



WISER Systems

Installation Manual & Quick Start Guide

Version 2.12.2



Wireless Tracking and Locating in Real Time

**WISER Redundant Radio Localization
& Tracking (RRLT) Locator System**

Installation Manual & Quick Start Guide

Version 2.12.2
November, 2019

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Quick Start Guide

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Introduction

The WISER Locator leverages new advances in ultra-wideband (UWB) technology to deliver low cost, high accuracy, real-time localization and tracking. This solution consists of a mesh network of two-way WISER Antenna Nodes and WISER Tracker Tags. Each Antenna may act interchangeably as either an antenna or a roaming device that may be tracked within the mesh. The following manual provides instructions on how to get started quickly with a demonstration of the system and how to use standard system features.

Parts

Your evaluation kit will include:

1. Five or more WISER Antennas
2. WISER Tracker Tags
3. USB Power Banks
4. USB Power Adapters
5. USB Extension Cables

Users may alternatively purchase their own USB power banks and power adapters; however, it is required that these accessories comply with RF emission limits established by the Federal Communications Commission (FCC) (Section 15.27(a)).

The image below shows an example of the hardware that may be included.



Chapter 1. Setting up the System

1.1 Physical Setup

This setup assumes you have five Antennas. Four or more of these Antennas will establish the mesh. One will be plugged into the base station laptop; this Antenna also contributes to the mesh. One Antenna may serve as a roaming device.

First, identify an area within which you wish to track, such as a small shop floor or office space. It is helpful to have a to-scale image of the floorplan (BMP, PNG, JPG) of the area pre-loaded onto your computer for use in the software program. In the absence of your own to-scale image, the software provides an infinite grid and scale so you can determine distances quickly and accurately.

Next, position the Antennas in a rough square to form your tracking perimeter. When selecting Antenna positions, keep in mind the availability of power, height, distances between Antennas, and the shape of the perimeter being formed by Antenna placement. One of these Antennas should be plugged into a USB port on the computer that will run the WISER software.

Note that operating distance varies indoors depending on the density of large objects and walls. The spacing of the Antennas can typically be much farther apart in large, open spaces with direct line-of-sight between the Antennas. Typically, spacing of no more than 50 feet indoors yields the best performance. Outdoors, spacing can usually be much larger, with an upper bound of more than 150 feet.

For optimal performance, place Antennas 10 to 15 feet above the floor with a clear line-of-sight between each other and the tracked items. Note: Antennas and Tracker Tags do not require line-of-sight for tracking, though it typically helps system performance. The UWB pulse will be able to penetrate most interior walls, but not metal sheeting.

After positioning them, power four or more of the Antennas. Antennas can be plugged into USB power banks or AC power adapters; one Antenna will be powered by being plugged directly into a computer. They can also draw power over Ethernet (PoE), which typically works best for more complicated installations.

Note: Some USB power banks intelligently sense power draw and turn off automatically if there is not enough power drawn. WISER devices use very little power, so some power banks may shut off prematurely. If using your own batteries, choose one that remains on at least a minute after a device is plugged in.

The images below show the Antenna plugged into a USB power bank and into a standard AC power adapter:



1.1.1 Temporarily Attaching to Wall

Antennas can be temporarily attached to walls as well. For best performance, the devices need to be oriented with the flat underside of the Antenna head facing the floor.

To achieve this, rotate the stem of the device 180 degrees relative to the base as shown in the images to the left. Then, the device can be attached to a wall somewhat like is shown:

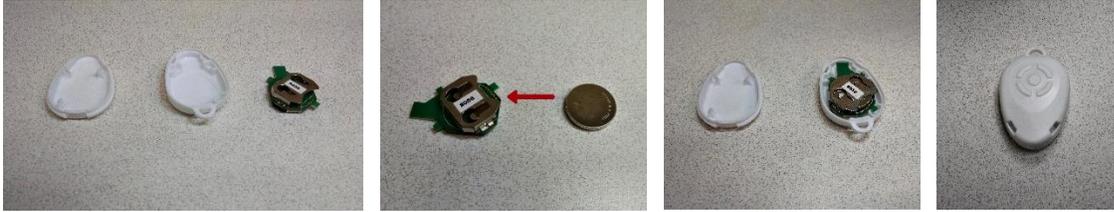


1.1.2 Tracker Tags

Each WISER Tracker Tag included is ready for immediate use after basic assembly.

First, place the battery in the battery clip on the on the PCB board of each tag to be used. Be sure to insert the coin cell battery positive (+) side away from the chips. Inserting the battery incorrectly may cause damage to the tag.

The WISER bullseye logo is found on the top half of the tag enclosure. Place the printed circuit board (PCB) down into the three cradles in the top half of the tag enclosure, with the battery fastener facing up. Then snap the bottom half of the enclosure shut to secure the PCB.



1.2 Floorplan Scaling

To view WISER tags moving on a floorplan or site map, you will need an image file (BMP, JPG, PNG) of the tracking area. You will also need to specify the image's scale in inches per pixel.

To do this, measure a set dimension on the floor; a doorframe can work and is typically 28-36 inches. Open the image file in any image editor and use the cursor to establish how many pixels the measured dimension spans in the image. For example, a door frame may be 36 inches with the measuring tape and 18 pixels in the image. If you divide the inch measurement (36 in this example) by the pixels (18 in this example), you will have a ratio of inches to pixels ($36/18 = 2$ in this example). For a large or more permanent installation, WISER recommends using a larger measuring distance. This will provide higher accuracy in determining the scale.

Keep this ratio for later steps in the calibration process.

1.3 Software Guide

Your WISER Account Manager will provide setup support and send you download instructions for the WISER Tag and Track software.

Minimum Software Requirements:

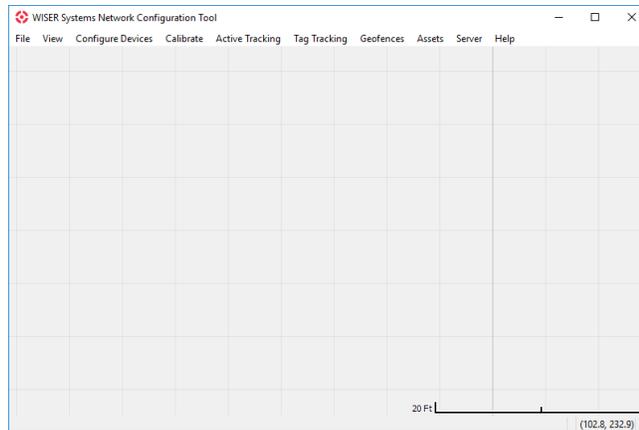
OS: Windows (Vista or newer, server 2008 or newer, 64 bit)

Hardware Requirements:

- Memory: 1 GB
- Processor Speed: 2.0 Ghz
- Processor Type: x86-64, dual core minimum but more cores will significantly enhance experience
- Storage: 1 GB

1.3.1 Launching the Software

Download and open the package folder. Then, open *wiserex.exe*. The following window will open:



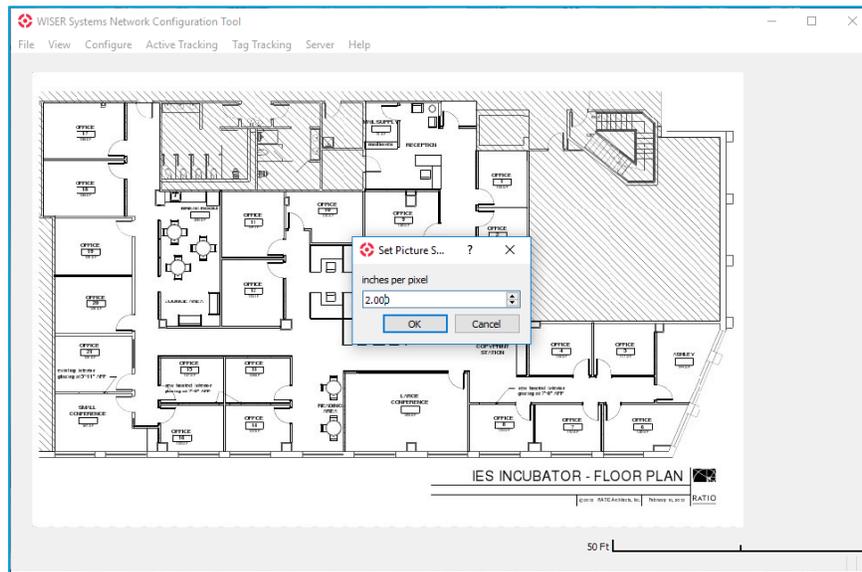
1.3.2 Using a Site Floorplan

- i. Click on the menu item *Configure Devices* → *Load Floorplan*. Select a layout image and load. Note: This example uses the map from an office suite, but your own image will be different.



- ii. In the menu, select *Configure Devices* → *Set Floorplan Scale*. For a scaled image to be accurately represented in the program, you must set the number of inches per pixel within the image. Use the ratio you calculated in the map scaling section 1.2. In the example shown above, the scale is "2."

1.3.3 Discovering the Antennas



The system requires at least four Antennas, including the one connected to your computer. Using a greater number of Antennas will generally increase the accuracy of the solution. Higher Antenna density may be required in complex, cluttered, or RF-harsh environments. See Section 1.1 for details on optimizing your physical setup. The system will track tagged assets within the polygon established by the Antennas.

- i. Plug four or more Antennas into batteries or power adapters and place these Antennas to establish the perimeter of a tracking area. Note the specific location and height of each device and its associated "short-ID" number, located on a tag near the base of the USB cable. Placing devices high with no visible obstructions around or near will improve overall system performance.
- ii. Keep one Antenna plugged into the computer running the WISER application. In the menu, select *Configure Devices* → *Enable USB Antenna*. As with other Antennas, placing this device high, with no visible obstructions around or near it, will improve overall system performance. Note: To run active (Antenna) tracking you will also need to have at least one Antenna that is not yet plugged in or powered. This unit will serve as the 'Roaming Device.'

- iii. In the menu, select *Configure Devices* → *Discover Network*. You will receive a message that says, “Found X Antennas.” Verify that the system has detected each USB or wireless device and that the short IDs match those detected.



- iv. If not all your Antennas appear, make sure all devices are powered and that each Antenna is in communication range with at least one other Antenna.
- v. Antenna icons should now appear on your map in the application. Using the mouse, left click and hold on the dots at the center of each icon and move them to the location that roughly reflects their position in the physical environment to be tracked. Do this for each individual icon.



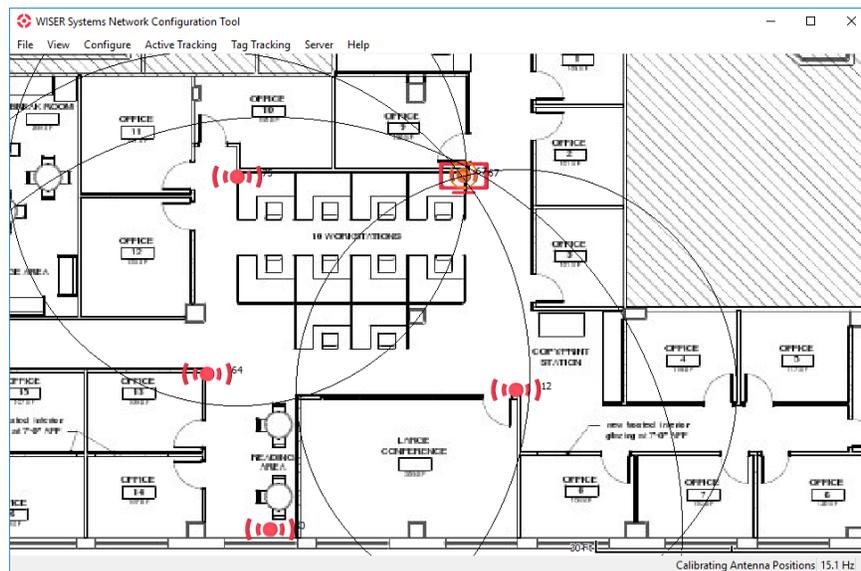
- vi. Finally, set the height of each Antenna to prepare for system calibration. To set Antenna heights, right click each individual Antenna or hover the cursor over an

Antenna and type "H" on the keyboard. Then supply a measurement in inches and click "OK" or hit "Enter" to complete this step.

1.3.4 System Calibration

To achieve maximum accuracy, it is important to auto-calibrate the Antenna positions by utilizing communication between the Antennas. To do so:

- i. Select the menu item *Calibrate* → *Calibrate Antenna Position*. It is often useful to turn on *Circles* (*Calibrate* → *Toggle Circles*) to view the interactions of the different fixed Antenna devices.



- ii. The circles represent measured distances from antenna to antenna. Where the circles intersect, an orange target will appear, indicating a calculated position for drag-and-drop antenna placement. Black or gray circles indicate proper relative placement of antennas. Red circles indicate that measurements between antennas do not match the current calibration. In very harsh environments some red circles are permissible, but system users should strive to calibrate such that all the circles are black. Note: It is typically the case that antennas with red circles should be physically moved to a more optimal position. However, it is also possible that the calibration on the floorplan is simply not yet correct.
- iii. If your circles are not intersecting, are too far apart, or are not displaying correctly, check the map scaling step to assure your scale value is accurate.
- iv. The orange target on the screen will indicate an estimation of where the Antenna is positioned according to each of the other Antennas. Press the spacebar to move the red Antenna icon to the location of the orange target and to advance to the next Antenna. You can also move an Antenna manually by clicking and dragging the red Antenna icons with the mouse. To manually select the next antenna,

position the mouse over another antenna and press "R." To automatically choose the next antenna without moving the current one, press "N." If the automatically chosen antenna is not currently visible in the viewport then the display will automatically center on the chosen antenna.

- v. Repeat this in an iterative fashion for all fixed antenna until they are all aligned.
- vi. It is often useful to ignore the circles of Antennas that are behind too many walls or too far away to properly register distance. If this is the case, use the reliable Antenna circle intersections to calibrate the system. A circle flashing, for instance, could mean the system is not constantly recognizing the targeted device or that the signal is too weak.
- vii. Note: If you have trouble keeping antenna positions in the correct places on the floorplan despite accurate scaling from pixels to inches, or if you have antennas that are already configured in the correct location, you can lock an antenna with a known location in place by positioning the mouse over the antenna and typing "L" on the keyboard. This antenna will then appear in gray. Antenna placement can also be unlocked by typing "L" while the mouse hovers over an antenna.
- viii. Select the menu item *Calibrate → Stop Antenna Calibration* to conclude this step.

1.3.5 Tag Tracking / Passive Tracking

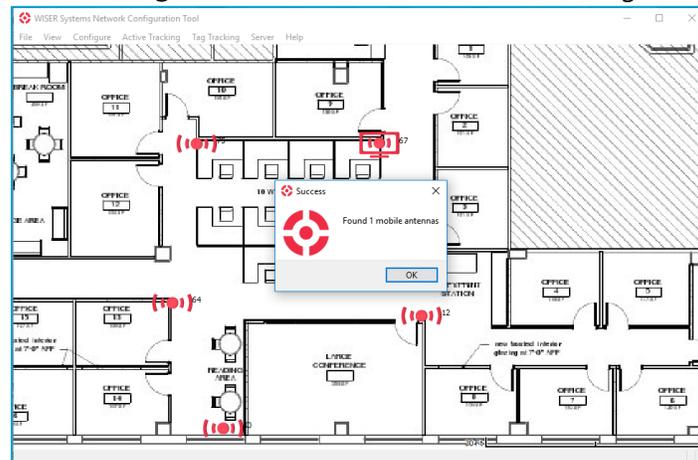
- i. Select the menu item *Calibrate → Set Expected Tag Height*. Enter an approximate value in inches of how high the tags are from the floor.
- ii. Select the menu item *Tag Tracking → Auto-Configure Tag Tracking*. When this is complete, you should receive the following message: "Successfully configured using 1 clock."
- iii. Select the menu item *View → Toggle Tag Filtering*.
- iv. Select the menu item *Tag Tracking → Run Tag Tracking*. All powered tags should appear in the tracking area soon after this. Note: Tags maintain both "moving" and "resting" update rates to conserve power when motionless. Because of this, motionless tags will take longer to appear when the system begins running tag tracking.
- v. Tag tracking will then continue indefinitely. To halt tracking, select the menu item *Tag Tracking → Stop Tag Tracking*.
- vi. While tracking is not running, you may adjust tag tracking settings via the menu item *Configure Devices → Tracking Settings*. See additional notes on these features in Chapter 2.

1.3.6 Active Tag Tracking

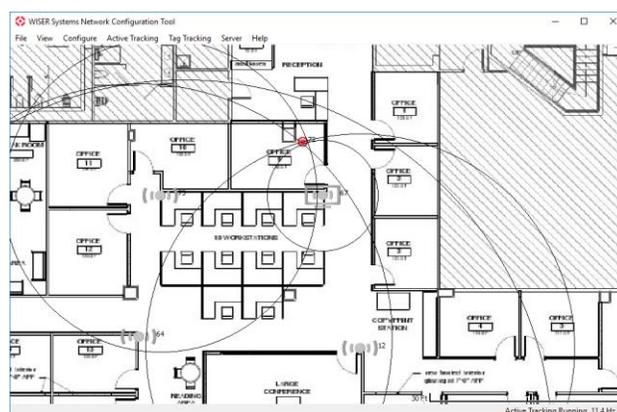
- i. After the mesh has been discovered and calibrated, plug one or more additional WISER Antenna into batteries. These will be the roaming devices you use to perform active (Antenna) tracking. Note that these devices needed to be

unpowered when you first discovered the network (*Configure* → *Discover Network*). Otherwise, the system will mistakenly count them among the system's fixed Antennas.

- ii. Select the menu item *Active Tracking* → *Find Active Tags*. If successful, the system will show the following message "Found X Mobile Antenna(s)."
- iii. Select the menu item *Active Tracking* → *Run Active Tracking*. This will initiate tracking. To halt tracking, select menu item: *Active Tracking* → *Stop Active Tracking*.



- iv. Select the menu item *View* → *Toggle Circles* to display circles showing the distance measured between Antennas and the tracking devices. This can also be toggled to de-clutter the view.
- v. Active Tracking can also be used to generate a heat map of Antenna connectivity.
 - a) Select the menu item *View* → *History Color Shows Number of Antennas*. A key will appear in the lower left-hand corner of the application. This key shows the color that will be used for historic data points with the given number of Antennas.
 - b) Select the menu item *View* → *Toggle Location History*. This option allows for the display of historic data points.
 - c) Move the "Roaming Device" throughout the area, being sure to cover all areas of interest.



1.3.7 Saving Your Settings

When the system is sufficiently calibrated, save the setup via the menu option *File* → *Save*. If you ever close the program, you can load this setup and bypass the discovery, calibration, and settings steps between 1.3.2 and 1.3.7 by selecting *File* → *Open*. After loading a saved file you can immediately run tracking.

Chapter 2. Other Software Features

2.1 Additional Tracking Features

- i. Use the menu item *View → Display Coordinates* to show XYZ coordinates above each individual tag. The X and Y will update in real time as the tag moves. The Z will be displayed as a preset tag height. If a Geo stake has been configured, latitude, longitude, and altitude will also be displayed.
- ii. Use the menu item *View → Toggle Grid Lines* to display a scale grid across the floorplan you have loaded. The distance bar, always visible in the bottom right corner of the program, will adjust as you zoom in and out to accommodate different sizes. This helps check the accuracy of both the map scaling and the tracking results.
- iii. Use the menu item *View → Display Geofence Indicators* to display circles around tags when they are inside of a geofence. The color of the circle will correspond to the color of the geofence. If the tag is inside of overlapping geofences it will be displayed with concentric circles for each geofence in which it currently resides.
- iv. Toggle Tag Filtering: Use the menu item *View → Toggle Tag Filtering* to apply smoothing to data points for clearer tracking performance. This menu item simply switches filtering on or off. Note: Toggling tag filtering will not affect other tag tracking settings like the Maximum Calculation Error Threshold.
- v. The amount of tag filtering can be configured under *View → Configure Tag Filtering*. A typical starting value is 4. A larger value will average more data points before displaying them. A lower value will display data with minimum latency but with somewhat more jitter.
- vi. Use the menu item *View → Toggle Location History* to turn on or off a granular, visual record of asset motion and location. The system will display this granular history in a unique color for each asset. To clear or de-clutter the view, use the menu item *View → Clear Location History*.
- vii. Use the menu item *View → History Color Shows Number of Antennas* to color the location history based on the number of antennas in range. A color key will be displayed in the lower left of the program that indicates how many antennas correspond to which color. Note that in this mode all tags will use the same history colors.

2.1.1 Tracking Settings

Users may optimize system performance in many ways by adjusting tracking settings.

- i. To open the tracking settings *Dialog* window, select the menu item *Configure Devices* → *Tracking Settings*.
- ii. Under Global Options, adjust the Maximum Calculation Error Threshold to filter out more or fewer location results based on the system's confidence in the results' accuracy. This is done by moving the slide-bar with the mouse.
- iii. Under Global Options, clicking the "Use 3D Tracking" button will automatically select the appropriate algorithm for tracking and will enable you to set maximum and minimum tag heights for tracking. Antennas detected too far outside the set heights will not appear. Note: This can only be done with Hybrid and Active tags.
- iv. For more complex installations, it may be helpful to increase the minimum number of Antennas required for passive tracking. Under Tag Tracking Options, adjust the slide-bar for Minimum Number of Antennas to Use For Passive Calculations to select a new number. The default is 3.
- v. Although the software opens with tag tracking settings that are optimal for most users, you may adjust these under *Configure Devices* → *Tracking Settings*. Your WISER representative can advise you on which settings will work best for your unique environment.
 - a. Passive Tracking comes with two algorithm options: Balanced Tracking (default) and Optimized for High Noise.
 - b. Hybrid Tracking comes with two options: Balanced Tracking (default) and Optimized for Outside Mesh. Note: Hybrid tags are not available in kits.
 - c. Clock Method allows users to adjust based on the size of the mesh, using either the Small Mesh (default) or Large Mesh settings. Your WISER Account Manager will advise you on which option best suits your installation.
 - d. Stale Tag Removal Interval allows users to adjust how long tags remain on the screen after their last ping. This should be configured based on your unique tag settings.

2.2 Naming, Finding, and Filtering Assets

2.2.1 Name Assets

Use the *Assets* menu to name, label, filter visibility for, and group assets.

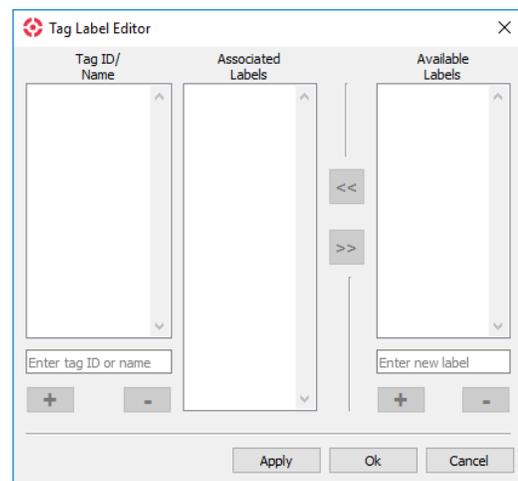
- i. To name an asset, select the menu item *Assets* → *Name Assets*.
- ii. In the top-left box, type "0x" followed by the short ID displayed on-screen for the desired asset; then type a name in the top-right box. Press the green "+" button to apply the name and click "OK" at the bottom of the *Asset Names* window to finalize this action. Note: Asset short IDs are also visible on the printed circuit board.
- iii. To remove an asset name, select the menu item *Assets* → *Name Assets*, and click on the desired name in the *Asset Names* window. Then click the red "-" button to remove that name and click "OK" to finalize this action.



2.2.2 Labels

You can apply labels to group assets together for visibility filtering, segmentation, or other organizational tasks.

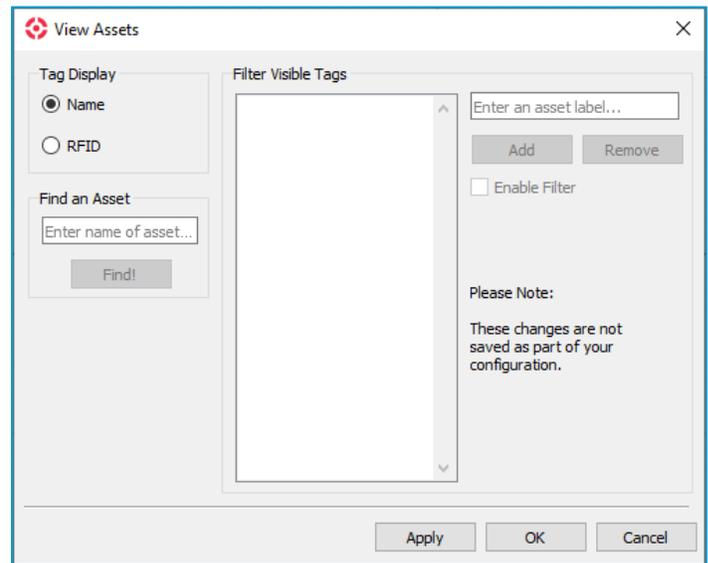
- i. Select the menu item *Assets* → *Labels* to open the *Tag Label Editor*.
- ii. Type the name of the desired asset in the "Enter tag ID or name" box at the bottom left of the editor. Then click the "+" button to add that asset to the list. Typing either the name or ID of a named asset will result in the same asset appearing in the list.
Note: When selecting an asset by ID, you must add "0x" to the beginning of each tag ID. Thus, to use a tag with ID 1021, enter 0x1021.
- iii. Next, type the name for an applicable label in the "Enter new label" box at the bottom right. Click the "+" button to add that new label to the list.
- iv. Click on the asset name or ID to which you would like to apply your label. Then select the label and click the left arrows << to move that label opposite the selected tag name or ID. Click "OK" to finalize this action, or remove a label by clicking the right arrows >> when the label is selected.



2.2.3 Asset View Settings

This menu allows you to search for and filter assets based on their names and labels.

- i. To locate an asset on the floorplan, select the menu item *Assets* → *Asset View Settings*. This opens the *View Assets* window. In the *View Assets* window, enter the asset's name in the "Enter name of asset..." box on the left and click "Find!" The view will then adjust to focus specifically on the asset requested.
- ii. To filter asset visibility by label, select the menu item *Assets* → *Asset View Settings*, which opens the *View Assets* window. In the *View Assets* window, click on the "Enter an asset label..." box and type the name of the label you would like to filter. Then click the "Add" button below, which should add this label to the middle column (Filter Visible Tags). Click on a label from the middle column, then the "Enable Filter" checkbox on the right, and the "OK" button at the bottom to apply this filter. When label filters are applied, only assets under these labels will be visibly displayed in the GUI, although the system will continue to propagate other asset data.
- iii. To turn off a filter, select the desired label from the middle column. After this, unlick the "Enable Filter" box. You can also click the "Remove" button when a label is selected. Click the "OK" button to finalize this action.
- iv. Note: Location histories will still be visible for all tags—not just tags under a label currently being filtered. Only the tag's current position will be filtered out. To de-clutter the image, turn off the Location History function.

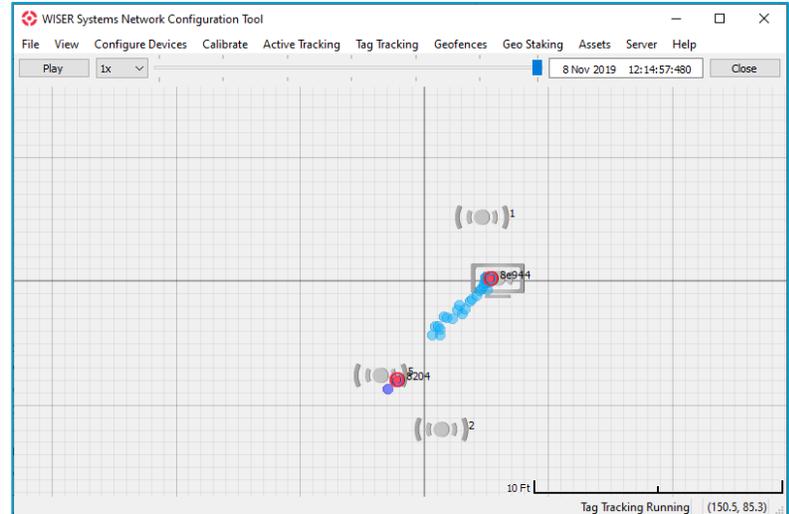


2.3 History Playback Controls

This menu allows you to review granular tracking histories, check specific points in time, and play back a visual record of asset motion and location.

- i. To open the tracking history, select the menu item *View* → *History Playback Controls*. A new toolbar will appear at the top of the screen.

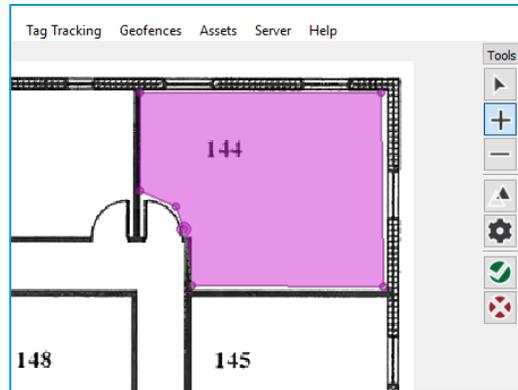
- ii. To check a specific point in time, click the slide-bar and drag it to the time of interest. The floorplan below will adjust to fit that point in time.
- iii. To watch a playback of the tracking history, click the "Play" button on the left. This will begin from the earliest recorded tracking point each time. Click "Stop" to pause the tracking history at a specific point.
- iv. To adjust the playback speed, click the drop-down menu left of the slide-bar. The normal playback speed is 1x, but you may adjust this for both faster and slower playback speeds.
- v. Click "Close" or select the menu item *View → History Playback Controls* again to return to a real-time tag tracking view when you are finished. Note: Tracking functionality will continue normally while the *History Playback Controls* are open, and the system will continue to log new data points.
- vi. Note: WISER's GUI is configured only to save so many data points. This means that older data will be dropped once the system reaches its threshold. Pulling data from the REST API will allow you to save data points.



2.4 Geofences

Geofences allow you to incorporate additional data points while tracking. These data points could be incorporated into zoning, virtual security, and numerous other applications using the REST API. The GUI also visually highlights assets crossing Geofences.

- i. To create a Geofence, select the menu item *Geofences → Browse Geofences*.
- ii. Within the *Geofence Browser*, select *Add New* to open the Geofence tool bar, which will appear on the right side of the screen. These tools allow you to delineate a Geofence simply by clicking points with the mouse. These points will then become corners or edges of a filled-in polygon.



- iii. To remove a point or adjust a Geofence, use the minus button and click the points you want removed.
- iv. To change the position of an existing Geofence, click the button with two triangles, then drag the desired Geofence to its new location using the mouse.
- v. To edit additional settings such as Geofence height parameters, click the gear icon.
- vi. Click the green check mark to complete a Geofence. A menu prompting you to name that Geofence will then appear. Type your chosen name and click "OK."
- vii. To remove a completed Geofence, use the menu item *Geofences* → *Browse Geofences*, click the name of the Geofence you would like to remove, and click *Delete*.
- viii. To quickly select a completed Geofence on your floorplan, use the menu item *Geofences* → *Select Geofence*. Then click directly on the desired Geofence to open the tool bar.
- ix. To toggle Geofences, use the menu item *Geofences* → *Hide Geofences*.
- x. Note: To pan across the layout floorplan while creating and editing Geofences, simply hold the shift button on the keyboard and click to drag the layout.
- xi. To limit the area in which the system will track and locate, use the menu item *Geofences* → *Valid Tracking Area*. Click the "Set Valid Tracking Area" button in the dialog box. Then click any point on the layout image to establish corners of a valid tracking area. Once you've formed a rough perimeter, click the green check mark to implement the boundaries or the red x mark to discard them. You may toggle the visibility of the tracking area using the "Show Valid Tracking Area" checkbox in the dialog box.

2.5 Antenna Groups

The Antenna Group Manager is useful for segmenting and organizing Antennas in complex installations and troubleshooting potential issues.

- i. To open the *Antenna Group Manager* window, select the menu item *Configure*

Devices → *Manage Antenna Groups*.

- ii. To form a new grouping, click the “New Group Name” box and specify a name for the group.
- iii. Click the “Add New Group” button to create the Antenna group.
- iv. Select an Antenna group from the list on the left. Then select the Antenna ID or IDs you would like to add to this group and click the left arrows <<.
- v. To apply an Antenna group while discovering the network, select that group in the *Antenna Group Manager* and click the “Use Group for Discovery” button. Then click “Ok” to exit the *Antenna Group Manager*.
- vi. Select the menu item *Configure Devices* → *Discover Network*. Only Antennas included in the discovery group will now appear. To resume discovering all Antennas, select the “All” group in the *Antenna Group Manager*, click the “Use for Discovery” button, and click “Ok.”
- vii. You may delete unwanted groups by selecting them and clicking the “Remove Group” button in the *Antenna Group Manager*.

2.6 Gateways

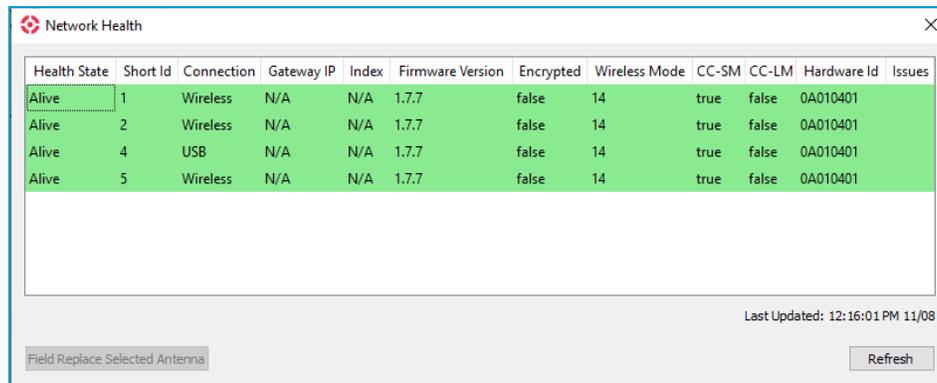
Implementing WISER Gateways and Ethernet Adapters allows you to connect WISER Antennas to a preexisting PoE installation. After following the *WISER Systems Gateway and Adapter Configuration and Installation Instructions*, use this software feature to connect a prepared Gateway.



- i. Select the menu item *Configure Devices* → *Gateway List*.
- ii. To add a Gateway, click the “Add” button. A new *Gateway Properties* window will appear. Type in the IP address for your Gateway and click the “OK” button. Note: Both the IP address and Listen Port will have a default preconfigured value, as outlined in the *WISER Systems Gateway and Adapter Configuration and Installation Instructions*.
- iii. Once you have added a connected Gateway, use the “Edit,” “Is Connected?” and “Remove” buttons for any additional adjustments you would like to make.
- iv. For more details on using Gateways, see WISER’s *Gateway and Adapter Configuration and Installation manual*.

2.7 System Health Info

Use the menu item *View* → *View System Health Info* to open the *Network Health* window. This window displays a current check of the health state of each Antenna's short IDs and hardware IDs, the type of connection being used, a gateway IP if applicable, current firmware version, and other data. The system will show healthy status for Antennas by highlighting them in green. It will show questionable status by highlighting in yellow and will try to recover these Antennas. Unusable Antennas will appear highlighted in red; the system will not use these Antennas in the network.



The screenshot shows a window titled "Network Health" with a close button (X) in the top right corner. Below the title bar is a table with the following columns: Health State, Short Id, Connection, Gateway IP, Index, Firmware Version, Encrypted, Wireless Mode, CC-SM, CC-LM, Hardware Id, and Issues. The table contains four rows, all of which are highlighted in green, indicating they are "Alive". The data for these rows is as follows:

Health State	Short Id	Connection	Gateway IP	Index	Firmware Version	Encrypted	Wireless Mode	CC-SM	CC-LM	Hardware Id	Issues
Alive	1	Wireless	N/A	N/A	1.7.7	false	14	true	false	0A010401	
Alive	2	Wireless	N/A	N/A	1.7.7	false	14	true	false	0A010401	
Alive	4	USB	N/A	N/A	1.7.7	false	14	true	false	0A010401	
Alive	5	Wireless	N/A	N/A	1.7.7	false	14	true	false	0A010401	

Below the table, there is a text area and a "Last Updated: 12:16:01 PM 11/08" timestamp. At the bottom of the window, there are two buttons: "Field Replace Selected Antenna" and "Refresh".

To update this window, click the "Refresh" button.

2.7.1 Antenna Field Replacement

Should an antenna be damaged or experience a hardware failure during tracking, it can be replaced with another antenna that is licensed to the installation. To do so, simply remove the antenna physically from its mount and insert a new antenna in the same mount. Then use the menu item *View* → *View System Health Info* to open the *Network Health* window, select the antenna to-be-replaced from the list, and click the "Field Replace Selected Antenna" button. In the new window that opens select the replacement antenna and click "OK."

2.8 Updating Firmware

The *Firmware Update Wizard* allows you to program your Antennas with newer versions of the firmware, provided by your WISER Account Manager or another member of WISER's technical support staff. Note: Before updating the Antenna firmware the mesh should be discovered or a configuration should be loaded.

- i. Use the menu item *Configure Devices* → *Update Antenna Firmware* to open the *Firmware Update Wizard*.
- ii. Click the "Select WISER Firmware File" to open the file browser. Then select the file provided for a firmware update and click the "Next >" button.
- iii. On the next window, choose the options that best fit your circumstances. If Gateways or USB antennas are already discovered, then those devices will be

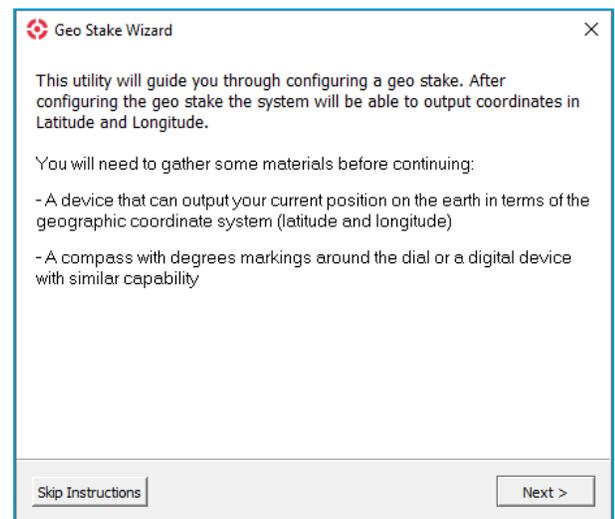
preselected. If you would also like to program additional connected Antennas, select either box below. You can also add Gateways to update or reprogram connected Antennas, if desired. When you are finished selecting reprogramming options, click the "Commit" button. The system will prompt you with a *Confirm Intention* window. Click "Yes" when you are ready to continue.

- iv. Note: Clicking the "Update in Recovery Mode" button will only update wired Antennas. This method is slower but will be able to update Antennas that otherwise cannot be integrated into the mesh.
- v. Note: Clicking the "Update in Parallel" button will allow the system to intelligently choose which devices can be updated in parallel. This will greatly increase the speed with which a firmware update can be performed.
- vi. Wait as the software runs its firmware update. It will display a completion message when the selected Antennas are updated.
- vii. Click the "Finish" button to conclude this action.

2.9 Geo Staking

Geo Staking allows WISER's software to report location data as latitude and longitude.

- i. Use the menu item *Geo Staking* → *Set Geo Stake* to open the *Geo Stake Wizard*. To utilize this wizard you will need a way to determine your current latitude and longitude and a compass with degree markings around the dial. Note: You can choose to either continue with guided instructions by clicking the *Next >* button in the wizard or to skip these instructions by clicking *Skip Instructions* in the bottom left of the wizard.
- ii. Use the menu item *Geo Staking* → *Remove Geo Stake* to clear a geo stake previously set.
- iii. Use the menu item *Geo Staking* → *Display Geo Stake* to toggle the visibility of a geo stake you have created.
- iv. Use the menu item *Geo Staking* → *Display Compass* to toggle the visibility of the compass paired with your established geo stake.



Chapter 3. Menu Map & Keyboard Shortcuts

File

- i. Open: Open a saved file
- ii. Save: Save current file for future use.
- iii. Save As: Save as a new file for future use.
- iv. Exit: Close the program.

View

- i. Zoom In: Magnify the tracking setting in the user interface. The scale bar at the bottom right of the screen will adjust to match for each iteration.
- ii. Zoom Out: Zoom out from the tracking setting in the user interface. The scale bar at the bottom right of the screen will adjust to match for each iteration.
- iii. Fit To Screen: Auto-zoom to a size that fits the mesh and floorplan on the screen.
- iv. Display Coordinates: Toggle real-time XYZ coordinates for display above each individual tag.
- v. Display Grid Lines: Toggle a scale grid across the floorplan.
- vi. Display Geofence Indicators: Toggle circles around tag icons that indicate their current geofences.
- vii. Toggle Tag Filtering: Switch visual filtering on or off.
- viii. Configure Tag Filtering: Adjust filtering settings to your preference.
- ix. Display Location History: Turn a visual, granular record of asset motion and location on or off.
- x. History Color Shows Number of Antennas: Toggle on or off to display a color scale showing how many Antennas can detect each Tag.
- xi. History Playback Controls: Open a history playback tool bar for reviewing tracking histories.
- xii. Clear Location History: Clear the tracking data points already generated since initiating tracking.
- xiii. View System Health Info: Open the *Network Health* window to check for network problems related to the Antennas.

Configure Devices

- i. Gateway List: Open the *Gateway List* to add, edit, remove, or check connections with gateways.
- ii. Enable USB Antenna: Allow your computer to use USB to interface with an Antenna.
- iii. Load Floorplan: Select a pre-made floorplan, such as a floorplan, to display for

- tracking.
- iv. Clear Floorplan: Remove the floorplan image currently selected.
- v. Set Floorplan Scale: Specify the inches-to-pixel scale for a selected floorplan.
- vi. Antenna Groups: Open the *Antenna Group Manager* to group and organize Antennas.
- vii. Discover Network: Detect powered, in-range Antennas included in your identity file.
- viii. Tracking Settings: Adjust various settings for tag tracking.
- ix. Update Antenna Firmware: Program new versions of firmware on Antennas.

Calibrate

- i. Set Expected Tag Height: Specify a uniform height expected for tags being tracked.
- ii. Toggle Circles: Toggle on or off the radius of measured distance between each Antenna.
- iii. Calibrate Antenna Position: Begin the auto-calibration process for Antenna placement.
- iv. Stop Antenna Calibration: Pause or conclude the auto-calibration process for Antenna placement.

Active Tracking

- i. Run Active Tracking: Begin actively tracking roaming Antenna devices.
- ii. Stop Active Tracking: Pause or conclude tracking roaming Antenna devices.
- iii. Find Active Tags: Discover roaming Antenna devices that are powered and ready for tracking.

Tag Tracking

- i. Run Tag Tracking: Begin actively tracking tags.
- ii. Stop Tag Tracking: Pause or conclude tracking tags.
- iii. Auto-Configure Tag Tracking: Prepare the software to run tag tracking.

Geofences

- i. Browse Geofences: Open the *Geofence Browser* to add, edit or delete Geofences.
- ii. Select Geofence: Toggle on or off a viewing mode to select Geofences by clicking them on the floorplan. If the mouse covers multiple Geofences, use "Tab" on the keyboard to cycle between them.
- iii. Hide Geofences: Toggle Geofence visibility in the GUI. Note: Geofence data will still register on the back end even while Geofences are invisible to the user.
- iv. Valid Tracking Area: Open the *Geofence Browser* to demarcate an area that the tags must physically be in. This is useful, for example when tags will only ever be in a particular area, but the nature of the mesh could lead to the tags being shown

outside of that area.

Geo Staking

- i. Set Geo Stake: Position and define a geo stake.
- ii. Remove Geo Stake: Clear a set geo stake from the floorplan.
- iii. Display Geo Stake: Toggle geo stake visibility on or off.
- iv. Display Compass: Toggle the compass on or off for a set geo stake. This compass will not be visible without the presence of a geo stake.

Assets

- i. Name Assets: Open the *Asset Names* window to pair names with IDs.
- ii. Labels: Open the *Tag Label Editor* to create labels for tag grouping / organization.
- iii. Asset View Settings: Open the *View Assets* window for finding specific assets and filtering asset visibility.

Server

- i. Change REST Hostname: Create a custom hostname for the server.
- ii. Enable TLS: Toggle Transport Layer Security on or off.

Help

- i. About: Check the software version, libraries, and license information.
- ii. Report an Issue: Generate an issue file to log the current software and mesh state.

Keyboard Shortcuts

Ctrl+=	Zoom In
Ctrl+-	Zoom Out
Ctrl+A	Save As
Ctrl+C	Calibrate Antenna Position
Ctrl+G	Toggle Grid Lines
Ctrl+H	Toggle Location History
Ctrl+I	Load Identity File
Ctrl+L	Toggle Tag Filtering
Ctrl+O	Open
Ctrl+S	Save
Ctrl+W	Gateway List
Ctrl+Shift+C	Toggle Circles
Ctrl+Alt+C	Stop Antenna Calibration

Additional keyboard tools:

During or before Antenna calibration, click "H" while hovering the mouse over an A to configure that Antenna's height.

During or before Antenna calibration, click "R" while hovering the mouse over an Antenna to select it for calibration.

During Antenna calibration, click lower-case "L" while hovering the mouse over an Antenna to lock or unlock that Antenna's position on the layout image.

During Antenna calibration, click the spacebar to move the currently selected Antenna to the target's location and automatically select the next Antenna.

During Antenna calibration, click "N" to automatically select the next Antenna without moving the current antenna.

While selecting Geofences and hovering the mouse over two or more Geofences at once, click "Tab" to cycle between them.

Within the Geofence editor, hold "Shift" to enable panning the screen around the mesh.

Reporting an Issue

To report an issue, simply select the menu item *Help* → *Report an Issue*. This will generate an issue file, and your system will immediately display this file, already selected, in a new file browser window. The file generated will log information to help WISER engineers troubleshoot and identify the source of a problem. Email this file to your account manager or support@wisersystems.com for the issue to be logged and addressed.

REST API (for developers)

The WISER API allows developers to integrate WISER Locator data into their existing software solutions. Please see the included REST API documentation (if purchased) to utilize this feature. For help with the API, please contact your WISER support representative.

Disclaimer

Demo Kits are sold as is. Any support hours included in the purchase of a demo kit will be specified in the quote associated with that purchase. Please see the end of this manual for company contact information.

FCC Regulations

Per Section 15.21 of the Federal Communications Commission, any changes or modifications not approved by WISER Systems, Inc. could void the user's authority to operate the equipment.

FCC Notice:

- 1) *This device complies with Part 15 of the FCC Rules:*
- 2) *Operation is subject to the following conditions:*
 - a. *This device may not cause harmful interference, and*
 - b. *This device must accept any interference received, including interference that may cause undesired operation.*
- 3) *Changes and Modifications not expressly approved by WISER Systems, Inc. can void your authority to operate this equipment under Federal Communications Commission (FCC) rules.*

Industry Canada Regulations

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Contact Information

For additional questions and support, contact WISER Systems, Inc. at:

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