

1 Description

The CUWB Viewer is a 3D visualization of the Ciholas Ultra-Wideband (CUWB) Real-Time Location System (RTLS). It provides a user interface displaying the locations of the CUWB devices, such as Anchors and Tags, in real time. The Viewer also presents basic system information, such as device status, statistics and more.

The CUWB Viewer is also compatible with our [CDP Logging Tools](#) and can render previously captured logs. Additional documentation for the CUWB RTLS system is available on [CUWB.IO](#).



2 Installation

2.1 Host PC Requirements

- **OS:** Ubuntu 22.04 Jammy or Ubuntu 24.04 Noble
- **CPU:** Intel or AMD 64-bit architecture, 2.5GHz, dual core or better with SSE2 instruction set support
- **GPU:** Integrated graphics or dedicated graphics card with Vulkan 1.3+
- **RAM:** 4GB or better
- **HD:** 8GB or more (plus any additional required by logging)

2.2 PPA Installation and Setup

Follow the instructions below for CUWB Viewer installation.

1. Follow best practices and review [the install.sh script](#).
2. `bash <(wget -qO- "https://cuwb.io/docs/latest/assets/software-packages/install.sh")`
3. Paste into an Ubuntu 22.04/24.04 terminal and press Enter.

When prompted in the "CUWB Applications Selection", ensure that **CUWB Viewer** is selected for installation.

2.3 Offline Installation

The CUWB Viewer can be installed on Host PCs that do not have PPA access. The following is a list of additional packages that may need to be installed on the Host PC before doing an offline installation of the CUWB Viewer. Use `dpkg -g -l | grep <package_name>` on the Host PC to verify whether each package is installed.

- libltnng-ust1
- libltnng-ust-common1
- libltnng-ust-ctl5
- dotnet-host-8.0
- dotnet-hostfxr-8.0
- dotnet-runtime-8.0

For instructions on how to obtain the DEB package, see [Download Debian Packages](#) for Software Packages. After downloading the package, transfer the DEB to a USB drive or another transfer method to the Host PC. Once the file has been transferred, navigate to its location and enter the following command in a terminal window to install the package:

```
sudo apt install ./cuwb-viewer-<version>.deb
```

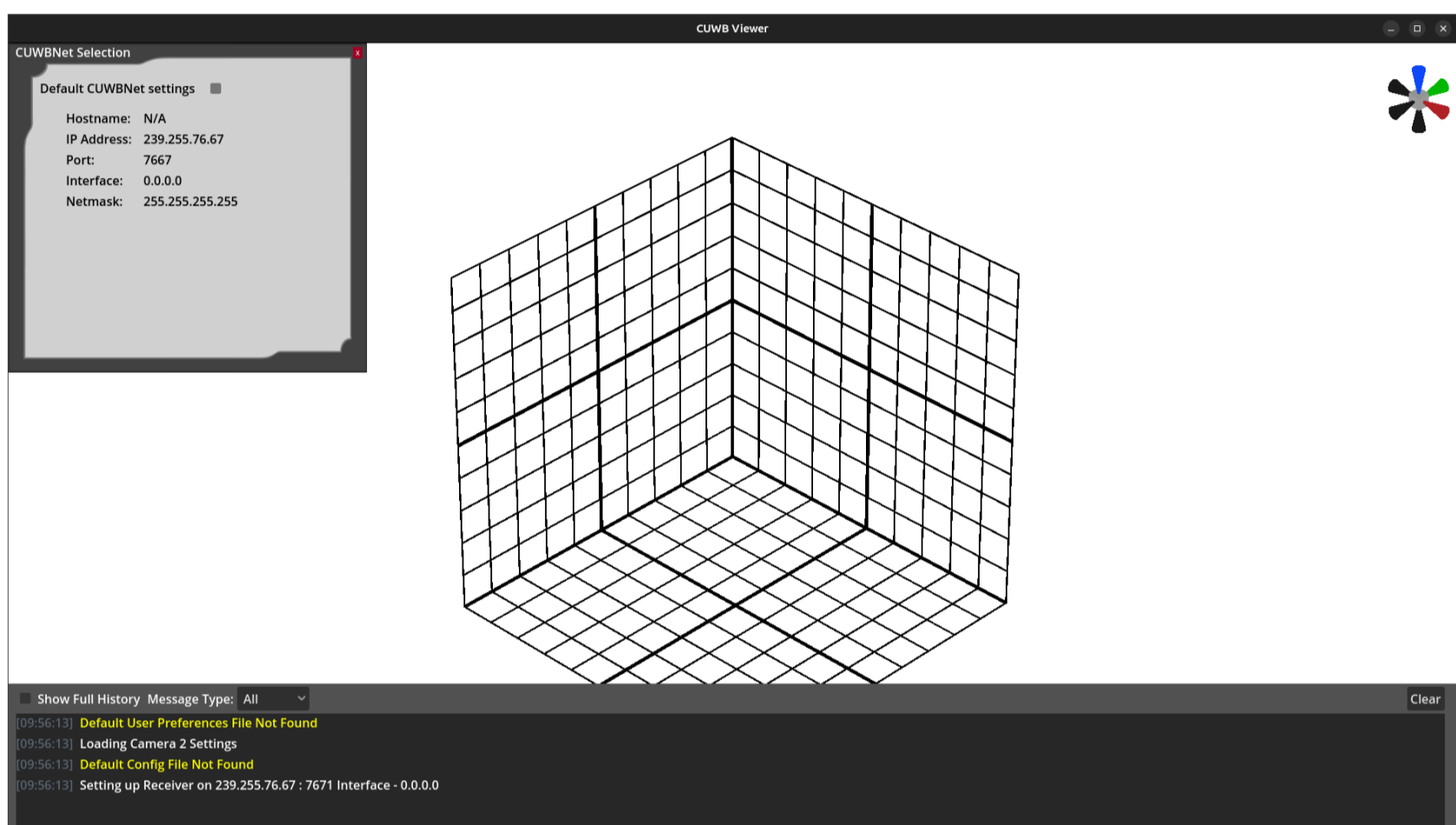
3 Getting Started

3.1 Launch CUWB Viewer

Once the CUWB Viewer has been installed, launch the application through the Linux applications menu or by typing the following command into a terminal window:

```
cuwb-viewer
```

After the initial boot animation, the user will be presented with a blank screen displaying a 3D 10-meter grid, the CUWBNet selection window, and the message window at the bottom of the screen.



3.2 Network Configuration

On the initial run of the CUWB Viewer, no viewer configuration file will be loaded. A CUWBNet selection tool will appear populated with all available CUWBNetS detected by the Viewer. By default, the Viewer listens on the CUWB Anchor Array configuration channel (IP 239.255.76.67, port 7671, interface 0.0.0.0), allowing the system to discover available CUWB Configurations.

Select an available CUWBNet and close the selection window. Once **CDP data** from the CUWBNet is received, the grid will expand and form around the representations of the system's Tags and Anchors. See [Network Settings](#) and [CUWBNet Selection](#) for additional details.

3.3 Message Window

Along the bottom of the CUWB Viewer is a message window, which by default only appears when a message is posted. This can be configured in [User Preferences](#).

3.4 Camera Configuration

The default Viewer camera angle is pointed at the center of the grid from the positive X, negative Y, and positive Z directions. See [Camera Defaults](#) for instructions on changing the default views or adding other custom views. The [Camera Gizmo](#) can also be used to create temporary viewing positions.

3.5 Grid Configuration

The default Viewer setup features a 10m x 10m x 10m cube with gridlines at each meter. This grid automatically expands to include all active devices and will shrink as devices move or stop reporting data. Additional settings including turning the grid off are available under [Grid Configuration](#).

3.6 Devices

When connected to a running CUWBNet, devices will appear in the 3D scene as they begin reporting data. The way devices are displayed in the Viewer can be configured using either global settings or individual device settings, see [Global Device Settings](#) or [Device Settings](#) for more information.

By default, tags are represented as spheres and anchors are cubes. The devices are colored via the [standard color scheme](#).

3.7 Objects

The Viewer is a valuable tool for modeling physical environments, primarily through the use of static 3D objects. See [Objects](#) for information on creating objects, modifying their properties, and adding custom objects.

4 CUWB Viewer Walkthrough

4.1 Message Window

Along the bottom of the CUWB Viewer is a message window that provides the user with system state changes, such as new devices appearing or CUWBNetworks going offline. By default, the window only appears when a message is posted. This behavior can be configured in [User Preferences](#).

The window can be configured to display the following message options:

- **Internal** - Messages that the CUWB Viewer generates
- **CDP** - CDP messages received by the CUWB Viewer
- **All** - Messages from both the internal and CDP categories
- **None** - No messages will be printed

The message history can be shown in full by selecting the [Show Full History](#) checkbox.

4.2 Camera Gizmo



The Camera Gizmo is located in the upper-right corner of the Viewer screen. It provides a simple interface for visualizing the camera's orientation and for moving and rotating the camera to face a specific axis. The Camera Gizmo displays the camera's position and rotation relative to the scene and updates dynamically as the camera is adjusted.

The axis cones are color-coded to match their respective axes: the X-axis is red, the Y-axis is green, and the Z-axis is blue. All negative axes are shown in black. When the mouse pointer hovers over a cone, it is highlighted in yellow. Left-clicking a cone adjusts the camera's position to align parallel with the selected axis and rotates the view to the nearest 90-degree orientation.

4.3 Configurations

A configuration can be created through the [File](#) menu to quickly save and reload settings, objects, images, and devices. Configurations may be saved by overwriting the default configuration or by creating a new configuration file.

4.3.1 File Menu Options

Submenu	Description
Save Configuration	Saves the current configuration, overwriting the default configuration file.
Save Configuration As...	Opens file browser to save the current configuration as a new file.
Load Configuration	Opens a file browser to select and load a configuration file.

4.3.2 Default Configuration

The default viewer configuration file, [config.zip](#), can be found in the [/usr/lib/cuwb/viewer/](#) folder. This file will load on boot and restore all settings that a user has saved for a given CUWB Anchor Network setup.

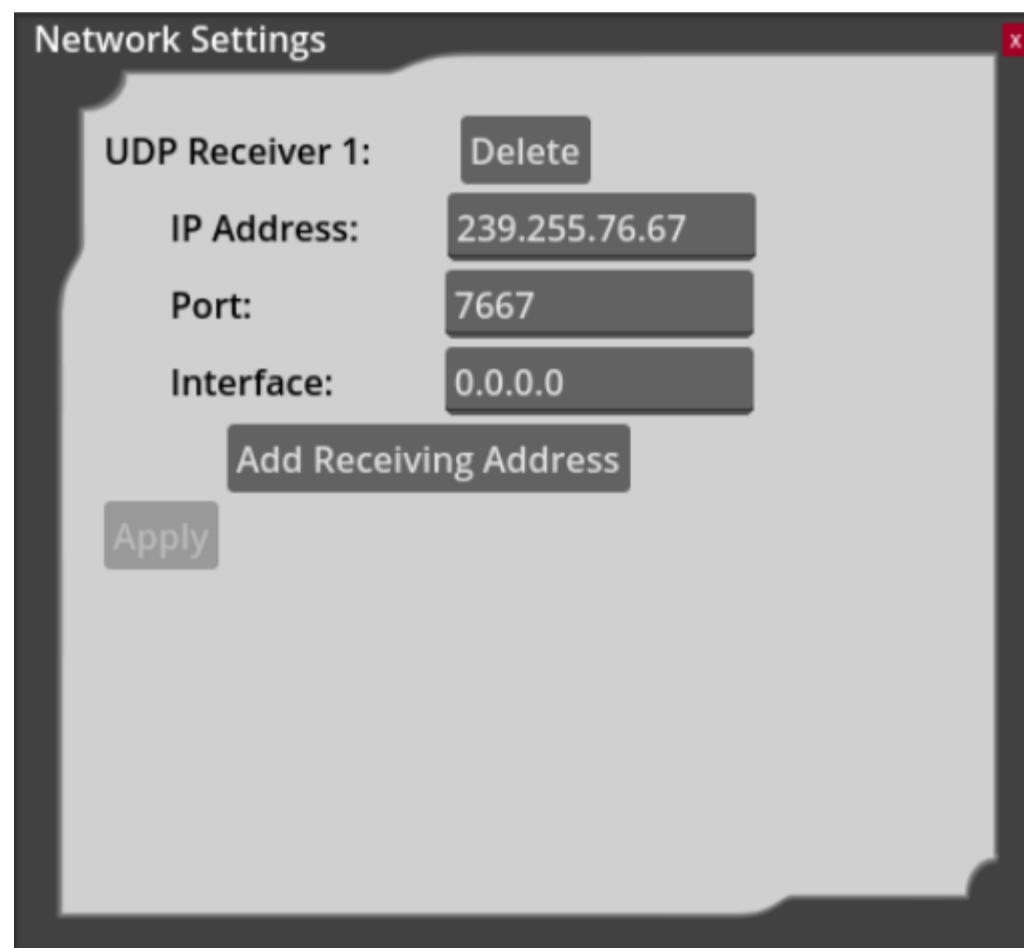
On the initial launch of the CUWB Viewer, no viewer configuration file will be loaded.

4.4 Edit Settings

4.4.1 Edit Menu Options

Submenu	Description
Network Settings	Modify and add network configurations
CUWBNet Selection	Select available CUWBNetS to connect to or disconnect from
User Preferences	Access the User Preferences Settings

4.4.2 Network Settings



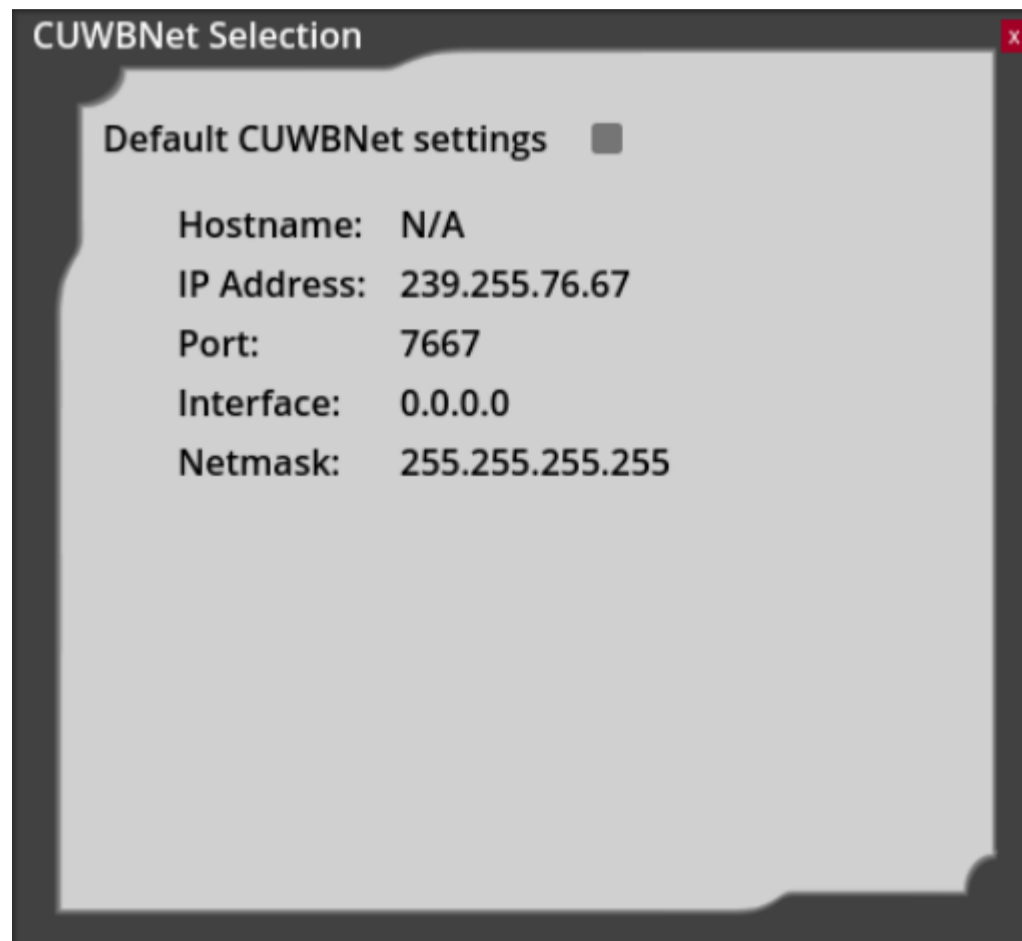
Network connection settings can be modified through this window if the user doesn't want to use CUWBNet selection. Additionally, the CUWB Viewer can support more than one UDP Receiver.

Receiver 1 will default to the Anchor Array configuration channel (IP 239.255.76.67, port 7671, interface 0.0.0.0). This allows the system to discover available CUWB Configurations.

A UDP receiver must be setup for log playback. See [Log Playback](#) for additional information.

4.4.3 CUWBNet Selection

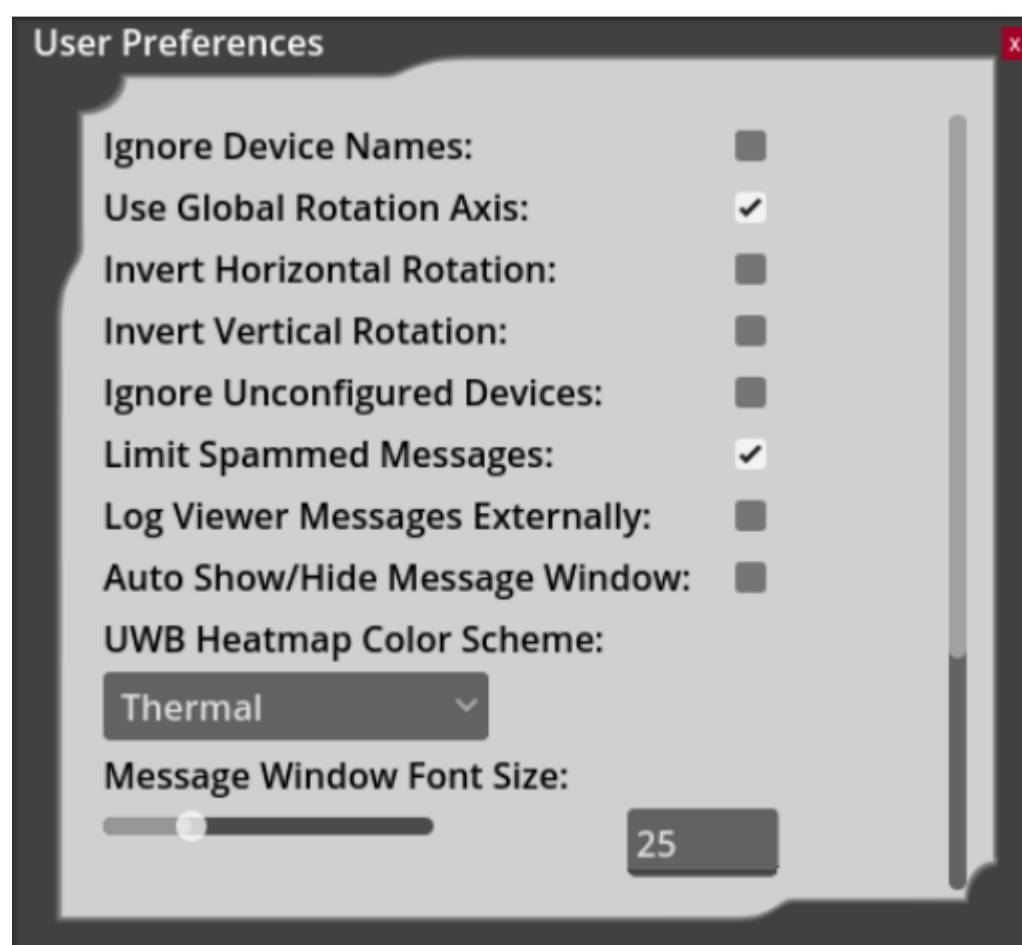
When the viewer is launched, the CUWBNet selection window will automatically appear, displaying all CUWBNetS detected by the system. Multiple CUWBNetS can be selected.



To prevent the CUWBNet selection window from appearing when the Viewer application boots, save the configuration using the **File -> Save Configuration** menu item. This will save the selected CUWBNetS to the default viewer configuration. To return to the CUWBNet selection window select **Edit -> CUWBNet Selection** from the menu.

Once a CUWBNet is selected and the viewer begins receiving **CDP data**, the grid will automatically expand and organize itself around the visual representation of the system's Tags and Anchors.

4.4.4 User Preferences



The Viewer provides several user-specific settings that can be adjusted independently of the active configuration.

Setting	Default	Description
Ignore Device Names	Off	When enabled, the Viewer will ignore any names set by the CUWB Manager and display only each device's serial number.
Use Global Rotation Axis	Off	When enabled, rotating the camera left or right will be around the nearest global "up" vector, rather than the "up" vector of the camera. When disabled, rotation is more similar to what is used in most CAD software.
Ignore Unconfigured Devices	Off	When enabled, all data received from devices marked as unconfigured in the CUWB Manager will be ignored.
Limit Spammed Messages	On	When enabled, frequently generated internal Viewer messages will be condensed into a single entry in the format "(x) Message Contents", where x is the number of messages that were suppressed.
Log Viewer Messages Externally	Off	When enabled, all messages displayed in the Viewer message window will also be logged with any other Viewer log messages.
Auto-Hide Message Window	On	When enabled, the message window will automatically hide itself after 15 seconds of inactivity and will reappear when a new message is displayed. When disabled, the message window will only be shown or hidden using the assigned keybind.
UWB Heatmap Color Scheme	Green to Red	Coloring option used by UWB Heatmap Mode. Available options include "Green to Red", "Thermal", and "Blue Monochrome." See Heatmap Mode for additional details.
Message Window Font Size	16	Adjustable setting that controls the size of text inside of the message window. Values are accepted in the range of 1 to 100.
Device Serial Numbers Scale	3	Adjustable setting that controls the size of the device's serial number labels. Values are accepted in the range of 1 to 10.
Max Framerate	60	Target frame rate of the Viewer. The Viewer will attempt to match this value as closely as possible. Accepts values from 0 to 500, with 0 representing no maximum (i.e. the Viewer will run at the fastest possible frame rate).

Don't forget to click apply to apply the selected settings.

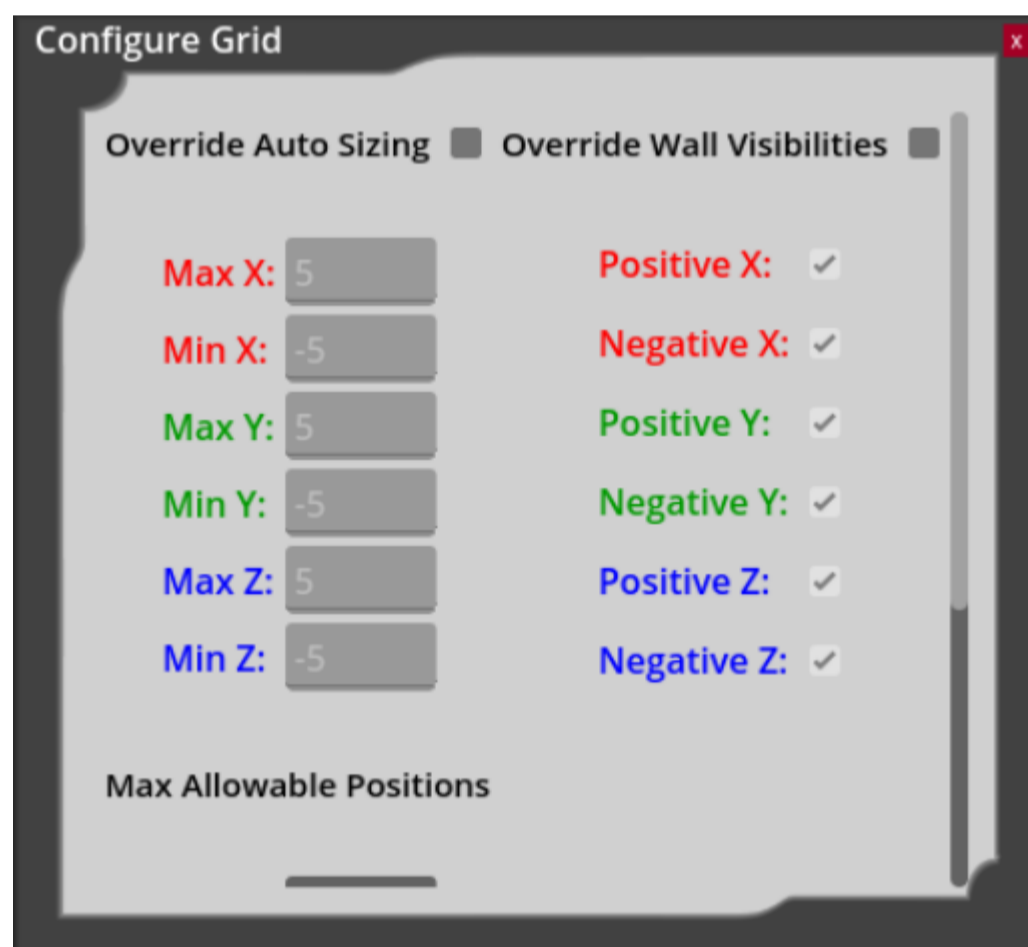
4.5 View Options

4.5.1 View Menu Options

Submenu	Description
Configure Grid	Configure the grid size and visibility
Camera Defaults	Set default camera view and perspective
UWB Heatmap Mode	Select device and enable UWB Heatmap mode
Toggle Measurement Mode	Enables or disables 3D measurement mode
Clear Measurements	Deletes all 3D measurements
Pause/Play	Pauses or Resumes CDP traffic

4.5.2 Grid Configuration

The default Viewer setup features a 10m x 10m x 10m cube with gridlines at 1-meter intervals. This grid can either be configured to automatically size based on the devices being tracked, or it can be manually configured to a fixed size.



Override Auto Sizing

By default, the Viewer grid automatically expands to accommodate all active devices and will contract as devices move or stop reporting data. This behavior can be overridden by enabling **Override Auto Sizing**. When enabled, the position of each grid wall can be manually configured using the corresponding input fields.

Disabling the **Override Auto Sizing** will return the grid to its default size settings.

Override Wall Visibilities

The visibility of each individual grid wall can also be configured by enabling **Override Wall Visibilities** and then unchecking the box of the corresponding wall to make it invisible.

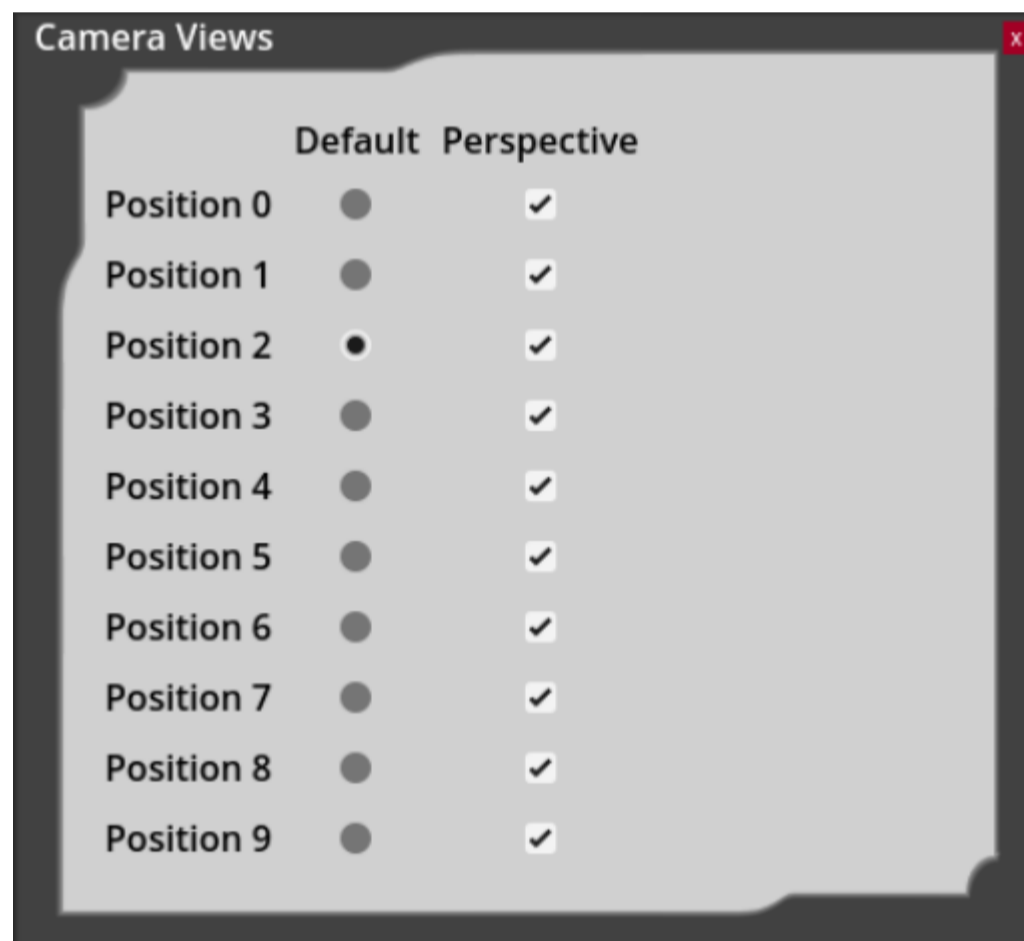
Disabling the **Override Wall Visibilities** will return the grid to its default visibility settings.

Max Allowable Positions

The maximum allowed position values for devices can also be configured in the configure grid window. Minimum and maximum limits can be set for each axis using the text boxes under "Max Allowable Positions." If a device exceeds any of these limits, its position will be ignored and a warning will be displayed in the message window.

4.5.3 Camera Defaults

The default view used at startup can be configured in **View -> Camera Defaults**. A radio button under "Default" selects the camera view used on boot (positions 0 through 9). In addition, each camera position includes a checkbox under "Perspective" that determines whether the view is rendered in perspective or orthographic mode.



The default camera positions can be overridden by saving the current camera view. Pressing **Ctrl** + a number key (0 through 9) will save the current camera settings to that position. Pressing the corresponding number key restores the saved view. Saved camera positions can be reset to their defaults from **View -> Camera Defaults** by selecting the "Reset" button next to the desired position. This button only appears after a custom view has been saved.

4.5.4 Color Modes

Standard Colors

The color of the device is used to indicate the connectivity and synchronization status.

Color	Description
Gray	Inactive
Red	Error
Yellow	Warning
Green	Good
Blue	Located

The above chart and the currently set heatmap color scheme can be found under [Help -> Color Legend](#).

Heatmap Colors

Enabling this mode changes the coloring of anchors to reflect their usage in tracking the selected tag. The location algorithm weights data from anchors depending on the quality of the tag beacon reception. Anchor coloring in heatmap mode reflects the relative anchor weighting used by the location algorithm. The table below describes the heatmap color scheme.

Color Scheme			Description
Green to Red	Thermal	Blue Monochrome	
Fluorescent Green	Sun Yellow	Ice Blue	90-100%
Yellow Green	Tangerine	Pale Blue	80-89%
Dandelion	Pumpkin Orange	Cyan	70-79%
Sun Yellow	Reddish Orange	Bright Sky Blue	60-69%
Orange Yellow	Tomato	Cerulean	50-59%
Tangerine	Magenta	Ocean Blue	40-49%
Fire Engine Red	Indigo	Navy	0-39%
Gray			No Data
Black			Bad Status

4.5.5 Measurement Mode

The distance between devices and objects can be measured in real time using the Measurement Mode tool. To enable it, select [View -> Toggle Measurement Mode](#). When active, a ruler icon will appear in the top-right corner of the view. Once enabled, select two devices or objects using the left mouse button to draw a red, three dimensional line between them that displays their distance in meters.

To return to normal operation, disable Measurement Mode via [View -> Toggle Measurement Mode](#). The ruler icon will disappear, and the left mouse button will return to selecting devices or objects. Measurement lines can be selected with the left mouse button, turning a brighter shade of red, and then deleted with the [Delete](#) key. Selecting [View -> Clear Measurements](#) will delete all existing measurement lines.

4.5.6 Play / Pause

The CUWB Viewer allows users to pause the stream of data using the play / pause command. This can be found under [View -> Play/Pause](#) or by hitting the [space](#) key.

4.6 Devices

When connected to an active CUWBNet, devices will appear in the 3D scene as they begin reporting data. Their display within the Viewer can be configured using the global settings or individual device settings. See [Device Settings](#) or [Global Device Settings](#) for additional information.

4.6.1 Devices Menu Options

Submenu	Description
Global Device Settings	Configurable settings applied to all devices, see Global Device Settings
Device List	Displays all anchors and tags and allows access to their information or settings windows
Find Device	Searches for a device and moves the view to its location
Clear Devices	Clears all devices from the view
Selected Device Info ¹	Opens the information window for the selected device
Selected Device Settings ¹	Opens the settings window for the selected device

1. Option only visible when a device is selected.

4.6.2 Global Device Settings

Device options can be configured individually per device through [Device Settings](#) or globally for all devices through the “Global Device Settings”.

The device configuration options supported by the system are as follows:

Option	Default	Description
Serial Numbers	All on	Toggle serial number display. Can be set to all devices, Tags only, or Anchors only
Device Resizing	Auto-Scale	Automatically resizes devices or allows manual adjustments of device size
Tag Time Until Gray	5 s	Time in seconds before a Tag turns gray after it's data is no longer received
Tag Time Until Remove	10 s	Time in seconds before a Tag is removed from display after turning gray
Tag Trails	2 s	Displays the Tag's path over a configurable time period in seconds
Tag Smoothing	1 packet	Number of tag position reports averaged for display
Quality Filter ²	0	Minimum accepted value for a position's quality; positions below this value are not displayed
Orientation Display	Off	Enables device rotation using quaternions and changes tag models to 3D arrows
Device Model	Default Model	Selects the 3D model used for the device
Color	Default	Sets the individual color for the device

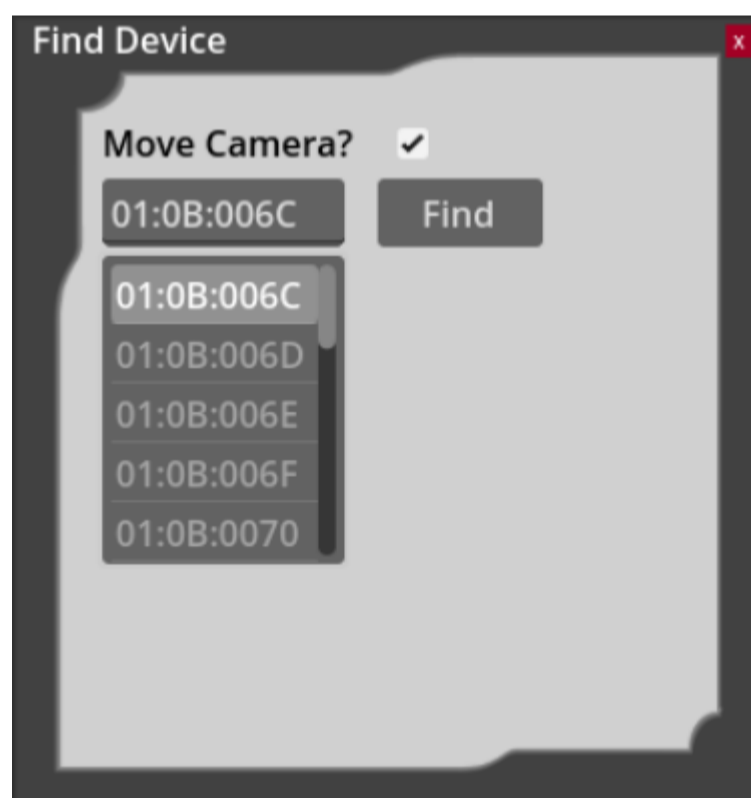
2. This value can only be set via the Global Device Settings window found in [Devices->Global Device Settings](#).

4.6.3 Device List



To view all devices in the Viewer, open the **Devices -> Device List** window. This window displays both Anchors and Tags, sorted by serial number. Selecting a device highlights it as if you clicked it directly and provides options to open its Info or Settings window. To show only currently active devices, enable the **Filter Inactive** option.

4.6.4 Find Device



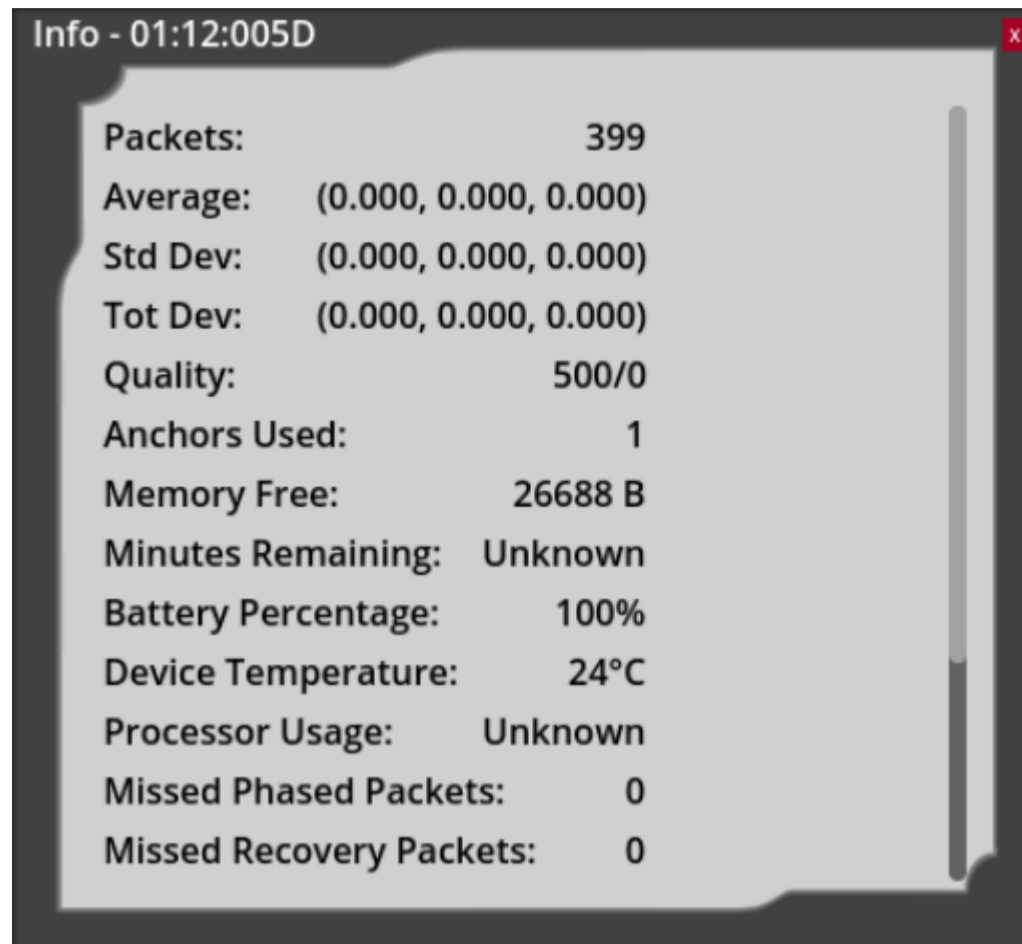
To locate a specific device in the Viewer, open the **Devices -> Find Device** window. Typing a serial number in the textbox will open a dropdown list of matching device serial numbers. When a valid serial number is entered, either by typing or selecting an option from the dropdown, click "Find" to highlight corresponding device as if it were clicked directly.

If the "Move Camera" option is enabled, clicking "Find" will also center the camera on the selected device.

4.6.5 Clear Devices

To remove all devices from the Viewer, select **Devices -> Clear Devices** option. This clears both active and inactive devices from the Viewer. Devices will reappear automatically once they are detected again.

4.6.6 Device Info



The screenshot shows a window titled "Info - 01:12:005D" with a list of device statistics. The statistics are as follows:

Packets:	399
Average:	(0.000, 0.000, 0.000)
Std Dev:	(0.000, 0.000, 0.000)
Tot Dev:	(0.000, 0.000, 0.000)
Quality:	500/0
Anchors Used:	1
Memory Free:	26688 B
Minutes Remaining:	Unknown
Battery Percentage:	100%
Device Temperature:	24°C
Processor Usage:	Unknown
Missed Phased Packets:	0
Missed Recovery Packets:	0

The device info panel provides detailed information for a selected device. Anchors and tags have different displayed settings in the info panels.

Tag Settings

Setting	Description
Packets	Count of received packets
Average	Average position of Tag in XYZ
Std Dev	Standard deviation of the Tag position in XYZ
Tot Dev	Total deviation of the Tag position in XYZ
Anchors Used	Count of Anchors used to resolve position calculation
Memory Free	Available memory on the Tag
Minutes Remaining	N/A
Battery Percentage	Percentage of battery available for use by the Tag
Device Temperature	Temperature in degrees Celsius
Processor Usage	N/A
Missed Phase Packets	Number of missed Command windows while in phase
Missed Recovery Packets	Number of missed Command windows while attempting to recover from being out of phase
Flags	See Flags
Quality	An assessment of the quality of the most recently calculated position
Accelerometer ³	Displays Accelerometer XYZ readings
Gyroscope ³	Displays Gyroscope XYZ readings
Magnetometer ³	Displays Magnetometer XYZ readings
Quaternion ³	Displays Quaternion WXYZ

3. Only available on supported hardware. See device datasheets for sensor support.

Anchor Settings

Setting	Description
Position	XYZ position of Anchor
Synchronization	Reports if Anchors have TX or RX sync
Connectivity	Reports if Anchors have UWB or Ethernet connectivity
Memory Free	Available memory on the tag
Minutes Remaining	N/A
Battery Percentage	N/A
Device Temperature	N/A
Processor Usage	N/A
Missed Phase Packets	N/A
Missed Recovery Packets	N/A
Flags	See Flags
Accelerometer ⁴	Displays Accelerometer XYZ readings
Gyroscope ⁴	Displays Gyroscope XYZ readings
Magnetometer ⁴	Displays Magnetometer XYZ readings
Quaternion ⁴	Displays Quaternion WXYZ

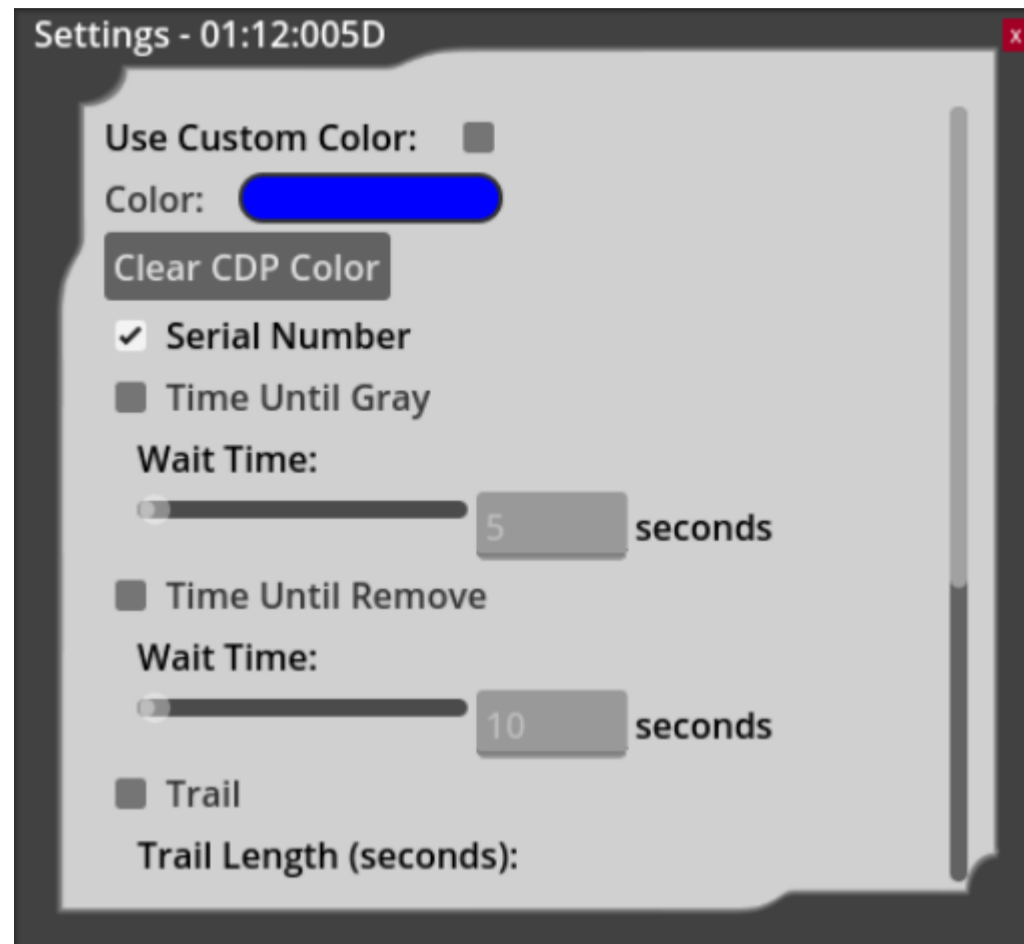
4. Only available on supported hardware. See device datasheets for sensor support.

Flags

The following flags are listed when selecting [View](#) on the Device Info panel for a Tag or an Anchor.

Flag Field	Description
Full Field	Provides the full field of the flag packet
Powered	Indicates if the device is receiving external power
Charging	Indicates if the device is charging its battery

4.6.7 Device Settings



Some of these settings are duplicated in the [Global Device Settings](#) options. Individual Device Settings take priority and will override the corresponding global setting when both are configured.

Option	Default	Description
Use Custom Color	Off	Check to use custom color for this device
Color	Blue	Select custom color from color picker
Serial Numbers	On	Toggle serial number display for this device
Trail	Off	Check to display Tag's historical path
Trail Length	2	Show tag path over configurable period in seconds
Smoothing	Off	Check to enable smoothing for this device
Smoothing (Packets)	1 packet	Set the number of Tag position reports to average for display
Size Scale	0.25	Scale the device model
Model	Default Model	Set the 3D model used by the device

4.7 Objects

The Viewer is a valuable tool for modeling physical environments, largely through the use of static 3D objects.

By default, tags are represented as spheres and anchors are cubes. The objects are colored via the **standard color scheme**.

4.7.1 Objects Menu

Submenu	Description
Import Object	Import primitive 3D objects, images ⁵ , or custom 3D models ⁶
Object List	View list of imported objects and open their properties window
Delete Selected Object ⁷	Delete the currently selected object
Selected Object Properties ⁷	Opens selected object's properties window

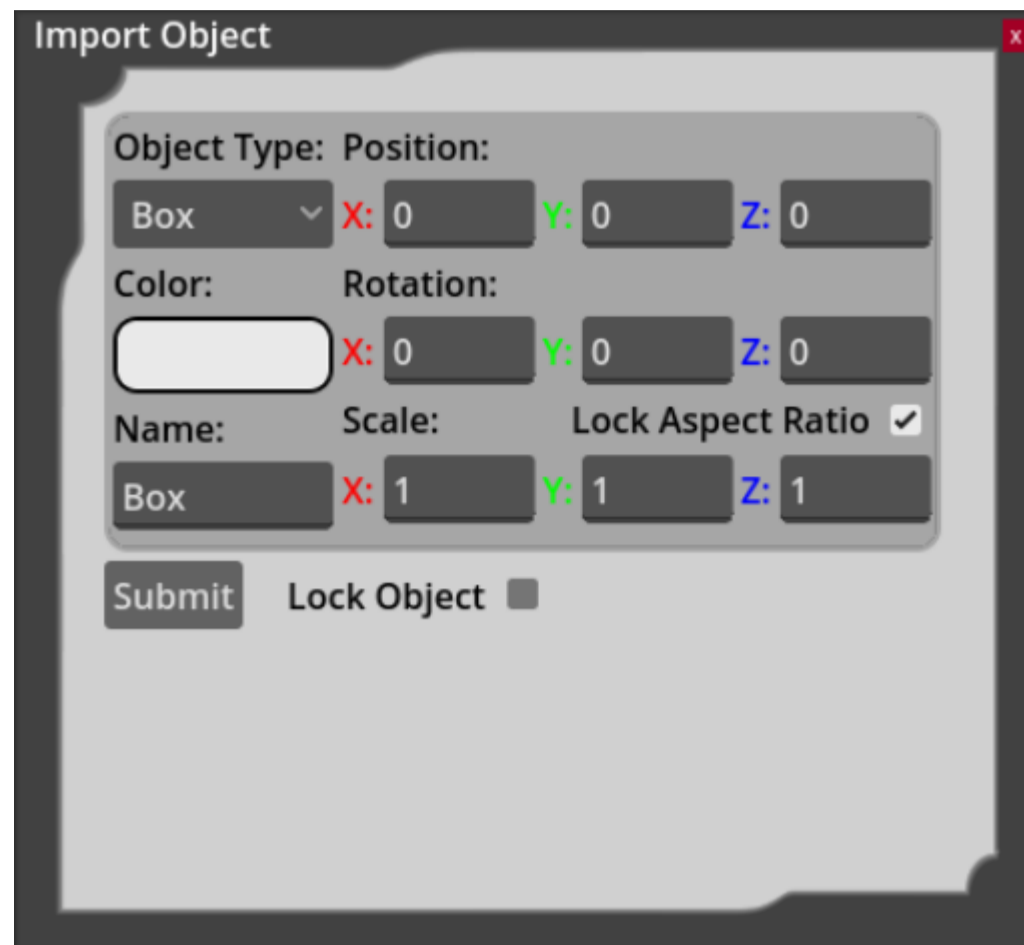
5. Supports .JPG, .PNG, .BMP, .SVG, .WEBP, .TGA, .HDR, .EXR, .KTX, and .DDS

6. Supports .GLTF and .GLB

7. Option only visible when an object is selected.

4.7.2 Creating Objects

Objects can be added to the Viewer via the **Objects -> Import Object** window. Imported objects are saved and loaded as part of your configuration. A variety of object types are supported, including primitive 3D shapes (such as cubes, spheres, and cones), as well as images and custom 3D models.



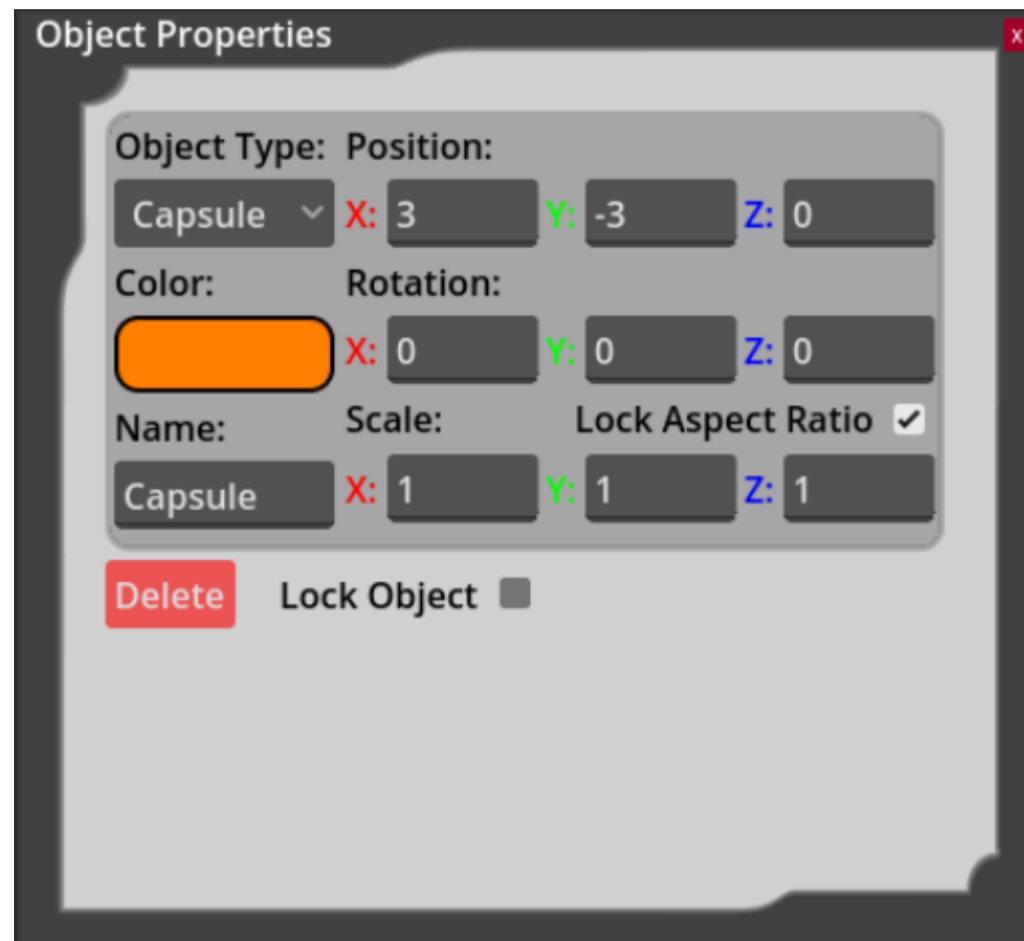
All objects have a corresponding type, color, position, rotation, scale, and name that determine their look in the 3D scene. These values can be changed, which will update the transparent preview of the specified object in the 3D view:

- **Object Type** - Box, sphere, cylinder, cone, capsule, prism, torus, image or custom
- **Position** - Define the X,Y, and Z position for the object
- **Color** - Brings up color selection menu and color picker
- **Rotation** - Define the X,Y, and Z rotation for the object
- **Name** - Give the object a name, helpful if using repeated objects
- **Scale** - Scale the object in X,Y, or Z
- **Lock Aspect Ratio** - Ensures that changing one axis of the scale values updates the rest of the values proportionally
- **Lock Object** - Prevents an object from being selected with the mouse or changed once it is created, until that object is unlocked

Once the object's settings have been specified, press the "Submit" button to create the object.

4.7.3 Object Properties

Once created, an unlocked object can be selected with the mouse to open its Properties window. This window can also be accessed from the **Objects -> Selected Object Properties** menu.

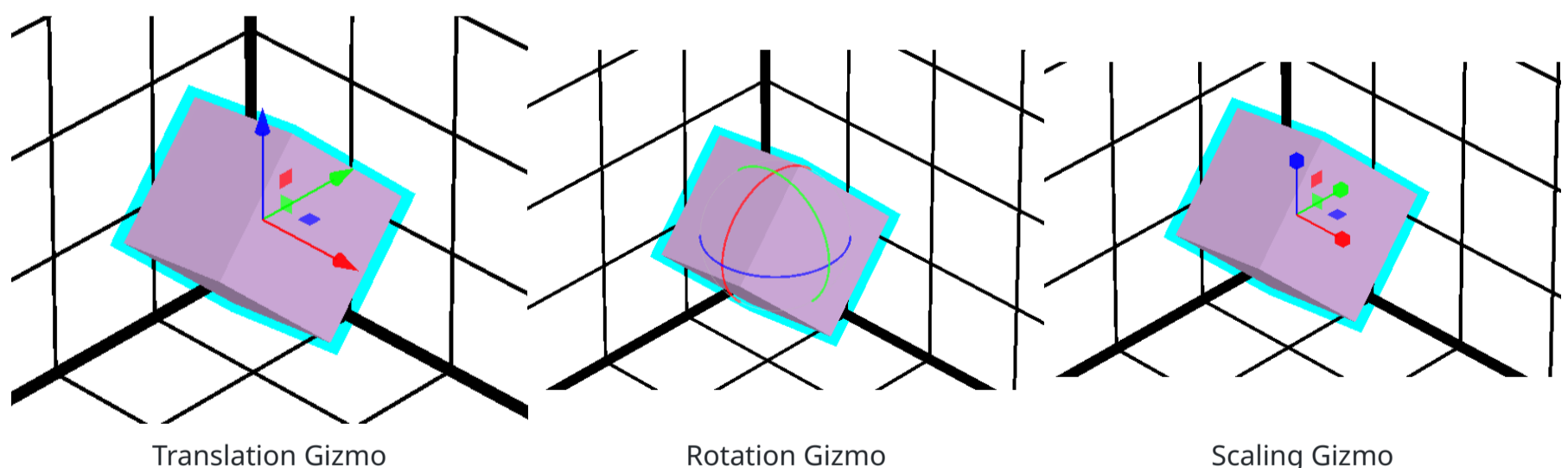


Changing these values will update the already created object. A “Delete” button is available to remove this selected object from the CUWB Viewer.

If an object is locked, it must be selected from the **Object List** to access its Properties window. This is the only way to unlock a locked object.

Object Gizmo

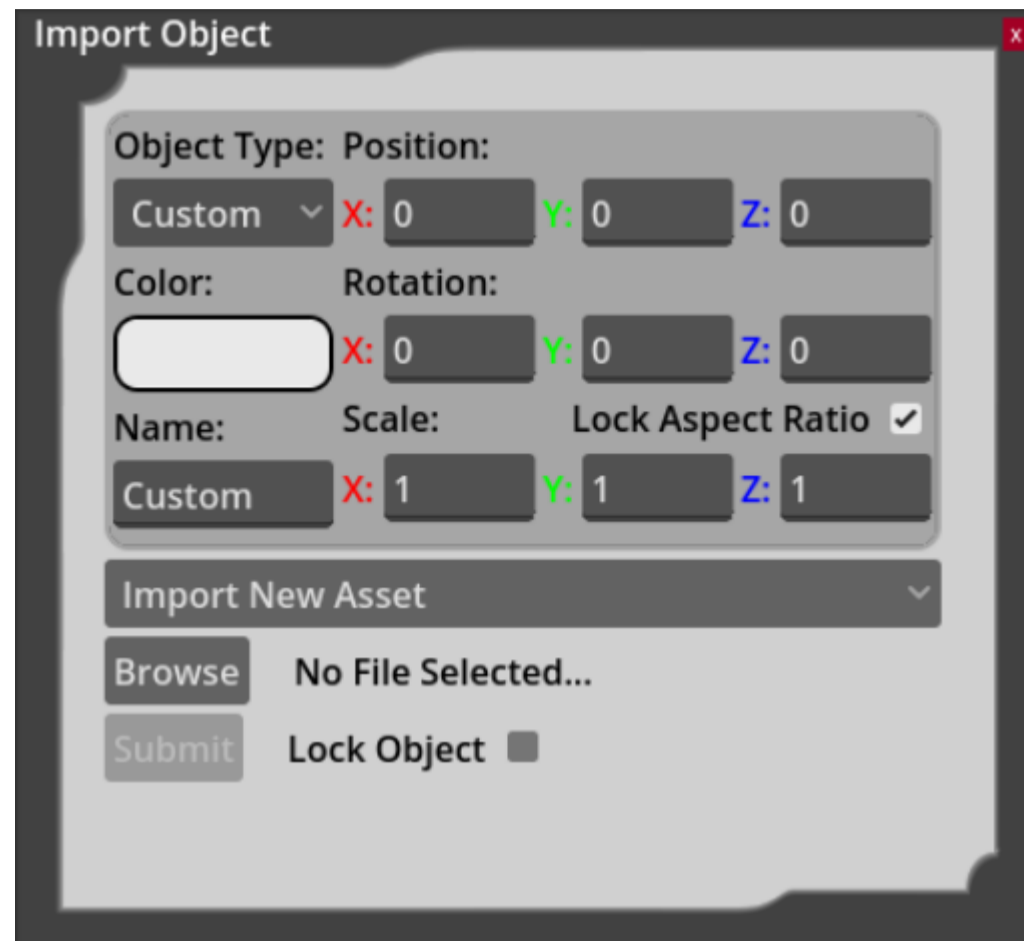
The Object Gizmo provides tools for translating, rotating, and scaling objects within the scene. When an object is selected with the mouse, the Object Gizmo appears and reflects the currently active tool.



To switch between tools, press the **T** for translation, **R** for rotation, and **S** for scaling. Clicking and dragging the red, green, or blue components of the Object Gizmo applies the corresponding operation along the X, Y, or Z axis. Holding the **Ctrl** key while dragging the mouse snaps the operation to whole number increments. See **Object Shortcuts** for additional keyboard shortcuts.

4.7.4 Custom Objects

When creating an image or custom object, an associated asset must be imported for that object.

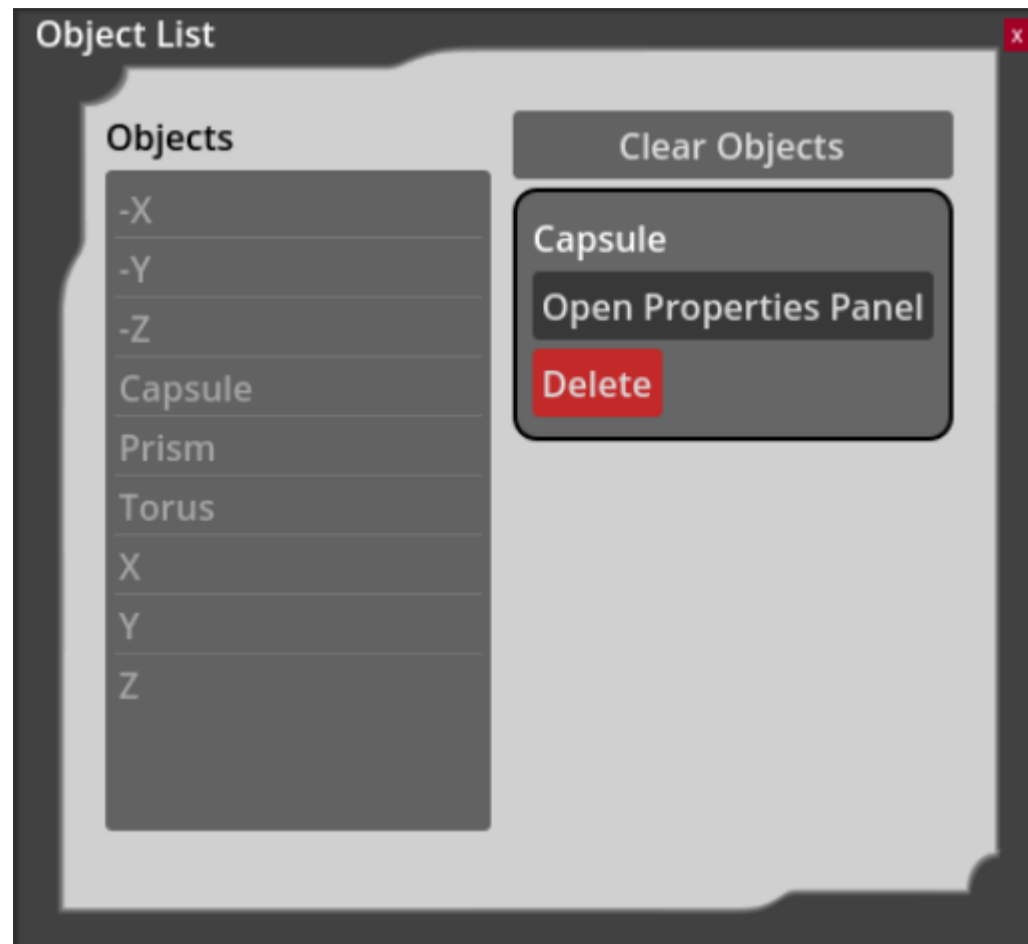


When selecting a custom object type, a dropdown list appears showing all previously imported assets of that type. These can be selected to reuse existing assets. If the “Import New Asset” option is selected, a “Browse” button appears allowing you to open a system file dialog and select the corresponding asset. Imported assets are saved as part of the Viewer configuration.

Custom assets that are large or complex may take longer to load and can reduce Viewer performance.

Custom 3D models can also be used in place of the anchor’s cube or the tag’s sphere. See [Device Model](#) under [Device Options](#).

4.7.5 Object List



To view all objects, open the **Objects -> Object List** window. This window displays all objects currently in the scene. Selecting an object from the list highlights the object as if clicked on with the mouse, and enables options to open its Properties window or deleting it. The object list also includes a "Clear Objects" button, which will delete all of the objects in the scene. Deleting or clearing objects cannot be undone unless the Viewer configuration is saved and not overwritten.

4.8 Help & Other Resources

4.8.1 Help Menu Options

Submenu	Description
Keyboard Shortcuts	View the keyboard shortcuts
Color Legend	View the color legend for the devices
Viewer Help	Open the documentation page
About CUWB Viewer	Display Viewer information
External Licenses	3rd-party software Licensing information

4.8.2 Color Legend

This menu option opens up the configured standard color and heatmap mode colors. See [Color Modes](#) for the available color mode options.

4.8.3 Mouse Controls

While not a menu option, this section outlines the available mouse controls for the CUWB Viewer.

Drag View

The camera view may be adjusted using the middle or right mouse button. Holding either button and dragging the mouse moves the view in the same direction as the drag.

Rotate View

To rotate the view, hold shift while dragging the mouse with the middle or right mouse button held. When the Shift is pressed, a sphere appears indicating the point of rotation, which is selected relative to the current cursor location. If no object is under the mouse, the rotation point is set to the center of the visible grid. If the grid center is not visible, the rotation point defaults to the center of the screen.

Zoom View

To zoom in and out, scroll the mouse wheel.

Device/Object Selection

The left mouse button is used to select devices or objects. Once selected, they can be configured through the [Selected Device Settings](#) or [Selected Object Properties](#) windows, or by pressing 'C'. To view current statistics for a device, choose the [Selected Device Info](#) or press 'I' on the keyboard while the device is selected.

Selected devices and objects are highlighted in cyan, and any associated a serial number or name is displayed in magenta.

4.8.4 Keyboard Controls

Camera Shortcuts

Description	Keyboard
Switch Camera Perspective	-
Zoom to Fit	=
Go to Camera Position 0-9	0-9
Set Camera Position 0-9	Ctrl+0-9
Pan Down	Down
Pan Left	Left
Pan Right	Right
Pan Up	Up
Roll Left	Ctrl+Left
Roll Right	Ctrl+Right
Rotate Down	Shift+Down
Rotate Left	Shift+Left
Rotate Right	Shift+Right
Rotate Up	Shift+Up
Zoom In	Ctrl+Up
Zoom Out	Ctrl+Down
Open Camera Defaults Window	Ctrl+C

General Shortcuts

Description	Keyboard
Close Window/Toggle Navbar Visibility	Esc
Pause/Resume	Space
Show/Hide Message Window	M
Save Configuration	Ctrl+S
Save Configuration As	Ctrl+Shift+S
Load Configuration	Ctrl+L
Open User Preferences Window	Ctrl+U
Open Configure Grid Window	Ctrl+G
Open UWB Heatmap Mode Window	Ctrl+V
Open Viewer Documentation	F1
Open About Window	F2
Open Keyboard Shortcuts Window	Ctrl+K
Open Color Legend Window	Ctrl+J

Network Shortcuts

Description	Keyboard
Open Network Settings Window	Ctrl+N
Open CUWBNet Selection Window	Ctrl+B

Device Shortcuts

Description	Keyboard
Open Global Device Settings Window	Ctrl+T
Open Selected Device Info Window	I
Open Selected Device Setting Window	C
Open Device List Window	Ctrl+D
Open Find Device Window	/
Clear Devices	Ctrl+Esc

Object Shortcuts

Description	Keyboard
Open Selected Object Properties Window	C
Open Import Object Window	Ctrl+O
Open Object List Window	Ctrl+Q
Snap Object Gizmo	Ctrl
Switch to Translation Tool	T
Switch to Rotation Tool	R
Switch to Scale Tool	S
Delete Selected Object	Delete

Measurement Shortcuts

Description	Keyboard
Toggle Measurement Mode	Ctrl+M
Delete Selected Measurement	Delete
Clear All Measurements	Ctrl+Delete



5 Log Playback

To use the CUWB Viewer with CDP Log Playback, first setup the [CDP Log Playback](#).

Then, set the CUWB Viewer to listen to the CDP Player IP address and port in the [Network Settings](#).

The log playback does not support using CUWBNet selection window to locate the playback stream.

Play the stream from the CDP player, and the data will populate the CUWB Viewer as if it were a live network.

6 Revision

Version	Date	Change Description
5.0.2	2026-05-01	Minor edits for reader clarity, updating images
5.0.1	2025-11-14	Updating Host PC requirements
5.0.0	2025-10-31	Initial Preliminary Release

7 APPENDIX A : License Terms and Conditions

1 General Terms and Conditions of Purchase/Service

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“End-User” means the person or entity that receives and uses Ciholas services and/or products.

“Firmware” means a code segment compiled into binary machine code that is embedded inside a device.

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In addition to export regulations, the United States and other countries have laws and regulations governing the use of radio frequency (RF) devices. In the United States, such regulation is under Title III of the Communications Act of 1934, as amended, and regulated by the Federal Communications Commission (FCC). The FCC oversees all non-Federal uses of the radio frequency spectrum, while other regulatory bodies oversee RF devices in other countries' jurisdictions. You agree that you will only use Ciholas products in the jurisdiction for which they were certified and will not exceed the products' operational and use limitations as stated in the product manual. All Ciholas products are labeled as to their specific jurisdictional certification in accordance with the laws of that jurisdiction.

7.5 Governing Law

This Agreement will be governed by the laws of the State of Indiana, USA. Parties agree to attempt, in good faith, to resolve and settle any dispute arising out of this Agreement through negotiation between officially authorized representatives of each party. If the dispute is not resolved through negotiation, any litigation arising from the use of Ciholas services and/or products must be brought and resolved in the State of Indiana, USA.

8 60-Day Money-Back Guarantee

All standard Ciholas products not covered by another agreement have a 60-day Money-Back Guarantee. If for any reason the performance of any product is not acceptable, the product may be returned to Ciholas for a refund. Please note: bulk orders are not eligible for the money-back guarantee and cannot be canceled once the order is processed.

Shipping costs and any taxes and/or duties are not refundable and there is a 20% restocking fee for all returns under this policy. To be eligible for a refund, a customer must include an RMA# (see our return process) and dated proof of purchase with the item for return. The cost of the return shipment, including all taxes and duties, is at the buyer's expense. Any product returned not in resalable condition will not be refunded.

9 Limited Warranty

Ciholas warrants that all Ciholas manufactured products, excluding software, will be free from any defect in materials or workmanship for a period of one year. Warranty begins on the date that an item is shipped from Ciholas to the buyer. The warranty is non-transferable and is extended only to the original buyers of this product when the product is used for the purpose for which it was intended. The one-year warranty covers only defects arising under normal use and does not include malfunctions or failures resulting from misuse, abuse, neglect, alteration, improper installation, acts of nature, tampering, or any repairs attempted by anyone other than Ciholas. During the one-year warranty period, the customer's sole and exclusive remedy will be, at Ciholas' sole discretion, the repair or replacement of the defective product, or refund of the purchase amount of the product. Ciholas reserves the right to substitute functionally equivalent new or serviceable used parts.

To be entitled to the rights provided by the one-year warranty, the customer must do the following:

1. Contact Ciholas Technical Support at returns@ciholas.com or 1-844-595-TECH (8324).
2. Provide in email/phone call, all model number(s), serial number(s), and proof of purchase for all items affected.
3. If return/exchange is necessary, customer will be given a Returned Material Authorization (RMA) # to include with their return.
4. The customer must then ship the item(s), at their expense (including all duties and taxes), to the address provided in the RMA authorization.
5. Once a product arrives at Ciholas, return shipment of repaired or replaced product(s) or a refund will be sent to the customer. The method of return shipment is at Ciholas' discretion and expense, except for applicable duties and taxes, which are the responsibility of the buyer.

9.1 Product Warranty Exclusions

Ciholas does not warrant or guarantee, and is not responsible for the following:

1. Defects, failures, damages, or performance limitations caused in whole or in part by: (A) power failures and surges; fires; floods; acts of nature; excessive temperatures; corrosive environments; accidents; actions by third parties; or

- other events outside of Ciholas' control; or (B) customer abuse; mishandling; misuse; negligence; improper storage, servicing, installation, or operation; or unauthorized attempts to repair or alter equipment in any way.
2. Performance of the equipment when used in combination with equipment not purchased, specified, or approved by Ciholas.
 3. Consumable goods used with, or required by, Ciholas products.
 4. Alterations and/or modifications to any Ciholas equipment without Ciholas' written authorization. Such action unconditionally VOIDS the Ciholas Agreement and Warranty.
 5. Installation of any software code, other than that provided and licensed by Ciholas. Any such installation onto any Ciholas product voids the one-year warranty, unless a written exemption is provided to the customer by Ciholas.

9.2 Disclaimer of Warranty

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The PII we collect could include the following:

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Credentials – Passwords and similar security information used for authentication and account access.

Payment Data – All payment data collected through the website is by a third-party payment processor (TPPP). Ciholas DOES NOT have access to any of the payment information that you provide to the TPPP. None of the TPPPs use any of your data for anything other than processing your payment and have their own privacy policies, which are as strict as or stricter than, those contained in this privacy policy. Ciholas and all Ciholas TPPPs use SSL/TLS encryption for securing data. All Ciholas TPPPs are PCI DSS compliant for payment processing standards.

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We use your PII for the purposes listed above and to keep our site safe and secure (for example fraud monitoring and prevention) and to enforce our terms, conditions, and policies for our legitimate business purposes.

We may disclose your information where we are legally required to do so to comply with applicable law, judicial proceedings, court order, or legal process, such as in response to a court order or a subpoena.

We will not share, sell, rent, or trade any of your PII with any third parties.

10.3 Duration of PII Storage

We keep your information for only as long as necessary to fulfill the purposes outlined in this privacy policy unless otherwise required by law.

10.4 Keeping PII Safe

We have implemented appropriate technical and organizational security measures designed to protect the security of any personal information we process. However, given that the internet is not 100% secure, transmission of personal information to and from our sites is at your own risk. Only access our services, products, and sites within a secure environment.

10.5 Unique Privacy Rights

Based on the laws of some countries and states, you may have the right to request access to the PII we collect from you, change that information, or delete it in some circumstances. For more information on how to do that, please contact Ciholas at info@ciholas.com.

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These Terms of Service were last modified on 2025-11-11.

[End of Agreement]

8 APPENDIX B : Software License Attributions

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Gizmo3D

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Godot

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5 SharpGLTF

SharpGLTF

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6 TrailRenderer

TrailRenderer
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8 Newtonsoft.JSON

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