



Elysium InfiPoints for VR Manual

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1. Overview

1.1. What is "InfiPoints for VR"?

This is designed to advance the communication in engineering scenes by the capability to visualize and handle processed point cloud data on VR headsets.

It supports Meta Quest 2 and Oculus Rift S from Facebook Technologies, LLC., VIVE Pro series and VIVE Cosmos series from HTC Corporation, and Valve Index from Valve Corporation.

You can explore the digital twin of the engineering site, measure distances, conduct virtual meetings and more.



Trademarks

InfiPoints is a trademark of Elysium Co. Ltd.

Oculus Rift, Oculus Rift S, Oculus Touch Controller, Meta Quest 2, Quest 2 Touch Controller and Oculus Link are trademarks or registered trademarks of Facebook Technologies, LLC.

HTC VIVE, VIVE Pro, VIVE Pro 2, VIVE Cosmos, VIVE Cosmos Elite, VIVE Controller and VIVE Cosmos Controller are trademarks or registered trademarks of HTC Corporation.

Valve Index, Valve Index Controller, Steam and SteamVR are trademarks or registered trademarks of Valve Corporation.

Other products are trademarks or registered trademarks of their respective owners.

InfiPoints elements supported in InfiPoints for VR

With InfiPoints for VR, you can view point cloud data processed in InfiPoints as well as modeling elements (planes, piping elements etc.), CAD models, drawing files (DWG) and notes. The project will be opened maintaining the layer information (structure, display status etc.).

1.2. Hardware Requirements

Table 1. Recommended Specifications

CPU	Intel i5-4590 equivalent or greater
Memory	8GB or more
OS	Windows 10 Pro 64-bit, Windows 11 Pro 64-bit (*1)
Graphic	NVIDIA GTX 1060 / AMD Radeon RX 480 or greater

(*1) Windows® is a registered trademark of Microsoft Corp.

Some of video cards tested by Elysium (64bit)

- NVIDIA GeForce GTX 970, 1050 Ti, 1060, 1070, 1070 Ti
- NVIDIA GeForce RTX 2060, RTX 2070 SUPER

VR headsets tested by Elysium

- Meta Quest 2 (Connect to the computer with Air Link and Link Cable)
- Oculus Rift S
- VIVE Pro 2, VIVE Pro, VIVE Cosmos, VIVE Cosmos Elite
- Valve Index

VR headsets tested by Elysium in the past

- Oculus Rift
- HTC VIVE



It requires a Steam account and the login to it to utilize InfiPoints for VR. It also requires a Meta account to utilize InfiPoints for VR with Meta Quest 2 or Oculus Rift S.

1.3. Set up Meta Quest 2

1. Set up Meta Quest 2 following the instruction by the Oculus App on your mobile device.
2. Install and set up Oculus App if it is not installed to your computer yet. Download it from [Setup Your Quest](#) website.
3. Enable to use applications that are not available at "Oculus Home" as follows;
 - i. Start Oculus App on your computer.
 - ii. Select [Settings] from the left-side menu bar.
 - iii. Select [General] tab.
 - iv. Select "Unknown Sources" and click [Allow] to enable to use InfiPoints for VR on Meta Quest 2.
4. Visit [Steam website](#) and install Steam.
5. Steam automatically starts upon the completion of installation. Connect Meta Quest 2 to a computer, and set up SteamVR following the setup wizard.



SteamVR is a VR platform that supports Meta Quest 2, Oculus Rift S, VIVE series, and many more VR headsets and controllers.

1.4. Set up Oculus Rift S

1. Set up Oculus Rift S and Oculus Touch following the instruction by the Oculus Rift S installer.
2. Enable to use applications that are not available at "Oculus Home" as follows;
 - i. Start Oculus App on your computer.
 - ii. Select [Settings] from the left-side menu bar.
 - iii. Select [General] tab.
 - iv. Select "Unknown Sources" and click [Allow] to enable to use InfiPoints for VR on Oculus.
3. Visit [Steam website](#) and install Steam.
4. Steam automatically starts upon the completion of installation. Connect Oculus Rift S to a computer, and set up SteamVR following the setup wizard.

1.5. Set up VIVE Series

- Set up VIVE series following the instruction by each installer respectively.
 - Steam and SteamVR will also be set up during this process.

1.6. Set up Valve Index

1. Visit [Steam website](#) and install Steam.

2. Steam automatically starts upon the completion of installation. Connect Valve Index to a computer, and set up SteamVR following the setup wizard.

1.7. SteamVR Commercial/Government Use License

1. SteamVR commercial/government use license (royalty-free) will allow to use InfiPoints for VR without login to SteamVR or the internet access.
2. Please refer to [SteamVR website: SteamVR for Enterprise / Government Use](#) for how to obtain SteamVR commercial/government use license, and set up for the use in an environment without the internet access.

1.8. Install InfiPoints for VR

1. Double-click the installer "setup.exe" in "infipoints4vr" folder.
Install InfiPoints for VR following the instruction by the installer.



InfiPoints for VR Viewer File is a self-contained viewer file, and requires no installation of InfiPoints for VR. Double-click "StartInfiPointsVRViewer.vbs" to view it.

1.9. License

- You can utilize InfiPoints for VR in two modes as appropriate;

Table 2. License Consumption

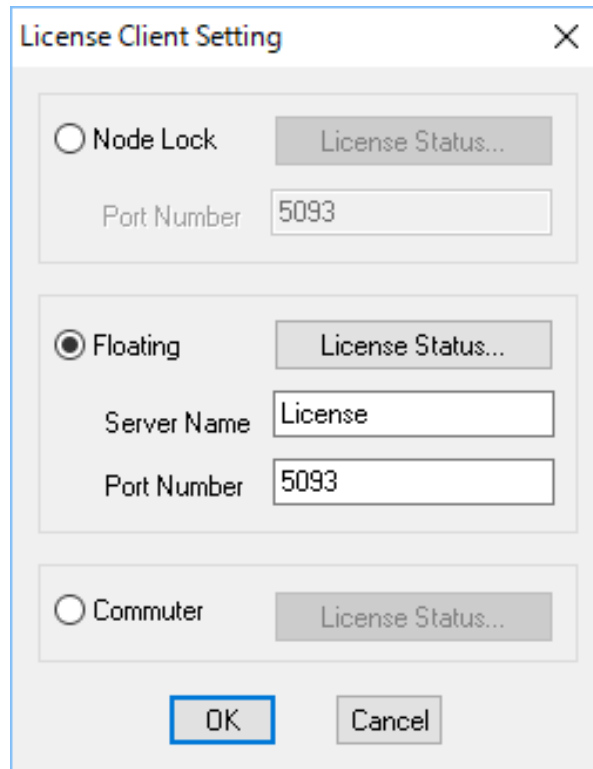
Mode	Key features	Required licenses
View Mode	<ul style="list-style-type: none">• View and explore within point cloud VR	It requires either; <ul style="list-style-type: none">• InfiPoints VR Option (IFP-OCLOP) (No license consumption)• InfiPoints Standard (IFP-STD)
Edit Mode	<ul style="list-style-type: none">• View and explore within point cloud VR• Save marks, dimensions, and Scenes.	<ul style="list-style-type: none">• InfiPoints VR Option (IFP-OCLOP)



It requires no license nor installation of InfiPoints to view InfiPoints for VR Viewer File. It requires InfiPoints VR option license (IFP-OCLOP) to export viewer file from InfiPoints.

1.9.1. Set up License

1. Register licenses to Sentinel RMS License Manager.
2. Specify the registered license file by the license server name (host name) and the port number.
 - "License Client Setting" dialog will appear when starting InfiPoints for VR without specifying the license file.




The image shows a 'License Client Setting' dialog box with a close button (X) in the top right corner. It contains three radio button options: 'Node Lock', 'Floating' (which is selected), and 'Commuter'. Each option has a 'License Status...' button next to it. Below the 'Node Lock' option is a 'Port Number' field with the value '5093'. Below the 'Floating' option are 'Server Name' and 'Port Number' fields, both containing the value 'License'. Below the 'Commuter' option is a 'License Status...' button. At the bottom of the dialog are 'OK' and 'Cancel' buttons.

- Floating: Select this option and specify the followings to use InfiPoints for VR with a floating license.
 - Server Name: Host name of the computer which the Sentinel RMS License Manager is installed to.
 - Port Number: Port number specified at the license setting. ("5093" by default)
- Commuter: Select this option to use InfiPoints for VR with a commuter license.

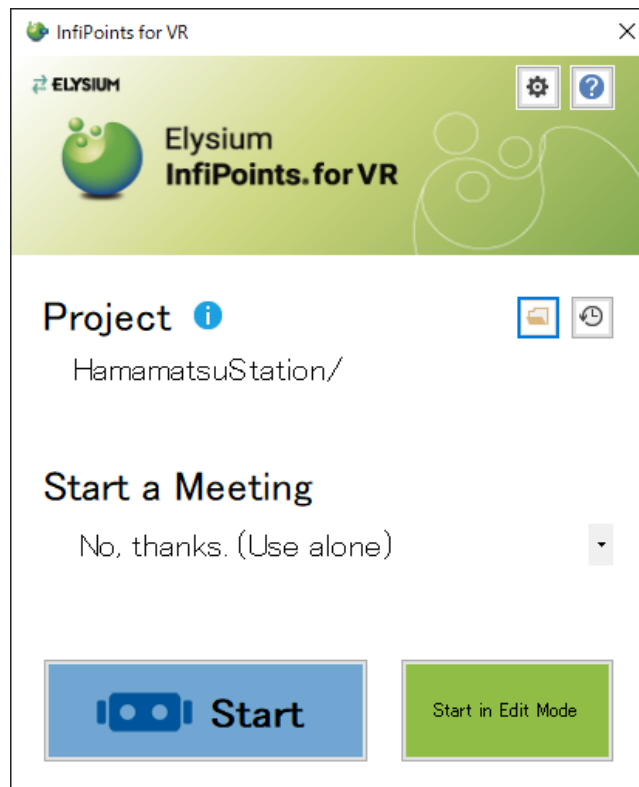


Please refer to "Sentinel RMS License Manager - Setup & Quick Start Guide" for how to install the license manager and register license files.

Please refer to "Sentinel RMS License Manager - Guide on Commuter Licensing" for how to check out licenses for a temporary use at another computer without a network connection to the license server.

You can change the license settings anytime from [Settings 

1.10. Start InfiPoints for VR



- Run InfiPoints for VR from [Start Menu] or with a desktop icon.
- Specify the project to work in, and then click [Start] / [Start in Edit Mode] button in the dialog.
- Please refer to "[Start InfiPoints for VR](#)" for the details.



Please ensure to copy the entire project when opening a project which was created on another computer. The ".ifprojx" file cannot be used on its own.



You will be placed at the viewpoint saved in the project when opening it.

1.11. Operation

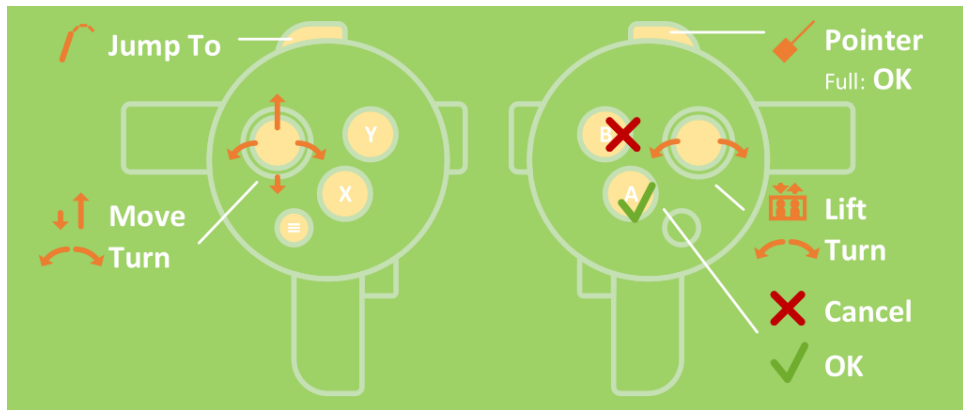


Figure 1. Operation (Meta Quest 2 / Oculus Rift S)

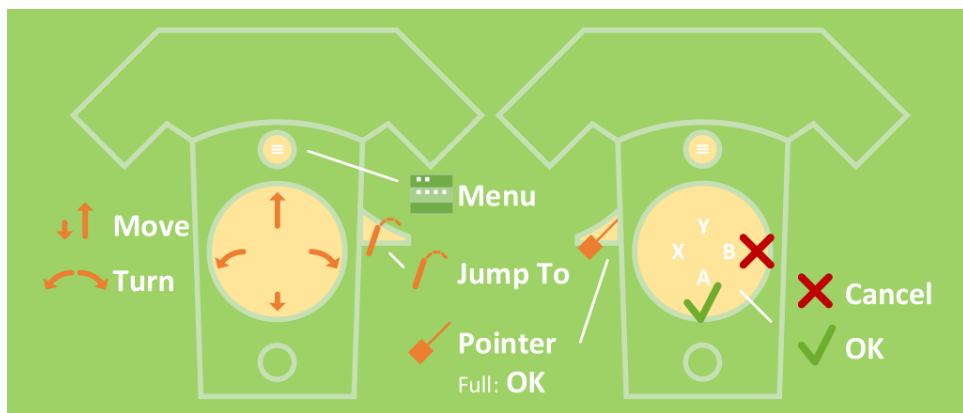


Figure 2. Operation (VIVE Pro series / VIVE Cosmos Elite)

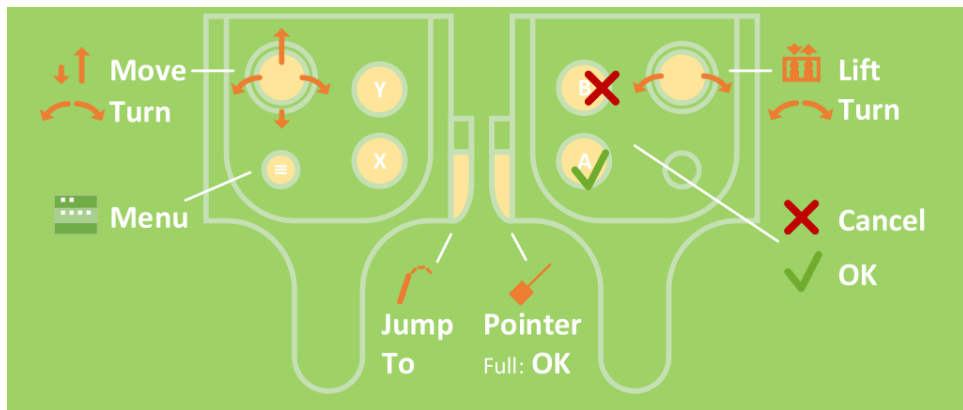


Figure 3. Operation (VIVE Cosmos)

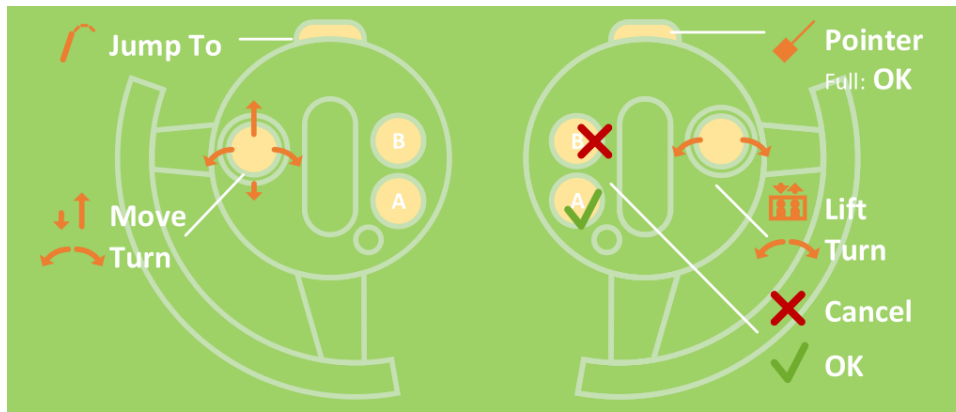


Figure 4. Operation (Valve Index)

Operation will be done with the dedicated hand controller (Meta Quest 2 Touch Controller, Oculus Touch Controller, VIVE Controller, VIVE Cosmos Controller, and Valve Index Controller).



- When using Valve Index Controllers, replace [A] / [B] / [X] / [Y] buttons in the tables below as follows;
 - [A] / [B] button: [A] / [B] button on Right controller
 - [X] / [Y] button: [A] / [B] button on Left controller

Table 3. Basic operations

	Meta Quest 2, Oculus Rift S, VIVE Cosmos, Valve Index	VIVE Pro, VIVE Cosmos Elite	Description
✓	[A] button	Right trackpad: Down	Confirm the selection. You can also confirm by full-pressing the right index trigger.
✗	[B] button	Right trackpad: Right	Cancel.
	[X] / [Y] button	Right trackpad: Left / Up	(Used for certain tools only)
📄	[Menu] button	[Menu] button	Open/close the menu. (*1) Select a menu item with your Right controller, and then press [A] button to use useful tools.



(*1): Please note that the [Menu] button on controllers do not function when using InfiPoints for VR with a Meta Quest 2 / Oculus Rift S, or Valve Index headset. Please use the virtual menu instead by;

1. Press [A] button while pointing the virtual menu displayed in front of the Left controller by the Right controller to open/close it.

Table 4. How to move around








	Meta Quest 2, Oculus Rift S, VIVE Cosmos, Valve Index	VIVE Pro, VIVE Cosmos Elite	Description
	Left thumbstick: Up	Left trackpad: Up	Move forward along the controller's direction. You can switch the mode ([Walk-through] or [Fly-through]) with Explore .
	Left thumbstick: Down	Left trackpad: Down	Move backward along the controller's direction. You can switch the mode ([Walk-through] or [Fly-through]) with Explore .
	Left thumbstick: Push Up/Down hard	Left trackpad: Up/Down + Left trigger	Move forward/backward faster.
	Left index trigger	Left trigger	Jump to the pointed location.
	Left index trigger + [X] / [Y] button	Left trigger + Right trackpad: Left/Up	Change the jumping distance.
	Left thumbstick: Left/Right Right thumbstick: Left/Right	Left trackpad: Left/Right	Turn left/right.
	Right thumbstick: Up/Down	-	Move upward/downward.
	Right thumbstick: Push straight down	Right grip button	Return to the ground level.

Table 5. Other features

	Meta Quest 2, Oculus Rift S, VIVE Cosmos, Valve Index	VIVE Pro, VIVE Cosmos Elite	Description
	Right index trigger	Right trigger	Show the laser pointer.

2. Explore

- You can move around in the digital twin using hand controllers.
- Select a motion type from the followings in the menu dialog.
- White dash line will be displayed while moving to indicate the way you are going.
 - Each dash segment shows the distance to move per second.
- When the controller bumps into a point cloud or CAD model during operation, the controller will vibrate.

2.1. Walk-through



This is a mode to walk around in the digital twin. You basically move horizontally and stay on the same altitude in this mode.

- Move forward/backward horizontally staying at the same altitude.
- Move upward/downward only when the controller is facing right up/down.

2.2. Fly-through



This is a mode to fly through in the digital twin. You go any direction along the controller's direction in this mode.

- Move forward/backward changing the altitude along the controller's direction.

3. Tools

3.1. Jump to Saved Viewpoints



This is a function to jump to viewpoints (scenes) saved in InfiPoints.

- Select [Scene] from the menu dialog. Saved scenes will be listed below.
- Move the pointer (right controller) over a scene. Preview will be displayed.
- Press [A] button on right controller to apply the selected scene.
- Specify item(s) to restore when jumping to the saved viewpoint from "[Tool] Tab".

Table 6. Operation

		Meta Quest 2, Oculus Rift S, VIVE Cosmos, Valve Index	VIVE Pro, VIVE Cosmos Elite	Description
+	[Add]	[A] button while pointing at the [Add] icon	Right trackpad: Down while pointing at the [Add] icon	Press to save the current viewpoint as a Scene. (It will be added to the end of the list.)
×	[Exit]	[B] button	Right trackpad: Down	Press to finish jumping to viewpoints.
⏮	[Prev]	[X] button	Right trackpad: Left	Press to apply the previous scene.
⏭	[Next]	[Y] button	Right trackpad: Up	Press to apply the next scene.



- The list will show up to 20 Scenes. (Only the top 20 will be listed when the project contains more than that.)

3.1.1. Operation in Edit Mode

- Viewpoints (scenes) captured in InfiPoints for VR will be saved in the project automatically when working in Edit Mode.

- You can play the saved scenes and further edit them in InfiPoints.

3.2. Play Virtual Tours



This is a function to play virtual tours (motions) created in InfiPoints.

- Select [Motion] from the menu dialog. Saved motions will be listed below.
- Move the cursor (right controller) over a motion. Preview will be displayed.
- Press [A] button on right controller to play the selected motion.

Table 7. Operation while playing motions

		Meta Quest 2, Oculus Rift S, VIVE Cosmos, Valve Index	VIVE Pro, VIVE Cosmos Elite	Description
▶	[Play] [Pause]	[A] button	Right trackpad: Down	Press to play and pause the motion.
✖	[Exit]	[B] button	Right trackpad: Down	Press to finish playing motions.
⏮	[Rewind]	[X] button	Right trackpad: Left	Press to rewind for five seconds.
⏭	[Fast-forward]	[Y] button	Right trackpad: Up	Press to fast-forward for five seconds.



- This is available only when the project contains motions created in InfiPoints.
- The list will show up to 20 motions. (Only the top 20 will be listed when the project contains more than that)
- Only motions whose target is set to "Viewpoint" will be listed.

Motion			
Start time	Play Time	End time	Target
0:00.00	00:06.45	00:06.45	Viewpoint
0:00.00	00:08.56	00:08.56	Part3.STEP

3.3. Move to Other Clients



This is a function to jump to where other clients are by synchronizing the viewpoint between multiple clients in the same meeting / tour.

- Select [Communication] from the menu dialog. Clients in the same meeting / tour will be listed below.
- Move the pointer (right controller) over a client. Preview (yourself just behind the selected client) will be displayed.
- Press [A] button on right controller to jump to where the selected client is.



- This is available only when working in multi-client mode (start InfiPoints for VR with either [Set a new meeting] or [Join an ongoing meeting] option).
- Max. 20 clients will be listed even when there are more clients in the same meeting / tour.

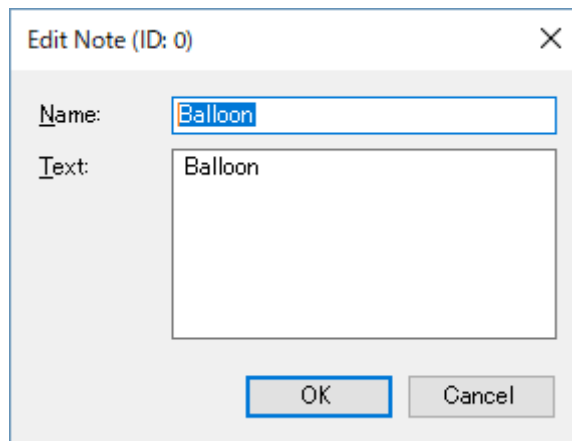
3.4. Add/Remove Bookmarks



This is a function to add bookmarks and comments at where you point with the right controller to mark dangerous areas, objects to move to clear the way to carry in/out facilities etc., and remove existing bookmarks and comments.

- Select [Mark] from the menu dialog, and move the right controller to point where you wish to put a bookmark. Preview will be displayed as you move the right controller.
- Press [A] button on right controller, or full-press the right index trigger to put a bookmark at where you are pointing.
- Select [Mark] and choose a mark type from [Options] in the menu dialog, and press [A] button to change the mark type.
- Point an existing mark with the right controller, and then press [A] button to remove it.

3.4.1. Operation in Edit Mode



- Each time you put a bookmark in InfiPoints for VR, they will be saved in the project automatically, and a dialog will appear where you can edit the name and an optional text, when working in Edit Mode.
 - Edit the name and the text as appropriate, and click [OK].
 - Or just close the dialog if you do not need to edit them or prefer to edit in InfiPoints instead.
- You can check the saved bookmarks and further edit them in InfiPoints.

3.5. Measure Distance between Two Points



This is a function to measure the distance between two points specified by the right controller.

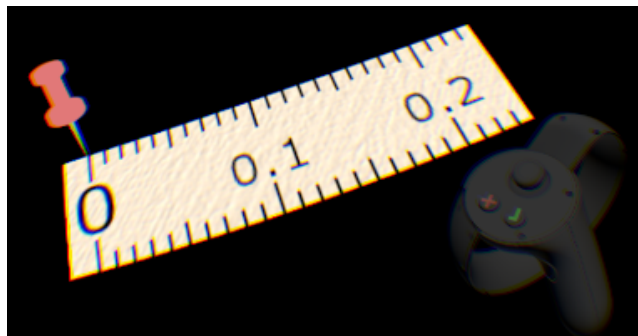
Please note that this is designed for casual measurements to get a rough idea on the size while exploring in the digital twin of engineering sites.

1. Select [Measure Distance] from the menu dialog.
2. Move the right controller to point the start point, and then press [A] button.
3. Do the same for the end point, and a dimension for the distance between specified two points will be displayed.
4. Point an existing dimension with the right controller, and then press [A] button to discard it.

3.5.1. Operation in Edit Mode

- Each time you put a dimension in InfiPoints for VR, they will be saved in the project automatically when working in Edit Mode.
- You can check the saved dimensions and further edit them in InfiPoints.

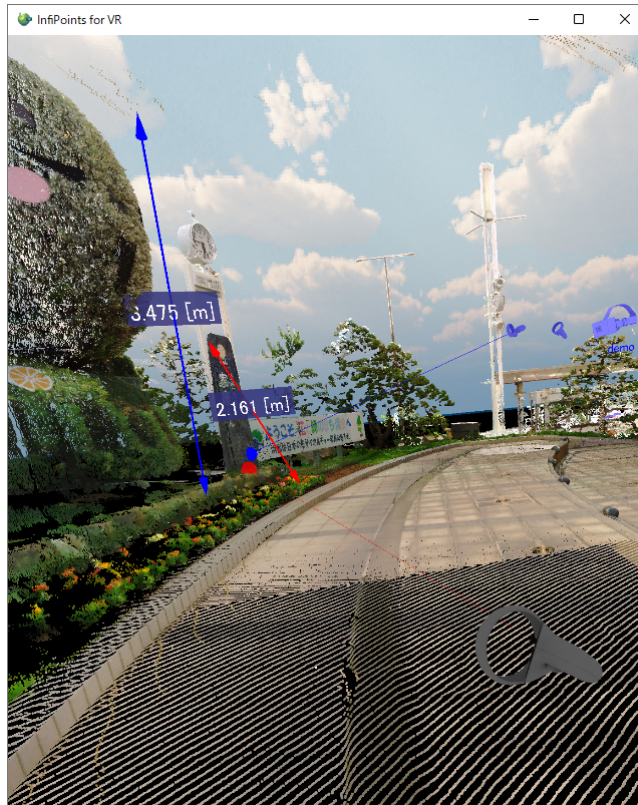
3.6. Hand-measure



This is a function to check the size of objects, spaces etc. with a hand measure.

- Select [Ruler] from the menu dialog. Hand measure will be displayed between your hands.
- Move the left / right controllers, and press [A] button to put the measurement result there.
- Press [X] button to pin the start point at where the left hand is. This is useful to measure large objects.
Press [X] button again to unpin the start point.
- Measurement results will be hidden when finishing [Hand-measure].
- Please note that measurement results will be discarded when closing InfiPoints for VR.

4. Virtual Meeting



- This is a function to conduct virtual meetings within point cloud VR.
 - Multiple users with VR headsets can get into the same point cloud data via a connection server, and communicate within a digital twin of engineering site.
 - It requires 1 seat of InfiPoints VR Option license to start a connection server.
 - It requires no additional license to invite people to join the meeting in View Mode.
 - The connection server accommodates up to 10 concurrent clients to join the virtual meeting including those in View Mode.
- And the type of VR devices does not need to match among concurrent clients.

- Use either of the following versions of InfiPoints / InfiPoints for VR to hold virtual meetings. Please ensure to use the same version of InfiPoints for VR on both server and client computers.
- Please also ensure that the viewer file is created in the same version as InfiPoints for VR on the server computer. In case the viewer file was created in a former version, open the source project in the same version of InfiPoints, and re-create with [Viewer File for VR].



Table 8. Following versions support virtual meetings.

Connection server	Client, Viewer file for VR
Ver.4.1, Ver.5.0 (*1)	Ver.4.1, Ver.5.0 (*1)
Ver.6.0 or later (*2)	Ver.6.0 or later (*2)

- (*1): Ver.4.1 and Ver.5.0 are compatible to each other.
- (*2): It requires Ver.9.0 (December 2022 Update) or later to share bookmarks and dimensions.

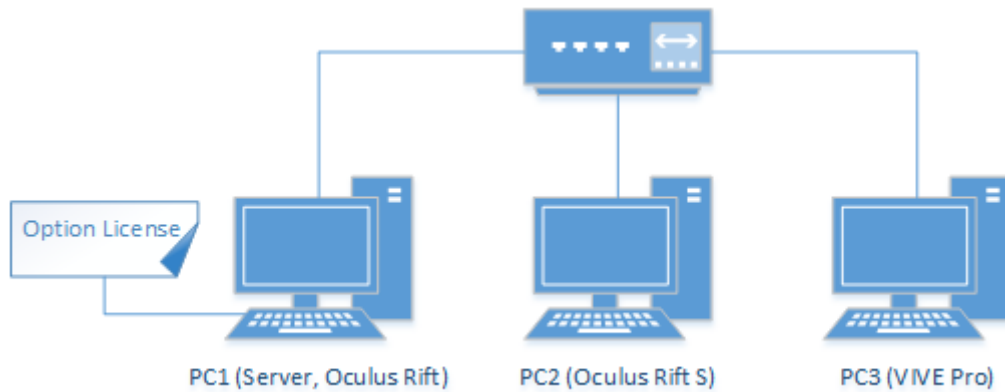
4.1. Set up

- Create a shared folder on the computer for the connection server (the one to start new meetings), and confirm that it is accessible from computers for the client (the ones to join the meetings from).

This is to test the connection between computers for the virtual meeting only, but please keep it as it may change the firewall settings etc. to delete the shared folder.

- You may need to set up a local network and/or firewall settings.
- Copy the same point cloud data (project folder) to every computer to join the virtual meeting from.

4.2. Start a Meeting (Sample Case)



To set a connection server on "PC1," and join a meeting (start InfiPoints for VR) from "PC1," "PC2" and "PC3."

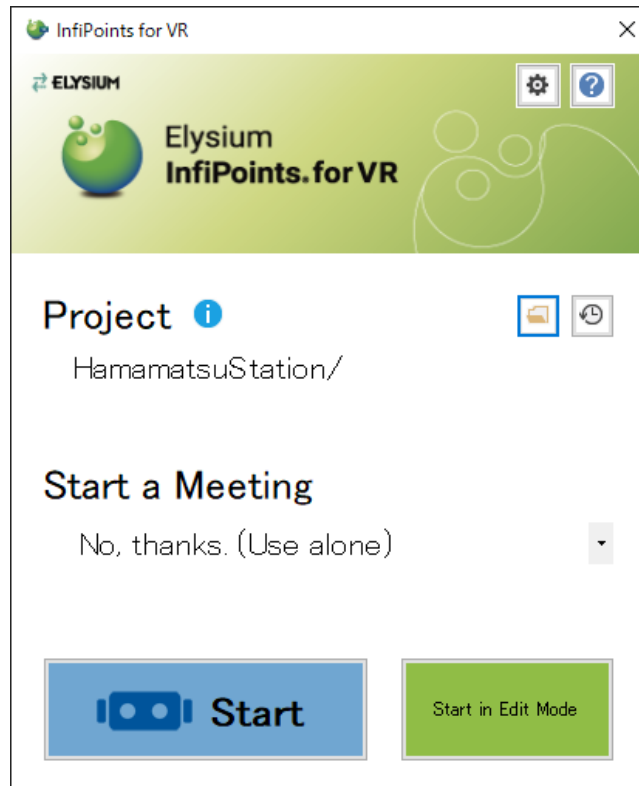
- Run [InfiPoints for VR] on "PC1," and select [Set a new meeting] from the pull-down list and click [Start].
 - This launches both InfiPoints for VR and the connection server on "PC1."
- Run [InfiPoints for VR] on "PC2," and select [Join an ongoing meeting] from the pull-down list, and specify "PC1" as the connection server to connect to, and click [Start].
 - This launches InfiPoints for VR on "PC2," and a virtual meeting will start between "PC1" and "PC2."
- Run [InfiPoints for VR] on "PC3," and select [Join an ongoing meeting] from the pull-down list, and specify "PC1" as the connection server to connect to, and click [Start].
 - This launches InfiPoints for VR on "PC3," and a virtual meeting will continue between "PC1," "PC2" and "PC3."
- Close [InfiPoints for VR] on all three computers, and the connection server on "PC1" to end the meeting.



- During virtual meetings, you can view avatar of other clients showing their head and hands positions, their laser pointer, and bookmarks and dimensions which they created.
- It requires an additional InfiPoints VR option license per client when they join an ongoing meeting in Edit mode.

5. Start InfiPoints for VR

5.1. Main Dialog



Project

Specify the project to work in.

InfiPoints for VR supports the projects both in the legacy format (saved in InfiPoints Ver.4.1.4 or earlier) and the new revision-managed format (saved in InfiPoints Ver.5.0 or later).

Please refer to the InfiPoints Help file > [Open Project] page for the details about the new revision-managed projects.

Start a Meeting

- Set a new meeting: Select this option to start a new meeting as an organizer, and invite people.
- Join an ongoing meeting: Select this option to attend an ongoing meeting set by someone else.
- No, thanks. (Use alone): Select this option to work in point cloud data alone. (No virtual meetings)

Settings

Click this icon to customize the settings for your needs.

Start

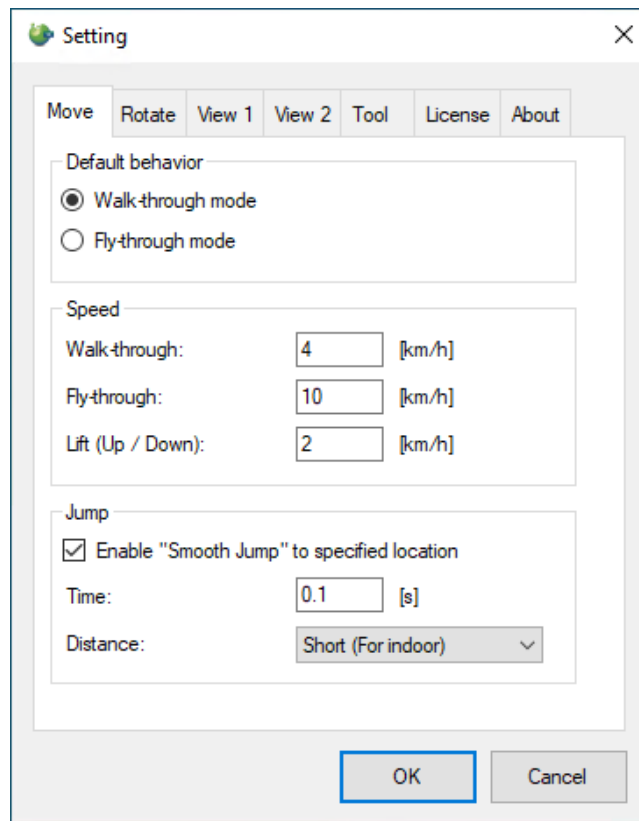
Start InfiPoints for VR in View mode.

Start in Edit Mode

Start InfiPoints for VR in Edit mode.

Edits will be saved in the project, and will be editable in InfiPoints when working in Edit mode. Please note that this requires InfiPoints VR option license.

5.2. [Move] Tab



Default behavior

Specify the default behavior ([Walk-through] or [Fly-through]).
You can change the behavior from "[Explore](#)" anytime.

Speed

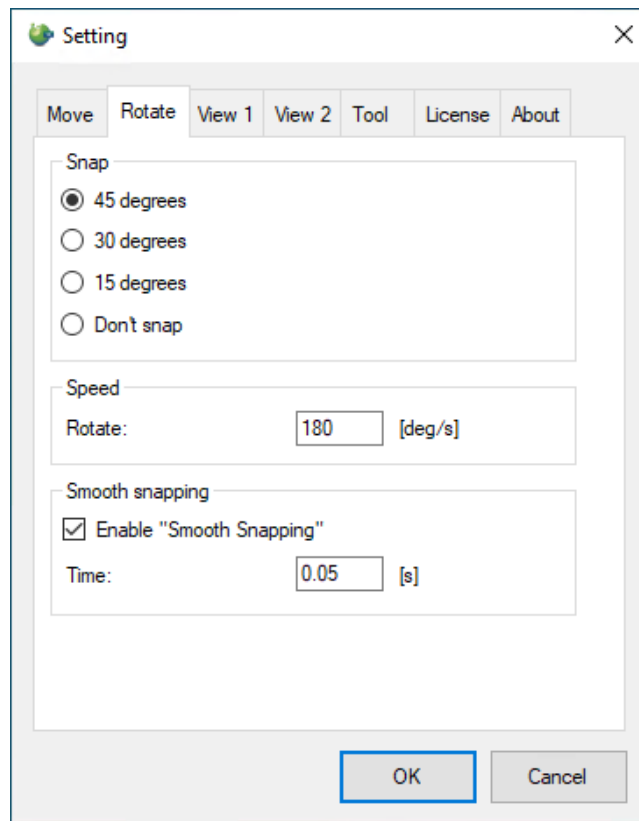
Set the speed for each motion.

Jump

Specify the behavior for jumping to the point specified with Left Index Trigger.

- Time: Specify how many seconds to take to move to the specified location. Very small value (e.g., 0.1 second) is recommended.
- Distance: Specify how far to go with a jump by three levels. You can also change this from [Menu] while exploring in VR. Please refer to "[Basic operations](#)" for how to open [Menu].

5.3. [Rotate] Tab



Snap

Snap to the specified degrees when turning left / right.
It is recommended to enable this to avoid VR sickness.

Speed

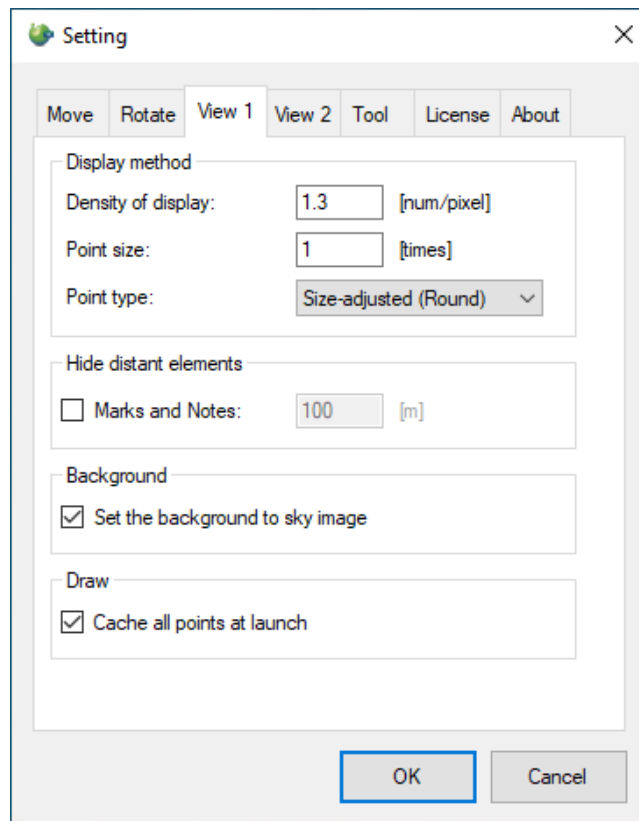
Set the speed for rotation.

Smooth snapping

Check "Enable \"Smooth Snapping\"" option to turn smoothly.

- Time: Specify how many seconds to take to turn. Very small value (e.g., 0.05 second) is recommended when snapping to every 45 or 30 degrees.

5.4. [View 1] Tab



Density of display

Density of display: Specify the density of points to display. You can raise the viewing speed by reducing this value.

Point Size

Specify the display size of the points.

Point Type

Specify the display type of the points from [Size-fixed], [Size-adjusted (Round)], [Size-adjusted (Square)] and [Size-adjusted (Cube)].

Hide distant elements

Check elements to restrict to hide elements located farther than the specified distance from the viewpoint.

Set the background to sky image

Check this option to set the background to the sky image.

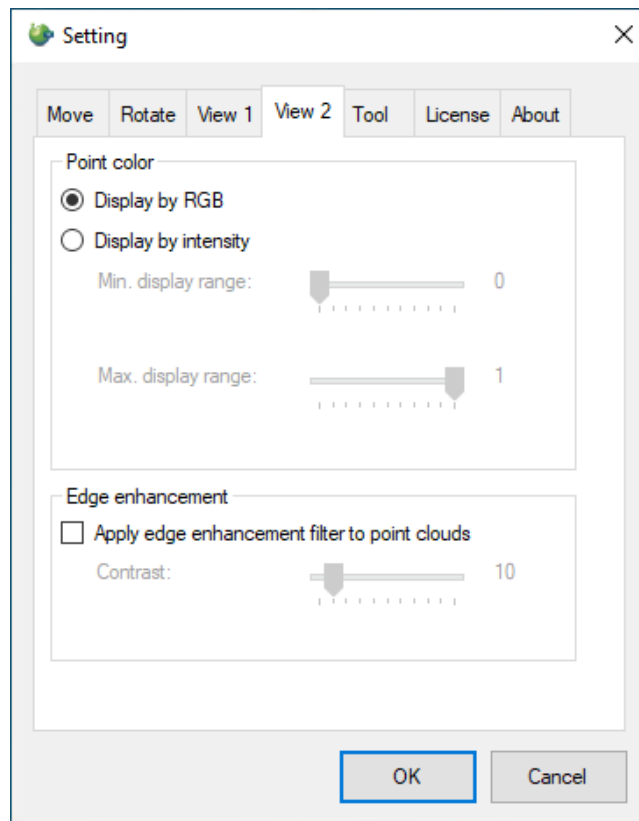
Cache all points at launch

Check this option to draw all points when starting InfiPoints for VR.

This is enabled by default.

Check off this option to reduce the processing time at launch. Please note that you may experience delays in drawing because the points will be drawn as you move around.

5.5. [View 2] Tab



Display by RGB

Display point cloud using the original color of each point from the scanning.

Display by intensity

Display point cloud in gray scale using the intensity of each point.

Min. display range / Max. display range

Specify the intensity range (min. / max. intensity value), and the points within the specified intensity range will be displayed in the corresponding color according to the intensity value.

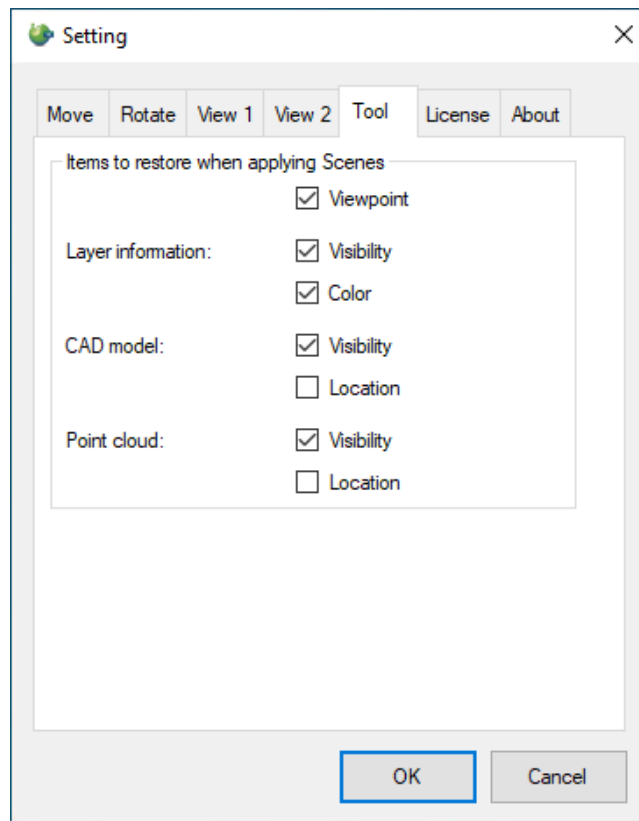
Apply edge enhancement filter to point clouds

Enable to apply edge enhancement filter (show the pixels that have a gap in the depth direction in darker colors to enhance the edge of point cloud) to point clouds.

Contrast

Adjust the contrast using the slider. Bring the slider to the right to increase the contrast to enhance edges with a small gap in the depth direction.

5.6. [Tool] Tab



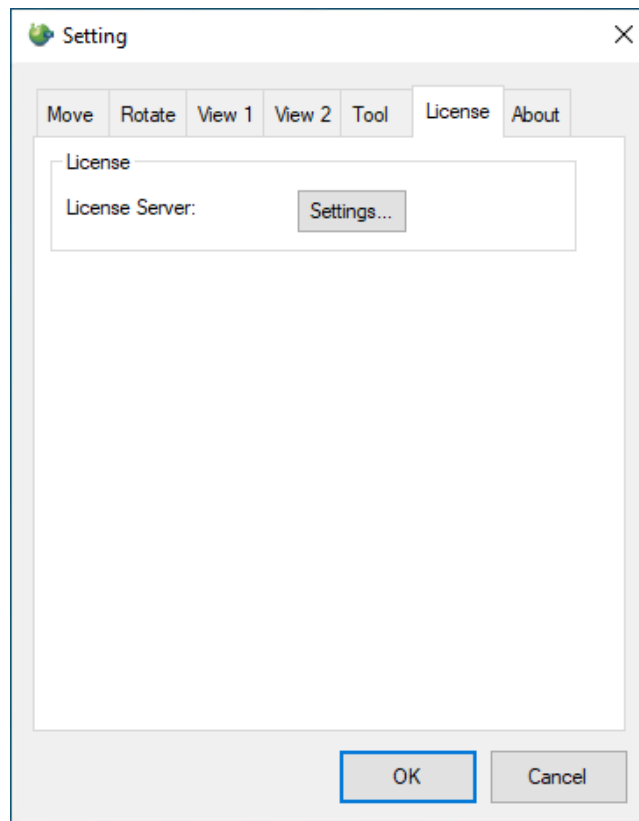
Items to restore when applying Scenes

Check item(s) to restore when applying Scenes.



- Please note that CAD models / point cloud will move with each "Location" option enabled if they are at a different location from that in the Scene to restore.

5.7. [License] Tab

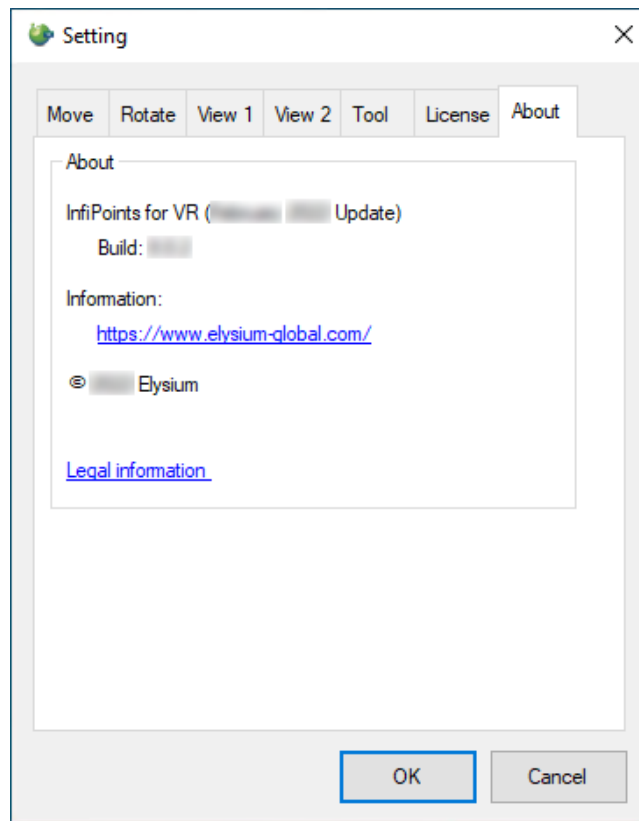


License Server

Specify the license server.

Please refer to "[Set up License](#)" for the details.

5.8. [About] Tab



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