ZONITH Positioner User Interface

Quick Start Guide

Version 2.7.x

ZONITH

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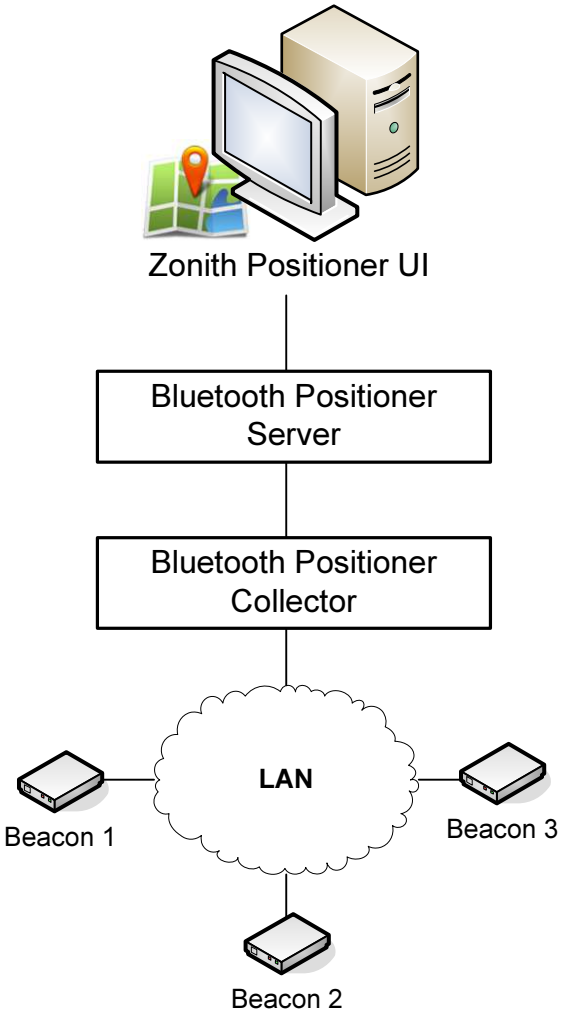
Contents

1. Introduction

This document will guide you through the installation and configuration of a stand-alone Zonith Positioner application. This can be used for demonstration purposes as well as a simple location tracking application. Make sure that you have all the requirements are met before starting the installation – see section 2. An overview of the whole setup is given below.



2. Requirements

Below is listed the requirements for a fully functional installation of ZONITH Indoor Positioning in the stand-alone mode.

2.1. Software

1. BluetoothPositionerCollectorSetup_v2.7.x.exe
2. BluetoothPositionerServerSetup_v2.7.x.exe
3. ZonithPositionerUserInterfaceSetup_v2.7.x.exe

See section 7.2 for download links.

2.2. Hardware

1. PC (Laptop/Desktop) for software Installation. (Recommended specifications: At least 1.6GHz Processor, 2GB Memory, 1 GB free disk space, Windows XP-Pro, or Windows 7 all editions updated with the most recent service packs and update from Microsoft such as the .NET framework)
2. At least 2 Bluetooth Positioning Beacons (BPB).
3. Router/Switch
4. Network Cables to connect the PC and BPBs to the Router/Switch Ethernet ports.
5. Bluetooth device(s) for localization.

   Note: The Bluetooth device should be configured in General Discoverable Mode.

3. Installation

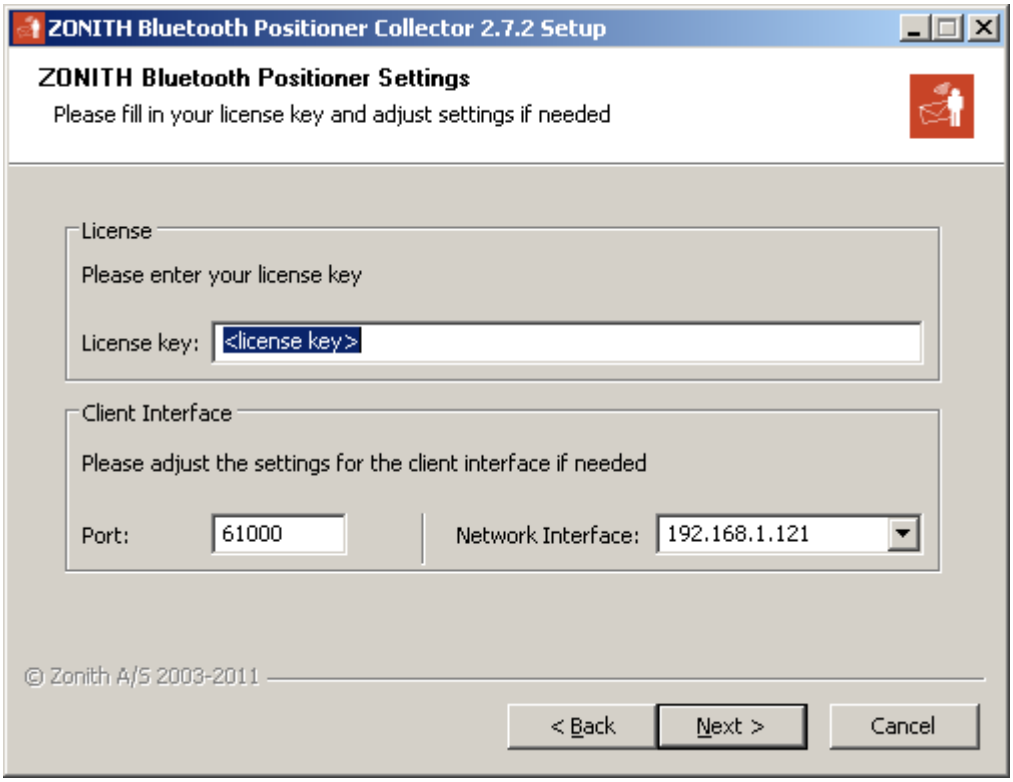
This section will guide you through the installation of the 3 software components that need to be installed. It is recommended that you install them in the mentioned order.

3.1. Bluetooth Positioner Collector

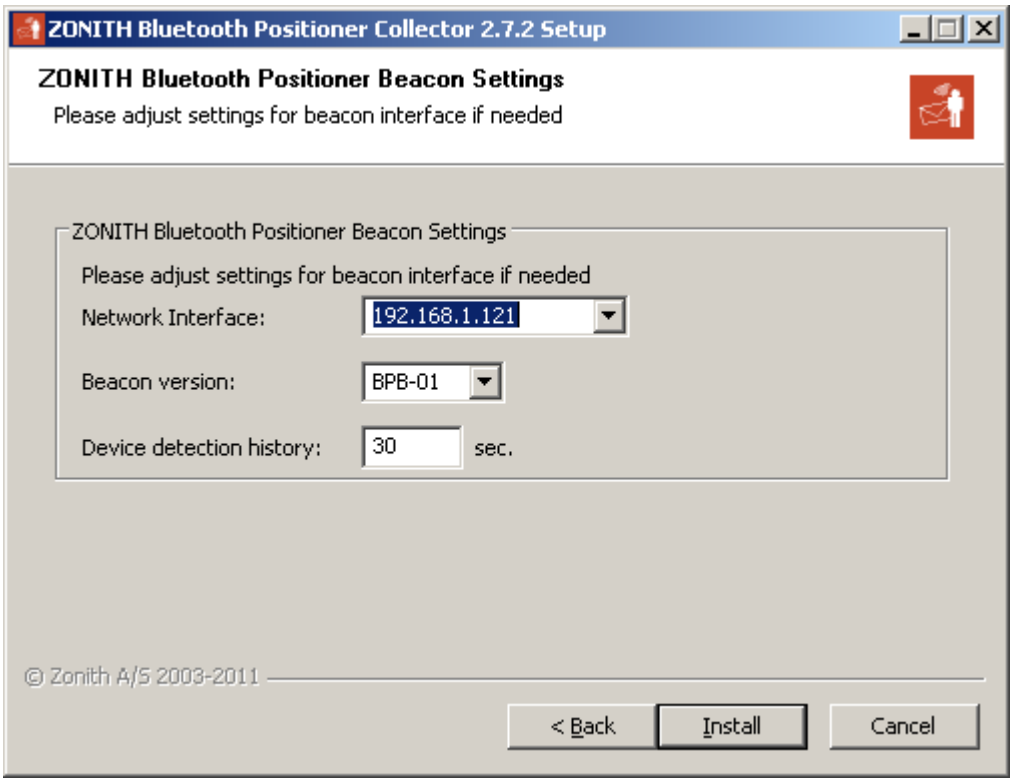
NOTE:

Before performing this installation, please ensure that you have the copy of the license code supplied by Zonith. This license is bound to a set of Bluetooth Positioning Beacons (BPB) that are required to be used in the installation.

Run the collector installation file and follow the on screen installation wizard.



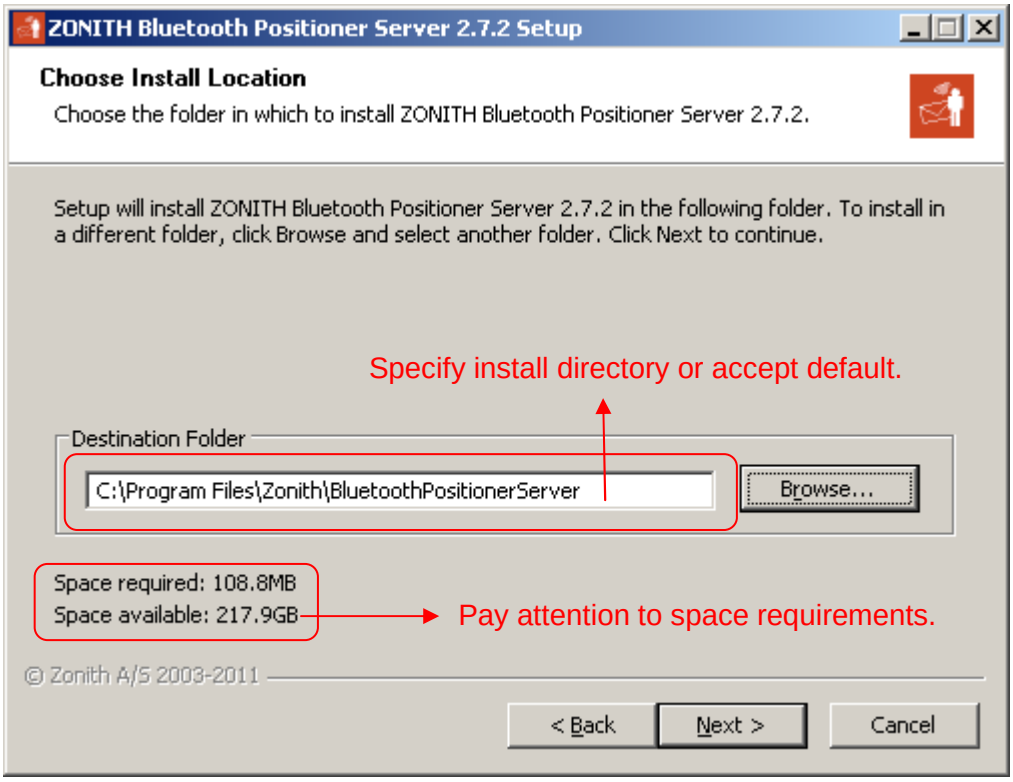
Enter the license key. Select the network interface and port number of where to accept client connections. Click “Next” to continue.



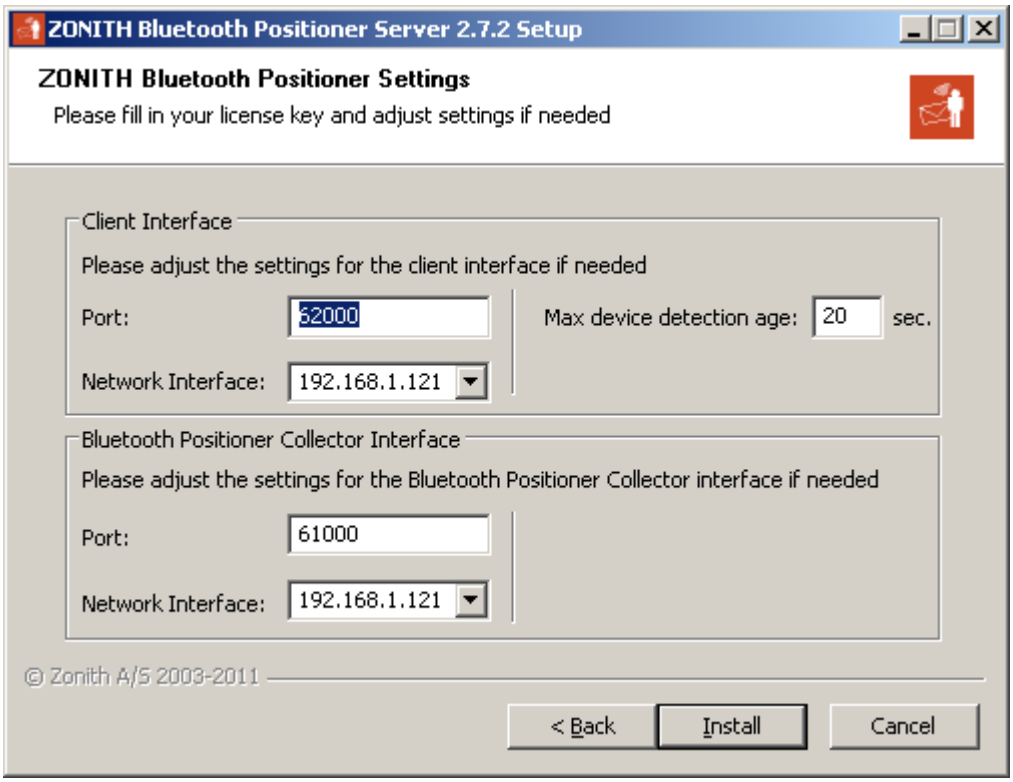
Select the network interface where the Bluetooth Positioner Beacons can be found and click “Install” to finish the installation.

3.2. Bluetooth Positioner Server

Run the server installationfile and follow the on screen installation wizard.



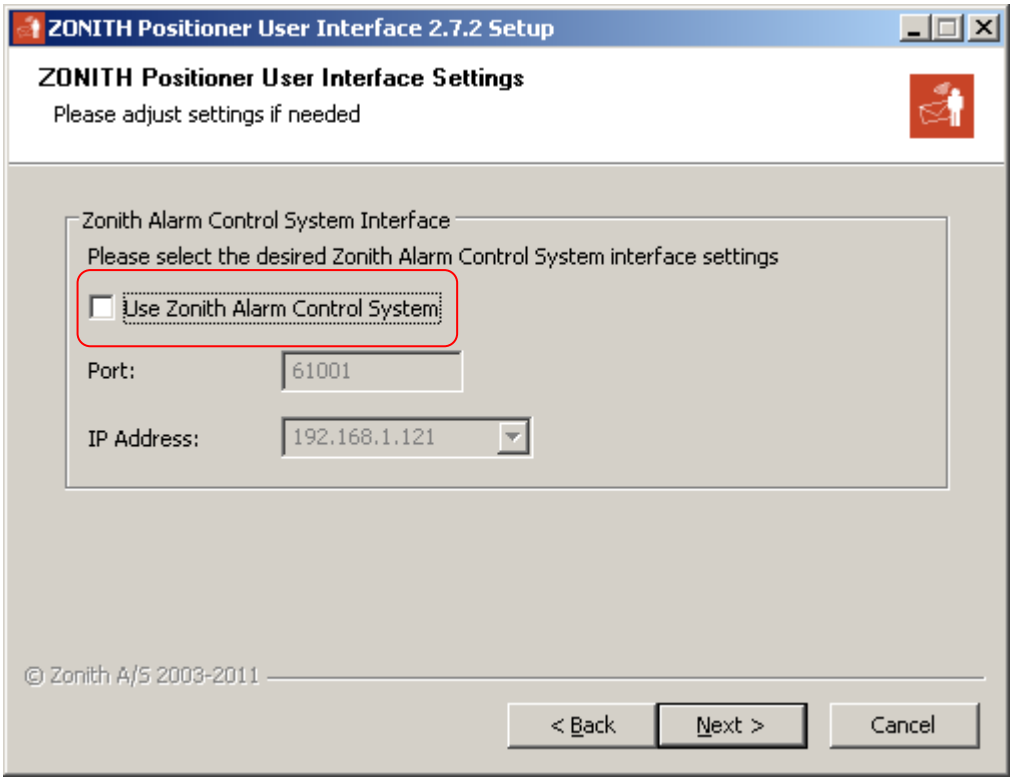
Select install directory or accept the default when prompted by the install wizard. Click “Next” to continue.



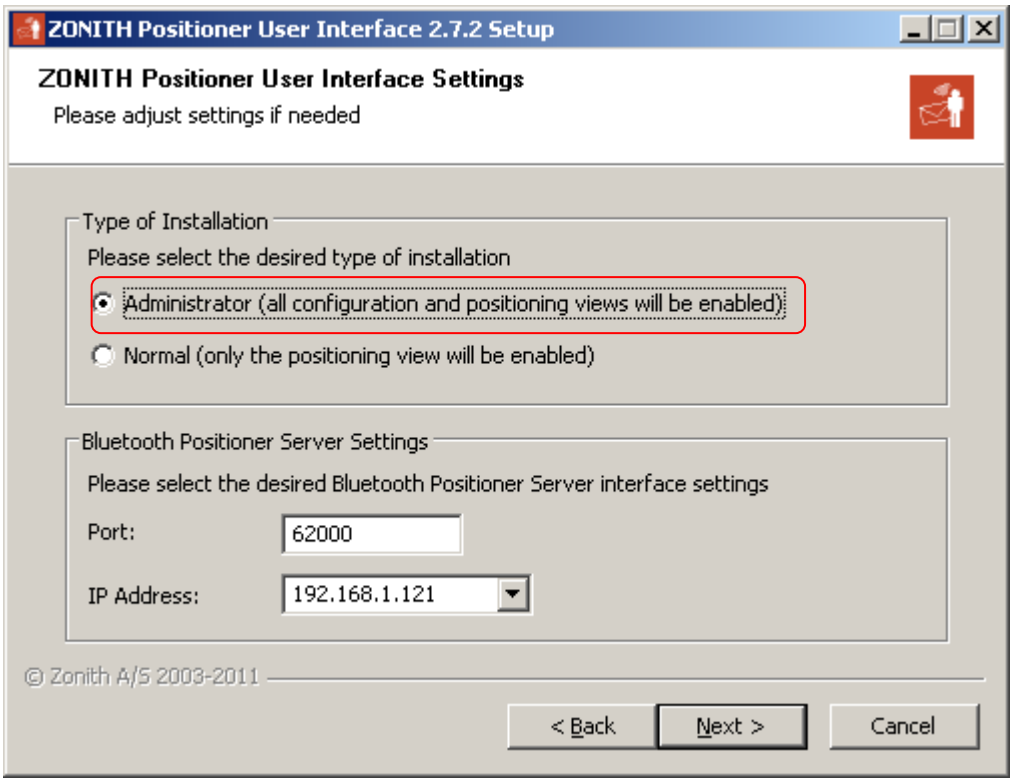
Adjust the Bluetooth Positioner Server settings according to your network and collector settings. Click “Install” to finish the installation.

3.3. Zonith Positioner User Interface

Run the user interface installation file and follow the on screen installation wizard.



Uncheck “Use Zonith Alarm Control System” to indicate stand-alone mode and click “Next” to continue.

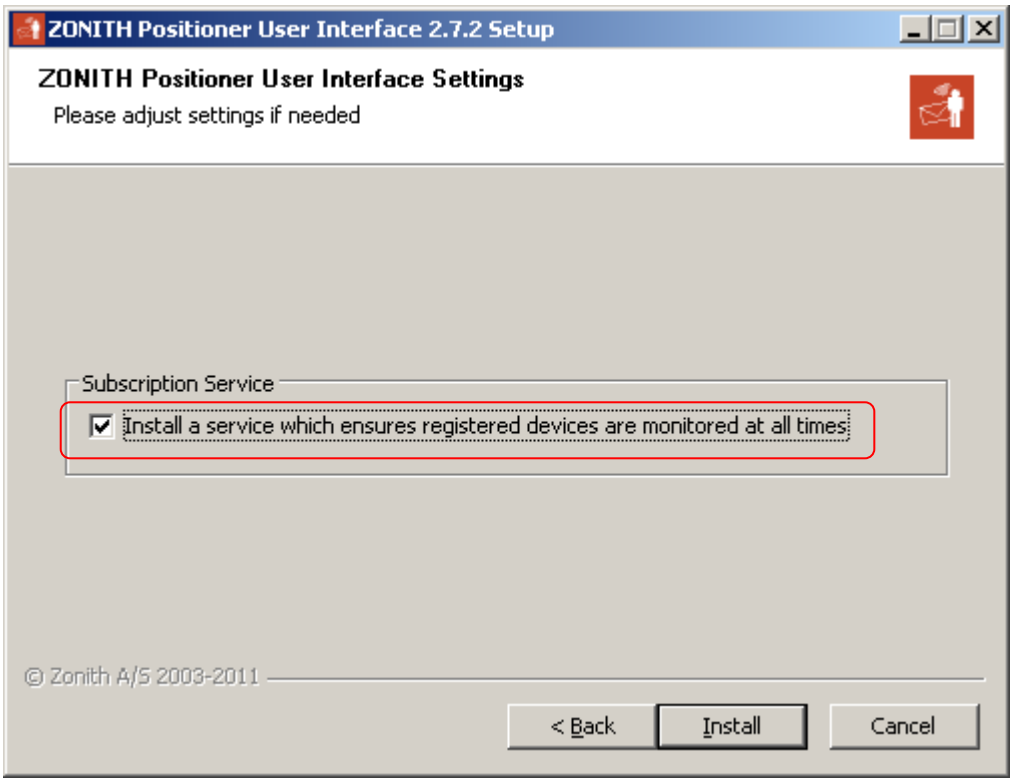


Select “Administrator” and adjust the Bluetooth Positioner Server Settings to match the settings selected when installing the server.

Note:

Administrator: The installation allows the user to modify the configuration such as adding maps and registrations of Bluetooth devices as well as the option for viewing current locations of the registered device(s).

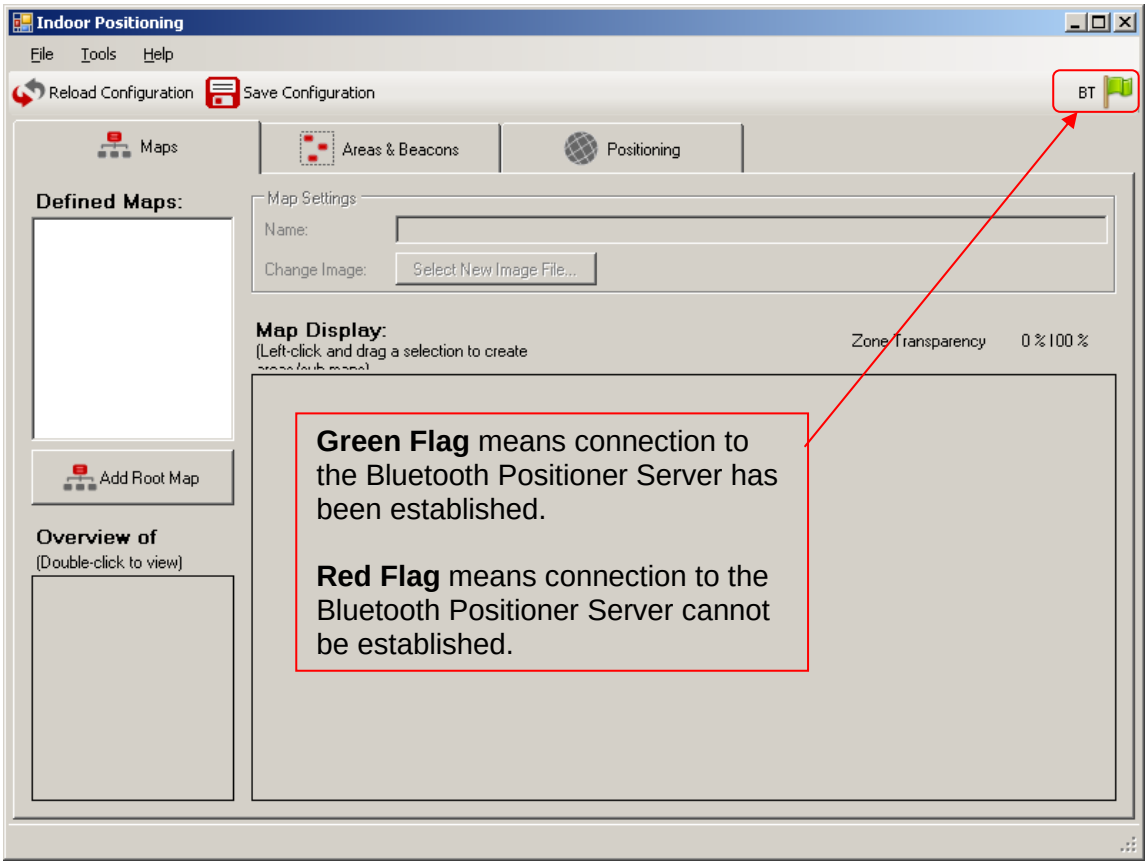
Normal: Only used for viewing current device positions. The installation does not allow users to make any changes to the configuration.



Check the checkbox to ensure that a Windows Service is installed to keep monitoring of devices even when the User Interface is not running. Click “Install” to finish the installation.

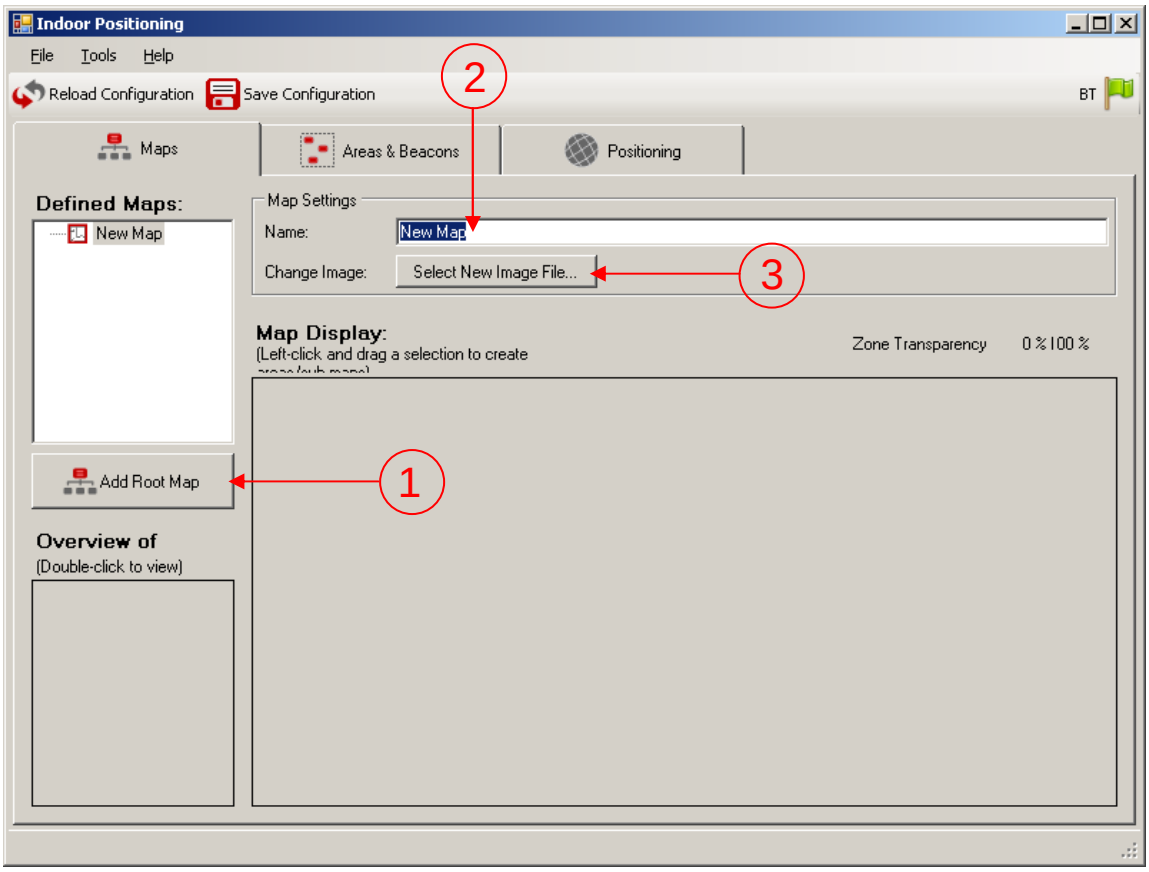
4. User Interface Configuration

Launch the Zonith Positioner User Interface. Ensure that the application communicates to the BP (Bluetooth Positioner) Server. This is indicated by the Green Flag as shown in the figure below:

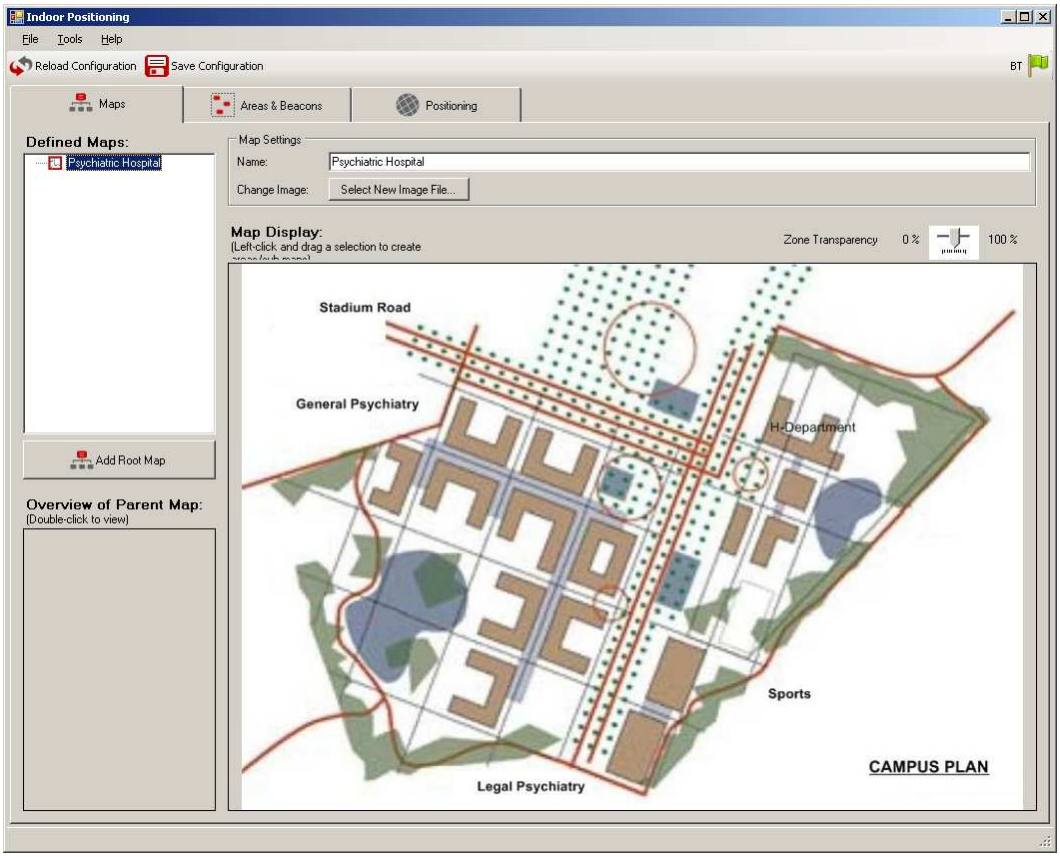


4.1. Adding Root Map in the configuration

Add a (root) map to the application by clicking the Add Root Map Button.



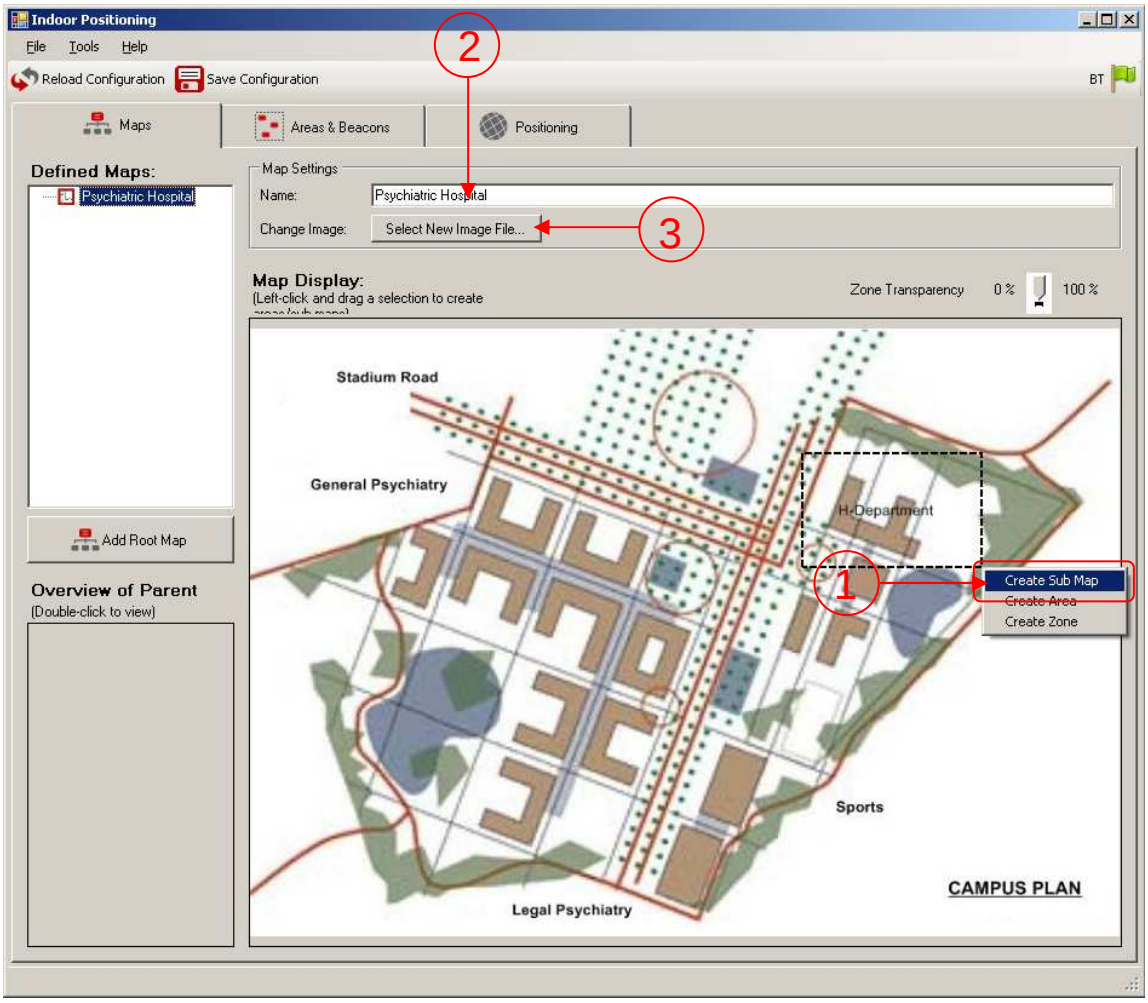
1. Click “Add Root Map”.
2. Type a logical name for the map in the field provided.
3. Click “Select New Image File…” and select a map image by navigating to the directory where the map images are stored. See example of a loaded map image below.



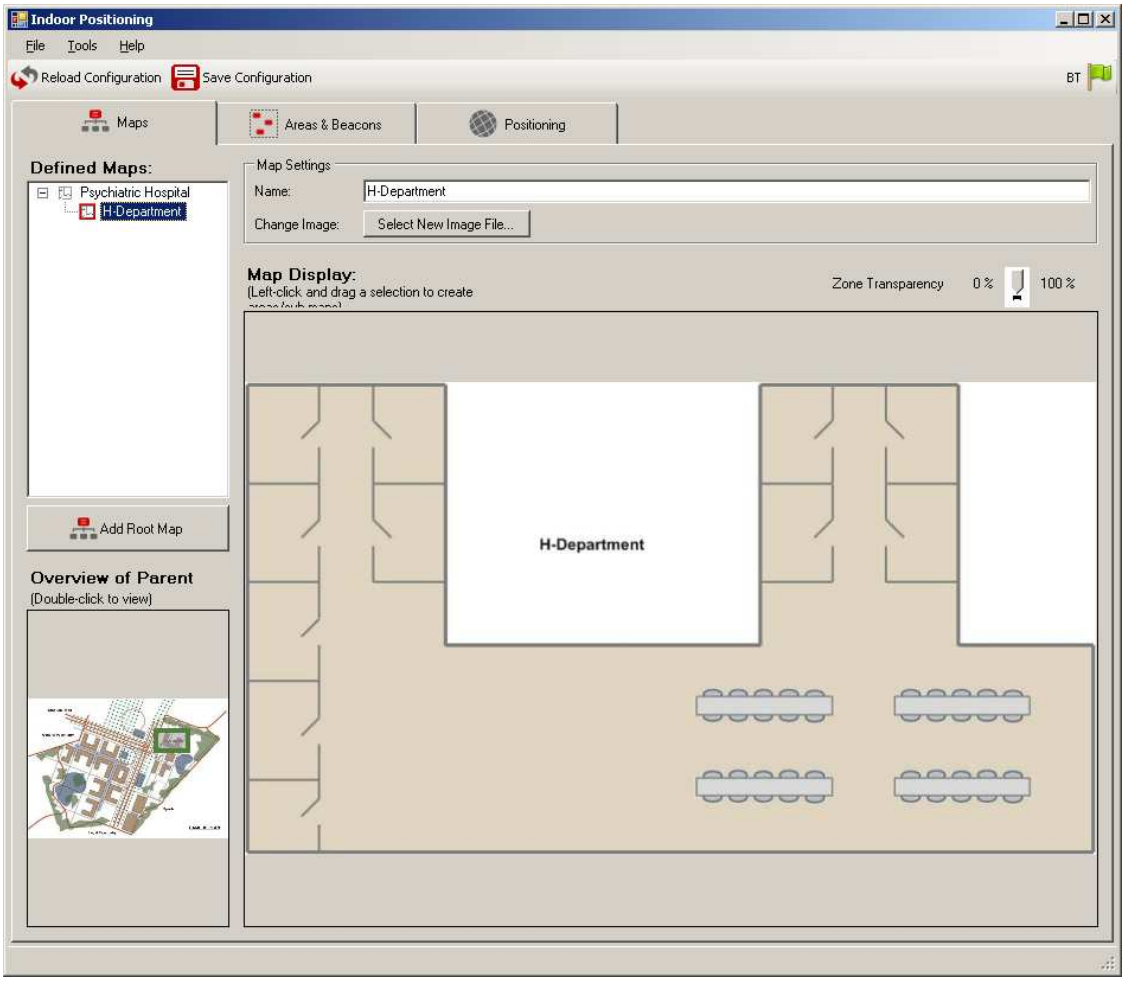
Example of a loaded map image

4.2. Creating Sub Map(s)

Sub maps are essentially “maps within maps” which is used to focus on a certain area of a large map and show that part in greater detail. To create a sub map, left-click the mouse and drag a square on the map. Select the “Create Sub Map” from the context menu that appears when the mouse button is released. See example below:



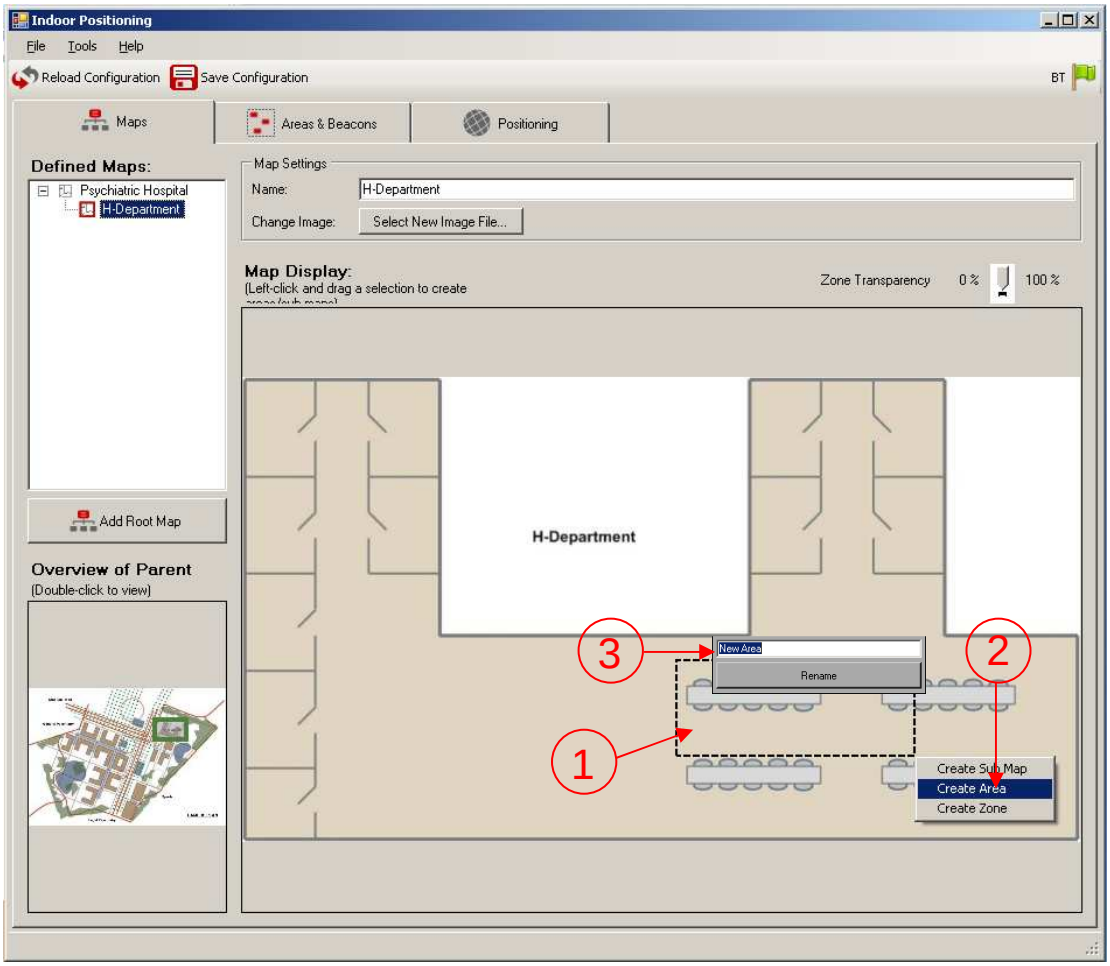
1. Left-click on the desired point on the map where a sub map is desired and drag a rectangle to represent the sub map.
2. Select “Create Sub Map” from the context menu that appears when the mouse button is released.
3. After the sub map has been created, type in a logical name for the sub map in the field provided.
4. Click “Select New Image File…” to select an image which shows the sub map in greater detail than what cropped image part taken from the “parent map”. See example of a loaded sub map image below.



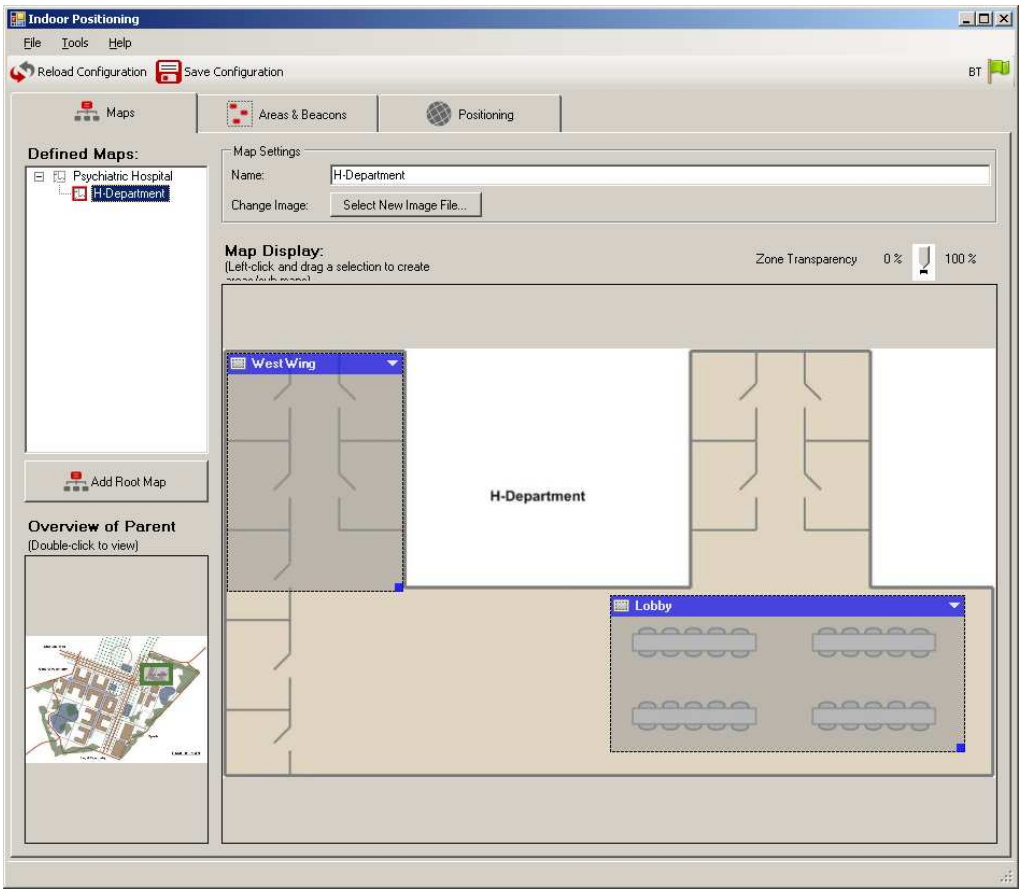
Example of a loaded sub map image

4.3. Creating Area(s) and Zone(s)

Areas and Zones are used to mark physical locations within the configuration. These physical locations can/will be associated with one or more beacons and the server will use these to identify which physical location a given Bluetooth device is “closest to”. The user interface will then display the given device (once added to the list of monitored devices) in the associated Area/Zone to indicate that the person is located in the vicinity of the Bluetoth beacon(s) which is/are associated with the given Area/Zone.



1. Left-click on the desired point on the map where a sub map is desired and drag a rectangle to represent the sub map.
2. Select “Create Area” (or “Create Zone”) from the context menu that appears when the mouse button is released.
3. Enter a logical name for the Area/Zone and click the “Rename” button.
4. Add Areas/Zones to as many maps as you desire. The maps can be in any level of the map hierarchy. An example of two Areas added in the same sub map is shown below.

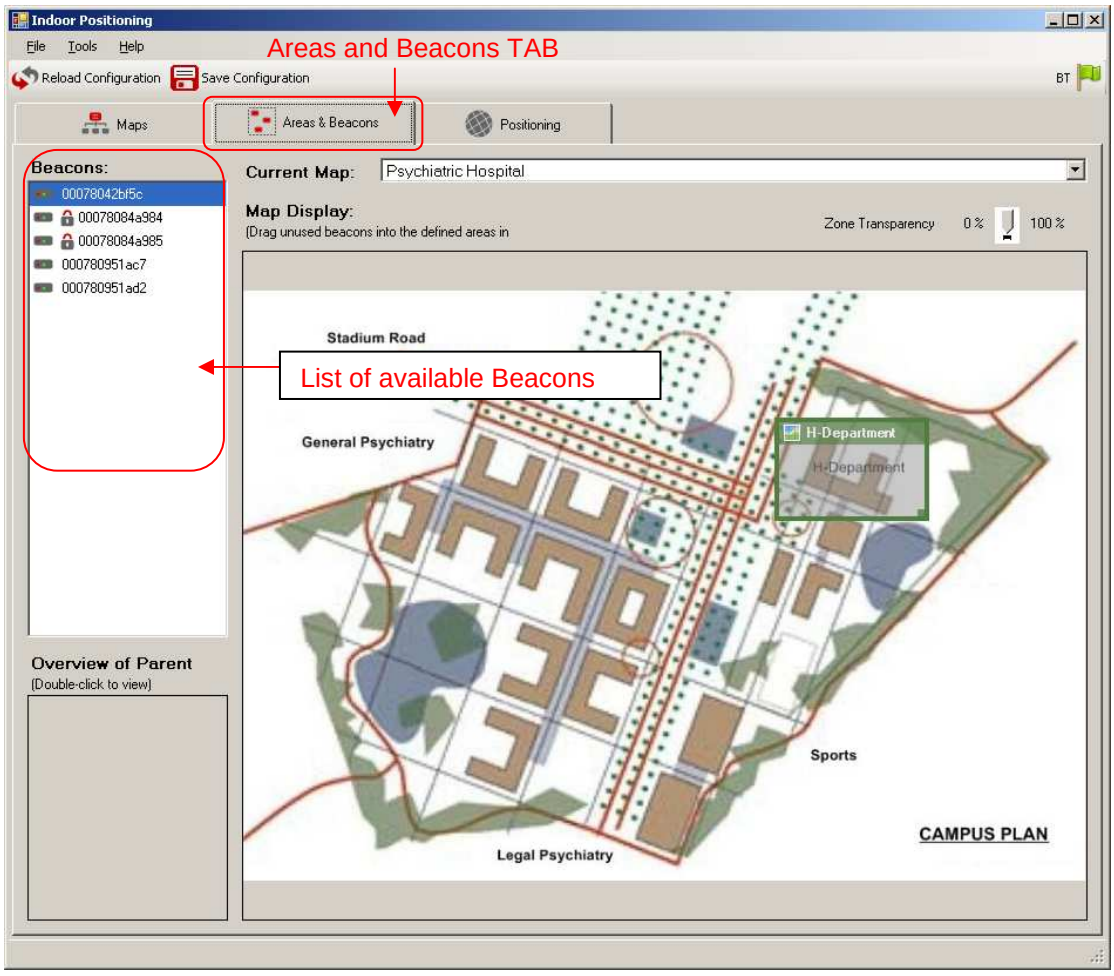


Example of a 2 Areas added to a sub map

5. Bluetooth Beacon Assignments

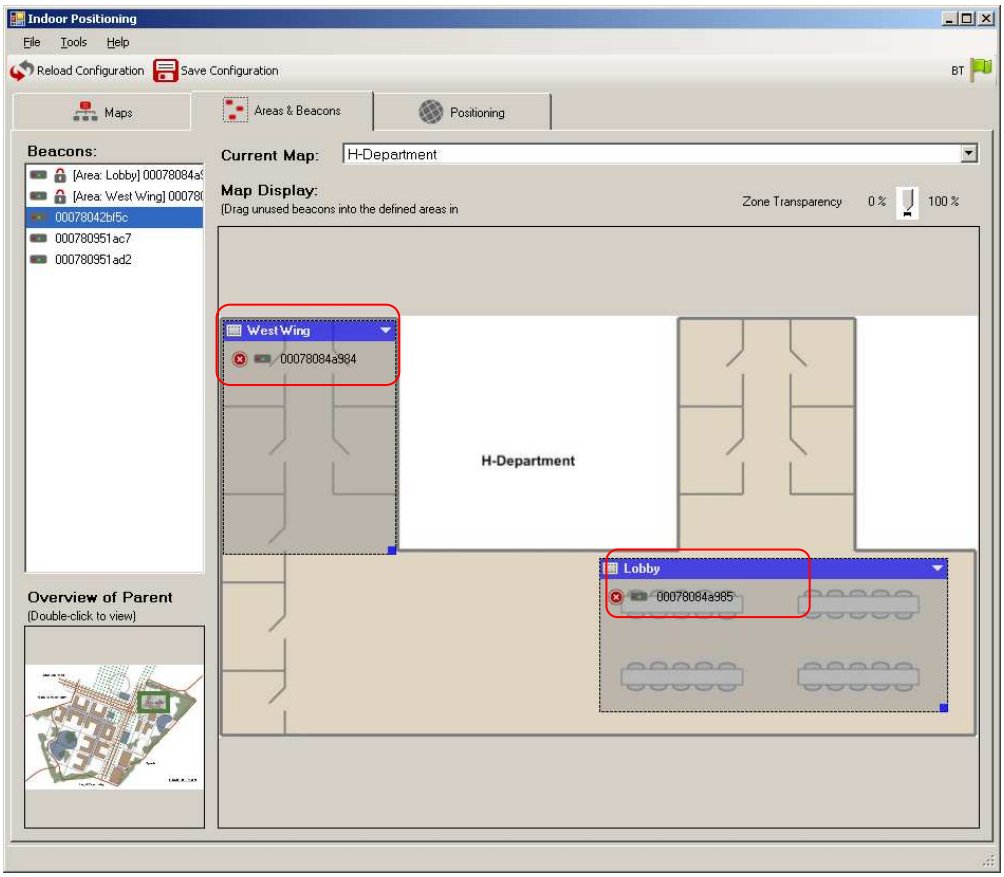
Bluetooth Positioning Beacons must be assigned to Areas/Zones defined within the configuration. One or more beacons can be associated with an Area/Zone, but a beacon can only be used in one Area and in one Zone (i.e. 2 times). Areas and Zones are two different concepts, see section 6, and therefore a beacon can be used once for each of these.

The “Areas & Beacons” tab is where you can assign beacons to specific Areas and Zones.



The list of beacons on the left contains all the beacons that are found (and correctly initialized) in the network. Beacons listed with a lock icon next to them are the ones that are included in the license key and thus required to be in the network.

Associating a beacon with an Area/Zone is done by selecting it in the list, left-clicking and holding the mouse button down while dragging the beacon to the desired Area/Zone where the button is released. An example of two Areas each associated with one beacon is shown below.

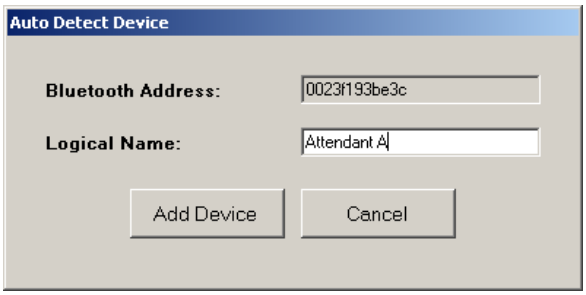


After making changes to the configuration, click “Save Configuration” in order to store the changes in the server.

5.1. Bluetooth Device Registrations

Adding devices to be monitored is done by assigning a logical name to a given Bluetooth (device) address. The Bluetooth address of a device is not always easy to find, and therefore an “Auto Detect” feature has been implemented. This allows you to place a Bluetooth enabled device close to a Bluetooth Positioner Beacon (i.e. “on top” of the beacon), and thereby read the Bluetooth address of the device with the strongest signal strength at the given beacon.

To auto detect the Bluetooth addresses of a device, place it on top of a given beacon, right click the beacon in the list of beacons and click “Auto Detect Device…” in the context menu that appears. If a device is found at the beacon, a dialog will be shown with the Bluetooth address preset and the option for the user to enter a logical name for the device. See example below.



Several Bluetooth devices can be registered in the application for positioning following the same procedure. If the application returns an Error message during registration this is most probably because no Bluetooth devices were detected near the given beacon. Ensure that the Bluetooth in the device is enabled, place the device as close to the beacon as possible and try again.

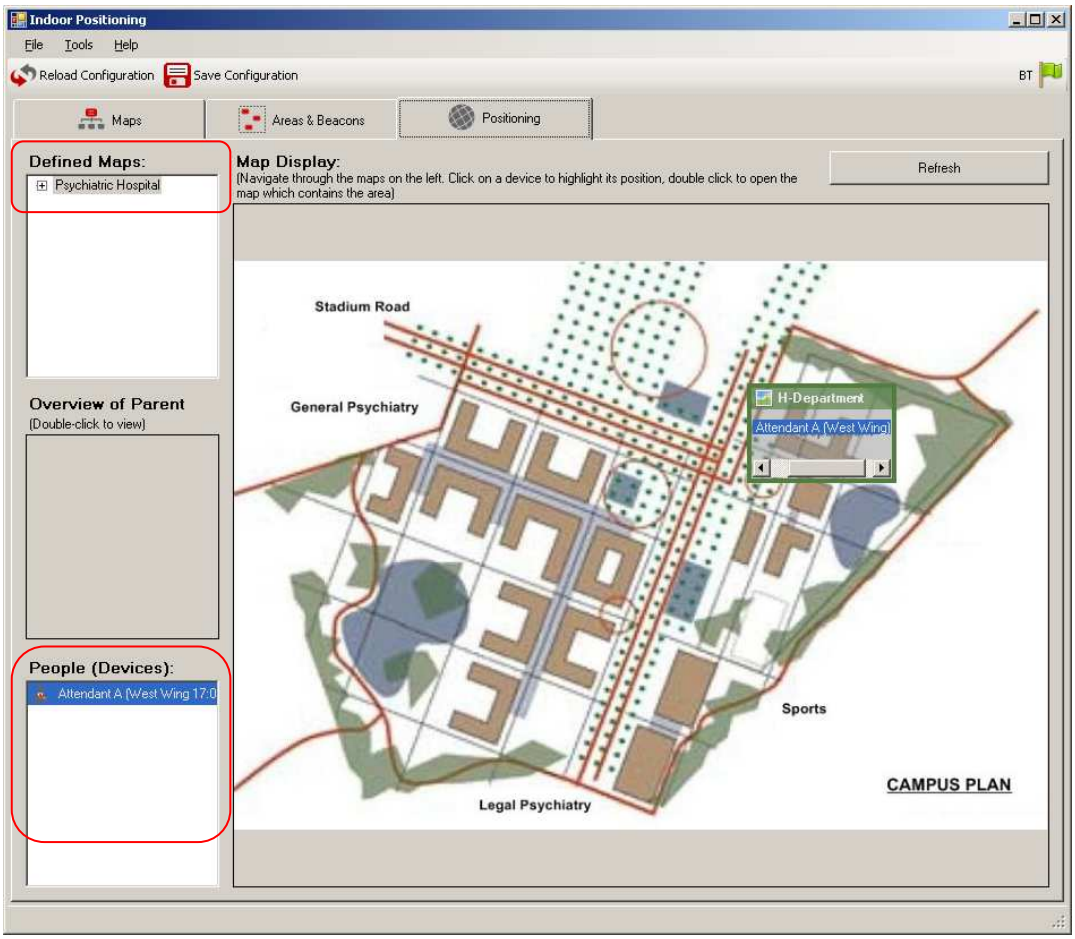
Note: Bluetooth devices must be configured in “General Discovery Mode”.

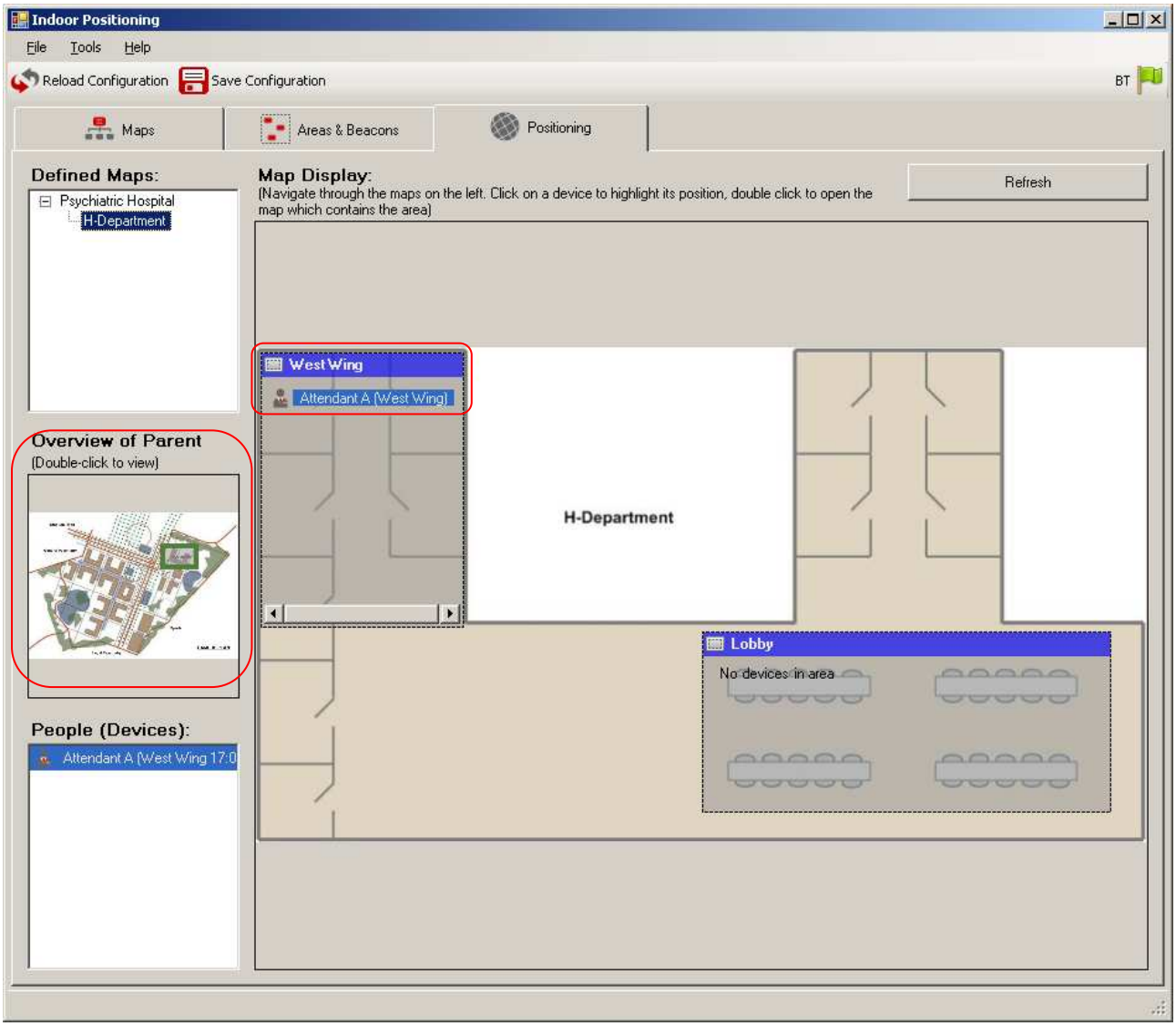
5.2. Positioning

Once a configuration is created with beacons associated with Areas/Zones and devices have been registered to be monitored, it is possible to view the current location of those devices in the “Positioning” tab.

In the “Positioning” tab you can monitor devices at any level in the map hierarchy and move/click your way down into more detailed views (sub maps) as desired.

In the tab, the left hand side contains a list of all maps, a view of the “parent map” (if any) and a list of all monitored devices and their last known locations. The map display itself will display the current location of any device located in an Area/Zone which is visible within the given map or its sub maps. The examples below outline where these items are found.




Indoor Positioning
File
Tools
Help
Reload Configuration
Save Configuration
BT
Maps
Areas & Beacons
Positioning
Defined Maps:
Psychiatric Hospital
H-Department
Map Display:
(Navigate through the maps on the left. Click on a device to highlight its position, double click to open the map which contains the area)
Refresh
Overview of Parent
(Double-click to view)
West Wing
Attendant A (West Wing)
H-Department
Lobby
No devices in area
People (Devices):
Attendant A (West Wing 17:0

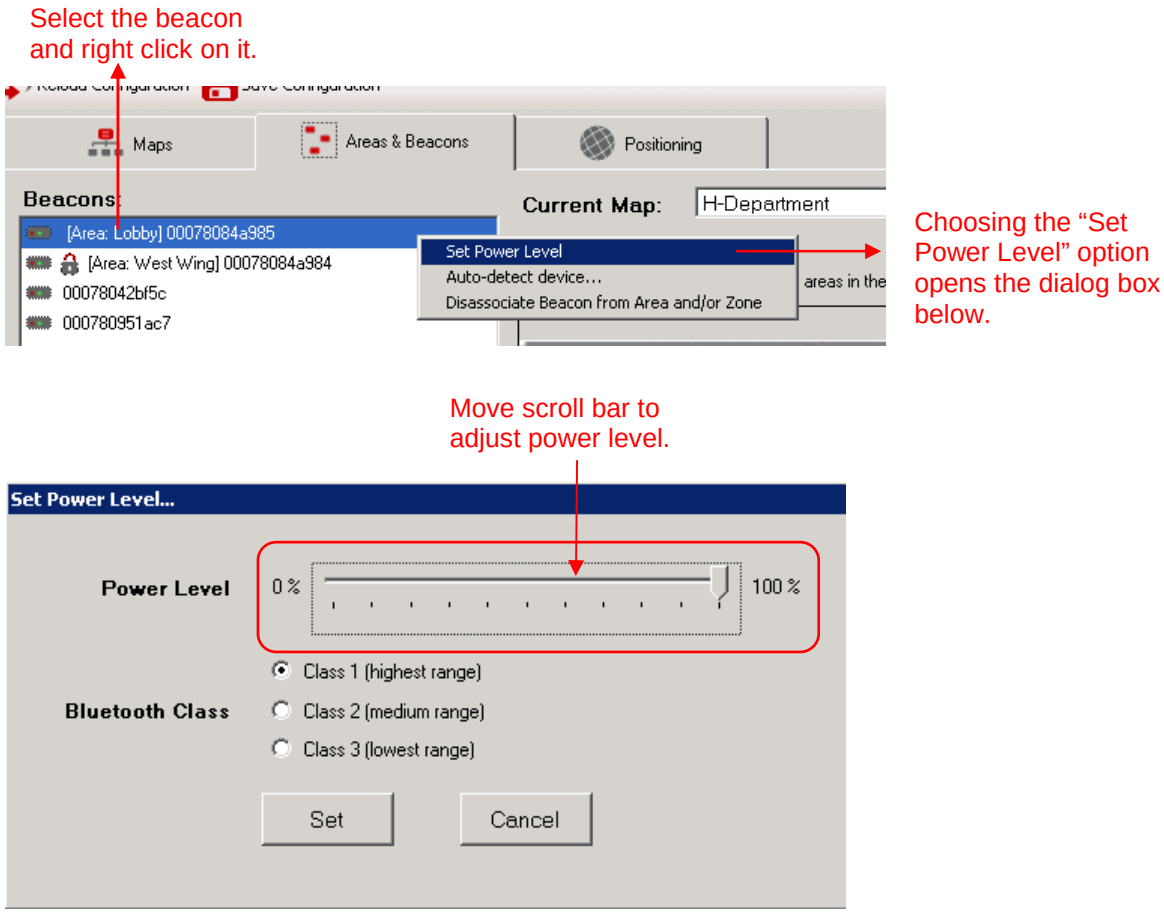
5.3. Adjusting Power Level

Each Bluetooth Positioner Beacon has a configuration denoted as “power level”. This setting basically covers 2 things: 1) A power level value (0-100%) used to reduce the strengths of the device signal values read at the given beacon and 2) a Bluetooth Class setting used to limit the range of the beacon.

The power level is set to 100% to allow a beacon to operate in “normal mode”. This setting is mostly used for fine tuning a configuration, or for beacons which has a very specific purpose such as only being used for auto detection for example.

The Bluetooth Class is used to set the range in which devices are detected. Class one represents the highest range, and class 3 the lowest. As a rule of thumb, Class 1 beacons will be able to see devices which are 100 meters away from it in open space. Obstacles in the line of sight will reduce this range.

Below is an example of how to adjust these settings.



After making the changes click the “Set” button to apply the changes.

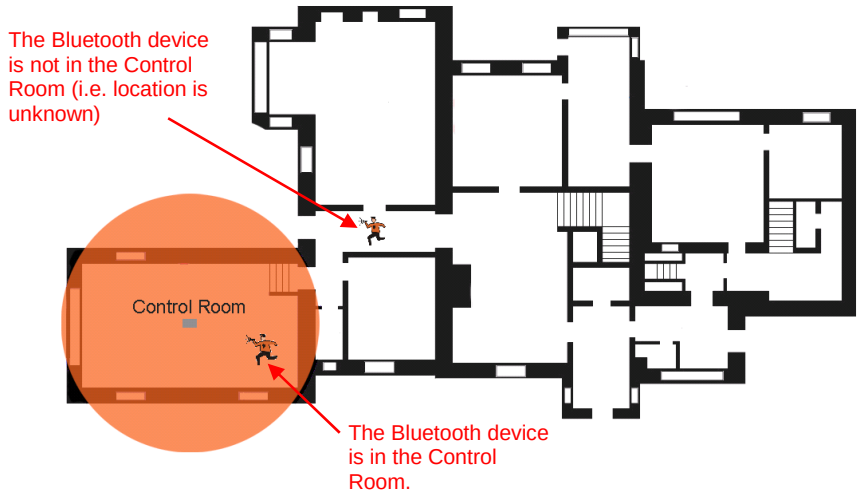
6. Understanding Zone and Areas

Although the Zones and Areas appear to be somewhat the same in the User Interface, there is a big and important difference between them. This section will describe each of the terms in more detail. In short, it can be stated that Areas require “full coverage” and Zones only require “coverage of entry/exit points”.

6.1. Areas

An Area covers the physical area which is within the range of the beacon(s) associated with the given Area. The term “full coverage” is often used to describe Areas because it requires that the complete physical area is within the range of at least one of the associated beacons. In the example below, a single beacon is enough to cover all of the control room, but if we imagine the control room being 3 times the size it is, one beacon would not be able to cover it. If you in such a case desire the control room to be considered one area, you would have to put up 1 or more beacons inside the control room to ensure that their total coverage is enough to cover the whole room.

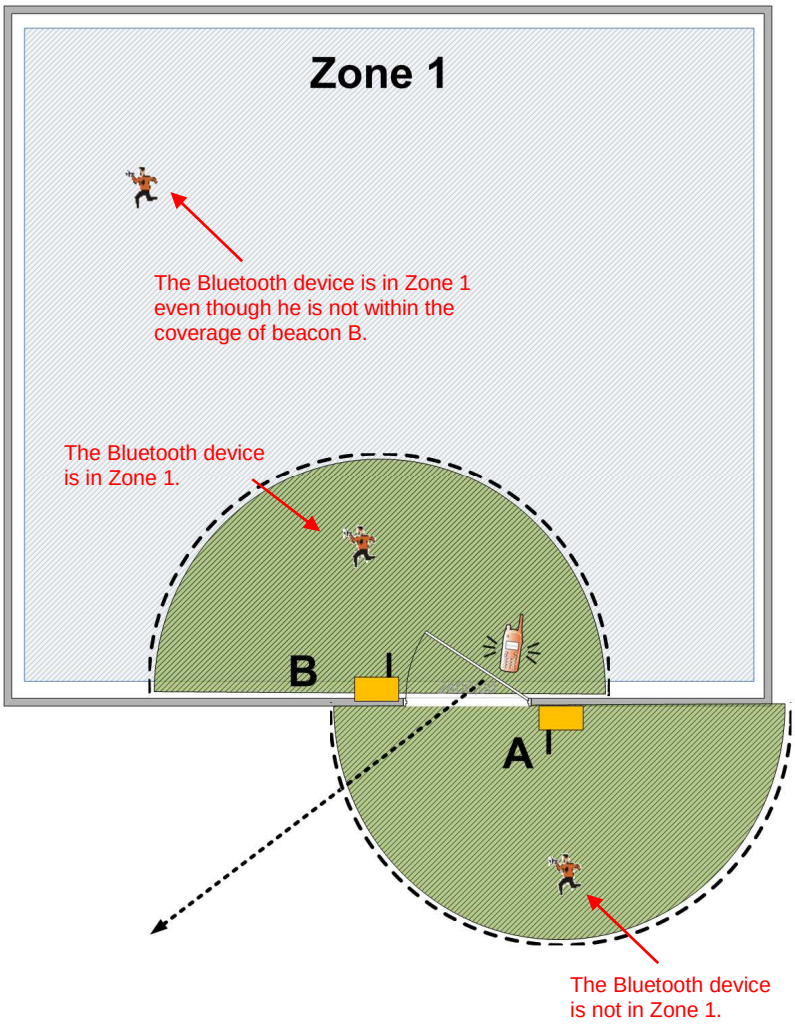
Areas are useful for smaller rooms which can be covered with 1-3 beacons, but when a room is larger than that you should consider using Zones instead.



Areas always provide “real-time” location information in the sense that the Area containing the beacon which has the strongest signal strength from a given device will be the Area where the device is located. If the device is turned off, or outside the range of all beacons, the device will not appear anywhere. This is not the case when using Zones.

6.2. Zones

A Zone can cover an arbitrarily large physical area, the only requirement is that all entry/exit points are covered with beacons to detect when devices enter and leave the Zone. The term “entry/exit point coverage” is often used to describe zones because they only require beacons to be placed at the entry and exit points and thus **do not** need to have the complete zone covered by the ranges of the associated beacons. In the example below, Zone 1 is a very large room which would require approximately 5-6 beacons to have “full coverage”. In order to avoid having to pull cables and purchase the extra beacons, it can be very useful to simply cover the entry/exit point with 2 beacons. Usually this is done using beacons with directional antennas such that beacon on the inside “only” points inward and the beacon on the outside “only” points outward. There is bound to be some back lobes on the directional antennas such that you don’t get a 100% directional coverage as indicated by the example. This means that there is an area around the door where a device will be within the coverage of both beacon A and B. This will only cause a problem if a device lingers around the entry/exit point (i.e. door) of the zone.



To create a real world scenario like the one from the example above, you would have to mount the two beacons on either side of the one entry/exit point of the large room you want to cover with a Zone. In the User Interface, you will the associate the beacon(s) that are **on the inside** to the Zone (beacon B from the example). The other beacons (beacon A from the example) can either be used in another Zone/Area or left unassigned.

As indicated in the example, once beacon B has the strongest signal strength for a given device, the device will be considered as “in Zone 1”. The device will then remain in Zone B until any beacon which is not associated with the Zone has the strongest signal strength. This means that if the device simply moves outside the coverage of beacon B, he will still be considered to be “in Zone 1”. Only when beacon A has the strongest signal strength for the device will the device “leave Zone 1”. This has two very important consequences:

- If the beacon(s) on the outside of the Zone (i.e. exit points) are not correctly placed, you may experience that a device remains in a Zone even after leaving it. When a device leaves a Zone, it **must** be detected by the beacon on the outside of the Zone in order to correctly leave the Zone.
- As a consequence of the above, the location information is not “real time” like when using Areas. If the device moves out of coverage but remains inside the Zone, nothing will happen. If the device is now switched off and then physically moved out of the Zone while switched off, still, nothing will happen. So in this case the location information is “wrong” in the sense that we don’t know any better. If the device is switched on again, the device will “leave Zone 1” as soon as any beacon not associated with Zone 1 has the strongest signal strength for the device.

7. Appendix

7.1. Support

For technical information and support, please contact Zonith at support@zonith.com

7.2. Software Download Links

Please contact Zonith to get the latest copy of the IPS software.

7.3. Acronyms

IPS - Zonith Indoor Positioning System

BPB - Bluetooth Positioning Beacon