Accel VR 2020.2 X4

USER MANUAL

TABLE OF CONTENTS

Version: 20201222.0617

© Lumiscaphe SA, 2001-2020

Headquarters:

Espace France 4 voie Romaine 33610 Canéjan France

Documentation lead: P. Peyrevidal

Reproduction, extraction, presentation, alteration, modification, or use, whether in whole or in part, of this documentation or of any of its elements whatsoever, by whatever means or for whatever purpose, and more generally any act that has not been explicitly authorized by Lumiscaphe are strictly forbidden and subject to prosecution.

Trademarks, brands, brand names, service marks, logos and other distinctive symbols displayed in this documentation are property of their respective owners and are protected by French and European legislation, as well as by other applicable legislation. All unauthorized use or reproduction is strictly prohibited.

This documentation is provided with the software Patchwork 3D. It does not, however, constitute a contractual agreement regarding the features and functionality of the software.

PRESENTATION

About Lumiscaphe

Lumiscaphe helps to strategically connect the design and engineering worlds with marketing and sales support by developing and publishing innovative hybrid solutions employing the Digital Aspect Mockup (DAM) and photorealistic, real-time 3D rendering.

Lumiscaphe provides 3D visualization solutions built on solid experience in real-time rendering technology. Lumiscaphe's range of specialized products includes online and offline 3D product configurators, applications and content created for the web and for mobile devices, as well as tools for publishing and sharing. For creators, a software development integration kit is also available.

Lumiscaphe's clients are found in the automotive, aerospace and luxury goods industries, as well as in the architecture world and in the product design community.

Founded in Bordeaux in 2001, Lumiscaphe has become an innovative actor on the worldwide technology market. With offices today in Paris, Shanghai and Osaka, Lumiscaphe is proud to provide its solutions to its clients directly or through a network of certified partners.

How to use this documentation

This documentation describes the interface and the functionalities of Accel VR.

This document is organized by topic. It does not need to be read in order, and you do not need to read it from cover to cover unless you want to. Instead, use the search function (*Ctrl +F*), the table of contents, and the index to help you find what you are looking for. The chapter and first sub-heading are always listed at the top of the page so that you will know where you are.

Interface Text

Text in the interface and shortcut keystrokes are written differently so that they will be easy to see. They appear like *this* in the text.

Links

You will also see hyperlinks in the text. This is an example of a link to the New features. If you are reading on a screen-based support, you can click on these links to be taken to the related subject. Likewise, the page numbers in the table of contents and the index are links to the pages they indicate. You can click on them to go directly to that page.

Boxes

> ⓘ **NOTICE**
> Boxes like this one are used to indicate novelties for the current software version.

⚠ **WARNING**

Boxes like this one are used to provide a warning.

🖉 **NOTE**

Boxes like this provide additional information. It may be an associated remark or additional explanation.

You may find this information interesting, but it is not essential for understanding the operation or interface being described.

💡 **TIP**

Boxes like this one give a tip to help you with a better understanding of the concept or with the functionality concerned.

Step-by-Step Instructions

When step-by-step instructions are given, they are formatted as a numbered list:

1. This is the first step.
2. This is the second step.
3. This is the final step.

INSTALLATION AND ACTIVATION OF ACCEL VR

Installation

This process installs Accel VR on the computer of your choice. It creates a shortcut in the **Start** menu > **Programs** > **Lumiscaphe** folder and it places a shortcut an icon on the desktop.

You need the following:

• The administrator status on the computer on which you want to install Accel VR

• The installation .msi file for your software.

It is strongly recommended that you run the installation .msi file locally, that is, by backing it up to the computer on which you want to install the software before launching it. You can place it on the desktop or in any folder on your computer.

1. Double-click on .msi file of Accel VR to start the installation. Click the **Next** button.

2. Select the device you want to use in a drop-down menu and click **Next** o continue the installation.

3. Click **Install** to continue. A window appears asking if you want to run this file (if you have not disabled Windows alerts). Click **Yes**. The installer checks that there is enough space on your hard disk to install the software.

4. Presentation of End User License Agreement. Read the end-user license agreement carefully. You must accept the terms of this agreement and tick the box **I accept the terms in the License Agreement** to continue the installation. Click **Next** to continue.

5. A status bar keeps you informed of the installation progress. When the installation is complete, click **Finish** to close the installation wizard.

Activation

Launch Accel VR for the first time

The first time you launch Accel VR by selecting it from the menu **Start** > **Programs** > **Lumiscaphe** or by double-clicking the icon on your desktop, the activation wizard opens automatically. You need to activate Accel VR first before using it.

In order to activate your software, you need a license. The following procedures show you the steps-by-steps guide to get your license key and activate the software.

Follow the steps below or contact support at license@lumiscaphe.com (`<license@lumiscaphe.com>`) for further assistance.

To purchase a license or to obtain an evaluation copy of Accel VR, the sales team is at your disposal. You can reach it at sales@lumiscaphe.com (`<sales@lumiscaphe.com>`).

License Activation Wizard

> 💡 **TIP**
>
> The activation wizard launches when you open Accel VR for the first time. You can also find the assistant at any time from [?] > *Change license > Change license*

The activation wizard shows you the steps to activate Accel VR.

Choose from the three options presented:

- *Create an activation request*,
- *Activate the product with a license server over the network*,
- *Use an existing license to activate the product*,
- *Activate the product with tokens license (dongle)*.

Create an activation request

Choose this option if you need to activate Accel VR via a nodelock license or if you have already purchased a nodelock license but you have not yet received a license activation key.

1. Select *Create an activation request*, then click *Next*.

2. Fill in the account information requested by the activation wizard on the next screen. You must provide your name, company and email address. Enter your work email address so that we can identify you. We send the license key to the business email address you provide in this step. Once the fields are filled, click on *Next*.

3. Click on the *Save* button. Choose where this file will be saved. It is advisable to save it in a place easy to find, for example, the office. By default, the name of the file is presented as follows: "`20190213_YourCompany_vrc_ng.lar`". Do not change the name of this file.

Create an activation request window

4. Click on *Finish* to close the wizard.

5. Email the file you just saved to license@lumiscaphe.com
    (`<license@lumiscaphe.com>`).

6. Upon receipt of this file, we will send you your activation key. Once your activation key is received, you can launch Accel VR again. This time choose the option *Use an existing license to activate the product* when opening the wizard.

Activate Accel VR over the network using a license server

Choose this option if you purchased a floating license and already installed it on an RLM server. Your computer must be connected to this server over the network. This method is currently valid for all floating licenses.

1. Select *Activate the product with a license server over the network* on the first screen of the activation wizard, then click on *Next*.

2. Enter the name of the RLM license server in the text box. If you do not know the name of your RLM license server, ask your system administrator. Click on the *Next* button.
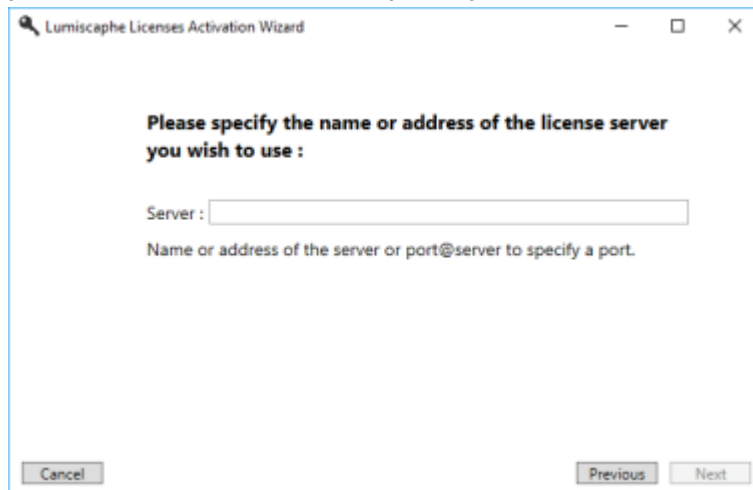
License activation with an RLM license server

3. Your activation is complete. Click on *Finish*.

4. The window that opens displays all the licenses available on your server.
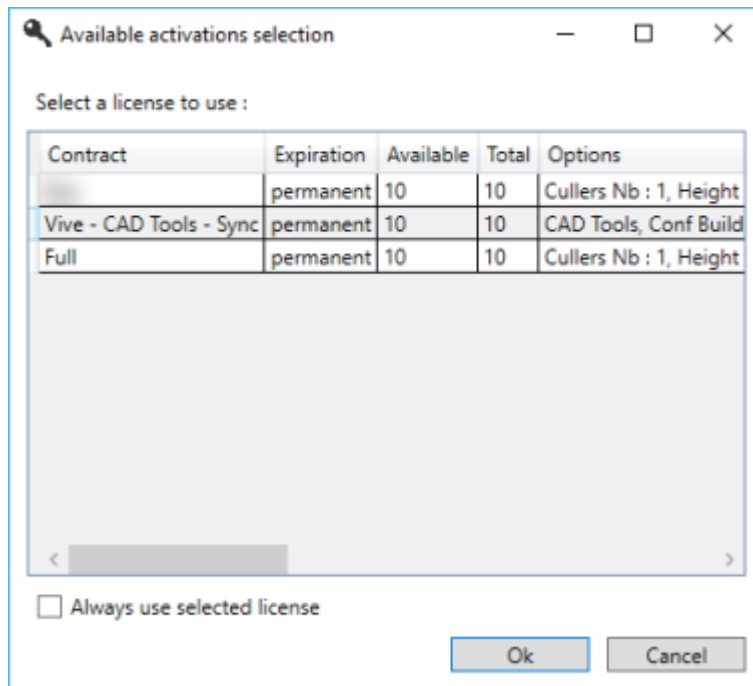
Example of licenses available on the server

Click on the license you want to use. If you only have one license available, or if you always want to use the same license, you can check the box ***Always use selected license***. If this option is not checked, you must select a license ID each time you open Accel VR.

Then click on ***Ok*** to start Accel VR.

Use an existing license to activate Accel VR

Choose this option if you have already received your activation key. The name of an activation file ends with the .lic extension.

Choose option ***Use an existing license to activate the product*** to use the activation file sent to you by email. This file must be saved on your computer.

1. Select ***Use an existing license to activate the product*** on the first screen of the activation wizard, then click ***Next***.

2. A window shows up to browse the activation file that has been sent by us by email and you have saved on your computer. Select it and click ***Open***.

3. Click ***Next***.

4. Your activation is complete. Click on ***Finish*** to launch Accel VR.

> 💡 **TIP**
> It is recommended to keep your .lic file in a safe place.

It can also be used to help us if you encounter a problem during activation or during a subsequent operation.

Use an activation with tokens license (USB key)

Choose this option if you have an UniKey type dongle (USB key) to use Accel VR occasionally. Indeed, the activation of a license token by the USB key is valid for 24 hours from the moment of the acquisition of the token.

> 💡 **TIP**
>
> Once the token license has been activated, it is not necessary to let the USB key (dongle) plugged into your computer. The token remains valid until the 24-hour period is over. When the token is no longer valid, it is necessary to plug the USB key back in to use another one token.

1. There are two activation possibilities:
   - Via the dongle which is connected to the computer.
   - Via a server or network. In this case, it is possible to indicate the IP address of the server in the dedicated field (speeds up the search for the server). If the specified server is not available, it is possible to automatically search for a server on the local network by checking the box.

2. Once you have made your choice, click on **Next >** and the wizard confirms that the activation has been completed.

3. Click on **Finish**.

4. Accel VR will ask you to use a new token.

NEW FEATURES IN THE 2020.2 VERSION

New features

- Addition of the possibility to adjust the interocular distance [35] (eye separation) in the VR headset settings.

- Addition of the possibility to adjust the rotation speed [29] of turntables.

- Addition of the possibility to recover surface colors when importing a Catia file (CAD Tools license required).

- Addition of the possibility to rebuild local environments when changing the configuration [21].

INTRODUCING ACCEL VR

General description

Accel VR is a virtual reality software solution designed for the visualization of Digital Aspect Mockups on a 1:1 scale on multi-screen immersive systems.

Visualization on a 1:1 scale makes it possible to assess objects with regard to their actual size and complements the photorealistic rendering quality of the Lumiscaphe rendering engine with an extra dimension of realism.

Accel VR conforms to a wide range of configurations. Its use is suited to various visualization profiles and modes, such as multi-screen devices, image walls based on juxtaposed projections, immersive systems of the C.A.V.E. type, or Head-Mounted Displays.

Overview of a CAVE operating with Accel VR.

Accel VR also supports several stereoscopic display modes and can interface with different tracking systems to enrich sensory experimentation during the project review.

Operating principles

Accel VR works with two different entities: Accel VR Pilot and Accel VR Unit.

It is important to understand the role of each of these entities to properly install the software solution.
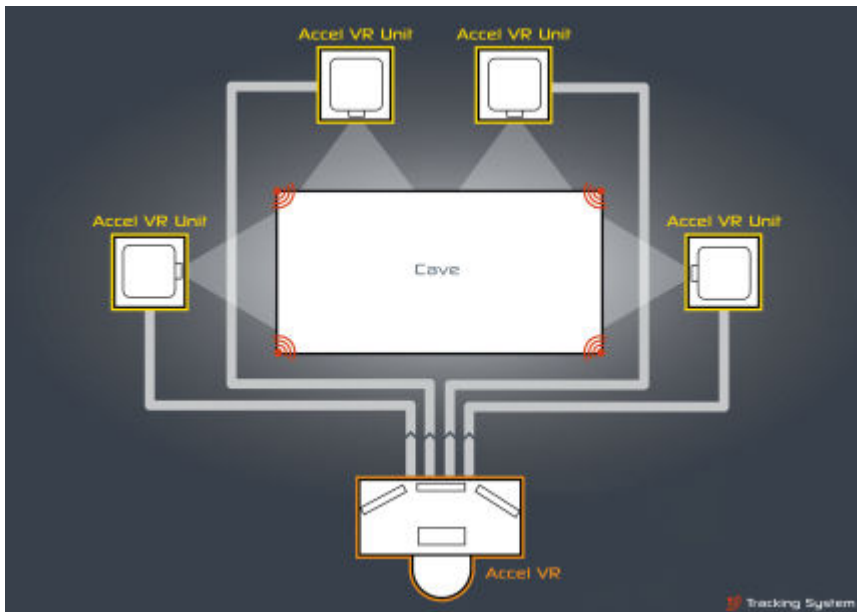
Accel VR Unit calculates images in real-time and displays the rendering on a remote screen of the visualization device while Accel VR Pilot manages calculation units that generate images on devices such as a zSpace or a VR headset.

These software entities are designed to communicate on a local network, but could be executed on a single computer if necessary.

> 💡 **TIP**
> There is no order to launch the two software entities: Accel VR Unit can be launched before Accel VR Pilot and vice-versa. It's recommended to test your infrastructure configuration to be sure entities correctly communicate.

Accel VR software entities operating principle.

Multi-screen or stereoscopic configurations require several calculation units to ensure optimal fluidity of rendering (min. 30 fps). Each rendering Unit calculates images intended for a single projection surface. A stereoscopic projection surface should display two distinct images and therefore it is best to consider it as two projection surfaces in system sizing.

> 💡 **TIP**
> It is best to install as many Accel VR Unit stations as there are projection surfaces in the visualization center. However, a station can render as many monocular projection surfaces as it has GPUs. If necessary, both eyes of a stereoscopic projection surface can be calculated using one GPU only, but the system performances will be reduced by half.

Each Accel VR Unit station is responsible for its own rendering piece. The final image consisting of all the screens of the visualization device is a mosaic of synchronized renderings.

Accel VR Pilot is the control station, its graphical interface allows an operator to import and manipulate the Digital Aspect Mockups prepared in Patchwork 3D or layouts produced in Patchwork Explorer.

The architecture of Accel VR makes it possible to manage the uniqueness of the various possible hardware configurations and visualization systems.

Understanding the Exploration Shuttle

Schematically, the installation can be considered as a mobile virtual space (often compared to an exploration shuttle) containing windows that are open on the world (the projection screens, VR headset, zSpace).

The observer can move around in this space and observe the world through these windows.
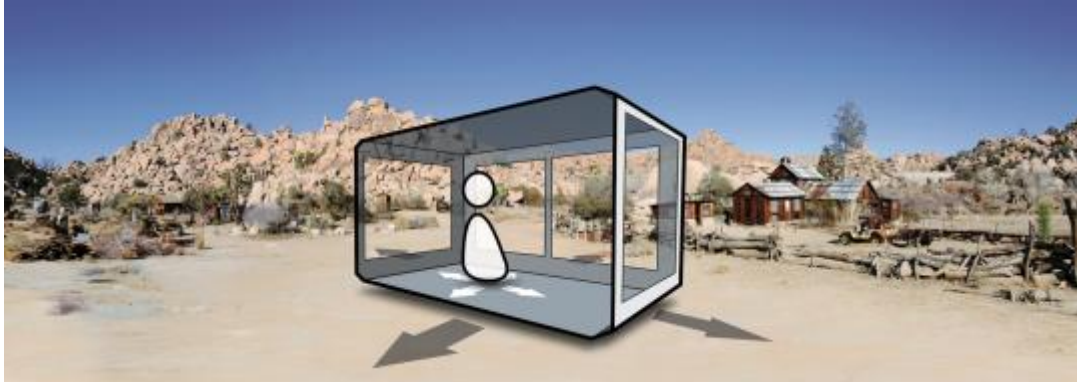
Exploration shuttle.

Frames of Reference in Accel VR

The fifth frames of reference used in Accel VR are:

- the world frame,
- the shuttle frame,
- the tracking frame,
- the head frame,
- the frame of the devices (right hand or left hand).

The world frame is the frame used in the database. Its origin is the center of the grid visible in Accel VR Pilot.

The shuttle frame is represented in the following scheme. Setting the origin of the shuttle frame at the center of the room is recommended. Its axes are positioned so that X and Y axes are collinear to the plane of the main window (front window) and Z axis is orthogonal to it.

The tracking frame and the shuttle frame are superimposed when the tracking system is calibrated according to the recommendations of the configuration assistant.
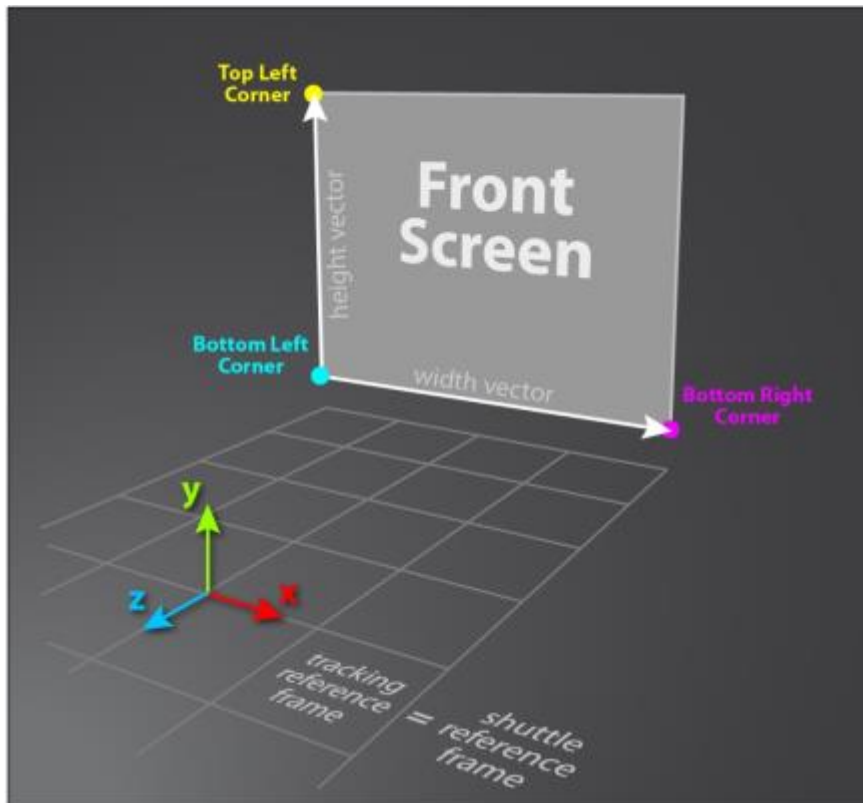
Shuttle and tracking frames of reference.

The head frame is controlled by the Head Manipulator.

- In the case of using a CAVE with tracked glasses, its origin is at the center of mass of the tracking targets or on one of them. It is highly important that in the tracking software, the frame is oriented so that the X axis points to the right (when looking through the glasses) and either Y or Z is vertical (based on the overall vertical of the tracking system). The position of each pupil center is defined with regard to this origin.

- In the case of using a VR headset, this frame of reference is provided by the headset software (HTC VIVE® or Oculus Rift®). Please follow the calibration process of Steam VR room.

- In the case of using a zSpace, please follow the VR glasses calibration process of the manufacturer.

ACCEL VR

Interface presentation

Accel VR Pilot is the command post used by the operator of the Accel VR system. From Accel VR Pilot, the operator loads databases and models, adjusts system settings, chooses rendering options, establishes and manages connections, and handles the monitoring of the user in the immersive environment.

The interface of Accel VR consists of three distinct areas.

Interface of Accel VR Pilot.

The View

A : The View is the visualization space in which the content of the scene is represented.

This space acts as a remote control screen. A remote operator can thus manipulate the camera in this 3D scene without taking the place of the observer interacting with the main 1:1 scale visualization device.

> 💡 **TIP**
>
> **Ctrl+Spacebar** sets the center of interest in the scene where the mouse cursor is. The focus is automatically repositioned at the center of the View.

Toolbar
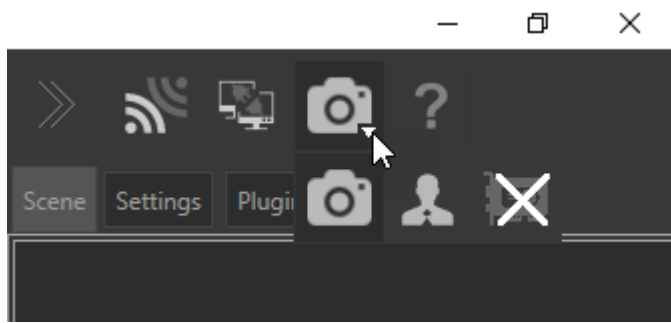
Toolbar

B The toolbar gives access to:

1. ![icon] Activate/deactivate Accel VR Pilot connection to Accel VR Unit to run rendering.

2. ![icon] Connect and synchronize pilot with other instances of Accel VR. (Requires a license option.) See details to add other immersive systems in the Peers paragraph.

3. ![icon] Display a virtual reality scene from Pilot's point of view.

4. ![icon] Display a scene in VR according to the operator's point of view.

5. ![icon] Hide a scene in the View. This feature is useful for saving computer resources.

6. ![icon] Give all the information to know the software: version number, user manual, license change, version changes, and license contract.

The Configuration Browser

C : The *Configuration browser* allows you to import, open a Digital Aspect Mockup (DEM) and browse among imported products.

The Configuration Browser permanently provides access to the tools most commonly used to configure:

• one or more Digital Aspect Mockups (DAMs),

• the positioning of one or more DAMs in the environment,

• the environment,

• scene rendering by the main computer (pilot),

• remote rendering units,

• synchronization with other immersive devices.

To import a Digital Aspect Mockup (DAM) proceed as follows. Click on this icon ![folder icon] to open the *Repository* browser. It is indeed necessary to import a DAM into the repository browser to

visualize it in immersion. To do this, click on the **Import** button at the bottom right of the window. You will have the choice between importing a DAM from your computer or from Lumis 3D.
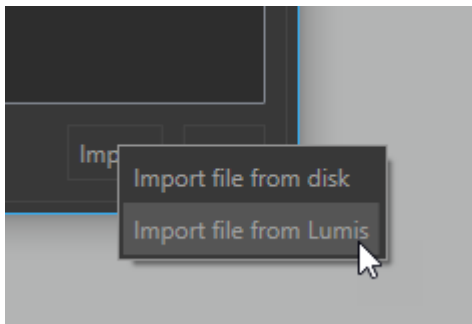
a. If you choose to import a DAM from your hard drive, select the file and click **Open**.

b. If you choose to import a file from Lumis 3D you will be prompted to identify yourself to sign in to Lumis 3D by using your login details. Browse the content of Lumis 3D to select the file you want to import, double click to open it (or single click on it, and then **Open**).

💡 **TIP**

Hold down the **Shift** key or the **Ctrl** key and click to select and open multiple databases at once.

✏️ **NOTE**

Depending on the database weight, the import can take several seconds.

💡 **TIP**

The repository browser allows you to manage DAMs. At any time you can delete a useless database by clicking on this icon 🗑.

Accel VR offers the possibility to reduce ⏩ the configuration browser to maximize the View while letting the main configuration tools of your model at your disposal.

Accel VR with the Configuration browser collapsed

The Configuration Browser tabs

It consists of three different tabs.

The Scene tab

The *Scene* tab consists of four accordion menus.

Icon	Action	Description
	Show	Shows the selected product.
	Hide	Hides the selected product.
	Duplicate	Duplicates the selected product (s).
	Delete	Deletes selected product(s) in View.
		TIP Hold down the *Shift* key or the *Ctrl* key and click to select multiple product instances you want to delete at once.
	Delete all	Deletes all products at once.

Configuration

The *Bookmarks* allow you to run and combine different configuration options.

> ### 💡 TIP
> Your database must contain configuration bookmarks set up prior to export and created in the *Library* tab of the *Create Configurations* editor in Patchwork 3D

Timelines

The *Timelines* allow you to animate your model with different data prepared in advance in Patchwork 3D.

Icon	Navigation mode	Description
⏮	*Go to start*	Starts the animation in reverse mode.
▶	*Play*	Plays the animation.
⏸	*Pause*	Pauses the animation.
⏹	*Stop*	Stops the animation.

It is also possible to control the animation with the cursor.

Transformation

In this section you can position, resize, and configure the instance of your product in the 3D View with the X, Y, Z axes.

Cameras

This section allows you to display camera bookmarks and, add new ones by clicking on this icon ➕. You can also edit ✏ each camera bookmark you have created in Accel VR by renaming them and changing their position.
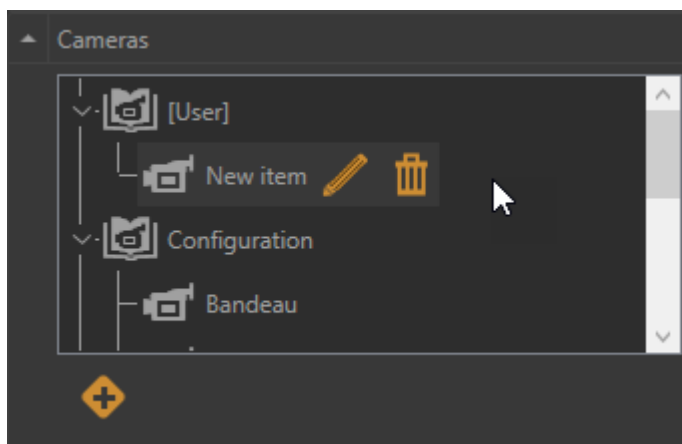
*The **Cameras** accordion menu with a camera bookmark created by the user.*

The Plugins tab

The *Plugins* tab lists the manipulators used by your device according to the license you purchased.

Please refer to the chapter on Advanced system settings [41] for more details on the operation of the manipulators.

Here below the list of available plugins:

Clipping planes management

The clipping planes plugin allows you to section the object of the scene in a pre-designated plane to see its interior. Active clipping planes are visible in all open View and will clip through all products.

With the accordion menu you can directly:

- show (*Active*) or hide the clipping planes.

- move a clipping plane depending on the chosen X, Y, Z axis.

- rotate a clipping plane depending on the chosen X, Y, Z axis.

Please find below the clipping planes settings available from this icon .
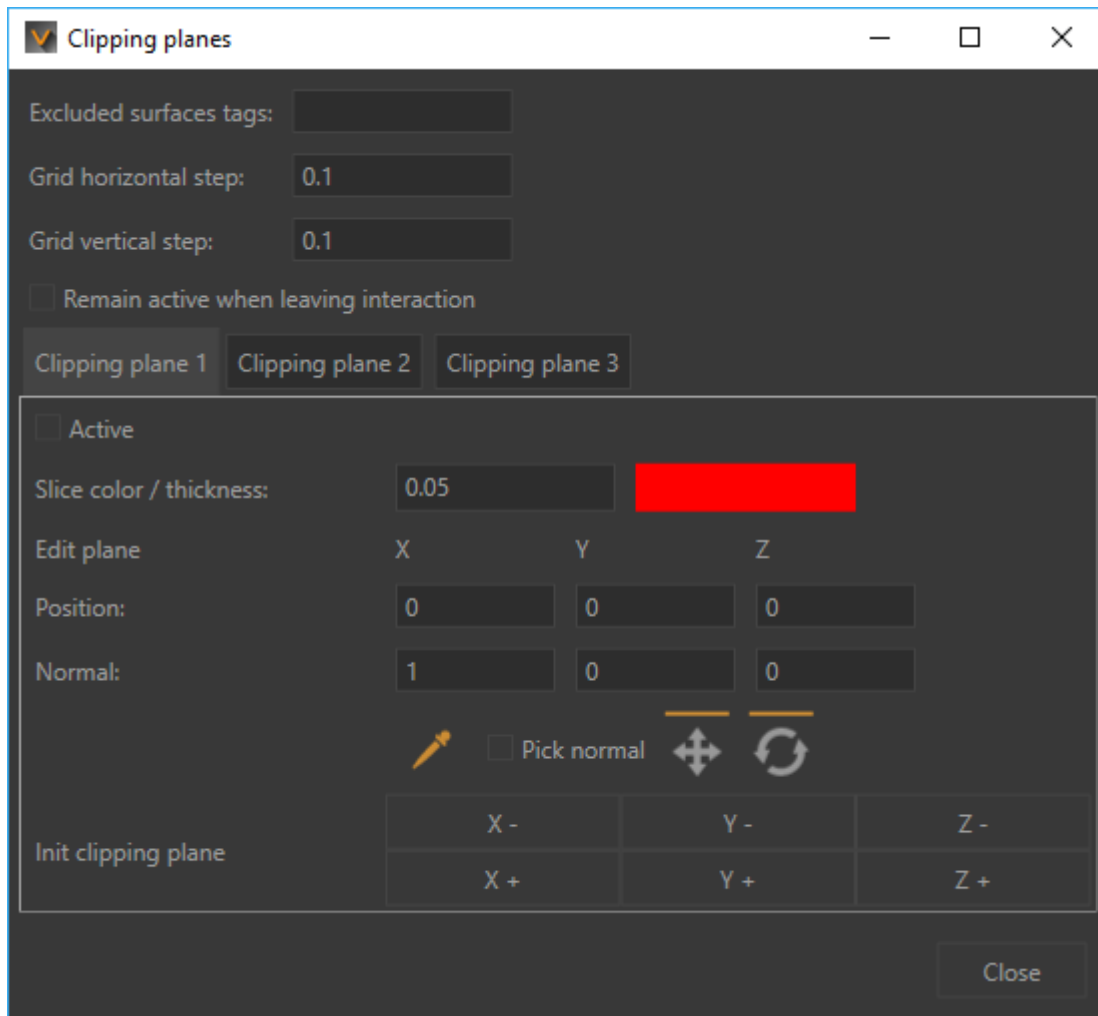
Clipping planes window

> 💡 **TIP**
>
> Tags used in Patchwork 3D to exclude surfaces from the clipping planes must be titled the same way in Accel VR.

For more information, please refer to the *Clipping planes (Editor)* chapter in the Patchwork 3D documentation. Accel VR excludes by default the label with the title *NoClip*.

> ✏️ **NOTE**
>
> Clipping planes are positioned in the world. Consequently, moving a product in the world will not move the plane. The position at which the plane clips the product will be modified.

You can set the horizontal spacing (*Grid horizontal step*) and the vertical of the grid (*Grid vertical step*) by entering values or using the up and down arrows on the keyboard.

Accel VR Pilot allows you to manage and display three clipping planes simultaneously.

Check *Remain active when leaving interaction* if you plan to combine the use of clipping planes with other interactions.

> 💡 **TIP**
> Make sure the *Active* box is checked to display a clipping plane.

However, you can exclude certain surfaces from the clipping planes by entering in the *Excluded surfaces tags* field the surface tag you want to exclude. If you have several surfaces to exclude use semicolons between each tag.

You can choose the color of the slicing-edge and modify the *Slice thickness* of the line by entering a numerical value, or by using the up and down arrows of the keyboard.

Selects a point of the surface in which the clipping plane passes through the surface that you want to section.

Clipping planes example with 1 section

Clipping planes example with 2 sections

Interest point management

The interest point plugin allows you to point an area that you need to focus on like a pointer during a slide presentation.

You can directly choose the color of the pointer by collapsing the accordion menu ▾ or by clicking on this icon ⚒.

> ### 💡 TIP
> Make sure the *Interest point management* checkbox is ticked in the *Pilot configuration* tab to be able to use this feature.

📏 Measure tool management

The Measuring Tools shows the distance between two points that you have chosen. This distance between these two points may thus be represented visually in the active view.

> ### 💡 TIP
> The option *Show gizmo* must be checked to use the eyedropper.

With the accordion menu ▾ you can directly:

- measure a length between two points
- calculate an angle

Measure a length

1. Click on the eyedropper 🖊 and select your starting point (Point A) in the View.
2. Then click on the end point (Point B) to measure the length between the two points
3. The result is displayed directly in the View or in the field named *Length AB*.

> ### ✏ NOTE
> If you want to measure another length, just click the eyedropper again to restart the procedure described above.

Calculate angles

The option **Compute angle** allows you to display the value of an angle between two segments. To measure an angle, do the following:

1. Check **Compute angle**, the fields **Length BC** and **Angle ABC** appear.

2. Click on the eyedropper and select the starting point (Point A) in the View.

3. Then click on the intermediate point (Point B) to measure the length between the first two points (**Length AB**).

4. 4. Click on the end point (Point C) to measure the length between the intermediate point and the end point. You automatically have the length of the second segment (**Length BC**) and the value of that angle (**Angle ABC**).

> **TIP**
> Repeat the procedure from point 2 each time you want to measure an angle.

In case you realize that you need to change the position of a point, instead of redoing the whole measurement procedure you can change its position individually. To do this click on this icon and select the point you want to change with the eyedropper. You can repeat the measurement as many times as you want. The lengths and angle ABC will automatically update.

The **Measure tool management** window gives you the following information:

*   the coordinates of each point
*   the length of each segment
*   the value of the Angle ABC

Spotlight management

The spotlight allows you to illuminate your model.

With the accordion menu you can directly:

*   select the spotlight color (**White**, **Hot**, **Cold**)
*   change the light radius (**Low**, **Standard**, **High**)

Please find below the spotlight settings available from this icon .

At any time you can choose to activate or deactivate the spotlight by checking the checkbox provided for this purpose

You can enable or disable the **Spotlight**, adjust its intensity with the slider, and choose the color of the lighting. You can also adjust the intensity of the light reflection (***Specular intensity***). The more the cursor moves to the right, the more the setting is magnified.

The gizmos below allow you to:

Icon	Action	Description
	Move	Moves the flashlight along the chosen X, Y, Z axis.
	Rotate	Rotates the spotlight along the chosen X, Y, Z axis.

Snapshot management

The snapshot plugin allows you to snapshot a scene in VR according to the operator's point of view.

With the accordion menu you can directly set the folder where snapshots will be saved.

Width and **Height** set the snapshot dimensions while the **Snapshot FOV** is the point of view angle.

Mannequin

The mannequin allows you to simulate and see the movements of your body in a 3D environment.

With the accordion menu you can directly:

- display the mannequin skeleton
- display/hide the mannequin's head
- activate the advanced tracking mode (five trackers are required)

Vive Trackers configuration:

> ## TIP
> If you are not using the ***Advanced Tracking Mode*** of the mannequin, your trackers will be placed on your feet and your waist. If you do, you will have to place an additional tracker on each forearm of your body (as close of your wrists as possible).

1. Start by pairing your first Vive Tracker using SteamVR (SteamVR > "Device" > "Pair Controller").

2. Use your headset, navigate to the "Manage Vive Trackers" section in settings ("Settings" > "Manage Vive Trackers").

3. Use the table below to associate your tracker with the corresponding role. Be aware that these roles will not be reset after your session.

> 💡 **TIP**
>
> We recommend that you note the roles of each tracker to easily identify them. Steam VR associates the tracker's serial number with the role.

4. Follow this process for each of your Vive Trackers.

Body part	Role
Feet (left / right)	Feet (left / right)
Waist	Waist
Wrist (left / right)	Shoulders (left / right)

How to use the mannequin in Accel VR:

The installation of the mannequin in Accel VR is carried out in 2 steps.

Size calibration (mannequin size)

1. Once all of your Vive Trackers are connected, select the *Mannequin* tool in the interactive menu.

2. Stand straight and trigger the interaction. If you see a Mannequin, then you can go to the next section. If not, make sure that all your trackers are connected and that you are not using the "Advanced Tracking Mode" with only 3 Vive Trackers.

Vive tracker calibration

1. Stand in the Mannequin's shape and try to make your body fit as much as possible.

2. Trigger the interaction again to validate.

You can now use the *Mannequin* tool.

Turntables

> ⓘ **NOTICE**
>
> New Features in Accel VR

Turntables simulate the rotation of one or more products on a turntable. For example, they make it possible to visually compare several configurations of the same product from different angles.

With the accordion menu you can directly control turntables by playing with the rotation direction (clockwise and counterclockwise) or pausing the animation. It is also possible to change the rotation speed with the dedicated slider.

Please find below the turntables settings available from this icon .

In the **Turntables** window, adjust the quantities **+** and **-** of the products you want to add to the scene, then select the **Product Spacing** and to finish click on the **Start** button to begin the turntable(s).

> **NOTE**
>
> The rotation is performed only along the axis of the rotation which is specific to the product.

Links

The **Links** plugin allows you to link a tracker to one or more products. With this feature, you can imagine moving a product naturally according to the movements of your members for example.

You can select and configure the trackers listed in the **Trackers** box by expanding the accordion menu (**Open advanced config**) or by clicking on this icon .

Follow these steps to link a tracker to one or more products.

1. In the **Links** window, select the tracker from the list.

2. Then with the eyedropper pick the reference point onto the product. This allows you to link the tracker to the product.

> **NOTE**
>
> To link a tracker to multiple products, restart at step 1 (describes above) by using the same tracker but by selecting a different product at step 2.

You can break the link from the tracker to the product at any time by clicking on this icon

. Use the translation gizmos and rotation if you need to change the reference position of your link.

The Settings tab

This tab consists of different accordion menus.

System Configuration

This section displays window status information such as coordinates (X, Y, Z), ground angle, and the number of frames per second (**Render FPS**).

You can reach the **Advanced system settings** window by clicking on this icon .

For more information, please refer to the chapter on Advanced system settings [41] for more details.

Head manipulator

To understand the operation of the head manipulator and configure it, please refer to the Head manipulator [45] paragraph of the **Advanced system settings**.

Device manipulator

To understand the operation of the device manipulator and configure it, please refer to the paragraph Device manipulator [46] of the **Advanced system settings**.

Interaction manipulator

To understand and configure the interaction manipulator, please refer to the paragraph Interaction manipulator [46] of the **Advanced system settings**.

Shuttle manipulator

To understand the operation of the shuttle manipulator and configure it, please refer to the paragraph Shuttle manipulator [48] of the **Advanced system settings**.

Windows (accordion menu)

This section allows you to configure features you desire to render in your immersive system.

Icon	Action	Description
	Hide rendering window units	Hides the window of each rendering unit (gray icon) to configure their graphics card for example.
		✎ **NOTE** The window for each rendering unit is displayed by default.
	Unit windows always on top	Keeps the windows of the rendering unit in the foreground among all the windows of the Microsoft Windows® operating system.
		✎ **NOTE** Disabled by default.
	Eye	If the display of the eyes is reversed by a projector (frequent with certain stereoscopic configurations), click on to switch between the left and right displays.
		✎ **NOTE** Disabled by default.

Please find below the window of the ***Advanced system settings*** available from this icon ✖.

Depending on your needs you can select or deselect the settings below to improve the rendering performance of render units:

- ***Mirrors*** Displays the reflections of other geometries in the scene in planar mirrors. This option can greatly increase the number of elements to be rendered in a scene. To save resources this option is disabled by default. You can disable it in order to increase rendering fluidity.

- ***Post-processes***

- ***Background***

- ***Overlay***[1]

- ***Material***, ***Color***, ***Lightmaps***, ***Wireframe*** change the representation of the model to be displayed.

---

[1]An overlay is a 2D image (often a logo) that is displayed in front of the objects in the 3D world. It does not move when you navigate in the 3D world but remains stationary with regard to the screen.

If necessary, you can also overwrite your background with a solid color or with a gradient of two colors. Check the *Overwrite background* checkbox to make your choice.

Accel VR can automatically display the available windows of the shuttle over the network.

Click on this icon ☑ to choose each window you want to use. The icon of the selected window turns orange ☑ to inform the user that the window has been added to the list. The question mark ⍰ then disappears. You can now close the window of the *Advanced system settings*.

Back in the accordion menu titled *Windows*, you will then see a brief description of the window (its IP and name) that you just added.

> 💡 **TIP**
>
> This icon ⍰ means that the shuttle window has not been added to the list yet. It is unknown. This icon ⚠ means that the dedicated calculation unit to the window of the shuttle is not available over the network despite the fact that it has been added to the list.

Peers
This section displays the status of the added peers.

> ⚠ **WARNING**
> This feature requires a specific license.

Please find below the window of the *Advanced system settings* available from this icon ✖.

Accel VR can automatically display available peers over the network.

You can also manually add a peer that is on a remote network by clicking ➕ and by entering its IP address and the port.

We recommend that you choose a different color for the identification of each peer.

Click on this icon ☑ to choose each pair you want to use. The icon of the selected window turns orange ☑ to inform the user that the window has been added to the list. The question mark ⍰ then disappears. You can now close the window of the *Advanced system settings*.

Back in the accordion menu titled **Peers**, you will then see a brief description of the peer (his IP and name) that you just added.
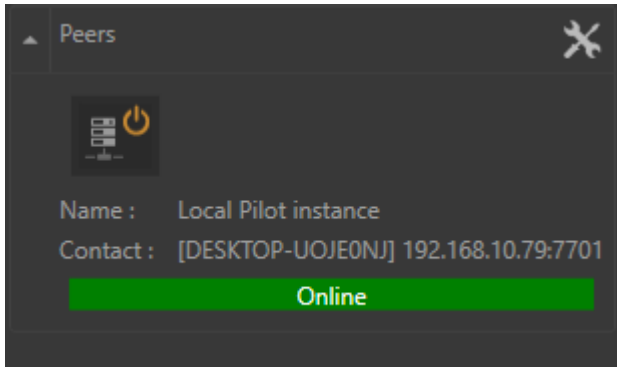
> ✎ **NOTE**
>
> This icon means that the shuttle window has not been added to the list yet. She is unknown. This icon ⚠ means that the calculation unit dedicated to the shuttle window is not available on the network despite the fact that it has been added to the list.

ZSpace management

With the accordion menu you can activate (**Active**) the zSpace or **Invert eyes** to swap the display from left eye to right in the event that your views rendered by your glasses are reversed for each eye.

Please find below the zSpace settings available from this icon .

This window allows you to render or not: the background, mirrors, and overlays. This can be useful to improve rendering performance in the View of Accel VR.

HMD management

> ⓘ **NOTICE**
>
> New Features in Accel VR

34

With the accordion menu ▾ you can optimize the rendering by checking or unchecking the parameters below:

- **Render in HMD** (to display the rendering in a virtual reality headset). By default, the rendering display is projected in a virtual reality headset. But you can choose not to display it to relieve the system in the rendering calculation by unchecking this box or by clicking on this icon ⊠ which is in the toolbar [19].
- **Render mirrors in HMD**
- **Render post-processes in HMD**
- **Render enhanced bump in HMD**

Please find below the HMD settings window available from this icon ⚒ .

This window gives you details if the VR headset is correctly recognized by Accel VR with its manufacturer's name and its model.

The **Eye separation** is initialized with the default value of the headset, however, this value can be modified in the dedicated field.

The **HMD render scaling** slider is useful for zooming out the world so that your model fits the dimensions of the screen of the VR headset.

VRPN devices management

The VRPN device management allows you to add, configure, and delete a VRPN device.

Accel VR supports ART, VICON, and NaturalPoint tracking systems.

Accel VR Pilot establishes the link between the render units and the trackers, gamepads, etc ... The connection is made via a local server.

Install ART or VICON equipment according to the manufacturer's recommendations. Accel VR Pilot 2020.1 must be linked with the machine on which the VRPN server of ART or VICON is installed.

The important parameters to remember from a VRPN server are: its IP address, the main tracker name (in the case of tracked glasses), and its index.

The VRPN server must receive information from the tracker(s) (please refer to the manufacturer's user documentation).

3D glasses

To use peripherals allowing navigation in the 3D scene (Logitech® controllers, Xbox 360® controller for Windows®, etc.), simply connect them to the machine on which Accel VR Pilot 2020.1 is running and install the peripherals drivers. A space mouse may also be used too.

SpaceMouse® Pro

This icon has the same action as the button **Open advanced config** from the accordion

menu . It opens the VRPN device management plugin.
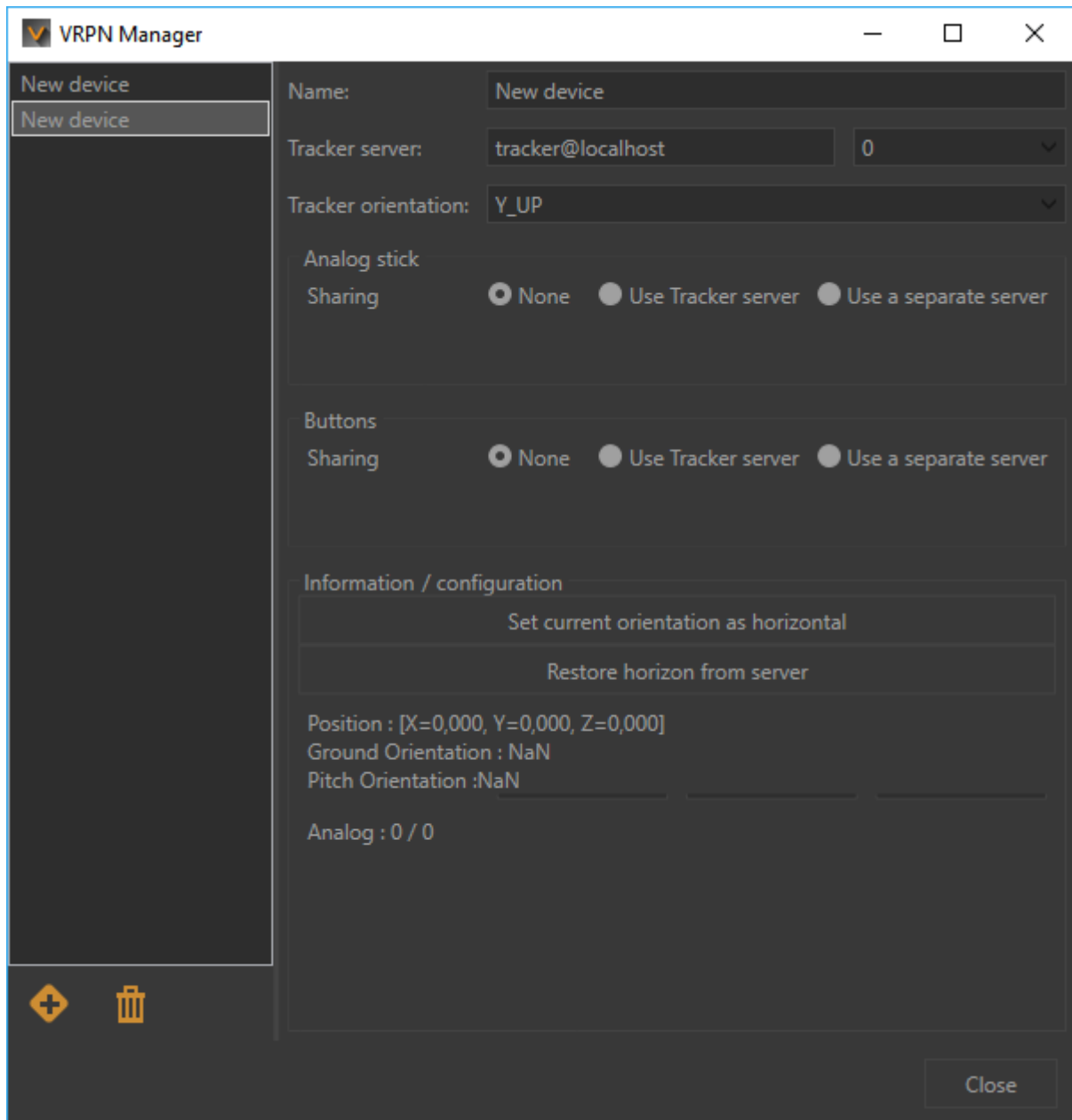
VRPN Manager

VRPN Manager consists of two parts:

- The left part to add or delete a VRPN device.
- The right part to configure a device.

Please refer to the manufacturer documentation of the selected device to know the IP address of the **Tracker Server**. The following drop-down menu provides to Accel VR Pilot 2020.1 by VRPN protocol the current position of the tracked devices. The digit represents the sensor ID of ART tracking systems. It is normally worth **0** with Vicon systems.

Select the tracker orientation with the following arguments (**Y_UP**, **Z_UP_X_LEFT**, **Z_UP_X_RIGHT**, **Z_UP_Y_LEFT**, **Z_UP_Y_RIGHT**) depending on the manufacturer specifications.

If the Y_UP convention is not used by default by the tracking system, data provided will be converted by the tracking framework.

If your VRPN device has an analog stick or buttons, the *Analog-stick* and *Buttons* boxes will allow you to configure them. Select the *Use tracker server* radio button if your device is communicating on the same tracking server configured earlier in the VRPN manager. If, on the contrary, the VRPN device does not have an analog stick and buttons such as tracked glasses, select *None* in both boxes.

In case your device does not communicate on the same tracking server, you then need to associate an analog stick or buttons on a separate server. To do this select the button *Use a separate server*. Then enter the server address in the field *Dedicated server*.

The box *Information / configuration* allows you to adjust the horizontal orientation of the device and make adjustments regarding its positioning in space thanks to the fields *X*, *Y*, *Z* coordinates.

Calibration management

With the accordion menu you can directly calibrate the projection areas of the CAVE.

See details in the Operating principles [14] chapter to understand how Accel VR works with a CAVE.

In the toolbar click on this icon to display the rendering in your immersive system.

Then click *Start warping* button.

A test pattern is projected by all render units in the system.
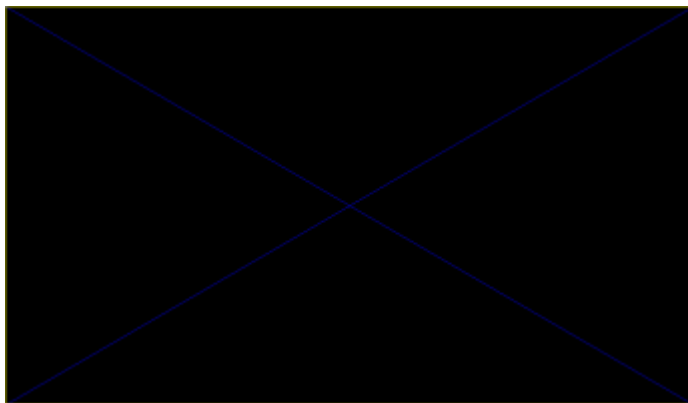
Sample test pattern projected during the calibration procedure for the projection areas.

On each unit, proceed as below (assuming you will use a gamepad for the calibration process):

Press **A** button of the gamepad to configure the bottom edge. Using the joystick or the paddle (for the pixel precision) of the gamepad, reposition this edge so that its projection overlaps the bottom of the corresponding screen. Then press the **B** button on the gamepad to select the lower right corner and repeat the setting to place the corner so that its projection overlaps the bottom right of the corresponding screen.

Do this for all corners and edges that require adjustment in the order of the buttons shown in the table below.

A	B	B	Y	Y	X	X	A
Lower edge	Lower right corner	Right edge	Upper right corner	Top edge	Upper left corner	Left edge	Lower left corner
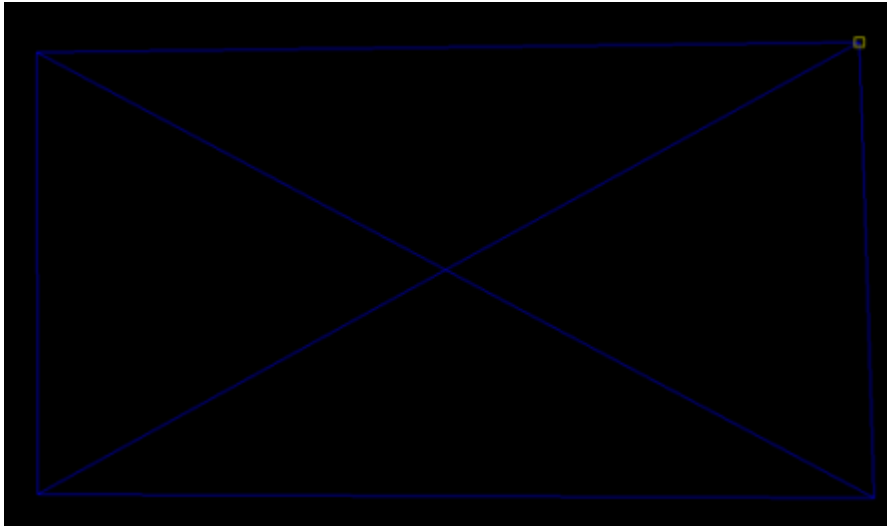
Positioning the upper right corner with the joystick of the gamepad.

When an image is rendered, Accel VR will distort it to compensate for the keystone projection resulting from the position of the projector. The model's normal proportions will be restored in the projection areas.

Areas outside of the test pattern will always be displayed in black to restrict the projection to the intended screen.

> ✎ **NOTE**
>
> Accel VR saves the configuration of the *Calibration Projection Areas*. However, you can change the calibration at any time by repeating steps 4 and 5.

Proximity Warning management

In an immersive system using walls, the observer is often unaware of the edges of the observation area and of the placement of the screens. To prevent the observer from running into the screens, a proximity warning is available.

With the accordion menu you can directly activate or deactivate the proximity warning option.

Please find below the proximity warning settings available from this icon .

The proximity warning colors the display and shows a grid with the color of your choice whenever an obstacle (the screen) is detected within a defined zone around the observer's head (**Minimum distance** and **Maximum distance**). This zone is defined in terms of the distance from the center of the observer's head.

You can also force its display (**Force to maximum**) in case the grid does not appear.

CAD Tools management

The CAD Tools plugin allows you to import a 3D model from third-party CAD software and interact in VR directly with it by distorting it, rotating it, moving it, or adding the curves. The changes can then be imported back into third-party CAD software.

The CAD Tools window consists of five tabs.
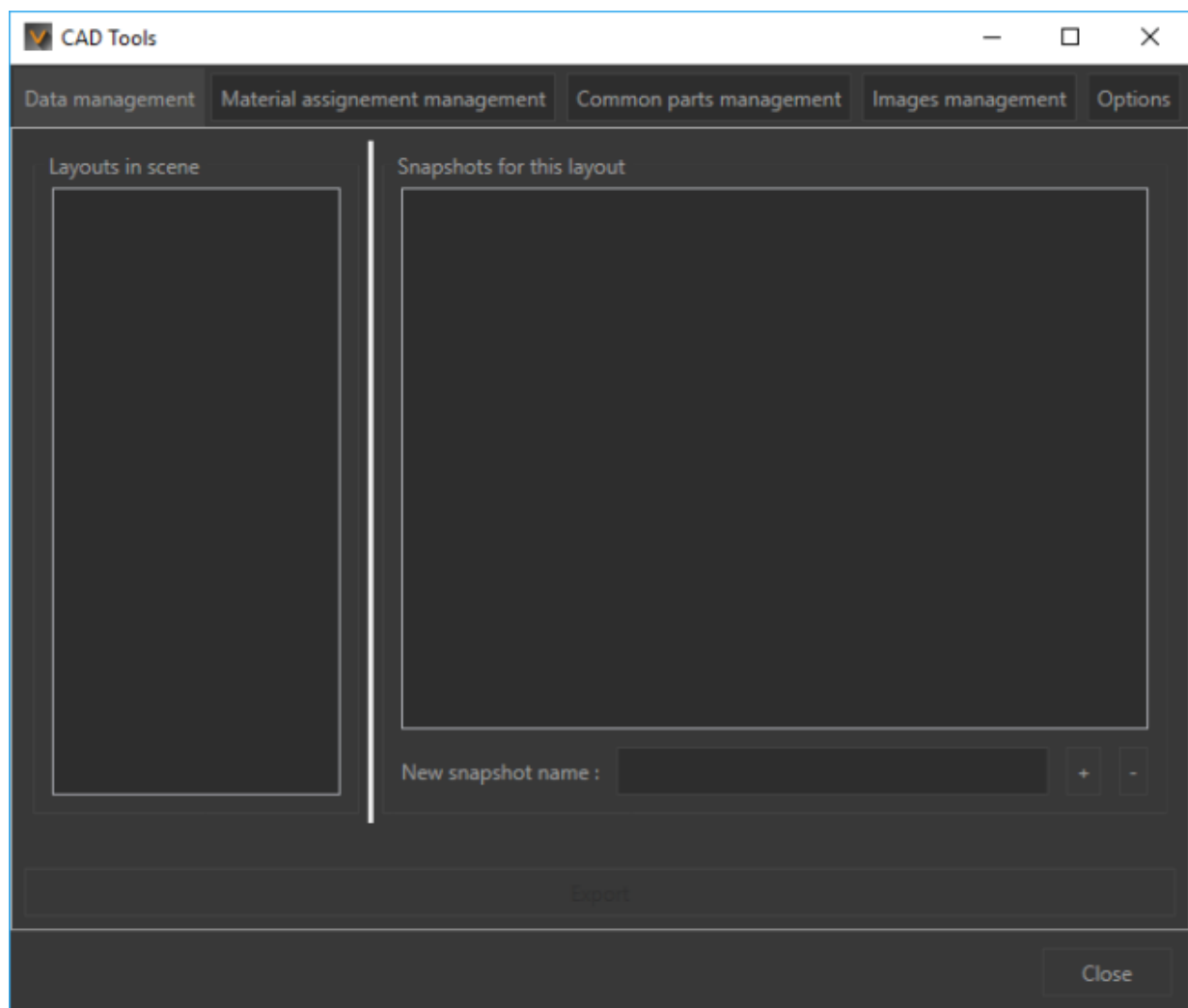
CAD Tools window

Data management tab

The operating mode is similar to the Timelines [22] section. You can indeed snapshot several previews of your model by clicking on the button to export them to your 3D software. The minus button deletes a snapshot.

Material assignment management tab

This tab allows you to choose the folder where materials are located in order to display them in the interactive menu. See details in the Material assignment [59] section.

Click on the ***Browse*** button to define the path to the materials.

Common parts management tab

This tab allows you to choose the folder where common parts are located in order to display them in the interactive menu. See details in the Common parts import [59] section.

Click on the ***Browse*** button to set the path to common parts.

Image management

This tab allows you to choose the folder where pictures are located to display them in the interactive menu.

Click on the ***Browse*** button to set the path to the images.

Options tab

Choose in this tab the units you want to use to move a part. For example, the ***Move part*** [54] interactive menu has units for translating a surface. The ***Options*** tab allows you to precisely set the translation units and rotation factors to move a part.

Advanced system settings

The window of the ***Advanced system settings*** helps you to configure secondary settings.

The advanced system settings window consists of five different tabs.

Global tab

This tab allows you to configure Accel VR global settings:

Setting	Default value	Definition
Hardware anti-aliasing	4	Allows to smooth the rendering. The maximum value can be 8.
Language	en	Allows you to change the language to another one.
Distance units	Meter	Allows you to change the distance units (centimeters, millimeters).

Setting	Default value	Definition
Angle units	Degrees	Allows you to change the angle units (radians).
Scaling units	Percent	Allows you to change the scale units (factor).

The parameter *Hardware anti-aliasing* or *Multi-sampling* is particularly effective for sharp borders or when there is a strong contrast between the start and end colors of gradients. The higher the default value is, the longer rendering will be.

Pilot configuration tab

> **(i) NOTICE**
>
> New Features in Accel VR

Depending on your needs you can select or deselect the features below to improve the rendering performance in the View of Accel VR Pilot:

- *Grid*
- *Referential*
- *Mirrors* Display the reflections of other geometries in the scene in planar mirrors. As this option can greatly increase the number of elements to be rendered in a scene, you can disable it to increase rendering fluidity.
- *Post-processes*
- *Background*
- *Overlay*[2]
- You can also choose to automatically update the local environment during configuration changes by checking the *Rebuild local environment* option. This ensures a visual coherence of the reflections of geometries, color, and lights in the scene.

> **NOTE**
>
> Enabling this option can cause rendering slowdowns when making configuration changes.

- Modify the representation of the model to be displayed in the View (*Material*, *Color*, *Lightmaps*, *Wireframe*)

As needed you can also choose to overwrite your background with one color background or with a gradient background. Just click on the *Overwrite background* checkbox to make your choice.

---

[2]An overlay is an image (often a logo) that is applied in two dimensions in front of objects in the 3D world. It does not move when you navigate in the 3D world; it remains stationary relative to the screen.

Avatar tab

Thanks to the Avatar plugin you can visualize your interaction devices as well as those of your coworkers. See details in the paragraph named Peers [33].

Simply choose your device from the list below.
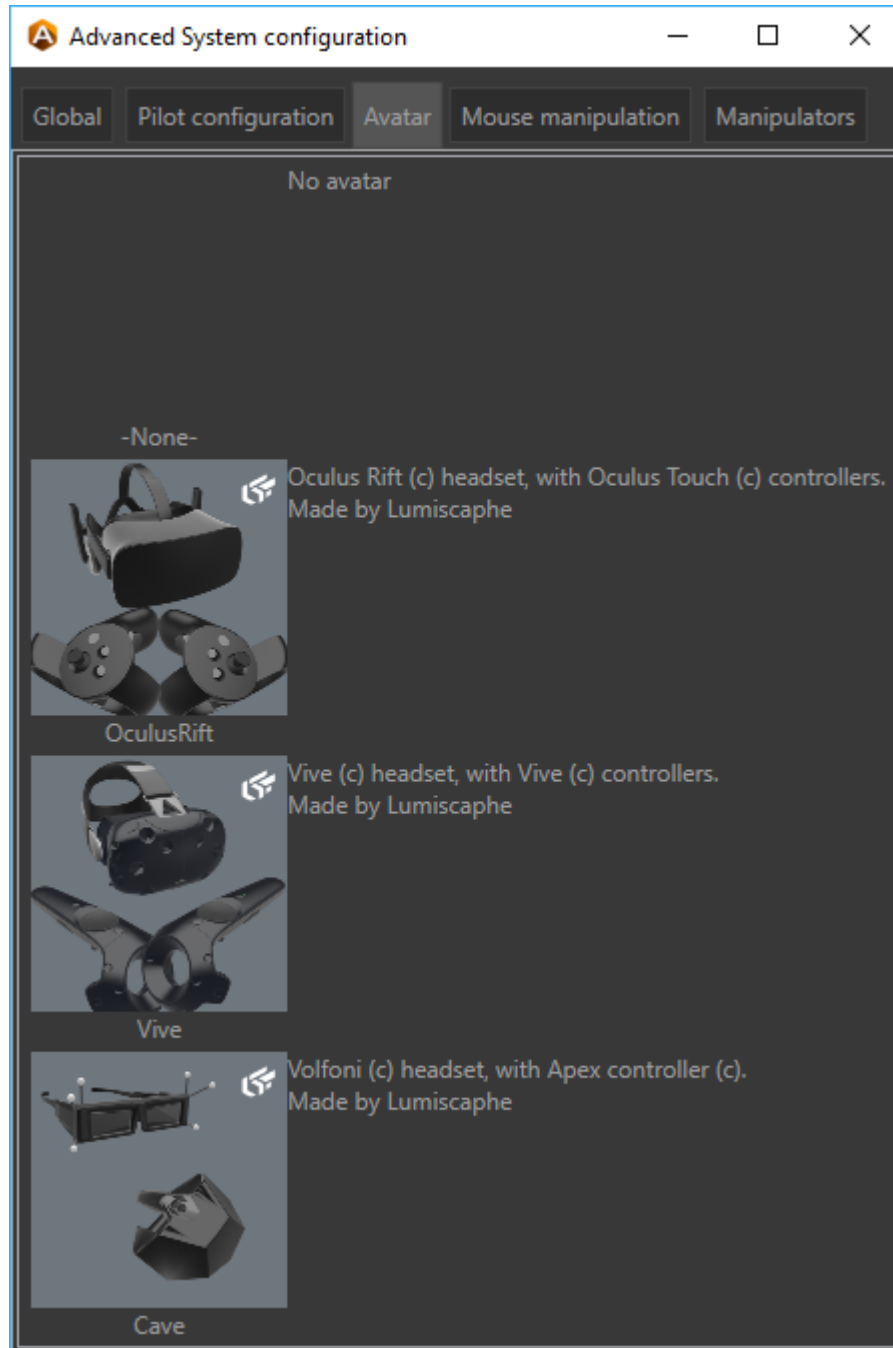
Select your device

Mouse manipulation tab
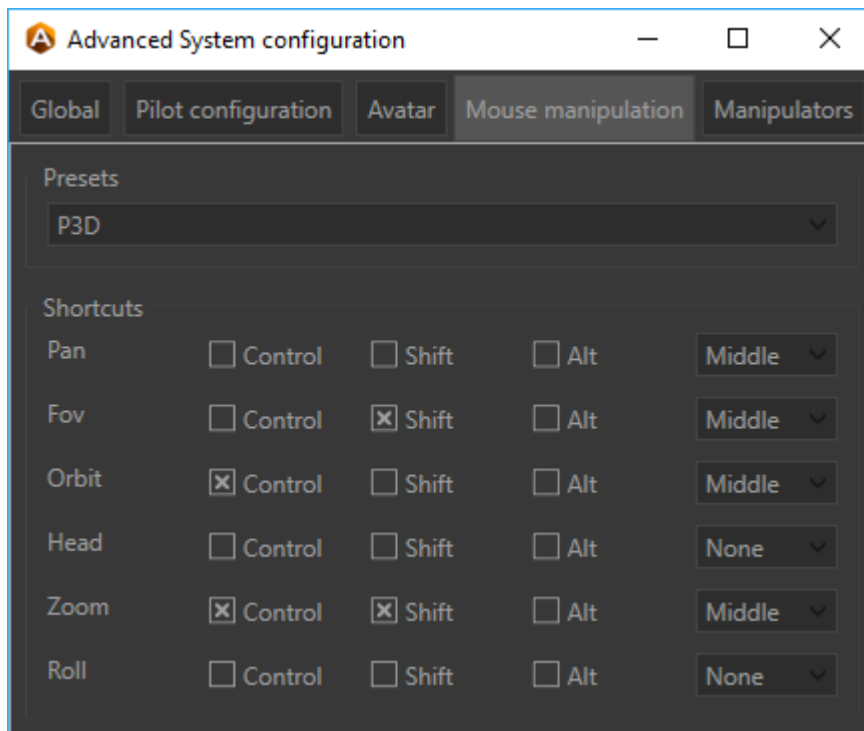
*The **Mouse manipulation** tab*

You can apply the keyboard shortcuts of your favorite CAD software in Accel VR. These are shortcut profiles named **Presets**.

The **Presets** drop-down menu lists the keyboard shortcuts of the following software:

• 3ds Max

• Alias

• Maya

• P3D (Patchwork 3D)

• SolidWorks

• Custom

If you modify an existing keyboard shortcut profile, it will automatically switch to **Custom**.

Manipulators tab

> ✎ **NOTE**
>
> The manipulators listed in this tab are linked to the **Settings** tab of the Configuration browser. That means all changes made in this tab will be applied to the **Settings** tab of the Configuration browser.

At the first installation of Accel VR the following drop-down menus Head, Shuttle, Interaction, and Device are automatically filled out with the detection of your device.

You can also change the manipulator of your device after the first installation of Accel VR.
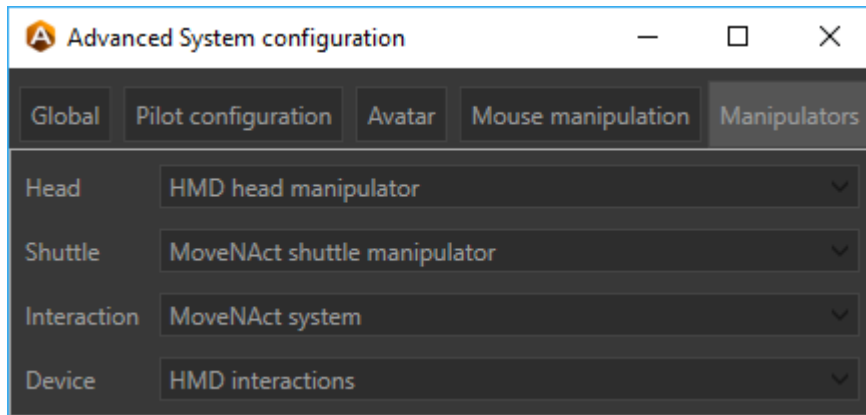
Example with Accel VR configured with an htc VIVE.

Please find below the complete list of available manipulators.

Head manipulator

The *Head* drop-down menu allows you to choose the manipulator that will control the head.

> ✎ **NOTE**
>
> In the paragraph below we have grouped together the operation of the *Manipulators* tab and the *Settings* tab of the Configuration browser because the two work closely together.

The head can be controlled by the following devices:

• a zSpace> *ZSpace head manipulator*

• a virtual reality headset> *HMD head manipulator* (Nothing to configure here)

• a VRPN device> *VRPN head manipulator* Select the configuration of the device that has already done in the VRPN devices management. That is the name of the tracker and its orientation.

Device manipulator

> ✎ **NOTE**
>
> In the paragraph below we have grouped together the operation of the tab ***Manipulators*** with the operation of the tab ***Settings*** of the configuration browser because the two work closely together.

From the ***Settings*** tab from the Configuration browser you can configure the following devices:

- a virtual reality headset > ***HMD interactions*** Please refer to paragraph The shuttle is controlled by a virtual reality headset [48] for additional information on the explanation of the parameters.

- a gamepad > ***Gamepad interactions*** If you have selected a gamepad as a manipulator, it is necessary to select on which side the interactive menu will appear. Cf. ***Left / right device side***.
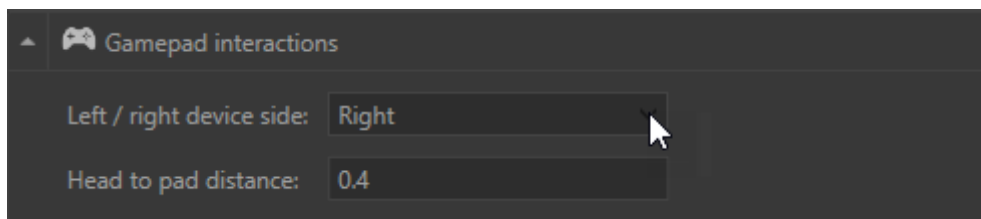
Head to pad distance defines the position of the interactive menu.

- a VRPN device > ***VRPN interactions*** Select the configuration of the device that had already done in the VRPN devices management in addition to the names of the VRPN left and right instance.

Interaction manipulator

Interactions can be controlled using the interactive menu and the interaction device called "system":

1. ***PieMenu***

2. ***MoveNAct***

> 💡 **TIP**
>
> The operating mode of the interactive menu depends on the device used and on the possibility of using one hand (gamepad, Apex in a CELLAR, zSpace stylus) or two hands (HTC VIVE®, Oculus Rift®, and HP Reverb).

PieMenu System

From the *Settings* tab of the Configuration browser, you can access the advanced settings of the *PieMenu* by expanding the accordion menu [ ] and clicking on the button *Open advanced config* or by clicking directly on this icon [ ].

The Pie Menu tool is configured using the following three tabs:

- The *PieMenu Orders* tab lists available interactions on the left and displays interactions you want to use on the right. To add an available action in the *Actions in use* box, click the arrow [>] or [>>] to add them all. In order to remove a used action, click the arrow [<] or [<<] to remove all of them.

> 💡 **TIP**
> Make sure there is at least one action in the box to interact with your 3D model. Depending on the interaction selected, the color of the pointer laser may change to indicate to the user that an action is possible.

- The *PieMenu bindings* tab allows you to define an action for each button of the interaction device (gamepad, virtual reality headset controllers, zSpace stylus, etc.). To assign an action to the interaction device, click on *Set*, then press a button on the interaction device. Accel VR saves the action automatically. If you make an assignment error, click the *Unbind* button to delete the assignment. Click again *Set* to start the procedure again.

- The *PieMenu configuration* tab allows you to configure the appearance of the interactive menu. Through the *Interaction side* drop-down menu you can assign the action to the left or right hand of your interaction device. *Screen Position* allows you to display the interactive menu on the left or right device of your immersive system. You can choose to display the interactions and the interactive menu on the same interaction device by choosing the configuration *Right* and *Right* in the drop-down menus. On the contrary, you can choose to distinguish the interactions of the interactive menu by choosing *Right* and *Left*. With this configuration, the operator uses the right hand to target an object to interact with it, the left hand is used to display the interactive menu. You can also do the opposite configuration by assigning interactions to the left hand and the interactive menu to the right hand. If the PieMenu is too close to the operator's hand you can move it in any direction you want with the following parameters: *depth*, *height*, *lateral move*. You can also change the color of the PieMenu with the following parameters: *Pies back color*, *Pies text color,* and *Pies icon color*.

MoveNAct System

From the *Settings* tab of the Configuration browser, you can access the advanced settings of the *MoveNAct* by expanding the accordion menu [ ] and clicking on the button *Open advanced config* or by clicking directly on this icon [ ].

The MoveNAct system use the followings tree tabs to be configured:

- The **Move and Act Order** tab lists the interactions available on one side and displays the interactions you want to use on the other. To add an available action in the **Actions in use** box click the arrow [>] or [>>] to add them all. Conversely, to remove a used action click on the arrow [<] or on [<<] to remove them all.

> 💡 **TIP**
> Make sure there is at least one action in the box to interact with your 3D model. Depending on the interaction selected, the color of the pointer laser may change to indicate to the user that action is possible.

- This icon enables or disables the immediate assignment of a one-touch interaction. It is a sort of shortcut. Once activated, the immediate assignment executes the interaction directly when the button is pressed. You do not need to use the other device to perform the interaction. This frees the other device and allows you to combine another interaction.

- The **Move and Act bindings** tab allows you to set a move to each button of the selected device. To assign a move to a button, just click on **Set**, then press a button on the controller. Accel VR saves the action automatically. If you make an assignment error, click the **Unbind** button to delete the assignment. Click again **Set** to start the procedure again.

- The **Move and Act display configuration** tab modifies the look of the interactive menu by choosing the color of each element (text, icons). The **Attached side** allows you to select in which hand (right stick or left stick) you want to display the interactive menu. By default, the **Display mode** is set to **World** mode which is suitable for the MoveNAct use with a full-range immersion device such as an HTC VIVE® or Oculus Rift® headset. We recommend the **Screen** mode if you combine the use of the Move and Act in a CAVE or a Powerwall. This makes it easier to use the menu by displaying it in 2D on a remote screen. **Scale factor**, **Menu orientation,** and **Menu translation** are the parameters for changing the size and position of the interactive menu.

Shuttle manipulator

The **Shuttle** drop-down menu allows you to choose the manipulator that will control the shuttle.

The shuttle can be controlled by the following devices:

- a virtual reality headset> **HMD shuttle manipulator**
- a gamepad> **Gamepad shuttle manipulator**
- a VR mouse> **SpaceMouse shuttle manipulator**
- a VR device> **Device Shuttle manipulator**

The shuttle is controlled by a virtual reality headset

From the **Settings** tab of the Configuration browser, you will see the following drop-down menu.
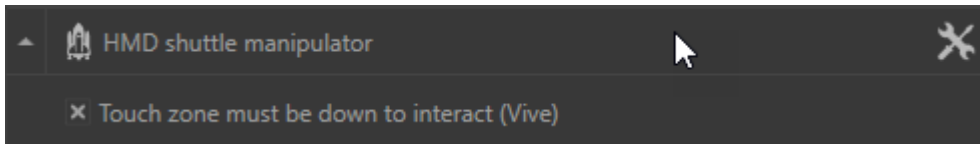
You can change the *Planar speed* and the *Rotation speed* by clicking on the following icon

.

Touch zone must be down to interact (Vive) is selected by default to avoid undesirable movements induced by controller touchpad. This feature is useful for an HTC VIVE controller that has a touchpad. On the other hand, uncheck this feature for an Oculus Rift controller.

The shuttle is controlled by a gamepad

From the *Settings* tab of the Configuration browser, you will see the following drop-down menu.
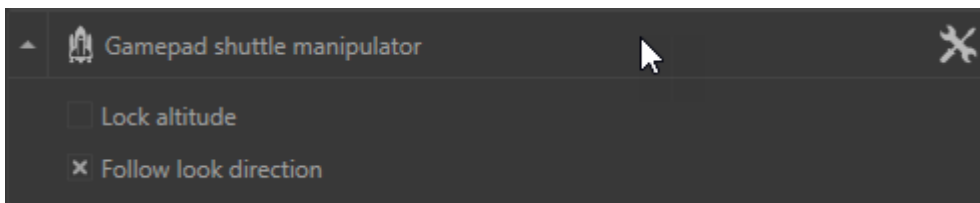
Devices with two analog joysticks such as a gamepad can be used to move the shuttle around the 3D world. One joystick is used to drive movement on the horizontal plane, the other allows you to rotate and move up or down if the altitude is not locked.

> ✎ **NOTE**
> *Lock Altitude* and *Follow look direction* are only available for gamepad configuration.

The *Lock Altitude* checkbox limits the shuttle movements on the horizontal plane. When this checkbox is ticked, the shuttle's altitude remains stable, despite any modifications to the position of the product.

The *Follow look direction* checkbox synchronizes the movements of the head with the direction taken by the exploration shuttle.

You can change the *Planar Speed*, the *Height Speed*, and the *Rotation Speed* by clicking on the

following icon .

The shuttle is controlled by a SpaceMouse

From the *Settings* tab from the Configuration browser, you can access the advanced settings

of the SpaceMouse by expanding the accordion menu and clicking on the button *Open*

advanced config or by clicking directly on this icon .

49

To manipulate the SpaceMouse Accel VR uses two distinct modes:

- The *OriginFocus* mode moves the shuttle around the center of the world. The *Avoid crossing ground* checkbox prevents the operator to move the shuttle under the ground.

- The *Helicopter* mode moves the shuttle like a helicopter in flight. The movements follow the movements applied to the axes of the SpaceMouse. The *Lock the horizon* checkbox stabilizes the movement of the shuttle by locking the horizon.

In both modes, you can fine-tune the SpaceMouse's movement controls by modifying the movement factors with the sliders: *Movement Speed*, *Rotation speed* and *Dead Zone*.

If your settings are no longer correct, you can reset them by clicking on the *Reset* button.

The shuttle is controlled by a device

The shuttle manipulator controlled by a device is accessible via this icon or via the button *Open advanced config* from the accordion menu .

The *Options* box allows you to choose the *Interaction side* (left, right), to adjust the *Planar speed*, the *Height speed,* and the *Rotation speed* of the device that will control the shuttle.

The *Bindings* box allows you to assign shuttle movements to buttons on your device. Please refer to the binding procedure described in the section of the Device manipulator [46] to configure the buttons on your device.

Immersion and interaction in the 3D World

This section covers the ergonomics of immersive environments available to a user in such an environment, without using the interface of Accel VR Pilot or VSN player.

Creating an Immersive Sensation

Multiple elements work together to create a sensation of immersion for a user, including:

- System calibration,

- Shuttle position,

- The use of tracking devices,

- Appropriate preparation of the database to be used.

The user in an immersive environment is particularly sensitive to the position of his feet with regard to what he perceives as the ground in the virtual world. Make certain that his feet are on the same level as the virtual ground by positioning the exploration shuttle at the level of the ground.

Camera Animations

Camera animations, when they are available in your database, can be used to increase the immersive sensation in multiple ways. Depending on the experience you are aiming to create, different locks and camera animation options will be required.

Interaction Devices

Various devices improve the feeling of immersion by facilitating interaction with the immersive environment.

It is possible to add in the immersive system a device that lets you interact with the virtual world such as a Fly Stick or the Apex by VICON. These devices allow surfaces to be indicated with a virtual laser beam. Based on the active interaction mode, you can then use the device's buttons to interact with the indicated surface or object.

For this to work, three conditions must be met:

- The model must have first been correctly configured in Patchwork 3D to be interactive.
- A tracking system of the position and the orientation of the user's head.
- One or two tracked interaction devices (left hand and right hand).

> **TIP**
>
> If your device is not tracked such as a gamepad, please use the ***Gamepad interactions*** of the ***Manipulators*** tab of Advanced system settings [41]. You can then define your interaction device as being positioned 40cm below the head tracker, which will place it approximately as though it were held at the stomach-level by an adult user.

Interactive Menu

> **TIP**
>
> The operating mode of the interactive menu depends on the device used and on the possibility of using one hand (gamepad, Apex in a CELLAR, zSpace stylus) or two hands (HTC VIVE®, Oculus Rift®, and HP Reverb).

Using the PieMenu system

Two configuration options are possible:

- Assign the interactive menu and interactions to the same VR controller.
- Assign the interactive menu to a VR controller (right or left) and assign the interaction to another (right or left).

Use the buttons or axes (triggers, sticks) that you previously configured in the VRPN devices management [0   ] to:

- go to the next interaction,

- go to the previous interaction,

- choose the options,

- start an interaction.

Using the MoveNAct system

The operation of the *MoveNAct* menu has been designed for two-handed use.

The immediate assignment allows you to combine multiple interactions at the same time. Please see the section Move and Act Bindings [48] tab for more information.

Whatever menu you choose (PieMenu or MoveNAct) all possible interactions are present.

Navigate through the menu and select the features below.

Configuration

The options available in the floating menu are as follows:

- Apply Similar Products (On / Off)

- Cycle bookmark cycle (On / Off)

Animation

When *Play Reverse* is enabled, you can interact with animation to play it in reverse mode (animation return to its initial state).

More information in the Timelines [22] section.

Interest Point

The *Interest point* functionality allows you to point an area that you need to focus on like a pointer during a slide presentation.

See details in the section of the Interest point management [25].

Grab world

Grab world allows to move the world with a VR controller.

The functions available in the floating menu are:

- Lock altitude (On / Off)

- Lock Horizon (On / Off)

Spotlight

The interaction device works like a spotlight to light the shadowed areas of your models. Point at the dark areas to shine the light at them

The functions available in the floating menu are:

- Color (White / Warm / Cold)
- The radius of the lighting (small, medium, large)

Manage clipping planes

The functions available in the floating menu are:

- Manage clipping plane (Plane 1)
- Manage clipping plane (Plan 2)
- Manage clipping plane (Plan 3)
- Free mode (On / Off) lets you move the clipping plane in the space without any axis restrictions.

More information in the section Clipping planes management [23] section.

Snapshot

The *Snapshot* functionality allows you to capture a virtual reality scene from the operator's point of view.

More information in the Snapshot management [28] section to configure it.

Measure tools

The *Measure tools* functionality allows you to measure a distance between two points and calculate an angle.

Show angles allows you to calculate the angle between two opposite points.

Please refer to Measure tool management [26] section for more details about its operating mode.

Turntables

The turntables in VR have the same actions as the Pilot View. Please refer to the Turntables [29] paragraph for more information.

Targeted navigation

The targeted navigation allows you to target, using the joystick of the immersion device, the location from which the shuttle will rotate.

The functions available in the floating menu are:

- the direction of rotation (***Clockwise***, ***Anticlockwise***)
- the rotation speed (***Slow***, ***Moderate***, ***Fast***)

⬚ Select a part

Select a part allows you to select multiple parts that interact directly with the following functions: *Move part*, *Reset transform*, *FFD Deformer*.

⊹ Move part

The Move part allows you to grab and move a surface with the trigger of your immersion device.

Move part interactive panel

Icon	Action	Description
	Translate	Moves a surface in a translational movement along the axis (X, Y, Z) you have chosen.
	Rotate	Rotates a surface according to the axis (X, Y, Z) that you have chosen.
5 °	Tilt	Tilts the surface by a preselected factor degree.
	Decrease / Increment	Decreases or increments the surface position.

The functions available in the floating menu are:

- Lock X (On / Off)
- Lock Y (On / Off)
- Lock Z (On / Off)
- Lock orientation (On / Off)

Reset transform

This function allows you to return the selected surfaces to their original transformation as they were when the file was opened.

Curve edition

This panel allows you to draw and edit curves that can be exported to several 3D software compatible files.

Curve edition interactive panel

Function-ality	Icon	Action	Description
		Add	Add a curve.
		Delete	Deletes a curve.
		Delete all curves	Deletes all curves.

Function-ality	Icon	Action	Description
	✂	Cut	Cuts a curve.
	🔗	Link	Links two curve segments together.
◉			
	✚	Add	Adds a point to a curve.
	▬	Delete	Deletes a point from a curve.
	✛	Move	Moves the selected points.
⚙			
	Free curve	Free curve	Draws curves without restriction.
	Stick to surface	Stick to surface	Draws curves that stick to the selected surface.
	Auto intersection	Select and move	Selects the point that intersects the two curves. Creates a new point on both curves.

Show / Hide products

This function allows you to show or hide product(s). This function is also available in the Scene [21] tab.

Show / Hide surfaces

Shows or hides surfaces individually.

The surface mesh (wireframe) is green to inform you that the surface remains visible. The mesh of the surface turns red to inform you that the surface will be hidden when you close this function.

FFD Deformer

The **FFD deformation** (Free Form Deformation) panel allows you to modify the geometry of one or more surfaces by applying FFD deformation as Autodesk Maya® does it.

FFD Deformation panel

Functionality	Action	Description
	Increase or decrease	Increases or decreases the number of divisions on the X axis.
	Increase or decrease	Increases or decreases the number of divisions on the Y axis.
	Increase or decrease	Increases or decreases the number of divisions on the Z axis.

Functionality	Action	Description
	Mirror off	Symmetrically duplicates the number of surface division when you deform an object (feature must be On).
	Reset	Resets all changes.

Material assignment

This function allows you to assign a material to a pointed surface by selecting it from a directory tree previously loaded. If this surface belongs to the selection, all surfaces of the selection will have the same material. See details in the CAD Tools management paragraph.

Common parts import

This function allows you to add models from a directory tree previously loaded. See details in the CAD Tools management paragraph.

Image

This function allows you to display an image (picture, sketch, etc...) in order to use it as a drawing template to compare your 3D model with this image. Pictures can be load from a directory tree previously loaded. See details in the CAD Tools management [40] paragraph.

ACCEL VR UNIT

Each Accel VR Unit is generally installed on its own dedicated machine. The Accel VR Unit stations are synchronized computation units. The efficiency of their hardware configuration has a considerable influence on the rate and fluidity of navigation in the real time scene.

Each station with Accel VR Unit installed must, therefore, have the best possible hardware configuration. The latest generation professional graphics cards with dedicated memory greater than 2 GB are recommended.

Stations with several GPUs can be used to calculate the images of several windows.

When the Accel VR Unit application is launched, a command prompt window opens. The station is then ready to receive instructions from the Accel VR Pilot to compute the images invoked and display them in real time on the visualization devices.

SUPPORT

For any further information about Accel VR, please contact our support service by e-mail: support@lumiscaphe.com (`<support@lumiscaphe.com>`).

APPENDIX

Preparing a database

To take advantage of all the functionality of the software, databases must be properly prepared.

Accel VR supports KDR format databases exported from Patchwork 3D.

> ✎ **NOTE**
> Check that your KDR database is compatible with the performance of your hardware.

Linking a Configuration Option to a Surface

Surfaces used as triggers for configuration options are set in Patchwork 3D.

Use the labeling system available in the *Tag manager* editor (*Shaper* > *Surfaces* menu > *Tag manager*) to add a tag corresponding to the partition of the configuration you want to use, and assign the tag to the trigger surfaces. To add a configuration rule of the partition type, add a tag "partition". To add a configuration rule of the partition.value type, add a tag "partition".

Examples

Type	Configuration symbol	Tag to apply	Result
partition	armrest	armrest	shows / hides armrests
partition.value	material.wood	material	displays the different values (wood, marble ...) one by one
partition.value	material.marble	material	displays the different values (wood, marble ...) one by one

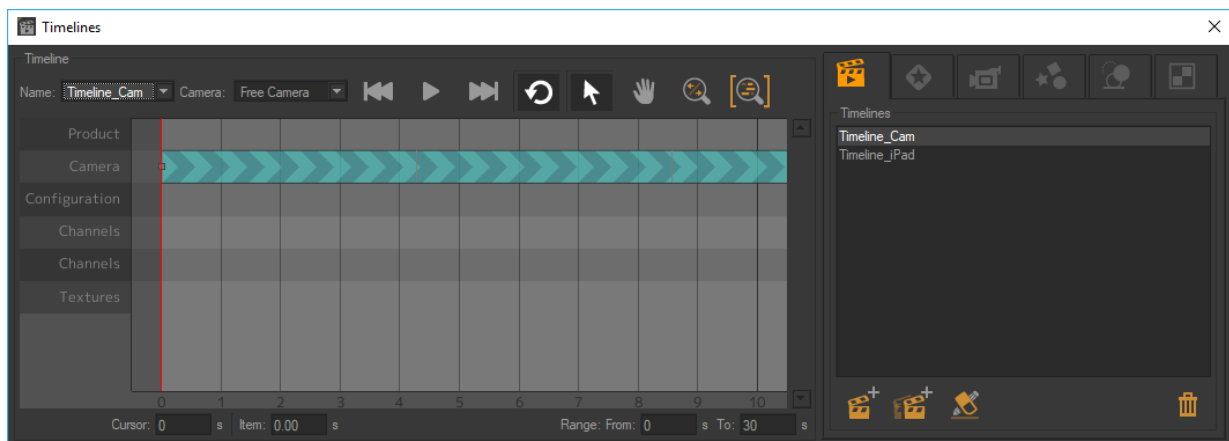More information is available in the Patchwork 3D user documentation.
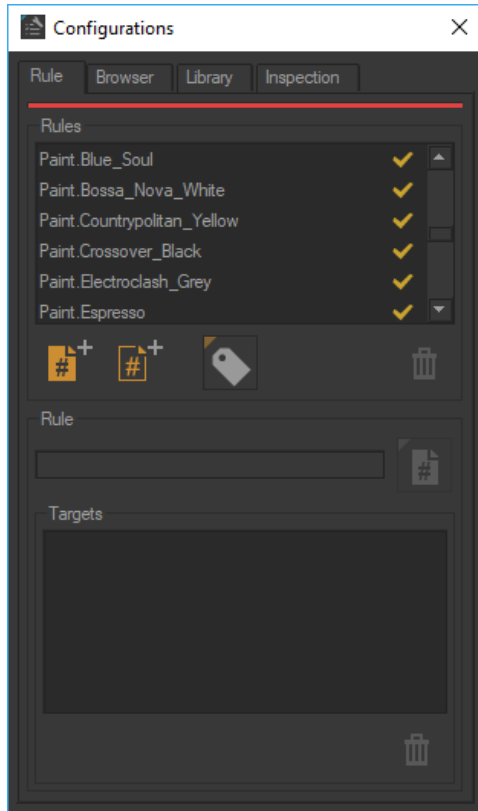
Left: defining paint.value type rules in the **Create Configurations** editor.
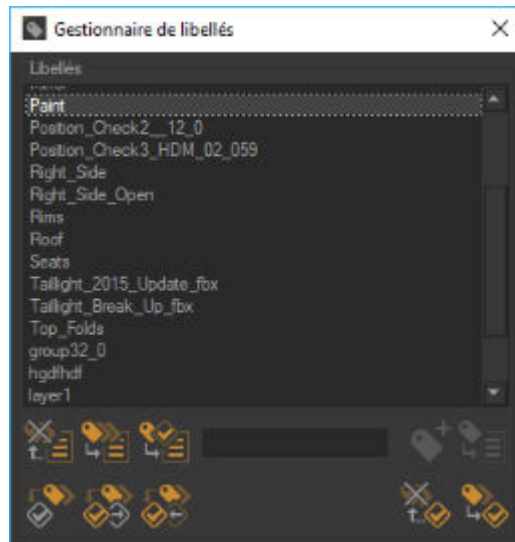
Right: Creating a paint tag in the **Tag Manager** and assigning it to a selected surface.

Creating Animation

Animations are created in the **Timelines** editor of Patchwork 3D.

Timelines editor

Creating Configuration Bookmarks

The configuration bookmarks are used by the Accel VR application. They are set up in Patchwork 3D, from the **Library** tab of the **Create configurations** editor.

This tab includes tools for updating a configuration saved as a bookmark and for managing the list by adding or deleting bookmarks.

To create a configuration bookmark, first set the desired configuration using the **Configuration Browser**. This tool is also available from the **Browser** tab of the **Create configurations** editor.

Then, in the **Library** tab of the **Create configurations** editor, click the button to create a new bookmark with the current configuration.
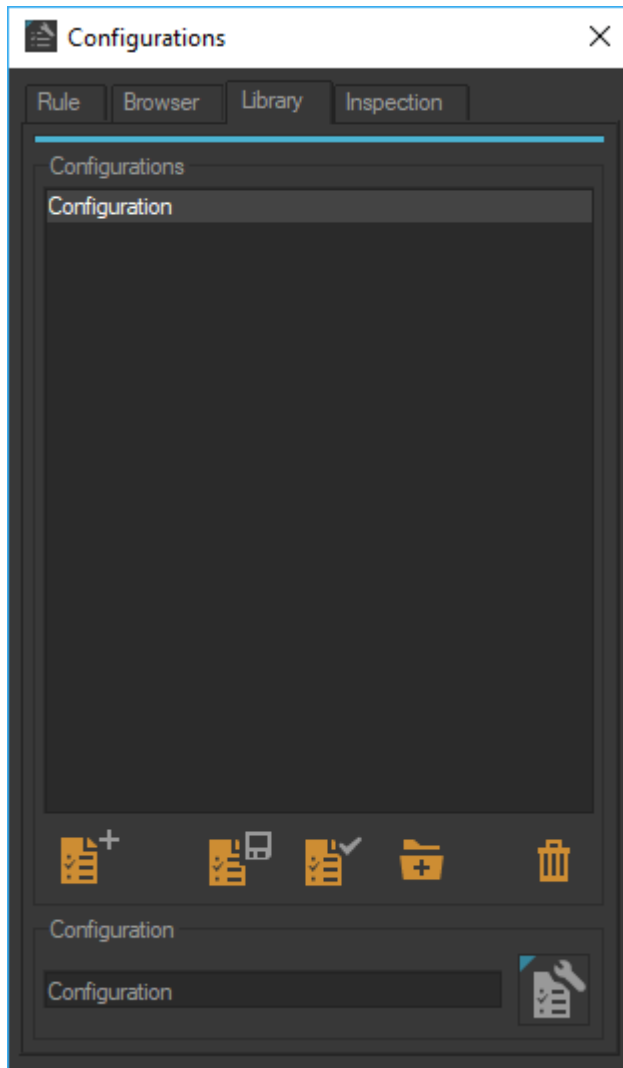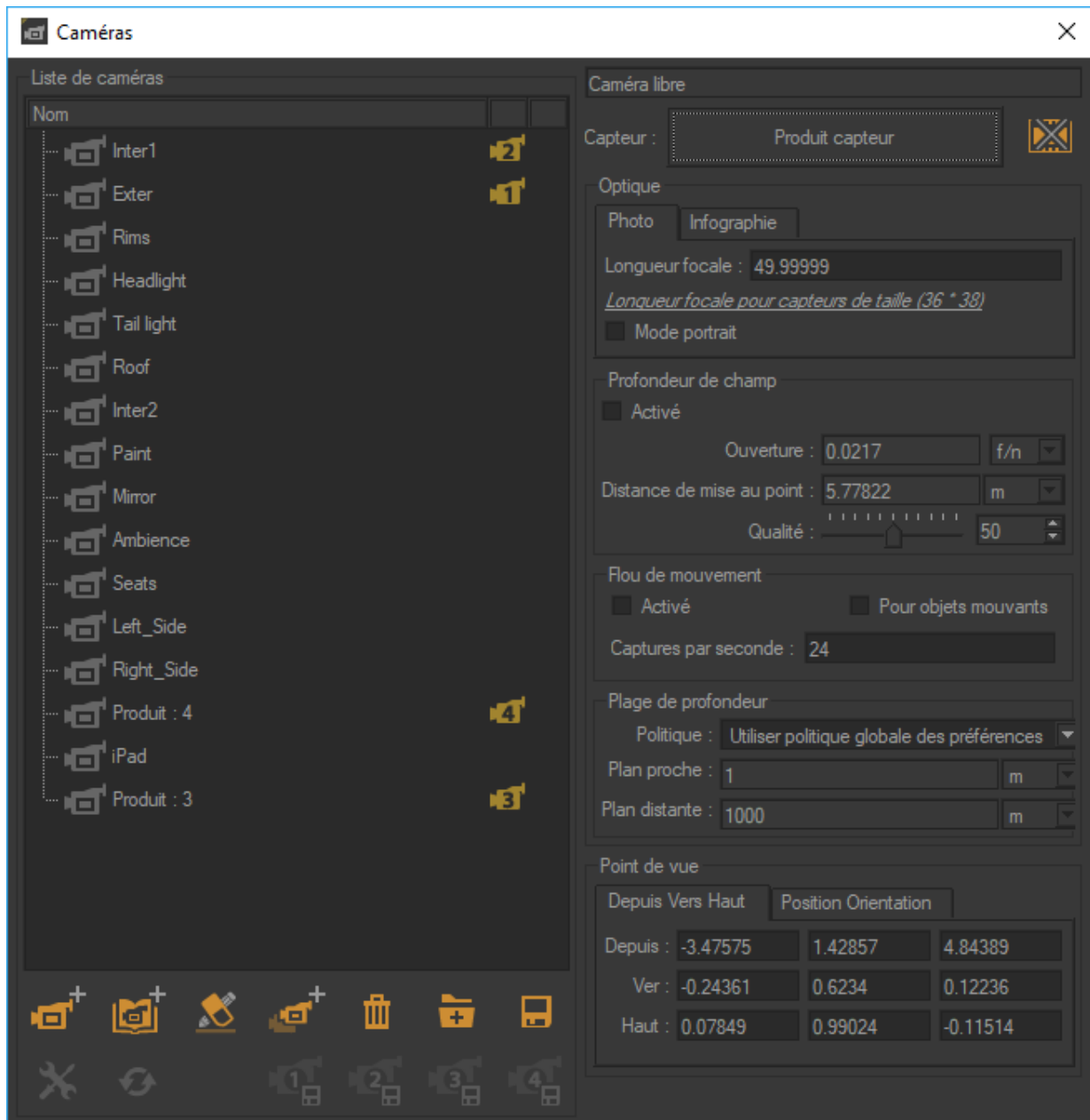

Configurations editor

Creating Camera Bookmarks

Camera positions set in Patchwork 3D are used as camera bookmarks by the application of Accel VR.
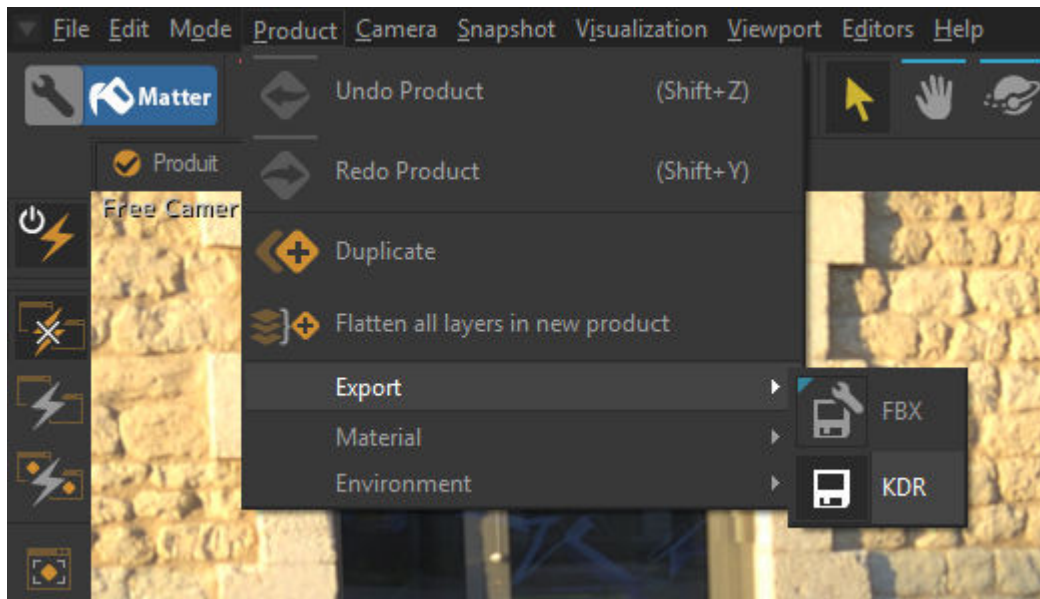
Manage your cameras in the **Cameras** editor.

Cameras Editor

Exporting the Database in the KDR Format

Export your database as a KDR file such as the screenshot below.

Export a database in KDR format.