Halden Virtual Reality Centre

HVRC CREATE

User Guide

Layout Tool

HVRC CREATE Project Tools



HVRC CREATE

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HVRC CREATE: Layout Tool User Guide.

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1 Overview

1.1 HVRC CREATE

HVRC CREATE 4 is the fourth generation of the CREATE tool suite, and builds on the technical platform and functionality established during the implementation of earlier versions of the software, as well as valuable feedback gained from usability evaluations and research work by the development team.

The CREATE control room design tools combine advanced interactive 3D technology with server-based user, project, and file management, providing an integrated package that supports and traces the various stages of a human-centred design process.

The software has been designed to support a flexible, iterative, design methodology, where a control room design is refined and tested many times before a final design is reached. This contrasts with traditional control room design methods where the design process only goes through one or two human factors review iterations, and where it is necessary to build a costly physical control room mock-up. Design iterations are tracked by the system.

When these virtual reality tools are used, it is not necessary to wait until a physical mock-up has been constructed before commencing design verification and validation against human factors guidelines, so greater emphasis can be placed on finding an optimal design solution for safe and efficient control room operation. Users with a variety of technical skills can operate the software, so control room operators, designers, human factors specialists, engineers and managers can all participate to some degree in the design process.

CREATE provides features designed to support and enhance communication between the various interest groups involved in a design project. Support for communication between the layout designers and reviewers is integrated into the system, while it is possible to extract electronic documents such as models, designs and reports for distribution to other interested parties.

The CREATE tools support the management of a reusable database of 3D objects, the interactive construction of control room layouts, and the validation of control room layouts against guidelines.

The CREATE tools are based on cross-platform Internet and Java technology and open standards such as ISO VRML, DAE/COLLADA, XML, and HTML.

1.2 Layout Tool

The Layout Tool is used to positions objects in a virtual room. Models are select from a Model Bank catalogue and are positioned interactively in the layout by dragging and dropping them into the 3D scene. The Layout Tools also provides functionality for modelling rooms and for creating parametric objects directly in the 3D view.

Design guidelines specified by the project manager can be referred to while working. The Layout Tool provides 3D tools that enable the user to evaluate the layout as it is being composed. These tools include a set of measurement tools and a set of manikin tools.

Control room layouts are saved to the CREATE Server. When a layout is ready for verification, it is "published". Reviewers using the Verification Tool can access and view published layouts. The user can access verification reports written by reviewers for layouts that have been published using the Layout Tool.

In addition to saving and publishing layouts to the CREATE Server, the Layout Tool can also be used to export layouts in ISO VRML 97 or DAE/COLLADA formats to the local file system, enabling the user to transfer 3D data to other packages. Complete layouts with Model Bank meta-data can also be exported to the local file system as a Layout Package enabling transfer of layouts between Servers and projects.

2 Getting Started

2.1 System Requirements

The minimum requirements for the HVRC CREATE Tools are:

- Intel Core i5 (8th gen) x64 processor or similar
- 8GB RAM
- 64-bit Microsoft Windows 10 or Apple macOS 11
- Discrete 3D graphics accelerator with at least 2GB memory and OpenGL 3.3 driver support
- For Microsoft Windows: 250MB free disk space for the complete tool suite.
  For macOS: 1GB.
- A three-button mouse (or a two-button mouse with scroll-wheel "button")

Use the option or alt-key on your keyboard in combination with the left mouse button to simulate the middle mouse button if you do not have three mouse buttons.

2.2 Installation

Important: See System Requirements above before installing.

On Windows, the installer called “CREATE Tools Installer” installs the full set of tools, including the Layout Tool. Double-click on the installer and follow the instructions.

On macOS, simply drag the Layout Tool (or the whole folder enclosing it) from the installation

2.3 Starting the Layout Tool

To run the Layout Tool, open the CREATE directory, which was created when you installed the tools, and double-click on the Layout Tool icon.

Depending on what options you selected when running the installer, you may also be able to start the tool by double clicking on an icon on the Microsoft Windows desktop or by selecting it from the Start menu (in the "HVRC CREATE" group).

Important: The first time you run a CREATE tool, a wizard will appear that guides you through configuring your connection to a CREATE Server. After the wizard has completed, you can change your settings via the Preferences Window (see The Preferences Window). Ask your system administrator or project manager for assistance if you do not know what to enter.

The information above assumes that you are using Microsoft Windows. On other platforms, the installation follows the platform conventions to provide easy access to the installed software.

2.4 Support

Please send questions, bug reports, or requests for new features to: create-support@ife.no

When submitting bug reports, please include the following information:

- A description of the result and how it differed from what you expected
- The conditions or circumstances under which the problem occurred
- Any other information that could be useful to isolate the problem, including the version of CREATE you are using, the version of the operating system of your computer, and the type of graphics card you are using. An overview of useful technical information is displayed in the tool’s About dialog, located in the Help menu, and can be copied into an email or saved to disk in a text file.

2.5 User Identification

Before you can use the Layout Tool to do any work, the server administrator or your project manager must have assigned a login name and password to you. If you do not have a login name and password then contact the server administrator or your project manager for assistance.

When the Layout Tool starts up and needs to retrieve data from the server, it will usually request that you enter your login name and password. If this does not occur, then you should check that the CREATE server address has been correctly set (see The Preferences Window). If the server address is correct, then you should verify with your system administrator or project manager that the host is currently operating and accessible on your network.

You will not be able to use the Layout Tool to do anything other than access items in the Help menu and specify the server address in the Preferences Window if you are not logged on to a CREATE server.

Important: After a successful login, you can enable an auto-login feature via the Preferences Window so that you do not need to enter your username and password each time.

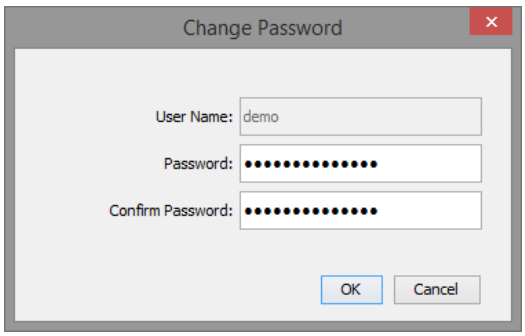
2.6 Changing Your Password

You can change your password via the Edit > Set Password… menu item. For security reasons, you should change your password regularly and use a password that is difficult for other people to guess.

You must be logged on to a CREATE server in order to change your password.

To change your password:

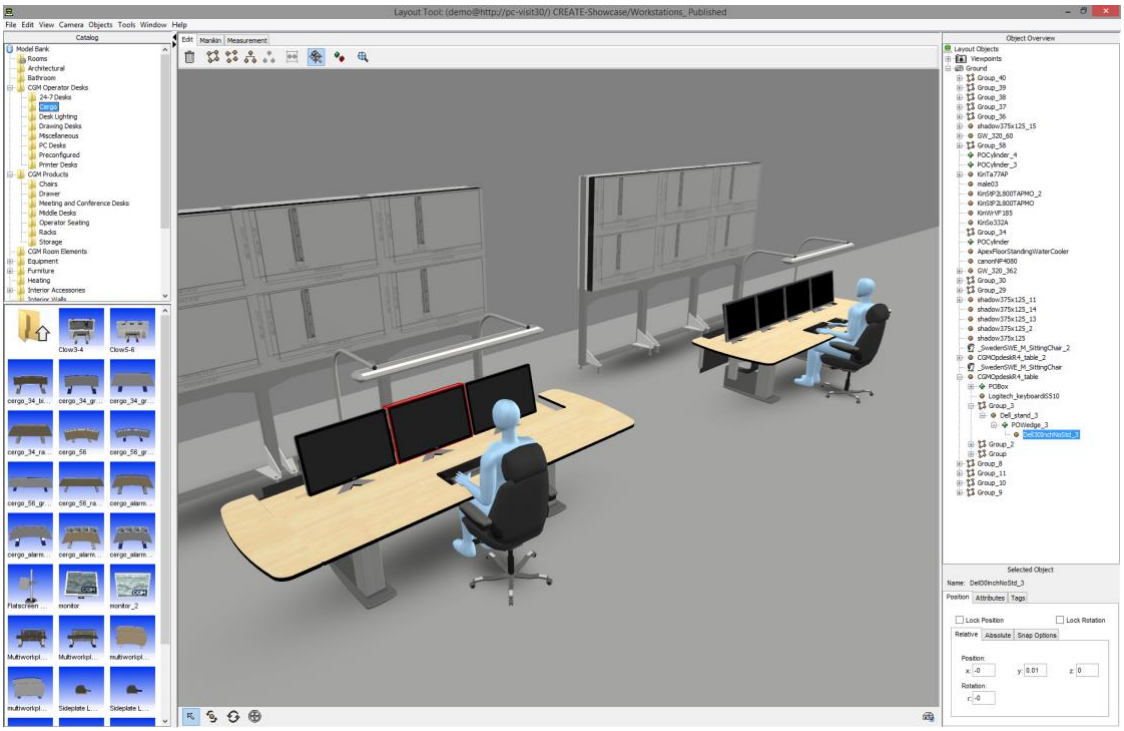
1. Select Edit > Set Password…
2. The Change Password dialog will appear:



The Change Password Dialog

3. Enter a new password into the Password field
4. Enter the new password again in the Confirm Password field
5. Click on OK to commit the change or Cancel to abort

2.7 Overview of the User Interface



The Layout Tool User Interface

The primary user interface of the Layout Tool consists of a large window with the main features of the Tool easily accessible.

At the top of the window is the Layout Tools main menu bar (see Menus).

To the left is the Model Bank catalogue. The upper part shows an overview of the categories of objects accessible for the current project. The lower panel shows icons representing the objects in the currently selected category.

The panel in the middle consists of the 3D scene in which layouts are displayed and two toolbars. The upper toolbar holds mainly toolsets for working with layouts while the lower toolbar provides support for navigation in the 3D scene.

Pre-modelled objects are added to a scene by dragging icons representing models from the Model Bank catalogue into the 3D scene. It is also possible to create new objects and shapes within the Layout Tool by adding objects of various types to the scene from the Objects menu. These can include geometric primitives, such as boxes and spheres, or more complex objects defined by parameters that can be configured, such as staircases. Walls, with openings for doors or windows can be added as parametric objects too. Wall groups are managed sets of wall objects that can also have a floor and ceiling (i.e. rooms) that can also be added to the scene as parametric object.

The upper right side of the user interface contains the Object Overview, a hierarchical overview of the objects currently loaded into the scene. The contents of the Object Overview are editable and you can manipulate the objects in the scene tree via a popup-menu. Below it is the Selected Object panel. Here the position and rotation of the currently selected object is displayed. It can be used to accurately set an object's position and orientation by entering values. It also supports setting object-level snap intervals for the object's positions and location, and locking of the object's position and rotation. The Attributes tab provides access to the parameters of parametric objects, created within the Layout Tool itself. The Tags tab provides access to the tagging functionality that enables association of meta-data with the selected object.

3 Managing Layouts

Every designer assigned to a project can create new layouts, modify unpublished layouts, publish layouts and save layouts under new names. Layouts are published (frozen) when they are ready to be formally reviewed by a reviewer using the Verification Tool.

3.1 Working with Layouts

You can create new layouts using the Layout Tool, and publish layouts when they are ready to be reviewed, for any project to which you have been assigned permissions to assume a designer role by the project manager. You can communicate with reviewers by adding comments to the layout you are working on or viewing.

You will usually work on a layout until you consider it to be completed, and then publish it for review. After it has been reviewed, you can read the reviewer's report and comments and create a new version of the layout that takes the results of the review into account. This iterative process continues until the project manager decides that the goals of the project have been met. During this process, you can communicate with reviewers, and other designers assigned to the project, by adding notes to the layout you are working on (or viewing), or by sending messages via the built-in messaging system.

You can use all Model Bank models that the project manager has made available to a project, and can also browse design guidelines, if any have been assigned to the project.

You work with a design by dragging models from a view of the Model Bank into a 3D representation of the room layout. These objects can be arranged as required in the layout and the result can then be saved. The Layout Tool provides a variety of powerful functions to support the easy arrangement of objects in a room and to informally verify the results.

The Layout Tool also offers some basic modelling features, enabling you to model rooms and other basic objects from within the Layout Tool itself. The rooms in which you place your objects can be pre-built in a 3D modelling or CAD tool and added to your layout via the Model Bank, or made in the Layout Tool. Even if you use a pre-built room, you can add architectural elements such as additional walls from within the Layout Tool.

Layout Tool can associate meta data with the objects placed in the Layout. This meta data is used by the Verification Tool to perform automated testing to verify the room in accordance with guidelines. The association of meta data is done by assigning Tags to the 3D objects, where the tags describe certain properties and aspects of the objects, as well as their context in relation to the room.

To verify the results, you have access to the same testing tools that the reviewer uses in order to informally check distances, sight lines, and other details related to the layout. This would typically be done with reference to the design guidelines, and can be done at any time.

You can export a 2D plan view of any layout as an image or the entire 3D layout in VRML format. These can be distributed to other people who are not CREATE users that have an interest in the design.

There may be several designers working on alternative layouts simultaneously or modifying the same layout at different times within the context of a project. The layouts, therefore, belong to the project environment and not to the individual designers. This means that any designer assigned to a project can modify any unpublished layout belonging to the project.

You can communicate with other designers, reviewers, and the project manager using a messaging system built into the Layout Tool.

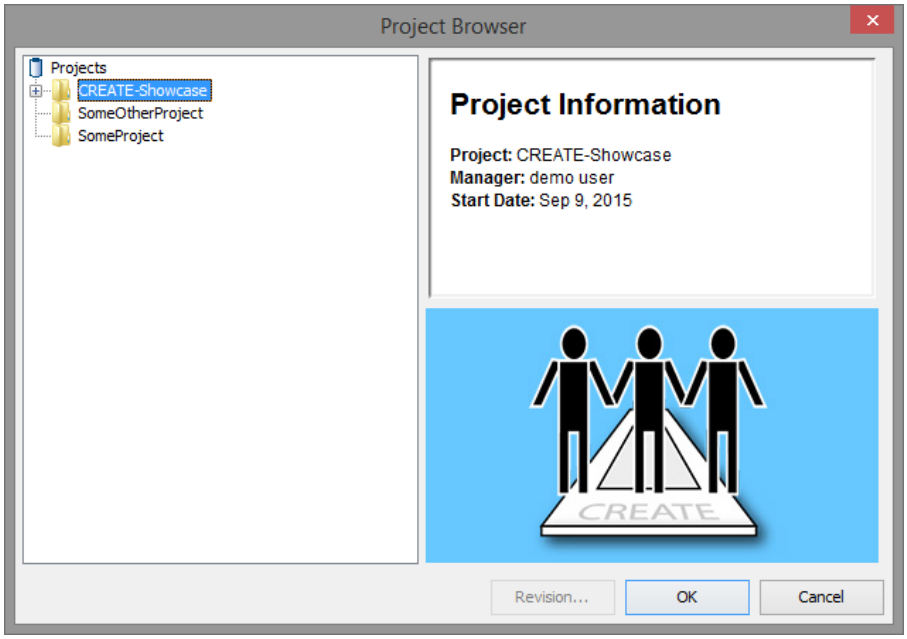
3.2 Creating a New Layout

In order to work with 3D models using the Layout Tool, you need to create a new layout. There may be several designers working on alternative layouts simultaneously or modifying the same layout at different times within the context of a project. The layouts, therefore, belong to the project environment and not to the individual designers. This means that any designer assigned to a project can modify any unpublished layout belonging to the project.

To create a New Layout:

1. Select File > New… or use the shortcut keys command-N

2. If a login window appears, enter your user name and password for accessing the CREATE server. If you are successfully logged in then the Project Browser will appear:



Project Browser with a project selected.

3. Using the tree on the left side of the Project Browser, select the project for which you wish to create a new layout. Information about projects can be viewed by selecting them, and appears on the right side of the Project Browser. Only projects that you are permitted to access are show, so if no projects are available to you then you the list may be empty.
4. Press OK to create a new layout and start working, or Cancel to close the Project Browser without creating a new layout.
5. If you press OK then a Room Wizard will appear, enabling you to generate a room or start working with an empty environment.

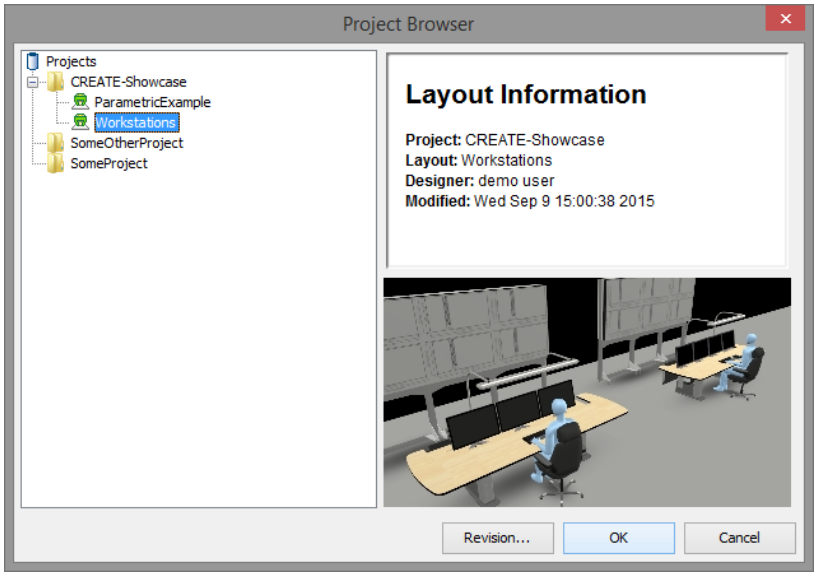
Please note that all existing work will be lost if it is not saved before a new layout is created.

3.3 Opening an Existing Layout

Opening an existing layout is done in much the same way as creating a new context, except that when you open the Project Browser and browse the project tree, it is possible to select individual layouts within projects.

To open an existing layout:

1. Select File > Open… or use the shortcut keys command-O
2. If a login window appears, enter your user name and password for accessing the CREATE server. If you are successfully logged in then the Project Browser will appear:



Project Browser with a layout selected.

3. Using the tree on the left side of the Project Browser, select the layout that you wish to open. You may need to click on one of the handles next to the project name to see all of the layouts associated with a project, in order to find the layout that you intend to work with. Information about projects or layouts can be viewed by selecting them, and appears on the right side of the Project Browser.
4. Press OK to open the layout and start working, or Cancel to close the Project Browser without opening a layout. The Revision… option lets you choose which version of the layout to open. This will be covered in more detail later, see Accessing earlier revisions of a layout.

If the layout is currently opened by another user, it is marked as locked and you will not be able to save new revisions for this layout (see Locking).

Note that if you attempt to open the project itself (as you would do to create a new layout via File > New), then a new layout is created.

Please note that all existing work will be lost if it is not saved before a new layout is created.

3.4 Viewing information about a project or layout

You can view basic information about projects and layouts that you have access to using the Project Browser as described in Opening an existing Layout. Select the item you want to view information about, but press Cancel to dismiss the Project Browser rather than OK to open a different layout or create a new one. The information provided includes details about the name of the project, name of the version, who the designer is and when the design was last modified.

For a layout that has already been opened, more detailed information is available via the Window menu, including who originally created the layout, who created the revision that is open, and the name of the layout it was based on (if the layout was created using “Save As” to save an existing layout under a new name).

To view basic information about a project or layout:

1. Open the Project Browser using File > Open… or use the shortcut keys command-O
2. Select the project or layout you want to view information about
3. Information, including a snapshot for layouts, appears on the right-hand side of the Project Browser window.
4. Press Cancel when you have finished browsing (or OK if you want to open a selected layout or create a new one).

Note that if you press on OK in the Project Browser then any unsaved work may be lost.

To view detailed information about a layout already opened in the Layout Tool:

1. Select Window > Layout Info

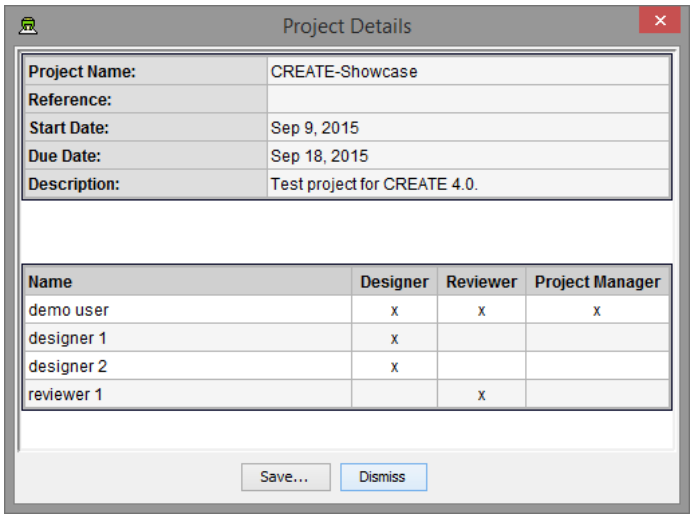
3.5 Viewing information about the current project

Information about the project that the layout you are working on belongs to is available to you and can be viewed and saved to file.

The information available includes the name of the project, the name of the project manager, the date that the project was created as well as an overview of project team members and their roles.

To view information about the project that the layout you are reviewing belongs to:

1. Select the Window > Project Details
2. The Project Details window appears:



Project Details

3. Press Save… to save a copy of the details to disk in HTML format or Dismiss to close the window.

3.6 Saving a layout

Each time you save a layout, a new revision is created, making it possible to retrieve earlier versions of a specific layout if necessary. You do not, therefore, need to save a layout with a new name each time you save in order to archive previous versions of a design in progress. See Working with versions of a layout.

Please note that if a layout has been published or if the layout is being edited by another user at the same time, then modifications can only be saved by giving the layout a new name. See Saving a layout with a new name.

All content that has been added to the layout from the users local machine, such as image files or project models will be uploaded to the server the first time the user saves the layout (after adding the content to the layout). This may impact the save time, as the content will have to be sent to the server, which may take longer than usual depending on the file sizes and the connection speed.

If you are working on an entirely new layout then you must save it with a new name the first time that it is save.

To save a layout:

1. Select File > Save or use the shortcut keys command-S

3.7 Saving a layout with a new name

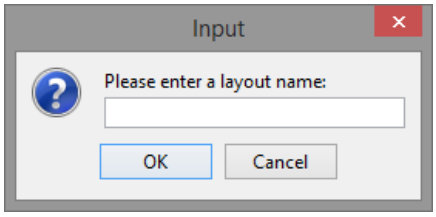
Each time you save a layout, a new revision is created, making it possible to retrieve earlier versions of a specific layout if necessary. You do not, therefore, need to save a layout with a new name each time

you save in order to archive previous versions of a design in progress. See Accessing earlier revisions of a layout.

However, it is often useful, or necessary, to save a modified layout with an entirely new name in order to distinguish it from the original. This might be because you want to work on alternative layouts rather than a single design, or because a layout has been published for review, in which case you must save it as a new alternative layout with a new name. New layouts also need to be saved with new names.

To save a layout as a new name:

1. Select File > Save as... or use the shortcut keys command-shift-S
2. A confirmation request shows to ask if you are sure. Press Yes if you are sure that you want to save the layout as a new version, or No to abort.



Dialogue box for entering a new layout name

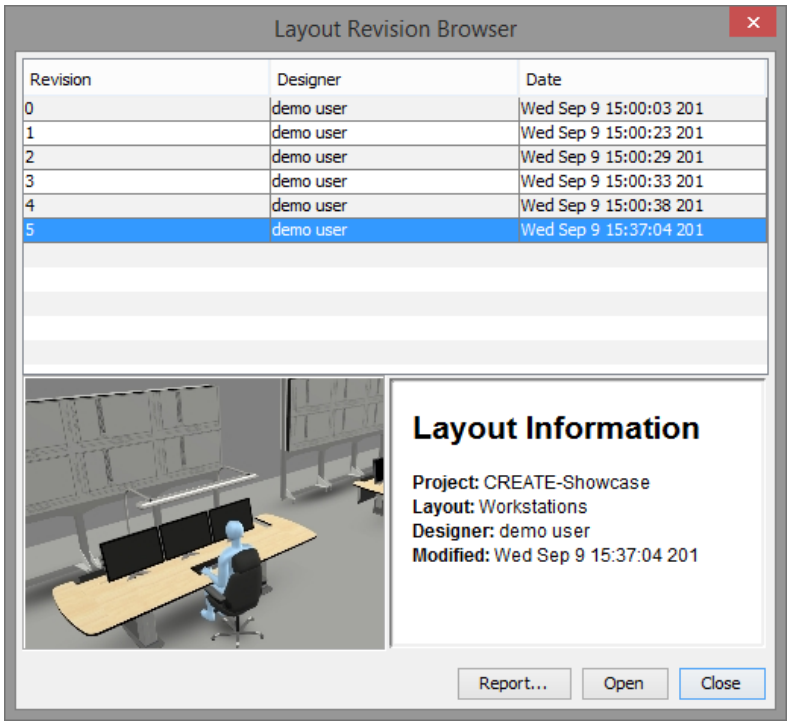
3. Enter a new layout name, and press the OK button to save the layout, or Cancel to abort the operation.

3.8 Accessing earlier revisions of a layout

The CREATE server archives all revisions made to a layout each time a layout is saved. This makes it possible to view previous versions of a layout and trace its history. This also makes it possible for you to revert to an earlier revision if you make a serious mistake and want to continue working on an earlier version rather than continue with the current one.

To view information about layout revisions or to open an earlier revision of a layout:

1. Select File > Revisions...
2. The Layout Revision Browser dialog will appear:



The Layout Revision Browser

3. In the Revision Browser, you can view the different revisions, designer, time, date and year for all the versions of the current layout.
4. To open an older layout, select one of the earlier revisions and press the Open button. If an earlier version is opened and subsequently modified, this it will become the latest revision of the layout when it is saved, unless you save it with a new name.
5. Pressing the Close button dismisses the dialog, while pressing the Report… button generates a report in HTML format.

It is also possible to open an earlier revision directly from the Project Browser. This enables you to load an earlier revision without first opening the newest version of the layout.

To open an earlier revision directly from the Project Browser:

1. Follow the instructions in Opening an Existing Layout up to the point where you selected the layout using the tree on the left side.
2. Press Revision… to open the revision dialog for the layout (instead of Ok).
3. This opens the Revision Browser. Refer to the instructions above on how to use the Revision Browser.

3.9 Generating a version history report for a layout

The Layout Revision Browser provides functionality for exporting a report containing the revision history of a layout.

To generate a layout version history report:

1. Select File > Revisions...
2. The Layout Revision Browser dialog will appear.
3. Press the Report… button and enter a filename in the Save dialog that appears.
4. Press the Close button to dismiss the Layout Revision Browser.

3.10 Publishing a layout

A layout is published (frozen) when it is ready for formal review. Once a model has been published, it cannot be overwritten using File > Save or File > Publish…, however a published model can be opened, modified, and saved under a new name using File > Save as…

Once a layout has been published, all reviewers assigned to the project will be able to access it using the Verification Tool.

To publish a layout to the server:

1. Select File > Publish...

3.11 Exporting a layout to ISO VRML97 format

In addition to saving and publishing models to the CREATE server, the Layout Tool can also export a copy of a layout to the local file system in ISO VRML97 format

When a layout is exported to the local file system, a number of files are created in the directory the layout is exported to. It is therefore normally advisable to export a model into a new directory.

The exported data consists of a main layout file and a set of directories containing the supporting files referenced by the mail file. You can load the model into any 3D software that can import VRML97 files.

To export a Layout to the local file system:

1. Select File > Export VRML...
2. A file chooser dialog will appear.
3. Select the directory into which the layout should be exported in the file chooser dialog that appears, and enter a name for the layout VRML file (which should normally end with `.wrl`)
4. Press OK to export the layout, or Cancel to abort the operation.

3.12 Exporting a layout to COLLADA format

In addition to saving and publishing models to the CREATE server, the Layout Tool can also export a copy of a layout to the local file system in COLLDA format

When a layout is exported to the local file system, a number of files are created in the directory the layout is exported to. It is therefore normally advisable to export a model into a new directory.

The exported data consists of a main layout file and a set of directories containing the supporting files referenced by the mail file. You can load the model into any 3D software that can import COLLADA files.

To export a Layout to the local file system:

5. Select File > Export COLLADA...
6. A file chooser dialog will appear.
7. Select the directory into which the layout should be exported in the file chooser dialog that appears, and enter a name for the layout COLLADA file (which should normally end with `.dae`)
8. Press OK to export the layout, or Cancel to abort the operation.

3.13 Exporting a layout package

Should you need to transfer a layout between two projects, or even two different CREATE servers, it is possible to export the layout as a *layout package*. An exported layout package is a single file that contains the layout, model data, and any other data or documents referred to by the layout.

To export a Layout Package to the local file system:

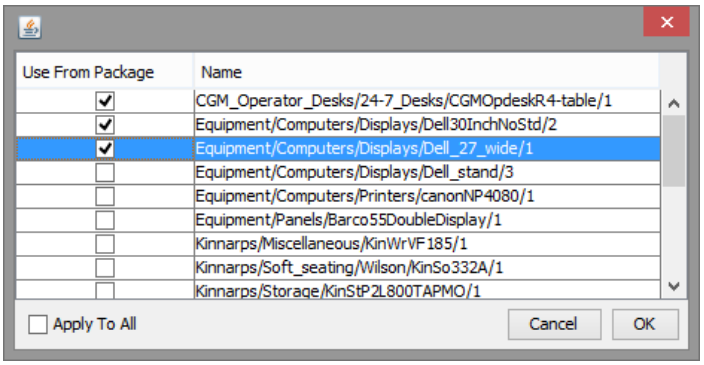
1. Select File > Export Layout...
2. A file chooser dialog will appear.
3. Select the directory into which the layout package should be exported in the file chooser dialog that appears, and enter a name for the layout package file (which should end with `.lp`)
4. Press OK to export the layout package, or Cancel to abort the operation.

3.14 Importing a layout package

A layout package is a single file that contains the layout, model data, and any other data or documents referred to by the layout. A package is created using the Export Layout… function, and can be imported used the corresponding Import Layout… function. A layout package has a filename ending with `.lp`.

When importing a layout package, Models and documents that already exist, and do not differ, on the target server will not be added to the database or the project.

If there are models and documents with the same name and version identification, but where the files are not the same, then a dialog offering the possibility to select between using the data from package or using the existing model or document in the target server.

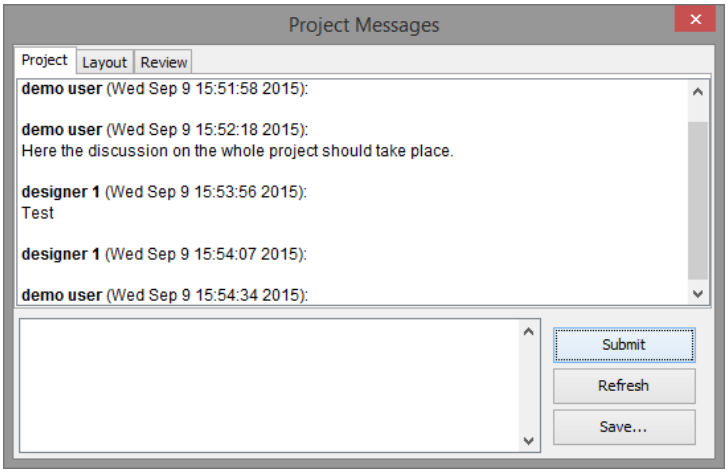


The dialog for choosing which model or document to use

To import a Layout Package from the local file system:

1. Select File > Import Layout...
2. A file project browser dialog will appear.
3. Select the project in which the layout package should be imported and the press the OK button, or Cancel to abort the operation.
4. Once a project has been selected, a file chooser dialog will appear.
5. Select the layout package file to import and then press the Open button, or press Cancel to abort the operation.
6. If conflicting models or documents are found, a dialog will appear, prompting you to indicate whether the data already existing on the current CREATE Server should be used or whether a new version of the data should be created using data from the layout package. For convenience, the Apply To All button can be used to toggle all of the choices on or off. Press the OK button when you have made your selection, or Cancel to abort the import layout operation.
7. The imported layout will load as a new layout in the selected project. You now need to save the layout in order to fully complete the import operation.

3.15 Communicating with other project team members



The Project Messages window with Project level active

The Project Messages functionality provides a simple way of communicating. Messages can be read by Project Management Tool, Layout Tool and Verification Tool users. All messages are logged by the system and stored as part of the project data.

- **Project** level messages can be read by everyone in the project team. This would typically be used by the project manager to provide information to everyone.
- **Layout** level messages can be read by designers and reviewers while working with a specific layout. For example, a reviewer can write comments to the layout designer here, and the designer can reply.
- **Review** level messages can only be seen by reviewers of a layout and is useful if there is more than one reviewer that needs to communicate with each other. This option is not available in the Layout Tool.

To communicate with other project team members:

1. Select Window > Project Messages to display the project message window.
2. Select the level you want to discuss on by pressing a tab in the top of the window.
3. Write your message.
4. Press Submit to enter the comment.

5. If you would like a local copy of the messages in HTML format, press Save to save the messages to file.
6. Press Refresh to reload the messages and view any new messages that may have been entered by other team members.

3.16 Browsing Design Guidelines

The Guideline Browser provides access to design guidelines, if guidelines are available for the project you are working on. These guidelines would normally explain issues that you need to take into account, and may include explanatory procedures that explain how to check that a guideline has been met.

You can access individual guidelines by clicking on the hypertext links on the index page in the Guideline Browser.

Once you are viewing an individual guideline, you can use the toolbar above the Guideline Panel to return to the index, browse between guidelines, and reload a guideline or index.

Note that only the Reload button in the toolbar is active while you are viewing the index page.

To browse design guidelines:

1. Open the design guidelines, Select Tools > Design Guidelines

To go to an individual guideline from the index page:

1. Click on the hyperlink representing the guideline that you want to access in the Guideline Browser.

To go to the index page from an individual guideline:

1. Click on the Home button in the Guideline Browser

To go to the previous or next guideline from an individual guideline:

1. Click on either the Previous or Next buttons in the Guideline Browser

To reload an index page or individual guideline with associate procedure:

1. Click on the Reload button in the Guideline Browser.

3.17 Reviewer Reports

Reports can be created that contain guideline and review text with associated snapshots.

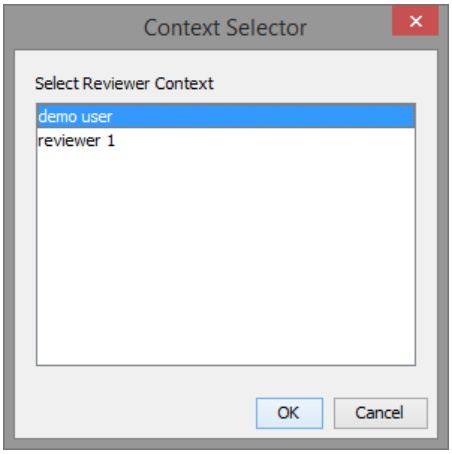
Reports are generated depending on the status of the guidelines in the review context. When you request a report, a Report Specification window is shown in which you can select between a set of different styles for the report.

If you are not using Microsoft Windows then the View Report option in the Report Specification window is replaced with a Save Report option. You can save the report as HTML to your local disk and then view it using a Web browser.

You can print your report via your Web browser.

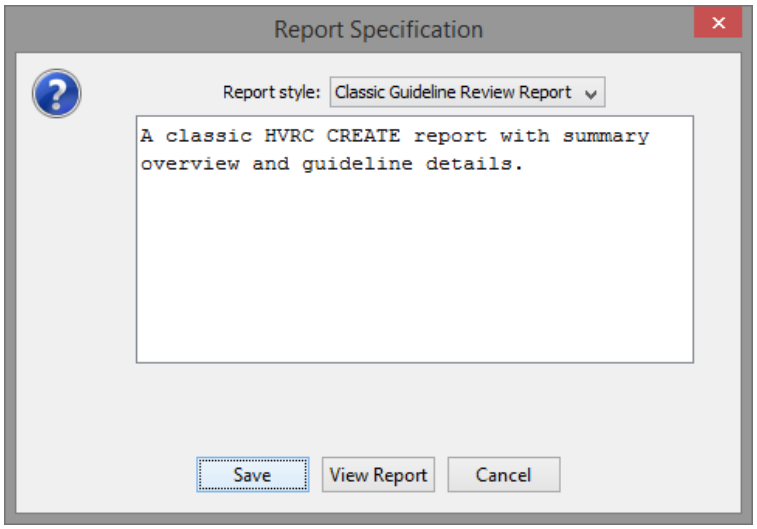
To view or save reports by reviewers:

1. Select Tools > Reviewer Report…
2. If any review contexts exist for the current layout then a Review Context Selector dialog window will appear:



The Review Context Selector

3. Select one of the reviewers, and press the OK button, or Cancel to abort.
4. The Report specification window appears:



The Report Specification window used to generate a report

5. The Report Style contains a dropdown with a list of different styles that change what the report contains, and how the data is presented. The text displayed below describes the currently selected style.
6. Press View Report (Microsoft Windows Only) or Save.
7. If you select View Report then the report will be displayed in your default web browser.

   If you select Save then a file dialog will appear requesting that you enter a name for the report. Enter a name and press save to store a copy of the report on your local disk.

3.18 Locking

When a layout is saved for the first time the layout is marked as locked. The layout will be unlocked if the layout is closed, either by opening another layout or if the Layout Tool is closed.

The layout will also be marked as locked when reopened if not already marked as locked by another user.

When the layout is locked, only the user that made the lock will be able to save modifications to the current layout.

This means that if you open a layout while another user is editing it, you will not be able to save your modifications. You can still save your work by giving the layout a new name. See Saving a layout with a new name. The user who is currently locking the layout is shown in the window title bar.

If you would like the layout to be available for saving by another user opening the layout, you can release the lock by selecting File > Release Lock… You will not be able to save your modifications to this layout.

4 Working with a Virtual Layout

4.1 Overview of the 3D view user interface



The 3D view with toolbars and a room layout loaded

The screenshot above shows the 3D view part of the Layout Tool user interface, with upper and lower toolbars and a virtual layout. The upper toolbar contains a selection of tools that are useful for editing and testing the model and retrieving information about it.

The tool sets available include:

- **Edit Tools** – which are provided for editing and organising the objects in the 3D scene. See Using the Edit Tools for more details.
- **Manikin Tools** – which are used to place virtual humans in the layout to test lines of sight, reach, human access, and so forth. There is normally a variety of manikins available from the server that can be used to test the layout, including standing and sitting manikins of various heights. See Using the Manikins Tools for more details.
- **Measurement Tools** – which enable you to make multiple measurements in the layout to check distances and angles, but also to visualise areas of readability for labels and areas within a specific point can be seen. See Using the Measurement Tools for more details.

The lower toolbar contains navigation controls (on the left) and access to the room configuration function (on the right). See Interaction and Navigation in a virtual layout and Layout Printing, Snapshot and Room Configuration for details.

4.2 Interaction and Navigation in a virtual layout

There are primarily two different categories of modes that affect how you interact with the virtual layout; these are **Interaction modes** and **Navigation modes**. The interaction modes change how you interact with the 3D objects in the layout, while the navigation modes change how you navigate the camera around in the layout (i.e. moving around).

The different navigation modes are **Orbit**, **Fly**, and **Pan**.

The different interaction modes are **Pick** and **Rotate**.

The navigation toolbar contains buttons for the most commonly used functions and provide useful information when working in the virtual layout. The toolbar contains four buttons (from the left): **Pick**, **Rotate**, **Navigation mode** (currently: **Orbit**), and **Seek**. This gives you quick access to changing between the two interaction modes and the navigation mode. It is also useful for keeping track of which mode is active. The navigation mode button changes icon depending on which navigation mode is active. To quickly switch between various navigation modes there are keyboard shortcuts, which will be covered in the following sections. Lastly the seek button allows the camera to quickly move to a location that the user selects in the 3D scene.



The main Navigation Controls in the 3D View lower toolbar

The Camera menu contains additional functionality used when navigating the camera in the 3D view, these will be covered in the following sections.

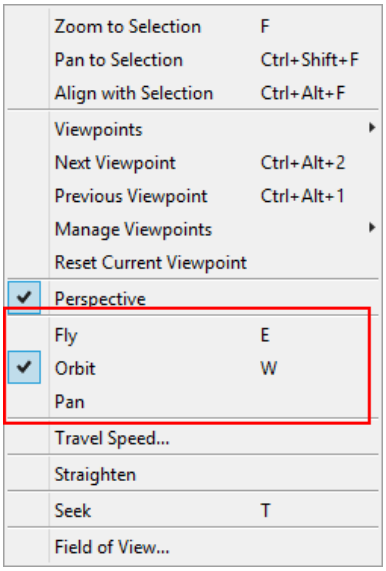
4.2.1 Navigation Modes

The three different navigation types are Orbit, Fly and Pan. You can switch between these types by accessing the Camera menu, and selecting the desired mode. The currently active mode is indicated both in the Camera menu and in the navigation controls in the lower toolbar. In the lower toolbar the navigation icon will change depending on which mode is active.



Orbit is the currently active navigation mode (second from the right)

The active navigation mode can be changed through shortcut keys, these are only available in the 3D view. Orbit is activated with 'W' and Fly with 'E'.



Navigation type can be changed through the Camera menu

4.2.2 Using the Orbit Navigation

The orbit navigation mode moves the camera in relation to a point in space, also referred to as the pivot point. This is the default navigation type used in the 3D tools in the HVRC CREATE suite.

Orbit mode can be activated by pressing the shortcut key 'W' in the 3D view or through the menu Camera > Orbit.



Orbit mode is active

If you have a three-button mouse, the buttons are mapped as follows:

- Left button: **rotate**

  Mouse cursor changes to orbit icon
- Right button: **pan**

  Mouse cursor changes to pan icon
- Middle button (or left & right button): **zoom**

  Mouse cursor changes to zoom icon

When **rotating** the camera with the left mouse button you change the position and orientation of the camera in relation to the pivot point. The pivot point will stay stationary and the camera will rotate (orbit) around the point by changing the horizontal and vertical rotation of the camera.

The direction the camera is moved when either rotating or panning is ***inverted***, meaning that when i.e. dragging left, the camera will rotate to the right and vice versa.

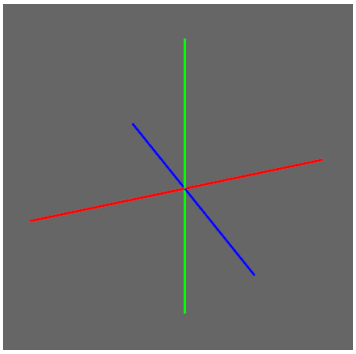
Panning will move the camera without changing its orientation. As the camera moves, the pivot point moves with the camera, maintaining the same distance and orientation from the camera.

Zooming will move the camera closer or further from the pivot point. The pivot point will stay stationary while zooming.

The distance that the camera is actually moved when either panning or zooming is relative to how far the camera is from the pivot point. The closer the camera is to the pivot point, the smaller is the distance that the camera is moved. The camera is prevented from moving past the pivot point, so the zooming distance will approach zero the closer the camera is to the point.

If the ctrl key is pressed while zooming, both the camera and the pivot point can be moved back and forth maintaining the same distance between the camera and the pivot point.

The pivot point can be shown in the 3D view temporarily while navigating. The point is visualised as three coloured lines that intersect at the point, where each lines corresponds to an axis (x, y, and z). To toggle the visibility of the pivot point select View > Show Camera Pivot Point (Orbit).



Pivot point visualisation, red, green, blue corresponds to x, y, z axis

4.2.3 Using the Fly Navigation

The fly navigation mode features free camera movement, enabling the camera to turn and tilt freely while moving. This gives full control over the movement.

Fly mode can be activated by pressing the shortcut key 'E' in the 3D view or through the menu Camera > Fly.



Fly mode is active

If you have a three-button mouse, the buttons are mapped as follows:

- Left button: **fly**

  Mouse cursor changes to fly icon
- Right button: **pan**

  Mouse cursor changes to pan icon
- Middle button: **tilt**

  Mouse cursor changes to tilt icon

Holding down the left button will **fly** the camera. This will move the camera forwards or backwards depending on the way you drag the mouse from the point you clicked. The camera will move in the direction the camera is currently facing. Moving the mouse to either side will also turn the camera towards that direction. Note that the turning is reversed when moving backwards.

Pressing the **tilt** button will tilt, or rotate, the camera in the direction you drag the mouse. This enables you to change the direction you are looking, and also the direction you will fly towards.

Panning will move the camera without changing its orientation. The camera will move in the direction the mouse is dragged.

The speed of the camera when using fly can be changed through Camera > Travel Speed…

4.2.4 Using the Pan Navigation

The pan navigation mode differs from the two other modes in that it does not allow you to change the orientation of the camera manually. This makes it a more specialized mode that you typically only want to use in some specific cases. Pan mode allows moving the camera location in any direction while maintaining the cameras current orientation, this effectively means that you can only pan and zoom.

A typical use case of the pan mode would be to align the camera with an axis, i.e. the y-axis, giving you a top-down view. Combining this with an orthographic view projection (see Changing Perspective Projection) will give a nice overview of the 3D scene. Typically when navigating like this you do not want to orient the camera, but rather want it to stay fixed. This navigation mode is tailored for this, preventing the user from making accidental changes to the camera orientation.

Although the mode itself does not offer any interactive way to change the cameras orientation, it is possible to use other tools to orient the camera. For example the Align Tool (see Aligning camera to selection) can be used to i.e. align the camera with a surface, such as a computer monitor.

Pan mode can be activated the menu Camera > Pan.



Pan mode is active

If you have a three-button mouse, the buttons are mapped as follows:

- Left button: **pan**

  Mouse cursor changes to pan icon
- Right button: **pan**



Mouse cursor changes to pan icon

- Middle button (or left & right button): **zoom**



Mouse cursor changes to zoom icon

Panning will move the camera without changing its orientation. The camera will move in the direction the mouse is dragged. The direction the camera is moved when panning is ***inverted***, meaning that when i.e. dragging left, the camera will move to the right and vice versa.

Zoom will move the camera forwards or backwards without changing its orientation.

4.2.5 Using the Pick Mode

The Pick mode is used to select and interact with objects in the 3D scene.

Pick mode can be activated by pressing the shortcut key 'Q' in the 3D view or the Pick button in the toolbar.



Pick mode is active

The pick mode is automatically activated when using some of the tools or interactions in the application, such as dragging an object into the scene (see Adding an object to the scene) or creating a measurement (see Using the Measurement Tools).

4.2.6 Using the Rotate Mode

The Rotate mode is used to rotate objects in the 3D scene.

To rotate an object:

1. Activate the rotate mode by either pressing the Rotate button in the navigation toolbar, selecting Rotate in the Object menu or by pressing the shortcut key 'R'. Note that the picking button will also be marked as active when in Rotate mode, this is to indicate that selection of objects, which is a feature of the Pick mode is also active.
2. When selecting an object with the mouse, the selected object will be rotated when moving the mouse while holding down the left mouse button.



Rotate mode is active

4.2.7 Temporary switching between Interaction and Navigation Mode

It is possible to temporarily switch between the current active mode and the previously used mode, allowing you to perform some actions using the other mode, before then first mode is resumed. This is useful when you only need to quickly switch to another mode to do a quick action, such as when you are i.e. manipulating objects in the scene, and you need to reposition the camera for a better viewing angle, before you continue operating on the objects.

Note that this switching is only allowed between the last used interaction mode (pick or rotation) and the last used navigation mode (orbit, fly, or pan).

The shortcut key 'shift' is used for this. For as long as the key is pressed, the previous mode will be active. When the key is released, the other mode will be reactivated.

4.2.8 Viewpoints

When viewing the 3D scene the camera is attached to a viewpoint. As the camera, and thus the viewpoint is moved around in the scene its position and orientation is modified. This is stored in the

currently active viewpoint. By changing viewpoints you can quickly switch between different locations in the scene, and you are also able to store locations that you might wish to jump back to at a later time.

There are always seven predefined viewpoints available, these are referred to as **System Viewpoints**. These are automatically created when a new layout is created, and are positioned at various predefined locations commonly used when working with a layout. The positions adapt to the dimensions of the 3D scene.

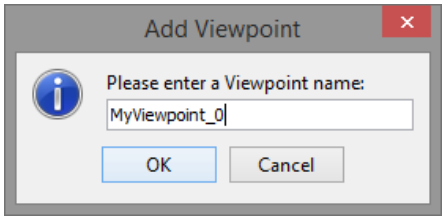
System Viewpoints:

- Top – view from above (looking down)
- Front – view from front
- Left – view from left side
- Right – view from right side
- Back – view from rear
- Bottom – view from below (looking up)
- Explore – view from front, tilted

It is also possible to create your own viewpoints, called **Custom Viewpoints**. There is no real difference between the system and the custom viewpoints, except that the system viewpoints are *locked*, meaning they cannot be renamed or deleted.

Add a custom viewpoint:

1. Optional: Navigate the camera to the position and orientation you want it positioned
2. Select Camera > Manage Viewpoints > Add Viewpoint…
3. Enter a suitable name in the dialog and press Ok or Cancel to abort



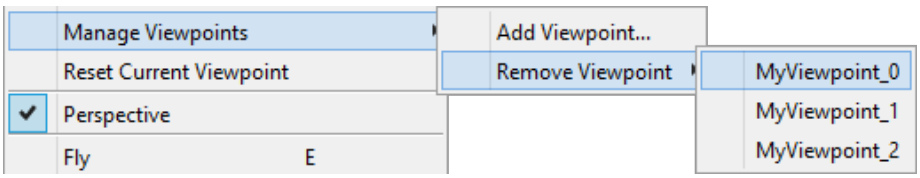
4. The viewpoint has now been created.

   The new viewpoint will automatically inherit the current position and orientation that the camera has at the time it is created.

   Note that the viewpoint you created will not be selected automatically. To select the viewpoint access it through the menu Camera > Viewpoints > MyViewpoint_0 (replace with the name you chose for the viewpoint)

Remove a custom viewpoint:

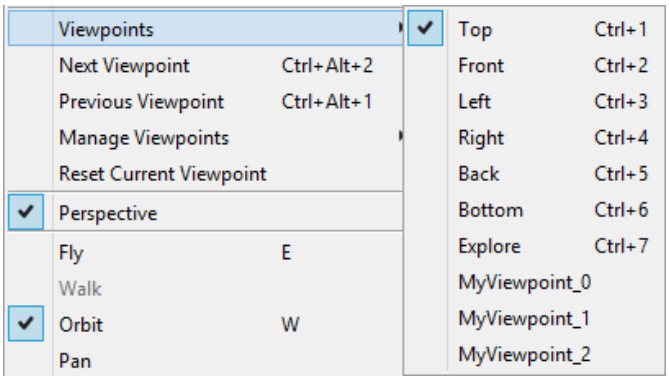
1. Select Camera > Manage Viewpoints > Remove Viewpoint
2. This will show a list of all the custom viewpoints
3. Select the viewpoint you wish to remove in the list:



4. A confirmation prompt will be shown. Press Yes to remove it or No to cancel. Note that you cannot undo this removal.

Select viewpoint:

1. Select Camera > Viewpoints



2. Choose the viewpoint you want to select. The currently selected viewpoint is marked in the list.
   Note that the system viewpoints are always listed first. The shortcut keys command-[1-7] will select the associated viewpoint. There is no associated shortcut available for custom viewpoints.
3. When a viewpoint has been selected the camera will automatically be moved to the location and orientation specified by the newly selected viewpoint.

Reset current viewpoint:

It is possible to reset the viewpoint back to its original position and orientation.

1. Select Camera > Reset Current Viewpoint

For the system viewpoints this will set the viewpoints back to the correctly fitted location calculated based on the size of the 3D scene and which viewpoint it is (i.e. top is different from front). The custom viewpoints have no relation to the size of the 3D scene, and will thus be reset to the position and orientation they had initially, which will either be what they had when the layout was loaded, or if it was newly created it will be the location it had then.

Quickly switch to next viewpoint:

It is possible to quickly select the next viewpoint in the list of viewpoints. This is done by either selecting Camera > Next Viewpoint or using the shortcut key command-alt-2. This cycles through all the viewpoints, including custom viewpoints.

Quickly switch to previous viewpoint:

It is possible to quickly select the previous viewpoint in the list of viewpoints. This is done by either selecting Camera > Previous Viewpoint or using the shortcut key command-alt-1. This cycles through all the viewpoints, including custom viewpoints.

4.2.9 Using Straighten

The Straighten feature is used to level the user view relative to the ground when moving around in the Explore navigation mode. It resets any tilt movement that might have been made.

To straighten your view:

1. Press the Straighten menu entry in the Camera menu, or use the shortcut key 'spacebar' when in the 3D view.

4.2.10 Using the Seek Button

The Seek button is used to move the view closer to a point clicked on in the scene. After activating Seek, you can click on the scene for the view to move automatically towards that point. This can be useful for quickly moving around a 3D scene. The mouse cursor will change as long as Seek is active.



The Seek Button

To use Seek navigation to move the camera towards a point in the scene:

1. To active Seek either press the Seek Button in the navigation toolbar, or select Seek in the Camera menu, or press the shortcut key 'T' in the 3D view.
2. The mouse cursor will change to the same icon as the Seek button. This will remain active until step 3. is completed or Seek is cancelled by either pressing the button again, or pressing the 'escape' key.
3. Click on a surface in the 3D view
4. The view will move rapidly towards the point clicked, stopping immediately in front of the point

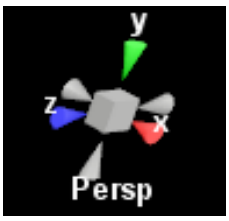
4.2.11 Using the Virtual Compass

The virtual compass indicates the cameras position and orientation in the virtual layout in relation to the direction of the X, Y, and Z axis. This can be useful to help you maintain your bearings while moving around.

If the camera is placed on the floor and the camera is looking straight ahead, then the x-axis is towards the right, y-axis is upwards, and z-axis is towards you.

To use the compass:

1. Select View > Show Compass
2. A virtual compass will appear in the upper right corner of the 3D view:



3. Press the menu entry again to turn the 3D compass off

The virtual compass is interactive. If you place your mouse above any of the elements that compose the compass you will see that they change colour indicating that the current element is interactive. Clicking on any of the cones will transition the camera to the position and orientation represented by the compass. The box can be pressed to switch between the different projection modes, Perspective and Orthographic (see Changing Perspective Projection).

4.2.12 Setting the Background Colour

The background colour of the 3D view can be configured to a colour that provides an appropriate background to the layout in use.

To toggle between a plain white background and a user-defined background for the 3D view:

1. Select View > Show Background

To change the background colour of the 3D view:

1. Select View > Set Background Colour…
2. A colour chooser dialog will appear
3. Select a colour and press OK or Cancel to abort

4.2.13 Using the Visual Grid

A user-configurable visual grid is available that can be useful as an aid to judging distances. See also Snap to Grid for more information on practical use of the grid.

To toggle the visual grid:

1. Select View > Show Grid or press the shortcut key 'G' in the 3D View

To configure the visual grid:

1. Select View > Grid Options…
2. A dialog will appear in which you can adjust the grid spacing and colour

Press OK to accept the changes or cancel to dismiss the dialog

4.2.14 Changing Perspective Projection

The default 3D projection in the 3D view is **perspective projection**. This is similar to what the human eye perceives when viewing the real world, where objects in the distance appear smaller than objects close by. Alternatively perspective projection can be turned off, in which case **orthographic projection** will be used instead. Orthographic projection will ignore the distance between the eye and the objects, effectively rendering all objects at the same scale.

To toggle perspective project:

1. Select Camera > Perspective

This will turn perspective projection on or off

4.2.15 Changing the Field of View

The field of view defines how much of the 3D scene is observable from the 3D view. Increasing the field of view will let you see more of the 3D scene, but objects may appear smaller. If the field of view value is set too high the image can look distorted. Generally values between 60 and 90 are recommended, depending on how large the monitor is, and how far away from the monitor the user is seated.

To change the field of view:

1. Select Camera > Field of View…
2. A dialog will appear in which you can set the field of view

Press OK to apply the new value or Cancel to abort

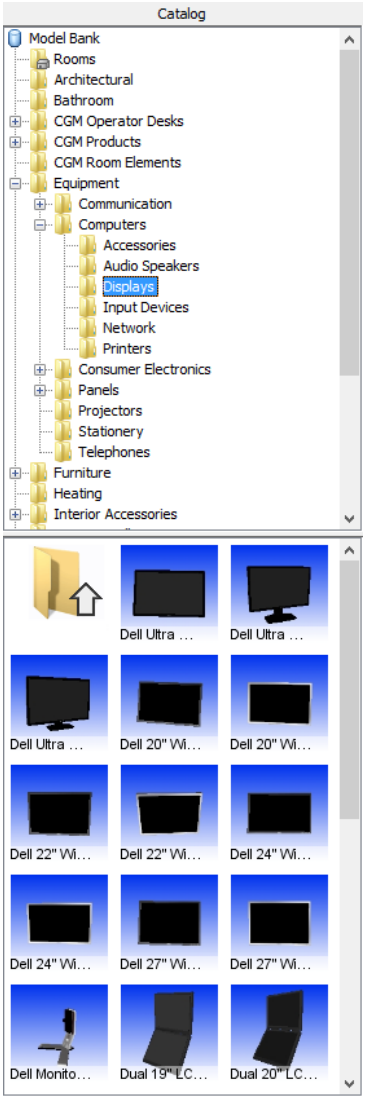
4.3 The Model Bank

The Model Bank Catalog provides access to the 3D models available to the current project, as specified by the project manager using the Project Management Tool.

Models are arranged in a hierarchy of categories.

Each category can contain sub-categories and/or a set of models.

Categories have a generic folder icon or an icon with a folder and a room, indicating that the category contains room models.



The Model Bank Catalogue

To browse model bank categories:

1. Click on a category name to reveal its contents (if any) in the lower panel of the Catalog.
2. If the category contains sub-categories, a handle is shown to the left of the category name. By clicking on this handle, you can reveal or hide subcategories, which can be accessed in the same manner.

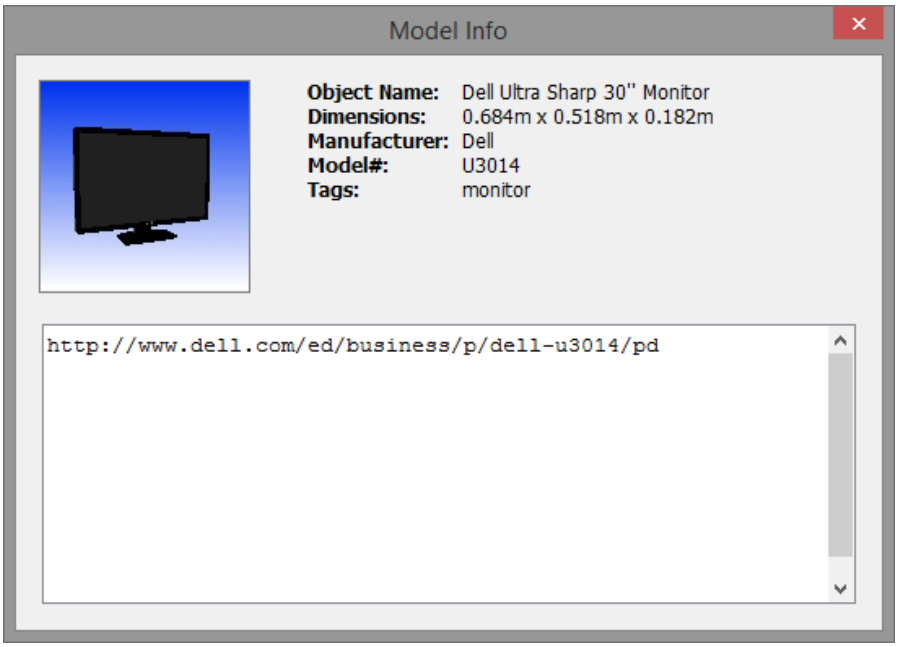
4.3.1 Viewing Model Bank details about an object

In addition to the models themselves, the Model Bank often contains additional useful information about the items in it. Model details for an object include a snapshot, its name, dimensions, comments, and associated tags.

Note that in addition to the method described below, Model Bank details can also be accessed via the Object Overview popup menu for an object that has already been added to a scene.

To view Model Bank details about an object:

1. Locate the icon of the object of interest in the Model Bank Catalogue
2. *Either* Click on the icon, without moving the mouse while clicking (i.e. Click on the icon, but do not drag it) *or* right-click on the icon to access a popup menu and select Model Details from the menu.
3. The Model Details window will appear with information about the object.



Model Details for a room objects in the Room category

4.3.2 Customising the icon view

It is possible to choose between small or large model and catalogue icons and to choose whether to display an item's name on the model icon.

To choose small Icons:

1. View > Small Catalog Icons

To choose large icons:

1. View > Large Catalog Icons

To display an item's name on the model icon:

1. View > Catalog Icon Labels

4.4 Adding a room to the scene

When starting work on a new layout, the first step is typically to either

- Insert a room from the Model Bank
  or
- Create a new room using the Layout Tool

By *room* we really mean an arbitrarily complex structure with walls, floors and ceilings, so your room could be the entire floor of a building or even a whole building. A layout can contain more than one room.

Typically a room is the shell of a storey of a building — the architectural constraint within which your layout will be created.

Pre-built rooms can be added to a layout by dragging the room icon representing the required model from the Model Bank Catalogue into the 3D scene. If a pre-built room is dropped onto a Ground object then the Ground is replaced by the pre-built room, otherwise it is inserted into the layout as an additional structure, which you can position as you wish. If you want a Ground and a pre-built room, then you should draw a foundation (e.g. a flattened parametric Box) for the room on the Ground and the place the pre-built room on top of that (locking the position of both afterwards to prevent accidentally moving them).

There are three ways of creating a room shell using the Layout Tool

- Use the Room Wizard to configure a predefined room layout
- Use the Room Wizard to configure a predefined room layout and then modify the result by splitting and pushing walls
- Choose an empty room from the Room Wizard and build a room, wall by wall, using wall objects

The easiest way to create a new room is by using the room wizard that appears when a new layout is started. The wizard creates the basic shell of a room, which you can later modify to include the details that you need. The room shell created by the wizard comprises of a Wall Group containing a set of Wall elements. A *Wall Group* is an ordered group of *Wall* elements, where neighbouring Wall elements share corners, and can share an enclosed ceiling and floor. A Wall Group typically represents a room or storey in a building.

Once you have loaded or created a room shell, you can partition it further by splitting wall, and adding architectural objects to a scene, such as Wall Groups and Walls from the Objects menu. The same architectural objects can also be used to create additional rooms from the ground up.

It is strongly recommended that you turn on the Snap to Grid functionality when drawing or modifying Wall elements or Wall Groups. In addition to snapping wall corners to the global grid, this also enables a snap features specific to the wall editor that makes modifying rooms easier.

To add a pre-modelled room to a scene:

1. Browse the Model Bank categories to locate a room. Room categories are always listed at the top of the Model Bank category list and have icons indicating that they contain rooms. In some cases, the rooms may be located in a sub-category of one of the categories near the top of the list.
2. Click on the icon representing the room that you want to add to the scene and hold the left mouse button down
3. Drag the icon over the 3D view. The cursor will change to indicate that the icon is being dragged



A room icon being dragged from the Model Bank Catalog into a scene

4. Release the mouse button over the ground, or some other location where you would like to place the room into the scene

5. If you drop a Model Bank object directly onto a Ground object then the Ground will be replaced by the new room, otherwise the new room will be added to the scene, like a normal Model Bank object that you can position (it is recommended that you then lock the position to prevent accidentally moving it).

To replace a pre-modelled room with another pre-modelled room:

1. Select the room object in the Object Overview
2. Right-click to reveal the popup menu and select Remove from the menu or select Edit > Remove
3. The existing room will be replaced by a Ground object
4. Add a different pre-modelled room to the scene, dropping it on the Ground
5. The Ground will then be replaced by the new pre-modelled room.

To create a room using architectural parametric objects:

1. Consider turning on snap-to-grid and setting an appropriate grid distance to make it easier to draw walls accurately
2. Select the Objects > Architectural > Wall Group menu item
3. Click inside the 3D scene (e.g. on the ground or the floor of an existing room) to start drawing a wall
4. A marker handle will be displayed indicating the start location for the first Wall element in the new Wall Group
5. Each time you click the mouse a new wall will be drawn from the last marker to the location you click on, and a new marker will appear. You can continue to click at new locations in the scene to add as many new Wall elements as you like to the Wall Group
6. To create an open Wall Group, double-click to specify the location of the last marker. Alternatively, create an enclosed Wall Group, where the last and first points meet to create an enclosed space, by clicking on the first marker handle
7. Click on the Attributes tab in the Selected Object pane to reveal the attributes table for the selected Wall Group object. You can add a floor or ceiling, change the wall height or thickness, or adjust wall colour, by adjusting the objects parameters. Door and window openings can be added to Wall elements similarly, by modifying the attributes of individually selected Walls.
8. To add additional internal walls, repeat this procedure to add additional Wall Groups or, in a similar manner, insert single Wall objects.

4.4.1 Using the Room Wizard

The Room Wizard is displayed when you create a new layout by selecting New from the File menu. The wizard has two forms that can be navigated between by pressing Previous and Next buttons. In the first form, you can select an empty room or a preconfigured room shape, and in the second form, you can enter parameters to configure the chosen room shape.

An “Empty Room” is simply a *Ground* object. You can select an empty room shape from the Room Wizard if you wish to start with a completely empty scene. If you hit Cancel when the Room Wizard is shown, a default empty room is created.

Even if the room you intend to build is relatively complex, you can save time by selecting a room with approximately the same shape as the one that you intend to model. Once the basic room has been created, you can modify it by splitting and moving walls.

The Room Configuration Options form is illustrated with a picture showing the parameters a, b, and c, which may be available for configuration depending on the room shape chosen. Note that the dimensions of the room and the a, b, and c parameters represent the inner dimensions, so a room that is 10 x 10 m is the same size from within the room regardless of how thick the walls are. The wall height is also from the floor to the ceiling, regardless of how thick the floor or ceiling is.

The *Ground* object and the *Floor* element of a room are different entities:

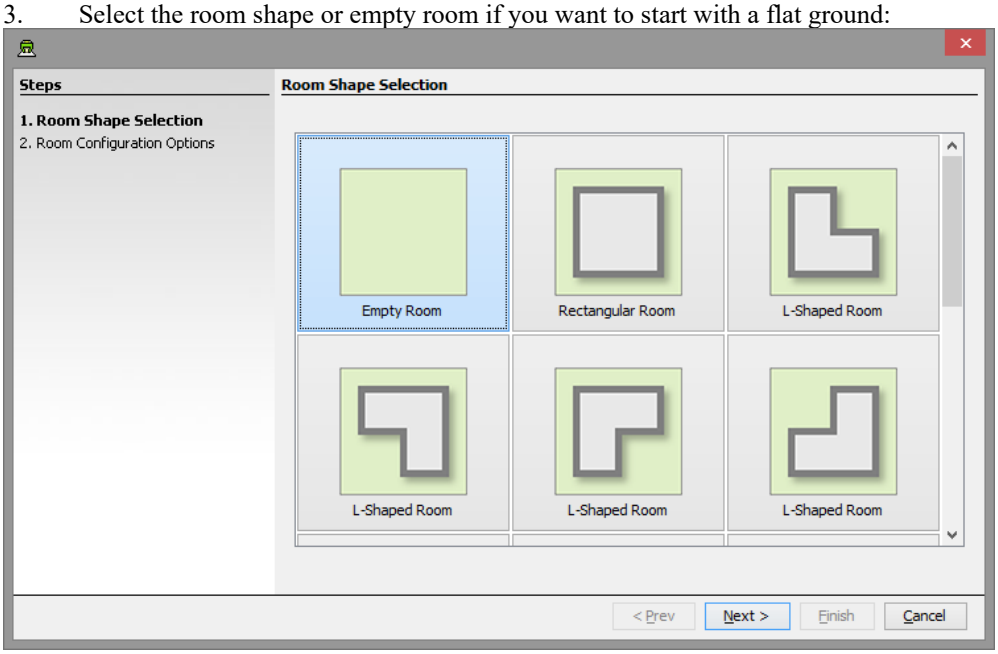
- The Ground is the surface on which a room (Wall Group) is placed
- The Floor (and Ceiling) is an element that belongs to a room. It is enclosed by Wall elements managed by the Wall Group that define its shape

- The position of the ground is fixed, but you can move a Wall Group (with its Floor) around, although you may need to unlock the position. It is a good idea to lock the position and rotation of a room to prevent it from accidentally being selected and moved around the scene

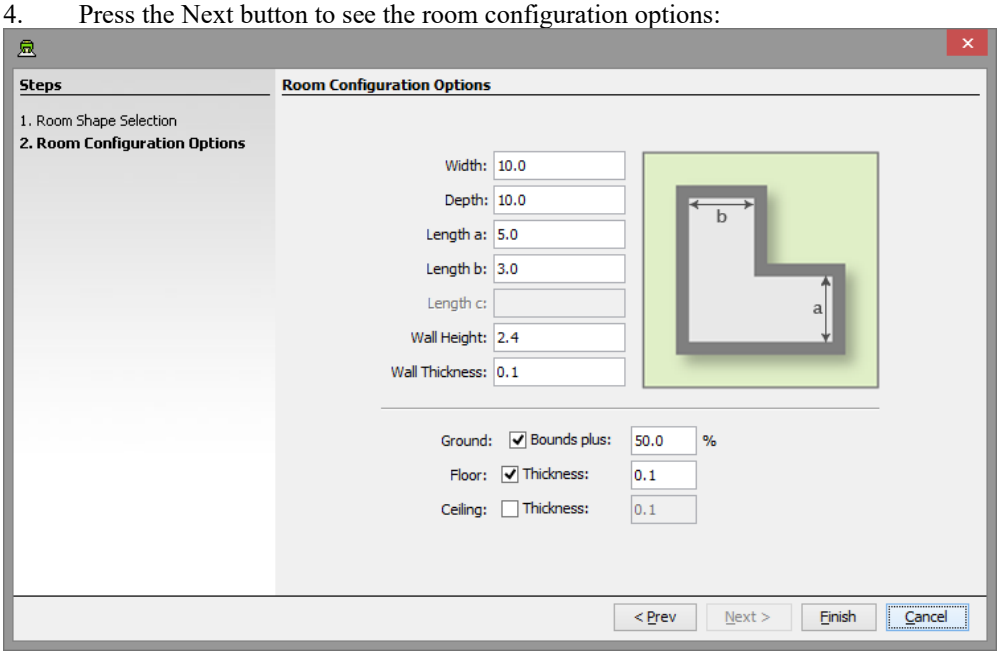
The Room Configuration Options form also enables you to specify that the ground should be a percentage larger than the bounds of the room.

To use the Room Wizard to create a new room:

1. Select File > New… to create a new layout
2. The Room Wizard will appear automatically. If you hit Cancel (or press 'escape') then a default sized empty room is created and the wizard is dismissed.
3. Select the room shape or empty room if you want to start with a flat ground:



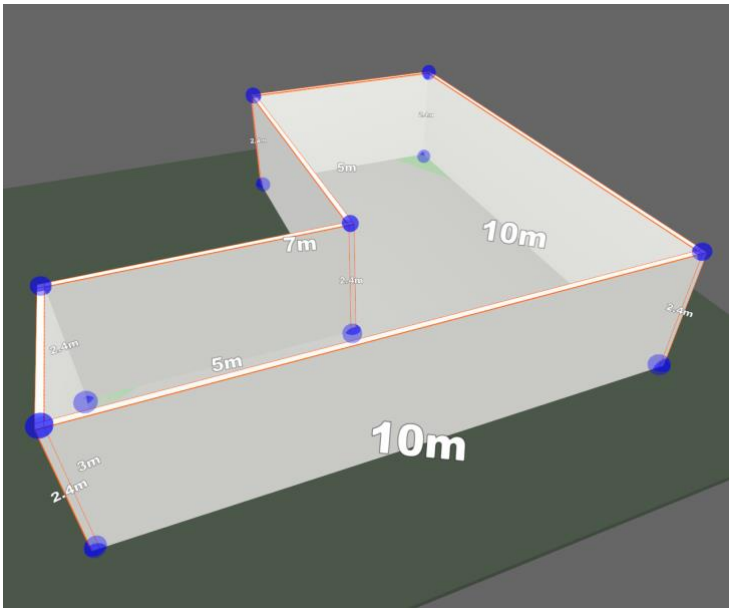
4. Press the Next button to see the room configuration options:



5. Set the room configuration options. You can use the Previous and Next buttons to switch between forms until you are satisfied with your choices
6. Press the Finish button to generate the specified room and dismiss the wizard

4.5 Modifying the ceiling, floor and walls of a room

Rooms comprising of Wall Groups and Wall elements can be modified. To modify a Wall or a Wall Group right-click on any of the walls in the 3D view and select Edit. This will enter the wall-editing mode. Alternatively, double-click on the Wall Group to make it editable, and then double-click on a Wall to make that editable. Once in the edit mode, you can modify the Wall Group and Walls quickly and easily. Spherical handles indicate the Wall corners when a Wall or Wall Group is in editing mode.



A Wall Group in wall-editing mode, with spherical wall-corner handles indicating the edges between Wall elements in the Wall Group.

If you select an object other than the markers or a wall, then the Layout Tool will exit wall-editing mode and the markers will disappear.

Until you exit the wall-editing mode, you can drag then handles to move the ends of walls and select wall elements and push and pull them to move them in or out. Pushing or pulling a wall is often quicker than moving the handles at each end of a wall. The upper sphere handles let you adjust the height of all the walls in the wall group. Within a Wall Group, all Walls share the same height. If you need different heights for the walls you need to create additional Wall Groups, or a single Wall.

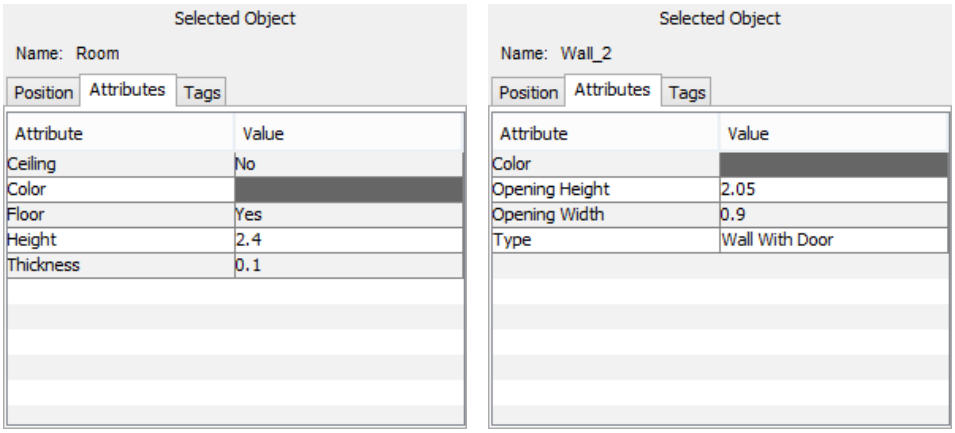
While in the wall-editing mode, you can split a Wall by right clicking on it and selecting Split Wall or by double-clicking on the wall while it is individually selected and already in edit-mode. A new handle will be created at the split. If you split a Wall that is not in a Wall Group, then the result of the split will be a new Wall Group with two Wall elements.

As for creating new rooms, it is easiest to edit a Wall Group or Wall if you first turn on the Layout Tools snap to grid function.

Wall Groups have optional ceiling and floors, and you can modify the colours of the floor, ceiling, or individual wall elements by modifying the appropriate attributes of the selected object. You can also add openings for doors or windows to Wall elements by modifying the attributes of a Wall element. Modifying the size and position of the opening is done interactively while when in the wall-editing mode. If a Wall element has an opening, then additional handles are drawn when it is in edit mode, enabling to change the dimensions of the opening. You can also drag the whole opening within the bounds of the individual Wall element.

It is strongly recommended that you turn on the Snap to Grid functionality when drawing or modifying Wall elements or Wall Groups. In addition to snapping wall corners to the global grid, this also enables a snap feature specific to the wall editor that makes modifying rooms easier.

When selecting any of the walls in a Wall Group in the 3D view, the selection will always default to the Wall Group. If you want to select a single Wall, right-click on it and select Select Wall.



Wall Group and Wall element attributes

To select a single wall:

1. Right click on the wall in the 3D view
2. Select Select Wall in the popup menu

Alternatively you can select the wall in the Object Overview.

To get selection back to the wall group either click on one of the other walls in the wall group or right click on the same wall and select Select Wall Group.

To move or resize a wall:

1. Right click on a Wall or Wall Group in the scene and select Edit to enter the editing mode
2. Wall handles will appear indicating that the wall is in edit mode
3. Select a Wall element and drag it to move it in/out or select a handle and drag it to move the end of a Wall element
4. To exit the wall-editing mode, click on the floor or ground to deselect the wall element or wall group

To split a wall:

1. Right click on a Wall or Wall Group in the scene and select Edit to enter the editing mode
2. Wall handles will appear indicating that the wall is in edit mode
3. Right click on a wall where you would like a split to be made. Select Split Wall from the popup menu. A single wall object will be converted into a Wall Group with two Wall elements, if it is not already part of a Wall Group.
4. A new handle will appear at the split point
5. Repeat the operation to add additional handles
6. To exit the wall editing mode, click on the floor or ground to deselect the Wall element or Wall Group

To add a door or window opening to a wall:

1. Select a Wall element directly in the Object Overview, or the 3D view while in the wall editing mode
2. Click on the Attributes tab of the Selected Object panel to reveal the attributes table for the selected object
3. Click on the value for Type and select Wall With Door or Wall With Window from the drop-down menu that appears
4. You can modify the size and position of the opening by interactively dragging one of the blue spheres or by entering values for fields in the attributes panel.
5. In some case you may need to split a Wall element to add more openings

To edit a wall with a door or window:

1. Select the wall you wish to edit as described above
2. Right click on the wall (once selected) and select Edit Wall
3. The wall and the hole will now be editable, you can modify the position of the opening by dragging the sphere handles
   Note that this will also enable editing of the rest of the wall group
4. To exit the wall editing mode, click on the floor or ground to deselect the Wall element or Wall Group

To add a floor and ceiling to an existing Wall Group:

1. Select a Wall Group object
2. Click on the Attributes tab in the Selected Object pane to reveal the attributes table for the selected object
3. Turn on the ceiling or floor by modifying the appropriate attributes shown in the Attributes panel
4. Click on the floor or ground to deselect the wall element and exit the object editing mode
5. If you need to change the thickness of the floor or ceiling then that attribute can be modified by selecting the Floor or Ceiling object and adjusting the Thickness attribute of that object in the Attributes table

To change the colour of an existing parametric wall, floor, or ceiling:

1. Select a Ceiling, Floor, or Wall element directly in the Scene Overview, or a Wall element in the 3D view while in the wall editing mode, or Select a Wall Group
2. Click on the Attributes tab in the Selected Object pane to reveal the attributes table for the selected object
3. Adjust the attribute that you wish to modify in the Attributes table by clicking on the value and selecting a new colour from the dialog that appears. If you change the Wall Group colour then you set the colour for all of the Wall elements that it contains, whereas changing the colour of a Wall element, Floor or Ceiling changes the colour for just that element.
4. Note that changing the colour of a Wall applies the same colour to both sides of the wall. If you need to colour one side a different colour then you can use thin primitive objects to cover the side of the wall and then set those primitives to the required colour. For example, for a plain rectangular wall with no openings, you can use a thin Box to wallpaper a wall.

4.6 Adding an object to the scene

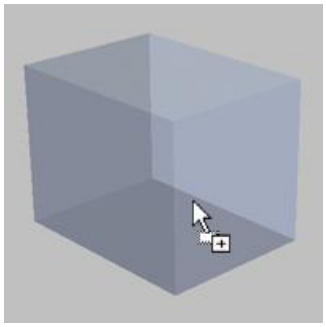
Ready-made models are added to a scene by simply dragging a model icon from the Model Bank Catalogue into the 3D view and dropping the model where you wish to place it.

3D models that are located on the local machine can also be added to the scene; these are referred to as project models and are described in greater detail in section 4.12.

Entirely new geometry can also be created within the Layout Tool by selecting a parametric object from the Objects menu and then drawing in the scene. While ready-made models cannot be altered, beyond positioning and rotating them, parametric objects created within the Layout Tool can be modified. In addition to basic geometry that can be edited interactively, some parametric objects have attributes that can be set to customise the appearance or shape of the object.

To add an object to the scene:

1. Browse the Model Bank categories to locate an object you would like to add to the scene.
2. Click on the icon representing the object that you want to add to the model (and hold the left mouse button down for the next step).
3. Drag the icon into the room (and hold the left mouse button down for the next step).
4. A box with the same dimensions as the object you are adding is displayed and follows the mouse cursor as you drag your mouse, to indicate where the new object will appear. Move the cursor to position the object.



An object in the process of being introduced to a scene

5. Release the mouse to create the object at the chosen location.



An object that has just been added to a scene

6. The object is added to the scene and automatically selected.

Updating the model version for objects in the Layout:

If a newer version of a model has been added to the Model Bank you can update the version used in the Layout to the latest version found. The Edit > Models contains a sub menu that has several different ways to update the model version for objects in the current layout. These are:

- **Update Model for Selected Object**: This will update the model version for only the selected object
- **Update Models for All of Selected Object Type**: This will update the model version for all objects in the layout that are using the same model object as only the currently selected object
- **Update Models for Selection**: This will update the model version for all objects currently selected
- **Update Models for All Types from Selection**: This will update the model version for all objects in the layout that are using the same model object as the ones currently selected
- **Update Models for All**: This will update the model version for all objects in the layout with no limitations

To create an entirely new object within the Layout Tool:

1. Select an object type from a sub-menu in the Object menu (e.g. Object >Primitive > Cone)
2. Click in the layout to start drawing the object and then EITHER drag the new object to the required size before releasing the mouse button, if the object is rectangular or volumetric, OR, if the object is a kind of line rather than a volume (such as a Line object or a Wall), the first click starts the line and subsequent clicks add a line segment, with a double-click completing the line for its last point.
3. You can interactively modify the object by right clicking on it and selecting Edit from the popup menu. This will turn on edit mode for the object, where there are blue sphere handles that can interactively be dragged to modify the object. To finish editing deselect the object. See Editing parametric objects for more information.

4. From the Object Attributes panel (in the Selected Object pane), you can adjust additional parameters related to the object manually (e.g. adjust the height of a cone or the width of a cube, set a colour, or enable an option).

4.7 Selecting objects

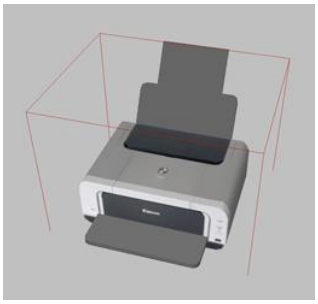
Most actions that can be performed on objects require that you select an object on which the action will be performed.

Clicking on the floor of a room deselects all selected objects. Alternatively the shortcut key 'escape' will achieve the same effect.

If you are not in multiple selection mode (see Multiple Selection), then selecting a new object will cause previously selected objects to lose their selection.

To select an object in the scene:

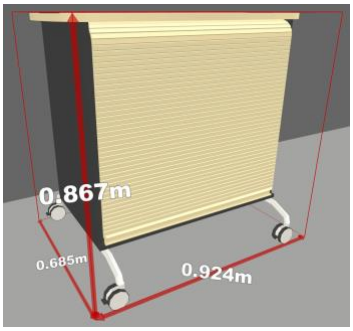
1. Make sure the Picking mode is active (or hold down the shortcut key 'shift' for the duration of the selection operation to temporarily toggle picking mode, if the Picking mode is not selected)
2. Move the mouse cursor over the object you would like to select.
3. Press the left mouse button to select the object.
4. An outline box will appear around the selected object to indicate that it is selected:



A selected object

To view dimensions of selected object:

1. Select View > Show Selection Dimensions
2. Selected objects will now display the dimensions:



Dimensions shown for the selected object

4.8 Positioning objects

To position an object in the scene:

1. Select the Picking Button if not already selected.
2. Select the object that you want to position (see Selecting objects), but do not release the left mouse button.
3. Drag the mouse to move the object to a new location. The object will follow your mouse.

4. Release the mouse button to drop the object.

4.9 Rotating objects

To rotate an object in the scene:

1. Activate the rotate mode by either pressing the Rotate button in the navigation toolbar, selecting Rotate in the Object menu or by pressing the shortcut key 'R'.
2. Select the object you want to rotate (see Selecting objects) – but do not release the left mouse button if you are using the alt-key modifier.
3. Drag the mouse to the left or right to rotate the object. The selected object will be rotated around its Y-axis.
4. Release the mouse button to complete the rotation.

4.10 Showing the dimensions for selected objects

To show the dimensions for objects selected in the layout:

1. Select View > Show Selection Dimensions
2. Select object(s) (see Selecting objects)
3. Dimensions of the outline box will show on the outline box

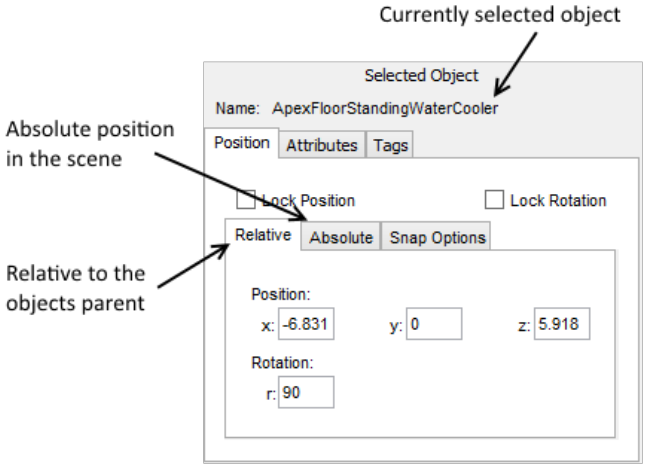
4.11 Accurate positioning of objects

It is possible to accurately position objects in the scene using the Selected Object panel.

There are two different ways of accurately positioning objects: Relative to the objects parent (relative positioning) or relative to the origin of the scene (absolute positioning).

To accurately position an object:

1. Select the object
2. The objects position and rotation will be shown in the Selected Object panel in the Relative or Absolute tabs:



The Selected Object Panel showing the objects relative position and orientation in a scene.

3. Select the Relative or Absolute tab depending on which method you want to use to adjust the objects position and orientation.
4. Enter new values as desired.
5. Values are updated when you hit the 'enter' key on your keyboard after entering them. If the object is within view in the 3D view then you will see the changes you make reflected in the 3D view.

4.12 Adding 3D models from the local machine (as Project Models)

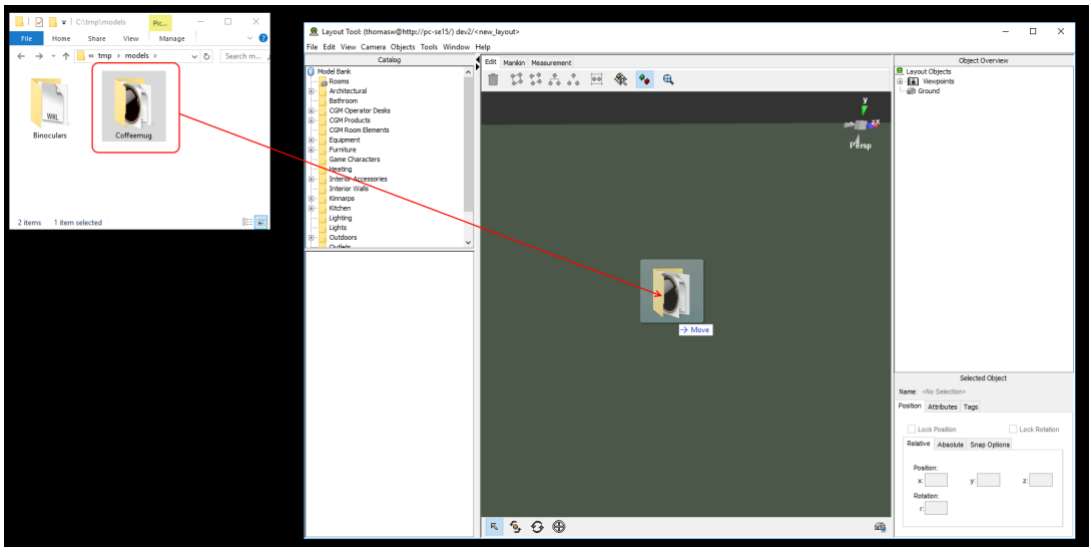
3D models that are stored on the local machine can be added directly to the layout without adding them to the server using the Model Bank Tool. This gives the user an easy way to quickly test various models without having to first upload them to the server using the Model Bank Tool.

These models are referred to as Project Models, and as the name indicates, these models are specific to the project that the current layout belongs to and will only be available within that project.

Please note that this feature is not intended as the default way of adding new models to the layout, it is only provided as an easy and quick solution for testing various 3D models for i.e. compatibility or as a placeholder.

To add a local 3D model as a project model in the scene:

1. Drag the 3D model from the local machine and release it on the image surface object. The file can either be the directory that the model is located in, a zip-archive containing the model or the model file directly. The supported model formats are COLLADA (dae), KMZ and VRML (wrl). Additional model formats (OBJ, LWO, PLY, SCENE (Ogre3D)) can be enabled by selecting "Enable experimental 3D loaders" in the Expert Preferences dialog.



Drag 3D models from the local machine into the scene

2. If the dropped 3D model is a valid type it will be loaded directly as an object in the scene. Note that the loading may take some time depending on the complexity of the model. The last used settings in the model import dialog from the Model Bank Tool are applied to the model. If there are problems with the loaded model, such as visual artefacts, incorrect scale, orientation etc. it is necessary to open the model in a 3D modelling tool and make adjustments.



Local 3D model loaded as a project model in the scene

3. The project model behaves the same as any other object in the scene. If you wish to have multiple instances of the same object in the scene either duplicate or copy/paste the object. Alternatively drag the same model from the local machine into the scene again.

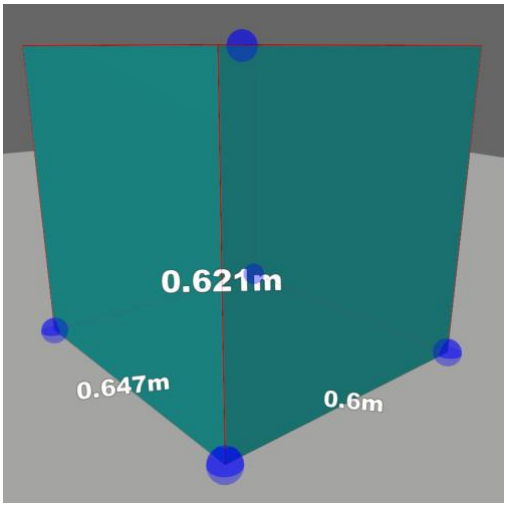
4.13 Editing parametric objects

Objects, including wall segments that have been created via the Objects menu are parametric, meaning that they are defined by parameters that you can either edit interactively or adjust via the Object Attributes pane.

Parametric objects may have their own representative icons in the Object Overview, whereas Model Bank objects (which cannot be edited) are represented as brown sphere icons.

To edit a parametric object interactively:

1. Double-click on a parametric object or right-click on it and select Edit from the popup menu
2. Click on one of the objects editing handles and drag the handle to interactively modify the objects geometry. Note that some parametric objects may not support interactive editing, in which case no handles will be shown when you select Edit on the object.

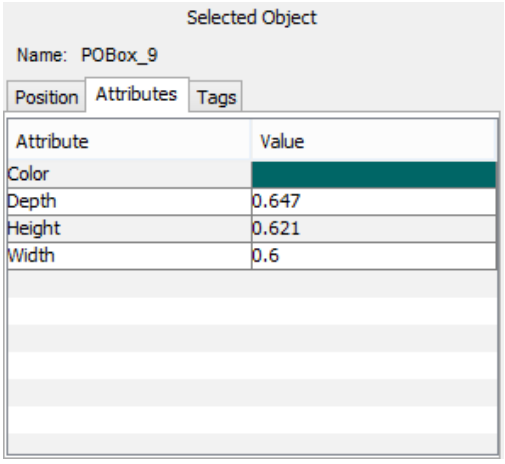


Parametric box in editing mode

3. Click on the ground or floor to exit the object editing mode (some objects may also exit the object editing mode automatically if you move them)

To edit a parametric object's attributes directly:

4. Select a parametric object
5. Select the Attributes tab in the Selected Object pane
6. Modify the values that you wish to change in the attributes table. If the value needs to be typed in rather than selected from a menu or dialog then hit 'enter' key after modifying the value, otherwise it will not be set.



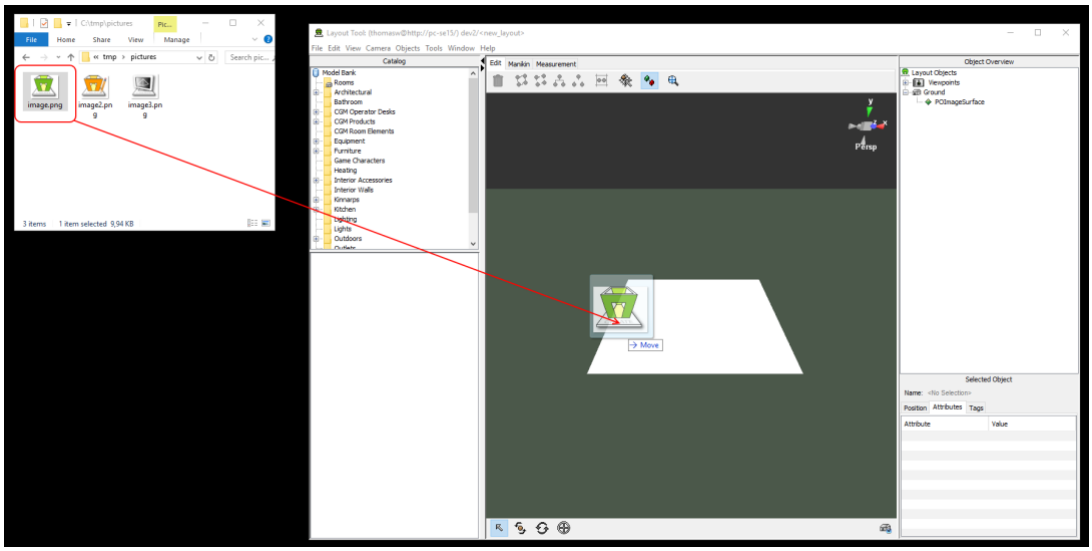
Parametric box attributes

7. Changes are reflected in the scene immediately after a value is modified

4.13.1 Editing Image Surfaces

Add local image to an Image Surface object:

8. Drag an image from the local machine and release it on the image surface object.



Drag image files from the local machine

9. If the dropped image is a valid type it will be applied directly to the object. Supported image formats are JPEG, PNG and GIF.

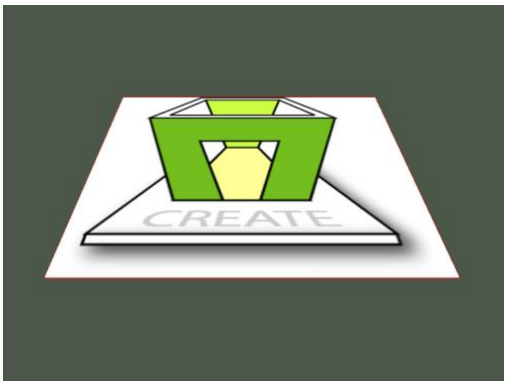


Image applied to image surface object

Note that the image file will be uploaded to the server when the layout is saved.

Image surfaces support images with alpha channel. The alpha channel can be turned on/off by selecting the Transparent property in the Attributes panel.

4.14 Showing scene as Wireframe

The objects in the 3D scene can be shown as wireframe, where only the edges and connecting lines of the models are shown.

To toggle wireframe:

1. Select View > Show Wireframe

4.15 Layout Printing, Snapshot and Room Configuration

4.15.1 Printing the Virtual Layout

The virtual layout can be printed directly to a printer at the maximum resolution of your screen, filling the entire page. The resulting printout may show more or less than you actually see in the 3D view, depending on the orientation of the paper as it creates a full-page image based on the location and direction of the view rather than the screen image itself.

This differs from printing screenshots that screenshots are printed exactly as taken (an exact copy of the 3D view), so this function will normally result in a higher-resolution image and will give more pleasing results when printing to large sheets of paper as the whole page is filled with the image.

Always set the orientation of the paper using the page setup dialog.

Note that the dialog windows shown by the Layout Tool will depend on the operating systems you are using, so the actual dialog window on a computer running Mac OSX will differ from the equivalent dialog window on a computer running Windows.

To set up the page:

1. Select File > Page Setup…
2. Choose the required settings and confirm or reject your changes.

To print the virtual layout:

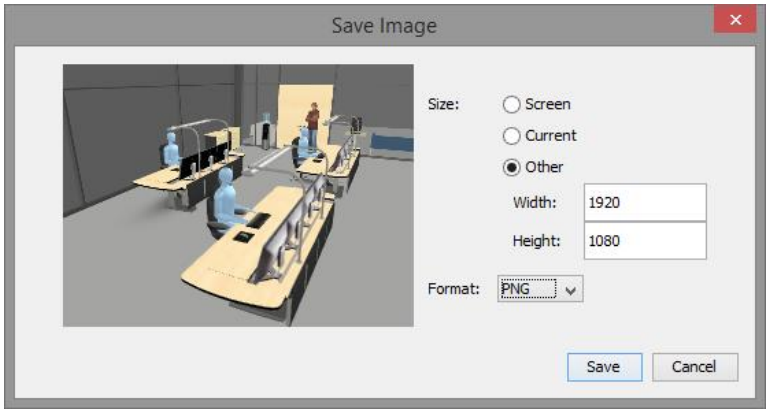
1. Select File > Print… or use the shortcut keys command-P
2. Choose the required settings. To ensure correct results, do not select orientation using the print dialog (Use File > Page Setup… instead)
3. Continue (typically, click on OK) or abort (typically, click on Cancel)

4.15.2 Creating a Snapshot of the Virtual Layout

Screenshots can be created by selecting File > Export 2D Graphic from the File menu.

To create a snapshot:

1. Select File > Export 2D Graphic from the File menu.
2. This will prompt you with the following dialog.



The Snapshot button in the centre

3. Select the appropriate options for the image to save.

   Screen: This will export the image using the resolution of the current screen.

   Current: This will export the image using the current size of the 3D view on the screen at the moment the dialog was opened.

   Other: This lets you export the image using a custom resolution.

   Format can be set to either JPEG or PNG.

4. Press Save or Cancel to abort. Upon pressing save you will be prompted to choose a filename and a location to save the image.

4.15.3 Controlling visibility of parts of the virtual room

Note that this feature is provided to give access to elements of pre-modelled rooms imported from the Model Bank only. For rooms modelled within the Layout Tool using the Room Wizard or Wall groups, you can use the functionality for hiding and showing objects (see Toggling the visibility of objects).

While working with a layout you may find that parts of the room obscure your view and that it would be convenient to temporarily hide them. For example, it is very often useful to temporarily hide the ceiling of a room in order to get a good overview of the layout and work with it from above.

Toggling the visibility of parts of the room is done using the Room Configuration window. Note that this is purely a visual aid for controlling visibility so no changes are actually made to the room model itself that would affect other users or modify the design.

What you can toggle depends on how the room model itself has been created. In some cases, you may not be able to toggle anything, whereas in others there may be many parts that can be toggled. In any case, this functionality only toggles parts of the room model and not the contents, which remain in place.

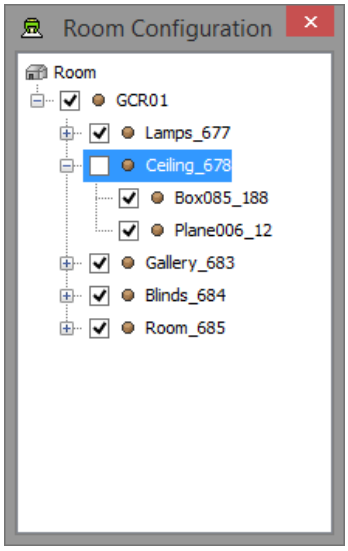
To hide/show parts of the room:

1. Press the Room Configuration button



The Room Configuration Button to the far right on the Navigation Toolbar

2. The Room Configuration window will appear:



Room Configuration window

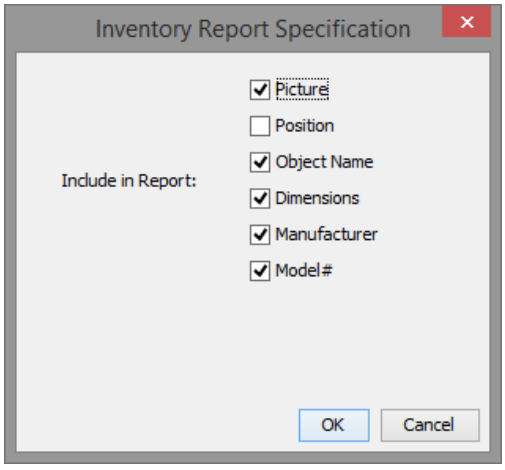
3. Toggle the visibility of parts of the room by selecting or deselecting the checkbox next to the named room part. In most cases rooms are organised hierarchically, in which case a handle is shown to the left of the check box. Clicking on the handle reveals/hides the next level of the room hierarchy.

4.16 Generating an Inventory Report

It is possible to generate a report with all the loaded models in a layout. This report can later be printed on paper or stored in html format.

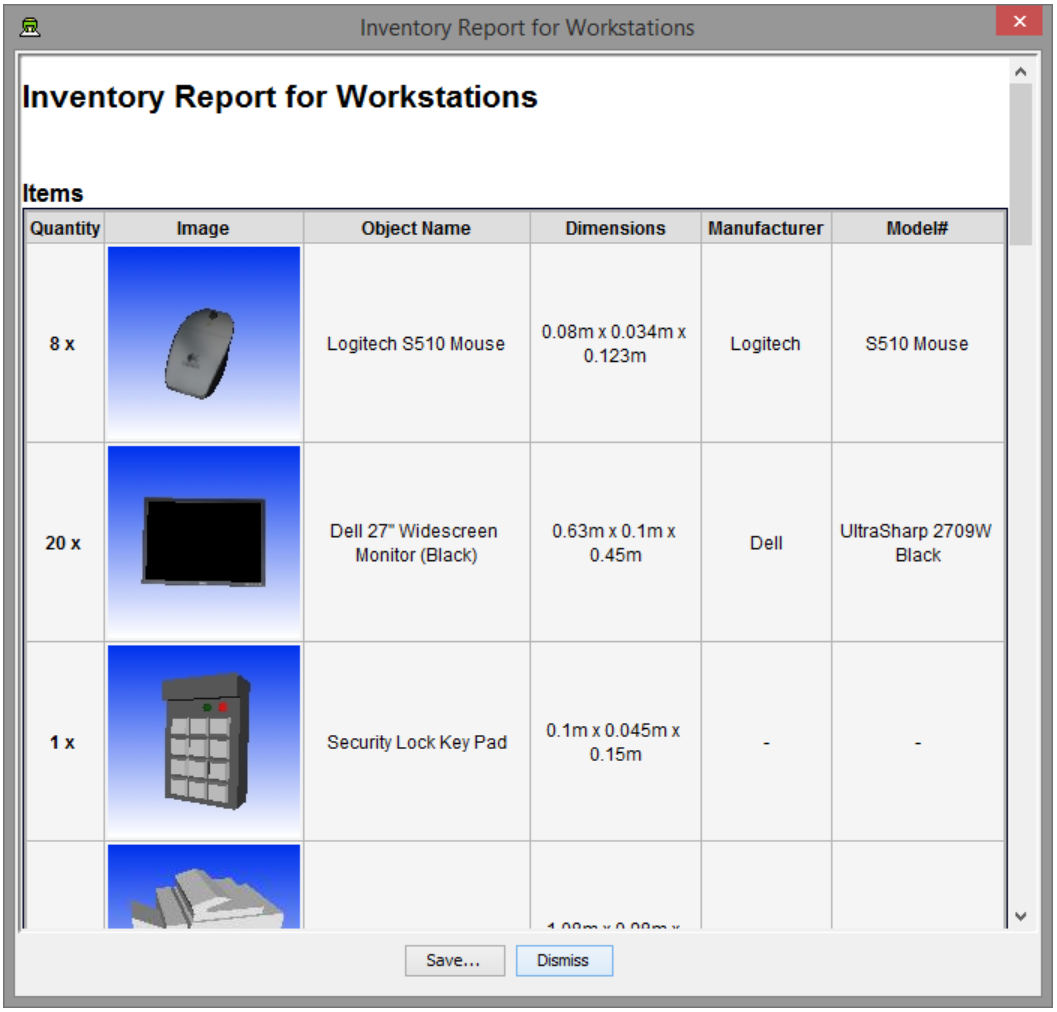
To generate an inventory report:

1. Select Tools > Inventory Report
2. A dialog with different options for what to include in the report will appear:



   If the position option is not selected then a column with the number of elements will be included to inform of the number of items of the same object that are added to the layout.

3. Select the options that are wanted to include in the report.
4. The Layout tool will now start to generate the report
5. The report will appear and can then be viewed, saved or printed.



An inventory report

4.16.1 Saving an Inventory Report to the local file system

An inventory report and the images it uses can be exported to your local file system in HTML format.

To save an inventory report to the local file system:

1. Generate a report as described in Generating an Inventory Report
2. Click on the Save… button
3. A file dialog will appear, choose the desired location on the disk to put the report

4.17 Tagging objects with Meta Data

It is possible to associate meta data to 3D objects in the layout by assigning them Tags. A tag describes certain properties and aspects of the objects, as well as their context in relation to the room. These tags are used by the Verification Tool to perform automated testing to verify if objects in the layout are in accordance with guidelines.

The tags that are available in Layout Tool consist of **model tags** that are associated directly with the model object from the Model Bank Tool. These tags are general tags that describe properties or type of the object, such as a chair or a desk. These tags are automatically assigned to any model that is added to the 3D scene. The other type of tags is **context specific tags**. The context tags contain tags that are specific to the layout you are working on. These typically describe domain specific knowledge or specific information in regards to the room or requirements. The context tags are specified in the Review Guidelines that are set for the Project.

The available model tags are:

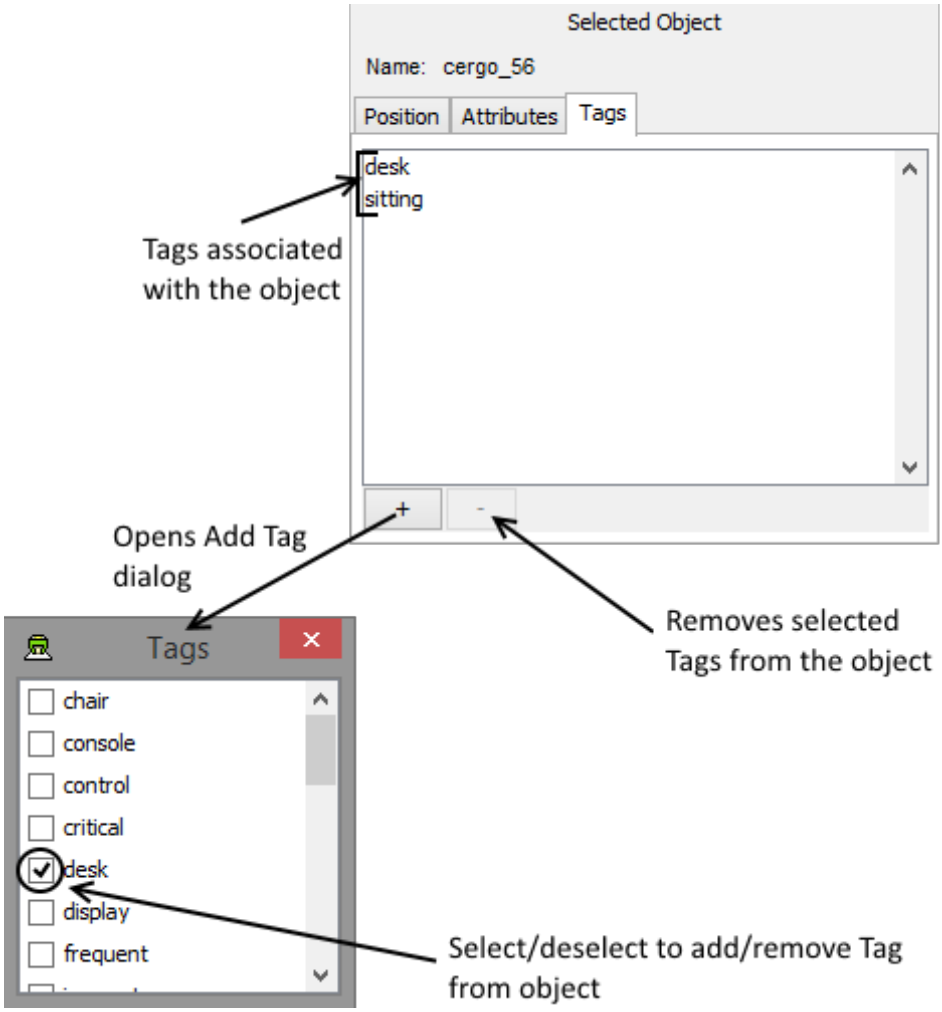
- *chair* – Any type of chair where a person can be seated
- *control* – Any type of control
- *desk* – Any type of desk
- *display* – Display describes any surface that display information, such as a sign
- *input-device* – Input devices such as a keyboard, mouse, keypad etc.
- *monitor* – Monitor is an electronic visual display
- *sitting* – Users will be sitting when using this equipment
- *standing* – Users will be standing when using this equipment

- *ignore-tags* - If this Tag is added to an object the objects tags will be ignored
- *z-is-up* – Use this Tag for objects that are modelled with their natural up-axis along the z-axis

Model tags should generally be assigned to the model objects directly in the Model Bank Tool. This is because they should remain the same for all layouts, and therefore if set once in the Model Bank Tool you do not have to add the tags to the object each time you add it to a layout. You do however have the ability to override the tags from the Model Bank locally, meaning for a specific object in the layout you can change the model tags for that object. This is however only locally, and only affects that single object.

The *ignore-tags* tag is a special tag that is contradictory to the previous statement, in that it is in the list of model tags, but is only intended to be used in the local layout, to actively hide objects from automated tests.

The associated tags for an object are managed through the Tags tab in the Selected Object panel:



Overview of the tagging functionality in the Tags tab of the Selected Object panel

Holding the mouse over a tag in the user interface will display a more detailed explanation of the use of the tag. In the user interface there is no distinction between the model tags and the context tags.

To add a tag to an object in the Selected Object Panel:

1. Select the object
2. Open the Tags tab in the Selected Objects panel
3. Open the Add Tag dialog by pressing the "+" button in the
4. Select the tag you want to add
5. Close the dialog

To add a tag to an object in the 3D view, Object Overview or menu:

1. Select the object
2. Right click on the object either in the 3D view or in the Object Overview or select Edit > Tags > Add Tag to Selection in the menu
3. Select Add Tag and choose the desired tag from the sub menu

To remove tag(s) from an object

1. Select the object
2. Open the Tags tab in the Selected Objects panel
3. Select the tags to remove in the tag list
4. Press the "-" button to remove the tags

Updating tags for objects in the Layout:

If you need to update the tags of objects in the Layout you have built to reflect changes done to the Model Bank this is possible. The Edit > Tags contains a sub menu that has several different ways to update the tags for objects in the current layout. These are:

- **Sync Tags for Selected Object**: This will update the tags for only the selected object
- **Sync Tags for All of Selected Object Type**: This will update the tags for all objects in the layout that are using the same model object as only the currently selected object
- **Sync Tags for Selection**: This will update the tags for all objects currently selected
- **Sync Tags for All Types from Selection**: This will update the tags for all objects in the layout that are using the same model object as the ones currently selected
- **Sync Tags for All**: This will update the tags for all objects in the layout with no limitations

5 Using the Edit Tools

The Edit Tools toolset is located above the 3D scene panel and provides functionality useful for editing and organising the contents of a layout.



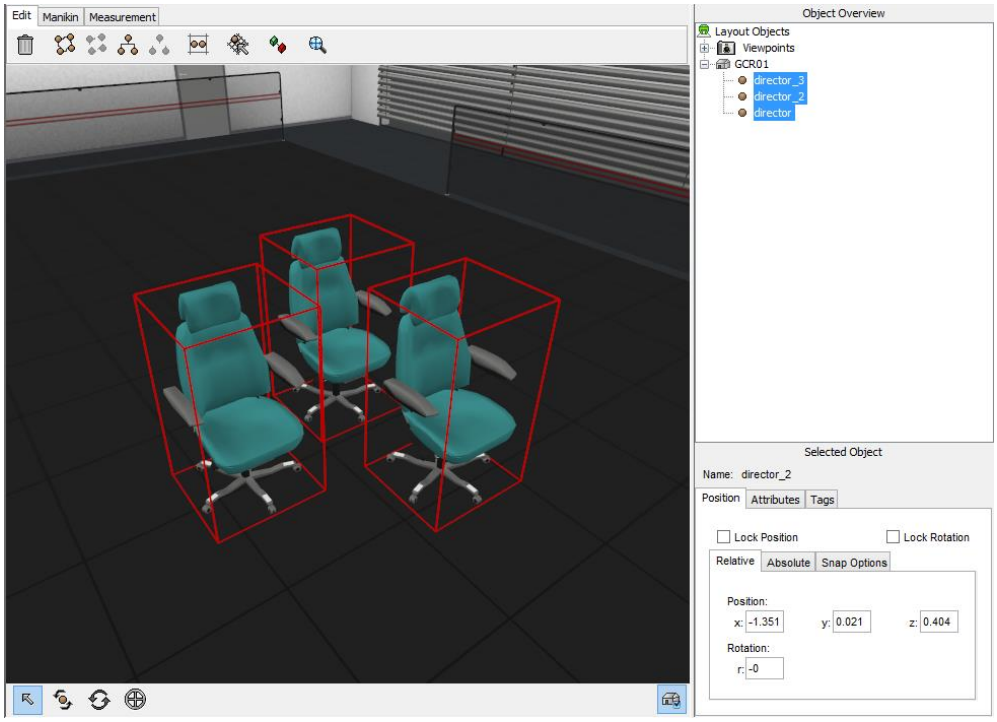
The Edit Tools toolset

The buttons in the Edit Tools toolset have the following functions:

1. Delete the currently selected objects from the scene
2. Group selected objects
3. Ungroup (split up into individual objects) a selected group
4. Associates objects to each other to a parent-child association
5. Disassociate the selected object from its parent in a parent-child association
6. Align or distribute selected objects in the scene
7. Toggle the snap-to-grid function
8. Toggle the visibility of snap points
9. Centre the view on the selected object

5.1 Multiple Selection

It is possible to select several objects simultaneously in order to perform actions on each object in the selection, such as moving them around together or duplicating them. Multiple-selection is also necessary in order to create groups. Multiple selection works for both the 3D view and the Object Overview.



Multiple selection in action

When multiple selection is on and you select objects, the previous selection is not lost. The selected objects will remain selected even when you release the command key.

To remove an object from the multiple selected objects, simply select the object you wish to remove from the selection with multiple selection enabled.

If you select either the room or the floor of a parametric room the entire selection will be cleared. Similarly if you select a new object without the multiple selection key pressed, this will clear the currently multiple selected objects and only select that object.

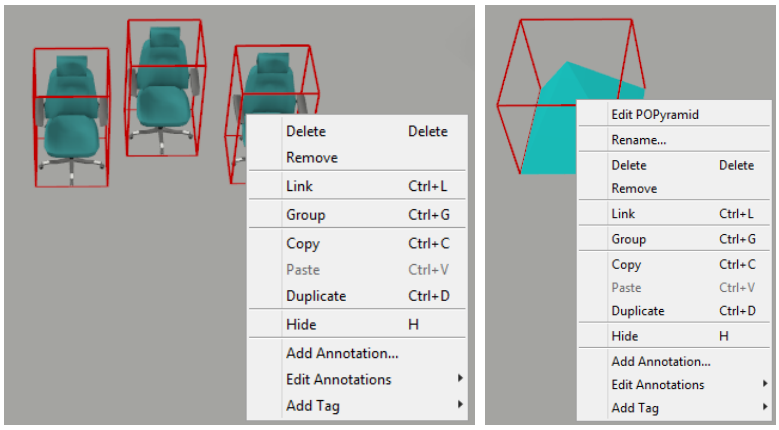
To toggle multiple selection mode:

1. Press and hold the command key to enable multiple selection (CTRL on Windows)
2. You can now select several objects in the scene by clicking on objects in the scene (see Selecting objects on selection of object).
3. Release the command key to disable multiple selection

5.2 Popup menu in 3D view

Right clicking in the 3D view shows a popup menu at the mouse cursor with available actions that can be performed on the current selection. Most of the items in the menu are accessible either via the Menu, or the Edit Tools toolset, but provide a quicker way to access common commands from inside the 3D view.

The popup menu dynamically adjusts the menu items depending on which objects are selected. This means that i.e. parametric objects will have some options available that a regular model object does not because they are not applicable.



The 3D view popup menu is shown for a multiple selection (left) and for a parametric pyramid (right).

5.3 Grouping objects together

Selected objects can be grouped together so that they can be manipulated as a single object.

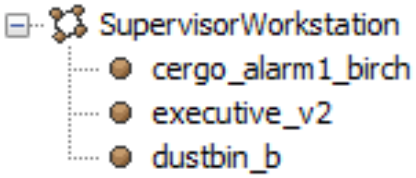
You can click on any object in a group via the 3D view to select the group object if the group selection policy is set to highest.

When a group is created, all of its member objects are rigidly linked to an object that represents the group, but has no visual representation of its own.

There are three different ways of performing a group operation in the Layout Tool:

1. Select the objects in the scene and press the Group Button in the Edit Tools toolset.
2. Select the objects in the scene and use the shortcut keys command-G
3. Select the objects in the scene and right click on any of the objects and choose Group from the popup or choose Edit > Group from the menu
4. Select the objects in the scene tree and then select Group from the Object Overview popup menu (typically right-click in the Object Overview).

When objects are grouped, an icon in will appear in the Scene-tree will appear above the grouped objects and give a visual representation of groups.



Visual representation of a group containing four objects

5.3.1 Ungrouping grouped objects

By “ungrouping”, we mean splitting a group of objects into individual objects (or groups of objects).

There are three different ways of splitting a group into individual objects:

1. Select the group in the scene and press the Ungroup button in the Edit Tools toolset
2. Select the objects in the scene and use the shortcut keys command-U or command-shift-G
3. Select the objects in the scene and right click on any of the objects and choose Ungroup from the popup or choose Edit > Ungroup from the menu
4. Select the objects in the Scene Overview and then select the Ungroup menu item in the Object Overview popup menu (typically right-click in the Object Overview)

5.4 Selection Policies

The Selection Policy specifies what should happen when an object in a group is clicked on to select it.

There are two different selection policies: highest (select the group itself) or lowest (select the object in the group).

To switch between group selection policies, select desired policy from the sub-menu items under Edit > Selection Policy. You can also press the shortcut key 'Z' when in the 3D view to toggle selection policies.

5.4.1 Selection Policy Highest:

When this policy is used, the topmost node in the group hierarchy is selected. That means that all the nodes in the group are manipulated as a single object.

This policy is default in the Layout Tool.

To set the selection policy to *highest*:

1. Select Edit > Selection Policy > Highest

5.4.2 Selection Policy Lowest:

When selection policy lowest is used, the group is opened so it is possible to access the individual objects contained in the group without ungrouping the group.

Using the Group Selection lowest maintains the integrity of the group.

To set the selection policy to *lowest*:

1. Select Edit > Selection Policy > Lowest

5.5 Rotation Policies

The rotation policy specifies the behaviour when rotating multiple objects using multiple selection. The rotation of multiple objects can either be with one object as pivot point for the others, or each object can be rotated individually.

To change rotation policy:

1. Select from sub-menu items under Edit > Rotation Policy
2. Select desired rotation policy

5.6 Toggling the visibility of objects

In some cases it is desirable to hide objects in a layout instead of deleting them. For example to gain easier access to part of a scene that is being worked on or to store partial alternative layout configurations in a single layout file until a decision is made on which to keep. Objects that are hidden remain in the layout scene structure and are saved with the layout, enabling hidden objects to be revealed in future, however hidden objects are not listed in the room inventory report and are not exported to VRML or a published layout when it is displayed in the Verification Tool.

Hiding and revealing objects are done via the Edit menu, the right-click pop-up menu in the Scene Overview panel, or by hitting the shortcut key 'H'.

To hide a selected object or group of objects:

1. Select the objects that are to be hidden in the scene overview or the 3D view
2. Press the hide shortcut key 'H', or select Edit > Hide to hide the objects or select Hide from the pop-up menu after right-clicking in the scene or scene overview to select the Hide option
3. The hidden objects are shown greyed out in the scene overview

To reveal a hidden object or group of objects:

1. Select the objects that are hidden in the scene overview (shown greyed out in the scene overview)
2. Press the hide shortcut key 'H', or select Edit > Hide to hide the objects or select Hide from the pop-up menu after right-clicking in the scene or scene overview to select the Hide option

5.7 Creating relationships between objects

There are two different ways to define parent-child relationships between objects, either by using a weak or strong link.

When linking objects together the child can be moved independently of the parent, but if you move the parent the child will move with it.

A weak link is performed when object is put on to another object. The objects are automatically associated with a parent child relationship. When a weak link is performed the child will automatically be detached from its former parent when it is moved on to another object.

When a strong link is performed, the objects are more tightly connected to each other. The child belongs to the parent no matter where the child is located in the scene. This feature can be useful for instance if we place a dustbin under a table and link it to the table. If we then move the table, the dustbin will move with it. This would not have been possible using a weak link.

There are three ways of create a strong link between objects in the Layout Tool. Each of the three methods must follow the same procedure:

1. The children must be selected first
2. The Layout needs to be told that the selected objects should be linked.
3. The parent must be selected.

There are three alternative ways of creating a link:

1. Select the children to be linked. Then press the shortcut keys command-L in the 3D view. Then select the object that should be parent to the selected objects.
2. Select the children to be linked. Then press the Link button. Then select the object that should be the parent to the selected objects.
3. Select the children to be linked. Then right click in the 3D view and select Link from the popup menu. Then select the object that should be the parent to the selected objects.
4. Select the children to be linked. Then select Edit > Link from the menu. Then select the object that is wanted to be the parent.

5. Select the child objects in the Object Overview. Then select Link from the Object Overview popup menu. Complete the linking of objects, by selecting the parent in the scene or in the Scene Overview.

5.7.1 Removing relationships between objects

Unlinking is the process of removing a parent-child dependency.

There are three alternative ways of unlinking a child object from its parent.

1. Select linked object(s) then press the unlink shortcut key command-shift-L
2. Select linked object(s) then press the Unlink button
3. Select linked object(s) then right click on any of the objects in the 3D view and select Unlink
4. Select linked object(s) then select Edit > Unlink
5. Select linked object(s) in the Scene Overview then select Unlink from the Scene Overview popup menu

5.8 Undoing changes

It is possible to undo changes in the layout tool if an unwanted operation is performed.

The text of the Edit > Undo menu item depends on the actions you perform. For example, if you move an object then the Undo text will change to Undo Move to reflect the last action you performed.

To undo a change:

1. Select Edit > Undo *action* or use the shortcut keys command-Z

5.8.1 Redoing undone changes

When an Edit > Undo command has been performed, the Edit > Redo menu item is enabled.

Selecting Redo reverses the undo command.

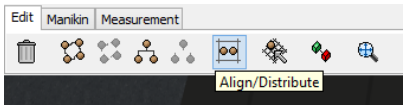
To redo an undone change:

1. Select the Edit > Redo or use the shortcut keys command-Y or command-shift-Z

5.9 Aligning selected objects to each other

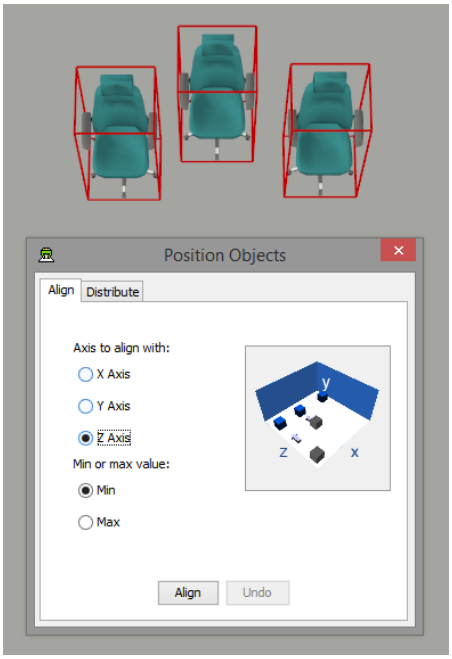
To align several selected objects with each other, two or more objects must be selected.

1. Select two or more objects
2. Press the Align/Distribute button or select Edit > Align from the menu



The Align/Distribute Button.

3. The Position Objects dialog appears. The dialog's Align tab offers to align along the X, Y, or Z axis. If the Min value is chosen the selected objects will be positioned using the lowest value for the selected axis. If Max is chosen the highest value will be used. By selecting any of the options a visual illustration of the command will be shown.



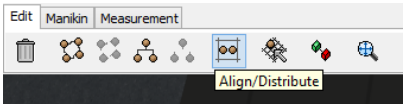
The Position Objects dialog with the Align tab active

4. Press the Align button to perform the select action, or close the Position Objects dialog to abort.

5.10 Distributing selected objects along an axis

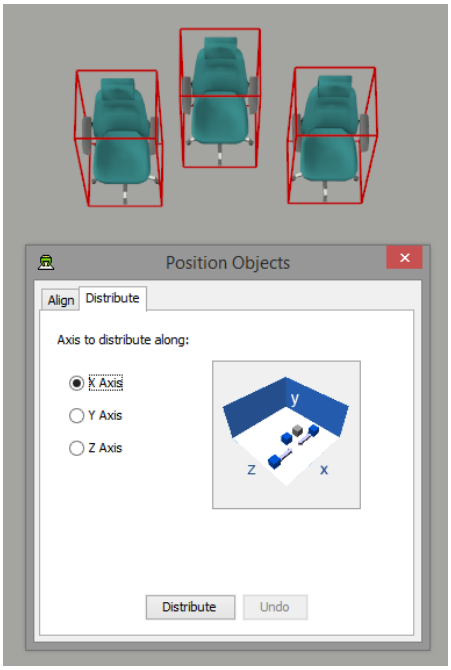
To distribute several objects relative to each other, two or more objects must be selected.

1. Select three or more objects.
2. Press the Align/Distribute button or select Edit > Distribute from the menu



The Align/Distribute Button.

3. The Position Objects dialog will appear. The dialog's Distribute tab offers three different distribution options, these are to either distribute along the X, Y, or Z axis. By selecting one of the options a visual illustration of the command is shown.



The Position Objects dialog with the Distribute tab active

4. Press the Distribute button to perform the select action, or close the Position Objects dialog to abort.

5.11 Copying and Pasting selected objects

Selected objects can be copied and pasted into the current layout or into a layout in any project on the same CREATE server.

To copy and paste objects within current layout:

1. Select the objects that should be copied
2. Select Edit > Copy or use the shortcut keys command-C
3. Select Edit > Paste or use the shortcut keys command-V
4. The selected objects will be pasted

To copy and paste objects into another layout:

1. Select the objects that should be copied
2. Select Edit > Copy or use the shortcut keys command-C
3. Select File > Open
4. Select layout
5. Select File > Paste or use the shortcut keys command-V
6. The selected objects will be pasted

The pasted objects initially appear in the same position in the layout as the original and are automatically selected to facilitate positioning.

5.12 Duplicating selected objects

Selected objects can be duplicated via the Edit menu or the Scene Overview popup menu.

To duplicate objects using the Edit menu:

1. Select the objects that should be duplicated
2. Select Edit > Duplicate or use the shortcut keys command-D

3. The selected items will be duplicated.

To duplicate objects using the Scene Overview:

1. Select the objects to be duplicated.
2. Select Duplicate from the Scene Overview pop-up menu.
3. The selected objects will be duplicated.

Duplicated objects initially appear in the same position in the layout as the original and are automatically selected to facilitate positioning.

5.13 Deleting objects

Deleting an object deletes the selected object and associated/linked children. For example, deleting a table with objects on it will result in the objects also being removed from the layout. If you do not want to delete associated/linked objects then you should use the Remove" function instead.

To delete objects from a scene:

1. Select the object(s) that you want to remove.
2. Perform one of the following alternative operations to delete the selected objects:
    - Press the 'delete' key on the keyboard.
    - Press the Delete button in the Edit Tools toolset.
    - Right click on the object in the 3D view and select Delete from the popup menu
    - Select Edit > Delete
    - Select Delete from the Object Overview popup menu.

5.14 Removing objects without deleting associated children

As an alternative to the Delete function, the Remove function can be used to remove an object (or group) from a layout without deleting any associated/linked children. Any children that the removed object had will remain in the scene but be reassigned to the parent of the removed object. Thus, in the case of removing a group-object, the effect is the same as Ungroup. This function is especially useful if you want to use an Image Surface object temporarily to display a 2D plan on which you drop various 3D objects. When you have finished using the Image Surface, you can remove it, and all of the objects that you dropped onto it will remain in place and belong to the object on which the Image Surface was originally placed (e.g. the floor).

To remove an object from the layout without removing any associated children:

1. Select the object(s) that you want to remove
2. Perform one of the following alternative operations to remove the selected objects:
    - Right click on the object in the 3D view and select Remove from the popup menu
    - Select Edit > Remove
    - Select Remove from the Object Overview popup menu.

5.15 Aligning camera to selection

The Align to Selection function positions the camera so that it is placed perpendicular to the selection. This is especially useful when used in combination with the zoom to selection function if you want to fit and align a 2D surface, such as a control panel, to your view.

To align the camera perpendicular to the current selection:

1. Select Camera > Align to Selection, or use the shortcut keys command-alt-F

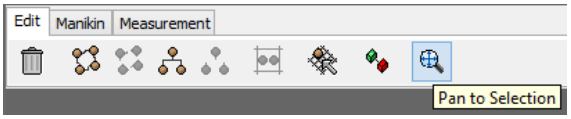
5.16 Centring camera on selection

The current camera view of the 3D layout can be centred on the current selection. This is very useful for aligning the view with objects selected by name, in the Object Overview, or directly in the 3D view.

If no objects are selected then the camera will centre on the room.

To reposition the camera at the centre of the current selection:

1. Press the Pan to Selection button in the Edit Tools toolset or select Camera > Pan to Selection, or use the shortcut keys command-shift-F



The Pan to Selection button

5.17 Zooming camera to selection

The Zoom to Selection function adjusts the view to fit the current selection into it.

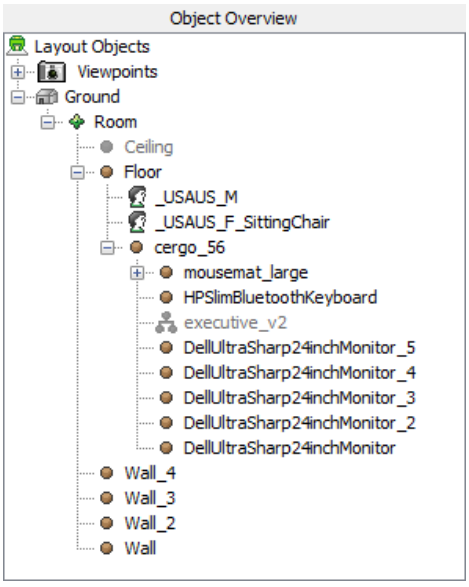
If nothing is selected then the room itself will be fitted into the view.

To zoom the camera to fit the current selection into the current view:

1. Select Camera > Zoom to Selection, or use the shortcut keys command-F or simply press 'F' in the 3D view

5.18 Working with the Object Overview

The Object Overview contains a scene tree that provides an overview of how objects are related to each other. The tree can also be used to perform actions on selected objects.

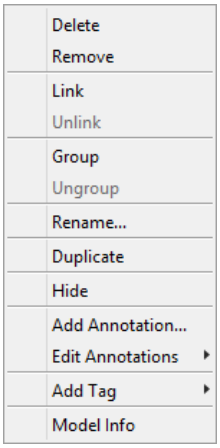


The Scene overview

Many of the features that are available when working directly with the scene in the 3D view are also available when working with the scene tree. When working with the Scene Overview, the same principles are used as when working directly in the 3D view, i.e. you should first select one or more objects and then performs an action on them.

Items can be selected in the Scene Overview by clicking on them.

The Scene Overview has an associated pop-up menu than can normally be accessed by right-clicking on a selected item in the scene tree. This menu provides convenient shortcuts to a number of commonly used actions.



The Scene overview popup menu

The following actions are possible to perform via the scene tree:

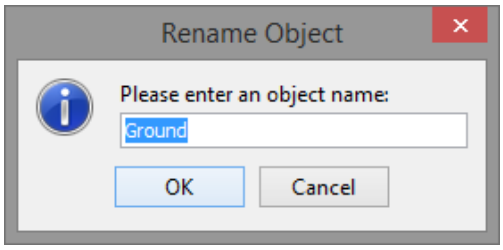
- Deletion of objects
- Removal of objects
- Linking of objects
- Unlinking of objects
- Grouping of objects
- Ungrouping groups
- Renaming objects
- Duplicating objects
- Toggling visibility while editing
- Adding annotations
- Editing annotations
- Adding tags
- Retrieving information about the selected model from the Model Bank

5.19 Renaming objects

Objects are automatically given names when you add them to a layout however you will often want to give items in the layout scene names that you have chosen yourself to make it easier for you to identify objects.

To give an object a new name:

1. Select an object in the scene, or in the scene tree.
2. Access the 3D view popup menu or the scene tree popup menu by right clicking on the object
3. Select Rename...
4. Enter a new name for the selected object in the Object Rename dialog that appears



The object rename input dialog

5. If the name is invalid or already taken by another object a notification is shown, and the user is prompted to enter another valid name.
6. Press OK to set the new name or Cancel to abort.

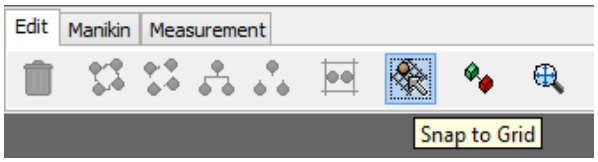
5.20 Snap to Grid

When enabled, the global snap-to-grid function causes objects that are moved to automatically align with a global grid. This can make the positioning of objects easier in many cases.

Adjustment of the grid by changing i.e. the spacing or colour is covered in Using the Visual Grid.

To toggle snap-to-grid:

1. Press the Snap to Grid button in the Edit Tools toolset, or select Edit > Snap To Grid in the menu or use the shortcut key 'C' when in the 3D view



The Global Grid Toggle button

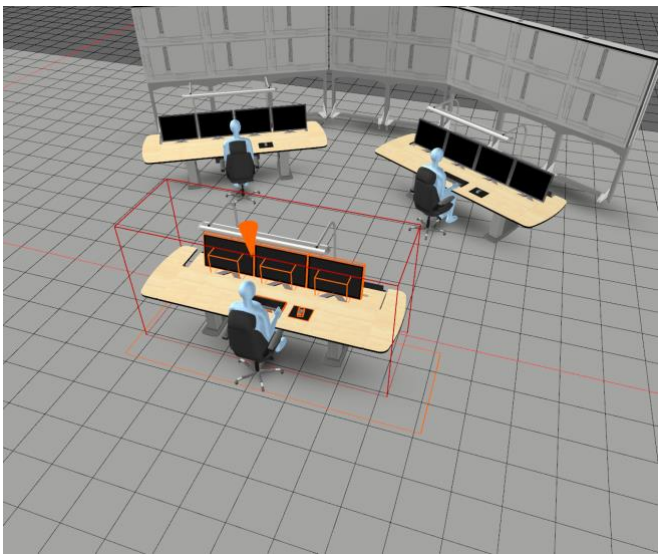
To toggle the visibility of the grid:

1. Select View > Show Grid from the menu or use the shortcut key 'G' when in the 3D view

   The visualisation of the grid will follow the selection as it is moved in the scene. This means that if the object is dragged onto another surface, the grid will align itself to that surface and adapt its visual size.

There are three different grid types:

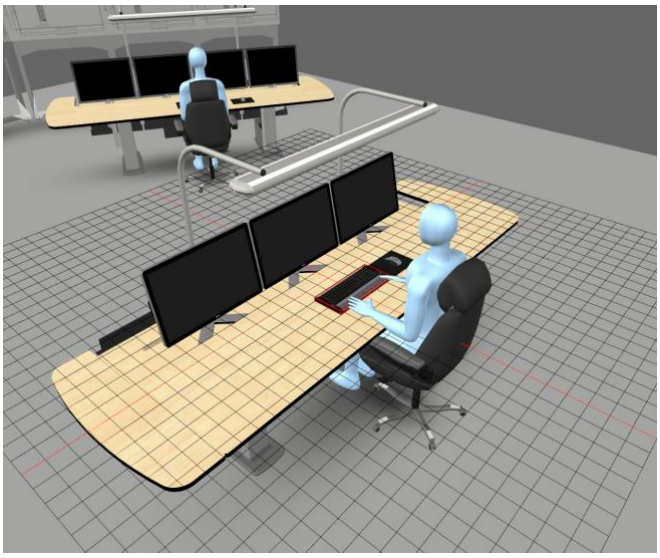
1. *Global* grid is a universal grid that is shared amongst all objects in the Layout. By default this is the grid that will be active if snap-to-grid is enabled. This grid will be available for all objects, and the spacing will remain the same regardless of the size of the objects being moved and which surface the object is being dragged on. This type is quick and easy to use, but if you frequently need to adjust the grid size depending on which objects you are operating on, or because of the size of objects being moved, you should consider using one of the other two.



The global grid used for positioning the desks on the floor

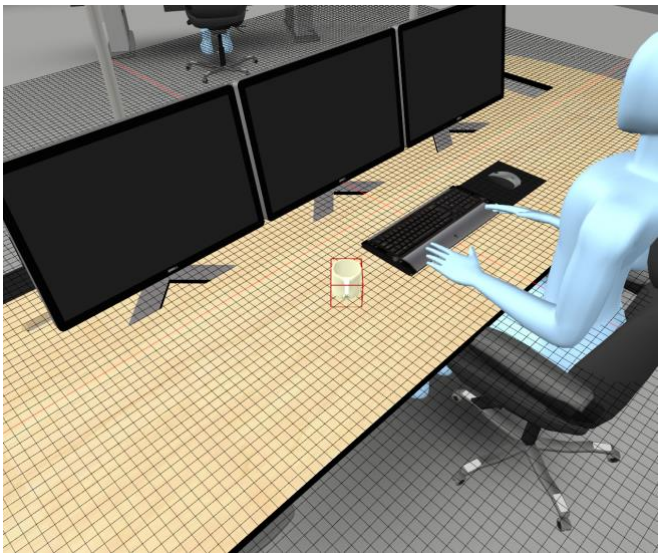
2. *Local* grid gives you the ability to specify a grid that will be local to the object it is associated with, and will override the global grid. This enables you to specify more suited grid spacing for i.e. the desk, were you often place smaller objects that require more precise positioning, than what you typically need when placing the actual desks on the floor. By specifying local

grids you do not need to change the grid spacing when operating on the different objects as you do with the *global* grid. Note that the local grid is only used for objects being placed on the specific object the local grid was added to. There can only be one local grid associated with an object, but there is no limit to how many objects can have their own local grid.



A local grid used for positioning objects on the desk

3. *Object* grid differs from the local grid in that it modifies the grid spacing only for that object, regardless of what surface or object it is moved on. This enables you to further customize the spacing if there is a specific object that needs custom grid spacing, and you do not want to change any of the existing grid spacing's (*global* or *local* grids). This type can also be customized so that it is always set to adapt to the size of the object being moved. See Automatically adapt Object Grid Distance.



An object grid is used for specific grid spacing for the object being moved

5.20.1 Configuring the Global Grid

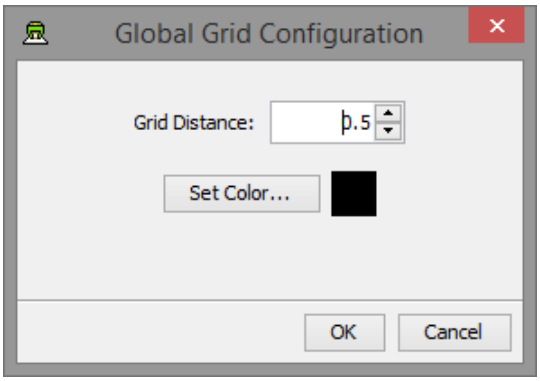
It is possible to configure the distance between grid rows and columns and change the colour of the global grid.

The colour and grid distance values are stored with the layout, and the settings are restored each time a layout is opened.

To access the Global Grid Options dialog:

1. Select View > Grid Options…

2. The Global Grid Options will appear.
3. Make changes (see below for instructions).
4. Click OK to apply the changes and close the dialog, or Cancel to ignore the changes.



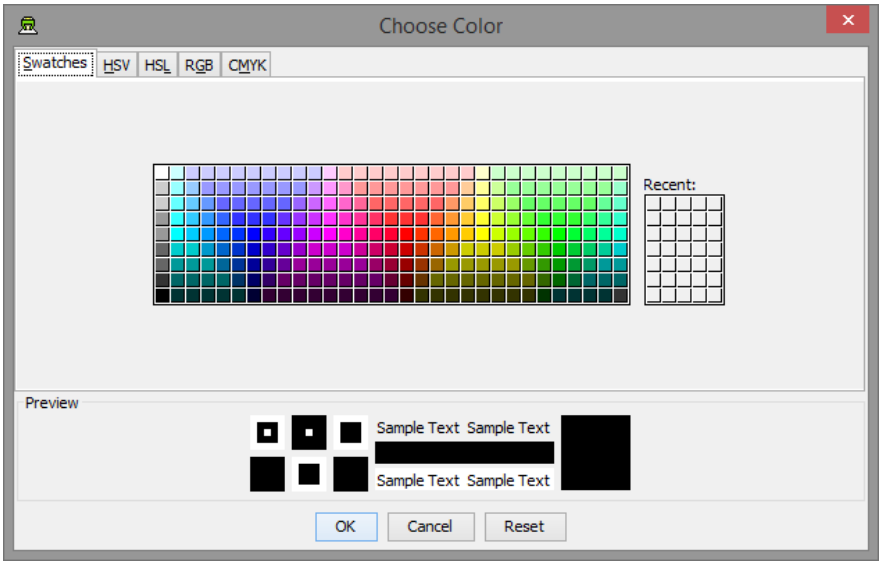
The Global Grid Options window

To change the grid distance:

1. Access the Global Grid Options window.
2. Enter a new grid distance value (in metres). You can use the up/down buttons next to the value to increase/decrease it incrementally.

To change grid colour:

1. Access the Global Grid Options window.
2. Press the Set Colour... button.
3. A colour chooser will appear:



The global grid colour chooser.

4. Select a new colour.
5. Press the OK button to set the grid colour, or Cancel to ignore the colour change.

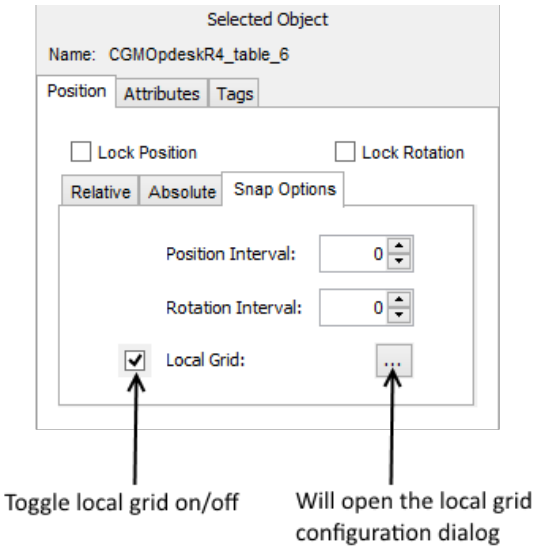
5.20.2 Configuring the Local Grid

The local grid can be configured similarly to the global grid.

To add local grid to an object:

1. Select the object either in the 3D view or in the Object Overview

2. Access the Selected Object Panel
3. Select the Snap Options tab



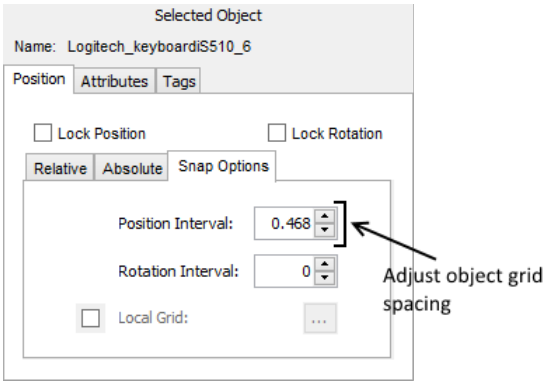
A local grid used for positioning objects on the desk

4. Toggle local grid on/off as shown in the picture
5. If the local grid is enabled the configuration button will be enabled
6. Pressing the configuration button will open up a dialog that enables configuration of the local grid. See Configuring the Global Grid for more information on how to configure the grid.

5.20.3 Configuring the Object Grid

To add object grid to an object:

1. Select the object either in the 3D view or in the object overview
2. Access the Selected Object Panel
3. Select the Snap Options tab



A local grid used for positioning objects on the desk

4. The object grid is enabled by changing the value of Position Interval to anything other than 0.0. This value is equivalent with the Grid Distance that is set for the *global* and *local* grid through the grid configuration dialog.

To remove object grid from an object:

1. Select the object either in the 3D view or in the object overview
2. Access the Selected Object Panel
3. Set the Position Interval to 0.0, this will remove the *object* grid from the object

5.20.4 Automatically adapt Object Grid Distance

The object grid can be set to be automatically enabled and adapted for objects. If enabled this will enable object grid by default for all objects, and will adapt the grid distance to the dimensions of the object.

If enabled the position interval of objects is automatically set to the largest of the X and Z dimensions of the object when it is added to the scene. Once an object has been added to a scene, you are free to manually change the automatically assigned position interval via the Snap Options panel.

To toggle the auto snap feature:

1. Select Edit > Snap Policy > Auto Set Object Snap Intervals

5.20.5 Ignore Object Grid Distance

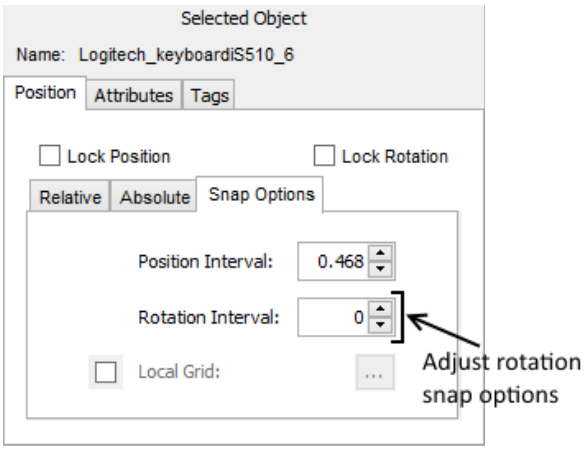
It is possible to set the snap policy to temporarily ignore the object grid distances that have been set. This gives an easy way to suppress any object grids specified for any object, enabling the object to follow either the *global* or *local* grid temporarily.

To toggle global ignore of object grid

1. Select Edit > Snap Policy > Ignore Object Snap Intervals

5.20.6 Object Rotation Snap Options

If snap-to-grid is enabled rotation of objects will utilize a snapping function as well. By default the rotation value of the object will be rounded to closest rotation interval value when the object has been rotated. For example, a rotation interval of 45 degrees will cause an object to snap to 0, 45, 90, 135, 180, etc. degrees when interactively rotated.



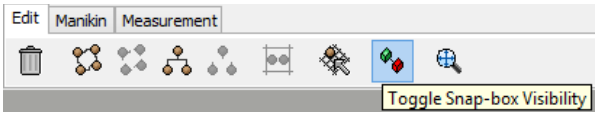
The Snap Options panel, with position and rotation intervals set to 0.

5.21 Snap points

Some model bank objects may have snap points defined. Snap points are typically used for modular furniture, for example, to define where modules should fit together.

To toggle visibility of snap points in the layout:

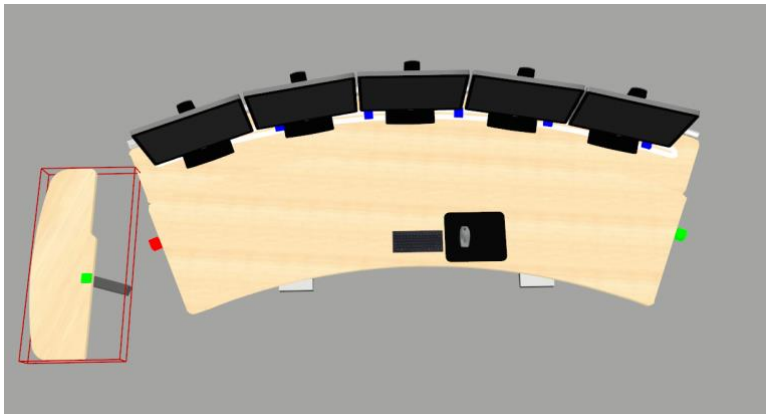
1. Press the Snap Points Visibility button in the Edit Tools toolset



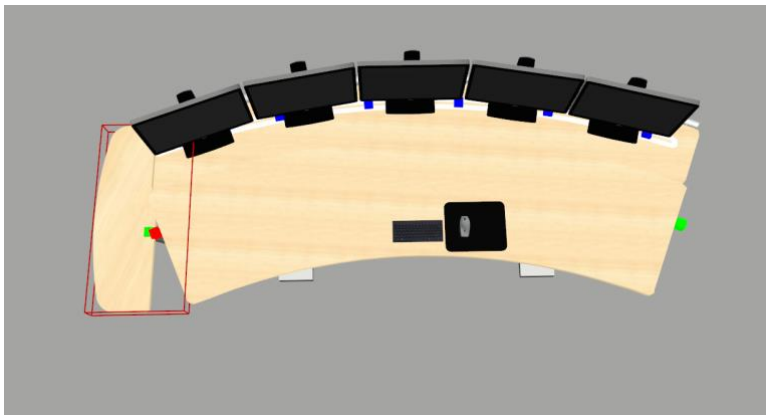
The Snap Points Visibility Toggle button

To add an object with snap points to the scene and align it with another object with snap points:

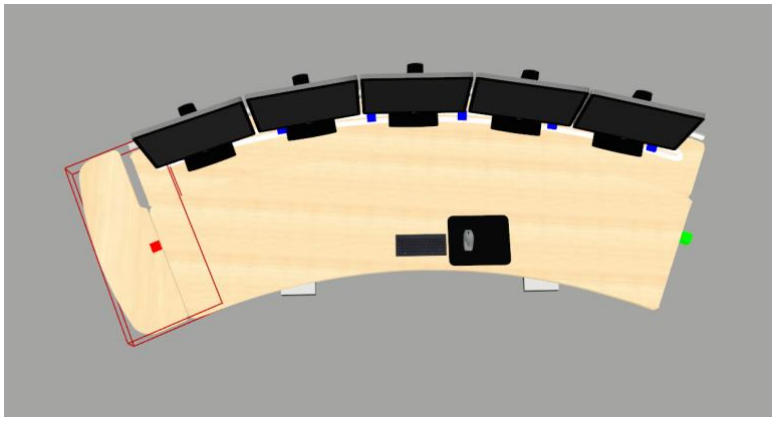
1. Add the object to the scene:



2. Drag the object close to the object that you want to snap it to, roughly in the location you want to place it relative to the existing object. If you have snap boxes visible make sure that the boxes intersect:



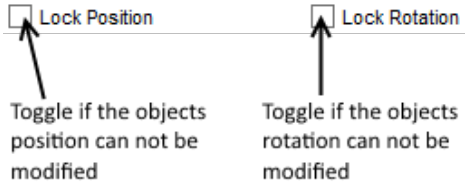
3. Release the object and it will align itself with the other object, if the snap points of the too objects intersect:



5.22 Locking an object's location and orientation

It is possible to lock and unlock an object's position and rotation to prevent accidentally moving object in the 3D view.

This can be done with the toggle buttons on the Selected Object panel.



The positioning and rotation locking mechanism

Locked objects can still be moved or rotated by entering exact position, location values in the Selected Object panel.

To toggle locking an object's position to prevent it from being moved:

1. Select the object for which you wish to lock the position.
2. Select the Lock Position checkbox.
3. Alternatively the shortcut key 'A' can be used in the 3D view to toggle position lock

To toggle locking an object's rotation to prevent it from being rotated:

1. Select the object for which you wish to lock the rotation.
2. Select the Lock Rotation checkbox.
3. Alternatively the shortcut key 'S' can be used in the 3D view to toggle rotation lock

6 Annotations

The designer can add annotations for specific objects in the scene or for the virtual layout. This enables the layout designer to associate information to specific virtual objects in the scene or the layout in general. These annotations are also available for the reviewer using Verification Tool, so they can be used to communicate information to the reviewer.

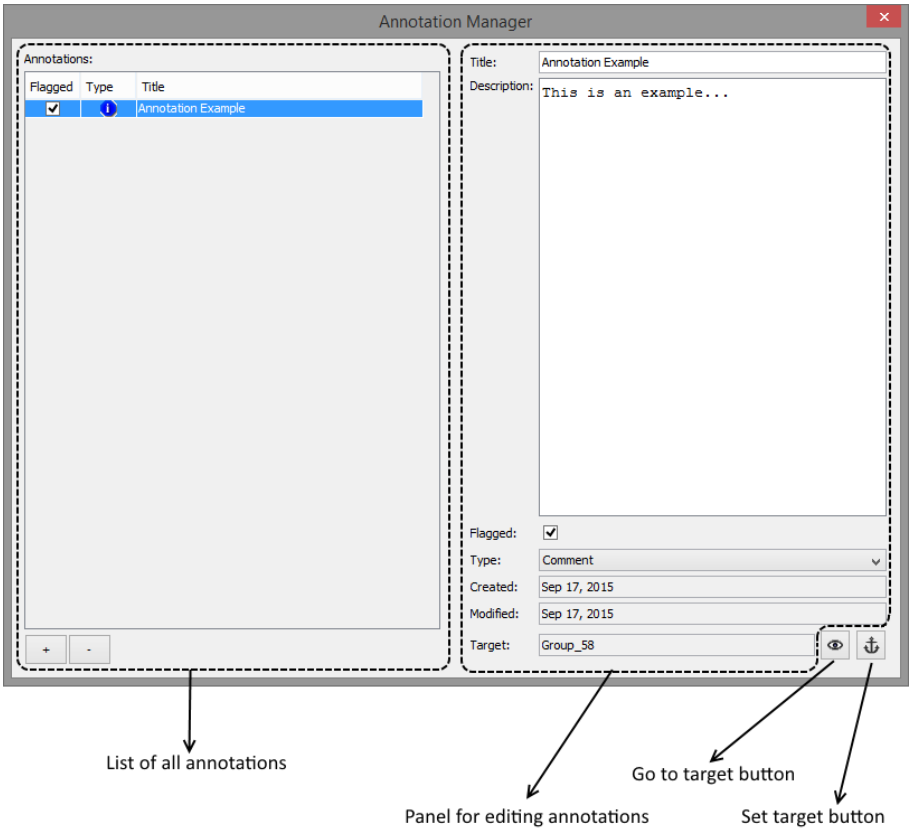
6.1 Annotation User Interface Overview

Selecting Window > Annotation Manager opens the Annotation Manager window.

This window consists of two parts:

1. The panel to the left holds a list of all current annotations for the current layout.
2. The panel to the right holds all user interface elements necessary to edit a specific annotation.

At the bottom right there is a button that navigates the view to the current selected target. This can aid the user to make sure that an annotation is added to the correct virtual object in the layout.



6.2 Adding and removing annotations

To create and edit an annotation:

1. Open the annotation manager by selecting Window > Annotation Manager
2. To create an annotation, press the "+" button to at the bottom left in the Annotation Manager window. An empty annotation is created and ready to be edited. If an object is selected in the scene, the currently created annotation is associated with the selected object, if no object is selected; the annotation is associated to the layout in general.



3. Note that is possible to edit and modify the annotation directly in the table to the left, or to use the specific user interface elements to the right in the window.

To remove an annotation:

1. Open the annotation manager by selecting Window > Annotation Manager
2. Select the annotation that should be deleted
3. Press the "-" button



6.3 Associating a target to an annotation

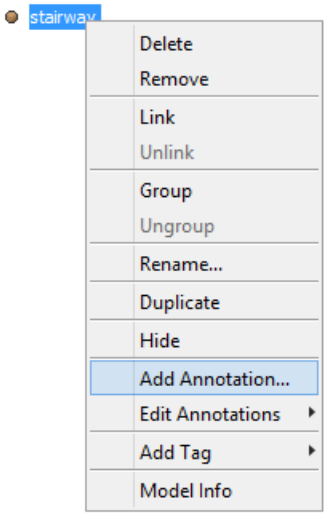
It is possible to associate an annotation to a specific object in the virtual layout. By default there is no target for an annotation and it belongs to the virtual layout in general.

To associate an annotation to an object in the virtual layout:

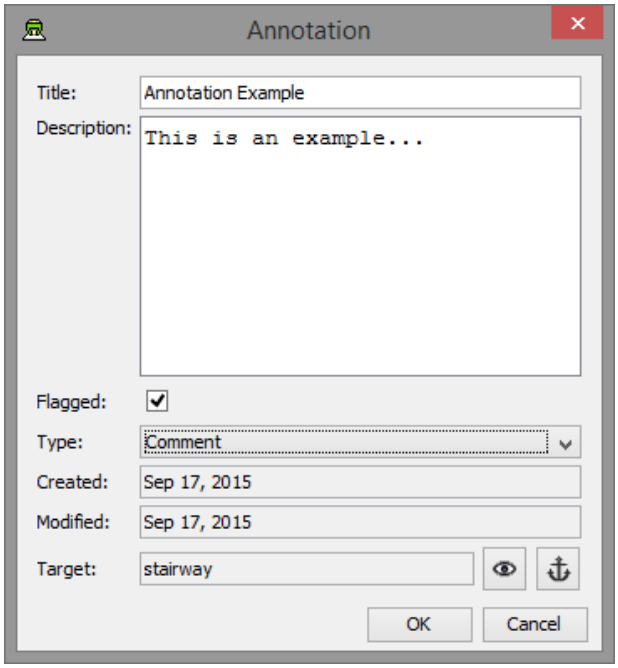
1. Add annotations as described in Adding and removing annotations
2. Select an object in the scene
3. Press the Set Target button in the Annotation Manager, the annotation is now associated to the selected object

To directly associate an annotation to an object in the virtual layout

1. Select an object in the scene or scene-tree
2. Right-click either in the 3D view or in the Object Overview and select Add Annotation.



3. A window that only contains the edit panel part of the Annotation Manager window appears with the selected object set as a target.



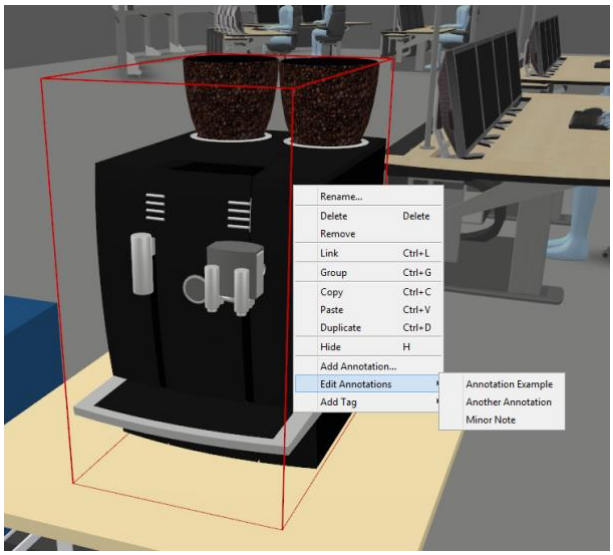
Annotation editing panel

6.4 Editing annotations

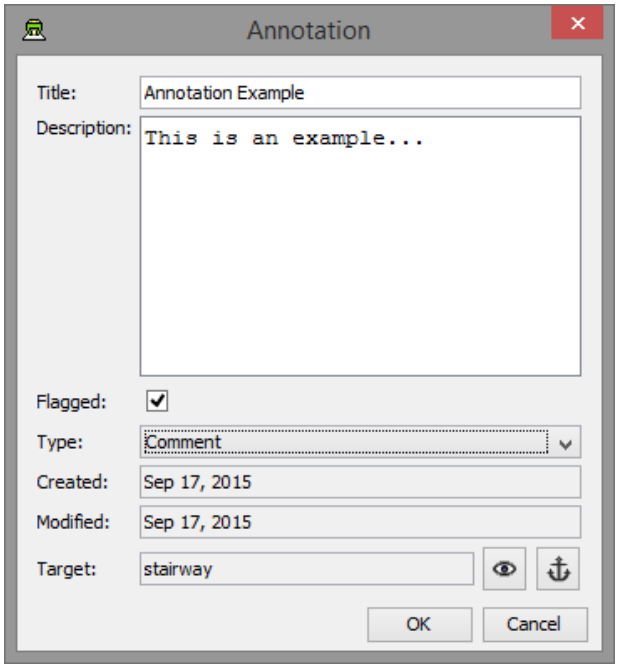
There are two ways to edit an annotation, either directly through the Annotation Manager, as described in Adding and removing annotations or through the more convenient popup menu available in the 3D view and Object Overview.

To edit an annotation through the popup menu

1. Select an object in the scene or scene-tree
2. Right-click either in the 3D view or in the Object Overview and select the sub-menu Edit Annotations, this will show a list of the annotations associated with the selected object



3. Select the annotation to edit
4. A window that only contains the edit panel part of the Annotation Manager window appears with the selected annotation.



Annotation editing panel

6.4.1 Navigating to an annotation target

When working with annotations, it is possible for the designer to navigate the view to a specific annotation target. Selecting the go to annotation target button can do this.

To move the view to a specific annotation:

7. Open the annotation window by selecting Window > Annotation Manager, or open the specific annotation for edit through the popup menu described in Editing annotations
8. Press the Go to Target button at the bottom right in the edit panel:



9. The view is moved to the annotation target

6.5 Set annotation target

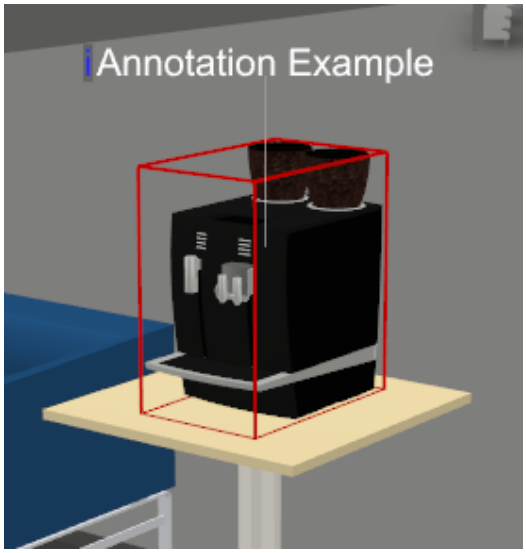
The Set Target button is used to set or change the target for an annotation. It is used to associate an annotation with a specific 3D object in the scene. When the button is pressed, the annotation is associated with the last selected 3D object in the scene. If no target is selected, the annotation will be associated to the layout.



Set Target Button

6.6 Show Annotations

It is possible to visualise all the currently added annotations in the scene. When showing annotations the title of the annotations is visualised as 3D text in the scene. If the visualised annotation has an associated target, there is a connecting line between the text and the target.



Visualisation of an annotation

To show/hide annotations:

1. Select View > Show Annotations

Using the Manikins Tools

The Manikin Tools enable you position virtual humans in the layout to test lines of sight, reach, access, and so forth. There is normally a variety of manikins available from the server that can be used to test the layout, including standing and sitting manikins of various heights.



The Manikin Tool toolset

The Manikin Tools toolset consists of Add Manikin and Remove Manikin buttons to the left, the Manikin Selector controls in the middle and the Manikin Control Buttons to the right.

The Manikin Control Buttons provide access to Go To, Reach, Reach Distance, View, View Cone, and View Cone Options functions.

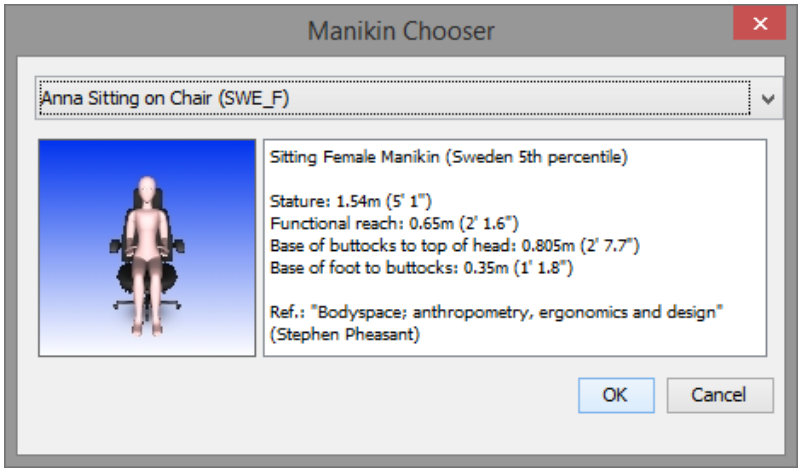
6.7 Inserting a manikin into a Virtual Layout

The first step when working with a manikin is to add it to the virtual layout. Manikins can be added to a layout by pressing the Add Manikin Button, located to the far left of the Manikins Tool toolset.

Once a manikin has been added to the layout, the Manikin Selector and the Manikin Control Buttons (Reach, View and View Cone Buttons) are activated in the Manikin Tool toolset.

To add a manikin to the virtual layout:

1. Press the Add Manikin button in the Manikin toolbar
2. The Manikin Chooser window appears:



The Manikin Chooser window

3. Select the manikin you want to use from the drop-down menu. A thumbnail image of the selected manikin is shown below the menu as well as some information about the manikin.
4. Press OK to add the manikin to the virtual layout, or Cancel to abort the operation
5. The Manikin Chooser window will close.
6. With the left mouse button, click the location in the layout where you want the manikin to be positioned
7. Repeat this procedure to add more manikins to the layout

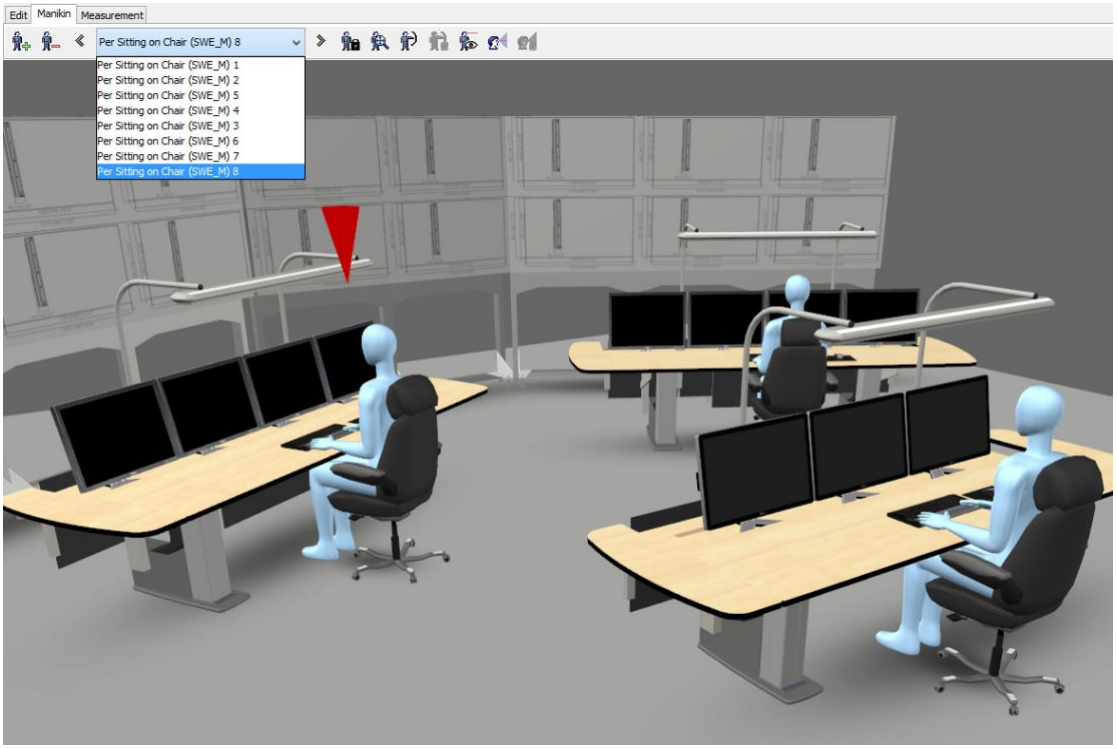
6.8 Selecting a manikin in a layout

If the virtual layout contains more the one manikin, you can select the manikin that you want to use using the Manikin Selector in the Manikin Tools toolset. The Manikin Selector consists of a drop-down menu that lists all manikins in the layout and previous and next buttons that can be used to cycle between manikins.

The current manikin is always indicated by a red cone that points down at its head.

To select a manikin using the Manikin Selector drop-down menu:

1. Click on the Manikin Selector drop-down menu with the left mouse button
2. Select the manikin that you want to select from the manikins listed in the menu by clicking on it with the left mouse button
3. The selected manikin will have a red cone over its head to indicate that it is selected:



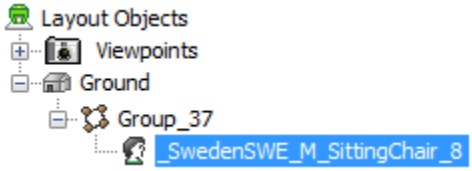
A selected manikin (one of several manikins in the layout) with the Manikin Selector menu shown

To select a manikin using the Manikin Selector cycle buttons:

1. Press the Previous or Next buttons on either side of the drop-down menu in the Manikin Selector to select the previous or next manikin in the list
2. The Manikin Selector menu is updated to show the name of the selected manikin and the selected manikin is highlighted

To select a manikin using the 3D view or Object Overview:

1. Select the manikin in the scene or in the scene-tree



The Manikin Chooser window

2. The Manikin Selector menu is updated to show the name of the selected manikin and the selected manikin is highlighted

6.9 Positioning a manikin

Manikins can be freely positioned in the virtual layout. You can change both the location and direction of a manikin.

Manikins are always located in an upright position.

To position the current manikin:

1. Use the left mouse button to click on the location that you want to move the manikin to. For standing manikins, this is the location of the bottom of their feet, whereas for sitting manikins it is normally the point you want the manikin to sit on. This can vary depending on how the manikin has been designed.
2. To change the direction that the manikin's body faces in, switch to rotation mode and rotate by dragging the mouse. See Rotating objects

6.10 Visualising a manikin's field of view and line of sight

The View Cone function enables you to display a view cone for a manikin, indicating the field of view and line of sight. A transparent white cone depicts the field of view and a green line indicates the direct line of sight. If the line of sight is broken by an object or surface then it turns red from the point at which the line of sight is broken.

A View Cone Properties window can be accessed that enables you to fine-tune the view cone to suit your requirements.

Each manikin you add to a layout has an independent set of view cone properties, so adjustments that you make to a manikin's view cone affect that manikin only.



The Manikin Control Buttons — View Cone Button selected

To see a manikin's view cone:

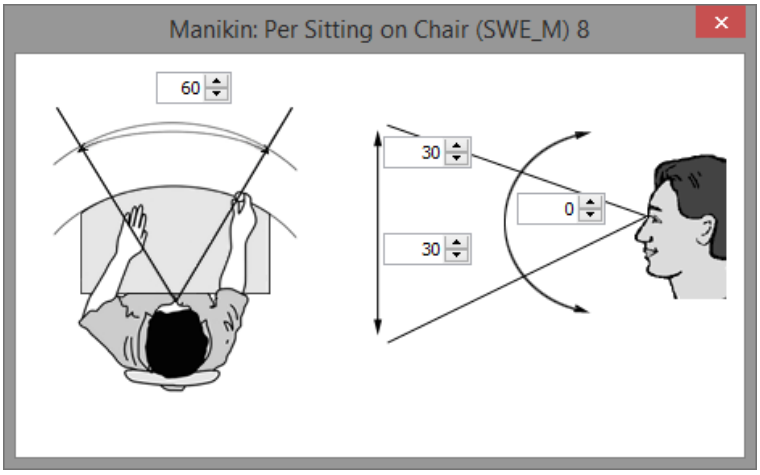
1. Select a manikin
2. Press the View Cone Button in the Manikin Tools toolset to turn on the view cone visualisation
3. Press the View Cone Button again to turn off the view cone visualisation



A manikin with view cone visualisation turned on

To modify the view cone settings:

1. Select a manikin and turn on its view cone
2. Press the View Cone Options button next to the View Cone Button in the Manikin Tools toolset
3. The View Cone Properties dialog window will appear:



The View Cone Properties dialog window

4. Adjust the values as indicated in the diagrams by either directly entering a value or using the increment/decrement buttons. The buttons adjust the value by 5-degree intervals
5. Press Dismiss/OK to close the dialog window

6.11 Viewing a manikin's reach envelope

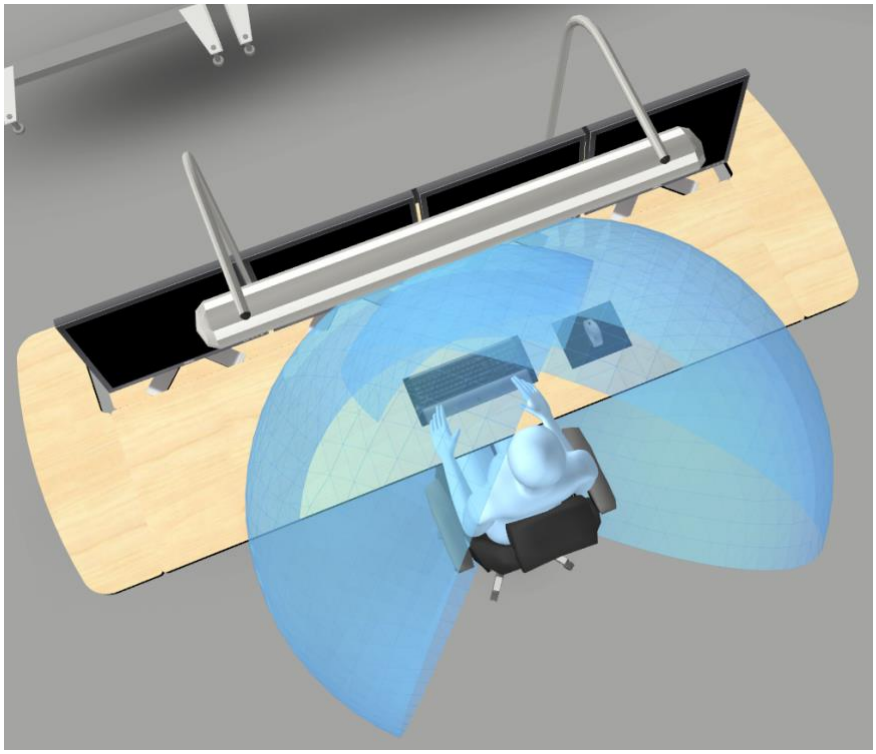
The reach envelope visualisation function enables you to see the reach envelope for a manikin. It indicates the maximum distance a manikin can reach.



The Manikin Control Buttons – Reach Button selected

To see a manikin's reach envelope:

1. Select a manikin
2. Press the Reach Button in the Manikin Tools toolset to turn on the reach envelope visualisation
3. The button to the right of the Reach button is the Reach Distance button, which toggles a visualisation that depicts the actual distance of the manikins reach in units. This is only enabled when the reach envelope has been toggled on.
4. Press the Reach Button again to turn off the reach envelope visualisation



The selected manikin with reach envelope visualisation turned on

6.12 Seeing through a manikin's eyes

It is often useful to be able to see the virtual layout through the eyes of the manikin. By selecting the manikin view function from the Manikin Control buttons, you can switch your view location so it follows the direction line of sight (as configured using the view cone properties – See Visualising a manikin's field of view and line of sight) from the location of the manikin's eyes.



The Manikin Control Buttons – View Button selected

To see the layout through a manikin's eyes:

1. Select a manikin
2. Press the View Button in the Manikin Tools toolset to switch view location
3. To turn the manikin while looking through its eyes, click and hold either the left or right mouse button down, while moving the mouse cursor in the direction the manikin should turn. The further you drag the mouse to either side from the point you originally clicked in the 3D view, the faster the manikin will turn. Release the mouse button, or move the mouse cursor to the point you first clicked to stop the manikin from rotating.
4. Press the View Button again to revert to your previous view location

6.13 Removing a manikin from a Virtual Layout

When a manikin is no longer needed, it can be removed from the layout by selecting it and pressing the Remove Manikin Button, located to the far left of the Manikins Tool toolset, next to the Add Manikin Button. Manikins can also be removed using the same method for deleting or removing other objects. See Deleting objects

Removing manikin from virtual layout:

1. Select the manikin to be removed

2. Press the Remove Manikin Button in the Manikin Tools toolset or use one of the delete methods described in Deleting objects

7 Using the Measurement Tools

The Measurement Tools enable you to verify the virtual layout against standards and guidelines where measurements of various kinds need to be taken.

The Measurement Tools toolset includes a Distance, Perpendicular Distance, Angle, Label Size, View Angle and Volume tools.

Only one measurement tool can be active at any time, but multiple measurements can be displayed simultaneously for each tool.

Selecting a tool enables it and will also switch the navigation mode to picking. Deselecting a tool turns it off and disables interaction with any existing measurements of that tool type.

When a tool is selected, “+” and “–“ buttons can be used to add and remove measurements. A drop-down menu with previous and next buttons enables you to select a measurement to adjust it if you are working with more than one measurement. If a measurement has been completed (e.g. a distance has been measured) then the active measurement is highlighted to help you identify which measurement is active when more than one measurement has been created.

When you add a measurement, picking is enabled and you can perform the measurement by clicking in the model. See the sections about the individual measurement tools for exact details on the mouse interaction possibilities available for each tool.

When working with measurements you will typically be in picking mode. If you need to move to a new position before continuing or adapting measurements, a quick way to switch between navigation modes can be to use the shortcut key 'shift'. This enables you to temporarily toggle between movement and picking.

Note that all measurements are in relation to surfaces in the model, including manikins added to it. You cannot measure the distance between, say, the ground and an arbitrary location in the air.

The button to the far left in the measurement toolbar will remove all measurements of all types placed by the user. Note that this is not undoable.



The Measurement Tool toolset with Distance, Perpendicular Distance, Angle, Label Size, View Angle, and Volume tool buttons. The button to the far left removes all measurements that have been created.

7.1 Measuring Distances

The Distance Tool and the Perpendicular Distance Tool in the Measurement Tool toolset are used to measure the distance between two surfaces. The Distance Tool displays the distance between two arbitrary points, while the Perpendicular Distance Tool displays the perpendicular distance from a point on a surface to the first surface hit. The Perpendicular Distance Tool is useful for measuring the distance between the floor and the bottom of a desktop or between two facing walls, for example.



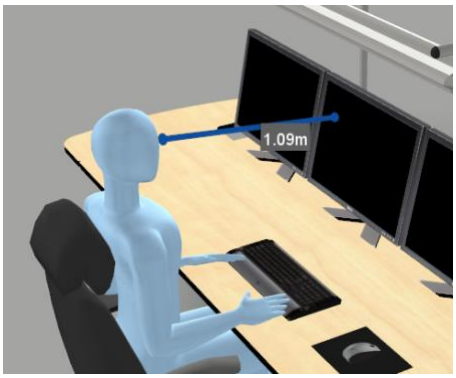
The Measurement Tool toolset with Distance Tool enabled



The Measurement Tool toolset with Perpendicular Distance Tool enabled

To measure arbitrary distances between surfaces:

1. Activate the Distance Tool in the Measurement Toolset by pressing the Distance Tool button
2. Use the left mouse button to click in the virtual layout on the point from which you wish to measure
3. Use the left mouse button to click again in the virtual layout at the point to which you want to measure from the previously clicked point
4. A measurement in the form of an elastic ruler will appear showing the distance in metres between the two points:



The Distance Tool ruler with distance shown

5. To adjust the ruler, pick and drag at a new location with the left mouse button. The closest measurement point will then move to the new point updating the ruler. The end of the ruler will follow the surface that the mouse is pointing at as you drag.
6. To move the ruler to a new location, repeat from step 2 (temporarily deselect the pick button, or hold down the 'shift' key, to navigate, if necessary)
7. To add a new measurement, press the plus button in the measurement toolbar and proceed from point 2 as before to work with the new measurement.
8. You can add as many measurements as you like. Use the drop-down menu to select the measurement you want to work with or use the previous and next buttons to cycle through measurements. The currently active measurement will be highlighted.
9. To remove a measurement, press the minus button while the measurement is active.

To measure perpendicular distance from a point on a surface to the first surface hit:

1. Activate the Perpendicular Distance Tool in the Measurement Toolset by pressing the Perpendicular Distance Tool button
2. Use the left mouse button to click in the virtual layout on the point from which you wish to measure
10. The perpendicular distance from the point clicked to the first surface hit is shown, similar to a distance measurement created using the Distance Tool. If nothing appears then there may be no surfaces between the point and the out boundary of the layout, so click elsewhere to try again. The distance in meters is shown:



The Perpendicular Distance Tool ruler with distance shown

3. To add a new measurement, press the plus button in the measurement toolbar and proceed from point 2 as before to work with the new measurement.
4. You can add as many measurements as you like. Use the drop-down menu to select the measurement you want to work with or use the previous and next buttons to cycle through measurements. The currently active measurement will be highlighted.
5. To remove a measurement, press the minus button while the measurement is active.

7.2 Measuring angles

The Angle Tool is used to measure angles between locations and is similar to the Distance Tool to operate except that there are three points rather than two to take into account.

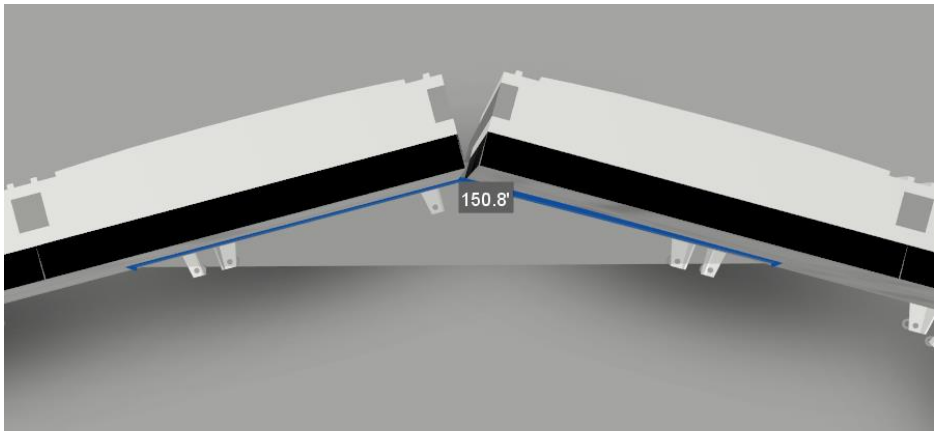
Once three locations have been selected, a visualisation of the angle between the points, and a label indicating the size of the angle, is displayed. The points can then be adjusted at will.



The Measurement Tool toolset with Angle Tool enabled

To measure the angle between three points:

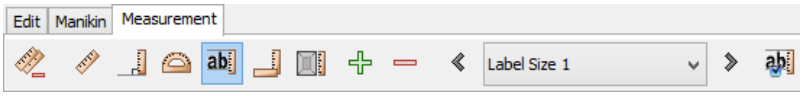
1. Activate the Angle Tool in the Measurement Toolset by pressing the Angle Tool button
2. Use the left mouse button to click on three locations in the model. The first location should be the first end point, the second is the point at which the angle should be measured, and third location is the final end point.
3. A visual representation of the angle between the first and last points at the second point will appear with the size of the angle shown in a label.
4. To move one of the points in the measurement pick a new point in the virtual layout with the left mouse button. The closest measurement point will then move to the new point.
5. Repeat from step 2 to measure a different angle (temporarily deselect the pick button, or hold down the 'shift' key, to navigate, if necessary)
6. To add a new measurement, press the plus button in the measurement toolbar and proceed from point 2 as before to work with the new ruler.
7. You can add as many measurements as you like. Use the drop-down menu to select the measurement you want to work with or use the previous and next buttons to cycle through measurements. The currently active measurement will be highlighted.
8. To remove a measurement, press the minus button while the measurement is active.



An angle measured using the Angle Tool.

7.3 Visualising legible distance and area for text labels

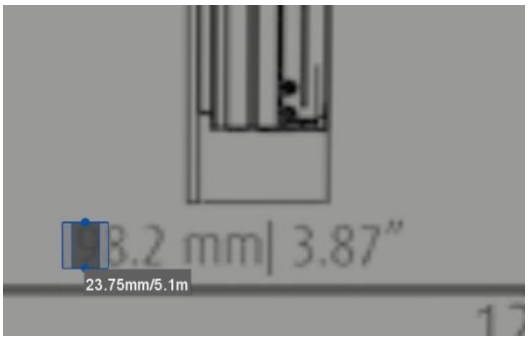
The Label Size Tool enables you to measure the distance within which text labels in a room are legible. This measurement tools indicates the height of the text, which you measure, and the distance from the measurement point within which the text is legible. This distance is visualised as a sphere that encloses the legibility area. While this sphere can help you to test whether text is large enough to be read at a certain distance, it does not indicate visibility. You can check visibility by navigating in the model, using the manikin tools, and/or using the View Angle Tool.



The Measurement Tool toolset with Label Size Tool enabled

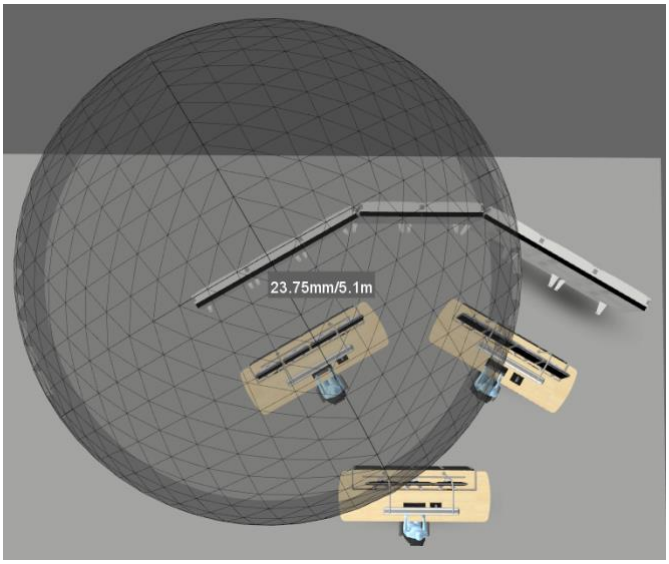
To visualise the maximum distance within text of a measured height is legible:

1. Activate the Label Size Tool in the Measurement Toolset by pressing the Label Size Tool button
2. Click on the lowest point of the character of text in a label with the left mouse
3. Click on the highest point of the character of text in the label with the left mouse button



The Label Size Tool in action – the user has clicked at the bottom and top of the first digit in the label

4. A rectangular area will appear highlighting the space between the two points, and a sphere appears indicating the area within which text of the height measured is normally legible. You may need to move away from the location where you made the measurement in order to see the sphere:



A Label Size Tool measurement showing the area (a 5.1m radius from the text) within which a label with text of height 23.75mm can be read. Note that the sphere indicates distance and not the visibility

5. The character height is displayed together with the maximum reading distance for this character.
6. To adjust the height, click and drag with the left button near the end of the label you wish to adjust
7. To move the measurement entirely, pick two new points using the left mouse button
8. To add a new measurement, press the plus button in the measurement toolbar and proceed from point 2 as before to work with the new measurement.
9. You can add as many measurements as you like. Use the drop-down menu to select the measurement you want to work with or use the previous and next buttons to cycle through measurements. The currently active measurement will be highlighted.
10. To remove a measurement, press the minus button while the measurement is active.

7.4 Visualising the area within which a location can be seen

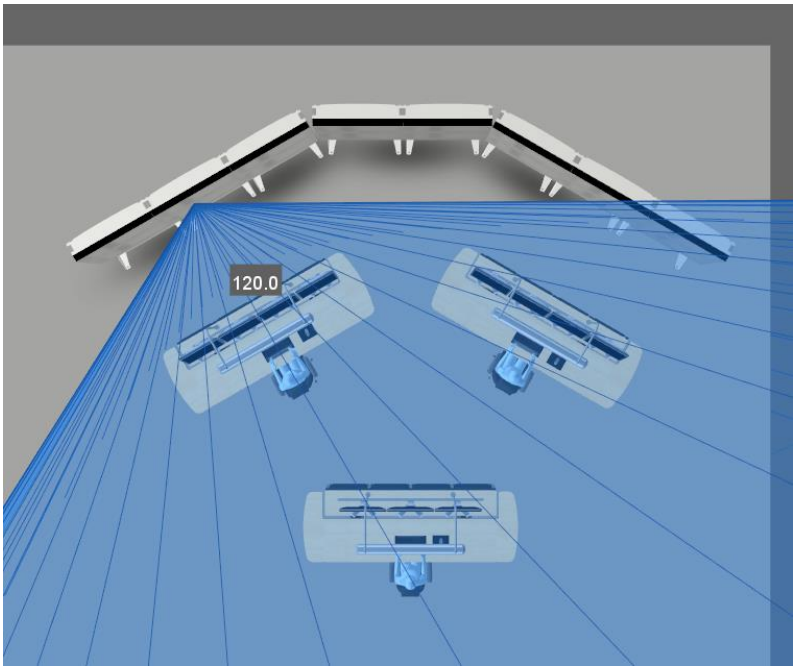
The View Angle Tool enables you to determine whether a location in a layout can be seen, providing a visual representation of the viewing angle for the location you select. This is particularly relevant for checking the extent of the area in which it is possible to see a sign (text label) or indicator and is typically used in combination with the manikin tools and/or in addition to the Label Size Tool.



The Measurement Tool toolset with View Angle Tool enabled

To visualise the viewing area for a location:

1. Activate the View Angle Tool in the Measurement Toolset by pressing the View Angle Tool button
2. Use the left mouse button to click in the virtual layout at the point from which you wish to measure
3. A visualisation cone appears for the selected point. You may need to navigate to a new position in order to get a better view of the extent of the visualisation (temporarily deselect the pick button, or hold down the 'shift' key, to navigate, if necessary):



A View Angle Tool measurement seen from above

4. To move the measurement point, pick a new point in the virtual layout with the left mouse button.
5. To add a new measurement, press the plus button in the measurement toolbar and proceed from point 2 as before to work with the new measurement.
6. You can add as many measurements as you like. Use the drop-down menu to select the measurement you want to work with or use the previous and next buttons to cycle through measurements. The currently active measurement will be highlighted.
7. You can configure the viewing angle by clicking on the Viewing Angle Options button that appears next to the tools selector when this tool is active.
8. To remove a measurement, press the minus button while the measurement is active.

7.5 Measuring rectangular volumes

The Rectangular Volume Tool enables you to measure volumes and distances.

Once three locations have been selected, a visualisation of the angle between the points, and a label indicating the size of the angle, is displayed. The points can then be adjusted at will.

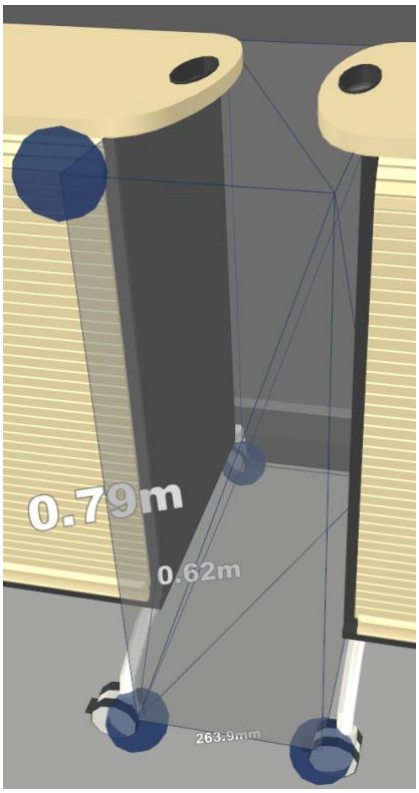


The Measurement Tool toolset with Rectangular Volume Tool enabled

To measure the rectangular volume:

1. Activate the Rectangular Volume Tool in the Measurement Toolset by pressing the Volume Tool button
2. Use the left mouse button to click on two locations in the model. These two points represents the lower and upper points in the volume, excluding height. Alternatively the mouse can be pressed and dragged, showing a visual rectangle as you drag the mouse, where the first point pressed, and the point when the mouse is released represents the lower and upper points of the volume. The height is always initialized default to 1 meter.
3. A visual representation of the rectangular volume will be shown. The visualisation consists of a rectangular box representing the volume, with the distances for each axis' depicted.
4. There are three spheres in the lower corners that can be dragged to resize either the width or the depth of the volume.

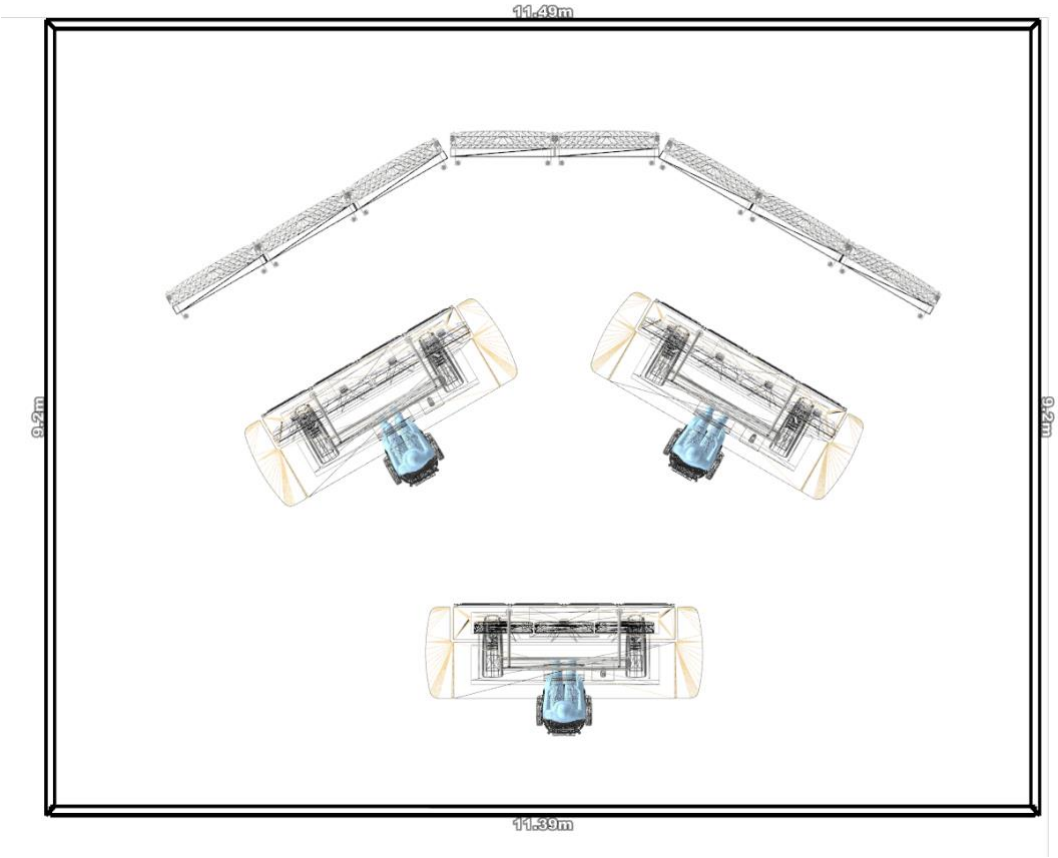
5. There is one sphere on the top of the volume that can be dragged to increase or decrease the height of the volume.
6. To move the volume around in the Layout press anywhere on the volume visualisation (except the sphere) and simply drag the volume around.
7. To rotate the volume switch to rotate mode (see Rotating objects), and drag anywhere on the volume to rotate.
8. To add a new measurement, press the plus button in the measurement toolbar and proceed from point 2 as before to work with the new volume.
9. You can add as many measurements as you like. Use the drop-down menu to select the measurement you want to work with or use the previous and next buttons to cycle through measurements. The currently active measurement will be highlighted.
10. To remove a measurement, press the minus button while the measurement is active.



A volume measured using the Rectangular Volume Tool.

8 Plan View

A plan view of the Layout can be created using different styles. The types can be customized by changing both the projection and the position and orientation of the view, as well as other properties that dictate how the 3D objects in the layout are drawn.

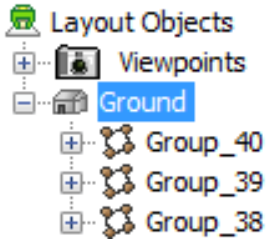


Plan view of a room in a layout

To display a plan view of a layout:

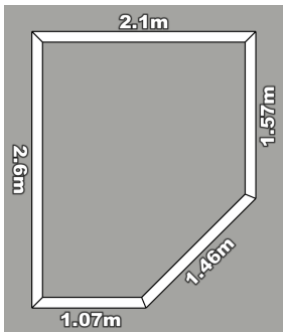
1. Position the camera at a viewpoint with an overview of the whole 3D scene, or the parts you wish a view of. There are two ways to do this:
    a. Select one of the system viewpoints, i.e. Top (see Viewpoints) and select Camera > Reset Current Viewpoint. Optionally adjust position by zooming in/out if necessary.
    b. Manually position the camera at the location

    Pan mode navigation is very suited for navigating when taking a plan view, because it prevents you from accidently changing the orientation of the camera (see Using the Pan Navigation).
2. Optional: Turn off perspective projection by deselecting Camera > Perspective (see Changing Perspective Projection)
3. Optional: A special rendering of the parametric wall groups can be turned on, that will show the distances of each wall as well as visualising the outline of the walls. Note this is intended for viewing the wall group top-down, meaning when viewed i.e. in front it will not look correct. To enable this:
    a. Select the Ground object in the Object Overview.



b. Enable selection dimensions by selecting View > Show Selection Dimensions

c. Parametric wall groups will now be rendered specially

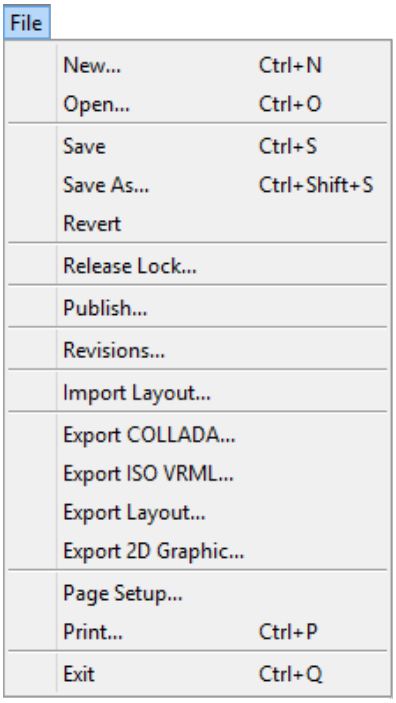


d. To remove the effect either turn of selection dimensions or deselect the Ground object

4. Optional: Turn on wireframe mode to only visualise the edges of the 3D objects by selecting View > Show Wireframe (see Showing scene as Wireframe)
5. Optional: Turn on the distance grid by selecting View > Show Grid (see Using the Visual Grid)
6. To save the plan view see Creating a snapshot of the Virtual Layout
7. If you wish to use the same camera position so that you can take similar snapshots of the layout during future iterations it can be a good idea to save the current location of the camera in a custom viewpoint (see Viewpoints for instructions). This enables you to reuse the exact same camera positioning later
8. When you are finished just reverse the features optional steps you performed

9 Menus

9.1 File Menu

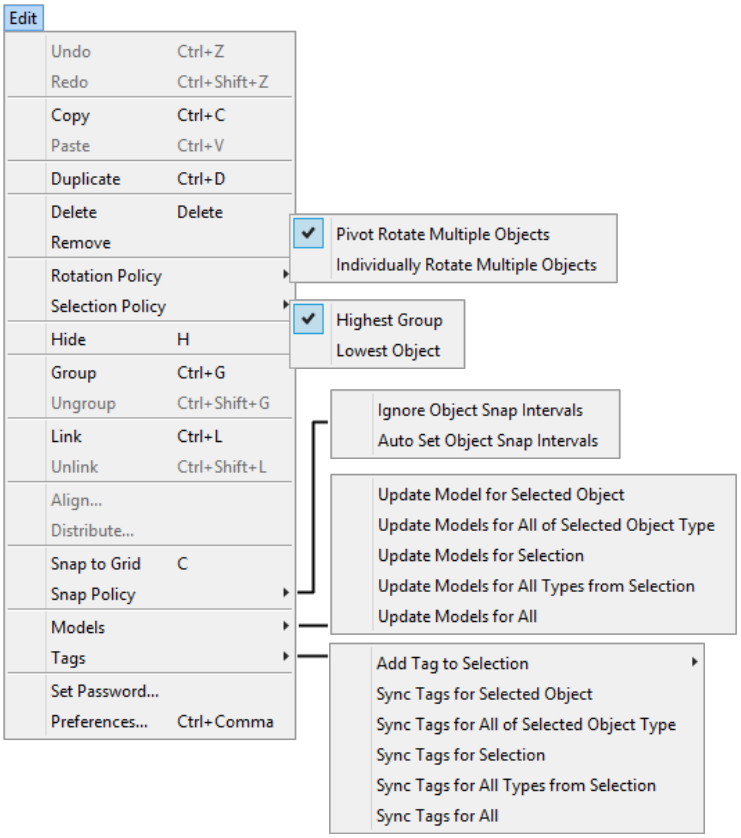


The File menu provides functionality for opening and saving layouts. The most used menu items have keyboard shortcuts (shown to the right of the menu items above).

New...	Creates a new Layout (see Creating a New Layout)
Open…	Opens an existing layout (see Opening an Existing Layout)
Save	Saves the layout the designer is currently working with (see Saving a layout)
Save as...	Saves the layout with a new layout name (see Saving a layout with a new name).
Revert...	Revert any changes made since the layout was last saved or opened
Release Lock…	Make the current layout saveable for the next user opening it (see Locking)
Publish...	Enables this layout for verification (see Publishing a Layout)
Revisions...	Enabling viewing of different versions for this layout (see Accessing earlier revisions of a layout)
Import Layout…	Imports a layout package from the local file system (see Importing a layout package)
Export COLLADA...	Exports the current layout to the local file system (see Exporting a layout to COLLADA format)
Export ISO VRML...	Exports the current layout to the local file system (see Exporting a Layout to ISO VRML97 format)
Export Layout…	Exports a layout package to the local file system (see Exporting a Layout)
Export 2D Graphic…	Exports a screen shot of the 3D view from the current viewpoint (see Creating a Snapshot of the Virtual Layout)

Page Setup…	Is used to set the page orientation and paper size (see Printing the Virtual Layout)
Print…	is used to print the currently displayed layout (see Printing the Virtual Layout)
Exit	is used to quit the Layout Tool. If you choose this menu item then you will be requested to confirm that you want to quit. If you are using macOS then a Quit menu item is located in the application menu ("Layout Tool").

9.2 Edit Menu

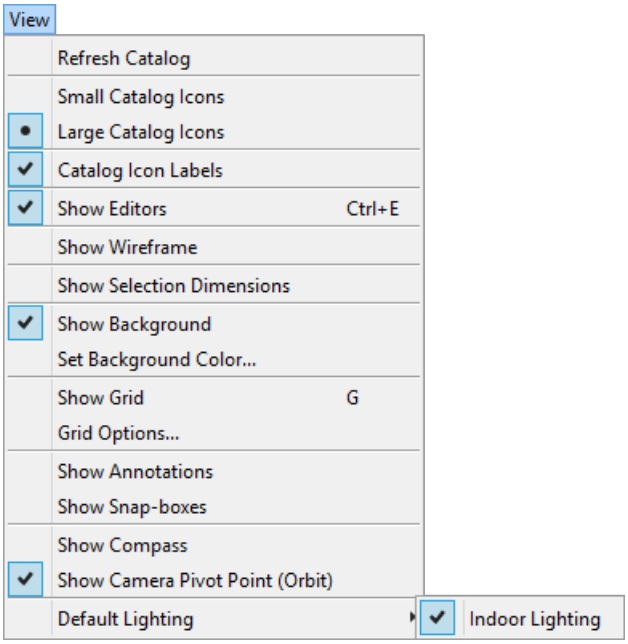


The edit menu consists of tools for helping editing the layout scene, and for setting password and preferences.

Undo	is used to undo the last action (see Undoing changes)
Redo	is used to redo the last action (see Redoing undone changes)
Copy	is used to copy the selected object(s) (see Copying and Pasting selected objects)
Paste	is used to paste the copied object(s) (see Copying and Pasting selected objects)
Duplicate	is used to duplicate the selected object(s) (see Duplicating selected objects)
Delete	is used to delete the selected object(s), including associated/linked children, from the layout (see Deleting objects)
Remove	is used to remove the selected object(s) from the layout (see Removing objects without deleting associated children).
Rotation Policy	is used to select the rotation policy when operating on multiple objects (see Rotation Policies)

Selection Policy	is used to select the group selection policy (see Selection Policies)
Hide	is used to toggle the visibility of objects (see Toggling the visibility of objects)
Group	is used to group objects together (see Grouping objects together (grouping))
Ungroup	is used to split a group into single objects (see Ungrouping grouped objects)
Link	is used to link objects together in a parent-child relationship (see Creating relationships between objects)
Unlink	is used to break the parent-child dependency (see Removing relationships between objects)
Align…	is used to align the currently selected objects. A dialog box is shown in which the align options can be configured (see Aligning selected objects to each other)
Distribute…	is used to evenly distribute the currently selected objects. A dialog box is shown in which the distribution options can be configured (see Distributing selected objects along an axis)
Snap to Grid	is used to enable the snap to grid function (see Snap to Grid)
Snap Policy	Ignore Object Snap Intervals enforces the global grid settings, overriding any object-level snap settings (see Ignore Object Grid Distance), while Auto Set Object Snap Intervals automatically sets a local snap distance setting when an object is introduced to the scene (see Automatically adapt Object Grid Distance)
Models	is used to update models to the latest version found in the Model Bank for the selected objects (see Adding an object to the scene)
Tags	is used to add tags, or synchronize tags with the Model Bank for the selected objects (see Tagging objects with Meta Data)
Set Password...	is used to change the password (see Changing Your Password)
Preferences…	is used to configure HVRC CREATE (see Preferences Window) If you are using macOS then this menu item is located in the application menu ("Layout Tool").

9.3 View Menu

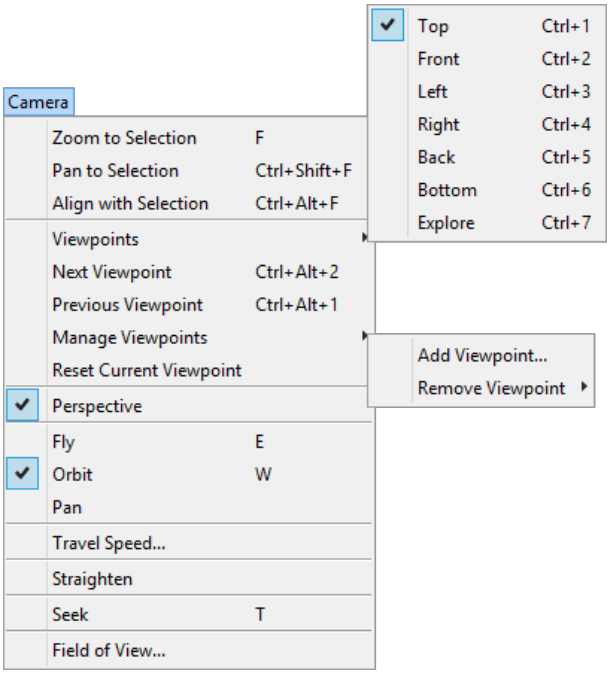


The View menu is used to modify User interface elements or bring up information from the user or layout.

Refresh Catalog	is used to refresh the Model Bank view (in case changes have been made to the project configuration on the server and new categories have become available)
Small Catalog Icons	is used when small model bank model icons is wanted (see Customising the icon view)
Large Catalog Icons	is used when large model bank model icons is wanted (see Customising the icon view)
Catalog Icon Labels	is used when it is wanted to draw the model name as text on top of model bank model icon (see Customising the icon view)
Show Editors	is used to show/hide the right side editor panels
Show Wireframe	is used to show wireframe rendering of the layout (see Showing scene as Wireframe)
Selection Dimensions	is used to show/hide the dimensions of the selected object (see Selecting objects)
Show Background	is used to toggle between a user-defined background colour for the 3D view and a plain white background (see Setting the Background Colour)
Set Background Colour…	is used to set the user-defined background colour for the 3D view (see Setting the Background Colour)
Show Grid	is used to toggle a visual grid (see Using the Visual Grid)
Grid Options…	is used to configure the visual grid (see Configuring the Global Grid)
Show Annotations	is used to show/hide the visualisation of the annotations (see Show Annotations)
Show Snap-boxes	is used to show/hide the visualisation of the snap-boxes (see Snap points)
Show Compass	is used to show/hide the virtual compass (see Using the Virtual Compass)

Show Camera Pivot Point (Orbit)	is used to show/hide the pivot point when using orbit mode (see Using the Orbit Navigation)
Default Lighting	is used to enable/disable default lighting in the 3D scene. Turn this off if your scene is lit by objects from the Model Bank or by lights in the room itself

9.4 Camera Menu

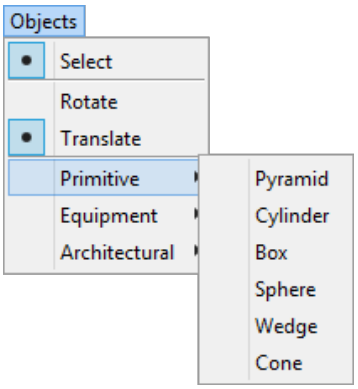


The Camera menu consists of features for aiding navigation as well as management of viewpoints and other camera related properties such as perspective projection and field of view.

Zoom To Selection	is used to fit the view to the currently selected objects (see Zooming camera to selection)
Pan To Selection	is used to centre the camera over the currently selected objects (see Centring camera on selection).
Align to Selection	is used to align the camera to the current selected objects (see Aligning camera to selection).
Viewpoints	is used to select which viewpoint should be active (see Viewpoints)
Next Viewpoint	is used to switch to the next viewpoint in the viewpoint list (see Viewpoints)
Previous Viewpoint	is used to switch to the previous viewpoint in the viewpoint list (see Viewpoints)
Manage Viewpoints	is used to add new viewpoints or remove any user created viewpoints (see Viewpoints)
Reset Current Viewpoint	is used to reset the current viewpoint back to the position and orientation it had when the layout was opened (see Viewpoints)
Perspective	is used to change perspective projection of the camera between perspective and orthographic (see Changing Perspective Projection)
Fly	is used to select Fly mode (see Using the Fly Navigation)
Orbit	is used to select Orbit mode (see Using the Orbit Navigation)
Pan	is used to select Pan mode (see Using the Pan Navigation)

Travel Speed…	is used to change the movement speed when using Fly mode (see Using the Fly Navigation)
Straighten	is used to level the camera relative to the ground (see Using Straighten)
Seek	is used to move the view closer to a point clicked on in the scene (see Using the Seek Button)
Field of View…	is used to change the field of view of the camera (see Changing the Field of View)

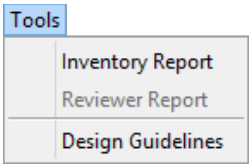
9.5 Objects Menu



The Objects menu contains controls for working with objects and controls for adding objects to the 3D scene. The available sets of objects that can be created depend on the Layout Tool configuration used and any additional plug-ins that might be installed. The sets for the default configuration are included in the list below.

Select	is used to toggle selection of object using the mouse. If enabled then you can click on objects to select them in the 3D scene (see Using the Pick Mode)
Rotate	is used to specify that when dragging (with the mouse) the current selection, selected object(s) should rotate (see Using the Rotate Mode)
Translate	is used to specify that when dragging (with the mouse) the current selection, selected object(s) should move
Primitives > [object list]	is used to create primitive parametric objects such as cubes, cones, spheres
Equipment > [object list]	is used to add parametric objects that represent configurable components such as labels and panels
Architectural > [objects list]	is used to create architectural objects such as walls and windows

9.6 Tools Menu

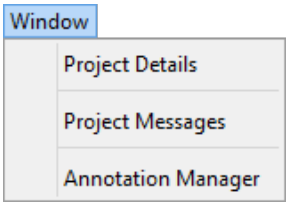


The Tools menu is used to access features that support working with a scene but do not change the scene itself.

Inventory Report	is used to create an inventory report for all objects loaded in scene (see Generating an Inventory Report)
Reviewer Report	is used to view a reviewer report (see Viewing Reviewer Reports)

Design Guidelines	is used to access Design Guidelines (see Browsing Design Guidelines)

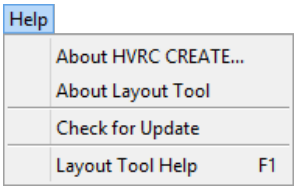
9.7 Window Menu



The Window menu provides access to layout and project windows.

Layout Info	is used to view information about the currently displayed layout (see Viewing information about a project or layout)
Project Details	is used to view project information (see Viewing information about the project)
Project Messages	is used to communicate back and forth in the project or design (see Communicating with other project team members)
Annotation Manager	is used to edit or add annotations for this layout (see Annotations)

9.8 Help Menu

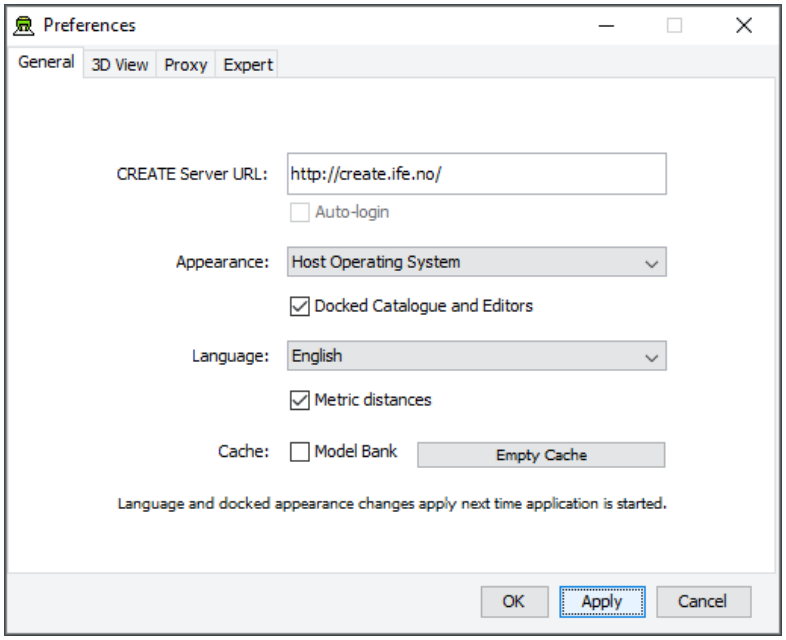


The Help menu provides access to copyright information about this software and to online help.

About HVRC CREATE…	is used to display copyright information about the CREATE tool suite
About Layout Tool…	Display technical information about this tool. This also provides access to the log file. If you are using macOS then this menu item is located in the application menu ("Layout Tool")
Check for Update	is used to check if the latest version of this tool is being used
Layout Tool Help	is used to access the online user guide for the Layout Tool

10 Configuration

10.1 The Preferences Window



The Preferences Window

The first time you use one of the CREATE tools you will normally be presented with a wizard that assists you in setting the configuration options that you need to get started using HVRC CREATE. Subsequently, you can adjust your personal configuration via the options in the Preferences Window.

The Preferences Window can be accessed from the main menu bar's Edit > Preferences… menu item. The keyboard shortcut to open the Preferences Window is ctrl-comma (or command-comma).

Changes to preferences are global and therefore affect all CREATE tools that you use, however they are also personal and will not affect any other users of CREATE that share a computer as long as you are not sharing a computer user account.

There are four sets of preferences in the Preferences Window, the most important of which is the “General” set, which is used to enter the address of the CREATE server that will be used. The individual sets and the options they contain are described in the subsections below.

The Preferences Window has three buttons:

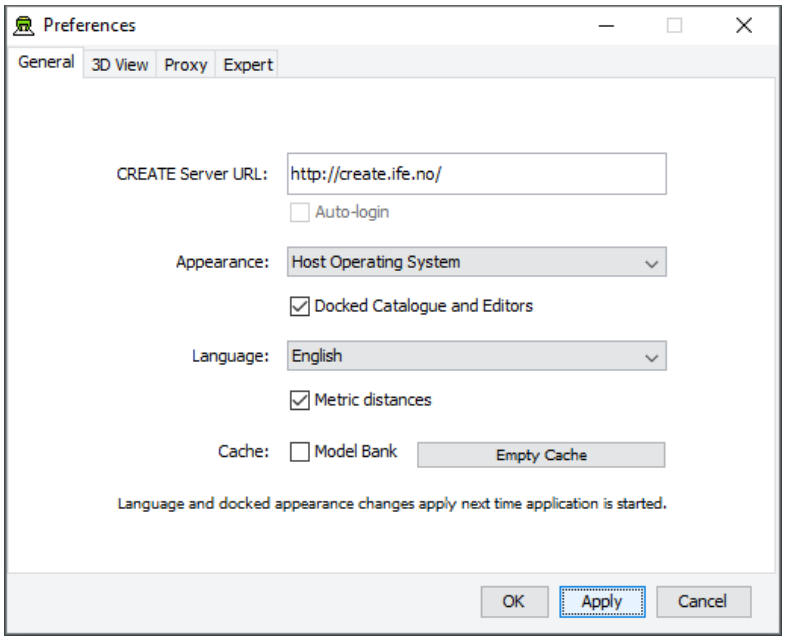
- OK is used to update the preferences and close the window
- Apply is used to set the update the preferences but not close the window
- Cancel is used to dismiss the window without making any changes

Clicking Apply followed by Cancel is equivalent to clicking OK.

A configuration file containing your preferences is created in your home directory and will be applied the next time you run a CREATE tool.

Closing the window by clicking on the close box (top right of the window) is equivalent to clicking on the Cancel button. Hitting the escape key is also equivalent to clicking on the Cancel button.

10.1.1 General Preferences



The General Preferences section of the Preferences Window with server create.ife.no set

The General Preferences section of the Preference Window is used to set the CREATE server URL, to specify the appearance of the CREATE tools, and to toggle caching to local disk of 3D models in the Model Bank.

Important information about changing the server URL:

- In general, it is recommended that you change the server URL setting either immediately after starting up a tool or immediately after saving any unfinished work to the current server, to avoid any risk of data loss before switching to a different server.
- If you are behind a firewall and are using a proxy server to access the internet then you should also refer to Proxy Preferences – section 10.1.3 if you need to access a CREATE server that is not on your local network (e.g. to access the demonstration server on `create.ife.no`).

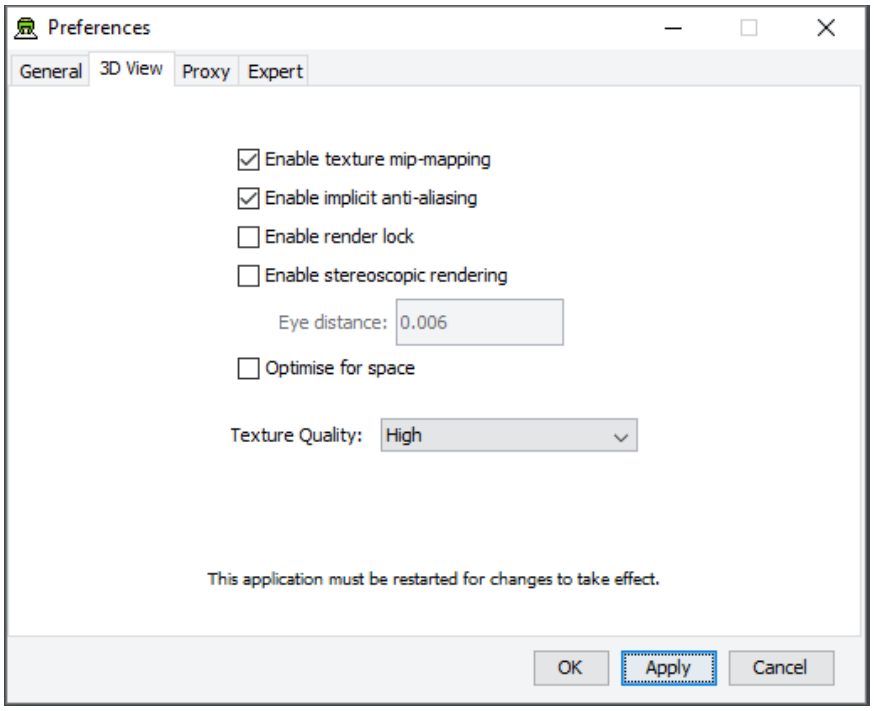
If some features of the tool are not working correctly and the software is reporting server access errors then the reason may be that the server is incorrectly configured, in which case you should report this to your CREATE server administrator.

The General options are described below:

CREATE Server URL	The server URL is the Web address of the CREATE server where all CREATE system and project data is stored. It is shared by all of the tools. If you attempt to modify the server URL then you will be asked to confirm the change. Changing the server URL to a non-existent host will render the tools unusable until a valid host URL has been entered. Changing the server URL before saving any work that has been done during the current work session will result in any unsaved data being lost. **Important: See notes above regarding changing the URL.**
Auto-login	If you are logged onto a CREATE Server then this option will be enabled. Once enabled, you can select it to indicate that you would like the tools to remember your user name and password for the current server and use it to automatically log on to the server at any time where you would otherwise be prompted to enter user name and password. The password is stored in encrypted form in the create preferences file for security reasons.

Appearance	The default Appearance is that of the host operating system. The host operating system appearance normally gives the CREATE Tools a look similar to that of other applications on your computer. The cross-platform setting provides a consistent user interface look and feel regardless of whether you are running the software on Windows, Linux, macOS, or some other operating system.
Docked Catalogue and Editors	This option (currently only used by the Layout Tool) causes the Model Bank Catalogue and Editors side panels to be detached from the main application window. When detached, the panels appear as floating windows that can be moved freely around your computer screen. This is especially useful if you have multiple displays attached to your computer as you can then move the Catalogue and Editor panels to a different display, giving more space to work with the 3D view on your main display. This option takes effect the next time the Layout Tool is started.
Language	The text of the HVRC CREATE tools user interfaces can be displayed in English, US English, French or Norwegian. By default this option is set to system default, enabling the software to select the language automatically depending on your operating system language settings. However, you can also select the language specifically. For example, this can be useful if you are working on an international project where English is the project language, but your personal computer is otherwise configured to use a non-English language.
Metric distances	If you want distances to be displayed using U.S. measurement units then you can turn this option off, otherwise distances are displayed in metric units.
Cache	If Model Bank caching is enabled then frequently used models load faster as copies of the models are read from the local hard drive, rather than transferred over the network, each time the model is loaded. The effect of this depends on the speed of the network and the size of the models. The greatest benefit of using caching is achieved when frequently accessing models over a slow connection to a server. Since the model cache is stored on the local disk, it is important that there is sufficient disk space (a few megabytes is usually sufficient) and that you are not using an insecure computer and an insecure user account to access the models (from which the cached models could be copied). Pressing “Empty Cache” deletes the data in your local cache, freeing up disk space. Caveat: If you are using a computer where your home directory is on a server (rather than stored locally on the computer that you are using) then turning on the cache may actually slow down the loading of Model Bank data, if the network connection to the CREATE Server is not significantly slower than the connection to your home directory. **We do not recommend turning on the cache if your home directory is on a network server.**

10.1.2 3D View Preferences



The 3D View Preferences section of the Preferences Window

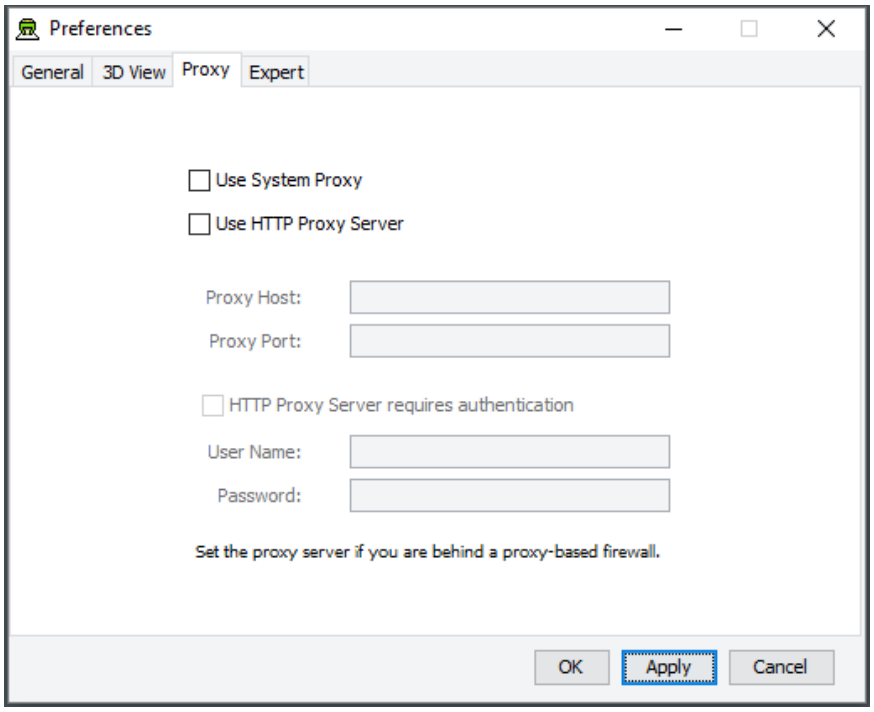
The 3D View Preferences are only applicable to the tools that display 3D graphics, and offer control over the way in which the 3D graphics are rendered. These options generally have no effect until the application has been restarted as the affect the way in which the 3D view is initialised.

The 3D View options are described below.

Enable texture mip-mapping	Enable generation of multi-resolution textures when textured models are loaded. This option improves the appearance and performance of textures, however some older graphics cards may not support this feature and the loading of textured models may be significantly slower if this option is enabled.
Enable implicit anti-aliasing	Allow the display driver to control full-screen anti-aliasing settings. If you have a graphics card with support for anti-aliased rendering then this option enables will cause the tool to acknowledge your anti-aliasing set-up. This option can greatly improve the visual appearance of the 3D view but there may be a performance impact, and some older graphics cards may not support this feature.
Enable stereoscopic rendering	Enable initialisation of 3D views in stereo mode. This option will only have an effect if you have a graphics card that supports active stereoscopic rendering. Unless you are actually using stereoscopic hardware, you should not enable this option as stereoscopic rendering will decrease the overall performance of the 3D view as it requires more effort of the graphics card. Default off.
Enable render lock	Controls rendering execution. Try changing this if you have driver problems. In general, you should leave it off. This option is offered only because it can resolve graphics driver problems in some special cases. Default off.
Optimize for space	Optimize 3D geometry to use less memory at the expense of slower performance. Disable this if you need to squeeze out a little more performance. In most cases the difference is unperceivable so we recommend leaving it on. Default on.

Texture Quality	If your layouts contain many high-resolution image surface parametric objects then you may reach a point where the rendering performance degrades significantly as you run out of memory on the GPU. You can improve performance by reducing the maximum quality used for texture rendering. Note that the images themselves are always stored at high resolution within CREATE so this only affects their appearance (both in the 3D view and when exporting 2D images). You can safely work with this set to Low if you want to maximise performance while working on a design, and increase it when you are ready to output high quality images. Default is High.

10.1.3 Proxy Preferences



The Proxy Preferences section of the Preferences Window

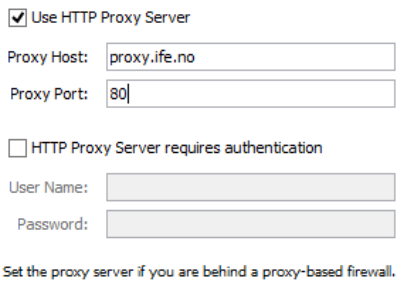
If you are behind a firewall and are using a web proxy server to access the Internet then you will need to configure the CREATE tools to use a proxy server if you wish to access a CREATE server that is not on your local network (e.g. to access the demonstration server on create.ife.no).

To enable proxy support, check the Use HTTP Proxy Server option, enter the server address (without entering `http://` in front of it and without any trailing slashes) in the Proxy Server field and the port number in the Port field. If you leave the port field blank then the default port (80) will be used.

To disable proxy support, uncheck the Use HTTP Proxy Server option.

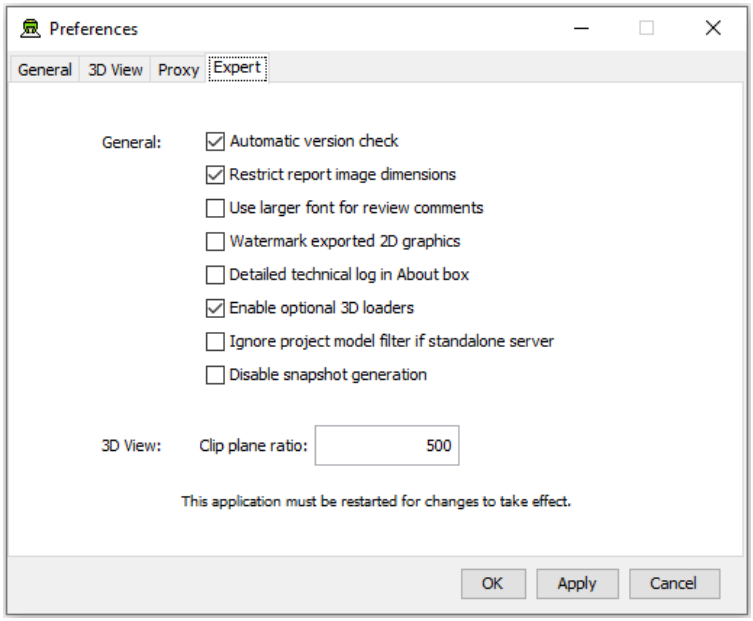
If necessary, select Proxy Server Requires Authentication and enter your network (i.e. not CREATE) user name and password.

Note that changing these items while in the middle of doing work with a CREATE tool is not recommended. Change these settings immediately after starting up a tool or after saving any unfinished work to avoid any risk of data loss.



Example of a filled-in Proxy Preferences section of the Preferences Window

10.1.4 Expert Preferences



The Expert Preferences section of the Preferences Window

The Expert preferences provide access to additional options, described below.

Automatic version check	Turn off the automatic daily checking for a new release of the HVRC CREATE Tools. If you turn this off then you will not be informed automatically of new updates, but can still check for updates manually via the Help-menu (Help > Check for Update). Default on.
Restrict report image dimensions	In versions of CREATE up to 4.0, snapshots of the 3D view added to reports in the Verification Tool were exact duplicates of the image in the 3D view, with the same resolution and aspect. From CREATE 4.0, the snapshots are taken with a consistent aspect to always fit neatly into a report page, with landscape or portrait format depending on the current 3D view aspect. Default on.
Use larger font for review comments	When using a non-Latin character set for entering review comments or procedures, some users may find the text easier to read if a large font is used than the system default size. Default off.
Watermark exported 2D graphics	If this option is enabled then “HVRC CREATE” and the name of the licensee is inserted at the top left on exported images. In the demo version of CREATE then this cannot be turned off. Default off.

Detailed technical log in About box	Select to enable detailed technical logging of system behaviour in the log in the About box. This is useful for troubleshooting if you experience technical issues with the software, and you need to contact CREATE support for assistance. Enabling this option has a small negative effect on the system performance. Default off.
Enable optional 3D loaders	Select to enable optional 3D loaders, to support importing 3D models in LWO, OBJ, PLY, and SCENE (Ogre3D) formats. These are termed experimental as they are not guaranteed to load all files in those formats correctly but may still be useful as they can load most files. Default on.
Clip plane ratio	If you experience tearing effects in the 3D view then this may be because your graphics processor is unable to draw surfaces that are close together with sufficient accuracy. Reducing this number may minimise that effect, although at the cost of not being able to view near surfaces as closely. Similarly, if you are not having any problems with tearing then you might want to try increasing this number in order to be able to move even closer to surfaces before they disappear from view. A ratio of 1000 is a good choice for most modern discrete graphics cards. Default is 500.
Ignore project model filter if standalone server	If you are using a standalone CREATE Server (as opposed to a networked server), on the same machine that you are running the CREATE Tools on, then you can opt to ignore any project level model filters set for the Model Bank. This makes all categories and models visible in the Layout Tool regardless of any filters that have been specified using the Project Management Tool. If you are the only user of the server then this can be useful as you will see all new categories added to the Model Bank without having to update the project context using the Project Management Tool. Default is off.
Disable snapshot generation	Enable a partial workaround to enable CREATE 3D tools to run on hardware that does not fully support the 3D hardware minimum requirements. Default is off.