sessions.
- **Switching back** to MicroStation whilst an object is selected will not only set the view in MicroStation, but also select the object. Selection of objects is done by element id (MicroStation v8) or DMRS value (MicroStation /J).

Chapter 17. Interface

The JetStream 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.

JetStream 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, Display 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 17.11, “Profiles” for more information on this feature.

In the lower right hand corner of the interface there are four performance indicators, that give you constant feedback as to how JetStream is performing on your machine.



- The progress bar under the left hand icon (pencil) indicates how much of the current view is drawn, i.e. how much drop-out there is in the current viewpoint. When the progress bar is at 100%, the scene is completely drawn, with no drop-out. The icon will change color when it is working. Whilst the scene is being drawn, the pencil will change to yellow. If there is too much data to handle and your machine cannot process this quickly enough for JetStream, then the pencil will change to red, indicating a bottleneck.
- The progress bar under the central icon (disk) indicates how much of the current model is loaded from disk, i.e. how much is loaded into memory. When the progress bar is at 100%, the entire model, including geometry and property information, is loaded into memory. The icon will change color when it is working. Whilst data is being read, the disk will change to yellow. If there is too much data to handle and your machine cannot process this quickly enough for JetStream, then the disk will change to red, indicating a bottleneck.
- The progress bar under the right hand icon (web server) indicates how much of the current model is downloaded, i.e. how much has been downloaded from a web server. When the progress bar is at 100 %, the entire model has been downloaded. The icon will change color when it is working. Whilst data is being downloaded, the web server will change to yellow. If there is too much data to handle and your machine cannot process this quickly enough for JetStream, then the web server will change to red, indicating a bottleneck.
- The field to the right of the icons reports the amount of memory currently being used by JetStream. This is reported in Megabytes (MB).

The view menu gives you control over the JetStream 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.

17.1. View Menu

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

- Control Bars
- Customize
- Split Vertical
- Split Horizontal
- Split
- Full Screen
- Window Size
- Scene Statistics

17.2. 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.

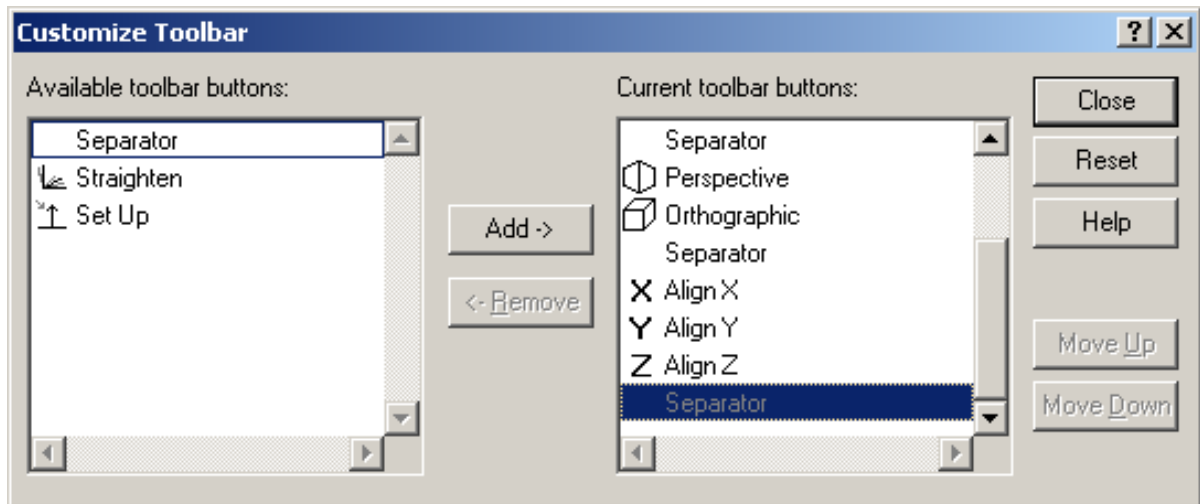
17.3. Customizing toolbars

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**
2. Click any of Standard, Workspace, Rendering Style, Navigation Mode, Navigation Tools.

The **Customize Toolbar** dialog is displayed



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 and use **Move Up** and **Move Down** to reorder the toolbar buttons.
5. Click **Close** to accept the changes you've made, or **Cancel** to return to JetStream without making any changes.

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.

17.4. Workspace Toolbar

The Workspace toolbar gives you control over the JetStream 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 JetStream frame and using the context menu, or selecting from **View, Control Bars**.

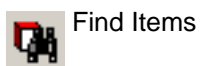
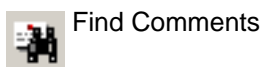
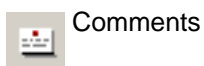
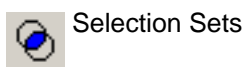
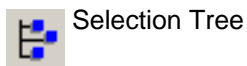
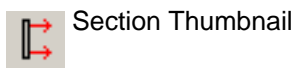
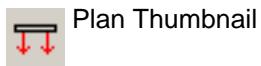
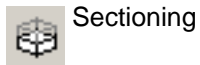


 Redline

 Hyperlinks

 Smart Tags

 Measure



17.5. 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.

or

- Go to **View, Split Horizontal** or **Split Vertical** to unselect that option.

Note

The recording and playback of animations will occur in the most recently used view. Each separate view remembers the navigation mode being used.

17.6. Full Screen Mode

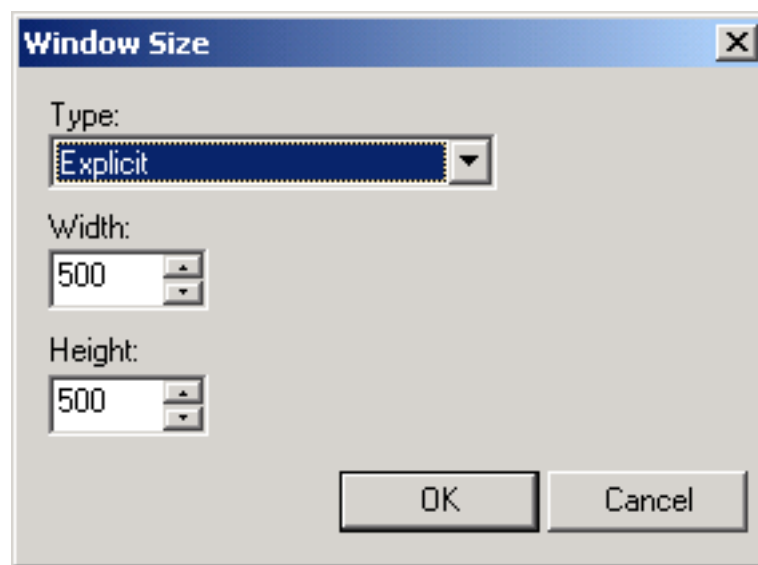
Selecting **Full Screen** or pressing the **F11** key puts JetStream into Full Screen mode; the main 3D navigation view takes up the full screen with no interface showing. Pressing the **F11** key for a second time turns full-screen mode off. Full screen mode will always go to full screen on the primary display. If two monitors are available, the interface can be placed on one whilst the main 3D view renders in full screen on the other.

17.7. Sizing of Navigation Window

JetStream allows you to specify the size of the main navigation window. This can be of particular use if you are composing a scene for image or animation export. By setting the window size to the same proportions as your intended output, you can visualize exactly how it will result.

Explicit sizing of the main navigation window

1. Go to **View, Window Size**. The window size dialog will be displayed.



2. From the **Type** drop-down list, select the sizing type you wish to specify:

- Select **Use View** to maximise the window size.

Or

- Select **Explicit** and enter the exact width and height you wish the window to be.

Or

- Select **Use Aspect Ratio** and enter the height you require and the width will be automatically calculated from the aspect ratio of the current view.

3. Click **OK** to set the window size, or **Cancel** to return to JetStream without changing it.

17.8. Stereo Rendering

Stereoscopic viewing in JetStream allows the viewing of the 3D model through stereo-enabled hardware, including active and passive stereo viewing glasses in conjunction with both CRT screens and dedicated projectors.

This feature requires the host computer have an OpenGL graphics card with stereo support. If this hardware is available, and has the correct driver and display settings, stereo can be turned on by selecting the **View, Stereo** menu option, otherwise this option will be greyed-out.

Note

Some drivers require stereo to be explicitly enabled in the driver and may require lower color or resolution settings before stereo becomes available.

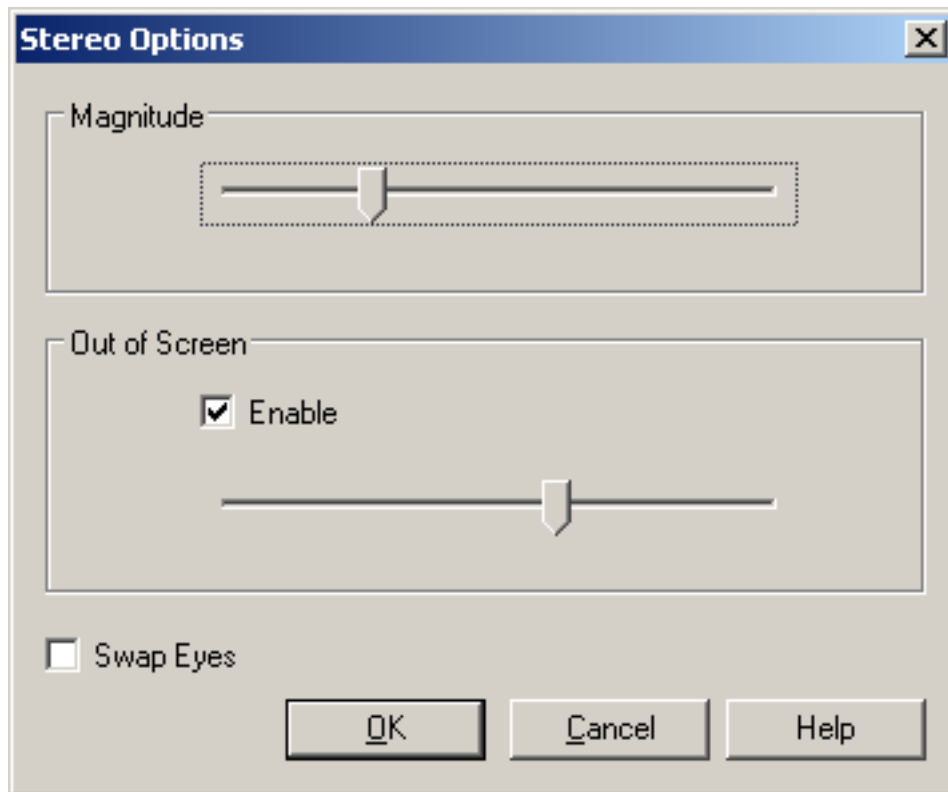
Selecting this menu option puts the video output into stereo mode; the view will look blurred without the correct glasses being worn. If the camera is in orthographic mode, it will need to be set to perspective for the effect to work correctly.

Note

As the view for each eye has to be rendered separately it is not possible to support incremental filling in of detail in stereo mode. The detail appears when rendering is complete. Progress can be seen using the bar in the status area, and it is still possible to interrupt and start interacting again at any time.

Stereo Options

1. Go to **View, Stereo Options....** The options dialog will be displayed.



2. Slide the **Magnitude** bar to vary the strength of the stereo effect.
3. Sliding the **Out of screen** bar, when enabled, and when using a focal point based navigation mode (examine, orbit, turntable, etc.), will position the model so that parts closer than the focal point appear in front of the screen, with the rest behind. The slider controls the balance, moving objects more or less out of the screen. When using any other navigation mode (walk, fly, etc.), the focal point is set so that any avatar will be level with the screen. Objects between you and the avatar will appear in front of the screen.
4. Check the **Swap Eyes** check box to swap the left and right eyes over. This can be useful when moving from CRT to a large screen projector and back.
5. Click **OK** to set the options or **Cancel** to exit the dialog without setting them.

17.9. 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.

17.10. Units

JetStream 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.

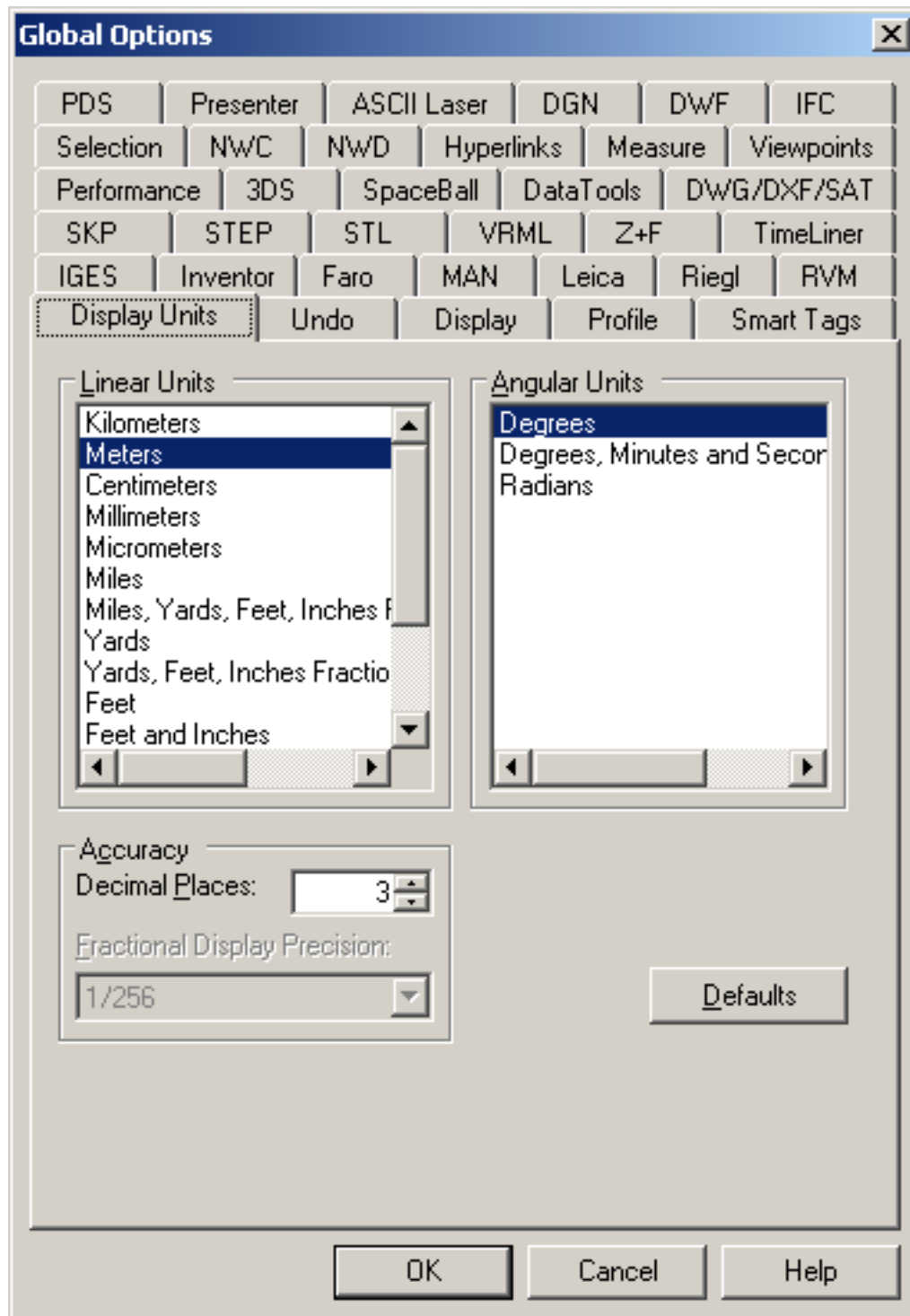
There is a default unit setting for each file type so that when files are opened, they are scaled appropriately to the scene's units. They can, of course, be rescaled after if the units turn out to be wrong for the scene.

Units Options

Setting units options

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

The **Display 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.

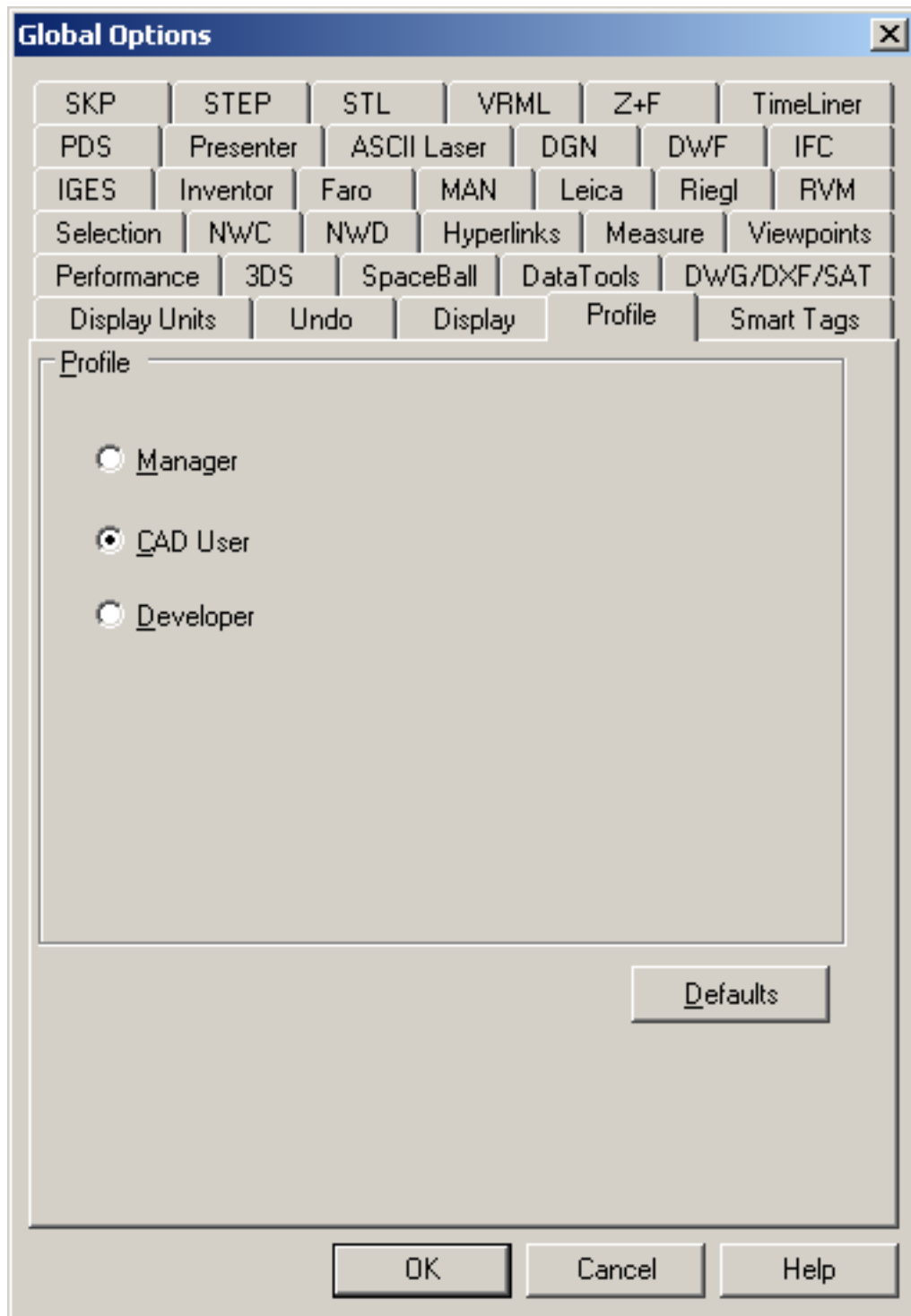
17.11. Profiles

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.

17.12. Search Directories

JetStream searches for a variety of configuration files in subdirectories of three standard directories. These files can be overridden on a per user, all users or per installation basis. The search directories are :

- Application Data\NavisWorks 5 within the current user profile. Usually C:\Documents and Settings\user\Application Data\NavisWorks 5 where user is the name of the current user.
- Application Data\NavisWorks 5 within the all users default profile. Usually C:\Documents and Settings\All Users\Application Data\NavisWorks 5.
- Within the JetStream install directory. Usually C:\Program Files\NavisWorks 5.

Chapter 18. Tools

The **Tools** menu in JetStream gives access to a series of useful tools, plugins and options. If you have purchased the Presenter, Clash Detective or TimeLiner plugins, they will be available under this menu.

The **Tools** menu consists of:

- Clash Detective (see the Clash Detective user guide for more details)
- Presenter (see the Presenter user guide for more details)
- TimeLiner or TimeLiner Playback (see the TimeLiner user guide for more details)
- 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.

18.1. Comparing Models

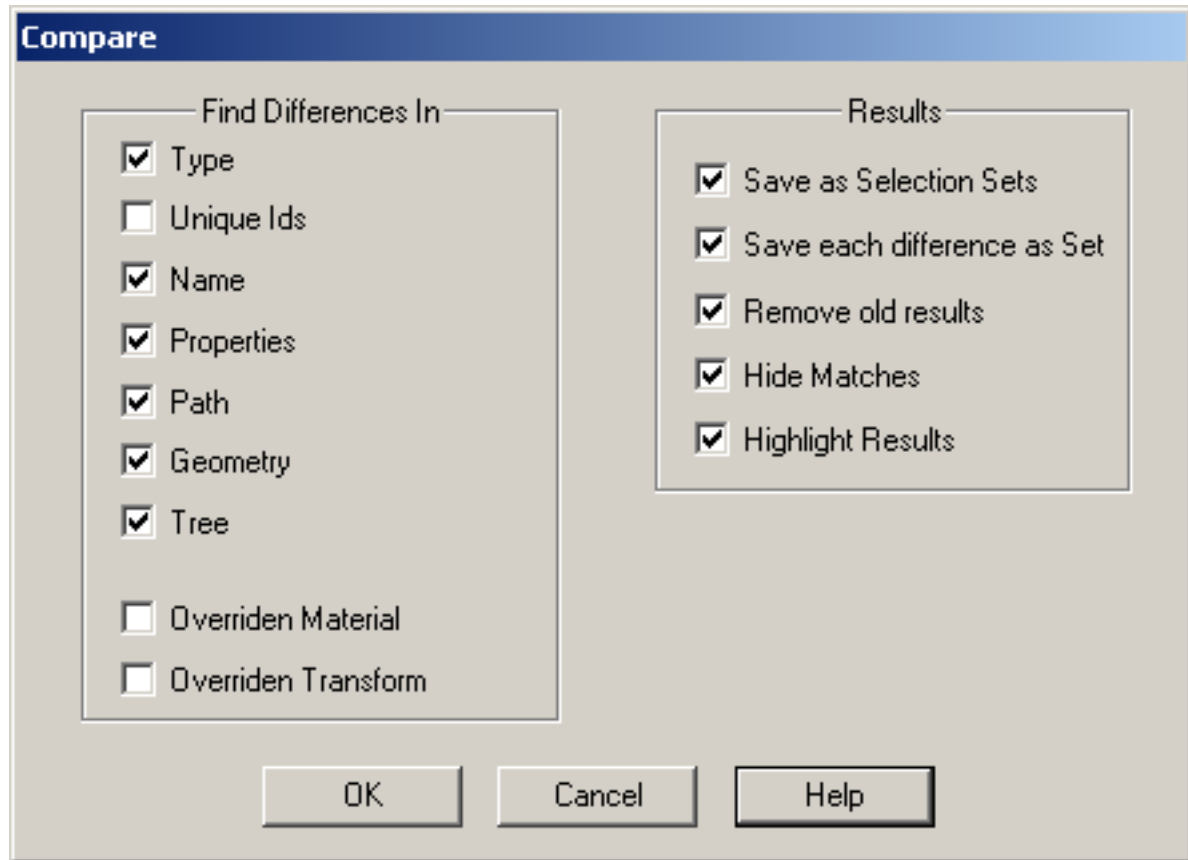
The **Compare** tool becomes available when *exactly* two items are selected. These can be any types of item, but the compare tool is most useful when comparing two versions of the same model. During the comparison, JetStream will start at each item and recursively travel down each path, as seen in the 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 9, *Selecting Items* 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 JetStream to compare for differences between the two items. **Overriden Material** and **Overriden Transform** relate to changing the color and/or transparency in JetStream and changing a file's origin, scale or rotation since loading into JetStream, 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 that 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 JetStream 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 19. 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 JetStream files (.nwf or .nwd) and reinstated when opening it. Global options, on the other hand, are set for *all* JetStream sessions.

This chapter simply links to other chapters where the functionality is described in more detail.

19.1. File Options

These options are saved into JetStream files and re-loaded when opening these files into JetStream. 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 five file options:

- Culling. See Section 12.2, “ Culling Options ”.
- Orientation. See Section 12.3, “ Orientation Options ”.
- Speed. See Section 12.4, “ Speed Options ”.
- Head light. See Section 12.1.1.3, “ Head Light options ”.
- Scene lights. See Section 12.1.1.5, “ Scene Lights Options ”.
- DataTools. See Chapter 20, *DataTools* .

19.2. Global Options

These options are persistent across JetStream sessions and are not saved into JetStream 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 JetStream Roamer, there are distinct sets of functionality that are controlled by the following options:

- Undo. See Section 11.2, “ Undo Options ”.
- Display. See Section 12.5, “ Display Options ”.
- Profile. See Section 17.11, “ Profiles ”.
- Smart Tags. See Section 16.5.1, “ Smart Tags Options ”.
- Performance Options. See Section 12.6, “ Performance Options ”.
- Selection of items. See Section 9.5, “ Selection Options ”.
- Hyperlinks. See Section 16.4.6, “ Hyperlinks Options ”.
- Measure tools. See Section 16.3.3, “ Measure Options ”.

- Saved Viewpoints. See Section 13.6, “ Viewpoints Options ”.
- Display Units. See Section 17.10, “ Units Options ”.
- NWC files. See Section 7.1.3, “ NWC Options ”.
- NWD files. See Section 7.1.2, “ NWD Options ”.
- Textures. See Section 12.7, “ Presenter Options ”
- SpaceBall. See Section 8.17, “ Using a SpaceBall ”
- DataTools. See Chapter 20, *DataTools* .
- TimeLiner (See the TimeLiner user guide for more details).

Note

The TimeLiner options tab is only available if you have a valid license for this plugin. See the TimeLiner user guide for more information on TimeLiner options.

The reading of native CAD file formats is also configured from this dialog using the following tabs:

- DWG/DXF. See Section 7.1.4, “ DWG and DXF File Reader Options ”.
- 3DS. See Section 7.1.7, “ 3DS File Reader Options ”.
- DGN. See Section 7.1.8, “ DGN File Reader Options ”.
- IGES. See Section 7.1.10, “ IGES File Reader Options ”.
- STEP. See Section 7.1.11, “ STEP File Reader Options ”.
- Inventor. See Section 7.1.12, “ Inventor File Reader Options ”.
- MAN. See Section 7.1.9, “ MAN File Reader Options ”.
- VRML. See Section 7.1.13, “ VRML File Reader Options ”.
- Riegl Scan. See Section 7.1.14, “ Riegl Scan File Reader Options ”.
- Faro Scan. See Section 7.1.15, “ Faro Scan File Reader Options ”.
- Leica Scan. See Section 7.1.16, “ Leica Scan File Reader Options ”.
- Z+F Scan. See Section 7.1.17, “ Z+F Scan File Reader Options ”.
- ASCII Laser Scan. See Section 7.1.18, “ ASCII Laser Scan File Reader Options ”.
- STL. See Section 7.1.19, “ STL File Reader Options ”.
- AVEVA Review RVM files. See Section 7.1.20, “ RVM File Reader Options ”.
- IFC. See Section 7.1.21, “ IFC File Reader Options ”.

Chapter 20. DataTools

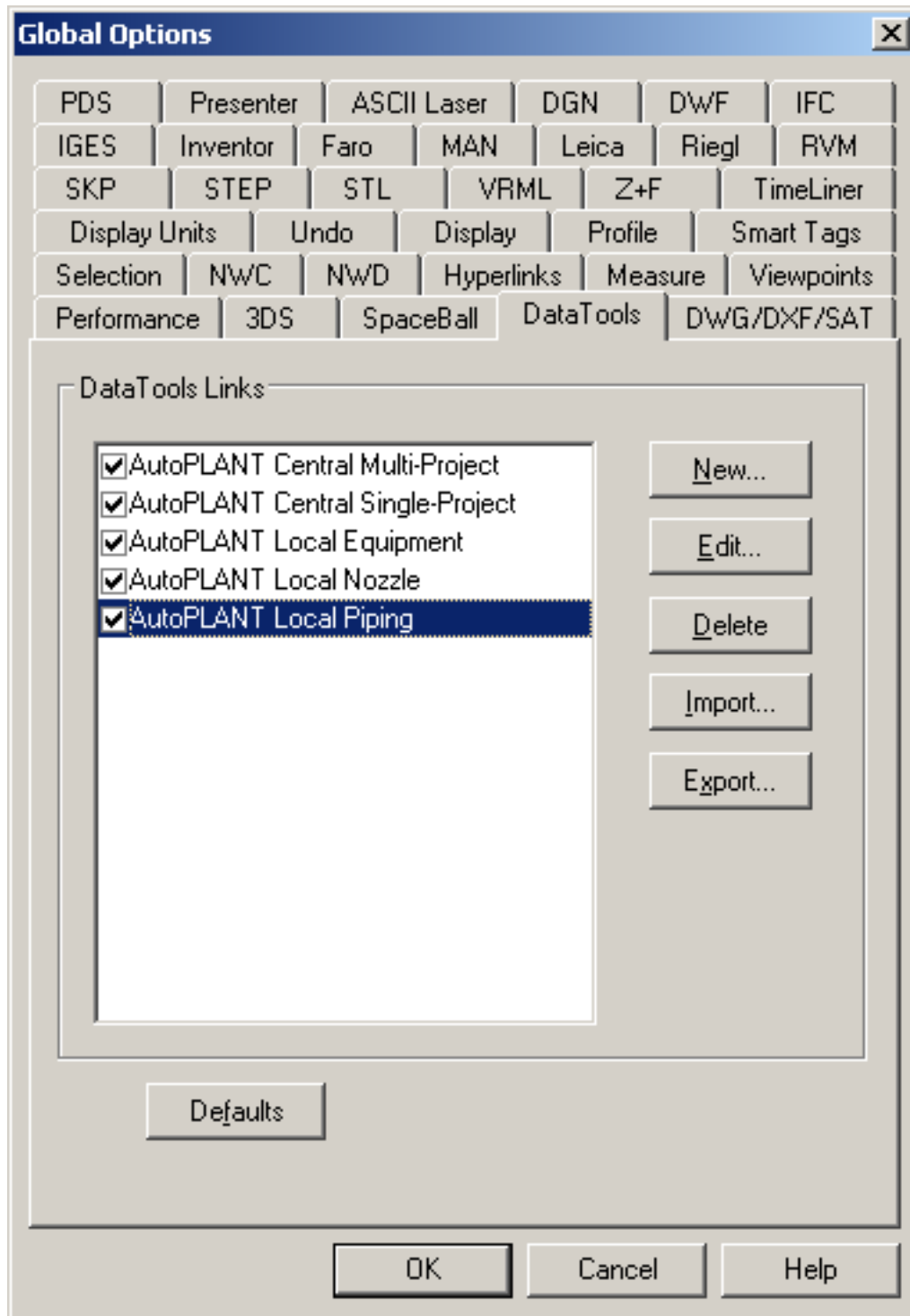
This feature is used to link Object Property elements in JetStream to fields that exist in a table within a database. Any database with a suitable ODBC driver is supported, and properties contained within database tables can be brought through and shown on the Properties control. If an object in a scene has associated database properties, clicking on that object will show the properties in a separate tab.

Data linked from a database can also be included in any searches using the **Find** tool, and can also be used within **Clash Detective** as part of the clash criteria. See Section 10.2, “ Finding Items ” for more details on how to use the **Find** tool, and the **Clash Detective** book for more information on clashes and clash criteria.

20.1. DataTools Links

To allow object data to be read from a database, a link between the model and the database needs to be set up. This link can be set up in two places; **Global Options** and **File Options**. Both places allow the same settings to be set up and database links in both places exist in tandem. Having the two locations gives the option of setting up a single set of database links in **Global Options** for multiple files to access, whilst allowing files to have their own individual database links within **File Options**.

- Click on **Tools, File Options** for setting up file related database information, or **Tools, Global Options** for setting up global database links.
- Clicking on the **DataTools** tab brings up the following tab



Note

The images and information here also apply to setting up DataTools in **File Options**.

On the left hand side of this tab is shown all links that have been added. The link names listed are user defined, and all links can be set to **Active** or **Inactive** by selecting or deselecting the check box beside

each.

- **New** is used to set up a new Link. An unlimited number of links can be set up using this button.
- **Edit** is used to edit an already existing Link. Select the link to edit and press the **Edit** button.
- **Delete** is used to delete an existing Link. Select the link to be deleted and press the **Delete** button.
- **Import** can be used to import a previously exported Link list. Clicking on this button will bring up an import dialog box to enable browsing to the required file.
- **Export** is used to export the currently selected list of Links and all their associated information. Select multiple Links for export using the **Shift** and **Ctrl** keys whilst selecting links in the list. Clicking on this button then brings up an export dialog box to enable a destination path and filename to be set. This also gives the option of stripping the Username and Password from the exported data.
- **Default** restores to the configuration as shipped with JetStream

20.2. Creating a DataTools Link

Clicking on the **New** or **Edit** button brings up the following dialog box, allowing the creation of a new Link, or the editing of an existing selected link.

Field Name	Display Name
MODULE	Module
CLASS	Class
EQUIP_NO	Equipment Number
TAG	Tag
SHORT_DESC	Short Description
LONG_DESC	Long Description
ITEM	Item
DRAWING	Drawing
SHEET	SHEET
REV_NUMBER	Revision Number
INSUL_SPEC	Insulation Specification
INSUL_THK	Insulation Thickness
MAT_STAT	Material Status
DATE_TIME	Date & Time
DES_PRES	Desired Pressure
DES_TEMP	Desired Temperature
VENDOR	Vendor
MATL_IDENT	MATL_IDENT
POSX	Position X
POSY	Position Y
POSZ	Position Z
WEIGHT_DRY	Dry Weight
VERSION	Version
USER_NAME	Username
BOM	Bill Of Materials

- Enter the name of your new link in the **Name** box. This should be a unique name.

- Select your **ODBC Driver** from the drop-down list box and click on the **Setup...** button to setup that driver. The driver will walk you through the setup options. If you have difficulties setting up your connection details, contact your database administrator.

The box underneath will show the connection string.

Note

This is editable, though should only be changed with care. Under most circumstances this can be left alone.

Some examples are:

- **Connection string:** Selecting a database with a certain name (test.mdb) that is always next to the model file (as in the resultant NWD/NWF not the original):

```
DBQ=%pushpath(%poppath(%currentpath), "test.mdb");DRIVER={Microsoft Access Driver (*.m
```

- **Connection string:** Selecting a database with the same name as the original model file (e.g. AutoPlant):

```
DBQ=%join(%removeext(%removepath(%sourcepath)), ".mdb");DRIVER={Microsoft Access Drive
```

- The **Hold open for application lifetime** check box, when checked, keeps the connection to the dbase open whilst JetStream is open, and only closes it on exit.
- The **SQL String** must always start with SELECT, and is used to connect to a table within the database. Set up the query for the table by writing the SQL String.

Some SQL String examples include:

- **SQL String:** Selecting all columns from table Test whilst requiring that the column called Entity Handles matches a category/property pair called Entity Handle/Value and the column called File Name matches the original filename of the drawing:

```
SELECT * FROM Test WHERE "Entity Handle" = %prop("Entity Handle","Value") AND "File N
```

Here the path and the extension of the file name are being stripped so a file like c:\model\3rdFloorDucts.dwg would come out as 3rdFloorDucts.

- **SQL String:** Selecting two columns from table Test whilst requiring that the column called Entity Handle matches a category/property pair called Entity Handle/Value:

```
SELECT Name,Part FROM Test WHERE "Entity Handle" = %prop("Entity Handle","Value");
```

- **SQL String:** Selecting all columns from table Test whilst requiring that the column called Value is within a certain range given by two category/property pairs:

```
SELECT * FROM Test WHERE Value BETWEEN %prop("Pressure","Minimum") AND %prop("Pressur
```

The full Tag list includes:

Property tags

- `%prop("category","property")` - Property of the currently selected object. Category is the name of the tab in the property windows (e.g. Item or Entity Handle) and property is the name of the property in that tab. (e.g. Value or Layer)
- `%intprop("category","property")` - Property of the currently selected object. This is the same as the previous tag except instead of using the publicly visible category and property name use the internal JetStream names. The benefit of using internal names is that they are not language dependent. [This is advanced tag that will make more sense to people familiar with the JetStream API]

File/Path tags

- `%sourcepath` – This tag represents the full path and filename that the currently selected object comes from. Even when a collection of model files have been combined into a single NWD file this tag will still remember the path and filename of the original model file.
- `%currentpath` - This tag represents the full path and filename of the currently loaded model. If you currently have an NWF or NWD loaded that contains many other models it will just return the path and filename of the top level NWF/NWD.

File/Path Manipulation Tags

- `%removeext("text")` – If the provided text includes a filename with an extension this tag will remove the extension.
- `%removepath("text")` – If the provided text includes a path and filename this tag will remove the path and just return the filename.
- `%poppath("text")` – If the provided text includes a path this tag will remove the top level. If it the text also includes a filename that will count as the top level and be removed. [e.g. `%poppath("c:\temp")` becomes `c:\` and `%poppath(c:\temp\readme.txt)` becomes `c:\temp`]
- `%pushpath("text1","text2")` – If `text1` is a path and `text2` is a file or folder name then `text2` will be added onto the path in `text1`. [e.g. `%pushpath("c:\test","model.nwd")` becomes `c:\test\model.nwd`]

String Manipulation Tags

- `%join("text","text")` – This tag simply joins the two pieces of text together. [For example

`%join("c:\", "model.nwd")` would return `c:\model.nwd`

Note

Tags must not contain white space between the brackets (unless enclosed by quote marks), so

```
%prop("EntityHandle", "Value")
```

works, but

```
%prop("EntityHandle", "Value")
```

does not.

- Once the string is complete, clicking anywhere in the **Fields** box brings up a new edit control. Type in the name of a field from the table accessed by the SQL String. Pressing enter automatically copies this name into the display name. This display name is the text that appears in the database tab in the Properties control; click on this display name to alter it. Continue to fill this in until the table contains all the information required to be seen.

Note

All file-based connection information is saved inside the project NWF or NWD. The global connection information is saved on the local machine. If the associated database is available on loading the NWF/NWD file, the link will automatically establish itself when an object is selected. On selecting an object, if the database is available, and there is data associated with the object, JetStream will create an appropriate database tab in the Properties control and show the appropriate data as set up in the connection details.

If a **Publisher** license is present, Object Properties can be extracted from a database connection and embedded as static data within the published NWD file. See Section 22.1, “ Publishing from Roamer ” for more information.

Chapter 21. Getting Help

The **Help** menu gives you access to useful resources about your system, your product and the documentation. JetStream 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?
- JetStream on the Web.
- Clash Detective... help for the Clash Detective plugin, (only available with a valid Clash Detective license).
- Presenter... help for the Presenter plugin, (only available with a valid Presenter license).
- TimeLiner... help for the TimeLiner plugin, (only available with a valid TimeLiner license).
- Publisher... help for the Publisher plugin, (only available with a valid Publisher license).
- License... open the JetStream License Manager.
- System Info
- About JetStream

If the online documentation and help does not answer your query, try the **Support** area on www.navisworks.com [<http://www.navisworks.com>]. If the website does not help answer your problem, you should contact the reseller from whom you purchased the software.

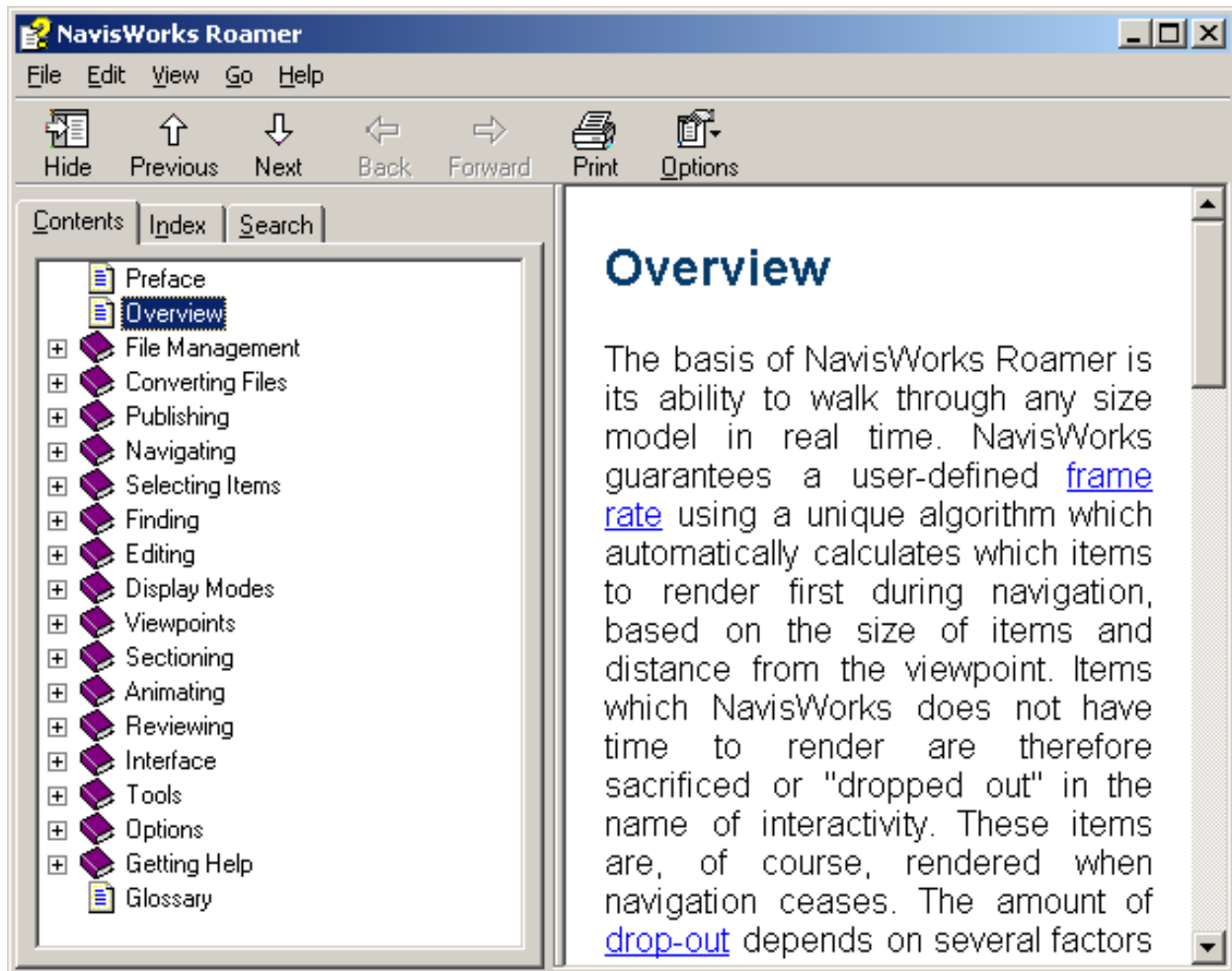
The JetStream Bond is an optional subscription program and gives you access to support via your reseller after 30 days from purchase. You also gain access to the Bond web site bond.navisworks.com [<http://bond.navisworks.com>] where you can download the latest patches and upgrades for your product, get useful tips and tricks about JetStream and join the online forum.

21.1. Help Topics

JetStream Roamer contains full help documentation. This is structured in chapters, sections and procedures which can be easily navigated on the **Contents** tab.

To open the Roamer help documentation, go to **Help, Help Topics**.

The **JetStream Roamer** help window is displayed:




In the **Contents** tab, select an item to view its contents. Expand and contract the chapters and sections (identified with a book icon) using the plus and minus icons to the left of them. The contents of the selected item will be displayed in the right hand pane.

The **Index** tab has a full index of all Roamer help topics. Select the topic you are interested in learning more about from the list, then click **Display**. The selected topic will be displayed in the right hand pane.

Should you not be sure of the topic name that you are interested in learning more about, use the **Search** tab to search on any keyword. Enter the keyword to be found, then click **List Topics**. Any topics within the Roamer help containing the keyword you entered, will be listed. Select the topic you are interested in and then click **Display**. The selected topic will be displayed in the right hand pane.

21.2. What's This?

JetStream 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.

21.3. JetStream on the Web

All documentation and support resources including, information on graphics cards, tutorials, animated demonstrations and a fully searchable knowledge base, are available for JetStream Roamer and each of the plugins on the **Support** pages of the JetStream website, (www.navisworks.com [http://www.navisworks.com]).

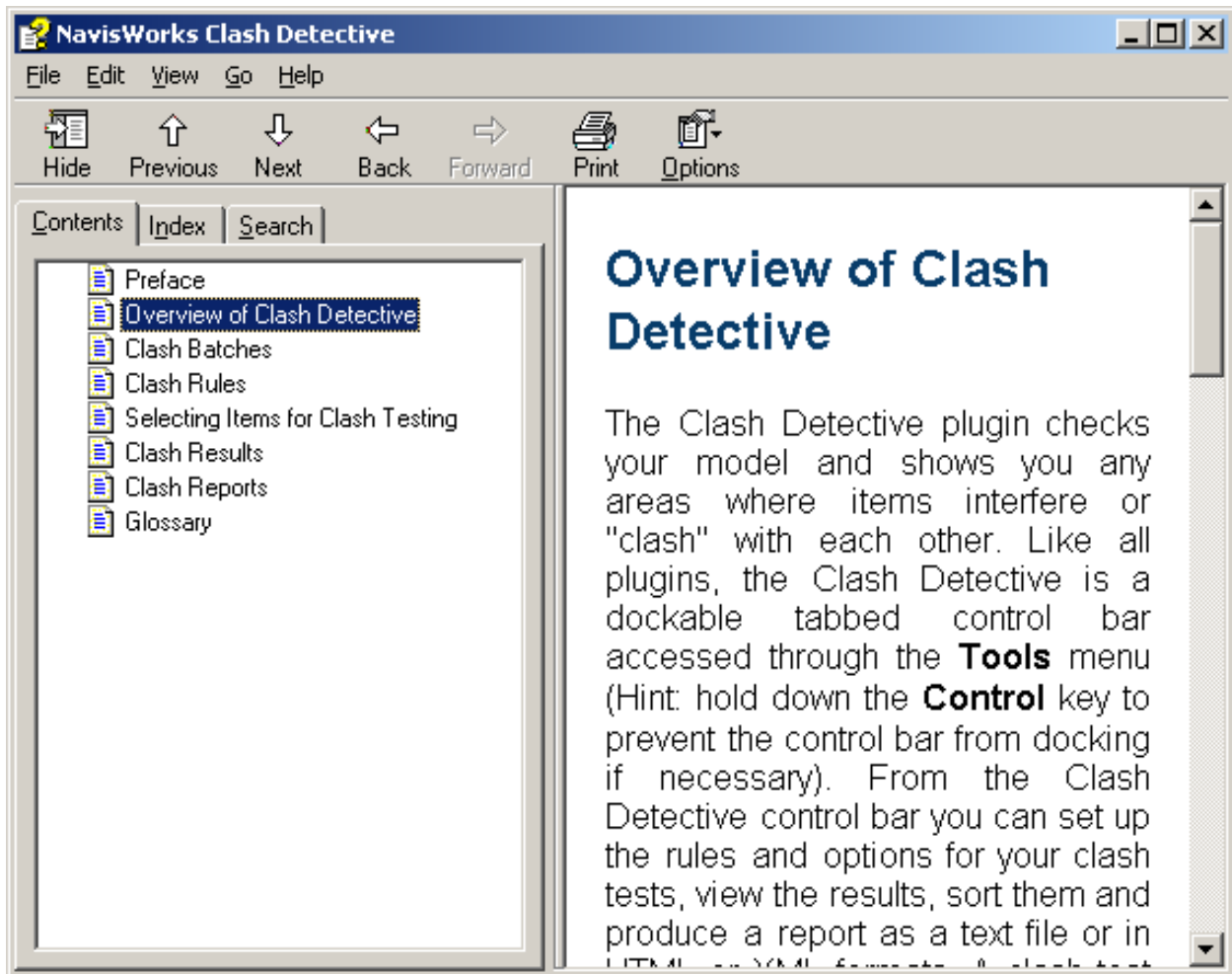
To visit the JetStream support pages on the Internet, go to **Help, JetStream on the Web**.

21.4. Clash Detective Help

The Clash Detective plugin contains full help documentation (this is available provided you have a valid Clash Detective license).

To open the Clash Detective help documentation, go to **Help, Clash Detective...**

The **Clash Detective** help window is displayed:



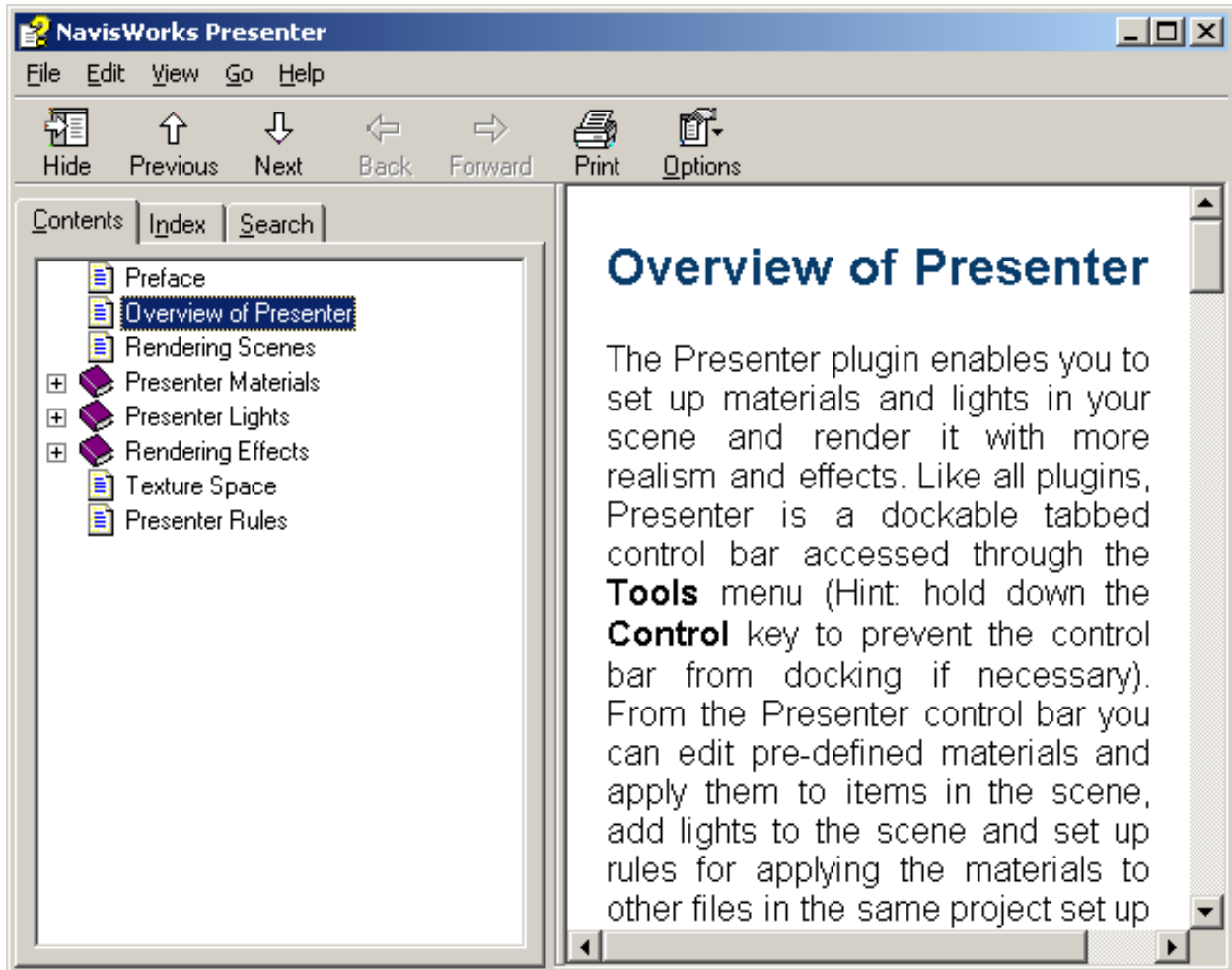
The Clash Detective help is used in exactly the same way as the Roamer help, see Roamer Help Topics for further information.

21.5. Presenter Help

The Presenter plugin contains full help documentation (this is available provided you have a valid Presenter license).

To open the Presenter help documentation, go to **Help, Presenter....**

The **Presenter** help window is displayed:



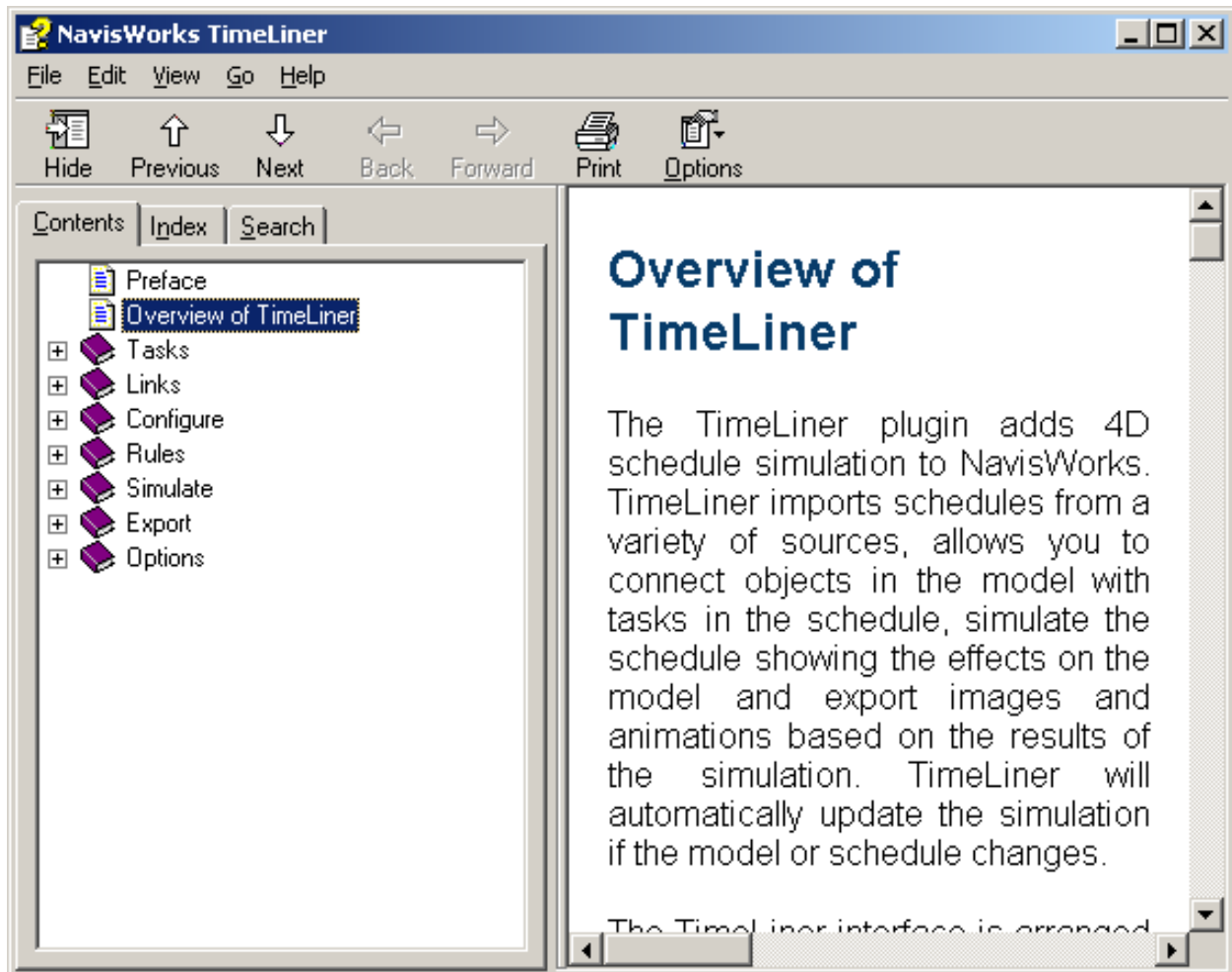
The Presenter help is used in exactly the same way as the Roamer help, see Roamer Help Topics for further information.

21.6. TimeLiner Help

The TimeLiner plugin contains full help documentation (this is available provided you have a valid TimeLiner license).

To open the TimeLiner help documentation, go to **Help, TimeLiner....**

The **TimeLiner** help window is displayed:



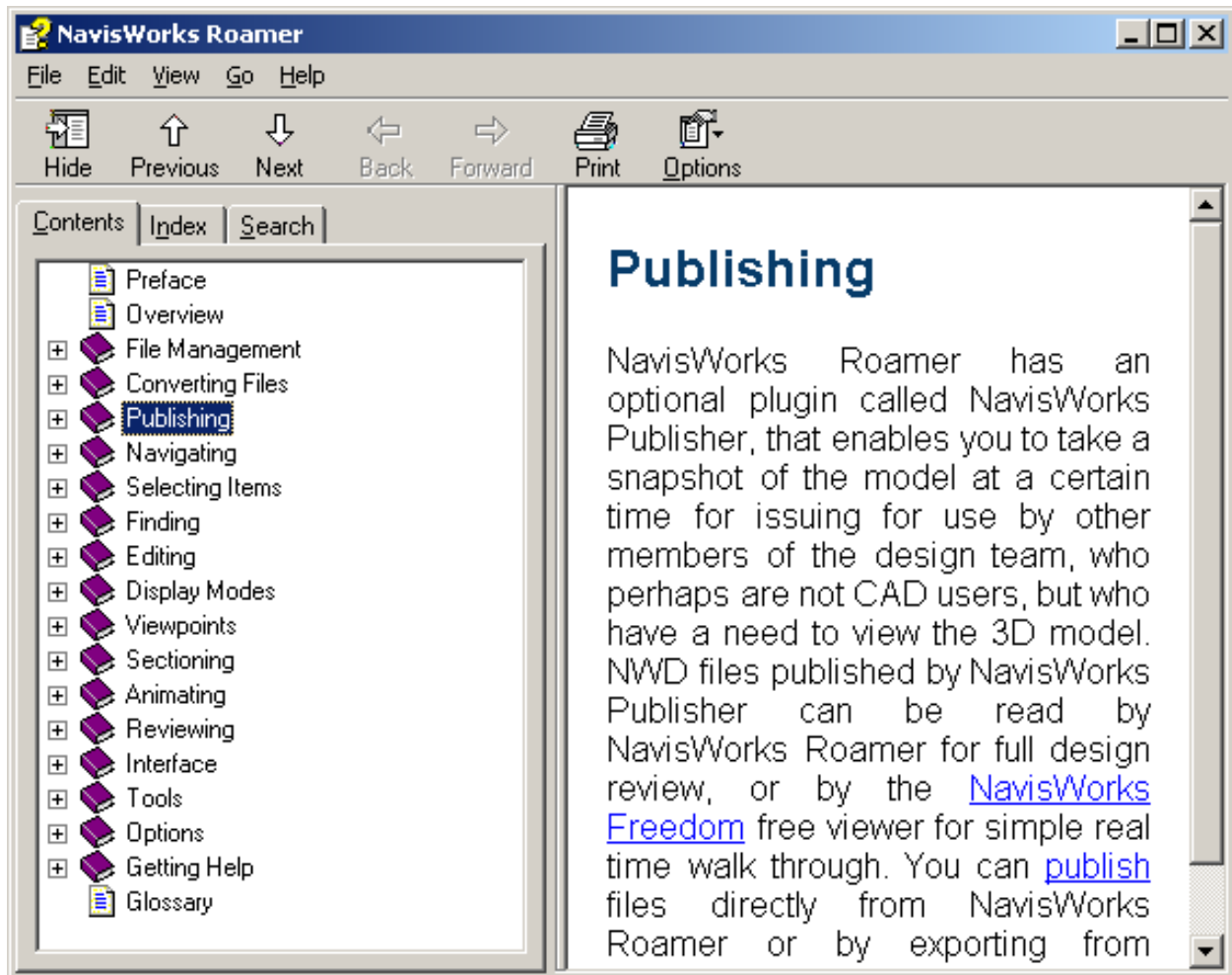
The TimeLiner help is used in exactly the same way as the Roamer help, see Roamer Help Topics for further information.

21.7. Publisher Help

The Publisher plugin contains full help documentation (the Publisher documentation is contained within the Roamer help documentation, though its functionality is only available provided you have a valid Publisher license).

To open the Publisher help documentation, go to **Help, Publisher....**

The **JetStream Roamer** help window is displayed at the **Publishing** chapter:



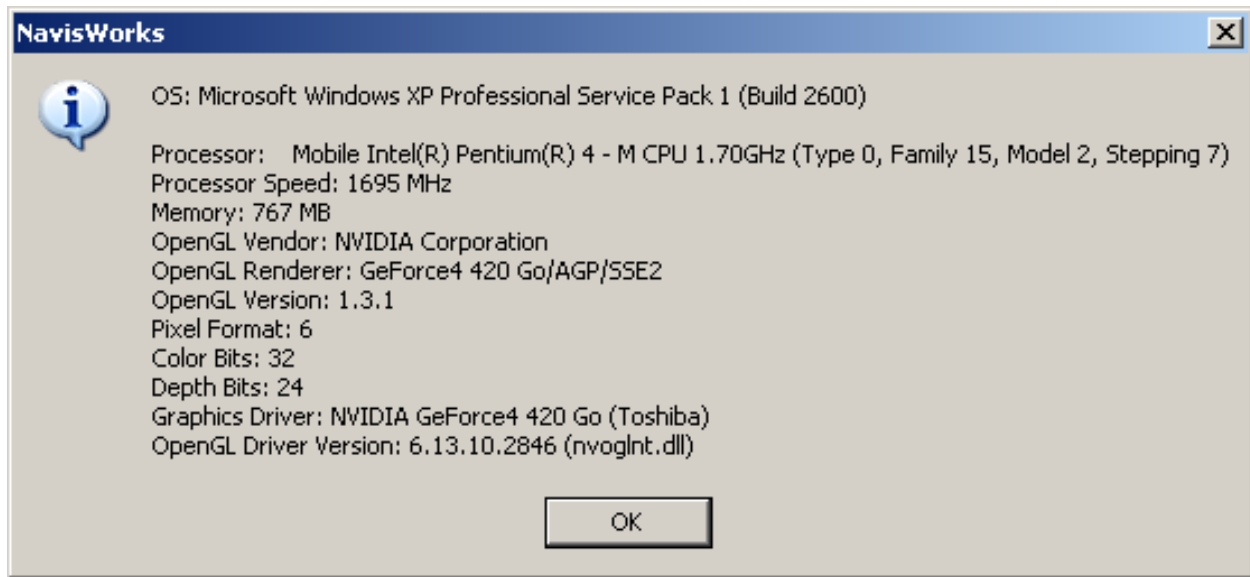
The Publisher help is used in exactly the same way as the Roamer help, see Roamer Help Topics for further information.

21.8. License

Opens the JetStream License Manager, where all licensing operations are done. For more information on this, see the book called `LicMan.pdf` in the `manuals` directory.

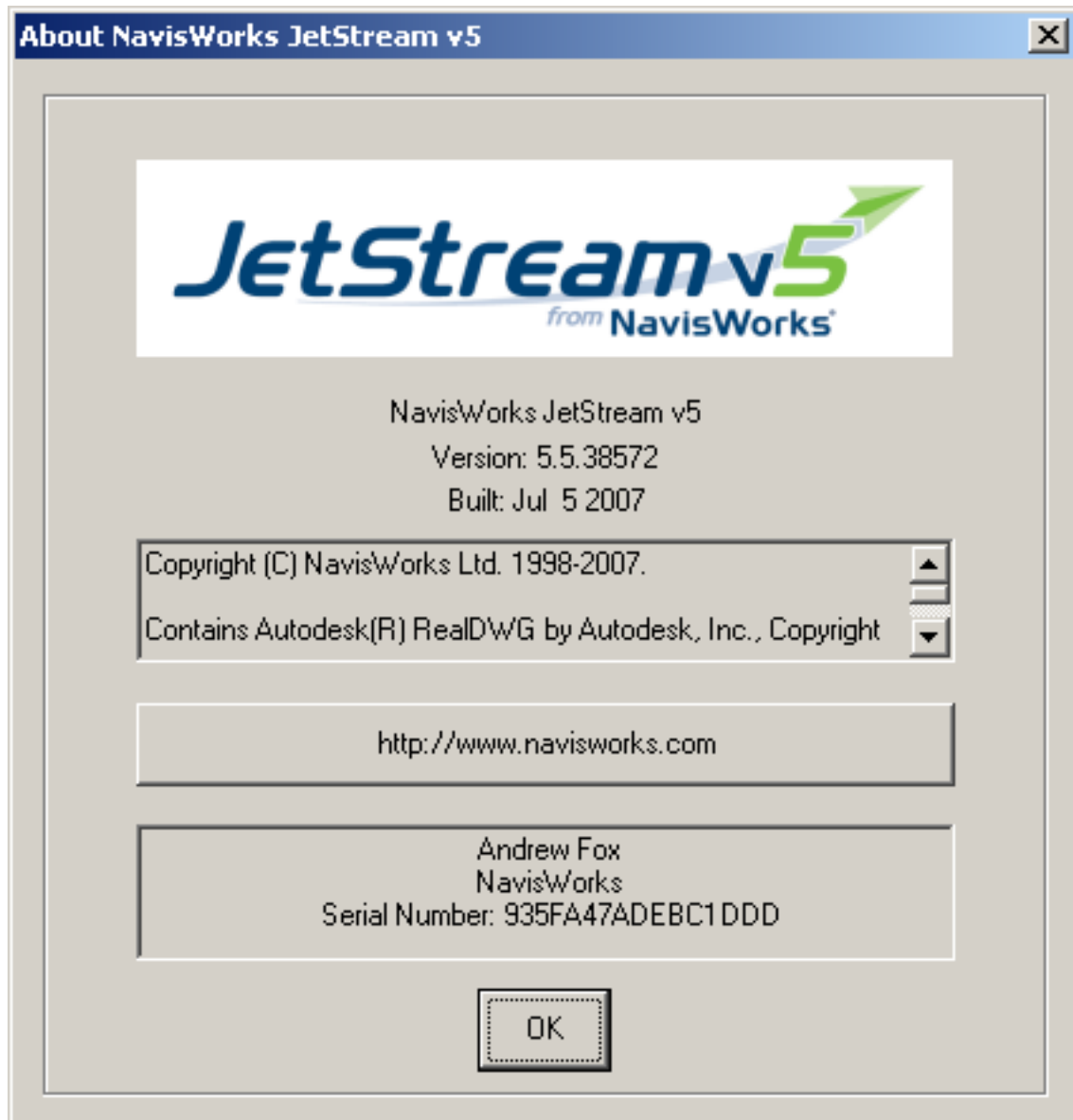
21.9. System Info

Opens a dialog giving you detailed information about your system, which can be helpful in support situations.



21.10. About JetStream

Opens a dialog giving you information about your product, including version and build number, which can be helpful in support situations.



Part III. JetStream Publisher

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Chapter 22. Publishing

JetStream Roamer has an optional plugin called JetStream Publisher, 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 JetStream Publisher can be read by JetStream Roamer for full design review, or by the NavisWorks Freedom free viewer for simple real time walk through. You can publish files directly from JetStream Roamer or by exporting from AutoCAD™ or MicroStation™.

22.1. Publishing from Roamer

JetStream Publisher .nwd files are files published by JetStream 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

Publish [X]

Title
Hartlib Library

Subject
Sheffield University extension to main library

Author
Steve Parnell

Publisher
Steve Parnell

Published For
Sheffield University

Copyright
Architectrics

Keywords
library extension

Comments
Issue 4. For review only.

Password

Display at password

Expires
20/02/2003

May be re-saved

Display on open

Embed Textures

Embed Database Properties

Prevent Object Property Export

OK Cancel

2. You can enter as much, or as little information 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 JetStream or NavisWorks Freedom 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 JetStream or NavisWorks Freedom™ after the date set.

Note

Evaluation copies of JetStream can publish .nwd files, however these files will have a "time-bomb" set to the same expiry date as the evaluation software. To remove the expiry date from an .nwd file created by an evaluation copy, you must re-publish the file with a full JetStream Publisher license.

6. If the **May be re-saved** checkbox is checked, this will allow JetStream 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 JetStream to display the publication entries in a dialog on opening the file.
8. If the **Embed Textures** checkbox is checked, all textures will be embedded in the published file; separate texture files will no longer be created.
9. The **Embed Database Properties** check box, if checked, force any properties accessed via an external database to be embedded in the NWD. No database links will be stored in the file from this point on.
10. The checkbox **Prevent Object Property Export**, if checked, will stop any native CAD package object properties from being exported into the published file.
11. 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 JetStream.

Note

When publishing a scene, any RPCs included in that scene are not published to the Presenter_maps directory or embedded in the NWD file. The size of the files and the fact that most are licensed currently prohibits this.

22.2. Publishing from AutoCAD™

JetStream 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 JetStream, then install JetStream again, choosing the **Custom Install**

option and choose the relevant AutoCAD. The JetStream 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 7.2.1, “ AutoCAD .nwc Exporter ” 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.

22.3. Publishing from MicroStation™

JetStream 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 JetStream is installed, this MDL plugin is installed with JetStream and ready for use.

Note

If you install MicroStation after JetStream, then install JetStream again, choosing the **Custom Install** option and choose the relevant MicroStation. The JetStream 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

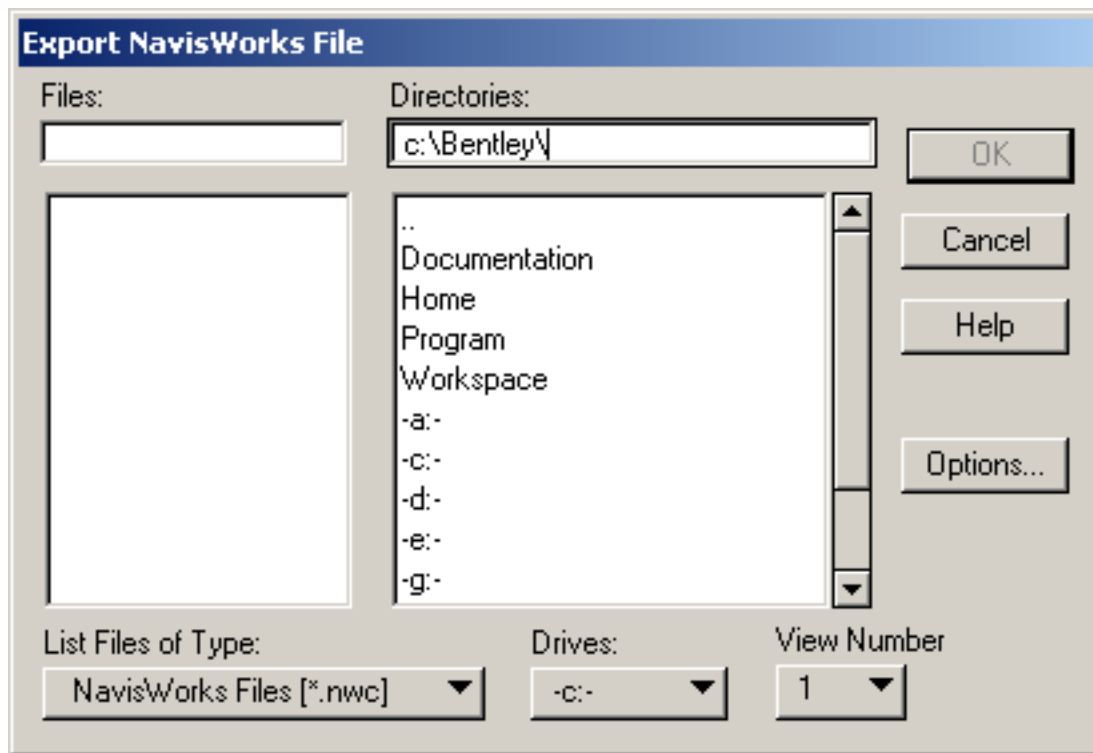
1. Go to **Workspace, Configuration**.
2. Choose **Design Applications** under **Category**.
3. Choose **NWExport** under **Available Applications**.
4. Click **Add** and confirm that you want NWExport added to your default configuration.
5. MicroStation will then automatically load NWExport in future 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 7.2.3, “MicroStation .nwc Exporter Options” 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 7.1.8, “DGN and PRP Files” for what entities are and are not supported by the MicroStation exporter.

JetStream 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 JetStream, whether level symbology is used and which levels are hidden.

Note

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

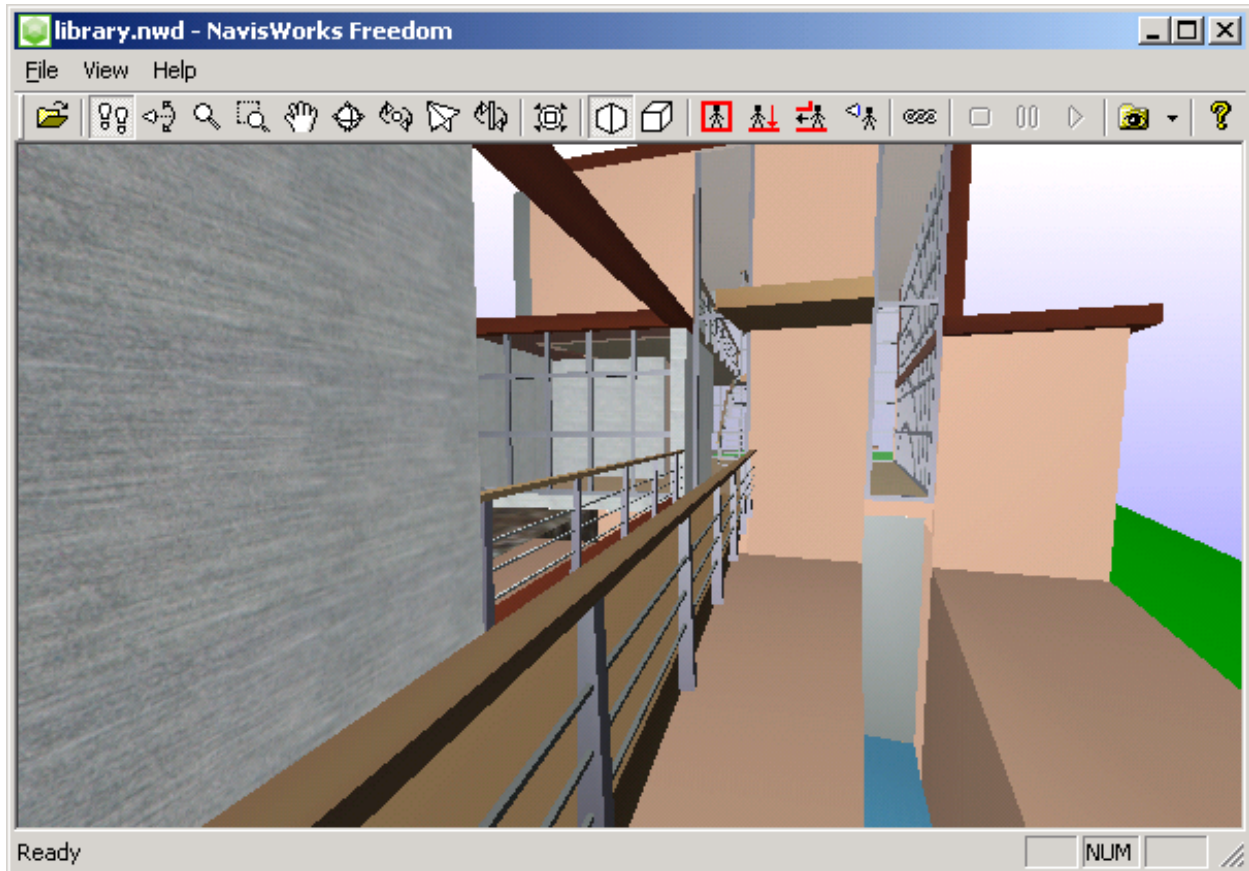
22.4. Freedom

Freedom™ is a cut down free version of JetStream Roamer. It is designed to work with JetStream 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


Freedom supports all .nwd files from NavisWorks v3 onwards.

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



The available functionality includes all of the navigation modes; the view all, perspective and orthographic modes; collision detection, gravity, auto crouch and third person modes; display of hyperlinks; and restoring viewpoints and animation playback.


The buttons on the Freedom interface work in the same way as the JetStream 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.

- Zoom 

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.

- Collision Detection 


Toggles collision detection on/off.

- Gravity 


Toggles gravity on/off.

- Auto Crouch 

Toggles automatic crouching on/off.

- Third Person 


Toggles the third person view on/off.

- Hyperlinks 

Toggles the display of hyperlinks on/off.

- Stop 


Stops the current animation playback.

- Pause 

Pauses the current animation playback

- Play 

Plays the currently selected animation.

- Viewpoints 

This drop down shows all the viewpoints and animations 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. Select an animation from the drop down and use the play, pause and stop buttons to control its playback.

- About 

Shows the **About** box, providing version details and offers a link to the NavisWorks web site.

Note

Once installed, Freedom can be copied and run, without additional installation, on other machines running Windows 2000 or later. For this to work, the contents of the Freedom folder simply need to be copied to a new location, perhaps a CD or a network location, which other people can then have access to. An NWD file could be included to make it very simple to view the model. People would simply need to double-click on the Freedom executable and open the accompanying model file from that location.

Freedom is installed to:

C:\Program Files\Common Files\NavisWorks 5\DX\

The entire contents of this folder will need to be copied to the new location.

Part IV. JetStream Presenter

User Manual

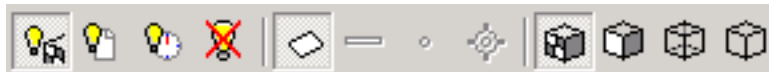
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Chapter 23. Overview of Presenter

The Presenter plugin enables you to set up materials and lights in your scene and render it with more realism and effects. Like all plugins, Presenter is a dockable tabbed control bar accessed through the **Tools** menu (Hint: hold down the **Control** key to prevent the control bar from docking if necessary). From the Presenter control bar you can edit pre-defined materials and apply them to items in the scene, add lights to the scene and set up rules for applying the materials to other files in the same project set up with the same parameters. You can define and apply your materials and lights to a model and save the settings into a JetStream .nwf file so that as the model is updated, the materials and lights remain the same. Materials can also be brought through from CAD applications via the .3DS, .dwg and .dgn file formats, or by exporting from 3D Studio Viz or Max (see the chapter called "Converting Files" in the Roamer book for more details on this).

While Presenter can be used for photorealistic renderings, it can also be used for OpenGL interactive rendering and once you've set up the scene with Presenter, you can view the materials and lights in Roamer. There are special rendering styles to interactively preview the Presenter materials and lights called **Full Lights** and **Full Render** on the **Rendering Style** toolbar:



The **Materials**, **Lighting**, **Effects** and **Rendering** tabs are divided into two panes. The left hand pane contains the archives and the right hand pane contains the scene's palette, which defines what materials, lighting, effects and render styles are used in the scene. Archives are shown in a tree structure and are defined in the LightWorks Archive (.lwa) format.

There are three pre-defined archives that are installed with Presenter:

- The **Recommended** archives contain materials, lighting, effects and rendering styles that are recommended for most users. These include materials, lights and effects that can be seen during interactive navigation in JetStream Roamer and can be fully rendered with OpenGL. Of course, they will look better when rendered photorealistically.
- Additional materials, light studios, effects and render styles are available in the **Standard** archive. These include materials that cannot be fully reproduced using OpenGL and therefore will not be seen properly in interactive mode, or until a full photorealistic render is done.
- Any materials, lights, effects and render styles from any archive can be used as a template starter for your own definitions, but the **Templates** archive contains instances of each type of material, light, effect and render style, giving you quicker access.

Additional .lwa archives can be downloaded from <http://www.lightworks-user.com>. Although materials, lights, effects and render styles cannot be edited in archives, once dragged into the scene's palette, they can be edited and saved with the scene in a JetStream .nwf file, or published as a JetStream .nwd file (if you have a valid JetStream Publisher license).

You can save your own edits to materials into an .nwp file - see Section 25.4, "Managing Materials" for more information on how to do this. Also, there is a **User** archive, which allow you to save your own edited materials, lights, effects and render styles, for use in other scenes.

23.1. The User Archive

The **User** archive is accessible from each of the **Materials**, **Lighting**, **Effects** and **Rendering** tabs. On

each of the tabs the archives are named **My Materials**, **My Lighting**, **My Effects** and **My Render Styles**, respectively. The principles are the same for each and will all be referred to as **User** archive, for the purposes of this guide.

Managing the user archive

1. To save a material, light, effect or render style to the user archive for use in other scenes, simply drag that item from the scene's palette (right hand pane) onto the respective **User** archive.
2. To create a new sub-folder in the **User** archive, right click on the archive and choose **New Directory...** from the context menu. You can rename this new folder by right clicking on it and choosing **Rename** from that context menu. You can make as many nested sub-folders as you wish in the **User** archive.
3. To save the **User** archive to disk, right click on it and choose **Save Archives** from the context menu. This will save any modified archives. You will also be prompted to save any modified archives when you close JetStream.
4. To remove a material, light, effect or render style from the respective **User** archive, right click on the item to be removed, then choose **Delete** from the context menu.
5. To remove a sub-folder you've created from the respective **User** archive, right click on the folder to be removed, then choose **Delete** from the context menu.

Note

You cannot delete the default **User** archive.

23.2. Additional Archives

Archives can be added within each of the **Materials**, **Lighting**, **Effects** and **Rendering** tabs. The principles are the same for each.

Adding archives

1. To download an archive from the LightWorks-User web site, right click on any archive (in the left hand pane) and choose **Download Archive...** from the context menu. Then follow the instructions given on their site.
2. To import a downloaded archive into Presenter, right click on any archive (in the left hand pane) and choose **Import Archive...** from the context menu. The normal Windows™ **Open File** dialog will appear for you to browse to and choose the .lwa file to import.

Deleting archives

- To remove an archive that you have previously added, right click on the archive, then choose **Delete Archive** from the context menu. Click **Yes** in the message box to confirm you wish to delete the archive.

Note

The archive will remain amongst your list of archives until you restart JetStream.

Chapter 24. Rendering Scenes

While the OpenGL rendering in the main navigation window is adequate for interactive walkthrough and previewing renders, you will no doubt want to render your scenes and animations with full photorealistic rendering at some point. You can render directly into the main window by simply clicking on the **Render** button at the bottom of the Presenter control bar at any time. The following procedures is an overview of how to do this:

24.1. Setting Up And Rendering A Scene

1. Drag and drop materials onto items in the model. You can use the pre-defined materials, or create your own from the templates in the **Materials** tab (see Chapter 25, *Presenter Materials* for more details on how to do this).

Or

2. Use the **Rules** tab to set up rules which define project-wide material application (see Chapter 31, *Presenter Rules* for more details on this).
3. Use the **Texture Space** tab to more accurately map materials onto items in the scene (see Chapter 30, *Texture Space* for more details on this).
4. Set up additional lighting using the **Lighting** tab (see Chapter 26, *Presenter Lighting* for more details on how to do this).
5. Background and foreground effects can be added to the scene with the **Effects** tab (see Chapter 28, *Rendering Effects* for more details on these).
6. Use the **Rendering** tab to select a rendering style for the render (see Chapter 29, *Rendering Styles* for more details on these).
7. At any point, you can click on the **Render** button to start JetStream Presenter rendering the scene in the main navigation window. The rendering process can be stopped at any point by clicking on the **Stop** button.
8. Click on the **Clear** button to clear the render in the main navigation window and return to an OpenGL interactive view.

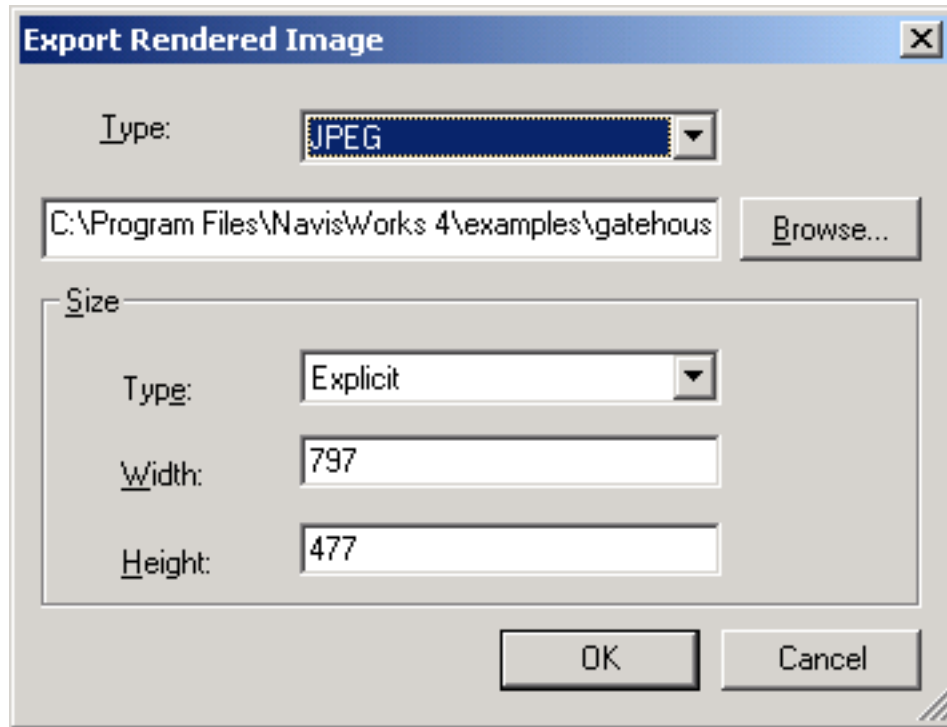
24.2. Exporting Rendered Output

If you want to save the rendered scene to a file or printer, you have to render directly to it. The following procedure describes how to do this:

Exporting a rendered image

1. With the scene set up as you wish (see Section 24.1, “ Setting Up And Rendering A Scene ”), go to **File, Export, Rendered Image**.

The **Export Rendered Image** dialog will appear:



2. To print directly to a printer, choose **Printer** from the **Type** drop down list.

The **Browse** button and box will be grayed out and you will get the standard Windows™ print dialog to set up the printer and options on clicking **OK**.

3. To save to one of the file types supported by JetStream Presenter, choose the file type from the **Type** drop down list.

JetStream Presenter supports the following file types:

- **Targa.**
- **Tiff.**
- **JPEG.**
- **Windows Bitmap.**
- **EPix.**
- **PostScript.**
- **LWI.**
- **HDR (High Dynamic Range Image).**
- **OpenEXR (High Dynamic Range Image).**

- **QuickTime VR Panoramic Movie.**

Note

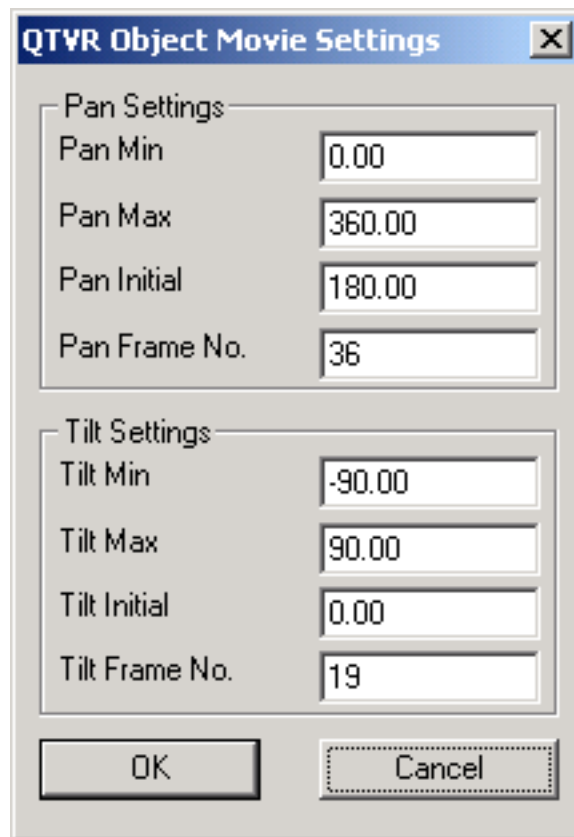
The QTVR Panoramic Movie will effectively export 32 images, rotating about the current camera position to form a 360 degree panorama. Best results are achieved when the camera has zero tilt and is located in a position that has a 360 degree panoramic view, for example, in the center of a room.

- **QuickTime VR Object Movie.**

Note

The QTVR Object Movie will effectively export an extensive number of images, (based on number of pan frames x number of tilt frames, see **QTVR Object Movie Settings** dialog below) pivoting the model about it's center point. Best results are achieved when the model is relatively small or compact.

When choosing this file type, you will be required to enter a number of settings. See the **QTVR Object Movie Settings** dialog below:



The **Pan Min** and **Pan Max** settings define how far the model can be revolved (as though on a turntable). The **Pan Initial** setting defines where you view the model from at the start (again, as though on a turntable, 0 or 360 would be the same point at the opposite side and 180 would be where the camera is now). The **Pan Frame No.** is the number of frames to be used to revolve the

model from **Pan Min** to **Pan Max**.

The **Tilt Min** and **Tilt Max** settings define how far the model can be tilted (backwards and forwards from its current position). The **Tilt Initial** setting defines where you view the model from at the start (assuming you are looking at the model straight, -90 would be from the bottom and 90 from the top). The **Tilt Frame No.** is the number of frames to be used to tilt the model from **Tilt Min** to **Tilt Max**.

4. **Browse** to a location and enter the name of the file you want to render to.
5. See the section called "Controlling the size of an image" in the chapter called "File Management" in the Roamer book for details on how to set the size of the rendered file. The only difference between those options and the size options on this dialog is that you have a **Use Printer Page** option here, which will size the image to the page setup size of the default printer.

If you choose **Use View** as the **Size** of the image file, then JetStream will save any existing render from the main window, without having to render again from scratch.

6. Click **OK** to export the rendered output, or click **Cancel** to return to JetStream without exporting it.

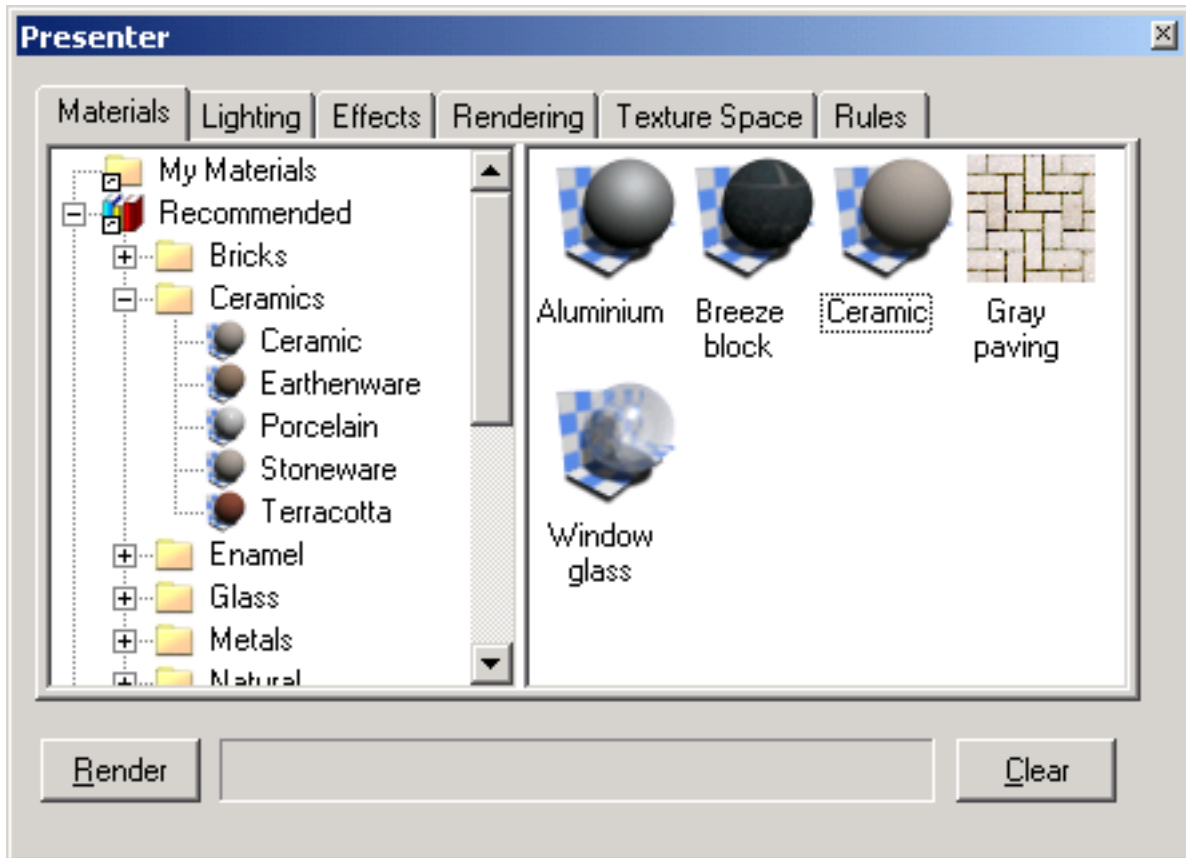
Exporting rendered animations

1. Once you have set up and rendered a scene as you wish, you can additionally create an animation within that scene, (see the section called "Creating Animations" in the chapter called "Animating" in the Roamer book). The rendering that you have set up will be applied to each frame of the animation.
2. You can save a rendered animation by choosing **Export, Animation** from the **File** menu. This will open the **Animation Export** dialog, as explained in the section called "Exporting an animation" in the chapter called "File Management" in the Roamer book.

Chapter 25. Presenter Materials

25.1. Materials Tab

Like the Lights, Effects and Rendering tabs, the materials tab is divided into two panes. The left-hand pane describes the pre-defined archives of materials that are installed and the right-hand pane shows the current palette of materials that have been defined and are being used in the scene. The palette also shows a small thumbnail of the material as it will appear when rendered.



The following sections will describe how to manage and edit materials for application onto items in the scene.

25.2. Applying Presenter Materials

Materials can be applied to items in the scene by dragging-and-dropping the material onto:

- an item in the scene;
- an item in the selection tree;
- a selection set.

If you drag the material from an archive then it will appear in the palette where it can be edited and saved with the scene if necessary.

Presenter uses Roamer's selection resolution to decide which items to apply the material to when dragging from an archive or palette onto the main view. When hovering over any item in the main view, the proposed selection will turn the selection color (blue by default). When you drop the material onto the current selection, it will be applied to all the items selected. If you drop the material onto an item that is not currently selected, it will be applied to just that item.

You can also apply materials to items by selecting the items in the JetStream selection tree or scene and then right-clicking on the material in the palette and selecting **Apply to selected items** from the context menu.

Rules can also be used to apply materials to items based on their layer or color or selection set names, for example. See Chapter 31, *Presenter Rules* for more information on this.

Applying a material to items

1. Select the items in the main navigation window, or by using the selection tree.
2. Choose your material from an archive or palette, right click on this material and choose **Apply to selected items** from the context menu to assign the material to those items selected. Note that the material will only be applied to those items and not to every instance of the item, if it is a multiply instanced block or cell. To assign the material to all instances of a multiply instanced block or cell in the scene, instead choose **Apply to all instances of selection** from the context menu.
3. Alternatively, you can simply drag-and-drop a material from an archive or palette onto items in the selection tree or main navigation window to assign those materials to the items. Note that the selection resolution determines which items will receive the materials. See the section called "Selection Resolution" in the chapter called "Selecting" in the Roamer book for more information on selection resolution.

25.3. Removing Presenter Materials

You can remove materials assigned to items either from the material or from the item:

Removing a material from items

1. Right click on the item in the main navigation window, or the selection tree and choose **Presenter, Remove Material** from the context menu. This item on the menu will only be available if the item right clicked on has a material assigned to it at that selection resolution in the tree - see the section on Inheritance below.
2. Alternatively, right click on the material in the palette that you want to remove from items in the scene.
3. From the context menu, choose **Remove from all items** to remove all assignments of the material from all items in the scene.

4. If you have items selected in the main navigation window or selection tree, then you can choose **Remove from selected items** from the context menu to remove that material from only those items you have selected in the scene.

Note

Deleting the material from the palette will automatically remove that material from any items in the scene which it was applied to.

Inheritance

Layers can have colors, just as geometry can. If a layer has a material, all its children in the selection tree inherit this material, until one of the children is assigned its own material, at which point, all *its* children in the selection tree inherit this material, and so on.

If you drag-and-drop materials onto layers, this works fine because only the layer picks up the material and although its children inherit the material, they do not have it explicitly assigned to them.

Therefore right clicking on such a child will not allow you to remove the material because one was not explicitly assigned in the first place.

However if you use a rule to assign a material to a certain color, then all objects in the scene will get this material explicitly assigned to them, including parent layers and child objects. If, with a selection resolution of something like **Geometry** (which is more specific than a resolution of **Layer**), you right-click on a child object and choose **Remove Materials** from the context menu, then the material will be removed from the child object, but not from the parent layer and there won't be any apparent difference.

To remove the material, you will therefore have to remove it from the parent object, in the above situation this would be the layer.

25.4. Managing Materials

The palette is where you edit and manage your materials for your scene. Materials are taken from the archives into the palette where they are edited. You can then save the palette into a JetStream Palette file (.nwp) for use in other scenes too.

Managing Palette Materials

1. Right click on a material in the right hand pane of the **Materials** tab (the palette).
2. Click **Delete** to delete the material from the palette. This will also remove the material from all items in the scene.
3. Click **Copy** to copy the material to the clipboard. Right click on an empty space in the palette and choose **Paste** to paste a copy of the material with a the same name suffixed with the next number in the list. This process is useful if you want to test small tweaks to a material.
4. Click **Rename** to rename the material. You can also select the material and press **F2** to rename it.
5. Click **Regenerate Image** to regenerate the thumbnail of the material in the palette with the current attributes.

6. Click **Select all instances** to select the items in the scene which have this particular material assigned to them.
7. Depending on whether items are selected in the scene and whether the material has been assigned to any items, there will also be a couple of **Apply** and **Remove** items on the context menu. See Section 25.2, “Applying Presenter Materials” and Section 25.3, “Removing Presenter Materials” for more details on these.
8. Click **Clear Palette** to delete all the materials from the palette and also from all items in the scene.
9. Click **Load Palette...** to load a previously saved palette of materials into the current scene. This will delete any materials currently in the palette. The standard **File Open** dialog will appear, allowing you to browse to an .nwp file.
10. Click **Append Palette...** to load a palette from an .nwp file, while keeping all the existing materials in the current palette. Any materials that are duplicated will be renamed with the .nwp file as an extension.
11. Click **Merge Palette...** to merge a palette from an .nwp file into the current scene. This is like appending, but instead of adding and renaming any duplicate materials, merging will overwrite existing materials of the same name.
12. Click **Save Palette As...** to save your current palette of materials into a NavisWorks Palette (.nwp) file. If you save the current scene using the usual **File, Save** method into an .nwf or .nwd file, the palette will be saved too, but the independent .nwp file is useful if you want to transfer materials you've made in one scene into other scenes.

Note

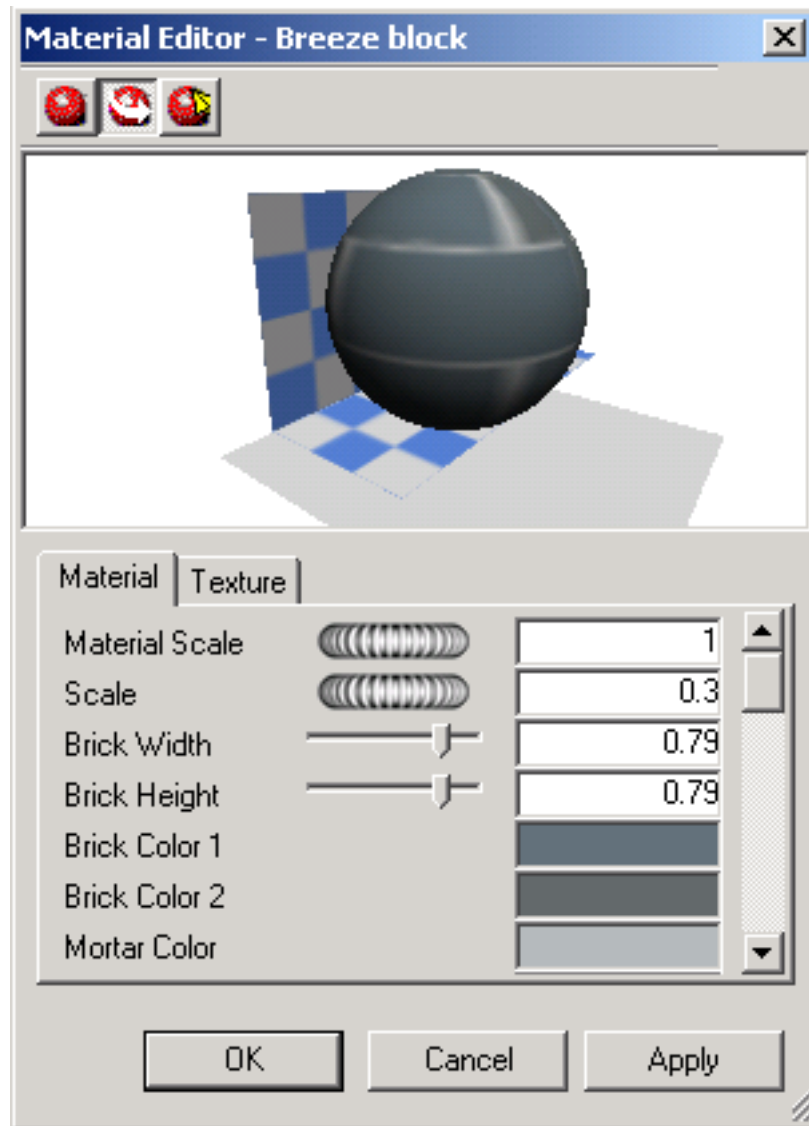
If you publish an .nwd file, using the **File, Publish** command (only available if you have a valid JetStream Publisher license) a **_Presenter_Maps** folder will be created along with the .nwd file. This folder will contain any materials that are not contained in **Presenter runtime**, which is used by both JetStream Roamer and NavisWorks Freedom, to view materials.

13. Click **Edit...** or simply double click on a material to open the material editor dialog, allowing you to edit its parameters. See Section 25.5, “Editing Presenter Materials” for more information on this.

25.5. Editing Presenter Materials

Installed archive materials cannot be edited whilst they are in the archives, but you can edit materials in the scene's palette. Edited materials will be saved with the JetStream model in an .nwd or .nwf file, or in an .nwp palette file, or they can be added to your user archive, **My Materials..**

To edit a material, double click on it in the palette, or right click on it and choose **Edit...** from the context menu. The material editor dialog will appear, which will vary for different types of material. You can't add or remove parameters on a material - merely edit those existing, so it is important to use the right type of material template for the material you want to edit. The dialog for the **Breeze block** procedural texture is shown below and this will be used as an example of how to edit a material.




Note



If the user profile (see the section called "Profiles" in the chapter called "Interface" in the Roamer book for more information on this) is set to **Developer**, there are more tabs and parameters to edit in this dialog. In particular, there are **Reflectance**, **Transparency** and **Displacement** tabs and at the top of each tab is a **Shader** type which allows you to completely change the type of material and all other parameters.

Editing the breeze block texture

1. The three buttons at the top determine what sort of material preview you get:

- Click on the **Standard Preview** button  to get a software generated photorealistic preview of

the material on the standard ball against checkered background, which is not interactive but will show how the material will look when rendered photorealistically.

- Click on the **Active Preview** button  to get an OpenGL interactive preview of the material on the standard ball against checkered background. This is updated interactively while you change the parameters and will resemble the quality of material shown in JetStream Roamer during navigation, but will not be as high a quality as the photorealistic render.
- Click on the **Main Window Preview** button  to close the preview window in the material editor and instead preview the material on the item in the scene in Roamer's main navigation window. This is updated interactively while you change the parameters and will be exactly the material shown in JetStream Roamer during navigation, but will not be as high a quality as the photorealistic render.

2. For a simple material, there is only a single **Material** tab on the material editor, whereas for a texture material, whether procedural (generated from an algorithm) or bitmap (generated from an image), there is an extra tab called **Texture**.

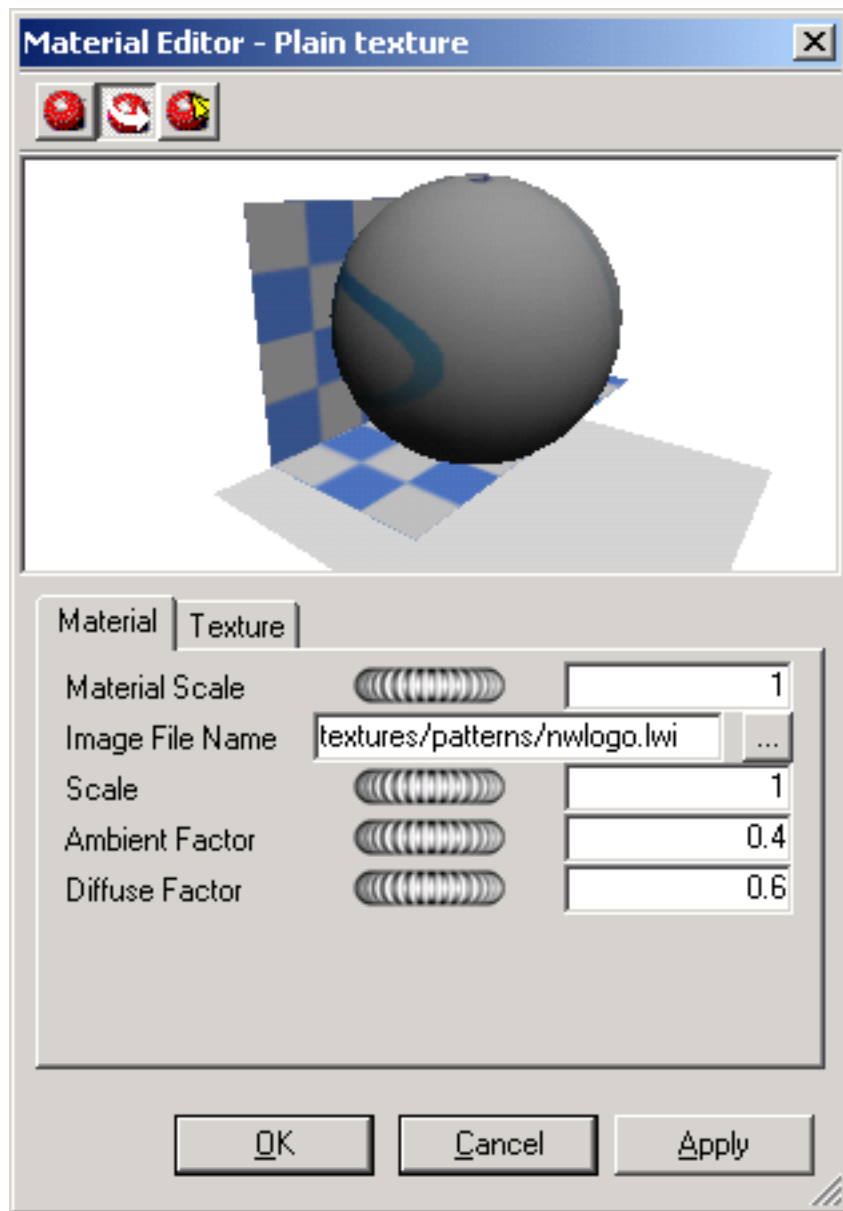
The **Material** tab contains simple parameters that affect the material's color, scale, shininess and so on. In the case of the breeze block, there are parameters for the overall scale of the material as well as a block's width and height, the blocks' color and mortar color, its roughness and reflectivity. On a bitmap texture, you would also define where the image is that becomes the texture map in the **Image File Name** text box (see Creating a texture using your own image). On a glassy material, other factors would affect the transparency and refraction properties of the glass. Some of these factors will not be apparent in the interactive OpenGL window and will have to be rendered with the **Render** button to be seen.

The **Texture** tab contains parameters that specifically affect a texture material's texture mapping properties, such as its rotation, offset (origin) and S- and T- (sometimes called U- and V-) scales. These parameter values are applied in relation to an origin point, (see Section 25.6, "Advanced Materials" for more information). There are S- and T- Reflect check boxes, which will show the reflection of the image in either (or both) of these axis. Finally there is an Offset Center check box, that repositions the origin to the center of the image (again, see Section 25.6, "Advanced Materials" for more information). When using the **Main Window Preview**, texture changes can be made instantly allowing interactive positioning of materials on an object.

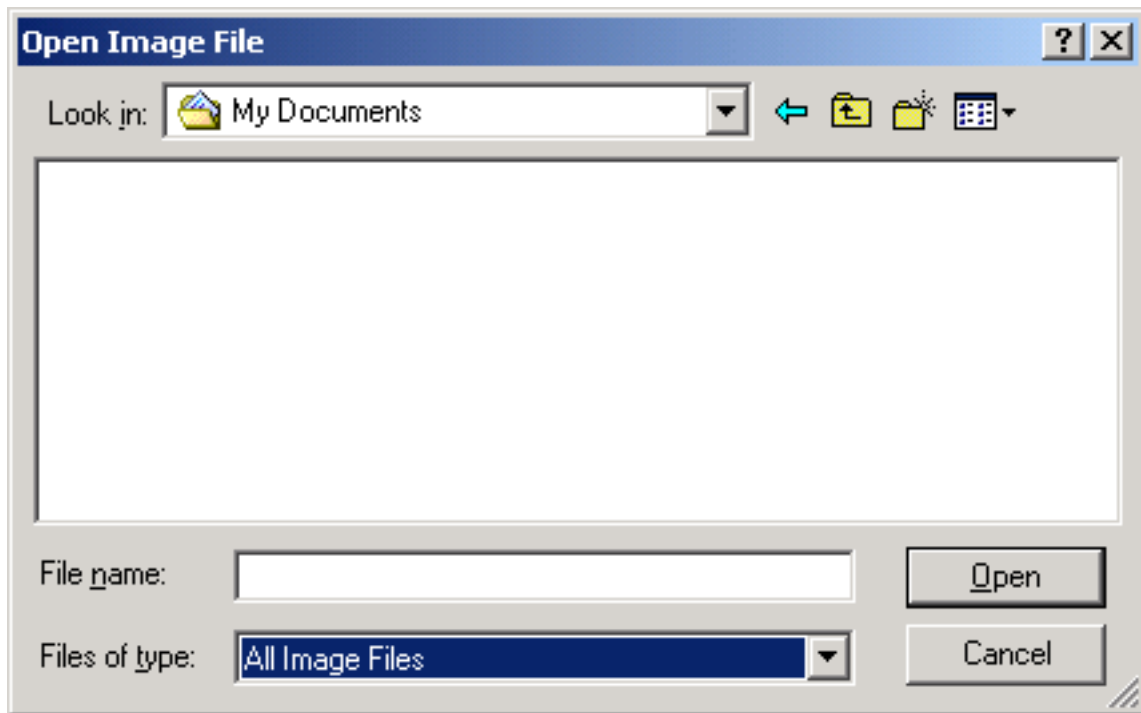
3. At any time, click on the **Apply** button to apply the parameter edits to the material in the scene.
4. Click **OK** to keep the changes made or **Cancel** to discard any changes made (since the last time you clicked **Apply** at least).

Creating a texture using your own image

1. From the **Templates** material archive, double click on the **Plain Texture** material. This will add the material to the scene's palette and open the **Material Editor**.



2. On the **Material** tab (or **Color** tab, if in **Developer** profile) click the **Browse (...)** button next to the **Image File Name** text box. The **Open Image File** dialog is displayed:



3. Browse to the location of and select your image file, then click **Open**.
4. You may then need to adjust some of the texture parameters of the new material, for example its scale, rotation, offset or reflection (if it's back to front). These may all be edited in the **Texture** tab. See Section 25.5, "Editing Presenter Materials" for more information on editing materials.

25.6. Advanced Materials

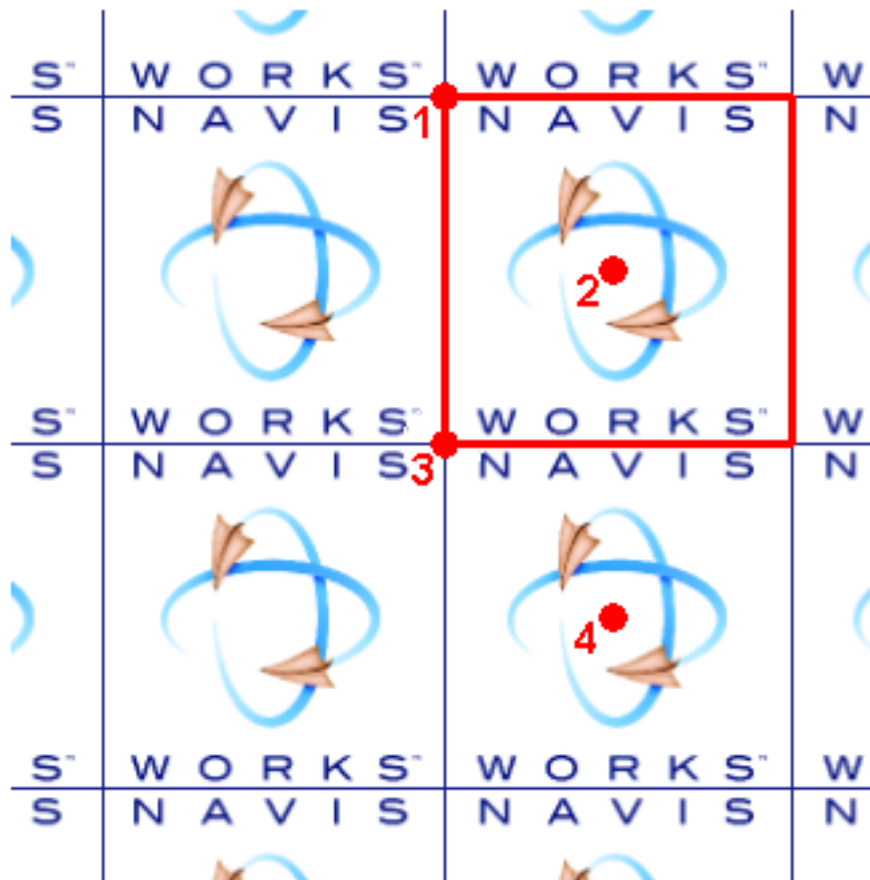
Internally a material is defined by four shaders from different classes - Color, Transparency, Reflectance and Displacement. Each class of shader controls a different aspect of a material's behavior. There are many types of shader in each class, each type being defined by its own set of parameters.

- A **color** shader is used to define the color of a surface at any point in space. It may be as simple as a plain color which specifies all parts of the surface to have a uniform color, or it may define complex surface patterns such as marble or wood. Every material *must* have a color shader.
- A **transparency** shader is used to define how transparent or opaque a surface is, and thus how much light is able to pass through it. Transparency shaders range from a simple uniform transparency to more complex regular or irregular eroded patterns that would be more difficult to represent using modelling techniques. A material without a transparency shader is completely opaque.
- The behavior of a surface in the presence light is represented by a **reflectance** shader which defines how much light is reflected by the surface towards the viewer. Shaders of this class may be thought of as defining a surface's "finish", and are used to model properties such as matte, metal and plastic.
- Small surface perturbations can be supported by means of **displacement** shaders. Typically, a displacement shader will give an otherwise smooth surface an irregular or indented appearance. Displacement shaders are used to represent features that would be difficult, impossible, or inefficient if

conventional modelling techniques were used. For example, rough metal castings and the regular indentations produced by pressed sheet metal can be simulated.

Normally the material editor displays a selection of the most important parameters from all shaders within the material tab. If the user profile (see the section called "Profiles" in the chapter called "Interface" in the Roamer book for more information on this) is set to **Developer**, then all four shaders can be edited and changed individually.

Some shaders are described as "wrapped". These define a flat, two dimensional material, like wall paper. Wrapped materials need a **texture space** shader to define how they should be applied to (wrapped around) a three dimensional object. Materials that include a wrapped shader can also include a texture space shader. A special type of texture space shader, called a layout shader, can be used to transform (rotate, stretch, offset) the two dimensional material before it is applied to the three dimensional object. Transforms are based around an origin point, which by default, is the top left hand corner of the image (refer to the diagram below, where the image is inscribed in the red square, which is then repeated). The default origin is **Point 1**). Checking the **Offset Center** check box will reposition the origin to the center of the image (**Point 2**). Finally, in **Developer** profile, you can edit the **Decal Mode**, choosing from either **Default** or **Normalized**. Selecting **Normalized** will move the origin to the lower left corner of the image (**Point 3**, with the **Offset Center** option un-checked). With both **Normalized** and **Offset Center** selected, the origin will be repositioned in the center of the repeated image, directly below (**Point 4**).



In Presenter, materials that include a wrapped shader also have a layout texture space shader associated with them. Normal texture space shaders are associated with objects.

Note

A complete reference manual for all types of rendering styles is included with the JetStream API, (see \API\COM\documentation\shaders.chm). The JetStream API is included with JetStream Roamer and can accessed via the JetStream installer menu.

Chapter 26. Presenter Lighting

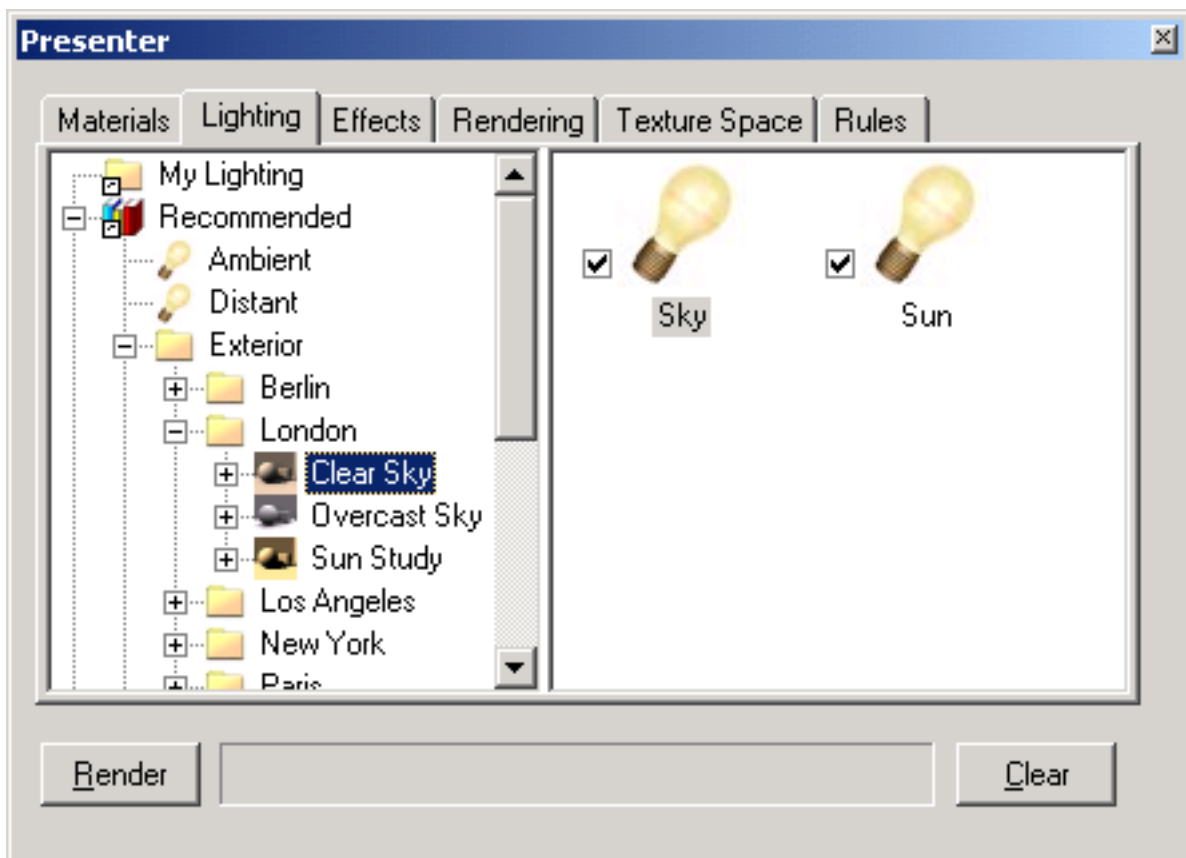
26.1. Lighting Tab

Like the Materials, Effects and Rendering tabs, the **Lighting** tab is divided into two panes - the archive on the left and the palette on the right. The archive contains individual lights, as well as light studios. A light studio is a combination of lights that work well together. The palette contains all the lights that are active in the scene.

To apply a light to the scene, you drag it from an archive into the palette, at which point you can edit its parameters if required. The light is added to those already in the scene.

To apply a light studio to the scene, you drag it from an archive into the palette. All the lights in the light studio *replace* those already in the scene. Light Studios are applied to the scene intelligently. The light studio is oriented and scaled to match the scene to which it is being applied. You can also expand a light studio in the archive and drag the lights into the palette individually. If you do this the lights are *not* oriented or scaled to match the scene.

Each light in the palette has a check box, which can be used to turn the light on or off in the scene.



The following sections will describe how to manage and edit lights for insertion into the scene.

26.2. Adding And Positioning Lights

Lights and light studios can be taken directly from the archives and applied to the scene by simply dropping them into the palette. These can then be repositioned as you wish.

The **Recommended** archive contains five lights (**Ambient**, **Distant**, **Eye**, **Point** and **Spot**), a **Standard Light Studio**, an **Environment Light Studio**, an **Environment** folder containing two Environment lights utilising HDRI-based light sources (see Section 26.6.4, “ Image-based Lighting ” for more information), and an **Exterior** folder, that contains three light studios for different city locations around the World (**Clear Sky**, **Overcast Sky** and **Sun Study**).

If you are creating an external render of a building, for example, then you may find that one of the **Environment** light studios can give a very realistic effect, using Image-based lighting to light the scene. Alternatively, **Exterior** light studios may give you the effect you require. These do use physically accurate lights however, which generally take longer to render the scene.

Alternatively, you may prefer to use the **Standard Light Studio** as a starting point and build up your lighting from there, adding combinations of the basic recommended lights to create the desired effect..

The **Standard** archive contains a **Default Eye Light** studio (which is effectively rendering with a head light); a folder of **Exterior** light studios which predominantly consist of studios that use a number of lights to replicate the effect of a **Sky** light. Not using physically accurate lights means you don't have to turn on **Auto Exposure** (see Section 29.4, “ Auto Exposure ”) which can negatively impact on the basic recommended light settings; a folder of **Interior** light studios for use in internal scenes; a folder of **Object** light studios which are best suited to lighting smaller models, such as a vehicle or piece of machinery, for example; and a folder of **Projector** light studios, which can be used to project an image onto an object in the scene.

The **Templates** archive contains all of the basic light shaders that are available. These can then be edited (as can all lights) to create the exact lighting you require (see Section 26.4, “ Editing Lights ” for more information on editing lights).

Adding lights to the scene

1. From one of the archives in the left hand pane of the **Lighting** tab, choose the light you wish to add to the scene.
2. Drag the light and drop it into the palette (right hand pane of the **Lighting** tab). This will automatically be added to the scene. To reposition the light within the scene, see Positioning lights in the scene.

Note

If you drag a light studio into the palette, this will replace any existing lights with those that make up the light studio.

As a general guide, the more lights there are in a scene, the longer it will take to render it photorealistically. For external rendered scenes, you may consider using the **Standard Light Studio**, (from the **Recommended** archive) as a starting point, then strategically add a couple of **Point** and **Spot** lights around the scene, (Point lights are good to light up a dark area of the scene, whilst Spot lights can add an element of drama and enhance realism).

Positioning lights in the scene

1. Having added a light to the scene (see Adding lights to the scene, double click on it, or right click and choose **Edit...** from the context menu, to open the **Light Editor**, (see Section 26.4, “Editing Lights”).
2. Point, distant, spot and projector lights have a **Location** parameter. Distant and spot lights additionally have a **To** parameter. You can type in x-, y-, and z- coordinates for these, or alternatively use the **Pick** button to interactively pick a point in the scene where the light and/or target is located. The light is represented by a 3D wireframe sun icon in the scene and the target by a wireframe sphere. The currently selected light is drawn in the selection color (see the section called "Selection Options" in chapter called "Selecting Items" in the Roamer book for more information on this).

Note

JetStream does not allow you to pick a point in empty space so you must pick a point on the model.

3. Lights can be positioned interactively. The 3D wireframe sun icon, representing the light, has six bars extending out along the x- axis, y- axis and z- axis. Hover the mouse cursor over one of the bars. The cursor will change to a hand and the bars will extend further along that axis. Hold the left mouse button down to hold on to the light and move it in either direction, along the extended bar. Release the left mouse button to release the light in its new position. This can be performed for all three axis.
4. Lights can also be positioned in the current location of the camera, which can be anywhere in the scene. Navigate to the location where you wish the light to be positioned. Right click on the light in the palette (right hand pane of the **Lighting** tab) and choose **Position as Camera** from the context menu.

Note

Not only will this position the light in the same location as the camera, if the light has a **To** parameter, this will also be set to the focal (or **Look At**) point of the camera.

26.3. Managing Lights

The palette is where you edit and manage your lights for your scene. Lights are taken from the archives into the palette where they are edited.

Managing palette lights

1. Right click on a light in the right hand pane of the **Lighting** tab (the palette).
2. Click **Delete** to delete the light from the palette. This will also remove the light from the scene.
3. Click **Copy** to copy the light to the clipboard. Right click on an empty space in the palette and choose **Paste** to paste a copy of the light with the same name suffixed with the next number in the list.
4. Click **Rename** to rename the light. You can also select the light and press **F2** to rename it.
5. Click **Clear Palette** to delete all the lights from the palette and hence from the scene.
6. Click **Edit...** or simply double click on a light to open the **Light Editor** dialog, allowing you to edit its parameters. See Section 26.4, “Editing Lights” for more information on this.

26.4. Editing Lights

You can edit a light in the palette by double clicking on it, or right clicking and choosing **Edit...** from the context menu.

There are six types of light visible in both OpenGL interactive renders and photorealistic renders:

1. **Ambient** lights give a general background light to the scene and therefore only have intensity and color parameters.
2. **Eye** lights are located at the viewpoint and also only have intensity and color parameters.
3. **Point** lights have a location but shine in all directions. They also have an intensity and color and additionally can cast shadows (only available in a full photorealistic render).
4. **Distant** lights are directional and so have a location and target. However, the location and target merely set up an axis down which the light shines, as these light types are infinitely far away and their beams are parallel. As well as intensity and color parameters, they can also cast shadows in a photorealistic render.
5. **Spot** lights are also directional and therefore have a location and target, as well as intensity, color and shadow parameters. In addition, they also have parameters for affecting the light's fall off and cone angle, as these light types are not infinitely far away, so do spread their light over a cone and the intensity does diminish away from the light.
6. **Sun** simulates the sun's light. The orientation of your model is defined by north and up directions. The position of the sun is specified as azimuth and altitude. If the sun's mode includes "Position", you can input your location on earth, the time (using local time zone) and date and Presenter will calculate the sun's azimuth and altitude for you. If the sun's mode includes "Intensity", Presenter will also calculate an accurate intensity for the sun based on position, time of year and atmospheric conditions.

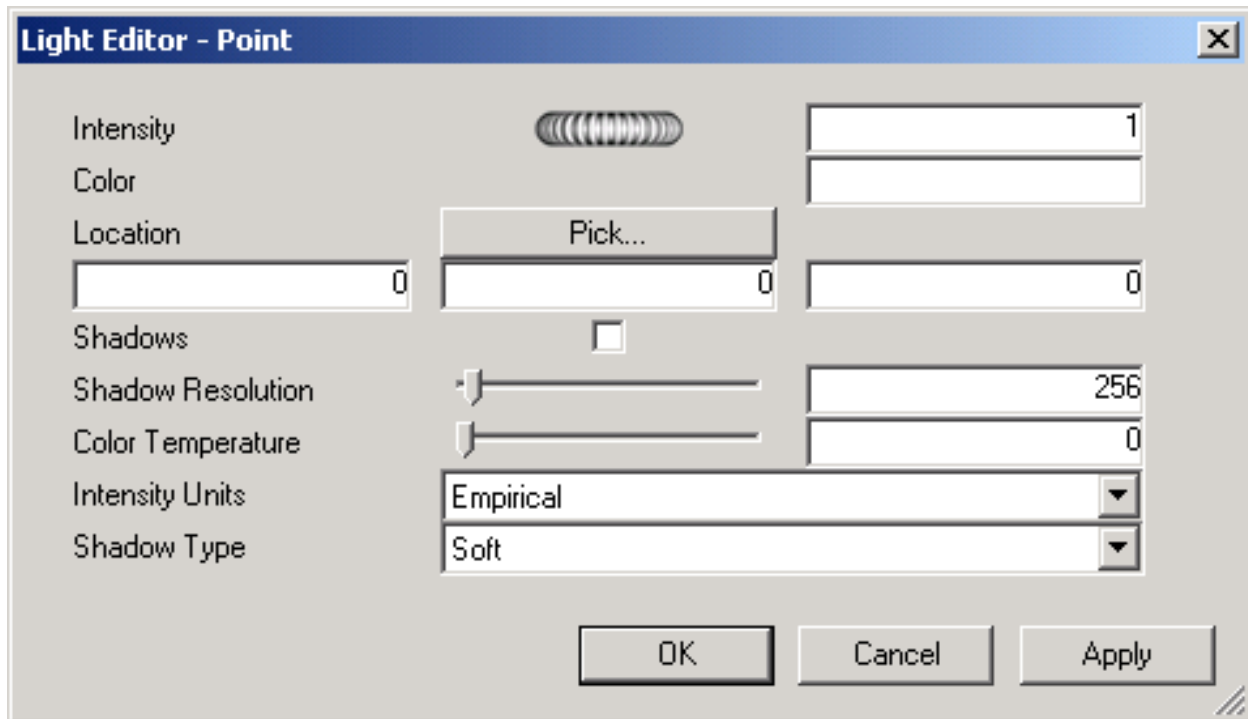
There are an additional three types of light visible only in photorealistic renders:

1. **Projector** lights are used to project an image onto surfaces. You can define the file of the image to be projected.
2. **Sky** simulates the illumination from the sky (but not the direct contribution due to the sun itself). The orientation of your model is defined by north and up directions. The position of the sun is specified as "sun altitude" and "sun azimuth". Whilst the direct contribution of the sun is not included, its location will determine the appearance of the sky hemisphere. If the intensity is left at 0, Presenter will calculate an accurate intensity for you based on the sun's position.
3. A **Goniometric** light is one which can emit widely varying amounts of light energy in different directions. One goniometric source could behave exactly like a point light, another could behave exactly like a spot light, and a third could look nothing like either of those. A goniometric light gets its intensity distribution function (how much light goes in any one direction) from an industry-standard file. Presenter supports CIE (*.cie), IESNA (*.ies), CIBSE (*.cib) and ILUMDAT (*.ldt) files.

Note

A complete reference manual for all light types is included with the JetStream API (see \API\COM\documentation\shaders.chm). The JetStream API is included with JetStream Roamer and can be accessed via the JetStream installer menu.

Each light type has its own parameters, and the editor for a **Point Light** is shown here:



Point, distant, spot and projector lights have a **Location** parameter. Distant and spot lights additionally have a **To** parameter. See Positioning lights in the scene for more information.

Note

When the user profile (see the section called "Profiles" in the chapter called "Interface" in the Roamer book for more information on this) is set to **Developer**, the dialog will include a full list of available parameters and allow you to change the type of a light.

Point, distant, spot, sky, sun, projector and goniometric lights have a **Shadows** parameter. See Shadow Casting for more information.

Editing parameters in the dialog will interactively alter the scene with those changes.

At any time, click on the **Apply** button to apply the parameter edits to the light in the scene.

You can save an edited light for use in other scenes by simply dragging it onto the **My Lighting** user archive.

Click **OK** to keep the changes made or **Cancel** to discard any changes made (since the last time you clicked **Apply** at least).

26.5. Shadow Casting

Checking the **Shadows** check box in the **Light Editor** of a light that supports shadows (Point, distant, spot, sky, sun, projector and goniometric) result in the selected light casting shadows in the scene. Shadows will only be visible in photorealistic renders; unless you are using a Hardware accelerated OpenGL 1.5 compliant graphics card, in which case you can preview **Interactive Shadows**. See the section called "Presenter Options" in the chapter called "Display Model" of the JetStream Roamer book

for details on how to display interactive shadows and lighting.

Note

Enabling shadows on lights should be given due consideration. If you turn on shadows on all lights, then you may find the effect very confusing and somewhat un-natural, especially if there are many lights in a small scene. This will also have an affect on performance, during navigation and general refreshing of the navigation window. You may wish to consider only enabling shadows on a few strategically positioned lights, to create the effect you require.

In addition to choosing which *lights* in your scene will cast shadows, you may also select which **items** in the scene should cast a shadow. Each item in the scene has its own shadow casting option.

The available shadow casting options available for an item, are:

- **Off.** Choose this to disable shadows. The selected item will not cast a shadow from any light source.
- **On.** Choose this to enable shadows. The selected item will cast a shadow from any light source that has shadows enabled.
- **Inherit.** Choose this to inherit the shadow casting option from the parent item. i.e. the selected item will use the same option as the item directly above it in the Selection Tree path (see the section called "Selection Tree" in the chapter called "Selecting Items" in the JetStream Roamer book for more information on the selection tree and its structure). For example, if you turn shadow casting **On** for a Group and the Geometry contained within that Layer is set to **Inherit**, then the Geometry will cast shadows also, as it inherits the **On** option from its parent (the Group).

Note

If all items in the scene are set to **Inherit** then the default setting is **On**.

To set an items shadow casting option:

- Right click on an item in the scene, select **Presenter** from the context menu and then choose the shadow casting option you require.

Note

The item selected will depend on your Selection Resolution setting. See the section called "Selection Resolution" in the chapter called "Selecting Items" in the JetStream Roamer book for more information.

or

- Right click on an item in the Selection Tree (see the section called "Selection Tree" in the chapter called "Selecting Items" in the JetStream Roamer book for more information), select **Presenter** from the context menu and then choose the shadow casting option you require.

26.6. Advanced Lighting

JetStream Presenter is capable of many advanced lighting effects, including soft shadows, physically

accurate lighting simulation, volumetric lighting effects and Image-based lighting.

26.6.1. Soft Shadows

JetStream Presenter includes shadows generated from pre-calculated shadow-maps for each shadow casting light source. The use of shadow maps enables rapid rendering of shadows with soft or graduated edges. The shadow resolution can be controlled to balance performance and image quality.

Soft shadows are only suitable for use with small models and are disabled by default. For large models the generation of the shadow maps can use excessive amounts of time and memory. Soft shadows generated for large models are often too vague and dispersed without using an excessively high resolution, which uses even more memory and time.

26.6.2. Physically Accurate Lights

By default Presenter uses lights with unitless, or empirical intensities. These are physically meaningless and are just chosen to give a visually pleasing result. Presenter can also use physically accurate intensities. These are defined in real world units such as Candela, Lumen or Lux. However, once we start using lights with real world intensities, we start to produce images with a real world variation in luminance values.

By default Presenter uses lights whose intensity remains constant as you move further from the light. In the real world intensity is reduced proportional to the inverse square of the distance from the light. Changing a light's "Fall Off" parameter to "Inverse Square Law" will more accurately model a light's fall off in intensity. However, once we start using lights with real world fall off, we start to produce images with a real world variation in luminance values.

In the real world, the human eye is capable of resolving images in extremely varied lighting conditions, ranging from bright sunshine reflecting off snow to a room lit only by a single candle. In computer graphics on the other hand, we need to produce an image on a display device which has a very limited range of luminance values. Therefore it is necessary to compress the range of luminance values found in a real world scene into the displayable range in such a way as to produce a realistic looking image.

Photography, of course, has exactly the same problem. If a photographer (or camera) does not take into account the light levels in a scene before calculating the exposure of the shot, the likely result will be an image which is either over-exposed (everything is too bright) or under-exposed (everything is too dark). A professional photographer will also use different speeds of film for different lighting conditions. The aim is to produce an image on film that is representative of how that scene would have looked to a human observer.

Presenter includes an "Auto Exposure" option (see Section 29.4, " Auto Exposure "). When enabled, Presenter will render the image twice. Once to sample the range of luminance values in the output image, then a second time to render the actual image with the luminance values adjusted to match the behavior of the human eye.

In general, when using physically accurate lights, "Auto Exposure" should be on.

26.6.3. Volumetric Lights

Volumetric lighting allows effects such as the scattering of light, by fog or smoke, in a scene. Enable the "Scattering" check box on each light. A "Scattering Medium" foreground effect must also be in use (see Section 28.3, " Foreground Effects " for more information on how to setup foreground effects).

You may need to adjust the "Medium Density" and "Medium Ambient" parameters of the "Scattering Medium" foreground effect to suit your model. If no volumetric effects are visible, the "Medium Density" is too low. If the rendered image is entirely white, the "Medium Density" is too high.

The default medium is plain white. Optionally, a "density shader" may be set to any solid (not wrapped) color shader, to create the effect of a non-uniform (inhomogeneous) medium. Examples of shaders that can be used are "Blue Marble" and "Solid Clouds". A shader that has been designed explicitly for this purpose is the "Turbulent" shader.

The key points when using volumetric lighting are:

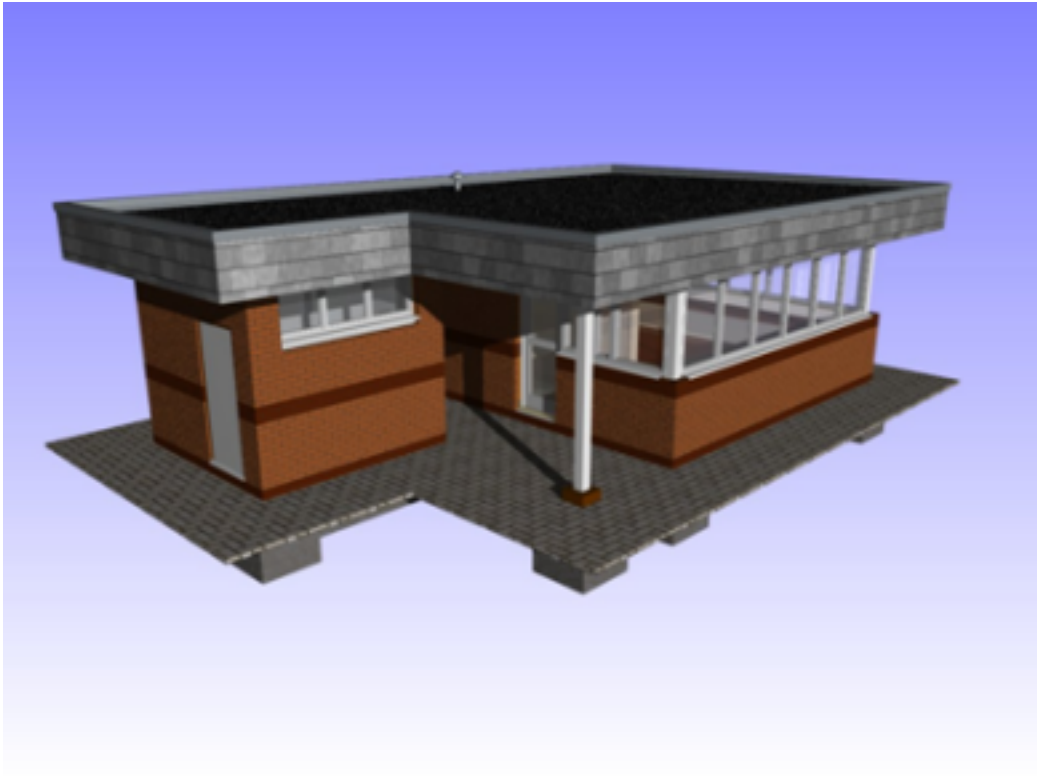
- Remember to turn the "Scattering" parameter of light sources on if you want to see their volumetric effects.
- Use "Medium Density" and "Medium Colour" to define brightness and colour of the lit medium.
- Use a solid color shader set as "Density Shader" for simulation of density variations in the medium.
- Decrease "Error Bound" if image appears spotty outside shadow areas.
- Increase "Min LOD" parameter if areas with volumetric shadows appear spotty.
- Set high "Error Bound" and small "Min LOD" for fast previews.
- Use "Inverse Square Law" for your light's "Fall Off", together with auto exposure, for best results.

26.6.4. Image-based Lighting

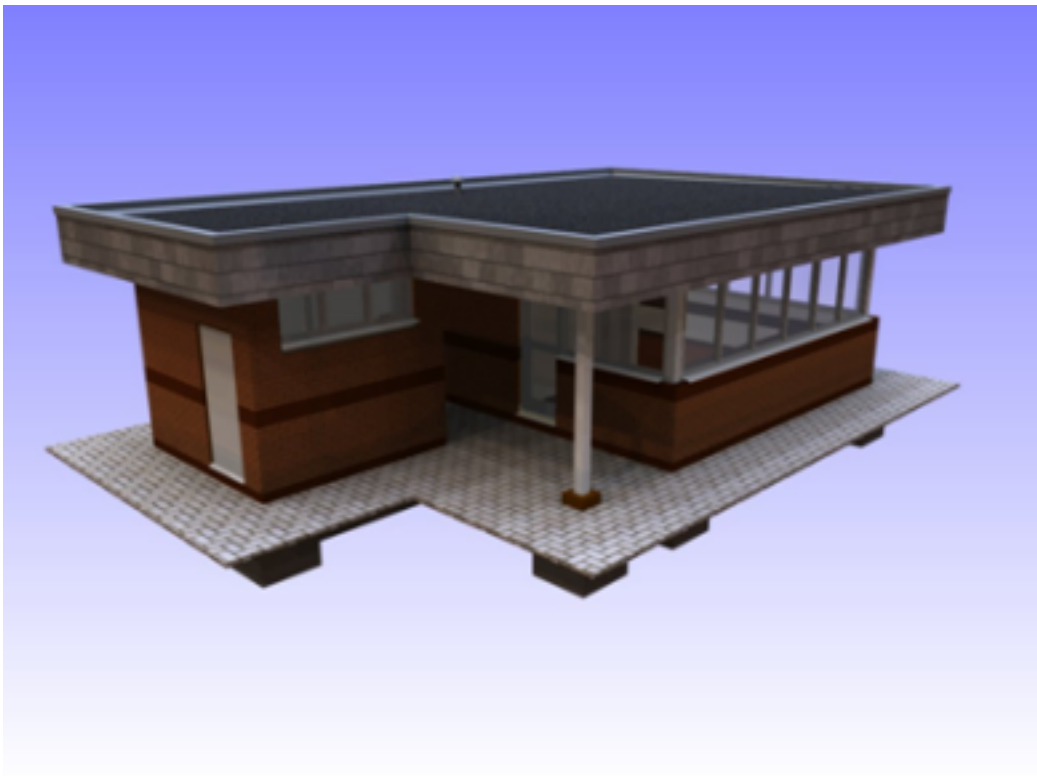
Image-based lighting, simply put, is where an image is used to light a scene. In the real world, every object is lit not only by light sources like the sun, lamps etc, but also by everything around. Standing in the middle of a street, a person will be lit by the sun, the blue sky, the brown buildings and the grey floor. Emulating this form of lighting clearly has the potential to create incredibly realistic images.

Images used in this lighting method are a special kind of image called a High Dynamic Range Image or HDRI. This type of image has the capability of lighting a scene with incredible accuracy. In Presenter an HDRI is wrapped around the scene as a sphere, and colour and brightness from the HDRI are cast onto the 3D model to light it.

To give an example of the difference this can make, this is a before shot using normal lights



and this is the same model lit with Image-based Lighting



It is clear the difference this form of lighting can make to rendered images. And the enormous advantage here is that it is much easier to set up than traditional lighting.

Image-based Lighting Setup

1. On the Lighting Tab, click on the **Recommended** folder in the left hand side of the palette.
2. Drag the **Environment Light Studio** into the palette on the right. This replaces all lights that were in the palette with an Ambient and an Environment light containing our High Dynamic Range Image.
3. Click on **Render** to render the scene using the default image contained in this Environment light. This type of render can take slightly longer than traditional lighting methods, but the results are worth the extra time invested.
4. To use an alternative sample image, click on the Environment folder on the left to show another two example environment lights; a Sky (used in the example above) and a City. Drag the City light over to the right to replace the Environment light in the palette (which should be deleted before rendering).
5. To manually insert a new HDRI, double click on the Environment icon in the palette, select the **Edit...** button next to Environment, click on the "..." button next to Filename, and browse to the .hdr file required. For this to work correctly, this HDRI must be a **Light Probe** HDRI. (Additional Light Probe HDRIs are available from a variety of places on the internet, including Dosch Design [<http://www.doschdesign.com>].) Click on **OK** in both dialogs to set the new image to be the light source, and click **Render** to produce a newly lit rendered scene.

Chapter 27. Presenter RPCs

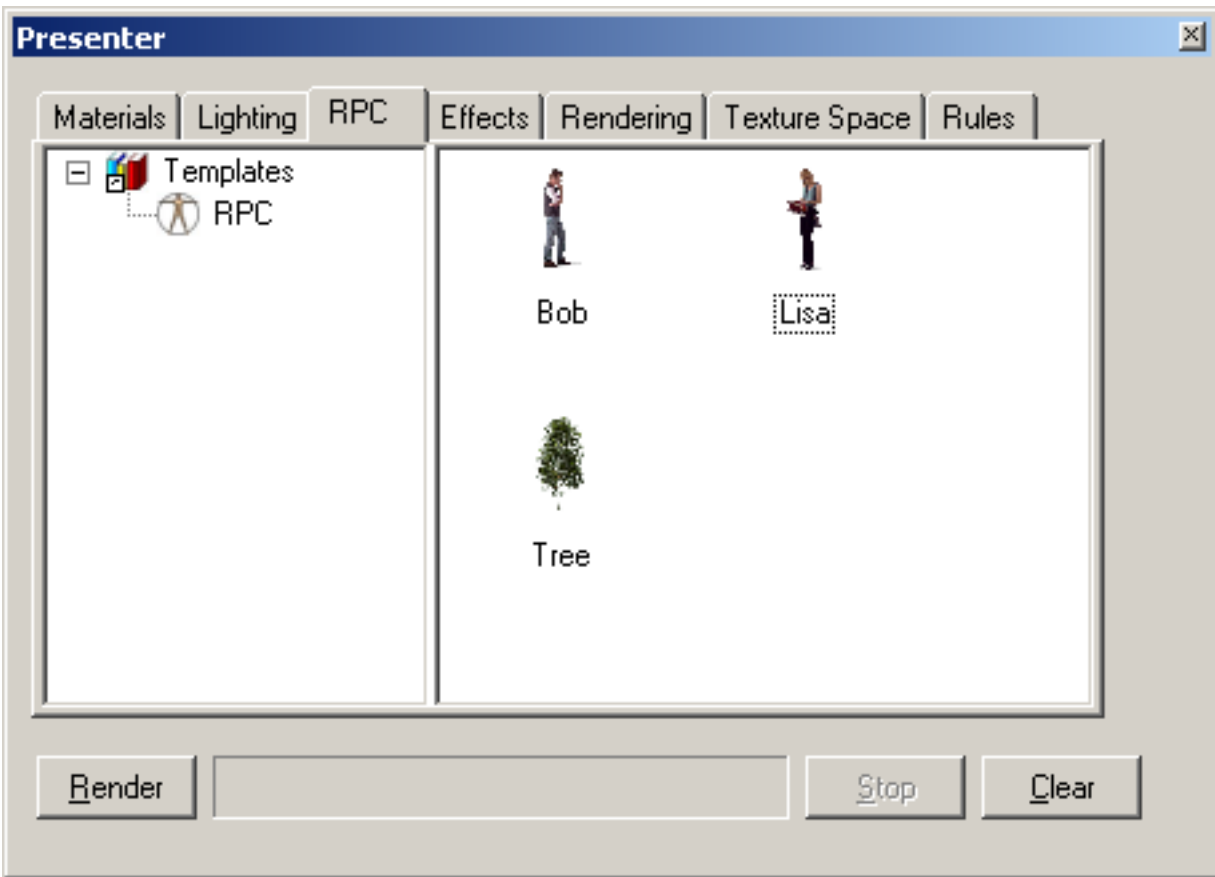
27.1. RPC Tab

Presenter RPC (Rich Photorealistic Content) support enables the addition of photographic scenery into any 3D project. RPC files can be bought directly from ArchVision [<http://www.archvision.com>], and typically come in libraries of content ranging from trees and plants to people. They also come in a variety of types.

- **2D** RPCs are single-direction 2D photographs that always face the camera, and are a single frame, looking the same from every angle, and not animating.
- **3D** RPCs are objects that have a high number of frames allowing the camera to move around the object and see it from all angles.
- **2.5D** RPCs are single-direction 2D photographs, but are animated. Animated RPCs will only animate visually when exported as a rendered animation.
- **3.5D** RPCs include animation and views from all around the object.
- **3D+** RPCs, often called "Smart Content" are not currently supported by Presenter.

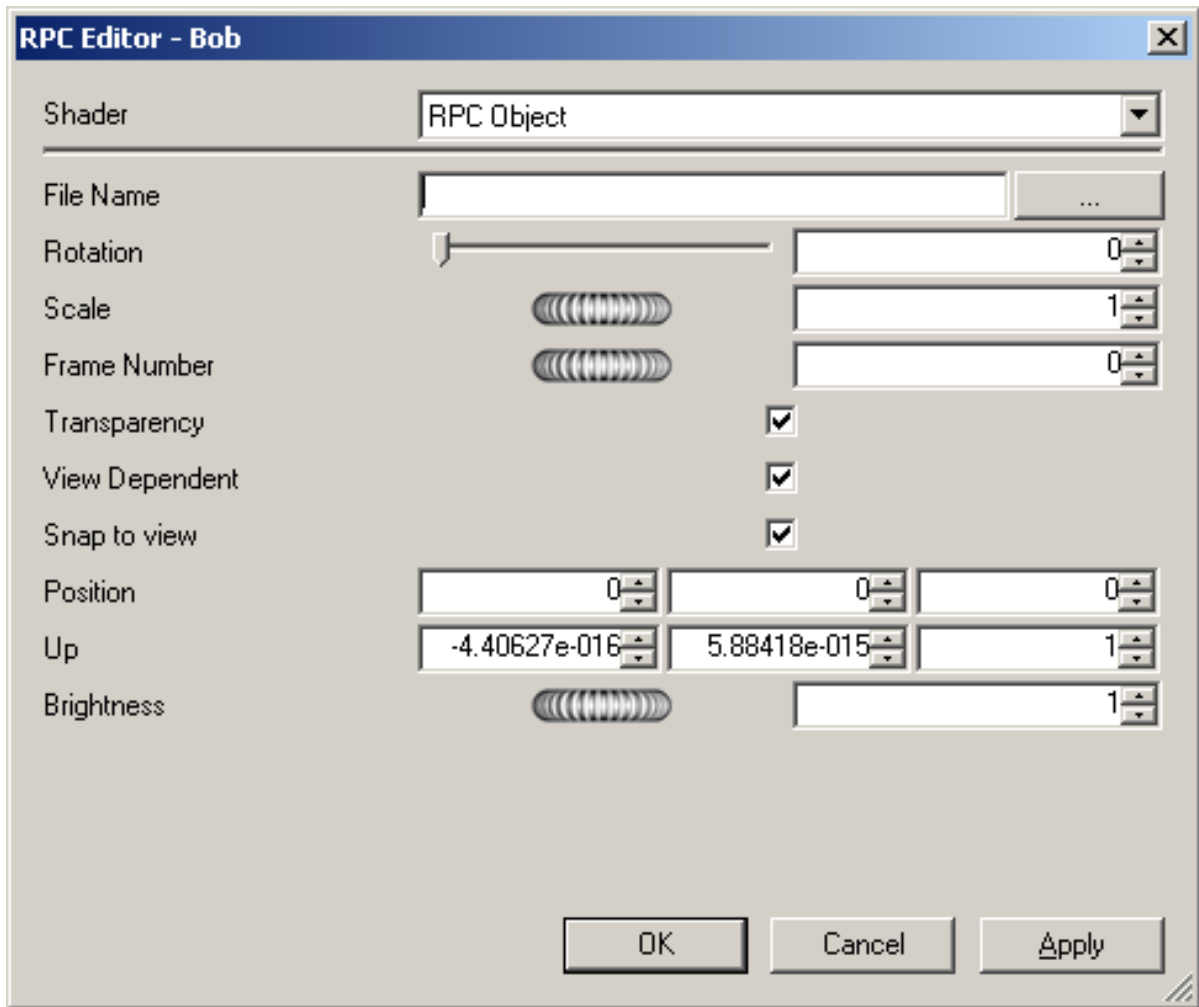
The key benefit to using RPC content is that it only takes a short amount of time to fill a scene with realistic content and it adds very little to the rendering time.

Like the Materials, Lights and Rendering tabs, the RPC tab is divided into two panes for archives and palette. This tab is where you set up RPCs (Rich Photorealistic Content).



RPC Setup

1. Drag the RPC symbol from the Templates archive to the palette on the right.
2. Double click on the symbol in the palette, which should bring up the options dialog.



3. To select an RPC for use, click on the "...". This brings up a load dialog to browse to the location of the RPC file. JetStream has a number of free example RPC files in the resources area of the product CD. Once the file has been selected, click on **OK**.
4. Make sure the settings on the options dialog are what is required. Often these will not need to be altered, though they are self explanatory and can be experimented with at any time. If they require adjusting, simply double click on the RPC symbol in the palette again and alter them until correct.
5. Click **OK** to continue.

This scene shows an example of some RPC people on and around a building.



RPC Manipulation

- To position the RPC in the scene, either right-click on the RPC in the palette and select **Add Instance** which gives a target cursor with which to then click on a location in the 3D scene, or left-click and drag the RPC icon from the palette on to the required position in the 3D scene.
- To move an RPC within the scene, right click on it in the main view and select **Pick Position**. This changes the cursor to a target for selection of an alternative location.
- To delete an RPC from the scene, right click on it in the main view and select **Remove**.
- Whilst navigating through the scene, RPCs will always turn to face the camera. If the RPC is 3D or 3.5D right clicking and selecting **Refresh** will set it to the correct frame based on the current camera position. Rendering the scene using the **Render** button will always refresh all RPCs.

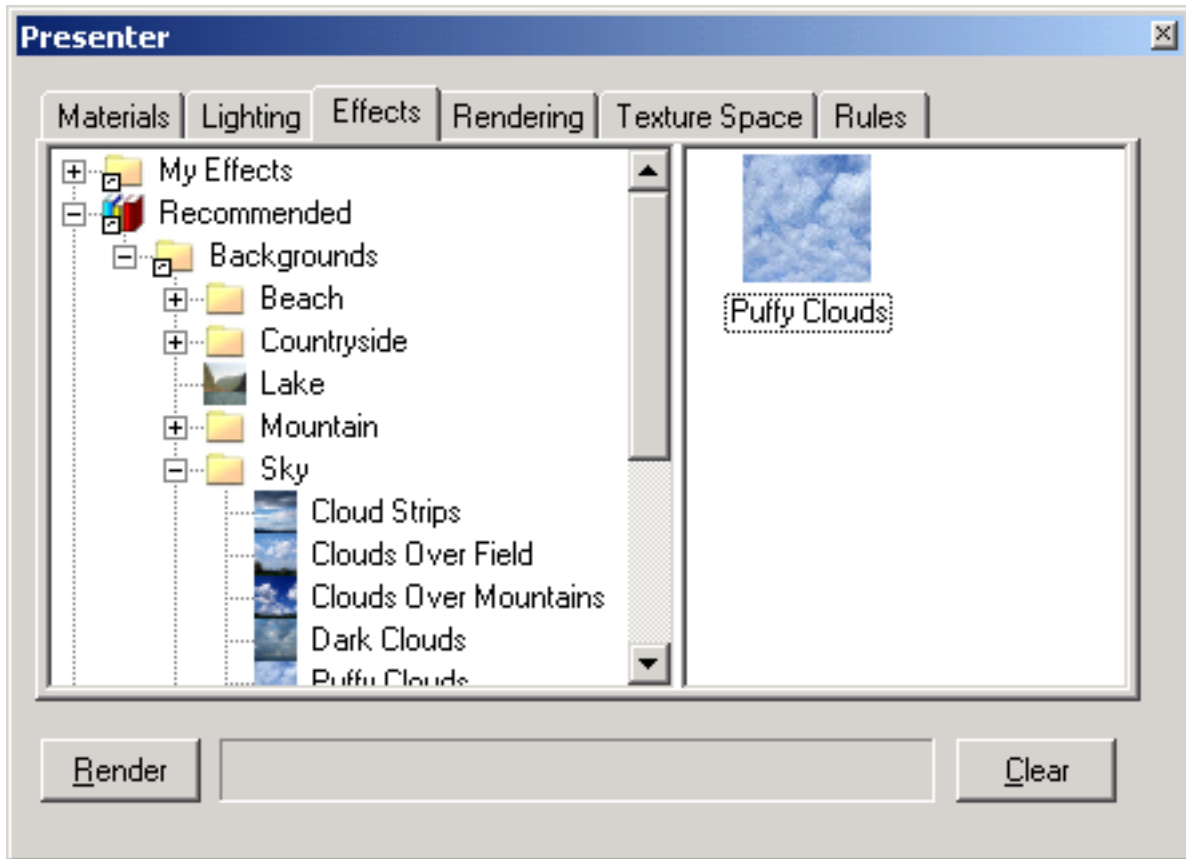
Note

When publishing a scene using Publisher, any RPCs included in that scene are not published to the Presenter_maps directory or embedded in the NWD file. The size of the files and the fact that most are licensed currently prohibits this.

Chapter 28. Rendering Effects

28.1. Effects Tab

Like the Materials, Lights and Rendering tabs, the effects tab is divided into two panes for archives and palette. This tab is where you set up different background and foreground effects.



To set up an effect for the render, you simply drag a style from the archive to the palette. You can only have one of each type of effect at once in the palette: that is, one background and one foreground style.

Note

A complete reference manual for all types of foregrounds, backgrounds and rendering styles is included with the JetStream API (see `\COM\documentation\shaders.chm`). The JetStream API is included with JetStream Roamer and can be accessed via the JetStream installer menu.

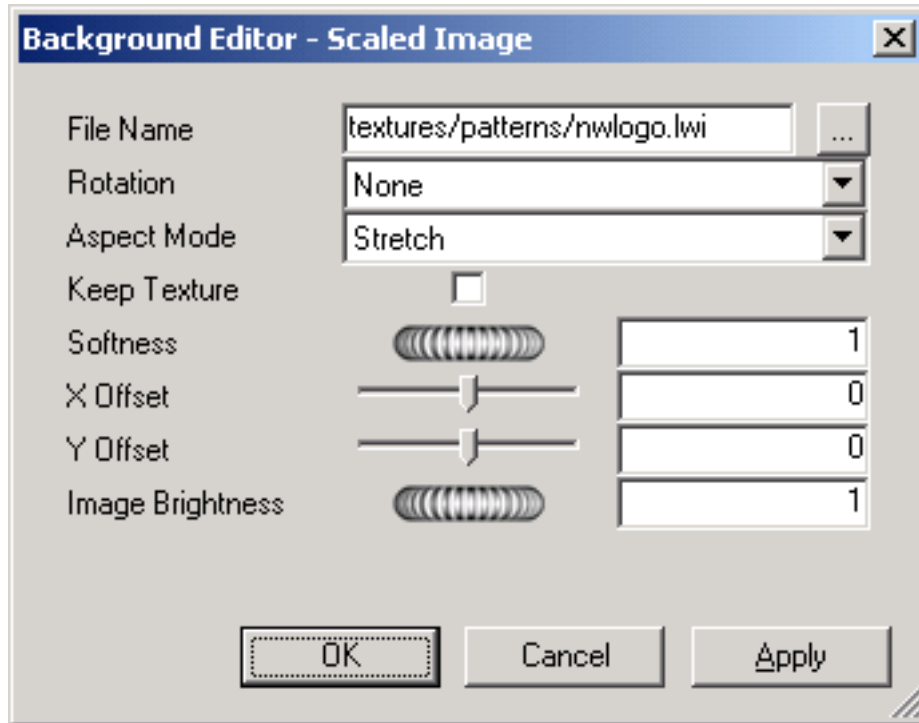
28.2. Background Effects

Background effects affect the background of the image when rendered and include plain colors, graduated colors, procedural clouds and image files (tiled or scaled).

To set up a background for your render, simply drag your chosen background onto the palette on the right hand side of the tab. Most backgrounds can be rendered interactively in OpenGL so you have a good

preview of how the background will be fully rendered.

To edit your chosen background effect, simply double click on the effect in the palette. The **Background Editor** dialog will appear. Each editor will be different for each type of background. The **Scaled Image** editor is shown here:



Note

When the user profile (see the section called "Profiles" in the chapter called "Interface" in the Roamer book for more information on this) is set to **Developer**, the dialog will include the full list of parameters and allow you to change the type of background.

In the **Background Editor**, click on the Browse button (...) next to the **File Name** box to display the **Open Image File** dialog. From here, browse to an image file and click **Open** to use that image as the background.

Editing parameters in the dialog will interactively alter the scene with those changes.

At any time, click on the **Apply** button to apply the parameter edits to the scene.

You can save an edited background for use in other scenes by simply dragging it onto the **User, Backgrounds** archive.

Click **OK** to keep the changes made or **Cancel** to discard any changes made (since the last time you clicked **Apply** at least).

Environment Backgrounds

Environment backgrounds are a special kind of background that move with the model and allow reflections from reflective model parts. There are a number of different types of environment image types; we recommend using **Vertical Cross** maps. These images are automatically placed on the inside of a

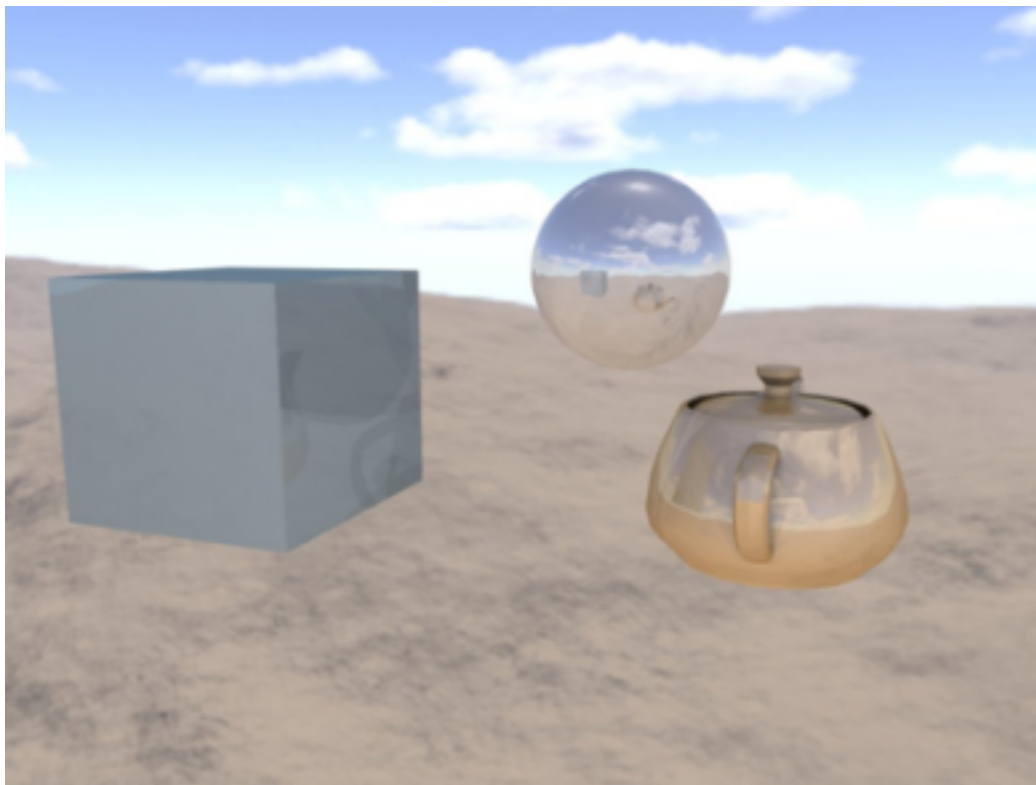
cube that then surrounds the scene. Due to the nature of the feature, edges and corners become indistinguishable. A wide variety of environment maps are available for purchase on the internet.

The additional realism accessible through Environment backgrounds is possible through two drag and drops.

1. Load a model into JetStream and set the view to be outside so that the external scene is visible.
2. Open the Presenter window and select the **Effects** tab.
3. In the left-hand window, open the **Recommended** folder, open the **Environments** sub-folder and then open the **Panorama** sub-folder. In here will be two environments, City and Sky. Drag Sky from the left over to the palette on the right.
4. Back in the **Recommended** folder, open the **Backgrounds** sub-folder, and drag the **Environment** over to the palette on the right. Because this type of background is made up of two parts, the Sky image and the background Environment shader that points at the image, these two elements will link together automatically.

Once this is complete, moving around the model will see the background moving appropriately in real-time. With a modern graphics card, if there are reflective surfaces in the scene, opening **Tools, Global Options, Presenter** and setting **Hardware** to **Lighting** will show the newly set up background reflected in all such surfaces.

Pressing the **Render** button will also show this background in the photorealistic output.

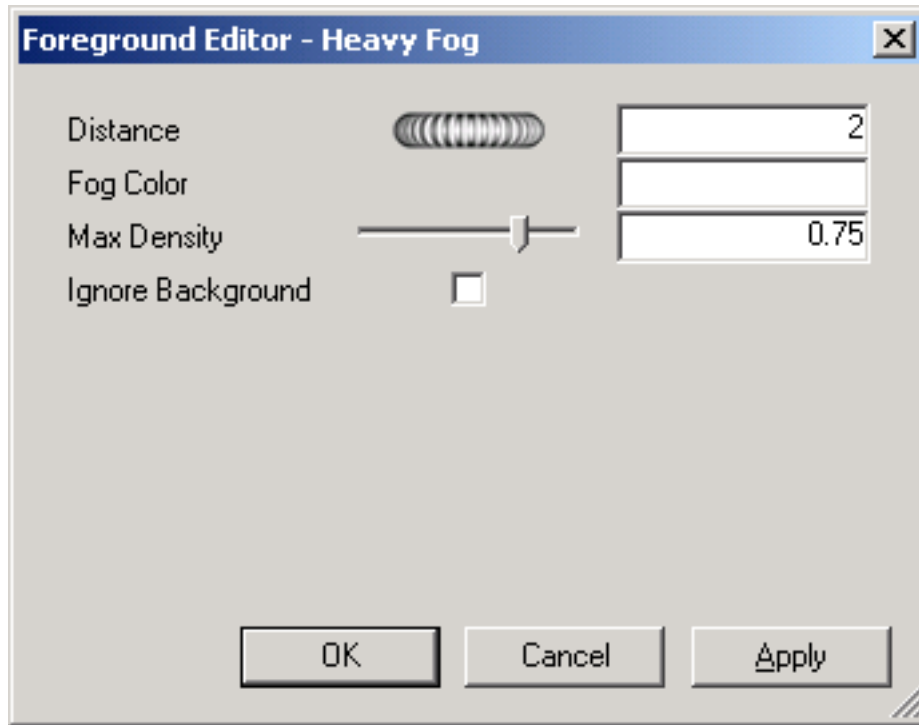


28.3. Foreground Effects

Foreground effects affect the foreground of the image when rendered and include fog and snow effect. None of these effects are available as an interactive preview and can only be seen when a full render is done.

To set up a foreground for your render, simply drag your chosen foreground onto the palette on the right hand side of the tab.

To edit your chosen foreground effect, simply double click on the effect in the palette. The **Foreground Editor** dialog will appear. Each editor will be different for each foreground type. The **Heavy Fog** editor is shown here:



Note

When the user profile (see the section called "Profiles" in the chapter called "Interface" in the Roamer book for more information on this) is set to **Developer**, the dialog will include the full list of parameters and allow you to change the type of foreground.

At any time, click on the **Apply** button to apply the parameter edits to the scene.

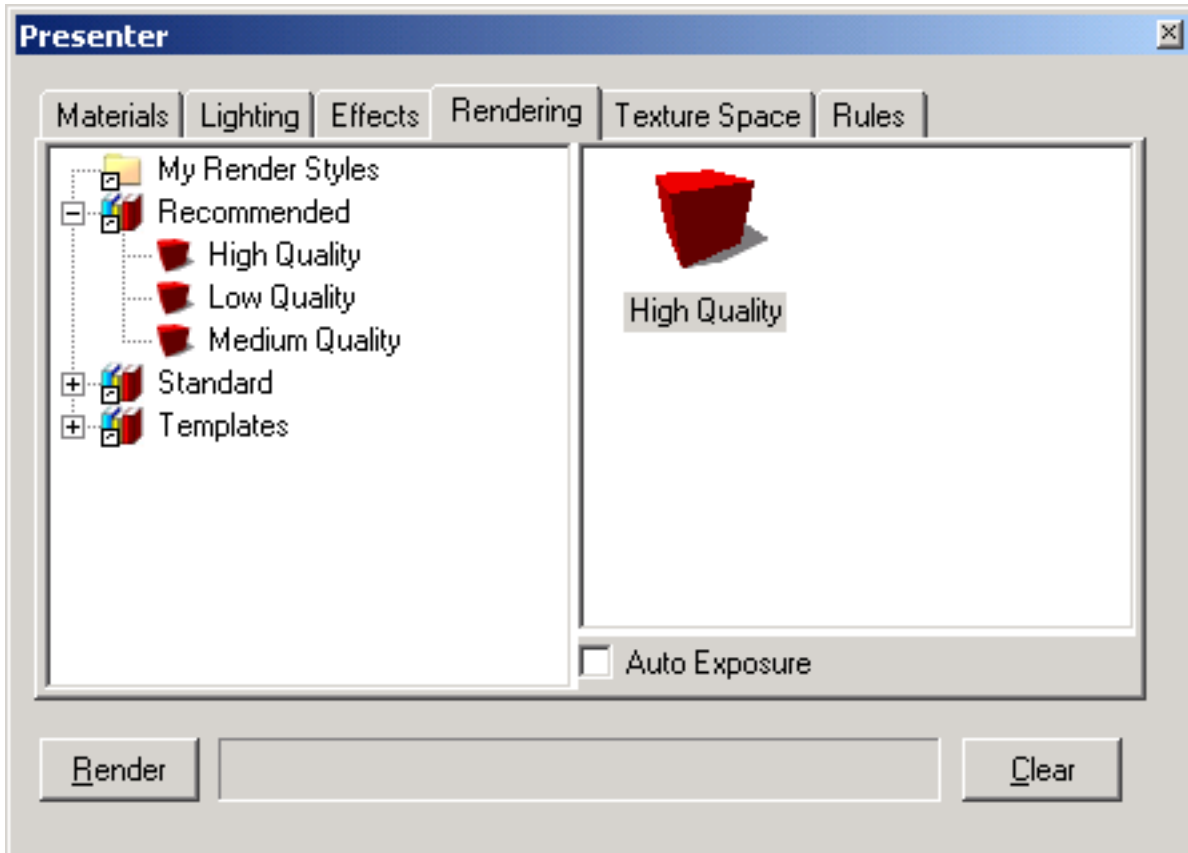
You can save an edited foreground for use in other scenes by simply dragging it onto the **User, Foreground** archive.

Click **OK** to keep the changes made or **Cancel** to discard any changes made (since the last time you clicked **Apply** at least).

Chapter 29. Rendering Styles

29.1. Rendering Tab

Like the Materials, Lights and Effects tabs, the **Rendering** tab is divided into two panes for archives and palette. This tab is where you select in which style and how you wish the scene to be rendered. Each archive has a number of different render styles to choose from.



Note

A complete reference manual for all types of rendering styles is included with the JetStream API, (see `\API\COM\documentation\shaders.chm`). The JetStream API is included with JetStream Roamer and can be accessed via the JetStream installer menu.

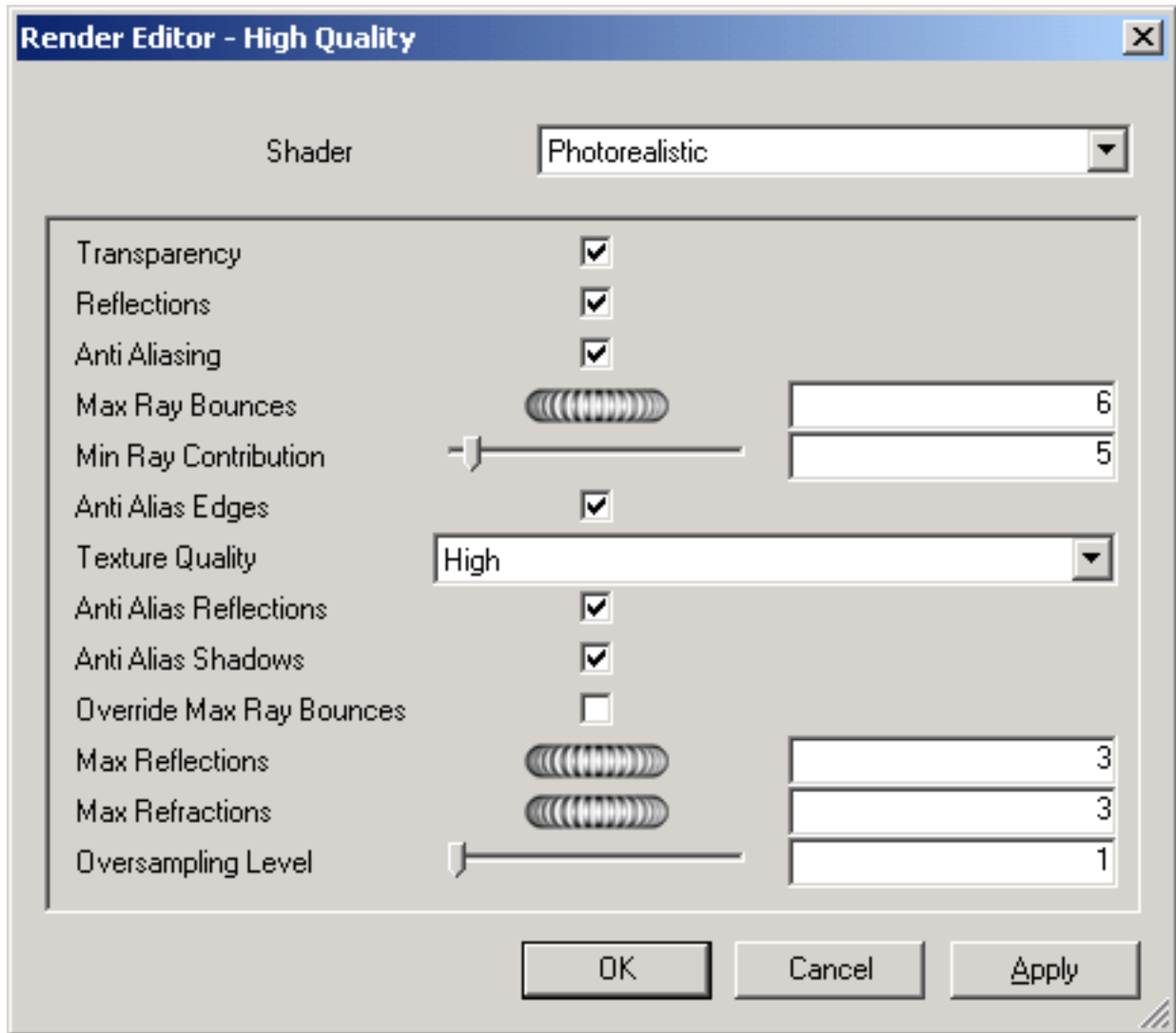
29.2. Rendering Styles

Rendering styles affect the way that the scene is rendered when a full photorealistic render is done (by clicking on the **Render** button). None of these effects are available as an interactive preview.

To set up a rendering style, simply drag your chosen style onto the palette on the right hand side of the tab.

To edit your chosen rendering style, simply double click on the style in the palette. The **Render Editor**

dialog will appear. Each editor will be different for each type of rendering style. The **High Quality** editor is shown here:



Note

When the user profile (see the section called "Profiles" in the chapter called "Interface" in the Roamer book for more information on this) is set to **Developer**, the dialog will include the full list of available parameters and allow you to change the type of render style.

At any time, click on the **Apply** button to apply the parameter edits to the scene.

Click **OK** to keep the changes made or **Cancel** to discard any changes made (since the last time you clicked **Apply** at least).

You can save an edited rendering style for use in other scenes by simply dragging it onto the **My Render Styles** archive.

29.3. Predefined Rendering Styles

The **Recommended** archive contains three predefined rendering styles:

- **High Quality.** Choose this rendering style for the highest quality rendered output. This includes all reflections and transparencies and anti aliasing on edges, reflections and shadows. Of the three recommended rendering styles, this will take the longest to render. This is also the rendering style used if no other is chosen. Use this style for the final export of your rendered output.
- **Low Quality.** Choose this rendering style for a quick, low quality render. This includes no reflections or anti aliasing. Use this style if you wish to quickly see the affects of materials and lighting you have applied to the scene.
- **Medium Quality.** Choose this rendering style for a medium quality render. This includes all reflections and transparencies and anti aliasing only on shadows. You may use this style for a final preview of the scene, prior to exporting your final rendered output.

The **Standard** archive contains twenty three rendering styles that simulate hand drawing and other non-photorealistic styles. These styles use a mixture of shaded, vector and image based rendering techniques. They are generally best suited to small models and small output images.

Note

The **Standard** rendering styles require multiple stages to render a scene. These can therefore often take a considerable time to render.

The **Templates** archive contains five main types of rendering style, which can be used to define your own rendering styles:

- **Photorealistic (Raytrace).** This archive contains photorealistic rendering styles, including **High Quality**, **Low Quality** and **Medium Quality** as per the **Recommended** archive. These rendering styles are fastest and use least memory where large parts of the model are obscured from any particular viewpoint. For example, when inside a room within a building, the walls of the room will obscure the rest of the building from view.
- **Photorealistic (Scanline).** This archive contains photorealistic rendering styles, including **High Quality**, **Low Quality** and **Medium Quality** as per the **Recommended** archive. These rendering styles are fastest and use least memory where most of the model is visible from any particular viewpoint. For example, when rendering an overview of a plant and process model, the majority of the model can be seen as there are fewer walls, or similar, to obscure your view.
- **Simple Shaded.** This template is a simple shaded rendering style, where advanced features such as textures and transparency are not required.
- **Sketch.** This archive contains twelve basic sketch rendering styles.

Note

Sketch rendering styles require multiple stages to render a scene. These can therefore often take a considerable time to render.

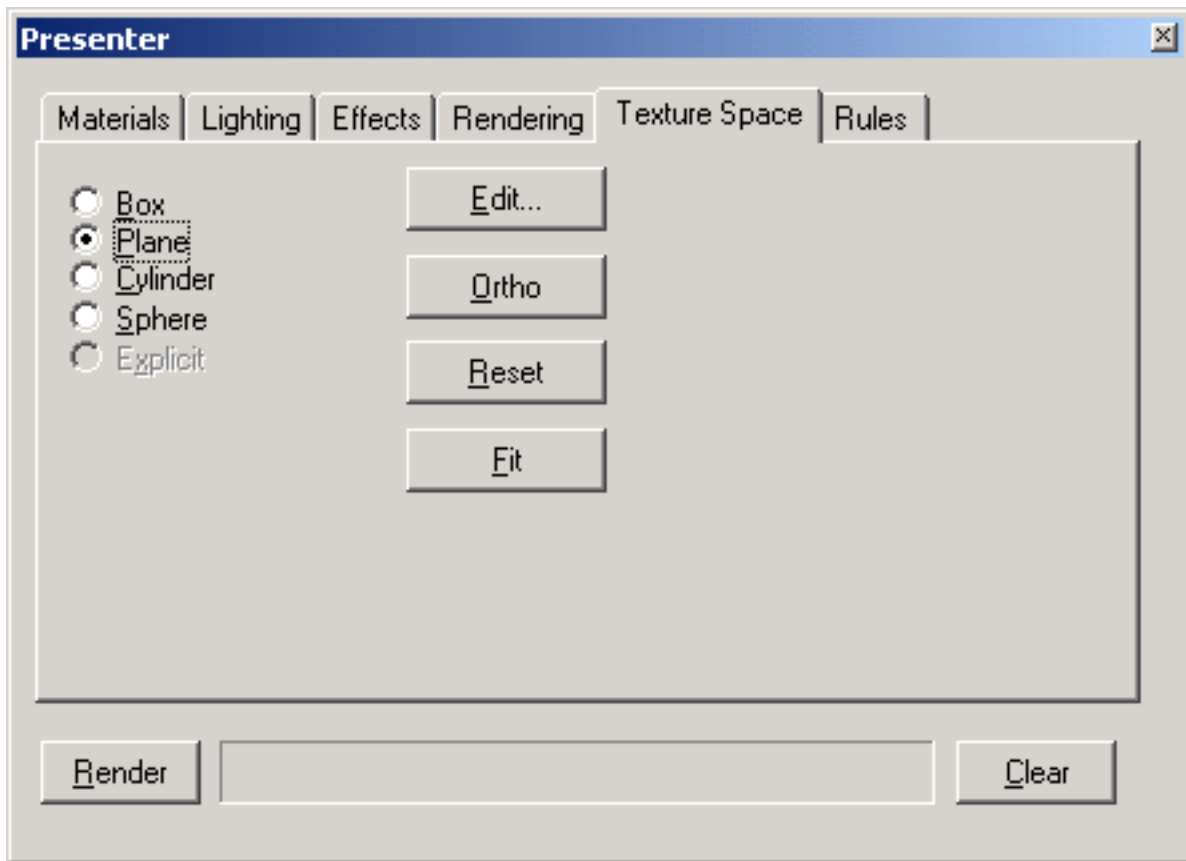
- **Vector.** This template is a vector rendering style, which will render the scene in wireframe.

29.4. Auto Exposure

Check the **Auto Exposure** check box to render the scene with balanced brightness and contrast. This is essential when using physically accurate lighting, such as a **Sky** or **Sun** light. If adding either of these lights to your scene, you will be prompted to turn auto exposure on, if it is not already.

Chapter 30. Texture Space

Texture space describes the way in which a texture is applied to an item. For example, applying a cylindrical texture space to a pipe will cause textures on the pipe to be rendered more naturally. An item's texture space may have been assigned from the original CAD application and brought through from the native CAD file, or set up within Presenter with the options of **Box**, **Plane**, **Cylinder**, or **Sphere**. The **Explicit** option allows a user-defined texture space to be applied and will be available if the item had a texture space applied to it in the original CAD application. Each texture space option applies some imaginary bounding geometry around the item and "shrink-wraps" the texture as best it can to the geometry underneath this bounding geometry.



If you've applied a texture to an item, Presenter will attempt to work out the best fit from the four texture spaces available. If this isn't what you intended, then you can then edit this texture space:

Editing Texture Space

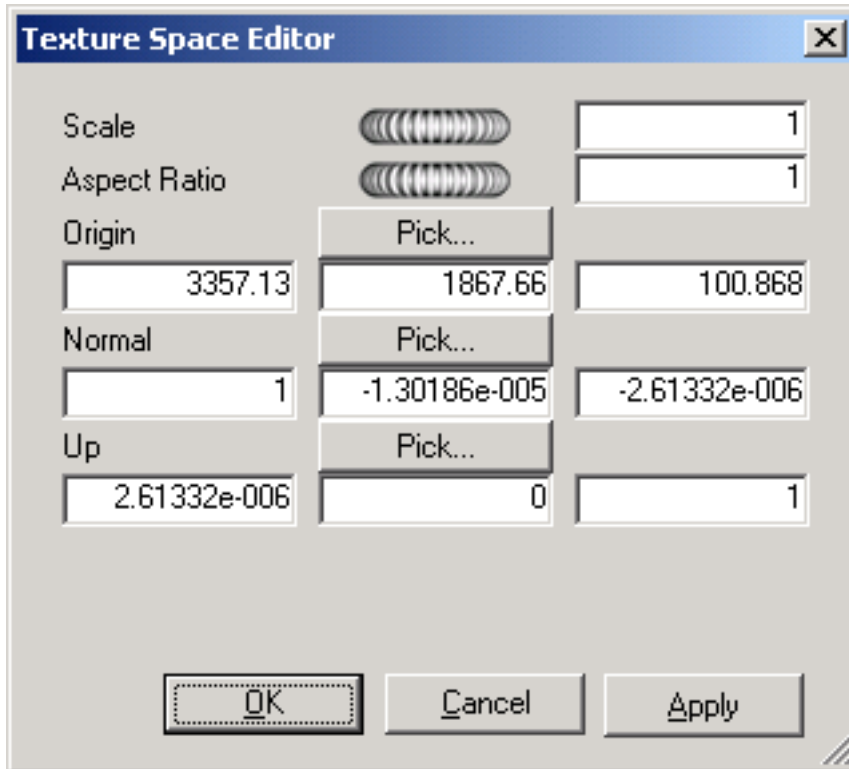
1.

- Select the item (see the section "Interactive Selection" in the chapter "Selecting Items" in the JetStream Roamer book for more information on selecting items) and go to the **Texture Space** tab in the Presenter dialog to choose another texture space.

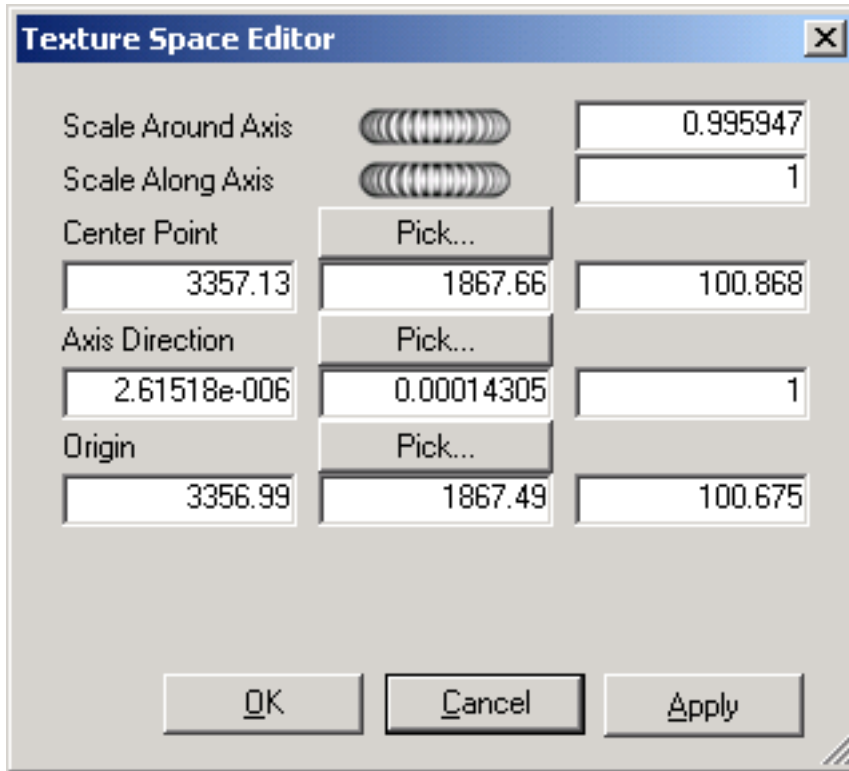
or

- Right click on an item which has a texture applied to it and select a new texture space from the **Presenter, Texture Space** context menu.
2. You can fine-tune an item's texture space further by clicking on **Edit...** in the **Texture Space** Presenter dialog tab. The relevant texture space edit dialog will appear:

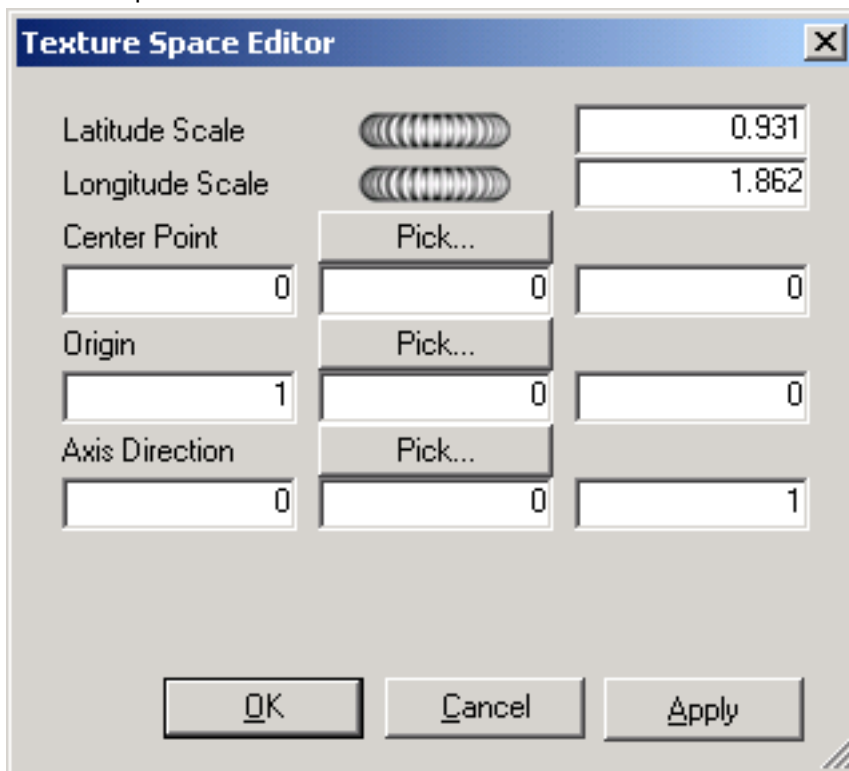
Either the plane texture space editor:



Or the cylindrical texture space editor:



Or the spherical texture space editor:



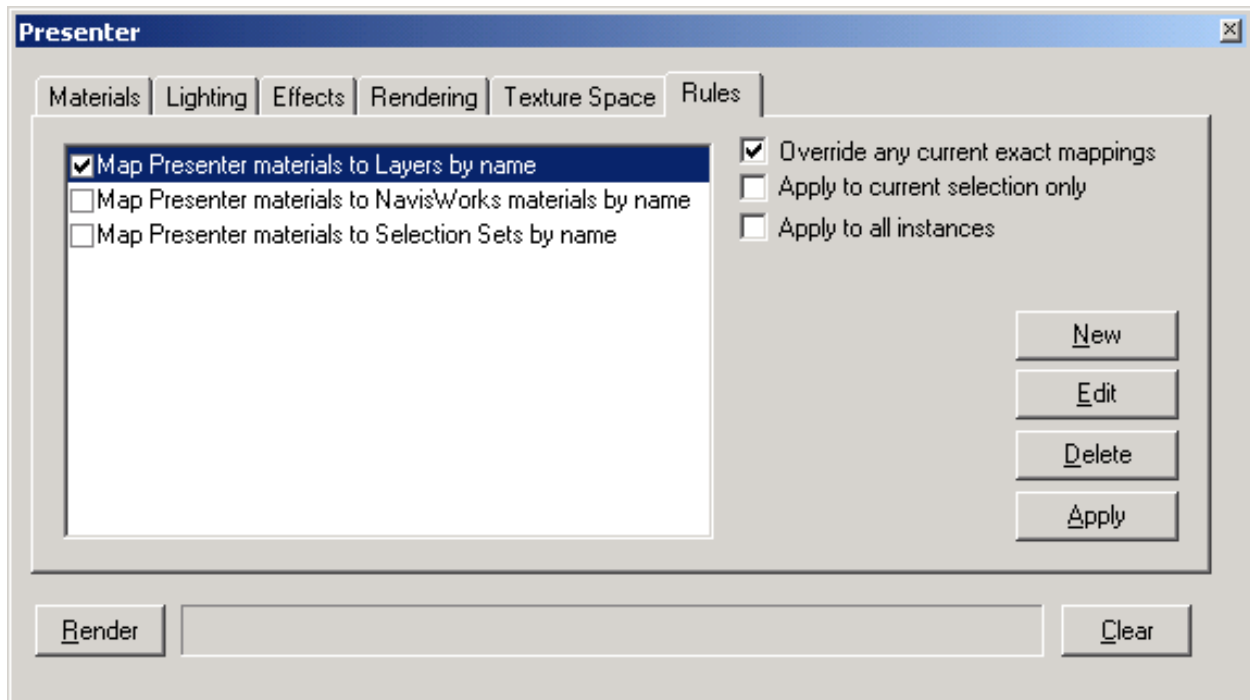
Edit each of the individual parameters and click **Apply** to see the results of the edit. Clicking on **Pick** allows you to interactively pick a point in the model rather than individually typing in x-, y-, and z-

coordinates.

3. Click on **OK** to apply the edits and return to JetStream or click on **Cancel** to return to JetStream without applying the edits (any clicks on **Apply** will have already applied the edits however).
4. Once edited, you can always reset a texture space to the JetStream-defined version by clicking on the **Reset** button.
5. Click on **Ortho** if you want JetStream to align the texture space with the nearest axis.
6. Click on **Fit** if you want JetStream to fit a single repeat of the texture to the item. This is of particular use when you are mapping an image to the exact size of the item it's being applied to.

Chapter 31. Presenter Rules

The **Rules** tab of the Presenter control bar allows you to apply materials to models according to certain user-defined criteria, rather than by dragging and dropping onto individual layers, groups or components. For example, all layers that are floors can be assigned a material called "floorboards", without having to manually drag-and-drop the material on to each floorboard. Each time the model is updated, the rules then just need re-applying, rather than manually re-applying them to all items.



All materials can be saved in a JetStream "palette" (.nwp) file, which allows you to set up a palette of materials once for a project and re-apply them to a model as it evolves, or to another model in the same project that has been set up with the same layer names, colors, selection sets and/or properties.

You can apply as many rules at once, as all rules depend on material names. Rules can be defined using the JetStream API, but three pre-defined rules are:

1. **Layers by name** enables you to apply a material to named layers.

As an example, if a layer is called "Doors" and you rename a material to "Doors" (the spelling and case must be exactly the same as the layer's name) then all layers named "Doors" will appear with the properties of that material when you check the rule **Layers by name**, and click **Apply Rules**.

You can give multiple materials the name of different layers and apply this rule to all of the layers.

2. **JetStream materials by name** enables you to apply a material to named Roamer materials. JetStream Roamer materials are *not* the same as JetStream Presenter materials - Roamer materials merely refers to the color and transparency of the item as it comes through from the original CAD file, whereas Presenter materials are those materials applied using the Presenter plugin, or are more complex materials such as bitmaps converted from the original CAD file.

If a Presenter material has the same name as a Roamer material in the model (for example,

"AutoCAD Color Index 7"), then all items with this original Roamer material name in the scene receive this Presenter material from the palette when you check the rule **JetStream materials by name**, and click **Apply Rules**.

3. **Selection Sets by name** enables you to apply a material to selection sets. See the section called "Selection and Search Sets" in the chapter called "Selecting Items" in the Roamer book for more information on setting up selection sets.

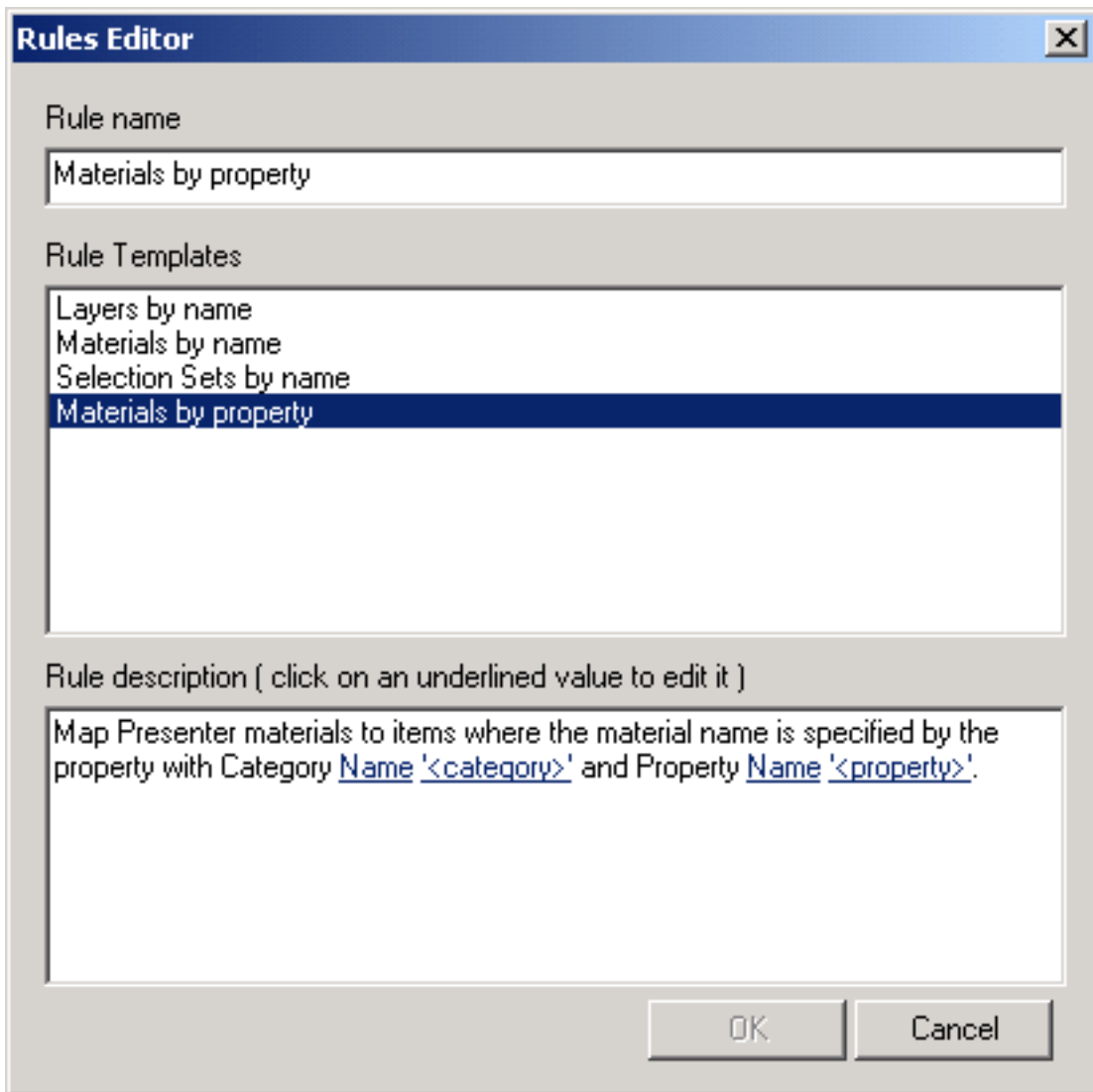
If a material has the same name as a selection set in the model, then all items in this selection set receive this material from the palette when you check the rule **Selection Sets by name**, and click **Apply Rules**.

New custom rules may also be added and defined, using the Rules Editor:

Adding custom Presenter rules

1. From the **Rules** tab of the Presenter control bar, click the **New** button.

The **Rules Editor** dialog is displayed:



2. Enter a new name for your rule in the **Rule name** box.

Note

If you choose not to enter a name, upon selecting a **rule template** the name of that template will be used.

3. From the **Rule templates** list, choose a template from which your rule will be based upon.

Note

The **Layers by name**, **Materials by name** and **Selection Sets by name** templates are those used for the pre-defined Presenter rules.

The **Materials by property** template enables you to specify a property within the model scene. If a material has the same name as the specified property value in the model, then all items having that property will receive this material from the palette when you check the rule **Materials by property**,

and click **Apply Rules**.

4. In the **Rule description** box, click on each of the **underlined values** to define your custom rule. The customizable values available with the built in templates are:
 - **Name**. Use the name of the category or property as it is displayed in the interface (recommended). You can also choose **Internal Name** which is that accessed via the API (for advanced use only).
 - **'<category>'**. Choose from the available list, which category the property you wish to define is in. Only the categories that are contained in the scene are available in the drop down.
 - **'<property>'**. Choose from the available list, which property you wish to define. Again, only the properties in the scene within the chosen category will be available.
5. Click **OK** to add the new ignore rule, or **Cancel** to return to JetStream.

The three options on the right hand side of the dialog affect how these rules are applied to the scene:

Setting Presenter Rules Options

1. Check **Override current mappings** if you want to override any existing mappings from Presenter materials to items in the selection tree.
2. Check **Apply to current selection** if you want to apply this rule only to the currently selected items in the scene. Be aware that this is the default setting, so if your rule seems not to have worked, check that you don't have this option checked with nothing selected in the scene.
3. Check **Apply to all instances** if you want to apply this rule to all instances of any multiply-instanced item affected by the rule.

Presenter rules example

Let's assume, you wish to apply an aluminium material to all (Intergraph PDS) items that have 50mm insulation thickness. The following procedure describes the necessary steps to achieve this, using Presenter rules:

1. From the **Rules** tab of the Presenter control bar, click the **New** button.
2. Enter a name for the rule, **Insulation thickness**.
3. Choose the **Materials by property** template.
4. Click on **'<category>'** and choose **PDS Component Data** from the drop down list.
5. Click on **'<property>'** and choose **Insulation** from the drop down list.

6. Click **OK** to save the custom rule.
7. From the **Recommended, Metals** archive on the **Materials** tab, drag the **Aluminium** material into the palette (right hand pane).
8. Select the **Aluminium** material and press **F2** and rename it, **50MM**. Press **Enter** to save the new name.
9. Go to the **Rules** tab and check the **Insulation thickness** rule.
10. Ensure only the **Override any current exact mappings** option is checked and then click the **Apply** button, to apply the rule.

All items within the model scene that have a 50mm insulation thickness property should now have the aluminium material applied to them.

Part V. JetStream Clash Detective

User Manual

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Chapter 32. Overview of Clash Detective

The Clash Detective plugin checks your model and shows you any areas where items interfere or "clash" with each other. Like all plugins, the Clash Detective is a dockable tabbed control bar accessed through the **Tools** menu (Hint: hold down the **Control** key to prevent the control bar from docking if necessary). From the Clash Detective control bar you can set up the rules and options for your clash tests, view the results, sort them and produce a report as a text file or in HTML or XML formats. A clash test is a configuration of options, rules and selections used in checking for clashes in a model. These are useful if you have set tests for your model and need to run them as a batch. You can create a number of different clash tests for a model and save them in a JetStream .nwf file for checking with updated models at a later date.

General clash tests that you are required to run on all projects can be set up once, exported and then re-used on subsequent projects. Such tests may be specific to your industry or company; for example, you may always use a particular diameter piping which requires insulating. You could therefore set up a test, which selects all of this piping in the scene and clash test it against the rest of the model to ensure a specific clearance around it is maintained.

Managing a series of clash tests can get complicated, especially if you have a whole set of different layers you want to clash separately. Clash Detective is designed to help you control these clash tests and leave an audit trail of clashes throughout the life of the project.

One simple but time-saving way it does this is by remembering the names of clashes throughout the project's life so you don't have to go through each clash every time you do a test to figure out whether it's a new clash, or one you have already seen. Clash Detective also allows you to assign a status to a clash and can update this status automatically, informing you of the current state of the clashes in the model.

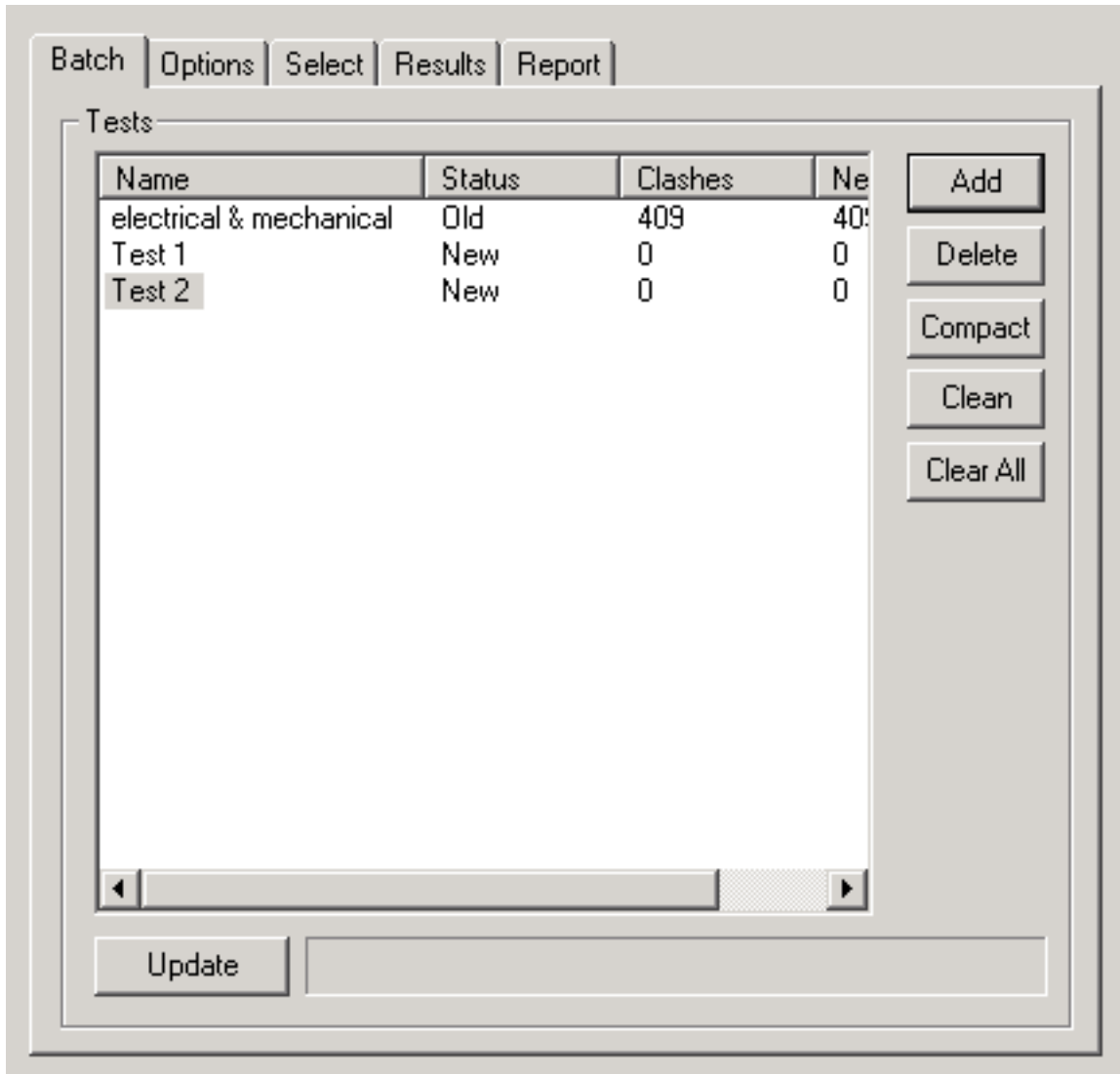
You can set up a batch of clash tests that you could run overnight, every night and for each test, choose the items to clash against, along with the options for the test.

Setting up and running a clash test

1. Select a previously run test from a batch, or start a new test
2. Set the rules for the test.
3. Select the required items to be included in the test and set the test type options.
4. View the results.
5. Produce a clash report.

Chapter 33. Clash Batches

The **Batch** tab of the Clash Detective control bar is used to manage your clash tests and results. You can set up as many tests as you like in a batch and save them into the JetStream .nwf file so that on opening it up again the tests can be re-run with the new model revision.



To run a clash test, either:

- Click on **Update** to run *all* of the tests in the batch.

or

- Select an existing test to run on its own, switch to the **Select** tab and click **Start**.

Managing batches of clash tests

1. Click **Add** to append a new test to the current batch.
2. Click **Delete** to delete the currently selected test from the batch.
3. Click **Compact** to delete all clash results with a status of resolved from the test in order to create a smaller file.
4. Click **Clean** to reset all tests so that they are as if you had not yet run them. In other words, this will make their test status new.
5. Click **Clear All** to remove all tests from the batch in order to start from scratch.

Note

You can rename a test by selecting it and either pressing **F2**, or by clicking again on the highlighted text. You can also sort the Batch columns alphanumerically by simply clicking on the column heads. Clicking again toggles between ascending and descending.

Merging clash tests from multiple files

- Merge the files using **File, Merge**. See the **File Management, Merging Files** section of the JetStream Roamer user guide for more information.

All of the clash test data will be combined, whilst any duplicate geometry from the files will not be loaded.

Importing clash tests

Clash tests can be imported into JetStream Clash Detective to set up pre-defined, generic clash tests. (see Exporting clash tests for information on exporting clash tests).

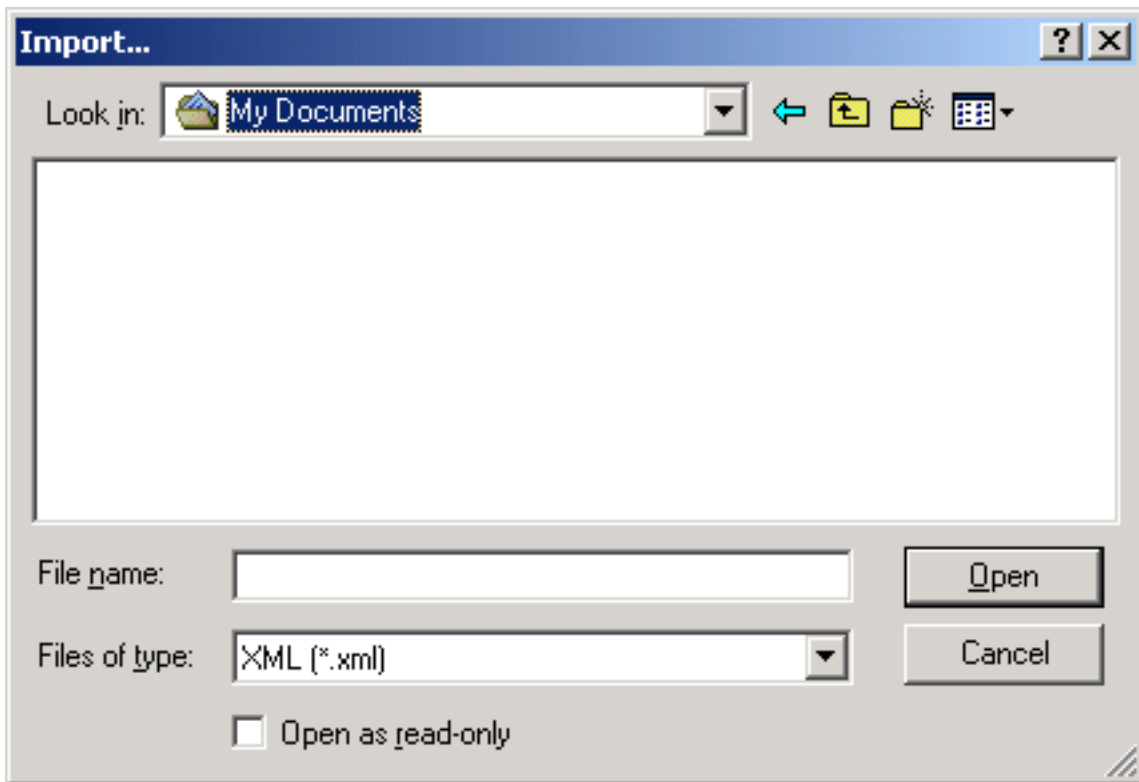
Note

If the clash test to be imported contains a search set as one of the clash selections, then the search set will also be imported along with all other test rules, options and selection information.

To import a clash test:

1. From the **File** menu, choose **Import, Clash Test XML...**

The **Import** dialog is displayed:



2. Locate and **Open** the .xml file to import the clash test information, or click **Cancel** to return to JetStream.

Exporting clash tests

Tests can be set up to clash items based on generic properties, including direct property selection in the left and right clash selection trees, or using pre-defined search sets.

For example, you may have saved a search set that finds all pipes of a specific size, named "100mm Pipes". Your test then clashes all 100mm Pipes against the entire model (see Chapter 35, *Selecting Items for Clash Testing*). Exporting this clash test will enable you to import it into another model, which will automatically set up a clash test between 100mm Pipes and the entire model.

Note

Any clash tests that are based on explicit selections will not be exported. For example, clashing one layer against another is not a valid test for exporting. To achieve this you will need to use the **Find Items** dialog to search for each layer based on a specific property (e.g. Item, Name). These searches can then be saved as **Search Sets** and finally selected in the **Left** and **Right** selection trees in Clash Detective.

You may also select all loaded files in the **Left** or **Right** selection tree and Clash Detective will treat this as selecting the entire model.

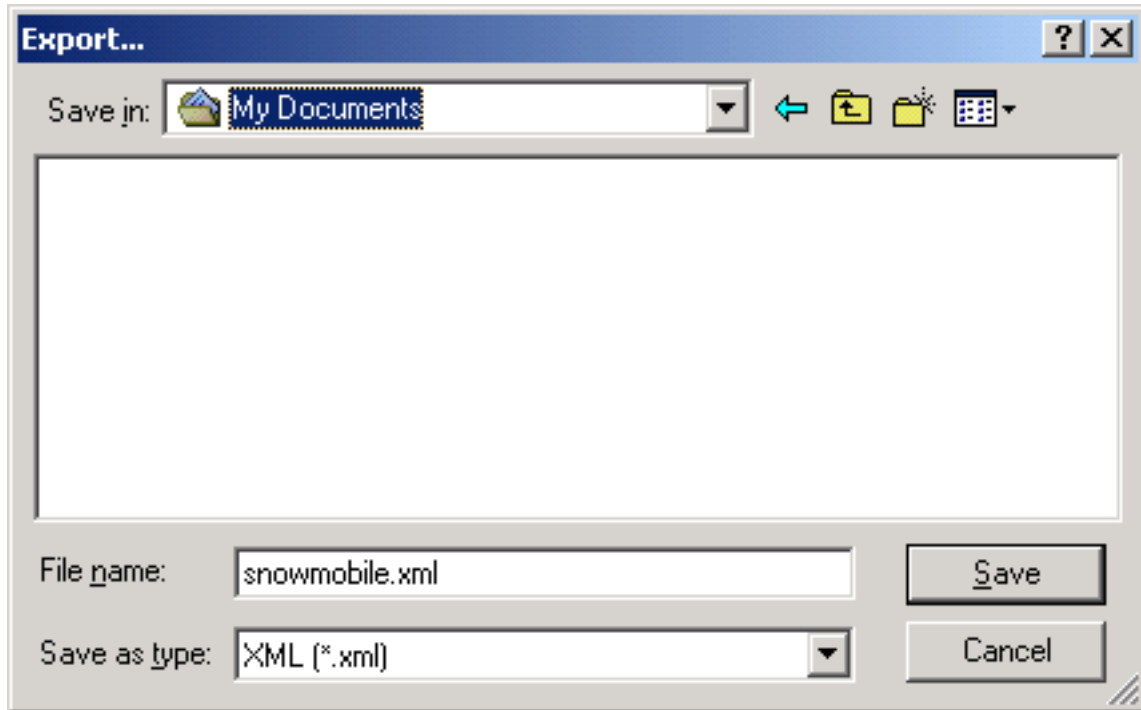
Multiple generic tests can be set up as a batch and exported for use by other Clash Detective users or by

yourself on other projects.

To export a clash test:

1. Having set up your implicit clash tests, from the **File** menu, choose **Export, Clash Test XML...**

The **Export** dialog is displayed:



2. Enter a new file name and location, if you wish to change from those suggested.
3. Click **Save** to export the .xml file, or click **Cancel** to return to JetStream.

Creating custom clash tests

Exported clash tests can be used as a basis to define custom clash tests. If you have a common set of clash tests that you reuse on multiple projects, you can turn them into a custom clash test. Once installed as a custom clash test, the entire batch of tests can be selected and run directly from the **Select** tab. The results from all tests in the batch are combined and presented as the results of the custom clash test. The name of each test in the batch is displayed in the **Description** field of the results.

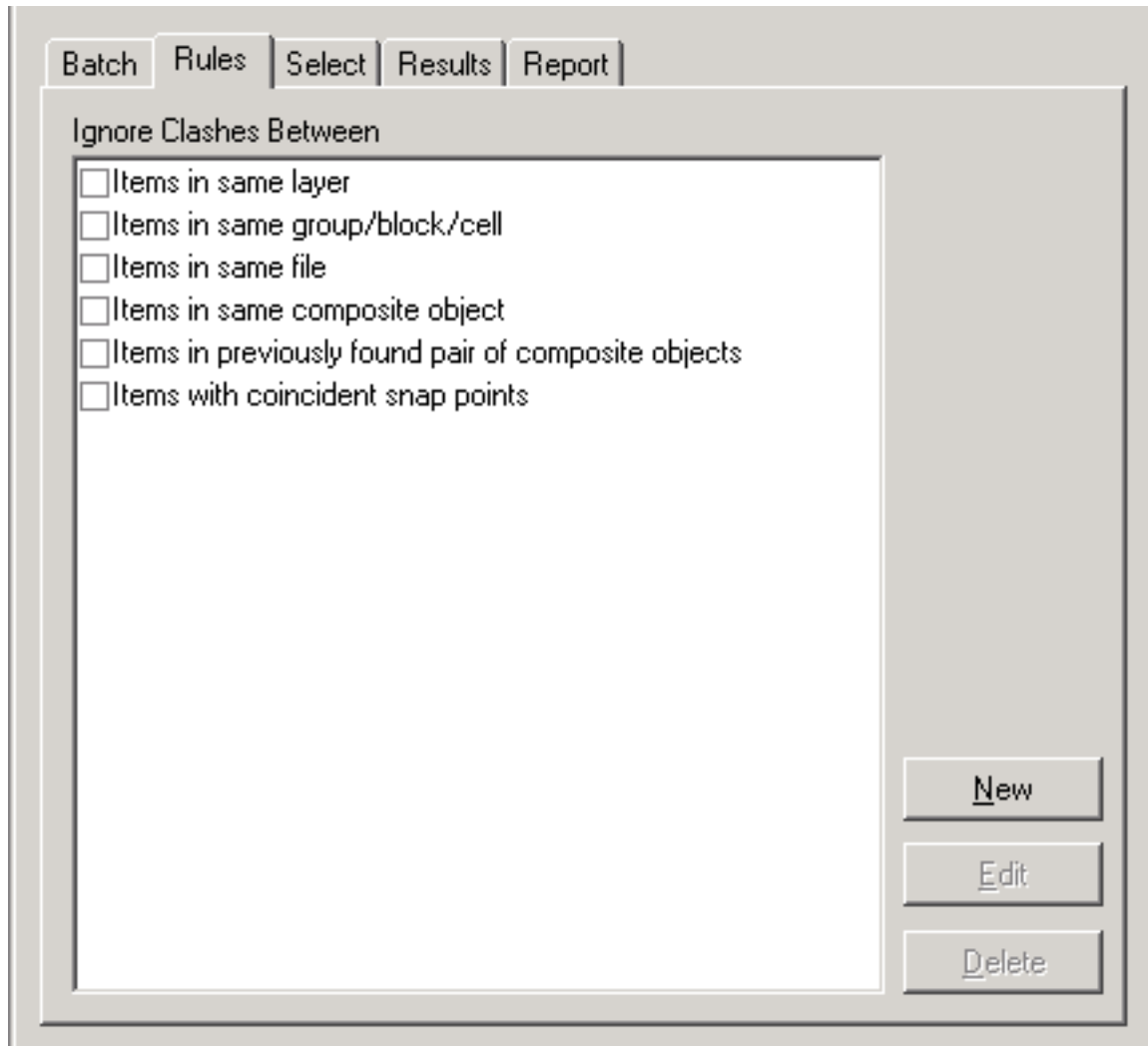
Custom clash tests are an excellent way to roll out a standardized set of tests across an organization. They allow the expertise of "power" users to be reused by everyone. Finally, they can be seen as a way of implementing object intelligence. For example, a custom clash test could be written that checked for compliance with a local building code based on object information and properties defined in a particular CAD system.

To define a custom clash test:

1. **Export** your clash tests to an XML file. The name of the file is used as the default name of the custom test.
2. If desired, change the name of the custom test by editing the XML file directly. The top level element in the XML file is called "batchtest". The name of the custom test as displayed to the user is defined by the "name" attribute. The name of the custom test as saved in a file is defined by the "internal name" attribute.
3. To install the custom test, copy the exported XML file to the `custom_clash_tests` subdirectory of one of the JetStream search directories. Clash Detective searches these directories on startup looking for custom tests. See the section called "Search Directories" in the chapter called "Interface" in the Roamer book for more information.
4. To use the custom test select it from the **Test Type** drop down on the **Select** tab. And press **Start**. All other options and rules are specified by the custom test.

Chapter 34. Clash Rules

The **Rules** tab of the Clash Detective control bar allows you to define and customize ignore rules to be applied to the clash test.



Setting clash rules

- The **Ignore Clashes Between** box enables you to select "rules" that reduce the number of clash results by ignoring certain combinations of clashing items. The following rules are built-in:
 - If **Items in same layer** is checked, any items found clashing that are in the same layer are not reported in the results.
 - If **Items in same group/block/cell** is checked, any items found clashing that are in the same group (or inserted block) are not reported in the results.

- If **Items in same file** is checked, any items found clashing that are in the same file (either externally referenced or appended) are not reported in the results.
- If **Items in same composite object** is checked, any items found clashing that are part of the same composite object (an item composed of multiple parts of geometry) are not reported in the results.
- If **Items in previously found pair of composite objects** is checked, any items found clashing that are part of composite objects (items composed of multiple parts of geometry) that have previously been reported in the test are not reported in the results.
- If **Items with coincident snap points** is checked, any items found clashing that have snap points that coincide are not reported in the results. This can be particularly useful for pipe runs made from cylinders.
- If **Items in the same AutoPlant Component** is checked, any items found clashing that are contained within the same AutoPlant component are not reported in the results.
- If **Connected AutoPlant Components** is checked, any items found clashing that are in connected AutoPlant components are not reported in the results.

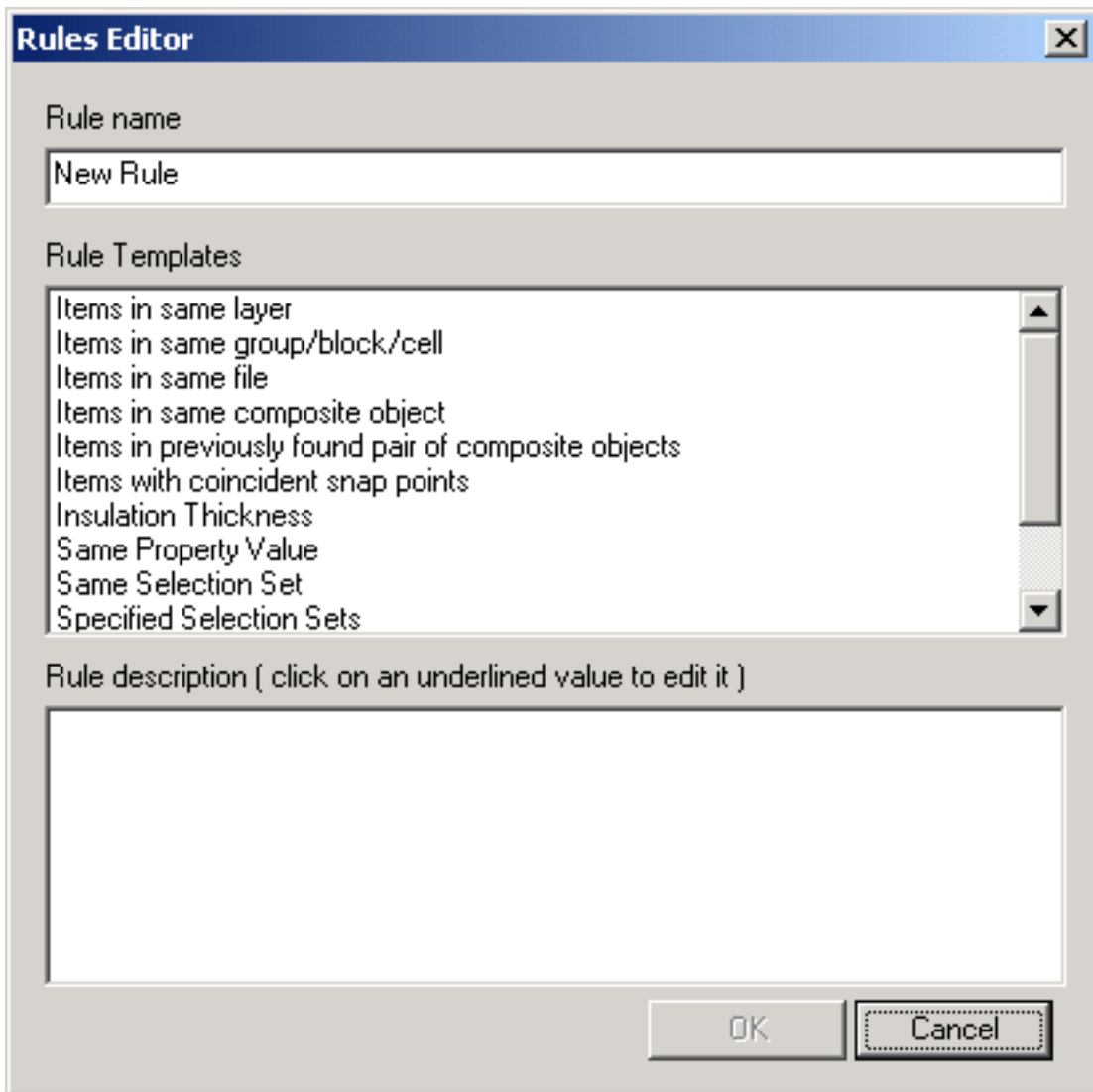
Adding custom clash rules

JetStream Clash Detective provides a number of templates which you can customize to create your own ignore rules.

To add a new ignore rule:

1. Click the **New** button.

The **Rules Editor** dialog is displayed:



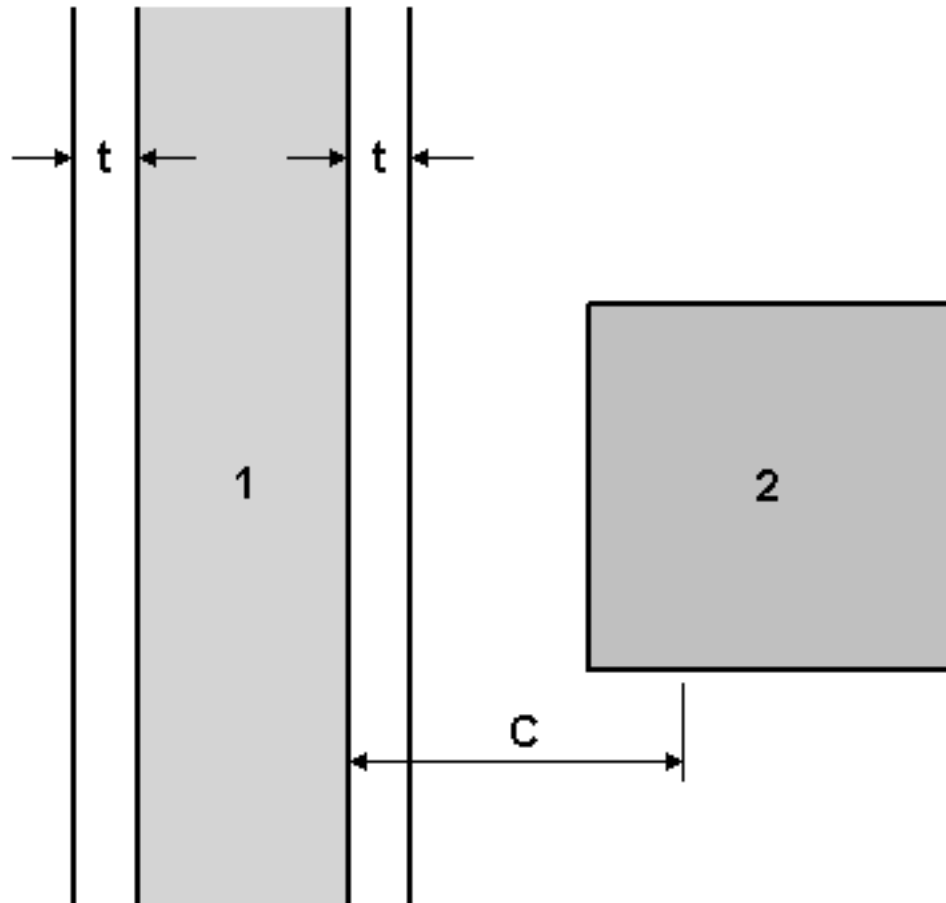
2. Enter a new name for your rule.
3. From the **Rule Templates** list, choose a template to customize. The following templates are built in:
 - **Insulation Thickness.** This rule is to be used with a **Clearance** test and will ignore any items found clashing where the clearance is greater than the insulation thickness.

If you have a pipe requiring a specific thickness of insulation, then you may want to carry out a clearance test on that pipe, setting the clearance tolerance to the required insulation thickness. This would identify any areas where there is not enough clearance around the pipe to install the insulation.

If you have various pipes, all requiring different thicknesses of insulation then rather than setting up a separate clearance test for each thickness, you can set up one test with the greatest necessary tolerance, i.e. assume all pipes require the maximum thickness of insulation. This rule can then be applied to ignore any clashes that are falsely identified, as their actual insulation

thickness is less than the maximum clearance used.

See the diagram below for an example of where this ignore rule would be applied:



Pipe 1 has insulation thickness t and C is the maximum clearance (thickest insulation) required anywhere in the current model. Any items (2) that come within the range of t to C will not be reported in the results.

- **Same Property Value.** This rule will ignore clashing items that share a specific property.
 - **Same Selection Set.** This rule will ignore clashing items that are in the same specified Selection Set.
 - **Specified Selection Sets.** This rule will ignore clashing items where each item is in a specified Selection Set
4. In the **Rule Description** box, click on each of the **underlined values** to define your custom rule. The customizable values available with the built in templates are:

- **Name.** Use the name of the category or property as it is displayed in the interface (recommended). You can also choose **Internal Name** which is that accessed via the API (for advanced use only).
 - '**<category>**'. Choose from the available list, which category the property you wish to define is in. Only the categories that are contained in the scene are available in the drop down.
 - '**<property>**'. Choose from the available list, which property you wish to define. Again, only the properties in the scene within the chosen category will be available.
 - **the Last Object.** Search for the defined property on the specified selection. The Last Object is the default, though you can also choose from **Any Parent, a Model, a Layer, or the Geometry.**
 - '**<set>**'. Choose from the available list, which Selection Set you require to define the rule. Only the pre-defined Selection and Search Sets are available in the drop down.
5. Click **OK** to add the new ignore rule, or **Cancel** to return to JetStream.

Editing clash rules

1. Choose the ignore rule you wish to edit.
2. Click the **Edit** button.
3. Rename the rule if you wish to change it from its current name.
4. Choose another **Rule Template** if you wish to change it from the current template.
5. In the **Rule Description** box, click on each of the **underlined values** to redefine your custom rule.
6. Click **OK** to save the changes you've made to the rule, or click **Cancel** to return to JetStream.

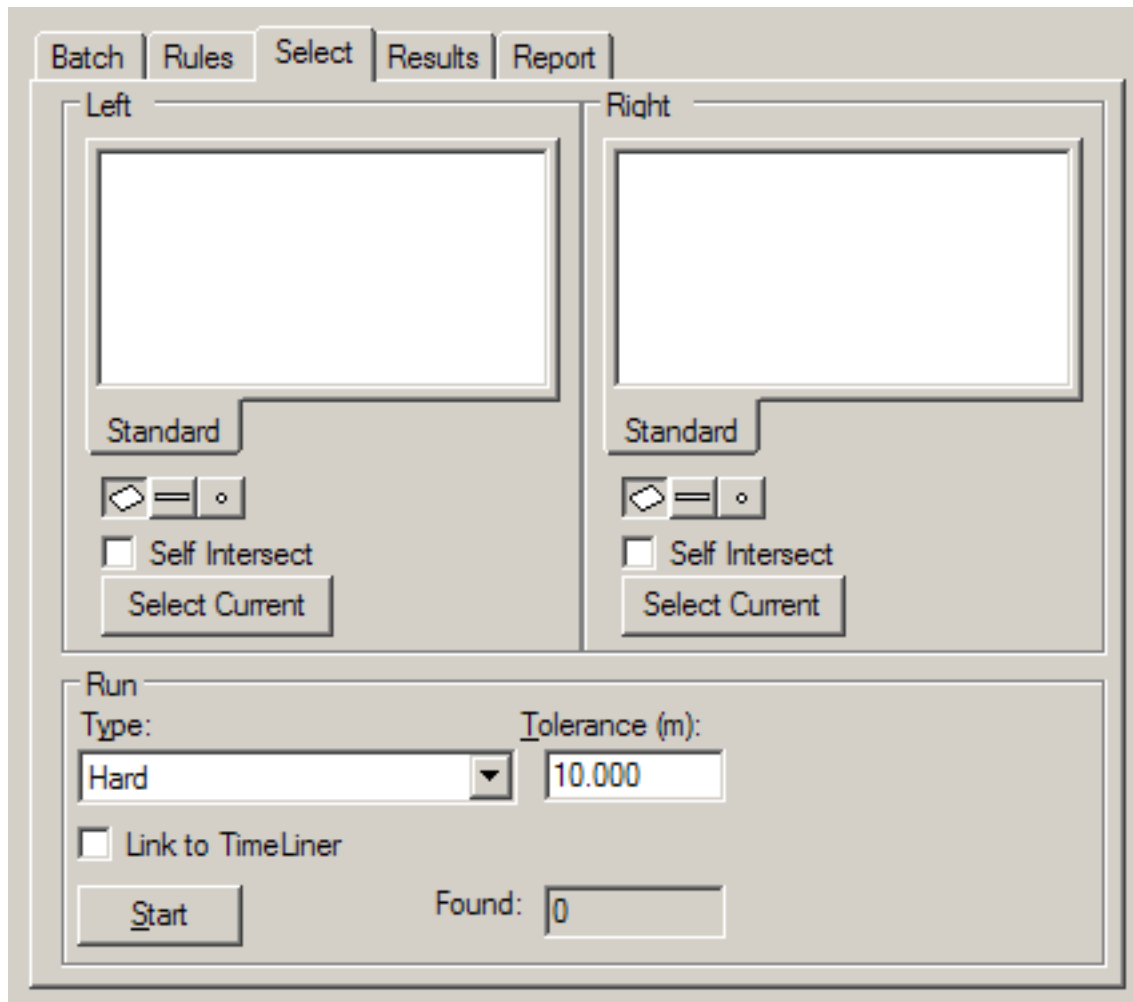
Deleting clash rules

1. Choose the ignore rule you wish to delete.
2. Click the **Delete** button to delete the clash rule.

Chapter 35. Selecting Items for Clash Testing

The **Select** tab of the Clash Detective control bar allows you to refine your clash test by only testing sets of items at a time, rather than the whole model against itself. This will produce faster and more sensible results. You choose two sets of items to test against each other using selection trees, which are exactly the same tabs as those in Roamer's selection tree control bar.

The **Select** tab is also where you set the test type and tolerance and where you run a single test from.



Selecting items for a clash test

1. There are two identical boxes in this tab called **Left** and **Right**. These boxes represent two sets of items that will be tested against each other during the clash test and you need to select items in each. You can select the items by choosing a tab from the selection tree and manually selecting items from the tree hierarchies. Any selection sets in the scene are also included on a tab, which is a

quick and useful method of setting up items across sessions (see the chapter called "Selecting Items" in the Roamer book for more details).

2. You can also transfer the current selection to one of the boxes by selecting items in the usual way in the main navigation window and/or selection tree and clicking the appropriate **Select Current** button.
3. Check the appropriate **Self Intersect** check box if you want that set to test for self-intersection, as well as intersection against the other set.
4. Clash tests can also include the clashing of points, lines and surfaces depending on which of the three buttons underneath each window are selected. These three buttons correspond to surfaces, lines and points, and each can be toggled on and off by clicking on them.

If it was required to do a clash test, for example, between some surface geometry and a point cloud, then it might be done by setting up the geometry in the left hand window, and the point cloud in the right. At that point the **Surface** button would be set under the left window, with the other two unset. The **Points** button would be set under the right-hand window with the other two unset, and the **Type** perhaps set to **Clearance** with a **Tolerance** of 1 meter.

Note

If the **Type** is set to **Hard**, lines and surfaces will actually need to intersect with any points to register a clash.

Setting the clash test type and tolerance options

There are four default clash test types for you to choose from:

- **Hard**. Choose this option if you wish the clash test to detect actual intersections between geometry.
- **Hard (Conservative)**. This option performs the same clash test as **Hard**, however it additionally applies a **conservative** intersection method. See Intersection Method for more information on this.

Note

This clash test type is only available when in **Developer** profile. See the **Interface, Profiles** section of the Roamer book for more information on user profiles.

- **Clearance**. Choose this option if you wish the clash test to detect for geometry within a set distance from other geometry (see Clash Tolerance for information on how to set this distance). You might use this type of clash when pipes need to have space for insulation around them, for example.

Note

Clearance clashes are not the same as "soft" clashes. Clearance clashes detect for static geometry coming within a distance of other geometry, whereas soft clashes detect potential clashes between moving components. JetStream Clash Detective does not currently support soft clash checking.

- **Duplicates**. Choose this option if you wish the clash test to detect for duplicate geometry. You might use this type of clash test to check a model against itself to ensure the same part has not been drawn,

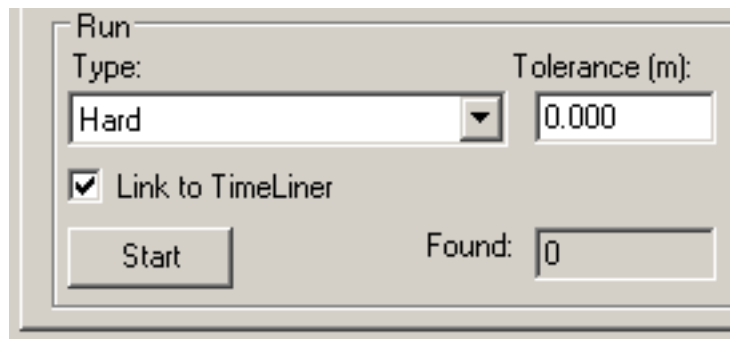
or referenced twice, for example.

To select the clash test options:

1. From the **Run, Type** drop down, choose the clash test type you wish to run. Any custom clash tests that have been defined (see Creating custom clash tests) appear at the end of the list.
2. Enter the **Tolerance** required, which will be in scene units. See Clash Tolerance for more information on this.

Time-based Clashing

If a JetStream TimeLiner license is available, the **Link To TimeLiner** check box will be available for selection.



Linking to TimeLiner integrates the features of Clash Detective and TimeLiner, allowing the automation of interference checking throughout the lifecycle of a TimeLiner project.

1. On clicking the **Start** button, if the **Link To TimeLiner** check box is checked, Clash Detective will combine with TimeLiner to produce a clash report based on the Clash Detective settings, TimeLiner simulation settings, and the project data contained in TimeLiner.
2. As the TimeLiner project simulation progresses forward in time, Clash Detective will check **at each interval in the project** to see if there are any clashes present. Once the simulation is complete, any clashes found in this manner will be shown in the Results tab alongside TimeLiner project information. See the following chapter on **Results** for more information.

Note

If the TimeLiner project is large in size, running this type of clash test will invariably take more time to complete than a normal clash run.

Running the clash test

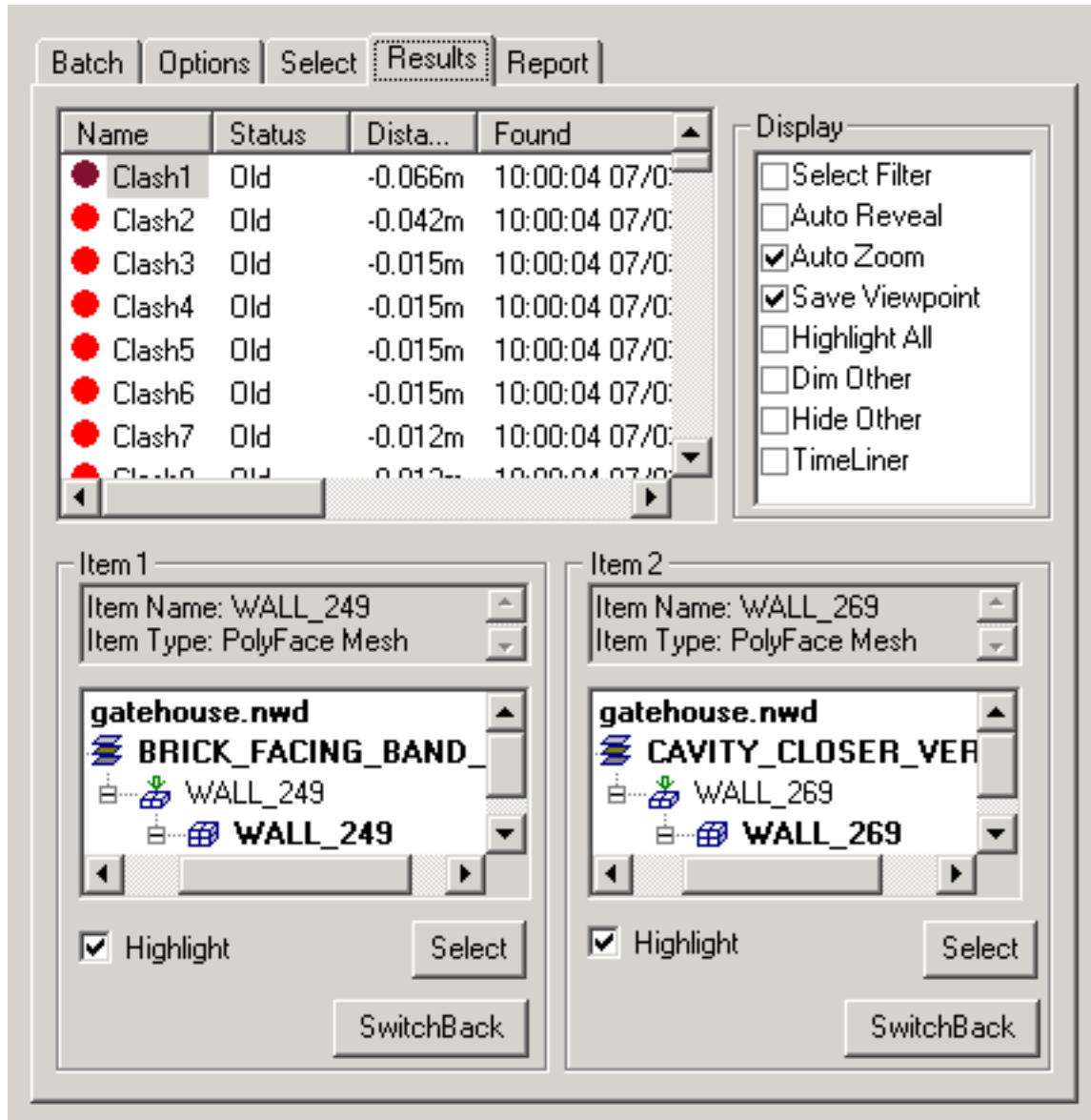
- Once the left and right sets are selected and the clash type and tolerance defined, click on **Start** to start the test running. The **Found** box shows how many clashes have been found so far during this test.

Note

The progress bar shows how far through the test Clash Detective has got. If you wish to stop the test at any time, press the **Cancel** button and all clashes found up until the interrupt will be reported and the test will be saved with a **Partial** status.

Chapter 36. Clash Results

The **Results** tab of the Clash Detective control bar enables you to interactively view the clashes found. On the left is a list of clashes, numbered and sorted by severity. The list also shows the status, the distance, the clash point, date found and, if the clash has been approved, who approved it and when it was approved.



Reviewing clash results

1. Click on a clash to highlight both clashing items in the main navigation window. The "Item 1" and "Item 2" boxes show the **Smart Tag** properties relating to each item in the clash and also the path through the standard selection tree from the root to the geometry of the item.

Note

Selecting an item in one of these tree lists and then clicking on the **SwitchBack** button beneath allows the current view and currently selected object to be sent back to the originating CAD package. This makes it very simple to show clashes in JetStream, take them back to the CAD package, alter the design, and reload them in JetStream for a very fast design review turnaround.

For more information on the use of **SwitchBack** and how to set it up, see the section on **SwitchBack** in the **Roamer** documentation.

If the **Link to TimeLiner** check box was checked, the TimeLiner start time/date of any clashes are recorded next to the appropriate Clash under the **Start**, **End** and **Task** columns in the Clash Detective Results tab. If multiple clashes are found on a particular date, each individual clash is listed with identical TimeLiner information.

Clicking on a clash in the Clash Detective Results tab highlights the clash in the main 3D view (with object visibility based on TimeLiner activities), and highlights the appropriate point in the TimeLiner project if available and visible on screen. TimeLiner visibility and colour settings in the 3D view will be overlaid by the appropriate Clash Detective highlight colours.

2. To rename a clash, click on the clashes name, press **F2** or right click on the clash and choose **Rename**. This name will be saved and remembered for future tests.
3. To manually change the **Status** of clashes, select the new clashes requiring the change, and select a new status from the drop down list. Multiple clashes can be changed by either holding down the **Ctrl** key whilst selecting individual clashes (the last selected being shown in the main view), or by holding down the **Shift** key and selecting another clash, thereby selecting all clashes between the two including the first and last (again, the last selected being shown in the main view). Once the required clashes have been selected, changing the Status of the currently selected clash updates all those highlighted to the same status.
4. To enter notes about the clash for others to review, right click on the clash and choose **Add Comment** from the context menu. The **Add Comment** dialog will appear to allow you to enter your comment.
5. Select the display options you wish to apply:
 - Check **Select Filter** if you want to select an item in the main navigation window and show only those clashes that involve that selected item.
 - Check **Auto Reveal** if you want JetStream to attempt to temporarily hide anything obstructing the clashing items so that you can see the clash when zooming in on it, without having to move location.
 - Check **Auto Zoom** if you want to automatically zoom in on the selected clash. Unchecking this box allows you to keep the main viewpoint static while flicking through the clashes one by one.
 - Check **Save Viewpoint** if you want to store the current viewpoint with the result. This allows you to tailor the viewpoint for a clash result. It also enables redlining to be stored with a clash result.

Note

Once redlining has been added, subsequent changes to the viewpoint due to navigation will not be saved. In order to save a different viewpoint, the redlining must first be removed using the redline **Erase** tool.

- Check **Highlight All** if you want to highlight all the clashes found in the main navigation window, in the color of their status.
 - Check **Dim Other** if you want to turn all items not involved in a clash to gray.
 - Check **Hide Other** if you want to hide all items not involved in a clash in order to focus better on the clashing items.
 - Check **TimeLiner** if you want to see the state of the TimeLiner sequence at the time of the clash (for use with **Time-based Clashing** - see the TimeLiner documentation for more information).
6. Check the **Highlight** check box to override the color of the item in the main navigation window with the color of the status of the selected clash.
 7. Click **Select** to select a clashing item in the main navigation window. If a selection color is set (by default blue), this overrides the **Highlight** option, which allows you to highlight the item, in the color of its status.
 8. Click on any of the column headings to sort the table using that column's data. This sorting can be alphabetical, numerical, date-related, or, in the case of the **Results->Status** column, in workflow order **New>Active>Approved>Resolved**. Clicking the column heading repeatedly toggles the sorting between ascending and descending.

Chapter 37. Clash Reports

The **Report** tab of the Clash Detective control bar is used to write reports containing details of all the clash results found in the current test. You can write a text file, an html or xml file containing jpegs of the viewpoints of the clashes or simply save the clash results as a list of viewpoints for review by a JetStream user without the Clash Detective plugin.



Reporting clash results

1. In the **Contents** box select all the information you want to appear in the report for each clash result. This can include **Smart Tag** properties relating to the items involved in the clash, how to find them in the standard selection tree from root to geometry, whether images or TimeLiner task information should be included, clash status and so on.
2. Check those clashes in the **Include Clashes** box to select which clashes you want to include in the report based on status.

3. Select the type of report from the **Report Type** drop down list:
 - **Current Test** creates a single file for the current test.
 - **All Tests (combined)** will create a single file containing all results from all tests
 - **All Tests (separate)** will create a separate file for each test containing all results.

4. Select the format of the report from the **Report Format** drop down list:
 - **XML** will create an .xml file containing all the clashes and a jpeg of their viewpoints alongside their details. On choosing this option, you will need to select or create a folder for the files and enter a name for the xml file.
 - **HTML** will create an .html file containing all the clashes and a jpeg of their viewpoints alongside their details. On choosing this option, you will need to select or create a folder for the files and enter a name for the html file.

Note

To customize the appearance or layout of the html file, you will need to edit the `clash_report_html_lang.xml` file, where `lang` is a code representing your language. The installed file is located in the `stylesheets` subdirectory of the JetStream install directory. You can copy the edited file to the `stylesheets` subdirectory of any of the JetStream search directories. See the section called "Search Directories" in the chapter called "Interface" in the Roamer book for more information.

- **Text** will create a .txt file containing all the clash details and the location of a jpeg of each clash. On choosing this option, you will need to select or create a folder for the files and enter a name for the txt file.
 - **As viewpoints** will create a folder in the saved **Viewpoints** control bar, called the name of the test. Each clash is saved as a viewpoint in this folder, with a comment attached containing the clash result details.
5. Click the **Write Report** button to write the report.

Part VI. JetStream TimeLiner

User Manual

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Chapter 38. Overview of TimeLiner

The TimeLiner plugin adds 4D schedule simulation to JetStream. TimeLiner imports schedules from a variety of sources; allows you to connect objects in the model with tasks in the schedule; simulate the schedule showing the effects on the model, including planned against actual schedules; and export images and animations based on the results of the simulation. TimeLiner will automatically update the simulation if the model or schedule changes.

TimeLiner has a Playback-only option when a full TimeLiner license is not available, allowing any externally created project data to be simulated, but no changes to be made to that data.

If both a TimeLiner and a Clash Detective license are available together, it is possible to combine the functionalities of both plugins to provide time-based clash checks on the project. See **Selecting Items for Clash Testing** in the Clash Detective documentation for further details on **Time-based Clashing**.

The TimeLiner interface is arranged as a tabbed dialog. You will perform different activities using each tab. The typical activities are outlined below:

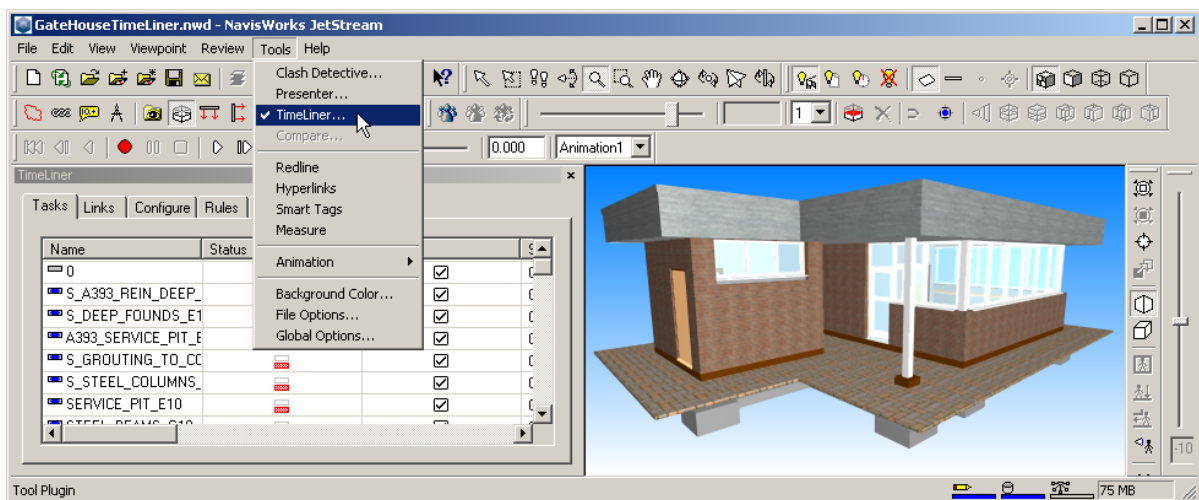
Getting Started

1. Load a model into JetStream in the usual way (see the section called "Opening Files" in the chapter called "File Management" of the JetStream Roamer book for more information on opening files) and then choose **TimeLiner** from the **Tools** menu.

Note

If a full TimeLiner license is not available, simulation playback will be available using **TimeLiner Playback** from the **Tools** menu. **TimeLiner Playback** will only give access to the Simulation tab and related controls.

The TimeLiner dialog is displayed:

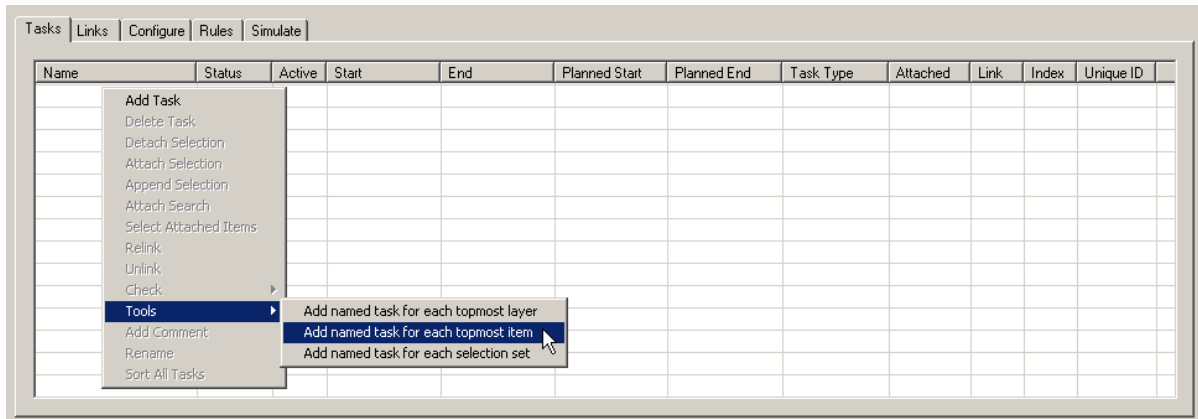


Note

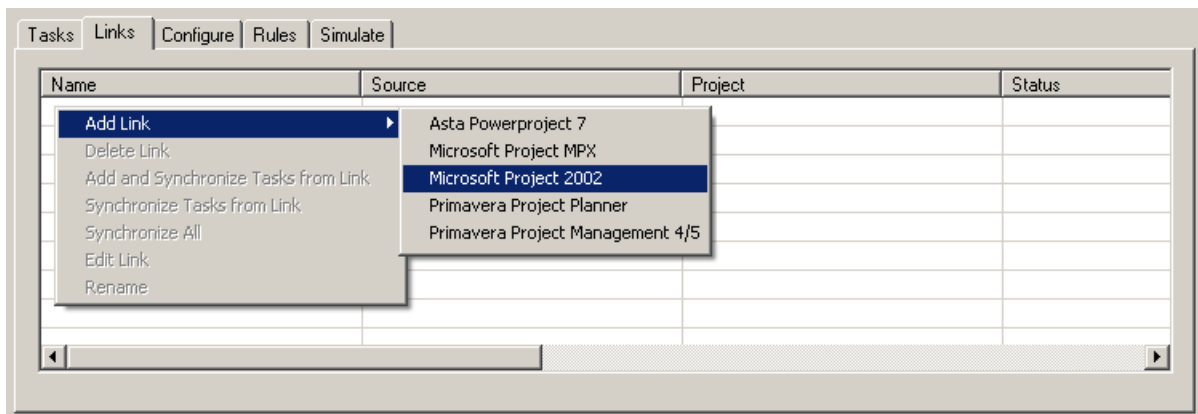
The TimeLiner dialog can be docked within the JetStream interface. To stop the dialog from

docking, hold down the Ctrl key.

2. Create some tasks, each having a name, start and end date and a task type. You can enter tasks by hand on the Tasks Tab. Alternatively, the **Tools** context menu on the Tasks Tab will create an initial set of tasks based on layer, item, or selection set names. TimeLiner defines some default task types for you (Construct, Demolish and Temporary), or you can define your own using the Configure Tab.



You can use the Links Tab to import tasks from an external source, such as Microsoft Project™. You can choose a field from the external schedule to define the types of the imported tasks, or you can set task types by hand. Linked fields cannot be edited directly in TimeLiner. You can, of course, update the schedule externally and **synchronize** the tasks in TimeLiner with those from the external source.



3. Connect objects in the model to tasks. You do this by hand on the Tasks Tab, using the context menu to attach selections, searches or selection sets.

The screenshot shows the 'Tasks' tab in the TimeLiner software. A context menu is open over the first task, 'S_A393'. The menu options are: Add Task, Delete Task, Detach Selection, Attach Selection (highlighted), Append Selection, Attach Search, Attach Selection Set, Select Attached Items, Relink, Unlink, Check, Tools, Add Comment, Rename, and Sort All Tasks.

Name	Status	Active	Start	End	Planned Start	Planned End	Task Type	Attached	Link	Index	Unique ID
S_A393			08:00:00 05/08/2003	17:00:00 05/08/2003	08:00:00	17:00:00	Construct	Attached Selection		2	35
S_DEEF			08:00:00 04/08/2003	17:00:00 12/08/2003			Construct	Attached Selection		3	178
A393_SI			08:00:00 06/08/2003	17:00:00 06/08/2003			Construct	Attached Selection		4	179
S_GROU			08:00:00 13/08/2003	17:00:00 13/08/2003			Construct	Attached Selection		5	180
S_STEE			08:00:00 14/08/2003	17:00:00 14/08/2003			Construct	Attached Selection		6	52
SERVIC			08:00:00 05/08/2003	17:00:00 12/08/2003			Construct	Attached Selection		7	197
STEEL_			08:00:00 26/08/2003	17:00:00 27/08/2003			Construct	Attached Selection		19	34
PURLIN			08:00:00 28/08/2003	17:00:00 28/08/2003			Construct	Attached Selection		20	24
S_BRICI			08:00:00 03/09/2003	12:00:00 03/09/2003			Construct	Attached Selection		22	41
S_BRICI			08:00:00 15/08/2003	17:00:00 18/08/2003			Construct	Attached Selection		8	39
S_BRICI			08:00:00 19/08/2003	17:00:00 19/08/2003			Construct	Attached Selection		9	38
S_SANC			08:00:00 19/08/2003	17:00:00 19/08/2003			Construct	Attached Selection		10	49
S_SERV			08:00:00 20/08/2003	17:00:00 20/08/2003			Construct	Attached Selection		11	195
S_DPM			08:00:00 21/08/2003	12:00:00 21/08/2003			Construct	Attached Selection		12	45

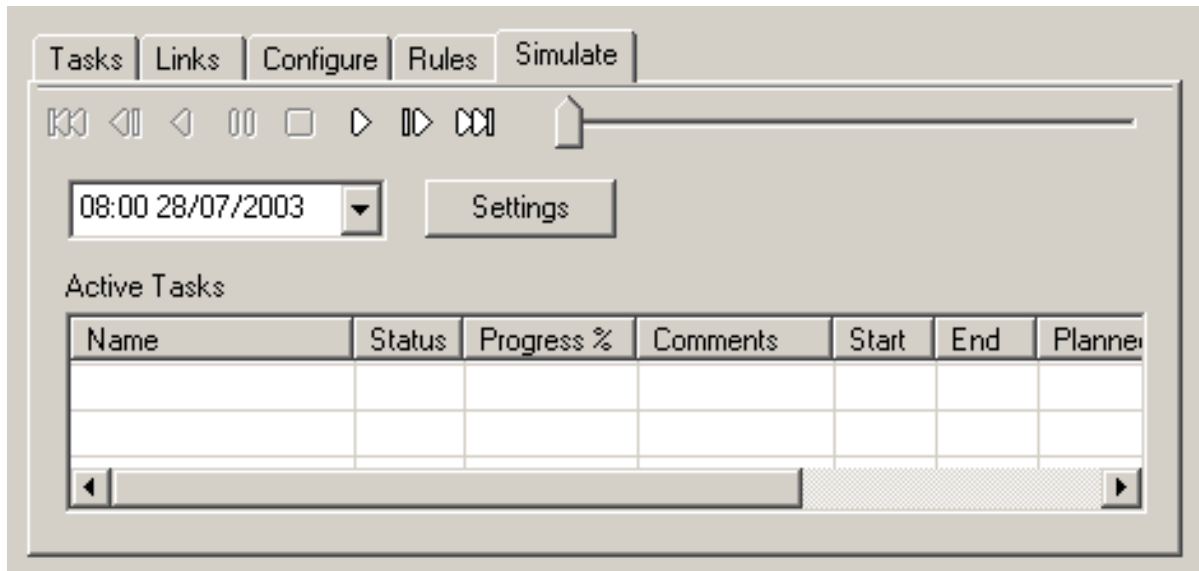
If you used the **Tools** menu on the Tasks Tab to create an initial set of tasks based on layer, item or selection set names, then the corresponding layers, items or selection sets will already be attached for you. Alternatively, you can use the Rules Tab to automatically attach objects.

The screenshot shows the 'Rules' tab in the TimeLiner software. It contains a list of checkboxes for configuring task attachment rules:

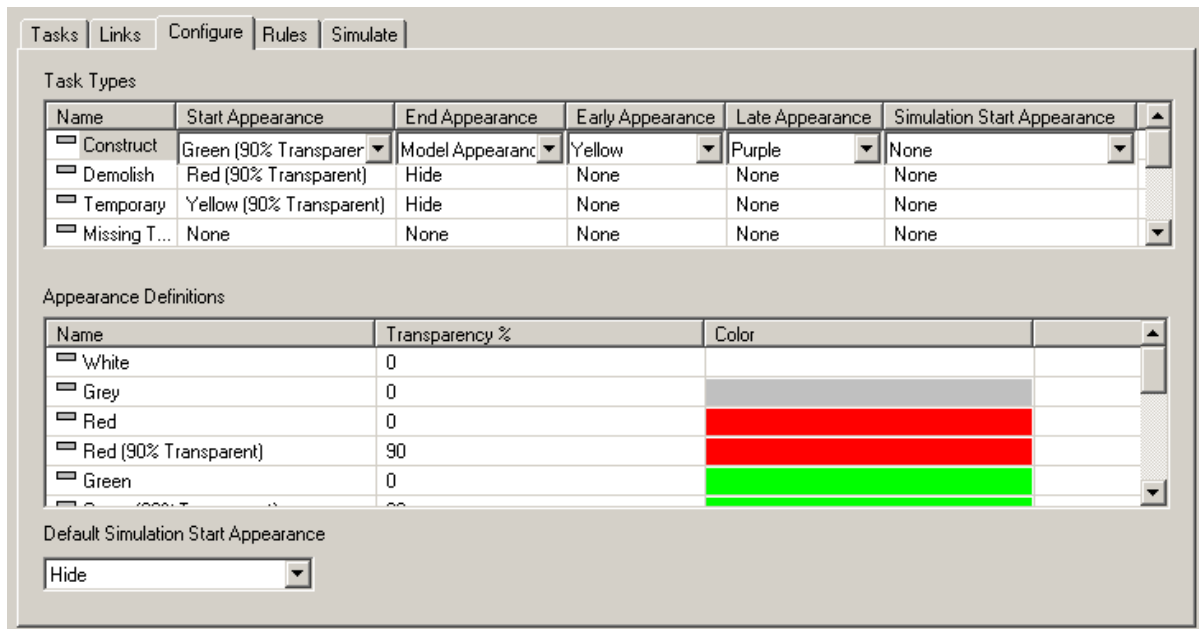
- Items By Task Name
- Selection Sets By Task Name
- Layers By Task Name
- Attach Items to Task by Category/Property

On the right side, there is a checkbox for Override current selections. Below these options are four buttons: New, Edit, Delete, and Apply.

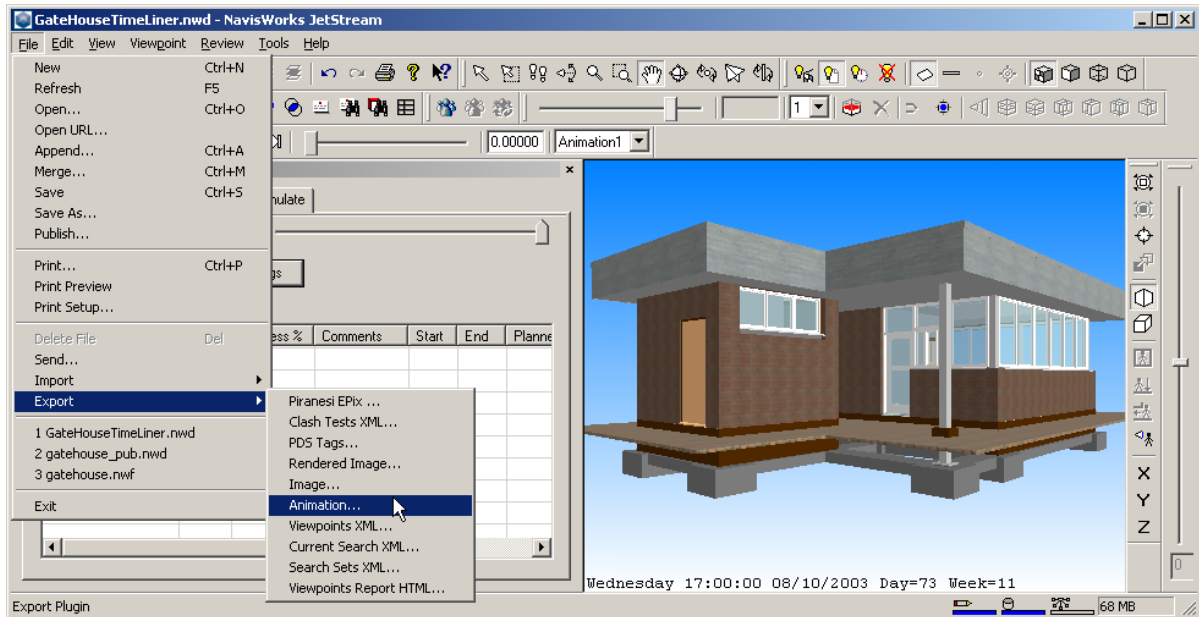
4. Simulate your schedule. Use the Simulate Tab to visualise your model at any date in your schedule with the currently active tasks highlighted. Run through the entire schedule using familiar animation controls. You can set the simulation to interact with an existing saved animation (created in JetStream Roamer) to provide a highly dynamic simulation.



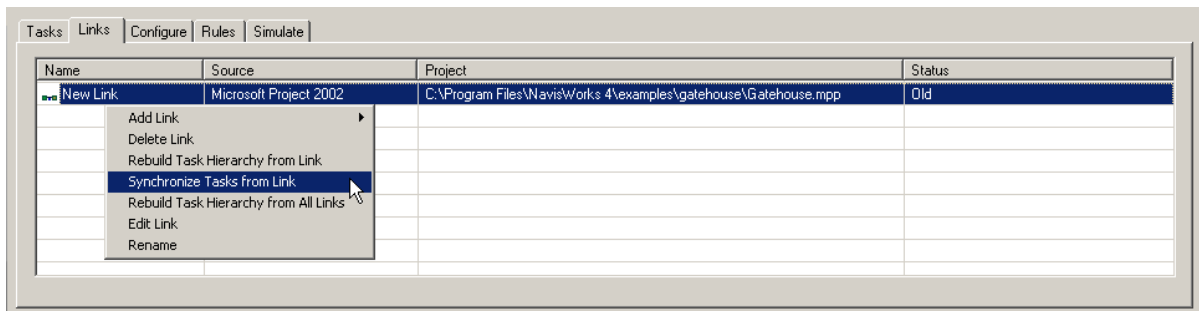
5. Configure the behaviour of the simulation. Use the Configure Tab to create new task types and edit old ones. The task type defines what happens at the start and end of each task of that type. You can hide attached objects, change their appearance or reset them to the appearance specified in the model.



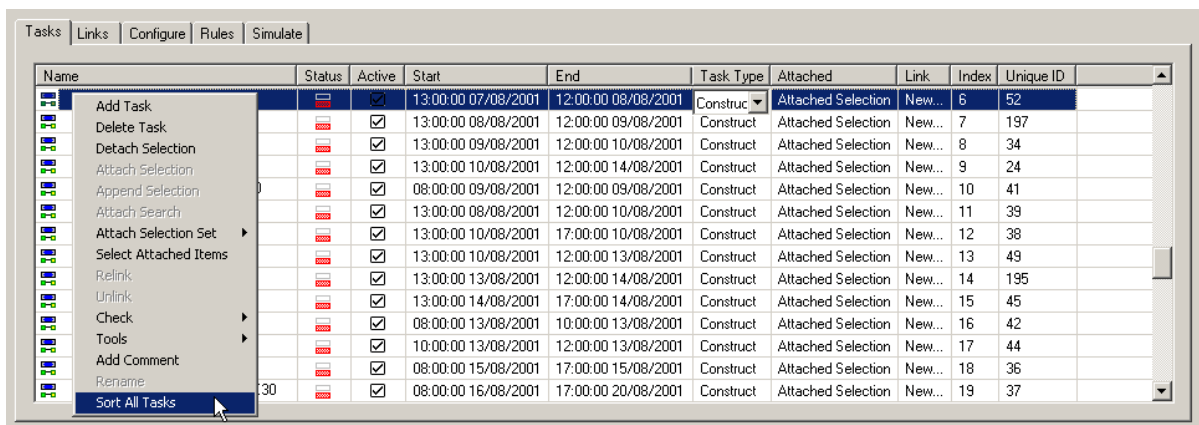
6. Create image and AVI files. Export the current simulation view as an image, or the entire simulation as an AVI.



- Keep up to date with changes in your project. Save your project as a JetStream .nwf file. Open the .nwf and use **Synchronize Tasks from Link** from the Links Tab. JetStream will update the project based on any changes to the model and external schedule. Use **Rebuild Task Hierarchy from all Links** to add any newly created tasks from your external schedules.



Sort All Tasks from the context menu on the Tasks Tab will keep all your tasks in numerical/alphabetical order.



Chapter 39. Tasks

The Tasks tab allows you to add, view and edit all of the scheduled tasks, either manually created, or linked to your scheduling software (e.g. Microsoft Project™). Selections in the model can then be attached to Tasks. Relinking a task to an external schedule will prompt you to select a link via the Select Link Dialog.

39.1. The Tasks Tab

The **Tasks** tab shows all of the tasks in your schedule, listed in a multi-column format.

Name	Status	Active	Start	End	Task Type	Attached	Link	Index	Unique ID
S_DEEP_FOUNDS_E10		<input checked="" type="checkbox"/>	08:00:00 06/08/2001	17:00:00 06/08/2001	Construct	Attached Selection	New Link	3	178
A393_SERVICE_PIT_E30		<input checked="" type="checkbox"/>	08:00:00 02/08/2001	17:00:00 03/08/2001	Construct	Attached Selection	New Link	4	179
S_GROUTING_TO_COLUMNS_G10		<input checked="" type="checkbox"/>	08:00:00 07/08/2001	12:00:00 07/08/2001	Construct	Attached Selection	New Link	5	180
S_STEEL_COLUMNS_G10		<input checked="" type="checkbox"/>	13:00:00 07/08/2001	12:00:00 08/08/2001	Construct	Attached Selection	New Link	6	52
SERVICE_PIT_E10		<input checked="" type="checkbox"/>	13:00:00 08/08/2001	12:00:00 09/08/2001	Construct	Attached Selection	New Link	7	197
STEEL_BEAMS_G10		<input checked="" type="checkbox"/>	13:00:00 09/08/2001	12:00:00 10/08/2001	Construct	Attached Selection	New Link	8	34
PURLINS_G10		<input checked="" type="checkbox"/>	13:00:00 10/08/2001	12:00:00 14/08/2001	Construct	Attached Selection	New Link	9	24
S_BRICK_TO_COLUMN_F10		<input checked="" type="checkbox"/>	08:00:00 09/08/2001	12:00:00 09/08/2001	Construct	Attached Selection	New Link	10	41
S_BRICK_ENG-DPC_F10		<input checked="" type="checkbox"/>	13:00:00 08/08/2001	12:00:00 10/08/2001	Construct	Attached Selection	New Link	11	39
S_BRICK_DPC_F10		<input checked="" type="checkbox"/>	13:00:00 10/08/2001	17:00:00 10/08/2001	Construct	Attached Selection	New Link	12	38
S_SAND_BLINDING_Q20		<input checked="" type="checkbox"/>	13:00:00 10/08/2001	12:00:00 13/08/2001	Construct	Attached Selection	New Link	13	49
S_SERVICE_PIT_E10		<input checked="" type="checkbox"/>	13:00:00 13/08/2001	12:00:00 14/08/2001	Construct	Attached Selection	New Link	14	195
S_DPM_I40		<input checked="" type="checkbox"/>	13:00:00 14/08/2001	17:00:00 14/08/2001	Construct	Attached Selection	New Link	15	45
S_CAVITY_INS-DPC_F30		<input checked="" type="checkbox"/>	08:00:00 13/08/2001	10:00:00 13/08/2001	Construct	Attached Selection	New Link	16	42

The columns show, task name; start date; end date; planned start date; planned end date; task type; whether any objects from the model are attached to the task; whether the task is linked to an external schedule; index of task in external schedule; and unique ID of task in external schedule.

An icon is displayed to the left of each task. These identify the current status of the task, with relation to attached items and links to external schedules:

	Task with no attached items
	Task with attached items
	Task with link synchronized to external schedule
	Task with link synchronized to external schedule, including Task Type
	Task with link to external schedule that is either broken or old (unsynchronized)

A context menu, accessed by right clicking in the **Tasks** tab, allows you to perform a number of functions to create, edit and check the tasks in your schedule:

Tasks

Name	Status	Active	Start	End	Planned Start	Planned End	Task Type	Attached	Link	Index	Unique ID
S_A393			08:00:00 05/08/2003	17:00:00 05/08/2003	08:00:00	17:00:00	Construct	Attached Selection		2	35
S_DEEF			08:00:00 04/08/2003	17:00:00 12/08/2003			Construct	Attached Selection		3	178
A393_SI			08:00:00 06/08/2003	17:00:00 06/08/2003			Construct	Attached Selection		4	179
S_GROU			08:00:00 13/08/2003	17:00:00 13/08/2003			Construct	Attached Selection		5	180
S_STEE			08:00:00 14/08/2003	17:00:00 14/08/2003			Construct	Attached Selection		6	52
SERVIC			08:00:00 05/08/2003	17:00:00 12/08/2003			Construct	Attached Selection		7	197
STEEL_			08:00:00 26/08/2003	17:00:00 27/08/2003			Construct	Attached Selection		19	34
PURLIN			08:00:00 28/08/2003	17:00:00 28/08/2003			Construct	Attached Selection		20	24
S_BRIC1			08:00:00 03/09/2003	12:00:00 03/09/2003			Construct	Attached Selection		22	41
S_BRIC1			08:00:00 15/08/2003	17:00:00 18/08/2003			Construct	Attached Selection		8	39
S_BRIC1			08:00:00 19/08/2003	17:00:00 19/08/2003			Construct	Attached Selection		9	38
S_SANC			08:00:00 19/08/2003	17:00:00 19/08/2003			Construct	Attached Selection		10	49
S_SERV			08:00:00 20/08/2003	17:00:00 20/08/2003			Construct	Attached Selection		11	195
S_DPM			08:00:00 21/08/2003	12:00:00 21/08/2003			Construct	Attached Selection		12	45

- **Add Task.** Choose this to add a new task to the schedule. "New Task" will be created and by default assigned the present date which you can change by clicking on the drop down icon to the right of the **Start** and **End** dates, then choosing the date you require from the calendar that is displayed:

Note

The dates under the **Start** and **End** columns are **Actual** start and end dates. For **Planned** start and end dates, see assigning planned start and end dates.



Use the left and right **arrow** buttons at the top of the calendar to move backwards and forwards a month, respectively, then click on the day you require.

Should you wish to change the start or end time, select the task, then click once on the time to highlight the hour, minute or second field. Once highlighted, you can then edit its value. Use the left and right arrow keys to move to the next time unit field. The date can also be edited in this way.













Should you also wish to add **Planned** start and end dates, simply click on the drop down icon to the right of the **Planned Start** and **Planned End** dates, then choose the date you require from the calendar.

Note

If you have both **Actual** and **Planned** dates entered, but would like to disable one or the other, then this can be done by unchecking the check box to the left of the date.

From the **Task Type** drop down, select the type of task you wish this task to be. There are three pre-defined task types, **Construct**, **Demolish** and **Temporary**. The task type defines how the items attached to the task will be displayed during simulation; for example, a default construction sequence would start with all items hidden, as the task starts the attached items will be displayed in transparent green, then as the task ends the attached items will be displayed as they are in the normal model display (this may be with materials applied if previously set up in JetStream Presenter). Task Types themselves can be defined and new types created in the **Configure** tab.

Each task has it's own **Status** identified by an icon, representing planned against actual relationships:

	Actual start and end dates equal Planned start and end dates
	Actual end date before Planned start date
	Actual start date after Planned end date
	Actual start date before Planned start date and Actual end date after Planned end date
	Actual start date before Planned start date and Actual end date equals Planned end date
	Actual start date equals Planned start date and Actual end date after Planned end date
	Actual start date equals Planned start date and Actual end date before Planned end date
	Actual start date after Planned start date and Actual end date equals Planned end date
	Actual start date before Planned start date and Actual end date before Planned end date
	Actual start date after Planned start date and Actual end date after Planned end date
	Actual start and end dates only
	Planned start and end dates only

Note

The relevant **Status** icon will be automatically displayed based on the tasks actual and planned start and end dates.

The check box in the **Active** column enables you to turn a task on/off. If a task is turned off, then it will not appear in the **simulation**. For hierarchical tasks, turning off the parent task will automatically turn off all child tasks.

JetStream TimeLiner supports a hierarchical task structure, as brought through from a link to your scheduling software, e.g. Microsoft Project™ (see **The Links Tab** for more information). The hierarchy can be expanded or contracted by clicking on the plus or minus sign, respectively, to the left of the task.

Note

It is possible to move between entries in a manually editable task using the keyboard. Simply select a task that has been set to be manually editable, and use **Tab** and **Shift-Tab** to move forwards and backwards between fields. The keyboard can then be used to edit and set each entry where necessary.

- **Delete Task.** Choose this to delete the selected task(s).
- **Detach Selection.** Choose this to detach the currently selected items in the scene, from the selected task(s). See the chapter called "Selecting Items" in the JetStream Roamer book for more information on making a selection in the scene.
- **Attach Selection.** Choose this to attach the currently selected items in the scene, to the selected task(s). See the chapter called "Selecting Items" in the JetStream Roamer book for more information on making a selection in the scene.
- **Append Selection.** Choose this to append the currently selected items in the scene, to the items already attached to the selected task(s). See the chapter called "Selecting Items" in the JetStream Roamer book for more information on making a selection in the scene.
- **Attach Search.** Choose this to attach all items selected by the current **Search**, to the selected task(s). See the section called "Finding Items" in the chapter called "Finding" in the JetStream Roamer book for more information on searching.
- **Attach Named Search.** Choose this to attach all items selected by the named search currently selected in the selection tree. For example, anything on the Sets or Properties tabs.
- **Attach Selection Set.** This option is used to attach all items contained within a **Selection Set**, to the selected task(s). When you choose this option a list of all Selection and Search Sets saved in the current scene is displayed. Choose the Selection or Search Set you wish to attach to the task(s). See the section called "Selection and Search Sets" in the chapter called "Selecting Items" in the JetStream Roamer book for more information on Selection and Search Sets.
- **Display Attached Items.** Choose this to select in the scene and the selection tree, all items attached to the selected task(s). The items will be highlighted based on the selection options you have defined. See the section called "Selection Options" in the chapter called "Selecting Items" in the JetStream Roamer book for more information on selection options.
- **Relink.** Choose this to relink the selected task with your scheduling software. You will only be able to relink the parent task, i.e. the task with the same name as the link. You will be prompted to choose the link to attach the task to, as you may have more than one link set up. See **Select Link Dialog** for more information on linking tasks.

Note

Whilst a task is linked to an external schedule, Actual or Planned start and end dates cannot be edited. **Unlinking** a task from it's schedule will enable you to edit the dates, however it will obviously no longer be synchronized with the schedule. For editing of dates, it is recommended to do this in the scheduling software and then **Synchronize Tasks from Link**.

- **Unlink.** Choose this to unlink the selected task from an external schedule, enabling you to manually edit start and end dates. You will only be able to unlink the parent task, i.e. the task with the same name as the link.
- **Check.** This option enables you to check the validity of the schedule, by identifying items that have not been included in any task, are duplicated in multiple tasks or, are in overlapping tasks. Choosing **Check** will list the available checks, including:

- **Find uncontained items.** Choose this to select any items in the scene that are not attached to a task, or are not contained within any other item attached to a task.

Note

A **Contained** item is the child of another item. For example, if you select a Group, Block or Cell which is comprised of various pieces of geometry, then that geometry is **contained** within the Group, Block or Cell. A Group, Block or Cell may therefore be **attached** to a task and although the child geometry is not directly attached itself, it is **contained** within an item that is attached.

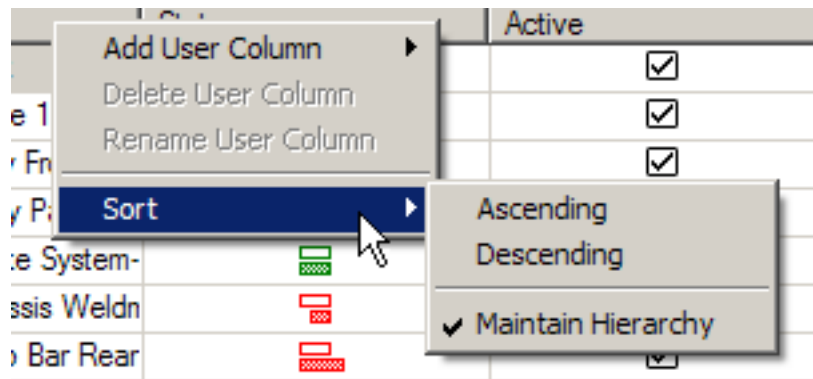
- **Find contained items.** Choose this to select any items in the scene that are either attached to a task or contained within any other items attached to a task.
 - **Find attached items.** Choose this to select any items in the scene that are directly attached to a task.
 - **Find items attached to multiple tasks.** Choose this to select any items in the scene that are directly attached to more than one task.
 - **Find items contained in multiple tasks.** Choose this to select any items in the scene that are either attached to, or contained within any other item that is attached to more than one task.
 - **Find items attached to overlapping tasks.** Choose this to select any items in the scene that are attached to more than one task, where the task durations overlap.
 - **Find items contained in overlapping tasks.** Choose this to select any items in the scene that are either attached to, or contained within any other item that is attached to more than one task, where the task durations overlap.
- **Tools.** This option enables you to quickly create your own schedule, based on model layers, topmost items, or selection sets:
 - **Add named task for each topmost Layer.** Choose this to create a new task for each topmost layer in the current scene. Each task will be named the same as the topmost layers and each layer will be attached to the corresponding task. Start and End dates will be automatically created, starting from the current date and incrementing by one day for each subsequent end and start date. Planned Start and End dates will also be automatically created and these will be the same as the 'Actual' dates. Finally, the task type will be set to Construct.
 - **Add named task for each topmost item.** Choose this to create a new task for each topmost item in the current scene, which may be a layer, a group, block or cell, or geometry, depending on how the model is constructed. Each task will be named the same as the topmost item and each item will be attached to the corresponding task. Start and End dates will be automatically created, starting from the current date and incrementing by one day for each subsequent end and start date. Planned Start and End dates will also be automatically created and these will be the same as the 'Actual' dates. Finally, the task type will be set to Construct.
 - **Add named task for each selection set.** Choose this to create a new task for each selection set in the current scene. Each task will be named the same as the selection set and each selection set will be attached to the corresponding task. Start and End dates will be automatically created, starting from the current date and incrementing by one day for each subsequent end and start date. Planned Start and End dates will also be automatically created and these will be the same as the 'Actual' dates. Finally, the task type will be set to Construct.

- **Add Comment.** Choose this to add a comment to the task. See the section called "Commenting" in the chapter called "Reviewing" in the JetStream Roamer book for more information on adding comments.
- **Rename.** Choose this to rename the task. When the text field becomes active, enter the new name then press Enter to save it.

TimeLiner tasks can be sorted on a per-column basis. This can be done in two ways.

Firstly columns can be sorted by left-clicking on the column headers. Clicking multiple times will alternate the sort between ascending and descending, treating a-z, 0-9, Monday-Friday etc. as ascending.

Tasks can also be sorted by right-clicking on the column heading and clicking **Sort**.



Columns can then be sorted by selecting **Ascending** or **Descending**.

Maintain Hierarchy, that is, keeping contained tasks inside their containers, is on by default, and shows in this menu with a tick next to it. When sorting with **Maintain Hierarchy** selected, tasks are sorted first by container, then by container contents.

If it is not required to maintain the hierarchy in the sort, then **Maintain Hierarchy** can be un-ticked. Sorting without the hierarchy maintained will treat the tasks and containers as un-connected items and sort everything together.

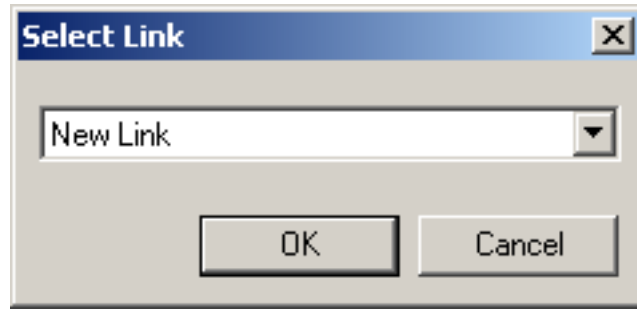
All columns can be sorted in this manner. If Sorting is selected on the Status column, activities will be sorted from early through to late start for ascending, and vice-versa for descending.

Note

You can use multi-selection (i.e. holding down Shift or Ctrl) to perform most commands on several tasks at once. For example, should you need to delete all tasks, **select** the first task, then hold down **Shift** and **select** the last task, then press **Delete**.

39.2. Select Link Dialog

You can Relink a task to an external schedule, by right-clicking on the Task and selecting Relink. When doing this, you will be prompted to select which Link to use, as your project may be linked to multiple schedules.

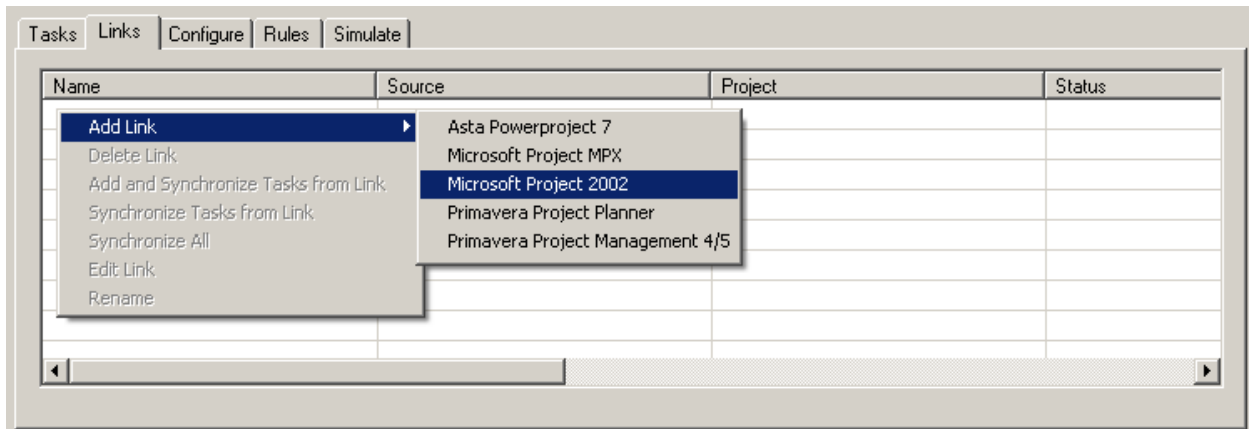


Chapter 40. Links

The Links tab allows you to add, view and edit all of the Standard Links to external schedules in your project. Task hierarchies can then be added to the Tasks tab and synchronized from the link. The Field Selector Dialog determines various options used when importing data from a link.

40.1. The Links Tab

The **Links** tab shows all of the links to external schedules in your project, listed in a multi-column format.

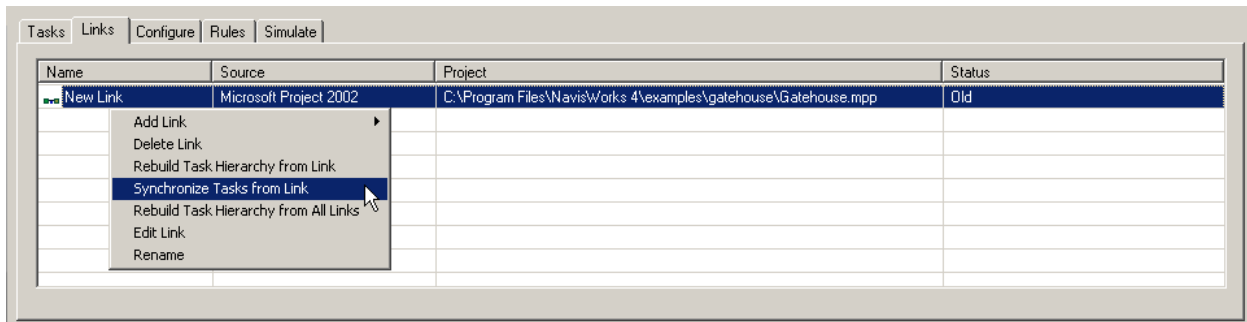


The columns show link name, source (e.g. Microsoft Project™), project (e.g. my_schedule.mpp, and link status. Any further columns (there maybe none) identify the fields from the external schedule which specify the task type, unique id, start date and end date for each linked task.

The possible values for Status are:

- Synchronized** All linked tasks have the same values as the external schedule.
- Old** Linked tasks have values that are out of date compared to the external schedule. **Synchronize Tasks from Link** to update the tasks.
- Status Not Available** Its not possible to determine whether tasks are Synchronized or Old. This value only occurs for schedule sources that don't provide any way of determining when a schedule was last updated.
- Broken** The external schedule can not be accessed. The file may have been moved or deleted, or required software may be missing or not functioning correctly. TimeLiner will still function using the task values determined when the link was last synchronized.

All Link operations are performed via the context menu (accessed by right clicking in the Links tab). This allows you to add, delete and edit links; rebuild the task hierarchy from the project file into TimeLiner; synchronize existing tasks in TimeLiner with updated data in the project file.



- **Add Link.** Choose this to create a new link to an external project file. Selecting this option will display a further menu, listing all project sources that may be connected to on the current machine (See Supported Scheduling Software for more information on which sources are available). Choose the source to which you wish to link to. A standard Open file dialog will be displayed. Browse to and **Open** the project file you wish to link to. The **Field Selector** dialog will then be displayed, from which you can identify additional data to be brought through from the project file.
- **Delete Link.** Choose this to delete the currently selected link.

Note

Deleting the link to an external project file will not delete any tasks that have previously been rebuilt in the TimeLiner Tasks tab.

- **Rebuild Taks Hierarchy from Link.** Choose this to read all of the tasks and associated data (as defined in the **Field Selector** dialog) from the selected project file and add these to the **Tasks** tab.
Choose this option also to synchronize with the selected project file when new tasks have been added to the project file. This will rebuild the task hierarchy in TimeLiner, containing all of the latest tasks and data.
- **Synchronize Tasks from Link.** Choose this to update all existing tasks in the **Tasks** tab, with the latest associated data from the selected project file (e.g. Start and End dates).
- **Rebuild Task Hierarchy from All Links.** Choose this to read all of the tasks and associated data (as defined in the **Field Selector** dialog) from all project files listed in the **Links** tab and add these to the **Tasks** tab.
Choose this option also to synchronize with all project files when new tasks have been added to the project files. This will rebuild the task hierarchy in TimeLiner, containing all of the latest tasks and data.
- **Edit Link.** Choose this option to edit the selected link. This will display the **Field Selector** dialog, from which you can define new fields or re-define existing ones.
- **Rename.** Choose this to rename the link to something more appropriate. When the text field becomes highlighted, enter the new name, then press **Enter** to save it.

Note

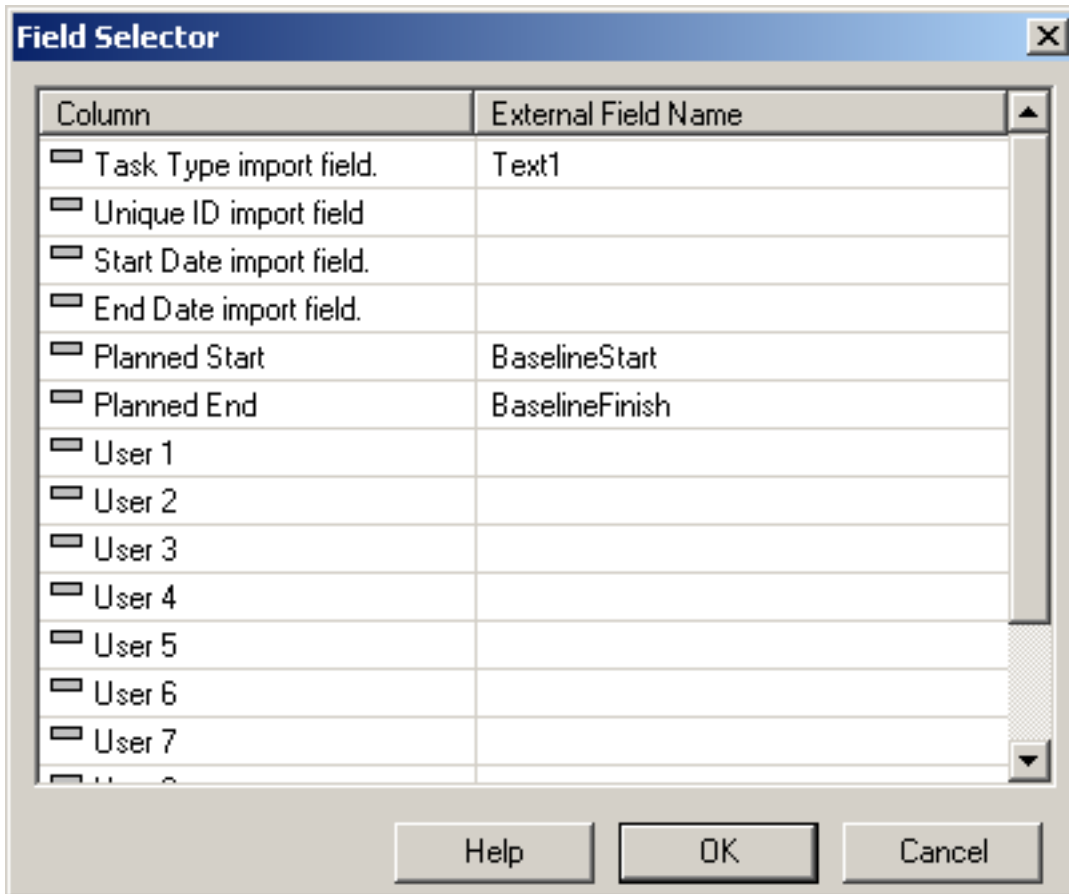
Tasks in the external schedule will be ignored if they do not include both start and end dates, with the start date being less than or equal to the end date.

JetStream TimeLiner supports multiple sources of external schedules using a COM interface. Anyone can

develop support for a new schedule source - the type library that defines the interface is included with TimeLiner.

40.2. Field Selector Dialog

The Field Selector dialog determines various options used when importing data from a Link. The options available may be different for each type of link source.



Options

Task Type import field	The field used to automatically assign Task Types to each imported Task.
Unique ID import field	The field used to uniquely identify each imported Task. This allows synchronization to work even if major changes are made to the external schedule in the scheduling software. The default behaviour is to use the most appropriate field for each source. Some sources do not have a well defined unique id, in which case you may need to choose a field manually.
Start Date import field	Some project sources support multiple start dates for different purposes. The default behaviour is to use the most appropriate available date for each source. This field may be used to define an Actual Start date, should it be different to that selected by default.
End Date import field	Some project sources support multiple end dates for different purposes. The

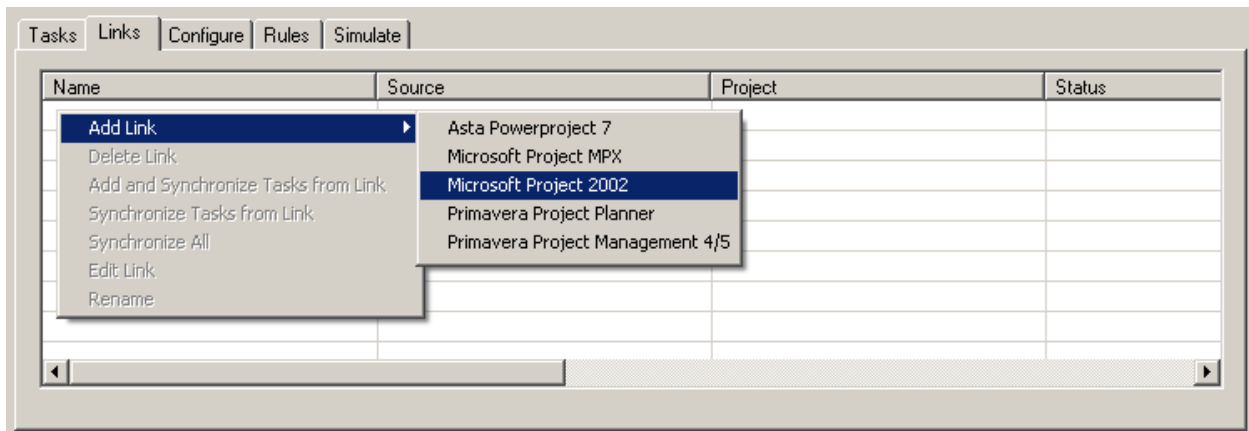
default behaviour is to use the most appropriate available date for each source. This field may be used to specifically define an **Actual End** date, should it be different to that selected by default.

- Planned Start The field used to identify a planned start date. This allows planned against actual comparisons to be made and simulated.
- Planned End The field used to identify a planned end date. This allows planned against actual comparisons to be made and simulated.
- User 1 to 10 Ten user fields available to link any custom data fields from the project source.

40.3. Standard Links

JetStream TimeLiner supports a variety of scheduling software. Note that some of these may only function if the relevant scheduling software is installed.

Supported Scheduling Software



- Microsoft Project 2000
- Microsoft Project 2002
- Microsoft Project MPX
- Primavera Project Planner
- Primavera Project Management 4 and 5
- Asta Power Project

40.3.1. Microsoft Project 2000

This Link requires Microsoft Project 2000™ to be installed.

40.3.2. Microsoft Project

This Link requires Microsoft Project 2002™ to be installed.

40.3.3. Microsoft Project MPX

TimeLiner can read Microsoft Project™ .mpx files directly, without needing a copy of Microsoft Project™ (or any other scheduling software) installed. Primavera SureTrak™, Primavera Project Planner™ and Asta Power Project™ can all export .mpx files.

Note

Primavera SureTrak™ exports its unique id in the text10 field of the .mpx file, rather than the unique id field. When linking to an .mpx file exported from SureTrak be sure to specify the text10 field as the unique id field in the Field Selector Dialog.

40.3.4. Primavera Project Planner

This Link requires Primavera Project Planner™ to be installed. The Link **status** will be displayed as "Status not available".

Note

TimeLiner will ask for a username and password to link to Primavera Project Planner. If these are unknown, there is a possibility that these can be retrieved from the P3 shortcut.

To locate this information, right-click on the shortcut used to run P3, and select **Properties**. The properties dialog will show the target command line which will look something like

```
"C:\Program Files\P3\P3.exe /U:Bob"
```

Here, the username is set as "Bob", and for the purposes of the TimeLiner dialog the password will be the same.

40.3.5. Primavera Project Management 4 and 5

This Link requires a number of elements to be installed alongside JetStream:

- **Primavera Project Manager 4 and 5 product**
- **ActiveX Data Objects 2.1**
- **Primavera Software Development Kit** (available on the Primavera CDs)

PPM 4 and 5 are database driven, and as such require the Software Development Kit to be installed in order to set up the ODBC data source link. This can be installed and setup from the Project Management CD by taking the following steps:

1. Insert Project Management CD, enter the Product Key and accept the License Agreement.
2. Make sure "Primavera Applications or Components" is selected and click "Next".
3. Select "Other Components" and click "Next".
4. Select "Software Development Kit" and click "Next".
5. Continue through clicking "Next" until the install starts.

6. Once installation is complete, click "OK" to start the Database Configuration Wizard.
7. Adjust settings in the Software Development Kit Setup dialog where appropriate, and click "OK".
8. Click "Yes" for a log file, followed by "Finish" to complete.

On connecting to PPM 4 and 5 within TimeLiner, a logon dialog allows the source link to be selected (a warning occurs if none are present). The username and password are not stored in the NavisWorks file, and will be prompted for each time.

Once connected, a dialog box allows the user to select which project to open. A checkbox determines if all sub-projects are opened.

By default, TimeLiner brings through Start, End, Planned Start, and Planned End as "Start", "Finish", "BL Start" and "BL Finish" respectively.

Other Primavera dates can be selected through the generic TimeLiner 'Field Selector' Dialog, including 'Project Activity Codes', 'Global Activity Codes', and 'User Defined Fields'.

The TimeLiner hierarchy supports the WBS structure for Project / Activity hierarchy.

Note

Due to the nature of the Primavera Project Manager 4 and 5 products using the SDK for data access, linking with TimeLiner can take a longer period of time than other formats.

40.3.6. Asta Power Project

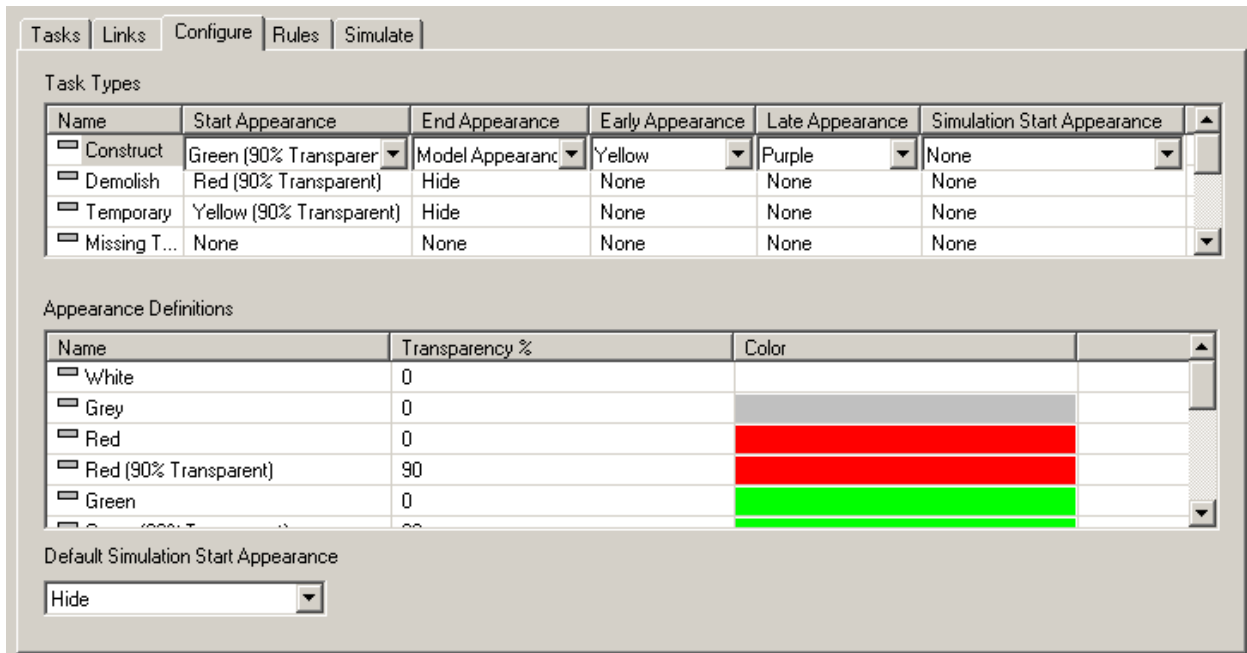
This Link requires Asta Power Project™ to be installed.

Chapter 41. Configure

The Configure Tab allows you to define task types, appearances and an overall start appearance for the simulation.

41.1. The Configure Tab

The configure tab allows you to define **Task Types**, **Appearance Definitions** and an **Overall Start Appearance** for the simulation.



Each Task has a Task Type associated with it, which specifies how the items attached to the task are treated (and displayed) at the start and end of the task during simulation. The available options are:

- **None.** Choose this if you wish for nothing to happen to the items attached to the task.
- **Hide.** Choose this if you wish the items attached to the task to be hidden.
- **Model Appearance.** Choose this if you wish the items attached to the task to be displayed as they are defined in the model. This may be the original CAD colors or, if you have applied color and transparency overrides in Roamer or materials in Presenter, then these will be displayed.
- **Appearance Definitions.** Choose from the list of **Appearance Definitions**, including ten predefined appearances and any custom appearances you have added. See Appearance Definitions for more information.

TimeLiner comes with three predefined **Task Types** to help get you started. These are: **Demolish** (highlight the object in red at the start of the task and hide at the end); **Temporary** (highlight the object in yellow at the start of the task and hide at the end); **Construct** (highlight object in green at the start of the task and reset to **Model Appearance** at the end). You are free to add your own task types or even delete the predefined ones, as you wish.

- **Construct.** For tasks where the attached items are to be constructed. The default appearance is for items to be highlighted in green (90% transparent) at the start of the task and displayed in the Model Appearance at the end of the task.
- **Demolish.** For tasks where the attached items are to be demolished. The default appearance is for items to be highlighted in red (90% transparent) at the start of the task and hidden at the end of the task.
- **Temporary.** For tasks where the attached items are only temporary. The default appearance is for items to be highlighted in yellow(90% transparent) at the start of the task and hidden at the end of the task.

Managing task types

New **Task Types** can be added and any may be deleted or renamed. These functions are available on the context menu (accessed by right clicking in the **Task Types** list).

1. Choose **Add** to create a new Task Type. This will be added to the bottom of the list and will be highlighted, enabling you to enter a new name for it.

Click on the drop down icons to the right of each **Appearance** field and choose a definition from the list.

Note

Early and **Late** appearances can be defined here for the purpose of displaying **Planned against Actual** simulations.

Simulation Start Appearance allows a unique start appearance to be set on a particular task type. Some tasks need to be visible at the start of a construction project to allow the simulation of the demolition of existing structures, prior to construction of new elements. Any tasks that don't have this set will default to the start appearance set in **Default Simulation Start Appearance**.

2. Choose **Delete** to delete the selected Task Type.
3. Choose **Rename** to rename the selected Task Type. Once the Task Type is highlighted, enter the new name, then press **Enter** to save it.

Defining appearance definitions

TimeLiner comes with a set of ten predefined **Appearance Definitions** that you can use when defining task types. Appearances define a level of transparency and a color. You can add your own Appearance Definitions, delete and rename them. These functions are available on the context menu (accessed by right clicking in the **Appearance Definitions** list):

1. Choose **Add** to add a new Appearance Definition. This will be added to the bottom of the list and will be highlighted, enabling you to enter a new name for it.

In the **Transparency %** field, use the **Up** and **Down** controls to set the transparency level, between

0% and 100% (where 0% is opaque and 100% is fully transparent).

In the **Color** field, click on the color to open the color selector. From here, either select one of the basic colors available, or click **Define Custom Colors** to define your own color choice.

2. Choose **Delete** to delete the selected Appearance Definition.
3. Choose **Rename** to rename the selected Appearance Definition. Once the Appearance Definition is highlighted, enter the new name, then press **Enter** to save it.

Default Simulation Start Appearance

The Configure tab also specifies a default appearance to apply to all objects in the model at the start of the simulation. The default is **Hide**, which is ideal for simulating most construction sequences.

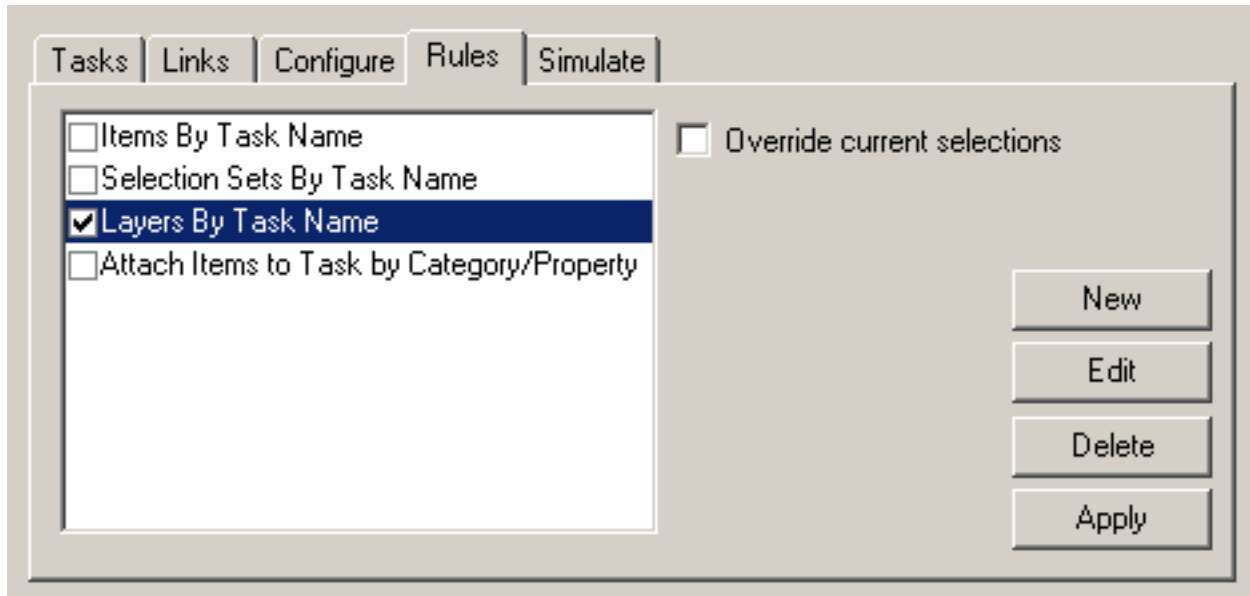
- From the **Default Simulation Start Appearance** drop down, choose from the list of Appearance Definitions that which you wish to start your simulations with.

Chapter 42. Rules

The Rules Tab enables you to automatically map Tasks to items in the model.

42.1. The Rules Tab

The **Rules** tab lists all currently available rules. These can be used to map Tasks to items in the model. Each of the default rules can be edited and new rules may be added as necessary:



Predefined rules

- **Items By Task Name.** Choose this rule to attach each Item in the model to each Task with the same name in the specified column. The default is to use the **Task Name** column. See Editing TimeLiner rules for information on editing this rule.
- **Selection Sets By Task Name.** Choose this rule to attach each Selection Set in the model to each Task with the same name in the specified column. The default is to use the **Task Name** column. See Editing TimeLiner rules for information on editing this rule.
- **Layers By Task Name.** Choose this rule to attach each Layer in the model to each Task with the same name in the specified column. The default is to use the **Task Name** column. See Editing TimeLiner rules for information on editing this rule.
- **Attach Items to Task by Category/Property.** Choose this rule to attach each Item in the model with the defined property, to each Task with the same name in the specified column. The default is to use the **Task Name** column, however you will also need to define the '<category>' and '<property>' values. See Editing TimeLiner rules for information on editing this rule.

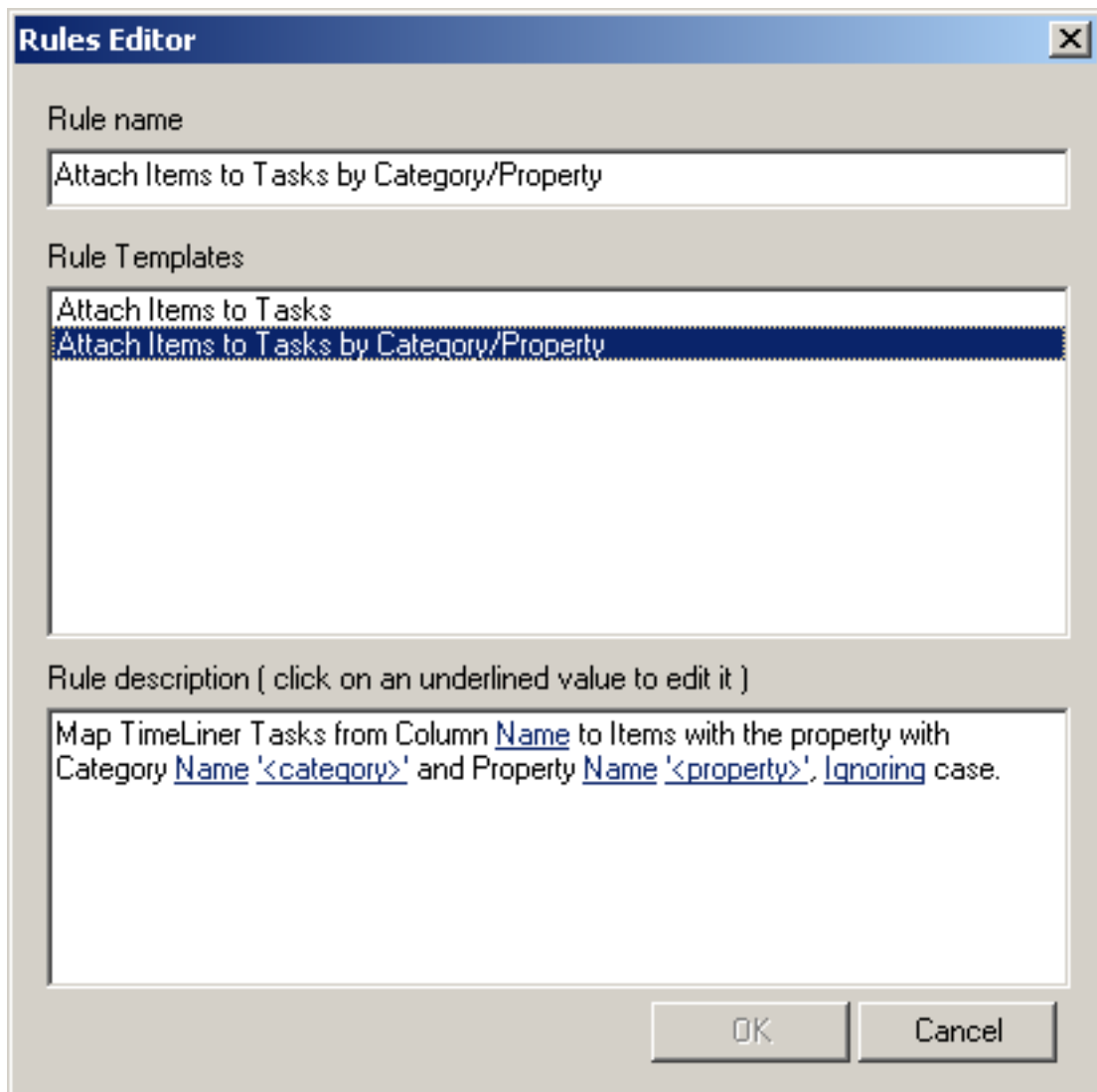
Editing TimeLiner rules

- To edit an existing rule, click the **Edit** button and the **Rules Editor** will be displayed for the selected rule. See Adding custom TimeLiner rules for information on the available options.

Adding custom TimeLiner rules

1. From the **Rules** tab of the TimeLiner control bar, click the **New** button.

The **Rules Editor** dialog is displayed:



2. Enter a new name for your rule in the **Rule name** box.

Note

If you choose not to enter a name, upon selecting a **rule template** the name of that template will

be used.

3. From the **Rule templates** list, choose a template from which your rule will be based upon.

Note

The **Attach Items to Tasks** template is that used for the first three pre-defined TimeLiner rules, (Items, Selection Sets and Layers By Task Name).

The **Attach Items to Tasks by Category/Property** template enables you to specify a property within the model scene. If a task has the same name as the specified property value in the model, then all items having that property will be attached to that task when you check the rule **Attach Items to Tasks by Category/Property**, and click **Apply Rules**.

4. In the **Rule description** box, click on each of the **underlined values** to define your custom rule. The customizable values available with the built in templates are:
 - **Column Name**. Choose which column in the Tasks tab you wish to compare Item names to. The default is the **Task Name**, though you may also choose one of the ten **User** columns, identified in the Field Selector.
 - **Items**. Choose what you would like the value in the **Column Name** to be compared to in the model scene. The default is **Item** name, though you may also choose either **Selection Sets** or **Layers**.
 - **Matching**. Use **case sensitivity** and therefore only match names that are exactly the same. You may also choose **Ignoring** to ignore case sensitivity.
 - **Category/Property Name**. Use the name of the category or property as it is displayed in the interface (recommended). You can also choose **Internal Name** which is that accessed via the API (for advanced use only).
 - **'<category>'**. Choose from the available list, which category the property you wish to define is in. Only the categories that are contained in the scene are available in the drop down.
 - **'<property>'**. Choose from the available list, which property you wish to define. Again, only the properties in the scene within the chosen category will be available.
5. Click **OK** to add the new TimeLiner rule, or **Cancel** to return to JetStream.

Applying TimeLiner rules

1. Check the rules you want to use and press **Apply Rules** to apply them. The rules will be applied in order and will attach items to any Tasks without attached items.
2. If **Override current selections** is checked, then when the rules are applied they will replace any existing attached items.

Deleting TimeLiner rules

- To delete an existing rule, click **Delete** and the selected rule will be removed.

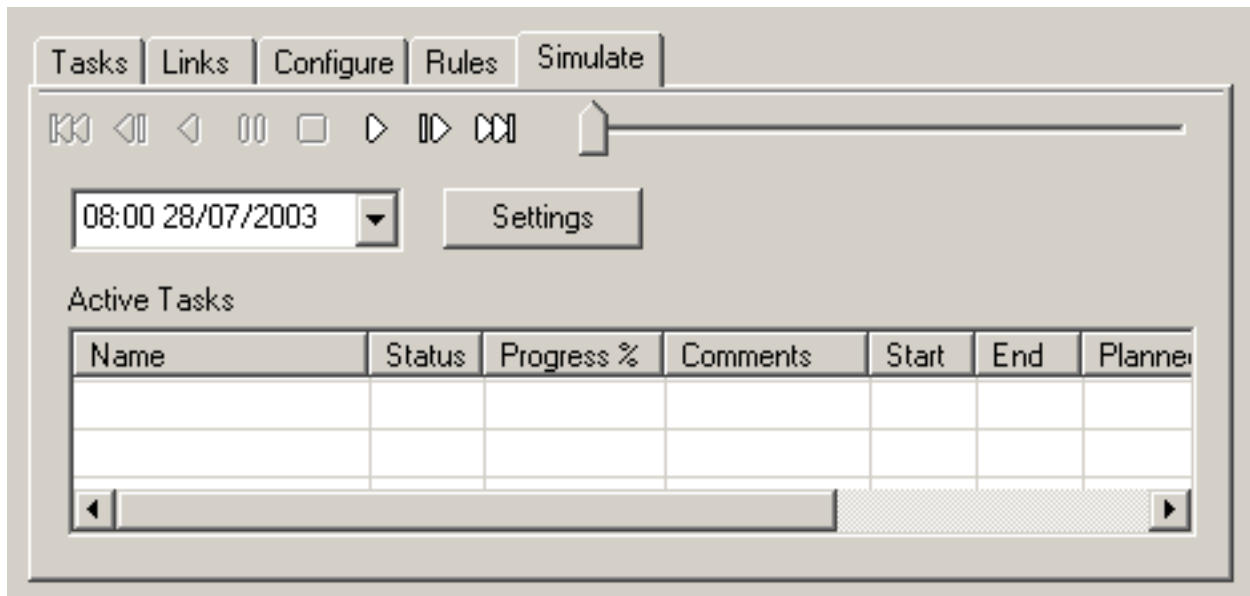
Chapter 43. Simulate

The Simulate tab enables you to simulate your TimeLiner sequence throughout the duration of the project schedule. If a full TimeLiner license is available, playback and Overlay Text options can be edited to customize your simulation, using the Simulation Settings button and the Overlay Text Dialog.



If no TimeLiner license is available, the Simulate tab will be the only accessible tab, and only Playback will be available.







43.1. The Simulate Tab

The simulate tab allows you to simulate your schedule. The tab includes standard animation style controls that enable you to set the simulation to any date within your schedule. Objects attached to each Task are hidden or highlighted as specified by the Task Type appearance definitions on the Configure tab.



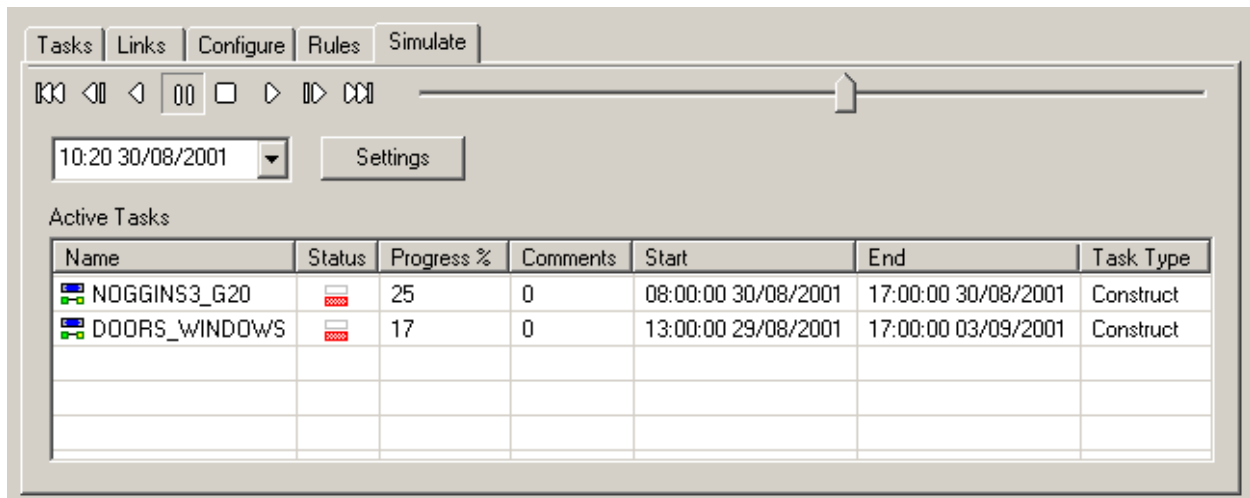
Playing back a simulation

1. You can use the slide bar to quickly move forwards and backwards through the simulation. Full left is at the beginning and full right is at the end. The date box below the playback controls shows the point in time through the simulation. You can click on the drop down icon (to the right of the date) to display a calendar, from which you can select a date to 'jump' to.
2. Use the playback controls to step and play forwards and backwards through the animation:
 - **Rewind**  will rewind the simulation back to the beginning.
 - **Step Back**  will step back a single step size (see Setting the step size for more information).

- **Reverse Play**  will play the simulation backwards.
- **Pause**  will pause the simulation at the time you press it at. You can then look around and interrogate the model, or step forwards and backwards through the simulation. To continue playing from where you paused, just press **Play** again.
- **Stop**  will stop the simulation playing and rewind back to the beginning.
- **Play**  will play the simulation from the currently selected time.
- **Step Forwards**  will step forwards a single step size (see Setting the step size for more information).
- **Forward**  will fast forward the simulation to the end.

The simulate tab also shows all **Active Tasks** at the current simulation time and how close to completion they are (**Progress**, displayed as a percentage). The **Status** of each active tasks is also displayed as an icon. For simulations where Planned and Actual dates are available, the status provides a visual representation as to whether there is any variance between the planned and actual dates. See TimeLiner task status for a definition of each status icon.

The **Comments** control bar can be used to view any comments attached to an active task (see the section called "Commenting" in the chapter called "Reviewing" in the JetStream Roamer book for more information on commenting).



While the simulate tab is in use, by default the current simulation date is overlaid on the main window. The information displayed can be customized using the Overlay Text Dialog accessed using the **Settings** button.

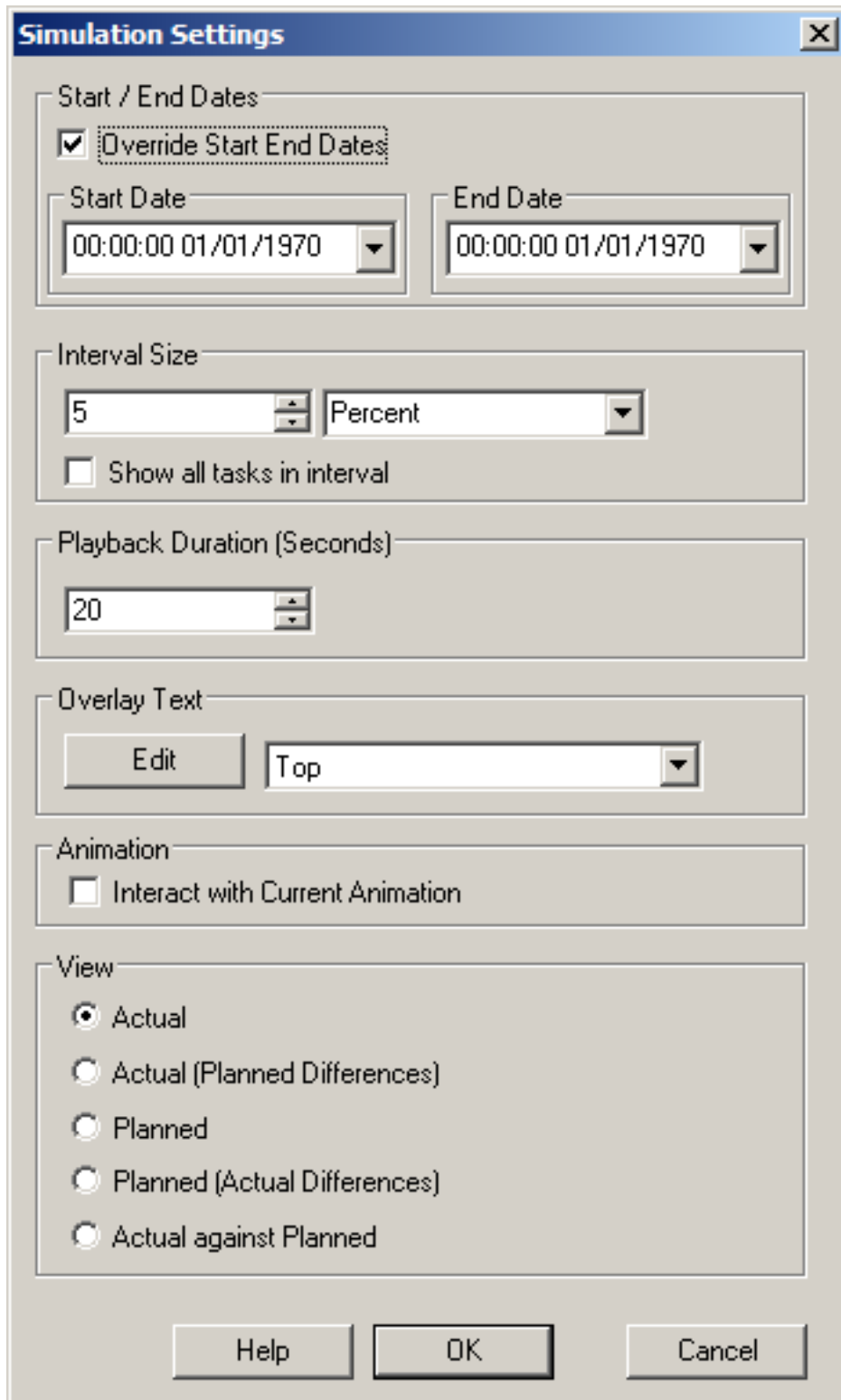
Note

If a full TimeLiner license is not available, the Simulation Settings will be inaccessible and the **Settings** button will be greyed out.

You can use a pre-recorded animation (created in JetStream Roamer) to dynamically change the viewpoint during simulation. See the Simulation Settings section for more information.

43.2. Simulation Settings

The **Settings** button provides access to the **Simulation Settings** dialog.



The image shows a 'Simulation Settings' dialog box with the following sections:

- Start / End Dates:** A checked checkbox labeled 'Override Start End Dates' is shown in a dotted box. Below it are two date pickers, both set to '00:00:00 01/01/1970'.
- Interval Size:** A numeric spinner set to '5' and a dropdown menu set to 'Percent'. Below is an unchecked checkbox labeled 'Show all tasks in interval'.
- Playback Duration (Seconds):** A numeric spinner set to '20'.
- Overlay Text:** An 'Edit' button and a dropdown menu set to 'Top'.
- Animation:** An unchecked checkbox labeled 'Interact with Current Animation'.
- View:** A group of radio buttons with 'Actual' selected. Other options include 'Actual (Planned Differences)', 'Planned', 'Planned (Actual Differences)', and 'Actual against Planned'.

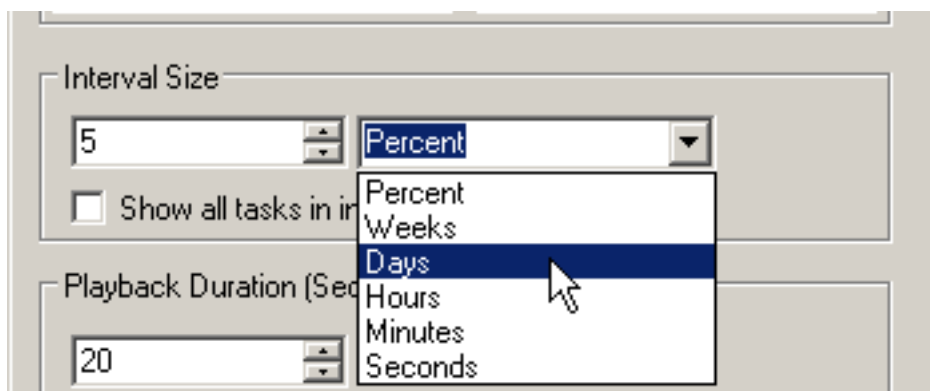
At the bottom are three buttons: 'Help', 'OK', and 'Cancel'.

It is possible to override the Start and End dates that the simulation runs between. Checking the **Override Start / End dates** check box un-greys the date boxes and enables the setting of start and end dates to suit, allowing a small sub-section of the overall project to be simulated. The dates will be shown on the

TimeLiner Simulate tab. These dates will also be used when exporting animations.

You can define the **Interval Size** to use when stepping through the simulation using the playback controls. The interval size can be set either as a percentage of the overall simulation duration or to an absolute number of days or weeks, etc.

Use the drop down to select the interval unit, then use the Up and Down arrow buttons to increase or decrease the interval size.

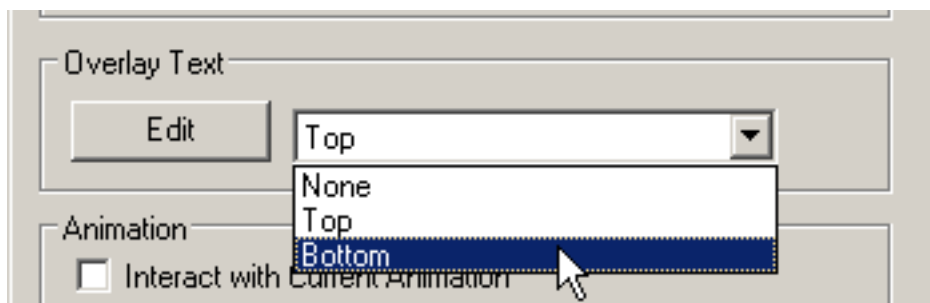


It is also possible to highlight all the tasks that are being worked on during the interval. By checking the **Show all tasks in interval** check box, and for example setting the **Interval Size** to 5 Days, all tasks being worked on during those 5 days will be set to their Start Appearance in the main view, including those that begin and end within the bounds of the interval. The Simulation slider will show this by drawing a blue line under the slider. If un-checked, tasks that begin and end within the bounds of the interval will not be highlighted in this manner, and will need to overlap with the current date in order to be highlighted in the main view.

You can define the overall **Playback Duration** for the complete simulation (the time needed to play it through from start to finish). Use the Up and Down arrow buttons to increase or decrease the duration (in seconds). You may also enter a duration directly into this field.

You can define whether the current simulation date should be overlaid on the main window, and if so whether it should appear at the top or bottom of the screen. From the drop down, choose from **None** (to display no overlay text), **Top** (to display the text at the top of the window), or **Bottom** (to display the text at the bottom of the window).

You can **Edit** the information displayed in the overlay text using the Overlay Text dialog. This dialog also makes it possible to alter the Font **Type**, **Style** and **Size** by clicking on the contained **Font** button.

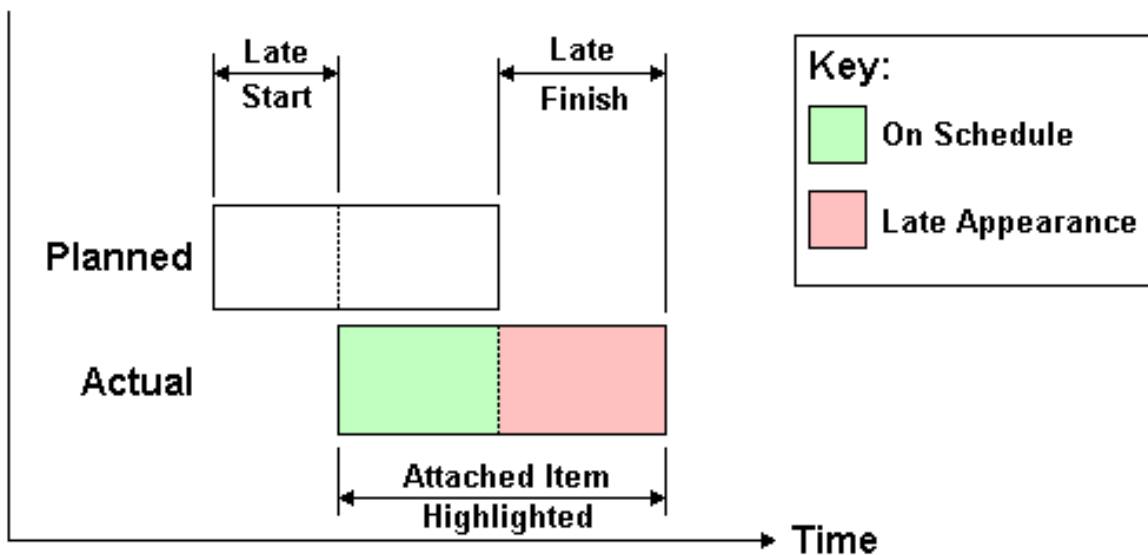
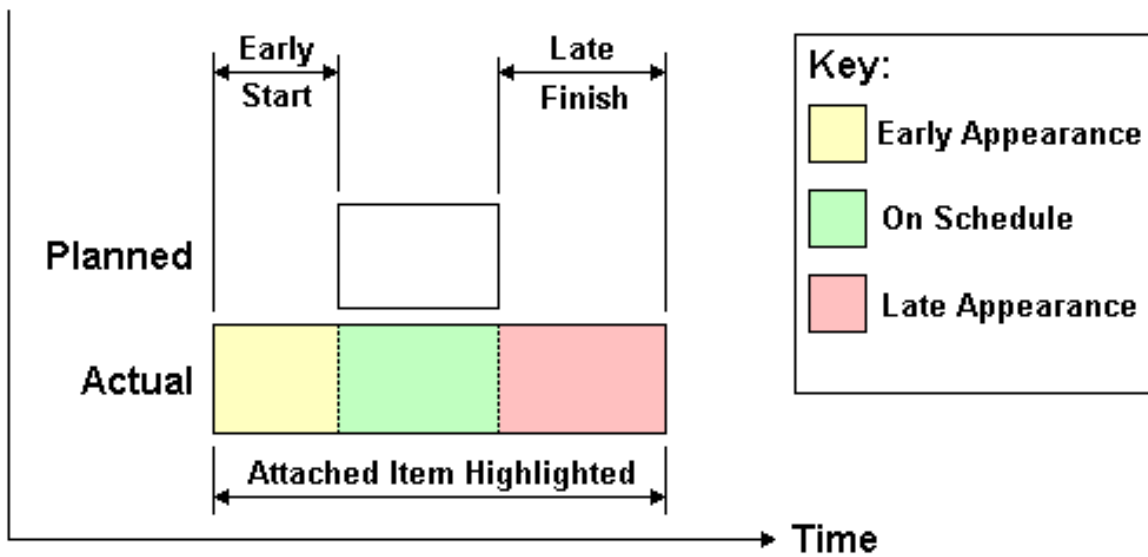


You can define whether the current simulation should interact with the current animation. If so, during the TimeLiner sequence playback, JetStream will also play the current animation, i.e. providing camera interaction throughout the simulation. You can pre-record a suitable animation for use with the simulation, using the normal JetStream Roamer Animation tools (see the section called "Creating Animations" in the

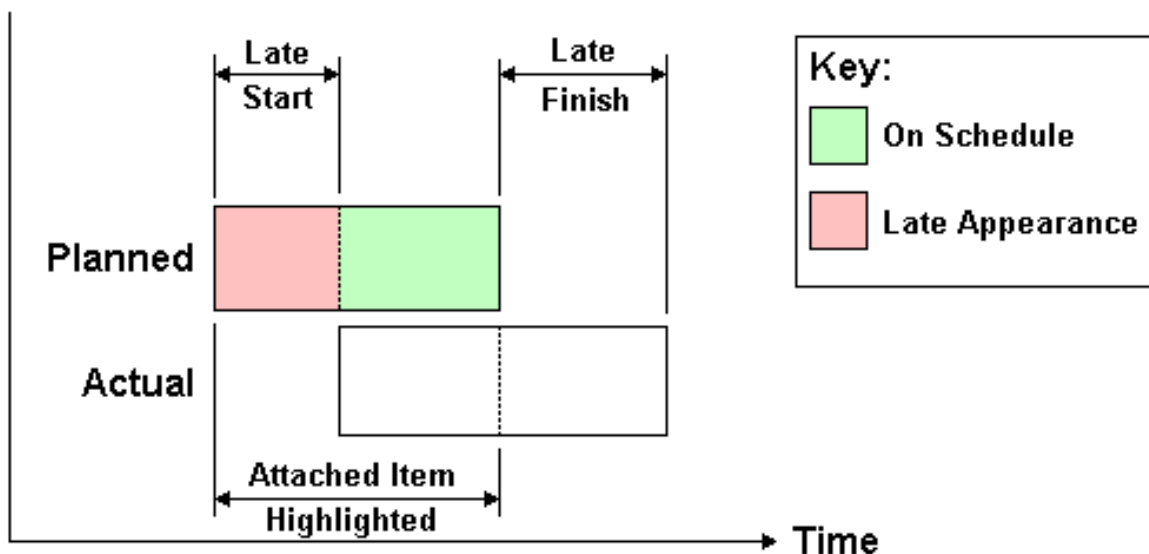
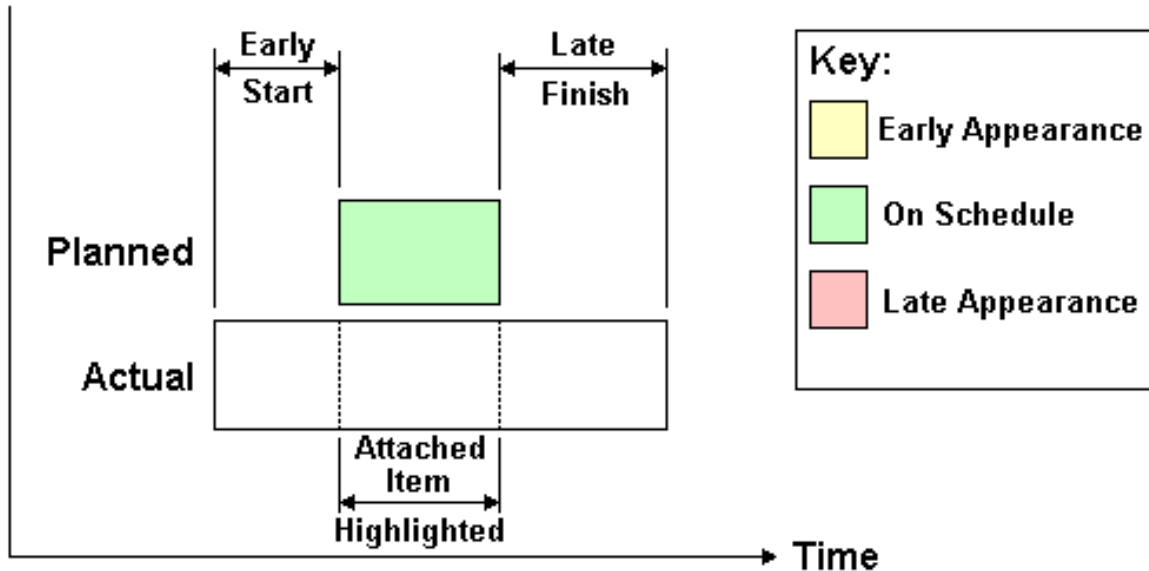
chapter called "Animating" in the JetStream Roamer book). This option also affects the Animation Export.

TimeLiner supports Planned and Actual dates and provides five simulation **Views**. Each view will playback the schedule depicting Planned and Actual relationships:

- **Actual**. Choose this view to simulate the **Actual** schedule only (i.e. only use the Actual start and Actual end dates).
- **Actual (Planned Differences)**. Choose this view to simulate the **Actual** schedule against the **Planned** schedule. This view will only highlight the items attached to the task over the Actual date range (i.e. between Actual Start and Actual End. See diagram below for graphical representation). For time periods where the Actual dates are within the Planned dates (on schedule), the items attached to the task will be displayed in the Task Type Start Appearance. For time periods where the Actual dates are early, or late in comparison to the Planned dates (there is a variance), then the items attached to the task will be displayed in the Task Type Early or Late Appearance, respectively.

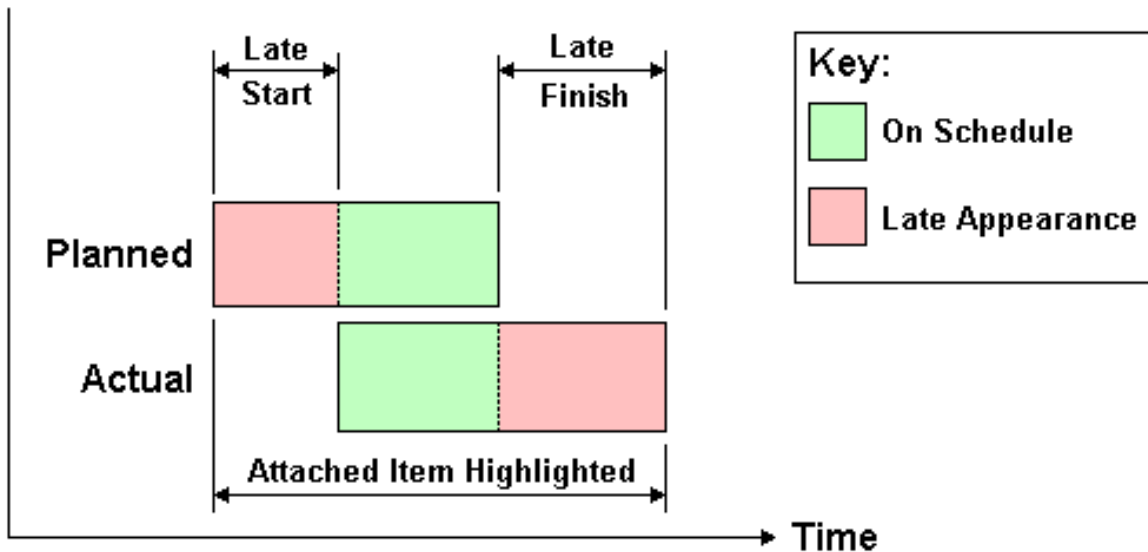
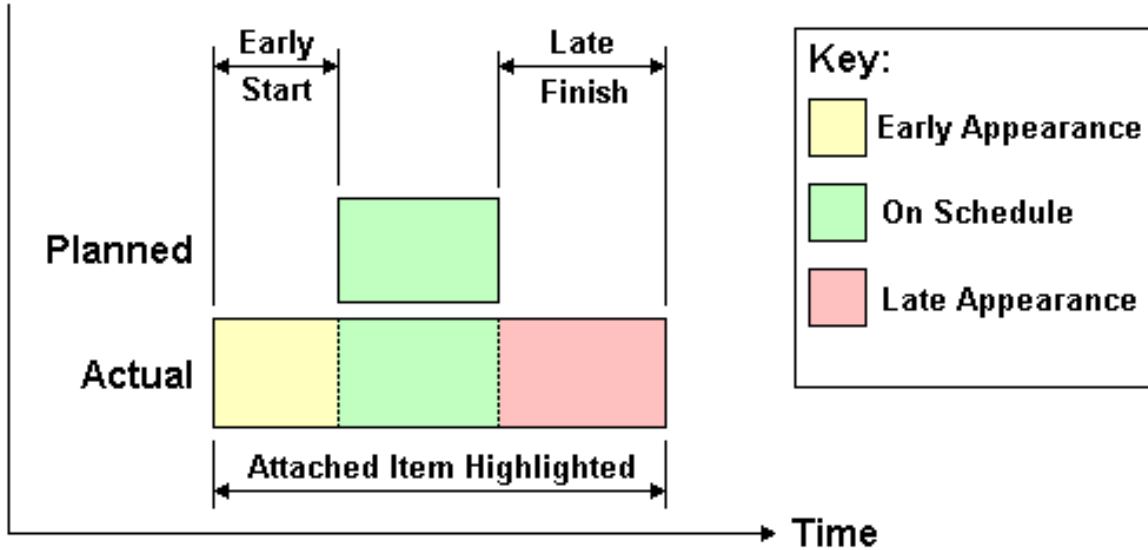


- **Planned.** Choose this view to simulate the **Planned** schedule only (i.e. only use the Planned start and Planned end dates).
- **Planned (Actual Differences).** Choose this view to simulate the **Actual** schedule against the **Planned** schedule. This view will only highlight the items attached to the task over the Planned date range (i.e. between Planned Start and Planned End. See diagram below for graphical representation). For time periods where the Actual dates are within the Planned dates (on schedule), the items attached to the task will be displayed in the Task Type Start Appearance. For time periods where the Actual dates are early, or late in comparison to the Planned dates (there is a variance), then the items attached to the task will be displayed in the Task Type Early or Late Appearance, respectively.



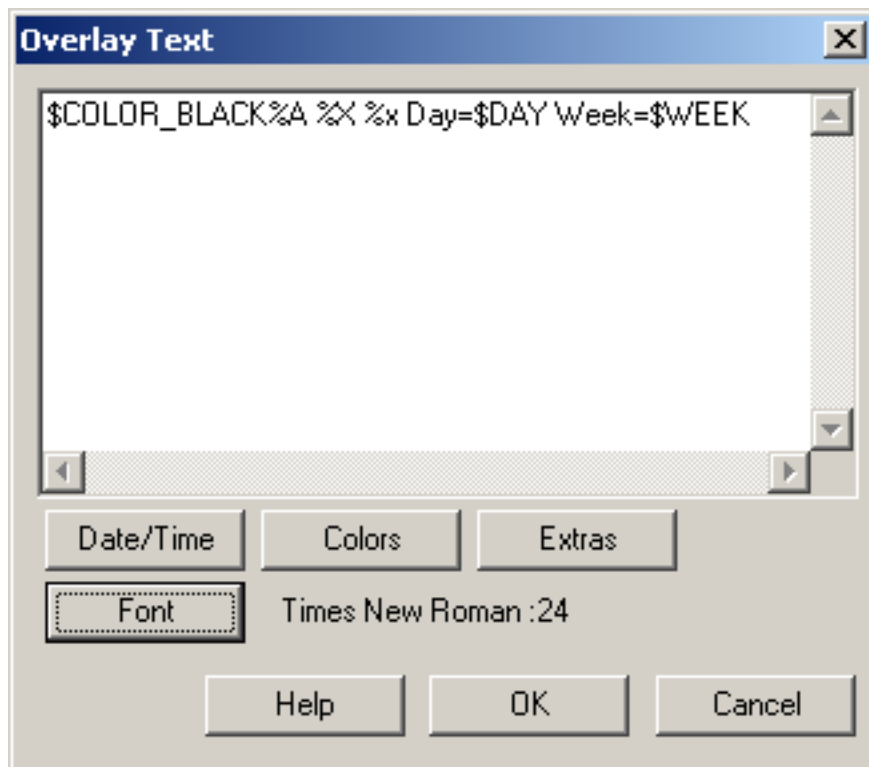
- **Actual against Planned.** Choose this view to simulate the **Actual** schedule against the **Planned** schedule. This will highlight the items attached to the task over the entire Planned and Actual date range (i.e. between the earliest of Actual and Planned start dates and the latest of Actual and Planned End dates. See diagrams below for graphical representation). For time periods where the Actual dates

are within the Planned dates (on schedule), the items attached to the task will be displayed in the Task Type Start Appearance. For time periods where the Actual dates are early, or late in comparison to the Planned dates (there is a variance), then the items attached to the task will be displayed in the Task Type Early or Late Appearance, respectively.



43.3. Overlay Text Dialog

You have the option to define the text overlaid on the main window during simulation, by clicking **Edit** in the Simulation Settings dialog.



By default the date and time are displayed using the format specified in **Control Panel, Regional Settings**. You can specify the exact format to use by entering text into the text box. Most text will appear as entered, except that words prefixed with a % or \$ character act as keywords and are replaced with various values. The **Date/Time** and **Extras** buttons can be used to select and insert all possible keywords. The **Colors** button can be used to define the color of the Overlay Text.

The **Font** button brings up the standard Microsoft Windows font picker dialog box. Once the correct font, font style and point size have been selected, press **Okay** to return to the **Overlay Text** dialog box. The current font selection is shown next to the Font button, and during the TimeLiner simulation, all text on the overlay will be shown using this font.

Date/Time Keywords

%a	Abbreviated weekday name
%A	Full weekday name
%b	Abbreviated month name
%B	Full month name
%c	Date and time representation appropriate for locale
%d	Day of month as decimal number (01 - 31)
%H	Hour in 24-hour format (00 - 23)
%I	Hour in 12-hour format (01 - 12)

%j	Day of year as decimal number (001 - 366)
%m	Month as decimal number (01 - 12)
%M	Minute as decimal number (00 - 59)
%p	Current locale's A.M./P.M. indicator for 12-hour clock
%S	Second as decimal number (00 - 59)
%U	Week of year as decimal number, with Sunday as first day of week (00 - 53)
%w	Weekday as decimal number (0 - 6; Sunday is 0)
%W	Week of year as decimal number, with Monday as first day of week (00 - 53)
%x	Date representation for current locale
%X	Time representation for current locale
%y	Year without century, as decimal number (00 - 99)
%Y	Year with century, as decimal number
%z	Time-zone abbreviation; no characters if time zone is unknown
%Z	Time-zone name; no characters if time zone is unknown

Color Keywords

\$COLOR_RED	Sets the overlay display text color to be red.
\$COLOR_BLUE	Sets the overlay display text color to be blue.
\$COLOR_GREEN	Sets the overlay display text color to be green.
\$COLOR_WHITE	Sets the overlay display text color to be white.
\$COLOR_BLACK	Sets the overlay display text color to be black.
\$RGBr,g,b\$RGB	Sets the overlay display text to any color specified using explicit rgb values between 0 and 255. For example, \$RGB127,127,127\$RGB sets the color to grey.

Extra Keywords

\$TASKS	Adds the name of each currently active task to the overlay display text. Each task is displayed on a new line.
\$DAY	Days since start of first task in project (starting from 1)
\$WEEK	Weeks since start of first task in project (starting from 1)

Ctrl+Enter

Type Ctrl+Enter to insert a newline into the overlay display text.

%%

Percent sign

Chapter 44. Export

You can export a static image at any time during a simulation by using one of the standard JetStream Roamer image exports, whilst the simulation tab is active. See the section called "Exporting an image" in the chapter called "File Management" in the JetStream Roamer book for more information.

You also have the option to Export an AVI of an entire TimeLiner simulation.

44.1. Exporting a TimeLiner simulation as an AVI

You can export a TimeLiner simulation as an AVI or as a sequence of still images, using the **File, Export, Animation** dialog. See the section called "Exporting an animation" in the chapter called "File Management" in the JetStream Roamer book for more information.

Chapter 45. Options

TimeLiner has some general options.

45.1. TimeLiner Options

This dialog is used to control the general TimeLiner options.

Setting TimeLiner options

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

The **TimeLiner** dialog is displayed



2. Check the **Auto select attached items** check box if you want TimeLiner to select any attached items as each Task is selected.
3. Check the **Display synchronization errors** check box if you want TimeLiner to inform you of errors when synchronizing Tasks from external Links.

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

Glossary

Glossary of technical terms relating to JetStream 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. JetStream 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, JetStream only renders what it can in the fraction of a second it has. The remainder is "dropped out", or not rendered. However, JetStream 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. JetStream guarantees a user-defined frame rate in order to maintain interactivity.

Export Terminology

These are terms specific to JetStream that are used in relation to exporting.

Codec

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 JetStream 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 is opened or appended, JetStream Roamer creates a cache file (.nwc) if the write cache option is set. When the file is next opened or appended, JetStream 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, JetStream 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 JetStream 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 JetStream Roamer. They store the location of the appended files, along with any design reviews made in JetStream, such as comments, redlines, viewpoints, animations and so on.

If a group of files is appended into a JetStream 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 JetStream.

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.

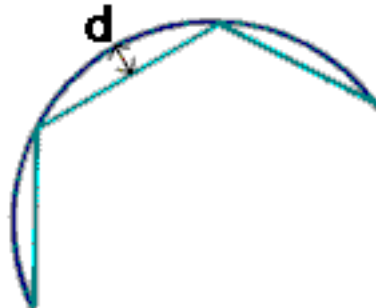
All items, no matter what their size, will use the same faceting factor and so have the same number of sides to curved entities. Therefore, you need to experiment a little with different values to account for the size that these items will appear on screen.

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 JetStream 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 Facet Deviation

Maximum facet 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, JetStream 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 JetStream 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 JetStream 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 JetStream 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 JetStream - 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 JetStream considers "up" is called the "world-up vector". This is maintained in the walk, orbit and turntable modes.

Clash Detective Terminology

Clash Status	<p>Each clash has a current status associated with it and each status has a colored icon to identify them. This status is updated automatically by Clash Detective or can be manually overridden if desired. The statuses are as follows:</p> <ul style="list-style-type: none">•  New: a clash found for the first time in the current run of the test.•  Active: a clash found in a previous run of the test and not resolved.
--------------	---

-  **Approved:** a clash previously found and approved by someone.
-  **Resolved:** a clash found in a previous run of the test and not in the current run of the test. It is therefore assumed to be resolved.
- **Old:** any clash in an "old" test. The icons still have the code of the status from the previous run, but this is a reminder to say that the current test is old. See Clash Test Status for a description of old tests.

If the status is changed to **Approved**, Clash Detective takes the user currently logged on as the person who approved it.

Enabling hyperlinks will show clash results using the relevant status icon



Clash Test Status

A clash test can have one of 4 statuses:

- **New** indicates a clash test that has not yet been run with the current model.
- **Done** indicates a clash test that has been successfully run with the latest version of the model.
- **Old** indicates a clash test that has been altered in some way since being set up. This might include changing an option, or having loaded the latest revision of the model.
- **Partial** indicates a clash test that has been interrupted during execution. Results are available up to the point of interruption.

Clearance Clash

A clash in which the geometry of item 1 may or may not intersect that of item 2, but comes within a distance of less than the set tolerance.

Hard Clash

A clash in which the geometry of item 1 intersects that of item 2 by a distance of more than the set tolerance.

Duplicate Clash

A clash in which the geometry of item 1 is the same as that of item 2, located within a distance of between zero and the set tolerance. A tolerance of zero would therefore only detect duplicate geometry in exactly the same location.

Intersection Method

A standard **Hard** clash test type applies a **Normal Intersection Method**, which sets the clash test to check for intersections between any of the triangles defining the two items being tested (remember all JetStream geometry is composed of triangles). This may miss clashes between items where none of the triangles intersect. For example, two pipes that are exactly parallel and overlap each other slightly at their ends. The

pipes intersect, yet none of the triangles that define their geometry do and so this clash would be missed using the standard **Hard** clash test type. However, choosing **Hard (Conservative)** reports all pairs of items, which *might* clash. This may give false positives in the results, but it is a more thorough and safer clash detection method.

Severity

For hard clashes, the severity of a clash depends on the intersection of the two items intersecting. Hard clashes are recorded as a negative distance. The more negative the distance, the more severe the clash. Hard clash severity depends on whether the **Conservative** or **Normal Intersection Method** has been applied (see Intersection Method for more details on this). If **Normal**, the greatest penetration between a pair of triangles is measured. If **Conservative**, the greatest penetration of space around one item into the space around another is measured.

For clearance clashes, the severity depends on how close one item invades the distance required around the second. For example, an item coming within 3mm is more severe than an item coming within 5mm of the other.

For duplicate clashes, the severity depends on how close one item is to the other. When the distance between them is zero, it is more likely that this is duplicate geometry, whereas items that are further apart are more likely to be different objects and therefore have a lesser severity.

Tolerance

The **Tolerance** controls the severity of the clashes reported and the ability to filter out negligible clashes, which can be assumed to be worked around on site. **Tolerance** is used for Hard, Clearance and Duplicate types of clash test. Any clash found that is within this tolerance will be reported, whereas clashes outside of this tolerance will be ignored. So for **Hard** clashes, a clash with a severity of between zero and the tolerance value will be ignored, whereas for **Clearance** clashes, a clash with a severity of more than the tolerance value will be ignored as it is further away than the distance required. Similarly, a **Duplicate** clash with a severity of more than the tolerance value will be ignored as it is likely to be a separate, yet identical piece of geometry.

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