



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:** 64-bit, 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/v5.0/assets/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 -l | grep <package_name>` on the Host PC for the following packages to check if they are installed.

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

For instructions on how to obtain the DEB package, see [Current Downloads Available](#) for Software Packages. After downloading the package, transfer the DEB to a USB drive or other transfer method to the Host PC. After transferring the file, navigate to the file location, and type the command below into a terminal window to install the package:

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

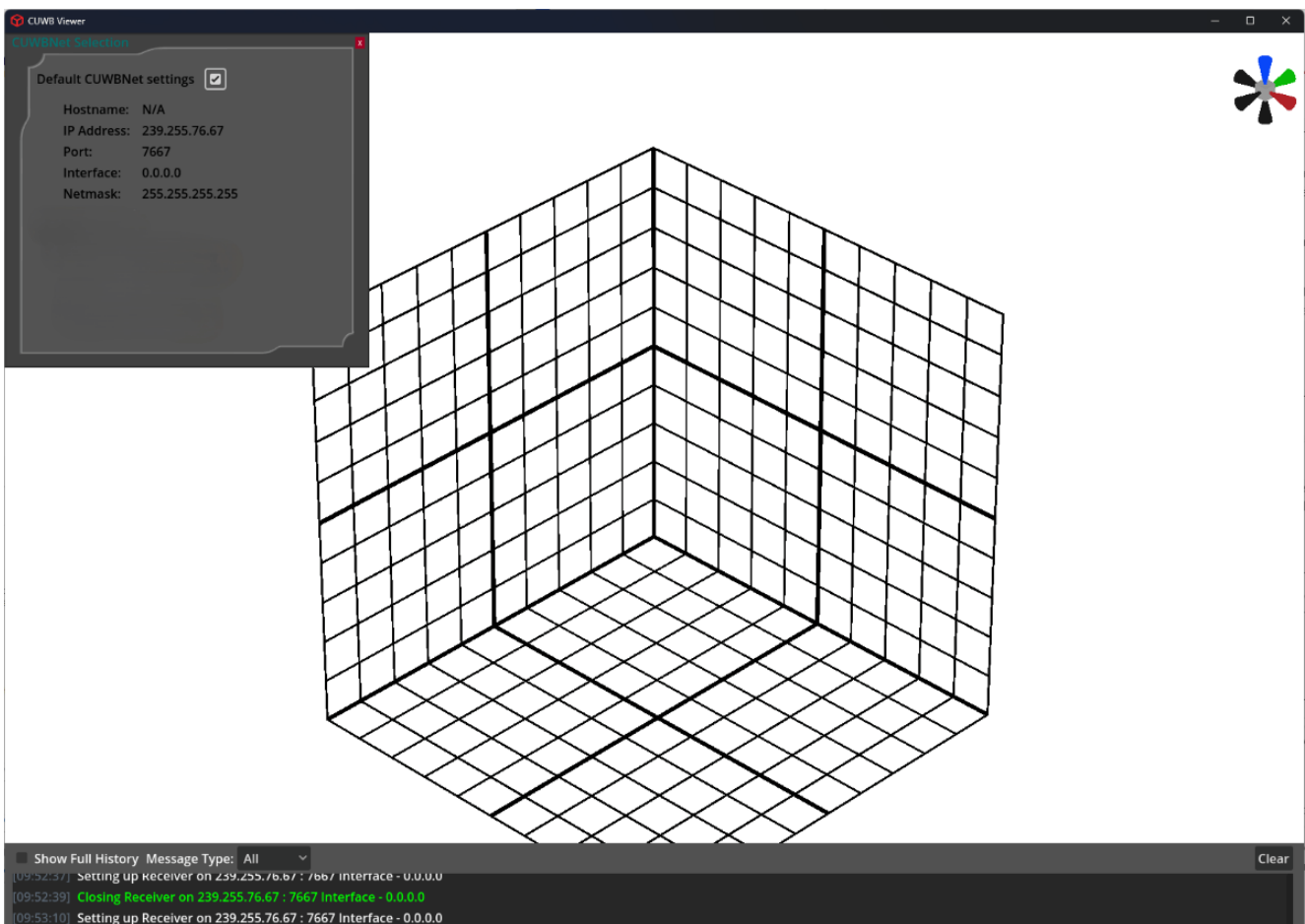
3 Getting Started

3.1 Launch CUWB Viewer

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

```
cuwb-viewer
```

After the initial boot animation, the user will be presented with a blank screen showing 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 Viewer, no viewer configuration file will be loaded. A CUWBNet selection tool will pop up populated with all available CUWBNetS that are detected by the Viewer. By default, the Viewer will listen on the CUWB 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.

Select an available CUWBNet and close the window. Upon reception of **CDP data** from a CUWBNet, the grid will grow and form around the representations of the system 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. By default, the box will only appear 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. See [Camera Defaults](#) for instructions on changing the default views or adding other custom views. The [Camera Gizmo](#) can also be used for 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 grows to fit all current devices, and will shrink as devices move and 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 to report data. How those devices are shown in the Viewer can be configured via the global or individual device settings, see [Device Options](#).

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, largely through the use of static 3D objects. See [Objects](#) for information on object creation, properties and custom objects.

4 CUWB Viewer Walkthrough

4.1 Message Window

Along the bottom of the CUWB Viewer is a message window. The message window provides the user with state changes, i.e. New Devices Appearing or CUWBNetS going offline. By default, the box will only appear when a message is posted. This 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 hand corner of the viewer screen. The camera gizmo provides a simple interface to visualize the camera's orientation as well as move and rotate the camera to face a specific axis. The camera gizmo visually shows the camera's position and rotation relative to the scene, updating as the camera is adjusted. The axis cones are colored matching what they represent, with the X axis being red, the Y axis being green, the Z axis being blue, and all the negative axes being black. Moving the mouse over one of the coned axes will highlight it yellow, and left-clicking on it will adjust the camera's position to be parallel to the selected axis, rotated to the nearest 90 degrees.

4.3 Configurations

A configuration to quickly save and reload settings, objects, images, and devices can be generated through the File menu below. Configurations can either be saved over the default configuration or as a new configuration file.

4.3.1 File Menu Options

Submenu	Description
Save Configuration	Save the current configuration, overwriting the default configuration file
Save Configuration As...	Open file browser to save the current configuration
Load Configuration	Open file browser to select 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



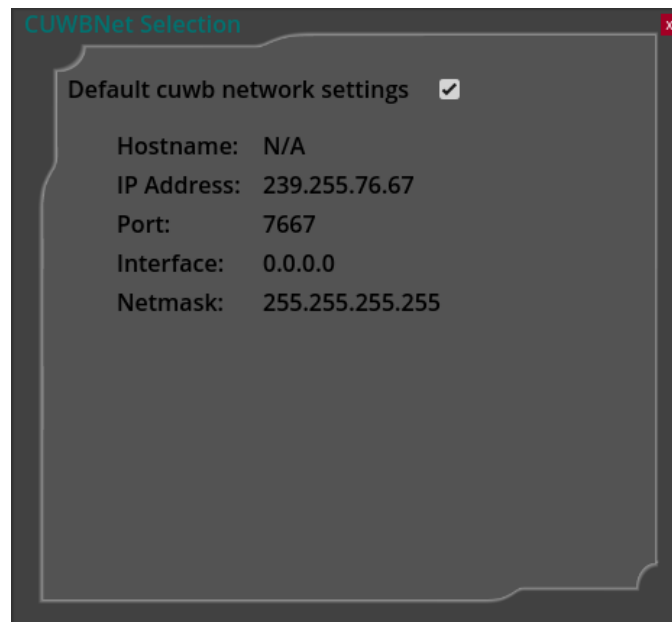
Network connection settings can be modified through this window if the user doesn’t want to use CUWBNet selection. The CUWB Viewer can support more than one UDP Receiver.

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

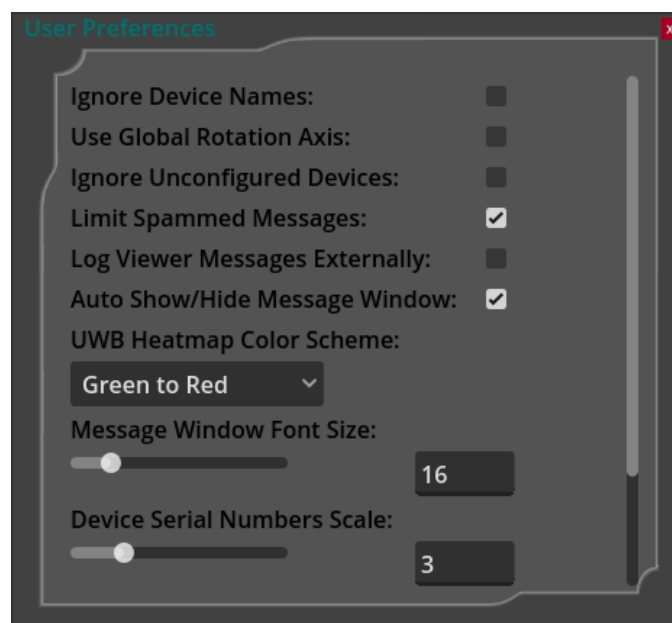
A CUWBNet selection tool window will pop-up populated with all available CUWBNetS that are detected by the Viewer when the viewer is launched. More than one CUWBNet can be selected.



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 to receive **CDP data** from a CUWBNet, the grid will grow and form around the representations of the system tags and anchors.

4.4.4 User Preferences



The Viewer provides several settings that can be changed on a per-user basis, separate from the currently used configuration.

Setting	Default	Description
Ignore Device Names	Off	When toggled the Viewer will ignore any names set by the CUWB Manager, instead always only showing a device's serial number.
Use Global Rotation Axis	Off	When toggled, rotating the camera left or right will be around the nearest global "up" vector, rather than the "up" vector of the camera. The untoggled rotation is more similar to what is used in most CAD software.
Ignore Unconfigured Devices	Off	When toggled, all data received from devices that are designated as unconfigured by the CUWB Manager will be completely ignored.
Limit Spammed Messages	On	When toggled, internal Viewer messages that are sent frequently will be limited to a single message at a time in the format "(x) Message Contents" where x is the number of messages that were not printed.
Log Viewer Messages Externally	Off	When toggled, all messages printed to the message window in the Viewer will also be logged with any other Viewer log messages.
Auto-Hide Message Window	On	When toggled, the message window will automatically hide itself after 15 seconds of inactivity and will reappear when a new message is printed. If untoggled, the message Window will only be shown or hidden when the keybind is pressed.
UWB Heatmap Color Scheme	Green to Red	Coloring option used by UWB Heatmap Mode. Features "Green to Red", "Thermal", and "Blue Monochrome", see Heatmap Mode .
Message Window Font Size	16	Adjustable value used for the size of text inside of the message window. Accepts values between 1 and 100.
Device Serial Numbers Scale	3	Adjustable value used for the size of the device's serial number labels. Accepts values between 1 and 10.
Max Framerate	60	Target framerate of the Viewer. The Viewer will match this as close as possible. Accepts values between 0 and 500, with 0 representing no maximum (i.e. always targeting the fastest possible framerate).

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

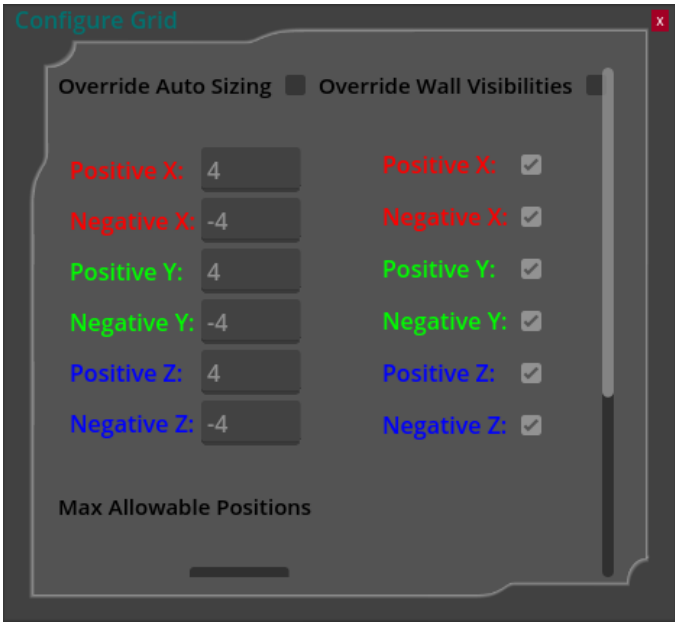
4.5 View Options

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 set UWB Heatmap mode active
Toggle Measurement Mode	Enables/disables 3D measurement mode
Clear Measurements	Deletes all 3D measurements
Pause/Play	Pauses/Resumes CDP traffic

4.5.2 Grid Configuration

The default Viewer setup features a 10m x 10m x 10m cube with gridlines at each meter. This grid automatically grows to fit all current devices, and will shrink as devices move and stop reporting data.



Override Auto Sizing

The default Viewer setup features a 10m x 10m x 10m cube with gridlines at each meter. This grid automatically grows to fit all current devices, and will shrink as devices move and stop reporting data. This behavior can be overridden by toggling **Override Auto Sizing**. The position of each grid wall can then be manually configured by adjusting the values in the below text boxes.

Toggling off 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 toggling **Override Wall Visibilities** and then unchecking the box of the corresponding wall to make it invisible.

Toggling off 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. Maximums and minimums can be set for each axis in the text boxes below “Max Allowable Positions”, such that if a device exceeds any of those the position will be ignored and a warning will be printed in the message window.

4.5.3 Camera Defaults

The default view used when booting up can be changed in **View -> Camera Defaults**. A radio button under “Default” is used to toggle which camera view is the default (positions 0 through 9). An additional checkbox is next to each camera position under “Perspective” for toggling whether a camera view is perspective or orthographic.



The default camera positions can also be overridden by saving the current camera position. Pressing the “Ctrl” key and a number key (0 through 9) will save the current camera settings to the position of that number. Pressing the corresponding number key will return the camera to the saved settings. The saved camera positions can be reset to their defaults from the **View -> Camera Defaults** window by pressing the “Reset” button next to the position, which is only present once a new value 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**. While in Measurement Mode, a ruler icon will be visible in the top right of the view. Once the mode is enabled, select two devices or objects with the left mouse button to draw a red, three dimensional line between them that displays their distance in meters.

To return to normal selection, disable Measurement Mode via **View -> Toggle Measurement Mode**. The ruler icon should disappear, and the left mouse button will return to selecting devices or objects. Created measurement lines can be selected with the left mouse button, turning a brighter shade of red, and then deleted with the "Delete" key. Pressing **View -> Clear Measurements** will delete all of the current measurements.

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 a running CUWBNet, devices will appear in the 3D scene as they begin to report data. How those devices are shown in the Viewer can be configured via the global or individual device settings, see [Device Options](#).

4.6.1 Devices Menu Options

Submenu	Description
Global Device Settings	Configurable settings for all devices, see Device Options
Device List	View list of all anchors and tags and open their info or settings windows
Find Device	Search for, and move to, a device
Clear Devices	Clears all devices from the view
Selected Device Info ¹	Opens selected device's info window
Selected Device Settings ¹	Opens selected device's settings window

1. Option only visible when a device is selected.

4.6.2 Global Device Settings

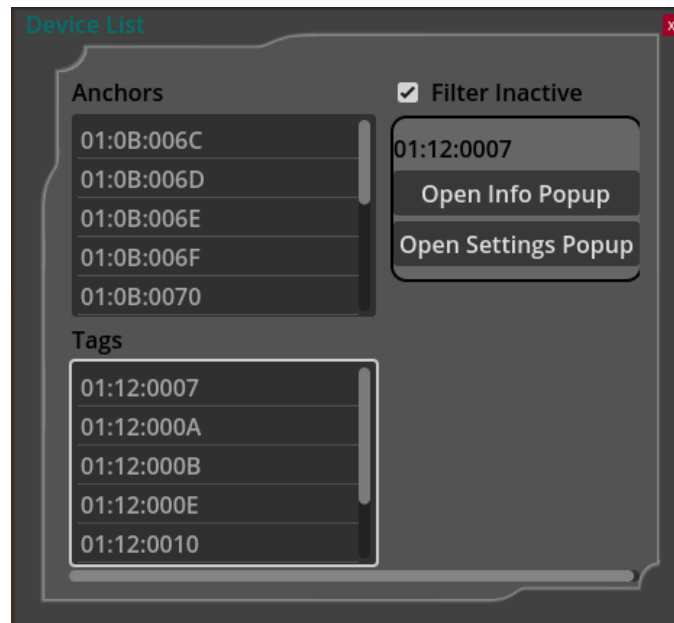
Device options can be configured individually per device through "Selected Device Settings" or globally for all devices through the "Global Device Settings".

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

Option	Default	Description
Serial Numbers	All on	Toggle serial number display. Selectable between all devices, just tags or just anchors
Device Resizing	Auto-Scale	Auto-resize devices or manually change the size of devices
Tag Time Until Gray	5 s	Time it takes for tag to turn gray after not receiving data in seconds
Tag Time Until Remove	10 s	Time it takes for tag to be removed after turning gray in seconds
Tag Trails	2 s	Show tag path over configurable period in seconds
Tag Smoothing	1 packet	Set the number of tag position reports to average for display
Quality Filter ²	0	Set a minimum accepted value for a position's quality. Any position with a quality below this value will not be displayed.
Orientation Display	Off	Enables rotation of devices via their quaternions and changes tag models to 3D arrows
Device Model	Default Model	Set the 3D model used by the device
Color	Default	Set individual coloring for device

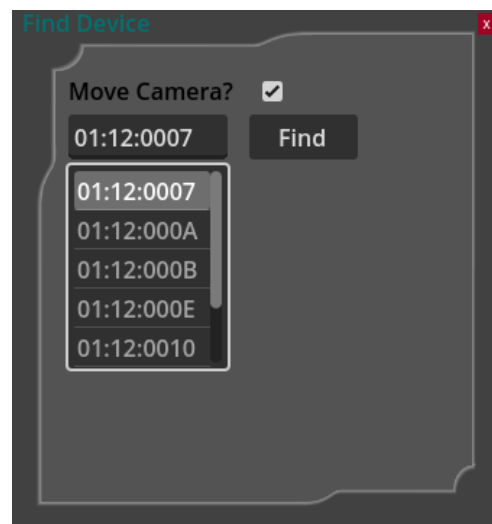
2. This value can only be set via the Global Device Settings window found in Devices->Global Device Settings.

4.6.3 Device List



To see a list of all the devices in the Viewer, open the **Devices -> Device List** window. This window shows a list of Anchors and a list of Tags, sorted by serial number. Selecting an item from either list highlights the device as if clicked on and provides buttons to open the device's info window or settings window. To only see currently active devices in the list, ensure the "Filter Inactive" option is toggled.

4.6.4 Find Device



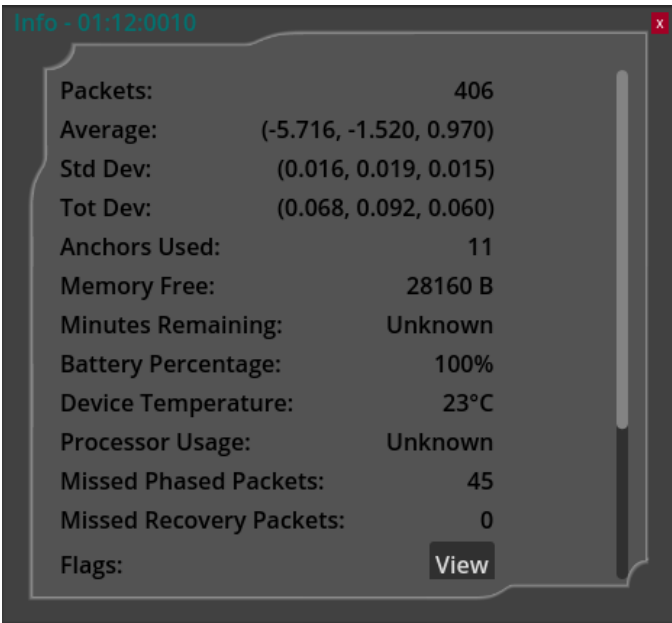
To find a specific device in the Viewer, open the **Devices -> Find Device** window. Typing a serial number in the textbox will open a dropdown list of matching device serial numbers. When a valid serial number is entered, either by typing or selecting an option from the dropdown, pressing the "Find" button highlights the device with the corresponding serial number as if it was clicked on.

If the "Move Camera" option is toggled, pressing "Find" will also move the camera to be centered on the device.

4.6.5 Clear Devices

To remove all of the devices currently in the Viewer, use the **Devices -> Clear Devices** option. This removes all devices from the view, active and inactive, until they are heard from again.

4.6.6 Device Info



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 has 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

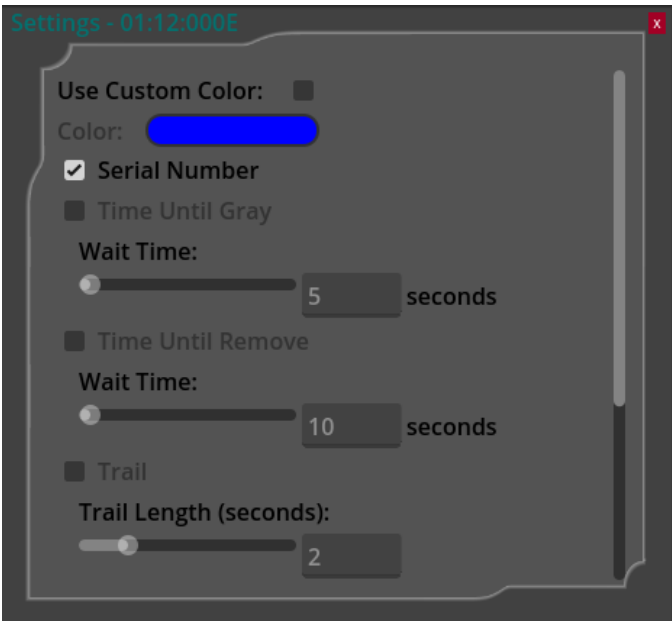
4. Only available on supported hardware. See device datasheets for sensor support.

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 will override the global setting.

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 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

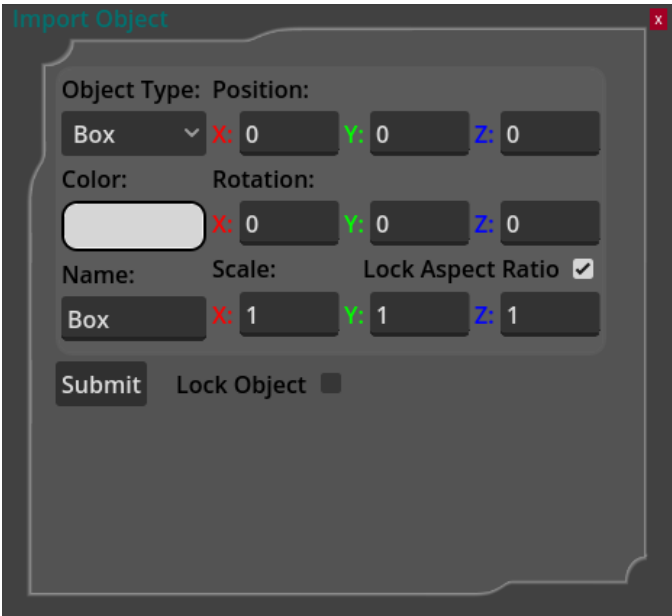
5. Supports .JPG, .PNG, .BMP, .SVG, .WEBP, .TGA, .HDR, .EXR, .KTX, and .DDS

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, and will be saved and loaded as part of your configuration. Many primitive 3D shapes are available as object types, such as cubes, spheres, and cones, as well as images or custom 3D models.



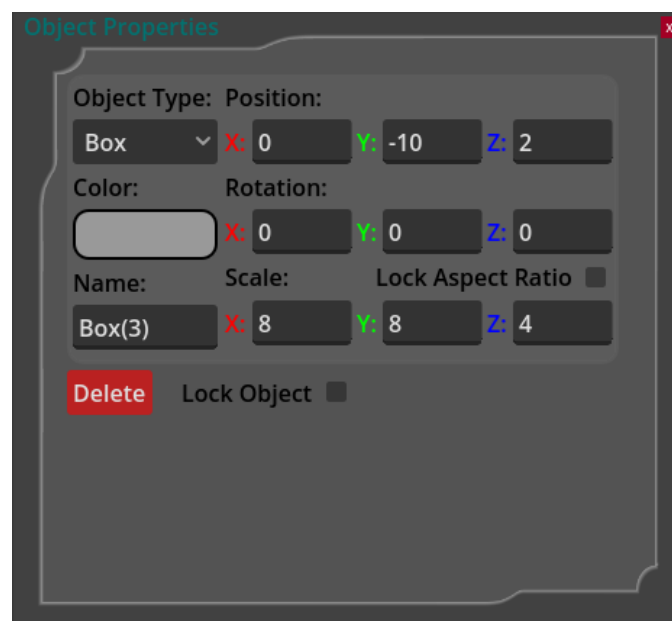
All objects have a corresponding type, color, position, rotation, scale, and name that determine their look in the 3D scene. These values can be changed, which will update the transparent preview of the specified object in the 3D view:

- **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 it has been created, an unlocked object can be selected with the mouse to open its properties window. This window is also accessible under **Objects -> Selected Object Properties** menu.

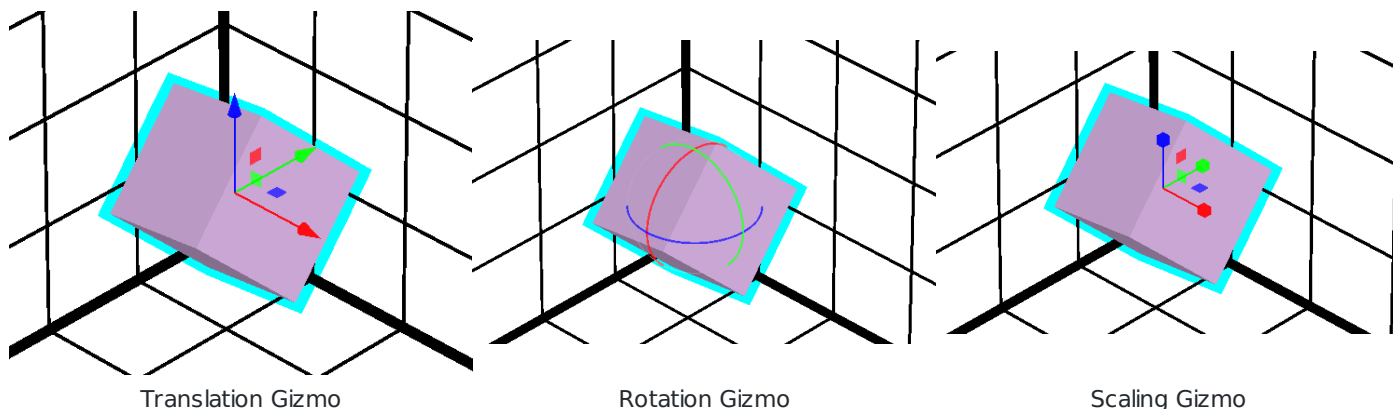


Changing these values will update the already created object. A "Delete" button is available to remove this selected object from the CUWB Viewer.

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

Object Gizmo

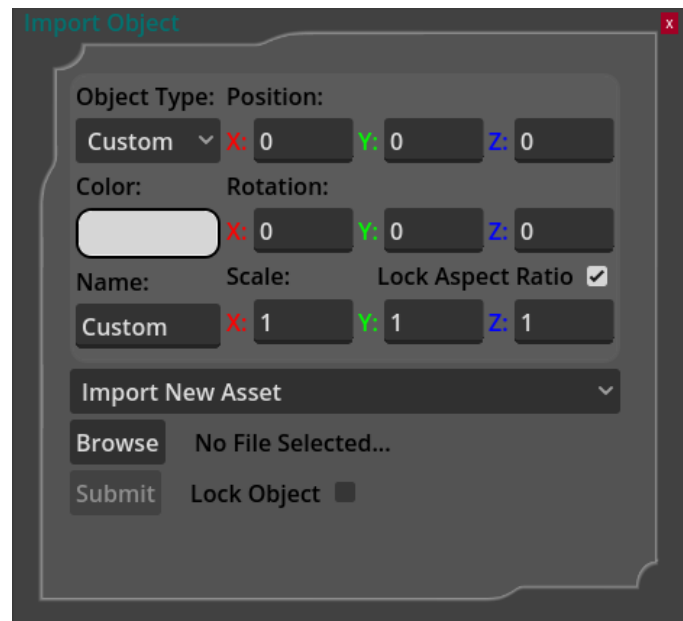
The object gizmo provides tools for translating, rotating, and scaling objects that are in the scene. Selecting an object with the mouse will show the object gizmo as well, which will reflect the current tool being used.



To swap between tools, press the T, R, and S keys for translation, rotation, and scaling respectively. Clicking and dragging on the red, green, or blue components of the object gizmo will apply the appropriate operation to the object in the X, Y, or Z axis. Holding the Ctrl key while dragging the mouse will snap the desired operation to round number increments. See [Object Shortcuts](#) for additional keyboard shortcuts.

4.7.4 Custom Objects

When creating an image or custom object, an asset will need to be imported corresponding to that object.

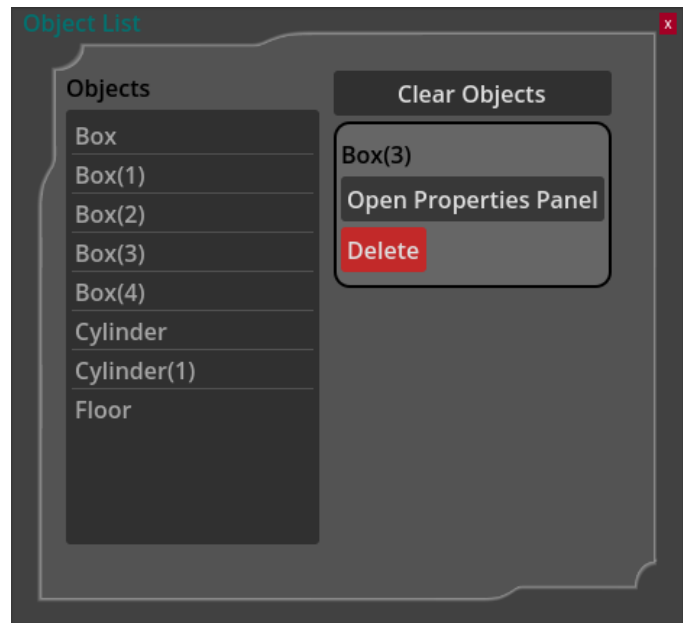


When selecting a custom object type, a dropdown will appear that provides a list of the assets of that type that have already been imported, which can be selected to reuse those assets. If the “Import New Asset” option is selected, a “Browse” button will appear that opens a system file importer to select the corresponding asset file. Imported assets are also saved as part of the Viewer configuration.

Custom assets of large size or complexity may take a long time to load and could slow down the performance of the Viewer.

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 see a list of all objects, open the **Objects -> Object List** window. This window provides a list of all the objects currently in the scene. Selecting an object from the list highlights the object as if clicked on with the mouse, and provides buttons for opening its properties window or deleting the object. The object list also provides 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 changed via the middle or right mouse buttons. Holding the chosen mouse button and dragging the mouse will move the user's view in the same direction that the mouse is dragged.

Rotate View

To rotate the view, press and hold shift while dragging the mouse with the middle or right mouse button held. When the shift key is pressed, a sphere will appear on the screen that represents the point of rotation. The point of rotation is selected relative to the current cursor location. If no object is underneath the mouse, the rotation point will be located in the center of the visible grid. If the center of the grid is not visible, a point in the center of the screen will be used.

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. Selected devices or objects may be configured through the [Selected Device Settings](#) or [Selected Object Properties](#) windows, or by pressing 'C' once selected. To see current statistics for an device choose the [Selected Device Info](#) option, or press 'I' on the keyboard once selected.

Selected devices and objects appear with a cyan highlight around them, and if they have a serial number or name, the label will be 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 the CDP Log Playback, first setup the [CDP Log Playback](#).

The CUWB Viewer should be set to listen to the CDP Player IP and port through the [Network Settings](#).

The log play back doesn't support using CUWBNet selection to find the playback stream.

Play back the stream from the CDP player, and the data will populate the CUWB Viewer just like a live network.

6 Revision

Version	Date	Change Description
5.0.1	2025-11-14	Updating Host PC Requirements
v5.0.0	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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2 Definitions

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“Agreement” means this General Terms of Purchase/Service Agreement and Technology License, any exhibits or appendices attached hereto, and any documents incorporated by reference.

“Buyer” means a person or entity that purchases or contracts to purchase products, services, or property from Ciholas.

“Ciholas” means Ciholas, Inc. including any entity controlled by Ciholas, Inc.

“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.

“Hardware” means the physical components of the Ciholas UWB Systems, such as anchors, tags, and supporting equipment.

“Indemnatee” includes, but is not limited to, all End-Users, Buyers, and/or Licensees.

“License Configuration” means a particular configuration or setting provided with Ciholas services and/or products for the purposes of meeting regulatory requirements, or ensuring performance to specification.

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“Our” means Ciholas, Inc. including any entity controlled by Ciholas, Inc.

“Personal Identifiable Information (PII)” means any identifying information unique to you that is made available to Ciholas when you browse our sites, create accounts on our sites, purchase and use our services and products, and/or contact us through our support phone number /email.

“Products” means any goods and/or services provided by Ciholas that are covered under this Agreement.

“Services” means services ancillary to the support and operation of Ciholas Products, Software, Firmware, or Hardware.

“Software” means programs or sets of instructions, including associated source code, object code, documentation, and data, which enable End-Users to perform specific operations or series of operations.

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Ciholas shall not be liable or responsible to you for any failure or delay in fulfilling or performing any term of this Agreement, when and to the extent that, such failure or delay is caused by or results from acts beyond Ciholas' reasonable control, including, but not limited to, acts of nature, natural disasters, war, terrorism, labor disputes, supply chain disruptions, power outages, or governmental restrictions.

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Ciholas products are subject to governmental regulations and laws that may vary by state and country. By purchasing Ciholas products, you agree you will not ship, transfer, or export said products in any manner prohibited by law. You also warrant and agree that you are not located in, under the control of, or a national or resident of any of the countries defined by the Office of Foreign Assets Control, which include, but may not be limited to, Cuba, Iran, North Korea, and Syria. In addition to embargoes, other countries and/or regions may face restrictions under various U.S. export control regulations or be the target of sanctions governed by the Export Administration Act of 1979 (EAA), as amended, any successor legislation, the Export Administration Regulations (EAR), and the International Traffic in Arms Regulations (ITAR). You will comply in all respects with the export and reexport restrictions applicable to Ciholas products and will otherwise comply with the EAA, EAR, ITAR, and other United States laws and regulations in effect from time to time.

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.

7.1 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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10 Ciholas Standard Privacy Policy

Ciholas is committed to protecting your personal information and your right to privacy. If you have any questions or concerns about our policy or our practices with regards to your personal information, please notify Ciholas at info@ciholas.com.

The following is to inform you of our policies for collecting, using, and disclosing your Personal Identifiable Information (PII) made available to Ciholas when you browse our sites, create accounts on our sites, purchase and use our services and products, and/or contact us through our support email. By using any of our services and products, you agree to the collection and use of your PII in accordance with this and other policies contained in this Agreement.

10.1 Personal Identifiable Information Collected

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The PII we collect could include the following:

Name and Contact Data – First and last name, email address, postal address, phone number, and other similar contact data.

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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[End of Agreement]

8 APPENDIX B : Software License Attributions

This appendix documents the legal attributions for third party software and components included in the CUWB Viewer.

11 Gizmo3D

Gizmo3D

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Godot

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15 TrailRenderer

TrailRenderer

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16 .NET

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17 Newtonsoft.JSON

Newtonsoft.JSON

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