



pCon.planner PRO Plugin VR-Viewer

Documentation

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1 Technical Notes

1.1 Check System Requirements

1.1.1 Hardware Components

The following minimum requirements must be met:

1. CPU: current Intel/AMD multi core - processor of the 4 GHz class
2. System memory capacity: 16 GB RAM
3. Hard drive space: 1 GB (SSD) or more
4. Graphics card: NVIDIA Geforce 1080, 2080, 3080, 4080 or higher with at least 8 GB RAM. Graphics cards from AMD as well as Intel Arc are not officially supported by the producer.
5. Needed for the application of the [Powerwall](#) in addition:
 - Head Tracking System, like for example HTC VIVE VR system
 - An additional monitor or beamer that is connected to the system in use and controlled via the Windows setting „Extend this display“. 3D-capable devices are also supported.
6. Supported HMDs (Head-Mounted Displays) – all devices that support SteamVR/OpenXR; like:
 - HTC Vive Virtual Reality-Headset
 - Varjo XR3, Varjo VR3
 - Meta Rift S, Meta Quest 2, Meta Quest 3
 - Pico 3, Pico 4
 - Windows Mixed Reality and many more

The operability of these headsets is guaranteed by third-party software. EasternGraphics GmbH has no influence on this, so that we accept no liability. The change of the software by the third-party providers may lead to the headset no longer working together with the VR plugin.

Please note that EasternGraphics GmbH cannot test all HMDs on the market for operability. If you are unsure, please contact your sales partner.

1.1.2 Software Components

The basic requirements for using the VR system are:

1. A 64-Bit Windows 10/11 operating system
2. Newest version of pCon.planner PRO
3. Newest version of pCon.planner PRO VR-Viewer plugin
4. The software needed for your VR headset (Oculus (Meta), Windows mixed Reality for SteamVR, Vive Cosmos Utility, Varjo Base, ...)
5. Depending on used VR hardware: SteamVR 1.24.7*

*Only the version of the SteamVR Offline Installer up to date at the time of release is supported. If you are using the free version of Steam VR and have problems with the plugin, install the [SteamVR Offline Installer](#). For head-mounted displays from Meta (Oculus), WindowsMR or Varjo, OpenXR runtime can be used instead of SteamVR. Further information: [Settings](#).

1.2 Installing pCon Components

To use the VR-Viewer, you will need the current version of pCon.planner PRO. It can be found under the following link: <https://pcon-solutions.com/download-area/>

Proceed as follows:

1. Download and install the pCon.planner PRO setup (administrative privileges required).
2. Download and start the VR setup with the following link:
<https://pcon-solutions.com/download-area/>
Administrative Privileges are also required for this step.

pCon.planner PRO and the VR-Viewer plugin are now ready to be used.

Both pCon.planner Pro and the VR Viewer Plugin install a 30-day demo license. After the trial licenses have expired, you will need a license to continue working with the programs. To purchase the license, please contact your sales partner.

1.3 Using the Steam Software

Note: SteamVR is only needed if you are using an HMD from a brand other than Meta (Oculus), WindowsMR or Varjo. Alternatively, the OpenXR runtime is also available for these brands.

SteamVR is a free Valve Corporation software and is provided via the Steam platform. You need a Steam account to use SteamVR.

Please bear in mind that only the version of the SteamVR Offline Installer up to date at the time of release is supported. Follow this link to download the installer: [SteamVR Offline Installer](#).

1.3.1 Installation of SteamVR for Different HMDs (Head-Mounted Display)

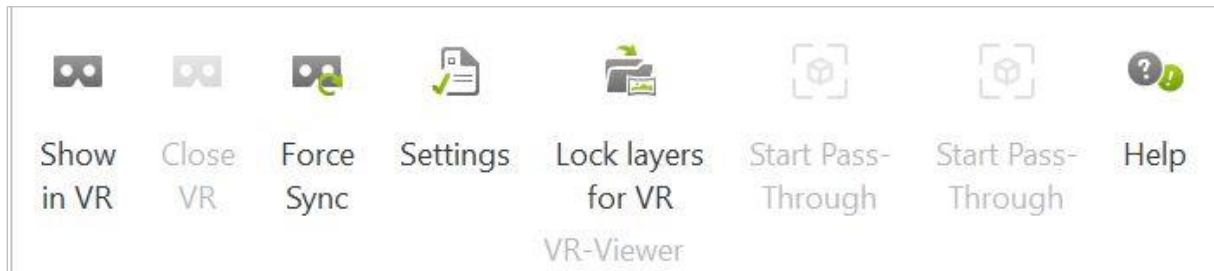
Depending on the HMD you want to use, please check the respective manufacturer's support websites to find out which additional software components are required to operate the glasses. Install these.

1.3.2 Setup of the HMD

For information on the setup of your HMD, of the controllers and the room capturing, please visit the support websites of the respective manufacturer.

If the HMD is installed correctly and if the additionally needed software is started, the VR-Viewer plugin will find the device without additional settings.

2 Using the VR Plugin



The VR plugin consists in the following features:

2.1 Show in VR

Your planning will be transferred to the VR headset by clicking *Show in VR*. It is now available for the user. The loading time depends on various factors such as the hardware being used or the size of your drawing.

In the next step, put on the headset and take the controller in your hand. You can now move around the planning by walking and turning your head.

2.2 Close VR

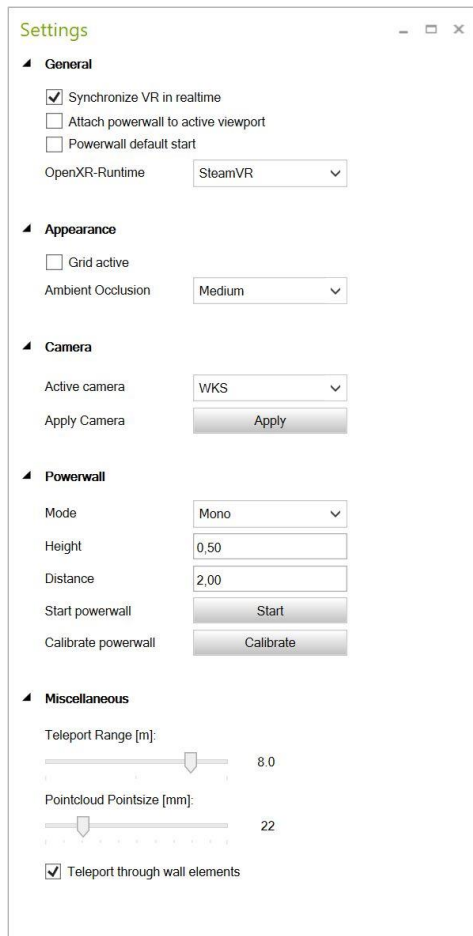
Quits the VR viewer.

2.3 Force Sync

Synchronize makes changes in your planning - such as object configurations or adjustments to the scenery - subsequently visible in VR.

Check *Synchronize VR in realtime* in the *Settings* to automatically synchronize all changes in your drawing just-in-time with virtual reality.

2.4 Settings



2.4.1 General

Synchronize VR in realtime: You will see object changes like color adjustments in your VR headset immediately after they are finished, if you activate *Synchronize VR in realtime*. If you move the object inside the virtual environment, these changes will not take effect in pCon.planner.

Attach Powerwall to active viewport: If this box is checked, the Powerwall will show the same perspective on your plan as visible in the viewport currently active in pCon.planner. For example: if the *Front* view is active in pCon.planner, the front of your drawing will also be visible on the Powerwall.

Powerwall default start: If you have a Powerwall and you choose *Powerwall default start*, then both Powerwall and Headset will be activated on starting the plugin.

OpenXR runtime: set the runtime environment for your work with the VR plug-in:

- SteamVR
- Meta (Oculus)
- WindowsMR
- Varjo

Note: SteamVR is no longer mandatory for Meta (Oculus), WindowsMR and Varjo. These head-mounted displays come with their own runtime environments. If you use one of the brands mentioned and switch the OpenXR runtime to the corresponding option, you must also set the OpenXR runtime as the default in the respective applications.

When using SteamVR, the OpenXR runtime must also be set as the default in the Steam software.

2.4.2 Appearance

The following options are available:

1. **Ambient Occlusion active:** The shading method enables realistic shading in the room with a short rendering time. It is set by default.

Use the drop-down menu to set one of the four possible levels for the Ambient Occlusion or deactivate Ambient Occlusion (by setting the value to *Off*).

2. **Grid active:** If enabled, the grid (on level 0) will be shown within the VR scene.

2.4.3 Camera



Active Camera: Set the start position in VR.

Use Camera: Select another view in the VR by selecting another camera under *Active Camera* when the VR is started. Confirm with *Apply*.

In VR, use the *Next Camera* option to switch through the cameras available in pCon.planner.

2.4.4 Powerwall

Because of the stationary sensors, the Powerwall function is only practicable for an HTC VIVE VR system that is fixed in one location.

Open a second VR window with the *Powerwall* function. This is useful, if for example another person would like to walk through the planning without wearing the VR headset. The person presenting the design does also not need a VR headset for this setup. The navigation is done with the controller.

Modus:

- None: Projection is deactivated.
- Mono: Use the Powerwall in 2D mode, without 3D functionalities.
- SideBySide: 3D mode for 3D-capable projectors or TVs that support this mode.
- TopBottom: 3D mode for 3D-capable projectors or TVs that support this mode.

Height: This parameter is important for a correct perspective. We recommend an average value of 1.70 m to take the body height of different viewers into account. Depending on their body height, the value might vary.

Distance: Used to set the distance to your monitor. 1.5 – 2 m is a good value here.

Start Powerwall: Starts the Powerwall mode.

Calibrate Powerwall: Calibrates the Powerwall.

[More information on this topic.](#)

2.4.5 Miscellaneous

Set the *Teleport Range* to decide how far the VR user will be able to move inside or outside of the planning by using the teleport function. A distance of 8.0 is set by default.

Pointcloud Pointsize

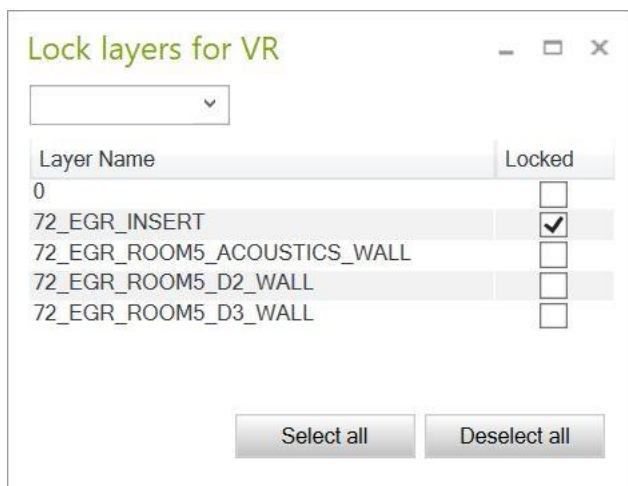
Controls the view of point clouds available in the planning. You define the size of the individual points using the slider.

More about point clouds: <https://help.pcon-planner.com/en/help/pointcloud.htm>

Teleport through wall elements

This option allows you to teleport through wall elements such as closed doors, windows, glass fronts, etc.

2.5 Lock Layers for VR



Lock layers and included objects by using the dialog *Lock Layers for VR*. Thus, users will not be able to select and move objects accidentally. The elements of EasternGraphics [72_EGR_INSERT] are locked by default. Check the relevant box to select or deselect all listed objects.

Use the filter line in the upper area of the dialog to search for layer names.

2.6 Start Pass-Through

Pass-Through enables you to use the Mixed Reality Headset Varjo XR-3. If the HMD is set up correctly and connected to the PC, Pass-Through can be activated after clicking *Show in VR*. This means that your scene from pCon.planner will be displayed in the real environment.

2.7 Stop Pass-Through

Ends the *Pass-Through* mode.

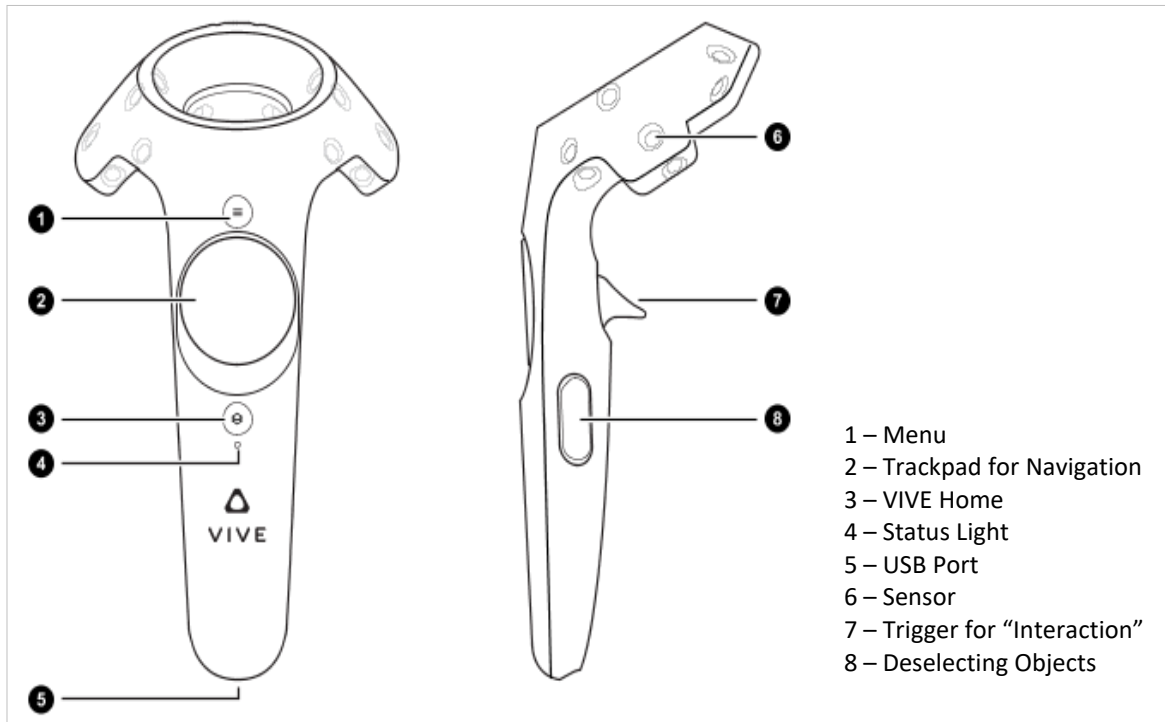
2.8 Help

Selecting the *Help* button will open a browser window for the [Help Center](#). In addition to this document you will find plenty of tips, tricks and notes on using pCon.planner successfully there.

3 Using the HTC VIVE VR System – A Stationary Solution

In this section, we will introduce the presentation of objects within the virtual environment using a stationary HTC VIVE VR system. It consists of a headset, controller(s) and base stations that establish the motion radius.

3.1 Controller Structure

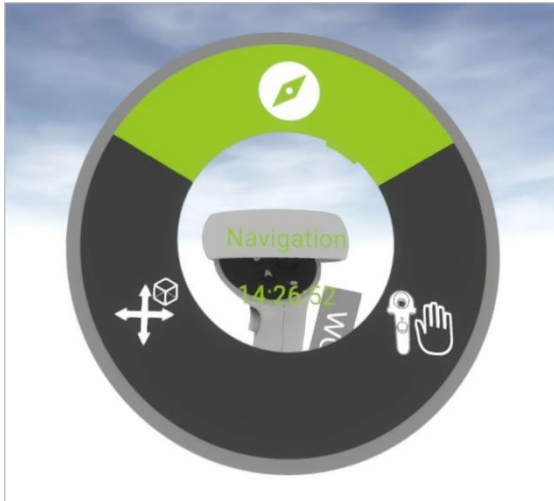


HTC VIVE Controller (Source: https://www.vive.com/us/support/vive/category_howto/about-the-controllers.html; Last access: 2022-12-19)

Once the planning has been transferred to the VR system, the manual control makes the following actions available based on the button selected. The controllers from other manufacturers behave similarly.

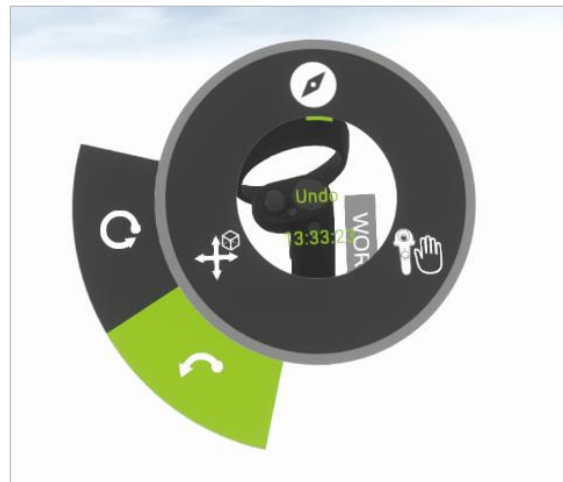
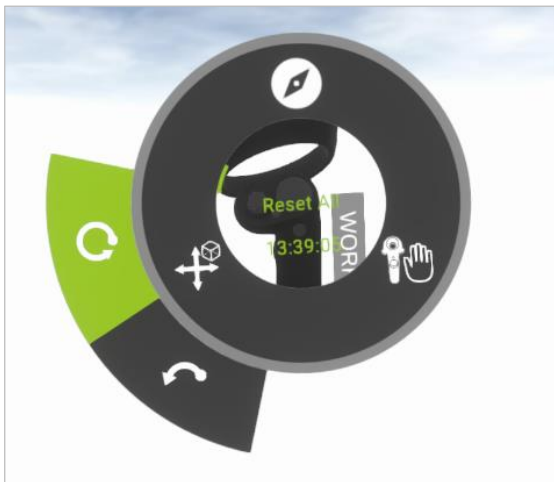
Number	Function
1 – Menu	The menu button opens the VR menu, which will be visible in the headset or on the monitor.
2 – Trackpad	The trackpad is used for pinpoint control and is engaged in other functions. More on navigation.
3 – VIVE Home	No feature.
4 – Status Light	The following display modes are available: <ul style="list-style-type: none">• Continuous green light when the controller is in normal mode• Red blinking light indicates low battery• Blue blinking signal for connecting the headset and controller• Continuous blue light once the controller is connected to the headset• Continuous orange light when the controller is charging
5 – USB	Connect the charger with your computer via USB cable to charge the controller.
6 – Sensor	Through the sensor, your position within the room is identified and shown within the planning.
7 – Trigger	The trigger allows you to select objects and move them freely throughout the room. Additional information.
8 – Deselecting Objects	By clicking this button, selected objects will be deselected.

3.2 Virtual Navigation with the Controller



Lightly touching the different sides of the track pad will give you're the following options:

- Upper area: move within the planning (*Navigation*)
- Right: move an object (*Interaction*)
- Left: submenu
 - Upper area: reset all settings
 - Lower area: undo last step



3.2.1 Hover Mode



You will move like a helicopter over the planning: Press the trackpad and keep it pressed while moving the controller in the desired direction. The stronger you move the controller, the faster you will move through the planning. This mode is ideal for large scenes that span over several levels.

3.2.2 Fly Mode



The Fly mode resembles the Hover mode, only that you can rotate around additional axes here.

3.2.3 Teleportation Mode



This function will help you moving horizontally to different locations (or different levels, if necessary) within the planning without losing orientation to the floor. A light touch on the trigger will show a “laser beam” that helps you to go to a new place.

3.2.4 Fit Viewport Mode



Select an area of your interest and zoom in to have a closer look at the planning and specific objects.

3.3 Conducting Interactions

3.3.1 Work Mode

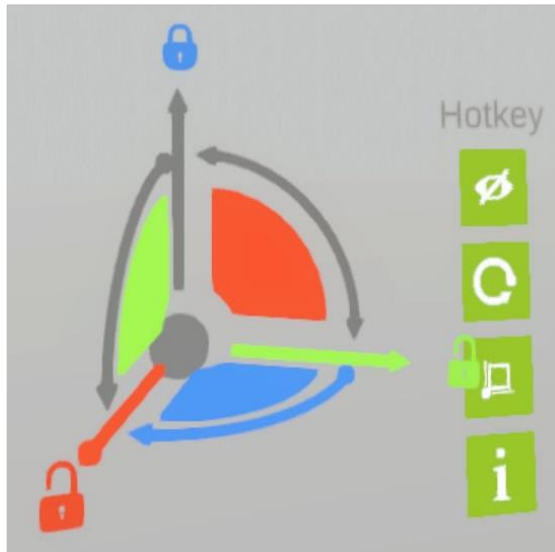


The Work Mode enables you to:





- a. Select objects: Quickly press the button to select an object. The object will be highlighted in green. A *Coordinate Display* and *Quick-Select Menu* will open next to the object. You can use the sphere in the middle to move the coordinate display to the desired location in relation to the object.

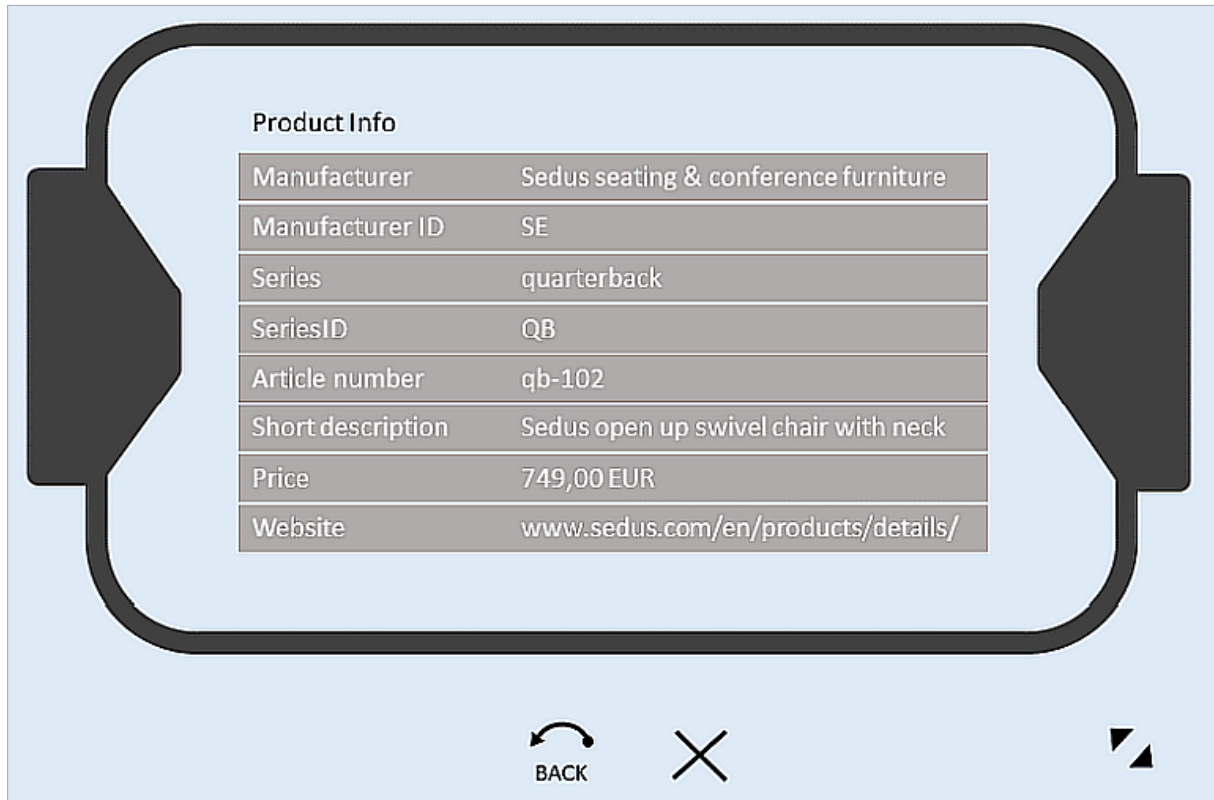


- b. Changing object location: Each selected object or entire group of objects can be moved based on their own coordinate system. Select the axis or level by 'grabbing'. Click on the padlock to unlock the axis or level and move it in the x-, y-, z-, xy-, yz- or zx- direction.



- c. Free transformation: If you lightly press on the trigger, a 'laser beam' will shine, helping you to aim at the object. The selected object will be highlighted and, by clicking and holding down on the trigger, can be moved throughout the room.

Menu Icon	Description
	Show or hide selected objects. To restore the visibility of all hidden objects, use <i>Reset All</i> in the controller menu .
	Reset all changes made and bring objects and object groups back to their original positions.
	Set the rotation point for the respective object by clicking on this function: The rotation point can be set to the center of the object or to its left rear bottom corner.
	While looking at an object (like a chair within your planning) closely, the user will get detailed information about the article by open the <i>info panel</i> . In the case of OFML articles, information such as the exact article name, the manufacturer code and a short description of the article are displayed.



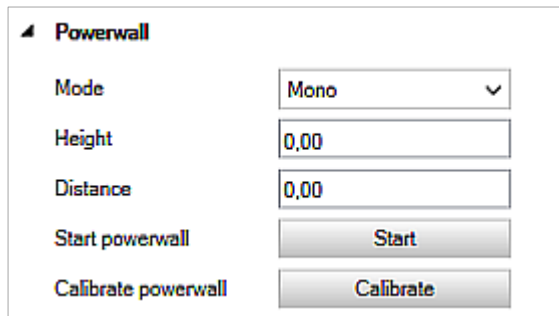
For OFML articles, the *info panel* provides many information like manufacturer name, series, article number and a description of the object.

3.3.2 Grab Mode



The controller will be shown as virtual hand when selecting the *grab mode*. You easily grab and move objects by using the controller.

3.4 Powerwall – Interactive Room Exploration without VR Headset



Use the Powerwall function of the VR-Viewer to present your planning to a group of people. The following chapter describes the setup of the Powerwall by using the example of the 3D-cappable Beamer Optoma EH320UST.

The HTC VIVE VR system, which is permanently positioned at one location, is suitable for using the Powerwall.

The Powerwall is used independently of the HMD or VR glasses.

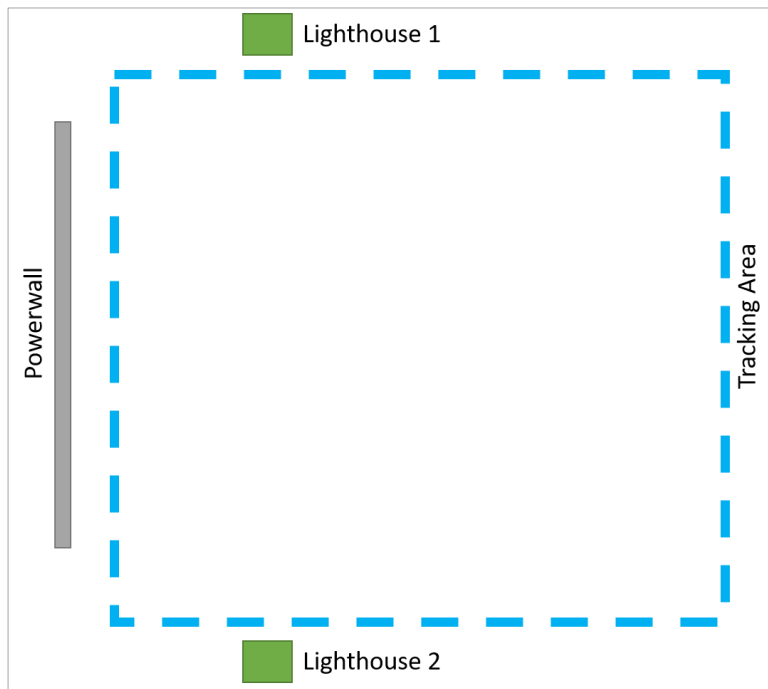
If you want to display exactly the same scene on the Powerwall that is visible via the HMD, proceed as follows:

Click Show in VR. The pConVR window opens, which represents the view of the HMD. Drag it onto the beamer or the second monitor. You do not need the Powerwall mode for this.

The following steps are necessary before using the Powerwall:

1. Connect the projector to the PC and set it up as an *Enhanced Display* (Windows Settings > Display > Multiple Screens).
2. Set up the HTC Vive system correctly and make sure it is ready to use.
3. Set the room calibration up correctly in SteamVR.
4. Set *3D Mode = VESA 3D* and *3D Format = Side by Side* under *Display* in the beamer's menu.
5. Start pCon.planner PRO and the VR viewer plugin.
6. Go back to pCon.planner PRO and select the *Calibrate Powerwall* tab in the VR Viewer *Settings* dialog.

3.4.1 Calibrating the Powerwall

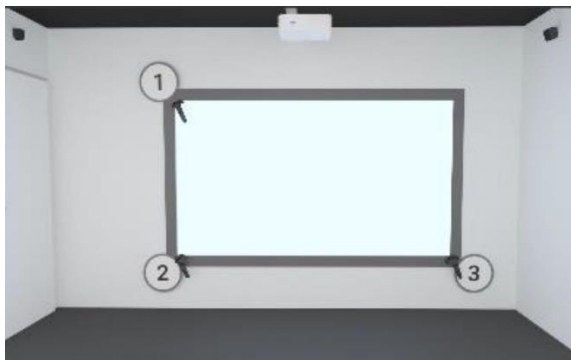


The prerequisite for the use of the interactive Virtual Reality wall is the correct positioning of the HTC VIVE base stations that should be found to the left and right of the Powerwall. In addition, ensure that the room calibration from the *SteamVR* is also valid.

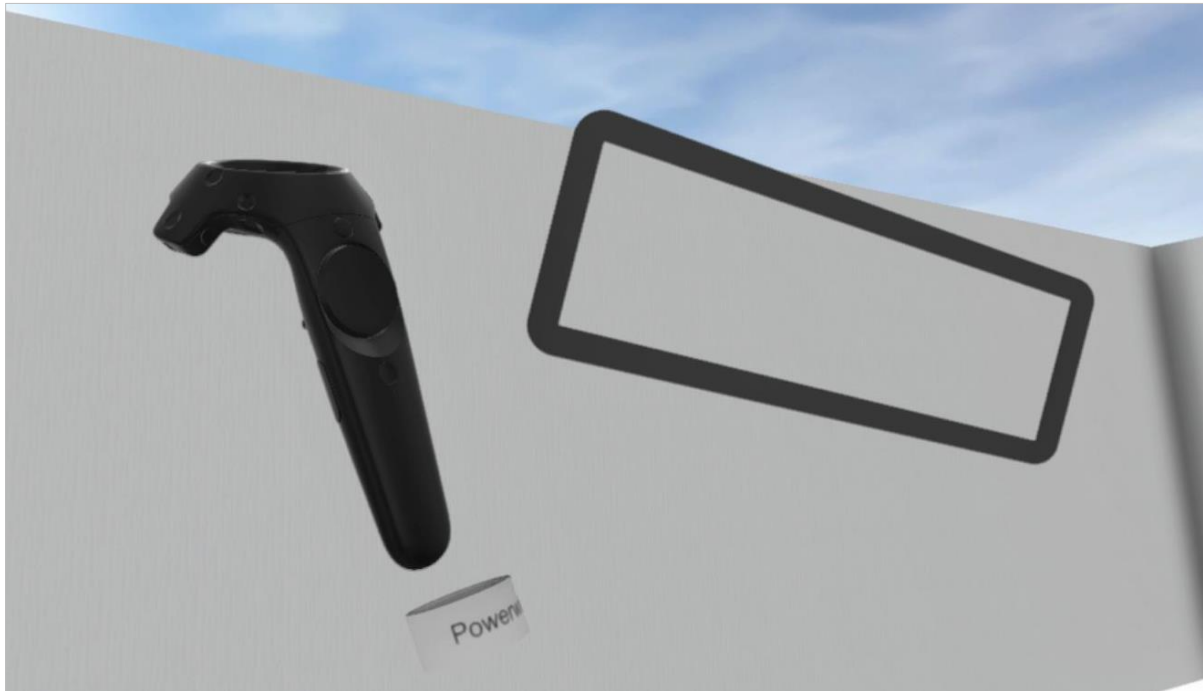
Click on *Calibrate Powerwall* and confirm the question by choosing 'Yes', if you would like to really calibrate the Powerwall.

The alignment process starts immediately. Please do the following:

1. Turn on the controller.
2. With the controller, tap the corners of the screen in the following order: "Top left – bottom left – bottom right" and press the control button to set the individual control points.



3. Once you have set the individual points, the Powerwall will open on your second monitor. The controller should be visible on the monitor. The controller should also be visible on the monitor, clearly recognizable by the ribbon with the inscription "Powerwall" attached to the bottom end. This controller starts directly in hover mode.



The following settings can be made for the Powerwall:

1. Mode: In addition to None (no projection), Mono, SideBySide and TopBottom are available. Our example (beamer Optoma EH320UST) uses the SideBySide mode.
2. Viewport: Depending on your position in front of the Powerwall, you can set two important parameters.
 - a. Height: Important for the optimum view of your planning. Since the height of the viewers will vary, an average value of 1.7 m should be used. Depending on the body height of your viewers, this value might vary.
 - b. Distance: This parameter determines the distances between you, or the viewers, and the screen. A distance of 1.5 to 2 meters is ideal.

Now you and all other users will be able to open and explore your planning in virtual environment, through the headset or on a separate monitor. Start your walk through the drawing by starting the Powerwall.

4 Problem Solving

4.1 Motion Sickness – Recommended Actions

VR sickness is similar to motion sickness, in which side effects can be experienced when moving throughout a virtual environment. If you experience symptoms such as nausea, vomiting, dizziness, headache or difficulty with orientation while using the VR system, stop using the application immediately. Do not continue using the system until you feel 100% fit again.

4.2 Error Messages

Error Message	Problem	Solution
A plugin requires a license by pCon.login. [X3G-VR-Viewer] Would you like to login now to obtain a license?	You are not authorized to use the plugin.	If interested, please contact your sales partner.
Could not start VR-Viewer	The application could not be started.	Close and restart the application.
	The VR windows starts in full screen mode.	Minimize the VR window by pressing Alt + Enter.
	The VR window is opened after starting the plugin. However, the output of the content via the HMD fails.	<p>Open the plug-in settings. Check whether the appropriate option for your manufacturer is selected under <i>OpenXR runtime</i>.</p> <p>Also check whether OpenXR is set as the default in the respective application.</p> <p>The <i>SteamVR</i> option must be set in the SteamVR settings > Advanced Settings > Set Steam As OpenXR Runtime.</p> <p>For Meta (Oculus), WindowsMR or Varjo, OpenXR must be set as the default in the respective applications:</p> <p>https://academy.vrex.no/knowledge-base/openxr/</p>

5 SteamVR Offline Installer

Note: SteamVR is only needed if you work with a HMD from a brand other than Meta (Oculus), WindowsMR or Varjo.

For maximum compatibility, we recommend using the SteamVR Offline Installer instead of the usual SteamVR installation. The advantage of the offline installer is that it does not update automatically. This way, you always work with the version that is tested and supported by the manufacturer at the time of release. To download the Offline Installer, register at <https://business.vive.com/dm>, download and install the SteamVR Offline Installer. The currently supported version can be found in the [system requirements in this document](#).

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