1 Description

The 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 CUWB network devices, such as Anchors and Tags in real time. The Viewer also presents basic system information, such as device status, statistics, sensor plotting, and more.

2 Installation

2.1 PPA Install and Setup

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

1. Follow best practices and review the install.sh script.
2. Paste into an Ubuntu 16.04/18.04 terminal and press Enter:

```
bash <(wget -qO- https://cuwb.io/install.sh)
```

2.2 System Requirements

- OS: Ubuntu 16.04 Xenial or Ubuntu 18.04 Bionic
- CPU: 64-bit dual core or better with SSE2 instruction set support
- GPU: Graphics card with DX10 (shader model 4.0) capabilities
- WAN: Must be able to reach ppa.cuwb.io via port 443
- RAM: 2GB or better
- HD: 200MB or more (plus any additional required by logging)

3 General System Usage

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
```

3.2 Network Configuration

On the initial run of the Viewer, no configuration file will be loaded. A network selection tool will pop up populated with all available networks the Viewer detects. The network window will also include default network settings properly configured for CUWB Network defaults. To get started select a network from this, and close the dialog.

To return to the network selection dialog select "*Edit->Network Selection*" from the menu. Users may also add new networks using the "*Edit->Network Settings*" dialog.

By default, the Viewer will listen on the CUWB Network configuration channel (IP 239.255.76.67, port 7671, interface 0.0.0.0). This allows the system to discover available network. These networks can be selected through the Network Selection dialog.

3.3 Default Configuration

To prevent the network selection dialog from appearing when the Viewer application boots, save the network configuration using the "*File->Save Configuration*" menu item. This will save the network settings to the default configuration.

The default configuration file, "viewer_default.db", can be found in the [/usr/lib/cuwb/viewer/cuwb-viewer_Data/StreamingAssets/] folder. This file will load on boot and restore all settings that a user has saved for a given CUWB Network setup.

3.4 Initial View

After the initial boot animation the user will be presented with a blank screen showing only a 3D 10 meter grid. Upon reception of CDP data from a CUWB Network the grid will grow and form around the representations of the system tags and anchors.

3.5 Device Color Table

By default tags are represented as spheres and anchors are cubes. The color of the device is used to indicate the connectivity and synchronization status.

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

4 Mouse Controls

4.1 Drag View

The system view may be changed via the middle mouse button or mouse wheel. Holding the middle mouse button and dragging the mouse will move the user's view in the same direction that the mouse is dragged.

4.2 Rotate View

To rotate the view, press and hold shift while dragging the mouse with the center button held. When the shift key is pressed, a sphere will appear on the screen that represent 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.

4.3 Zoom View

To zoom in and out, scroll the mouse wheel. Zoom direction and speed may be adjusted in the "*Edit->User Configs*" dialog.

4.4 Object selection

The left mouse button serves as the object selector. Selected objects may be configured through the main menu in the "*Device Config*" dialog, or by pressing 'C' once selected. To see current statistics for an object choose the "*Device Info*" dialog, or press 'I' on the keyboard once selected.

Selected Tags and Anchors will appear with a cyan highlight. Imported objects that are selected will appear with a yellow highlight.

4.5 Distance Measurement

Distance measurement is done quickly by left clicking on an object and dragging the selection over to another object. The result will be a dark line between the object with a distance measurement displayed in the center.

5 Keyboard Controls

5.1 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 Up	Shift+Up
Zoom In	Ctrl+Up
Zoom Out	Ctrl+Down

5.2 General Shortcuts

Description	Keyboad
Open Viewer Documentation	F1
Show/Hide UI	ESC
Pause/Resume	Space
Delete Selected Model	DEL
Open Keyboard Shortcuts Dialog	?
Hide Selected Device	H
Show/Hide Message Window	M
Save Configuration	Ctrl+S
Save Configuration As	Ctrl+Shift+S
Load Configuration	Ctrl+O
Open Import Model Dialog	Ctrl+M
Open Import Primitive Dialog	Ctrl+E
Open Device Settings Dialog	Ctrl+T
Open Network Settings Dialog	Ctrl+N
Open Device List Dialog	Ctrl+D
Open Object List Dialog	Ctrl+Q
Open Configure Grid Dialog	Ctrl+G
Open Import Image Dialog	Ctrl+I
Open Camera Defaults Dialog	Ctrl+K
Open User Settings Dialog	Ctrl+U
Open Device Names Dialog	Ctrl+L
Open UWB Heatmap Mode Dialog	Ctrl+V
Clear Devices from Screen	Ctrl+ESC
Open TWR Graph Dialog	Ctrl+W
Open Find Device Dialog	/
Open Color Legend Dialog	Ctrl+J
Open Device Stats Panel	I
Open Device Config/Object Properties Panel	C
Open Network Selection Dialog	Ctrl+B

5.3 Object Transform

Note: these transforms only work on selected objects.

Description	Keyboard
Move Left	Left
Move Right	Right
Move Up	Up
Move Down	Down
Move Away From Camera	Shift+Up
Move Away From Camera	Shift+Down
Switch to Rotation Tool	R
Switch to Translation Tool	T
Switch to Scale Tool	S

6 Menu Bar Options

The main menu bar has the following submenus:

Main Menu	Submenu	Description
File	Save Configuration	Save the current configuration, overwriting the previously loaded configuration
File	Save Configuration As...	Open the save configuration dialog
File	Load Configuration	Open file browser to select a configuration
File	Exit	Close the CUWB Viewer
-	-	-
Edit	Configure Grid	Configure the grid size and visibility
Edit	Network Settings	Modify and add network configurations
Edit	Network Selection	Select available networks to connect to or disconnect from
Edit	User Settings	User preference dialog
-	-	-
View	Camera Defaults	Set default camera view and perspective
View	Device Names	Assign names to devices see Device Options
View	Device Settings	Configurable settings for the devices see Device Options
View	Device List	Device listing and global configurations see Device Options
View	Object List	Imported object listing
View	UWB Heatmap Mode	Select device and set UWB Heatmap mode active
View	TWR Graph	Two-Way Range dialog

Main Menu	Submenu	Description
View	Find Device	Search for, and move to, a device
View	Clear Devices	Clears all devices from the view
-	-	-
Object	Import Image	Import an image[1]
Object	Import Model	Import a model[2]
Object	Import Primitive	Import a primitive object
-	-	-
Help	Keyboard Shortcuts	View the keyboard shortcuts
Help	Viewer Help	Open the documentation page
Help	Color Legend	View the color legend for the devices
Help	Tutorial	Open the usage tutorial
Help	Tips	Open the usage tips dialog
Help	About CUWB Viewer	Display Viewer information
Help	External Licenses	3rd-party software Licensing information
-	-	-
Device Stats[3]		Opens Device Stats dialog.
Device Config[3]		Opens Device Configuration dialog.
Object Properties[3]		Opens Object Properties dialog.

1. *Supports most common image formats: JPG, BMP, PNG, etc.*
2. *Supports most common 3D object formats: OBJ, FBX, DAE, etc.*
3. *Menus only visible when an object is selected*

7 Heatmap Mode

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.

Heatmap Color Table

Color	Description
Red	90-100%
Orange	80-89%
Yellow	70-79%
Green	60-69%
Blue	50-59%
Violet	40-49%
Pink	0-39%
Gray	Not Used
Black	Bad Status

8 Device Options

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

Option	Description
Projection Shadows	Toggle projection of device shadow on grid walls
Projection Lines	Toggle projection line from device to grid walls
Serial Numbers	Toggle serial number display
Interface ID	Toggle interface ID display for all devices
Tag Trails	Show tag path over configurable period in seconds
Shown/Hidden	Toggle display of device on or off in Viewer
Color	Set individual coloring for device
Tag smoothing	Set the number of tag position reports to average for display
Device Resizing	Change the scale of devices
Device Names	Assign name to device for display instead of serial
Quality Filter*	Set a minimum accepted value for a position's quality. Any position with a quality below this value will not be displayed.

The above options can be configured by highlighting the device and clicking on the options button. They can be toggled for devices simultaneously in the main menu bar "*View*" menu.

* This value can only be set via the Device Settings dialog found in View->Device Settings.

9 CUWB Viewer Manual Manual Change Log

Version	Date	Change Description
1.1	2018-12-03	Updated device color table
1.0	2018-05-16	Initial Public Release