Cambium Networks™

USER GUIDE

Intelligent Positioning System for Nomadic Wireless Broadband Devices

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Contents

About This User Guide

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Purpose

Cambium Networks Intelligent Positioning Systems for Nomadic Wireless Broadband Devices documents are intended to instruct and assist personnel in the operation, installation, and maintenance of the Positioner equipment and ancillary devices. It is recommended that all personnel engaged in such activities be properly trained.

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Problems and warranty

Reporting problems

If any problems are encountered when installing or operating this equipment, follow this procedure to investigate and report:

1. Search this document and the software release notes of supported releases.
2. Visit the support website.
3. Ask for assistance from the Cambium product supplier.
4. Gather information from affected units, such as any available diagnostic downloads.
5. Escalate the problem by emailing or telephoning support.

Repair and service

If unit failure is suspected, obtain details of the Return Material Authorization (RMA) process from the support website (http://www.cambiumnetworks.com/support).

Hardware warranty

Cambium's standard hardware warranty is for one (1) year from date of shipment from Cambium Networks or a Cambium distributor. Cambium Networks warrants that hardware will conform to the relevant published specifications and will be free from material defects in material and workmanship under normal use and service. Cambium shall within this time, at its own option, either repair or replace the defective product within thirty (30) days of receipt of the defective product. Repaired or replaced product will be subject to the original warranty period but not less than thirty (30) days.

To register positioner products or activate warranties, visit the support website. For warranty assistance, contact the reseller or distributor. The removal of the tamper-evident seal will void the warranty.

Caution

Using non-Cambium parts for repair could damage the equipment or void warranty. Contact Cambium for service and repair instructions.

Portions of Cambium equipment may be damaged from exposure to electrostatic discharge. Use precautions to prevent damage.

Security advice

Cambium Networks systems and equipment provide security parameters that can be configured by the operator based on their particular operating environment. Cambium recommends setting and using these parameters following industry recognized security practices. Security aspects to be considered are protecting the confidentiality, integrity, and availability of information and assets. Assets include the ability to communicate, information about the nature of the communications, and information about the parties involved.

In certain instances, Cambium makes specific recommendations regarding security practices, however the implementation of these recommendations and final responsibility for the security of the system lies with the operator of the system.

Warnings, cautions, and notes

The following describes how warnings and cautions are used in this document and all Cambium Networks document sets:

Warnings

Warnings precede instructions that contain potentially hazardous situations. Warnings are used to alert the reader to possible hazards that could cause loss of life or physical injury. A warning has the following format:

Warning

Warning text and consequence for not following the instructions in the warning.

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Caring for the environment

The following information describes national or regional requirements for the disposal of Cambium Networks supplied equipment and for the approved disposal of surplus packaging.

In EU countries

The following information is provided to enable regulatory compliance with the European Union (EU) directives identified and any amendments made to these directives when using Cambium equipment in EU countries.

Disposal of Cambium equipment

European Union (EU) Directive 2002/96/EC Waste Electrical and Electronic Equipment (WEEE)

Do not dispose of Cambium equipment in landfill sites. For disposal instructions, refer to

http://www.cambiumnetworks.com/support/weee-compliance

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Chapter 1: Overview

Intelligent Positioning System Overview

Overview

The Cambium Intelligent Positioning System for Nomadic Wireless Broadband Devices is designed to align Point-to-Multipoint or Point-to-Point deployments, where one end of the network is fixed with an antenna beamwidth greater than 10 degrees, and the other end is typically a PMP 450 subscriber module or a remote module that is usually installed on a vehicle providing a nomadic network for the end-users.

When the vehicle is parked at a location, the operator can use the Intelligent Positioning System to automatically align the remote module's antenna with the Access Point, providing optimized wireless connectivity without manual alignment.

The following diagram shows a typical installation setup of a PMP 450i attached to the Intelligent Positioning System.

Specifications

Supported Models:	PMP 450, PMP 450i

Azimuth:	400° (+/-200°) and Elevation 40° (+/-20°) Up to 4.5° / second in Azimuth Up to 4° / second in Elevation
Dimension:	17”(H) x 9”(W) x 11”(D)
Weight:	18.0 lbs
Payload:	45 lbs
Mounting:	Clamps to 2” diameter mast Optional Table mount with four holes in a square
Temperature:	Operational: -22 to 140F° Survival: -40 to 158F°
Power:	Passive PoE with -48 VDC to -56 VDC
Management:	HTTP web interface, SNMPv2
Ethernet:	10/100

Standard parts required for the Intelligent Positioning System installation include:

Quantity	Part Number	Description
1	C000000H002A	Intelligent Positioner for Nomadic Wireless Broadband
1	N000000L143A	Intelligent Positioning Systems PoE Cable with a weather-tight end, 30 meters
1	N000000L144A	Intelligent Positioning Systems PTP450/670 Radio adapter bracket
1	N000065L001C	AC Power Injector 56V
1	N000065L003A	US Line Cord
1	N000065L004A	UK Line Cord
1	N000065L005A	EU Line Cord
1	N000065L006A	Australia Line Cord
2	C000000L033A	Gigabit Surge Suppressor (56V)

Note

Depends on the region of installation, use different lines (instead of N000065L003A) for the following markets:

- N000065L004A for UK
- N000065L005A for EU
- N000065L006A for Australia

Note

Additional components required are:

- Mounting Mast
- Radio and accessories including LPU
- Switch

Chapter 2: Configuration

Configuring the Management PC

Configure the management PC settings to communicate with the Intelligent Positioning System.

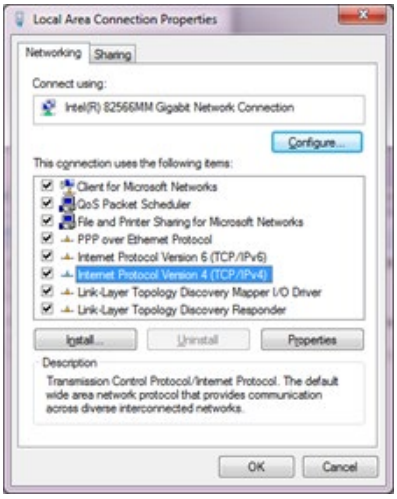
1. Configure your computer IP address

Set the management PCs wired Ethernet RJ-45 connection to a static IP address of 192.168.0.200. The Cambium Intelligent Positioning System uses a default IP address of 192.168.0.245.

Note: The steps to change IP addresses vary based on the operating systems used on the management PCs.

a. In Windows 7 and above, go to Control Panel > Network and Internet > Network and Sharing > Change Adapter Settings > Ethernet > Properties.

b. Select Internet Protocol Version 4 (TCP/IP IPv4) and click Properties.

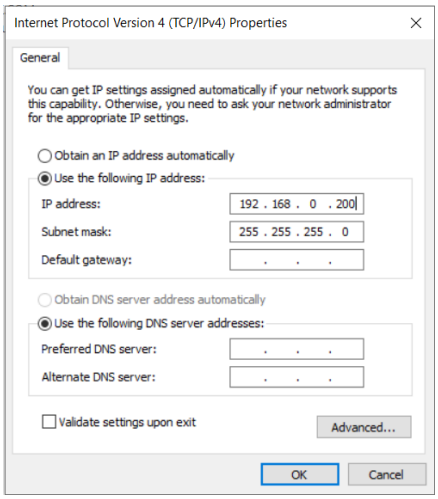


c. In the General dialog box, click the Use the following IP Address radio button.

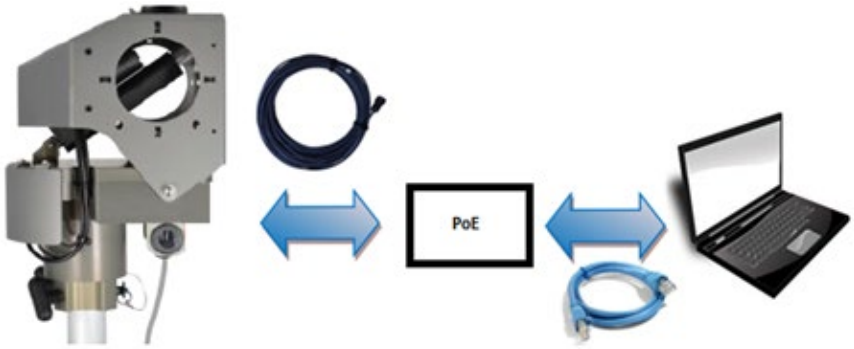
d. Enter an IP address of 192.168.0.200.

e. Enter a subnet mask of 255.255.255.0.

f. Click the **OK** button.



2. Connect the Management PC to the Intelligent Positioning system as shown.

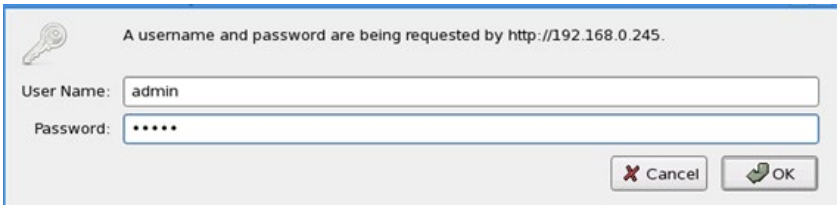


3. Access the Intelligent Positioning system's user interface using a web browser.

a. Launch a browser of your choice (Google Chrome, Safari, or Mozilla Firefox).

b. Enter the Intelligent Positioning System's IP address (192.168.0.245) in the address bar.

c. An authentication required window will be displayed in the browser.

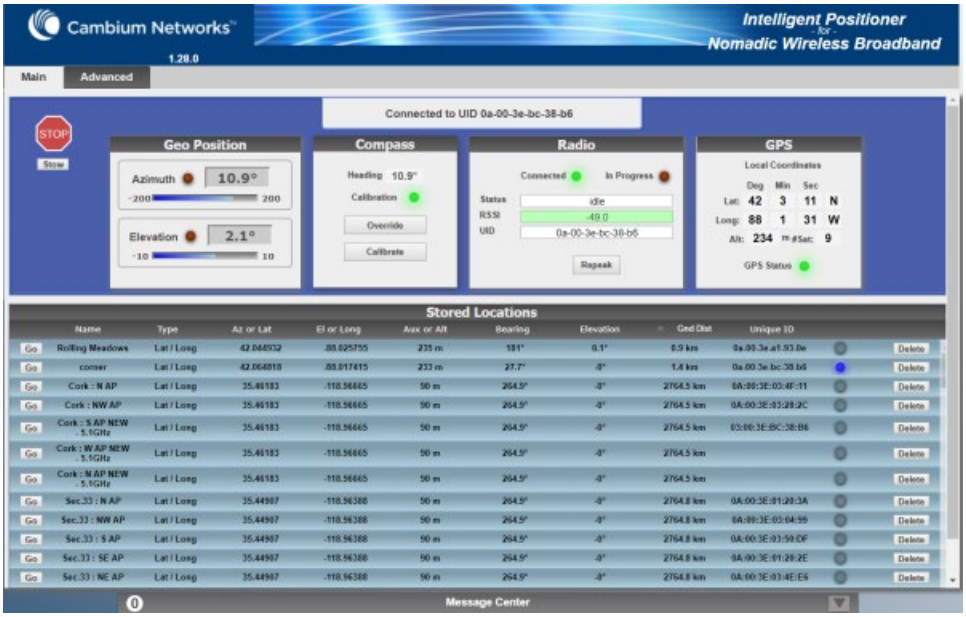


d. Enter the default user name and password and click the OK button.

User Name: admin

Password: cambium

e. The user interface will open to the Main GUI screen upon successful login.



Intelligent Positioning System Configuration

The following configuration steps are required for the Intelligent Positioning system to work with PMP 450.

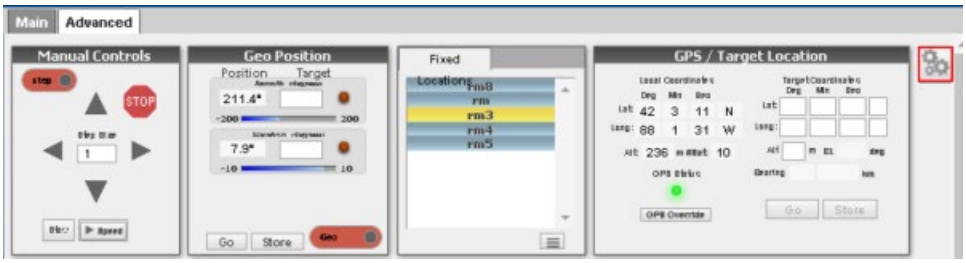
Tip: Perform these steps prior to mounting the devices on a pole.

Procedure

- Configure the Intelligent Positioning System's IP address.
- Configure the radio's IP address (radio that is attached to the Intelligent Positioning System). Set the SNMP version and SNMP credentials, and the Radio Type (this is the type of radio that is attached to the Intelligent Positioning System).
- Load a list of Access Point Coordinates to the Intelligent Positioning System (if you are using the system in a PMP 450 deployment environment).

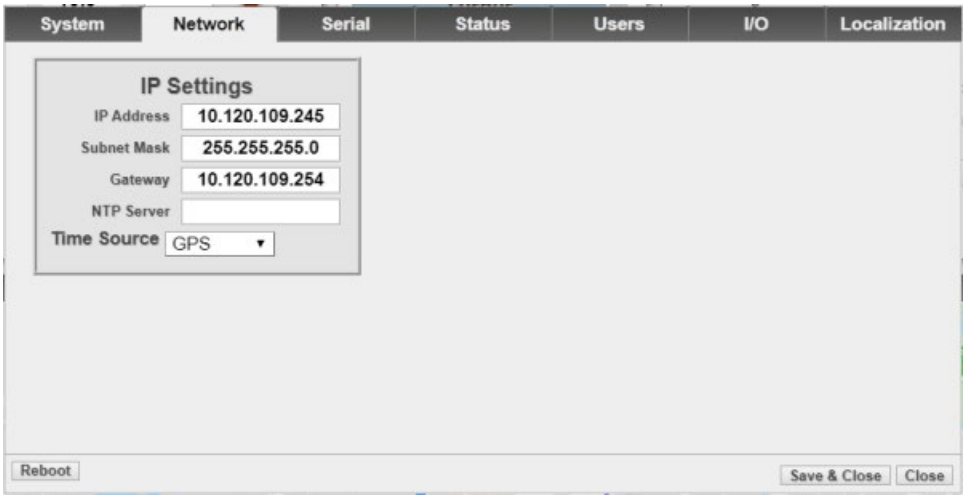
1. Configure the Intelligent Positioning System's IP address.

a. Click the **Advanced** tab > Click the **Settings** (Gears) button.



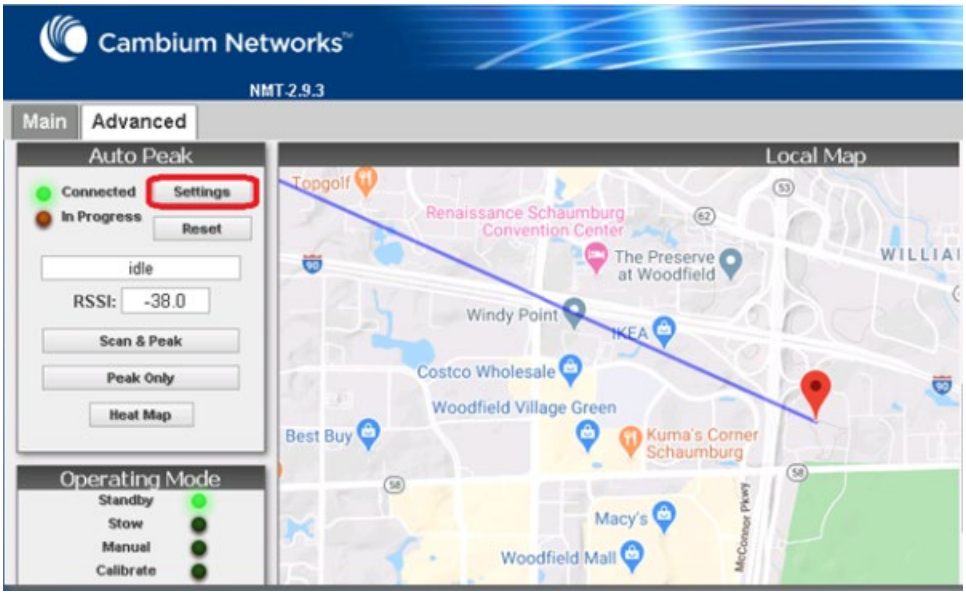
c. Click the **Network** Tab and enter the IP address settings.

e. Click the **Save & Close** button.



2. Next, configure the radio's IP address, set the radio type, and the SNMP Settings.

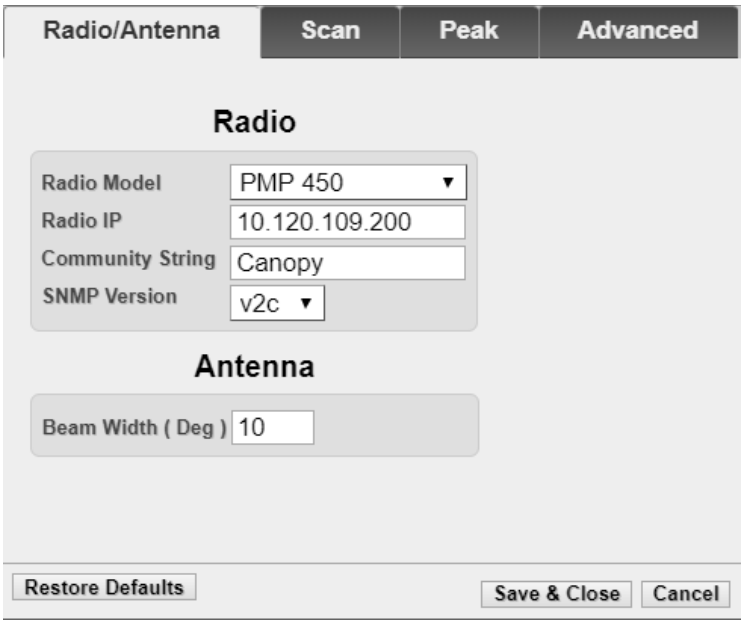
Click the **Advanced** Tab and click the **Settings** button on the **Auto Peak** panel.



b. Click the **Radio Mfg** drop-down list to select the radio type (for ex. PMP 450).

c. Enter the radio's IP address in the **Radio IP** settings section.

d. Select the **SNMP version** and the SNMP credentials.



3. Load the Access Point Coordinates list to the Intelligent Portioning System. The information circled in red is filled in by customers. The rest should be hard-coded as is. The UniqueID column lists the Access Points' MAC addresses. The AP coordinates list can be exported from a LinkPlanner file and reformatted as shown.

Name	Type	Az or Lat	El or Long	Pol or Alt (m)	UniqueID
Rolling Me	LatLng	42.04493	-88.025755	0	0a-00-3e-a1-93-0e
corner acc	LatLng	42.06166	-88.001082	0	0a-00-3e-bc-38-b6
Cork : N Al	LatLng	35.46183	-118.96665	0	0a-00-3e-03-4f-11
Cork : NW	LatLng	35.46183	-118.96665	0	0a-00-3e-03-28-2c
Cork : S AP	LatLng	35.46183	-118.96665	0	03-00-3e-bc-38-b6

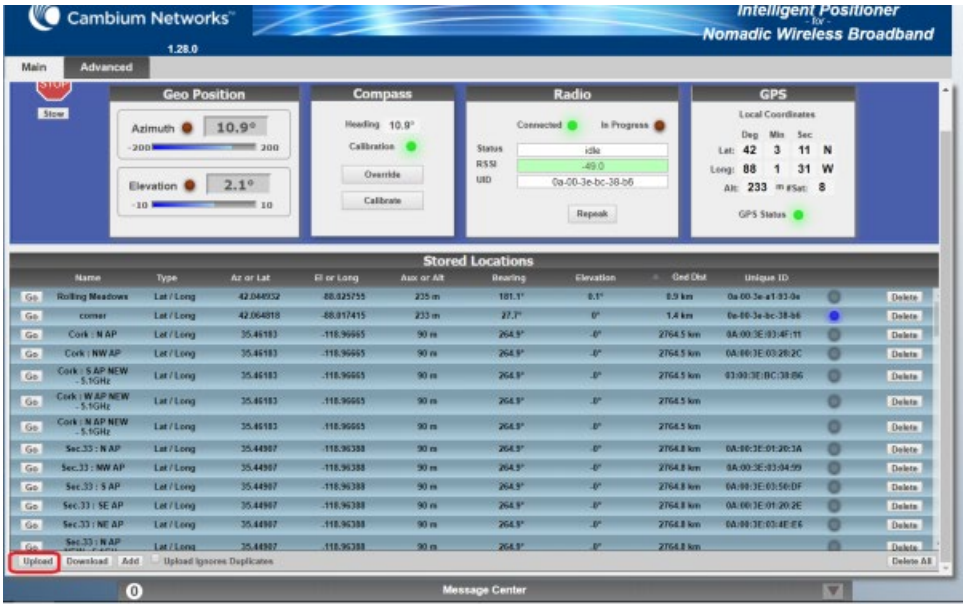
Note

The UniqueID/MAC address must be in lower case in format (eg. 0a-00-3e-03-28-40).

The Az or Lat/ El or Long can be formatted as 42.044932 -88.025755 or 42.044932N 88.025755W.

a. Once the Access Point Coordinates file is formatted, the next step is to upload the list to the Intelligent Positioning System.

b. Navigate to the Main Screen, click the **Upload** button in the **Stored Locations** panel and follow the Graphical user interface directions for uploading the file.


Cambium Networks
Intelligent Positioner
- for -
Nomadic Wireless Broadband
1.28.0
Main
Advanced
Stow
Geo Position
Azimuth
10.9°
-200
200
Elevation
2.1°
-10
10
Compass
Heading 10.9°
Calibration
Override
Calibrate
Radio
Connected
In Progress
Status
idle
RSSI
-49.0
UID
0a-00-3e-bc-38-b6
Repeak
GPS
Local Coordinates
Deg Min Sec
Lat: 42 3 11 N
Long: 88 1 31 W
Alt: 233 m #Sat: 8
GPS Status
Stored Locations
Name
Type
Az or Lat
El or Long
Aux or Alt
Bearing
Elevation
Geo Dist
Unique ID
Rolling Meadows
Lat / Long
42.044952
-88.025755
235 m
181.1°
0.1°
0.9 km
0a:00:3e:a1:93:0e
corner
Lat / Long
42.064818
-88.017415
233 m
27.7°
0°
1.4 km
0a:00:3e:bc:38:b6
Cork : N AP
Lat / Long
35.46183
-118.96665
90 m
264.9°
-0°
2764.5 km
0A:00:3E:03:4F:11
Cork : NW AP
Lat / Long
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-118.96665
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Cork : S AP NEW - 5.1GHz
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Cork : W AP NEW - 5.1GHz
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Cork : N AP NEW - 5.1GHz
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90 m
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Sec.33 : N AP
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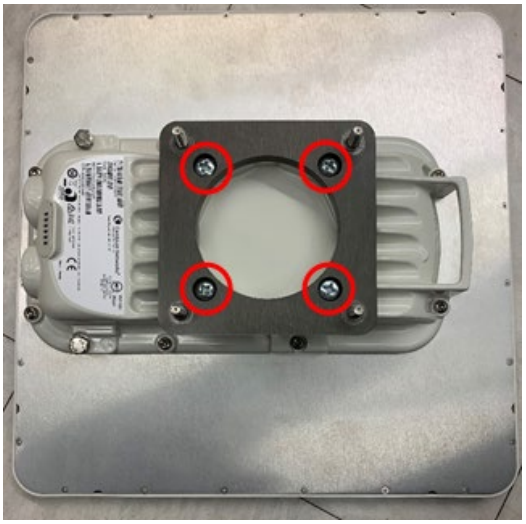
35.44987
-118.96388
90 m
264.9°
-0°
2764.8 km
Go
Delete
Upload
Download
Add
Upload Ignores Duplicates
Delete All
0
Message Center

Chapter 3: System Installation

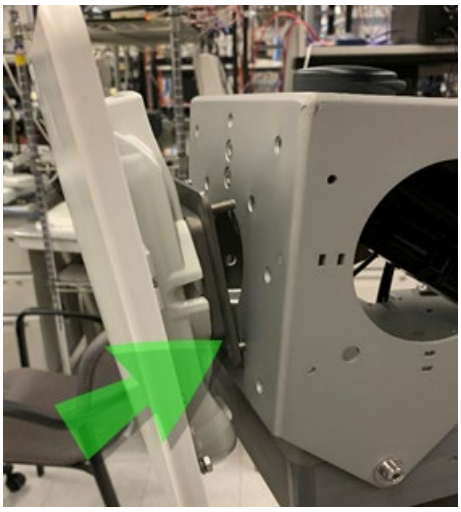
Installing the Intelligent Positioning System

Follow the steps to assemble and install the Intelligent Position System to a radio.

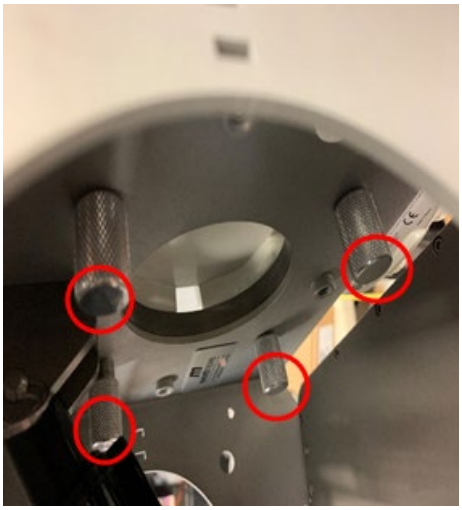
1: Mount the Intelligent Positioning System's Antenna Bracket to the radio.



2. Mount the radio assembly to the Intelligent Positioning System.



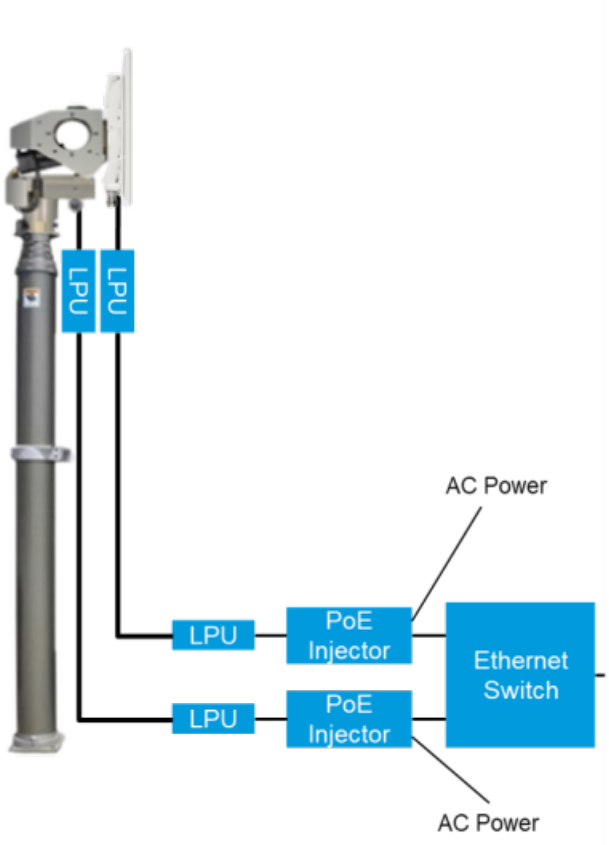
3. Secure the radio assembly by hand-tightening the screws inside the system.



4. Install the Intelligent Positioning System to the Mast Pole. Connect the cables to the system as shown.

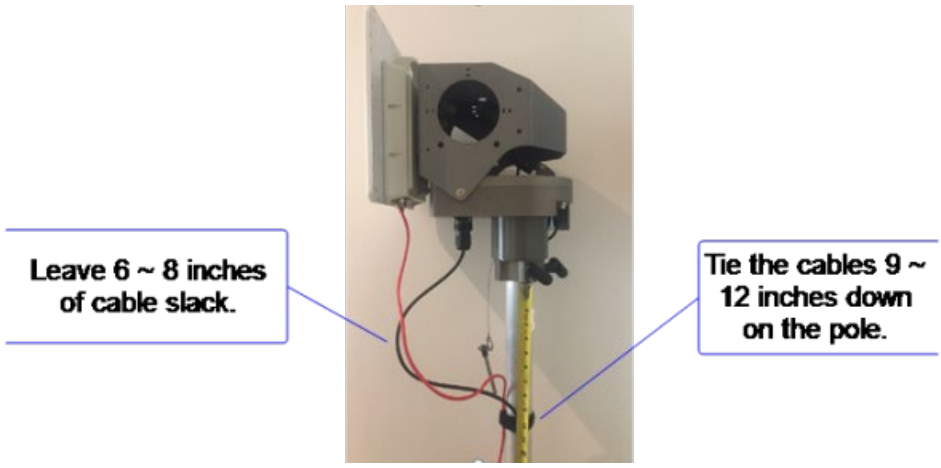
Positioner Grounding

Grounding of the positioner is accomplished through the 2-inch I.D. socket mount base. For installations with grounding, use a conductive metal pole such as aluminum or steel.



Considerations for concern of cable wrap around

If the cables are tied to the mast, it is recommended to leave 6 ~ 8 inches of cable slack, and tie it between 9 inches and a foot down the mounting pole, allowing the cable to wrap around the pole with the Intelligent Positioning System.



5. Power the system by applying mains power to the PoE supply.

Chapter 4: Antenna Alignment Operations

Aligning the Antenna using the Intelligent Positioning System

Once the Intelligent Positioning System is properly installed and stationary at the deployment site, perform the following steps to complete the alignment.

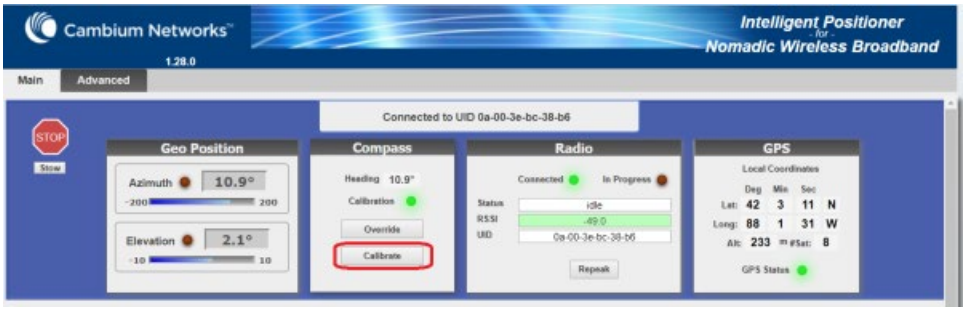
Procedure

- Calibrate the Compass (Optional)
- Point to the target AP

1. Calibrate the compass.

Check the compass status in the Compass panel to confirm the LED icon status is green. If the LED icon color is amber, compass calibration is required.

Click the **Calibrate Compass** button in the **Controls** panel. The Intelligent Positioning System will rotate 360 degrees to perform the calibration.



2. Point to the target AP.

At the target location, the Intelligent Positioning System automatically arranges the AP sites list based on distances from the system's current location. Click the **Go** button for the first AP site on the list (this is the closest AP to the Intelligent Positioning System).


Cambium Networks
Intelligent Positioner
for
Nomadic Wireless Broadband
1.28.0
Main
Advanced
Connected to UID 0a-00-3e-bc-38-b6
STOP
Stow
Geo Position
Azimuth
10.9°
-200
200
Elevation
2.1°
-10
10
Compass
Heading 10.9°
Calibration
Override
Calibrate
Radio
Connected
In Progress
Status
idle
RSSI
-49.0
UID
0a-00-3e-bc-38-b6
Repeak
GPS
Local Coordinates
Deg Min Sec
Lat: 42 3 11 N
Long: 88 1 31 W
Alt: 232 m #Sat: 8
GPS Status
Stored Locations
Name
Type
Az or Lat
El or Long
Aux or Alt
Bearing
Elevation
Geo Dist
Unique ID
Go
Delete
Rolling Meadows
Lat / Long
42.048932
-88.025755
235 m
181.1°
0.1°
0.9 km
0a-00-3e-a1-93-0e
corner
Lat / Long
42.064818
-88.017415
233 m
27.7°
0°
1.4 km
0a-00-3e-bc-38-b6
Cork : N AP
Lat / Long
35.46183
-118.56665
90 m
264.9°
0°
2764.5 km
0A:00:3E:03:4F:11
Cork : NW AP
Lat / Long
35.46183
-118.56665
90 m
264.9°
0°
2764.5 km
0A:00:3E:01:28:2C
Cork : S AP NEW - 5.1GHz
Lat / Long
35.46183
-118.56665
90 m
264.9°
0°
2764.5 km
03:00:3E:BC:38:B6
Cork : W AP NEW - 5.1GHz
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35.46183
-118.56665
90 m
264.9°
0°
2764.5 km
Cork : N AP NEW - 5.1GHz
Lat / Long
35.46183
-118.56665
90 m
264.9°
0°
2764.5 km
Sec.33 : N AP
Lat / Long
35.44907
-118.56388
90 m
264.9°
0°
2764.8 km
0A:00:3E:01:20:1A
Sec.33 : NW AP
Lat / Long
35.44907
-118.56388
90 m
264.9°
0°
2764.8 km
0A:00:3E:03:04:99
Sec.33 : S AP
Lat / Long
35.44907
-118.56388
90 m
264.9°
0°
2764.8 km
0A:00:3E:03:50:DF
Sec.33 : SE AP
Lat / Long
35.44907
-118.56388
90 m
264.9°
0°
2764.8 km
0A:00:3E:01:20:2E
Sec.33 : NE AP
Lat / Long
35.44907
-118.56388
90 m
264.9°
0°
2764.8 km
0A:00:3E:03:4E:E4
0
Message Center

How the Compass Calibration Works

1. **Why is compass calibration needed?**

   The Intelligent Positioning System uses a triple-axis magnetometer as a compass. The compass relies on the Earth's magnetic field to determine the North/South orientation.

   As local electric magnetic environments (such as mines, metal buildings, etc.) can affect the accuracy of the Earth's magnetic field strength reading, resulting in errors in determining the North/South direction, compass calibration is required when the Intelligent Positioning system is relocated.

2. **How does it work?**

   The Intelligent Positioning System rotates 360 degrees and stops 7 times (roughly every 50 degrees) to measure the magnetic field strength/density. The ideal magnetic measurement of the earth (without any interference) is a sphere for 3-D and a circle for 2-D.

   Due to interference from local magnetic environments, the magnetic density measurement becomes distorted. Using a complex algorithm, the system uses the data measured from the calibration to adjust the direction of North/South orientation.

   True North is determined using the magnetic north information and GPS coordinates to determine magnetic declination for the current location. On completion of calibration, the system points back to its last commanded azimuth position.

3. **When is compass calibration required?**

   Compass calibration is recommended when the system is relocated and re-installed, or if the Intelligent Positioning System's compass LED status is not green.

Compass calibration is required.

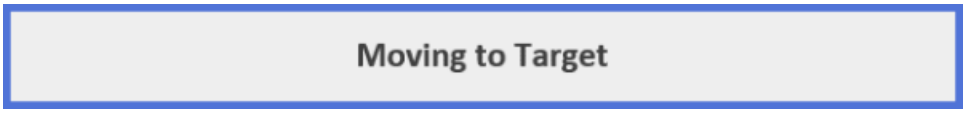
Compass calibration is not required

How Seek and Peak Works

When the positioning system is set up correctly and has a radio connected to it, and the base station is in place, the system will go through the following steps.

The positioning system is waiting for the user's input with a message displaying "Select Target from Stored Locations".

The message is displayed once the user has selected a target and will move to latitude/longitude using the on-board magnetic compass.



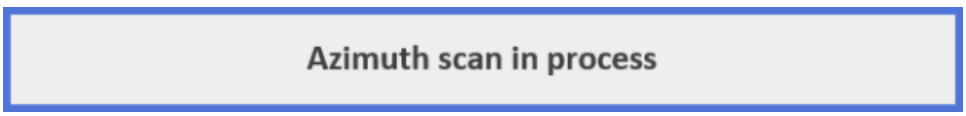
The positioning system sends an SNMP message to the radio to reset and waits until it sees a registration.

The system will wait for up to 600 seconds for the radio to register.

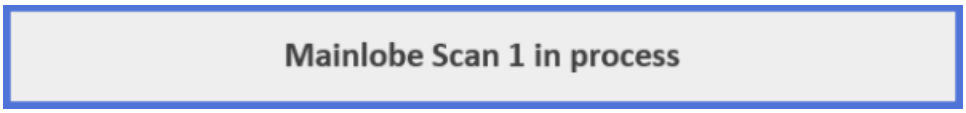
The positioning system has connected to the base station with a matching ID or an Unkown ID and performs a +/- 25 deg scan to find the highest signal.

Note: if it lands on a radio with a different UID, it will display "**Alternate Target Identified, Recalculating Heading**".

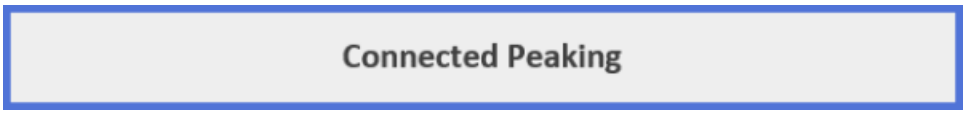
The positioning system will still perform a +/- 25-degree scan and peak on the alternate link, and then update the heading with an override based on knowing where that radio is located and then calculate the proper azimuth offset to get exactly to the other OID.



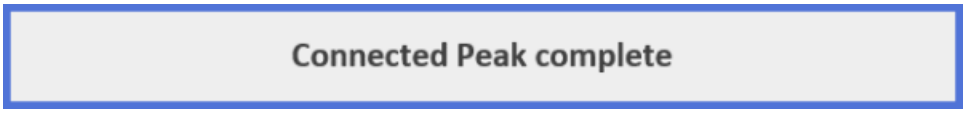
This is the second scan centered around the hottest point from the first scan. This scan is also a +/- 25-degree scan.



The radio has the proper UID identified from the initial list it was connected to and is performing a peak to optimize signal.



The positioning system is done and the link is up. No further action is taken from the system.



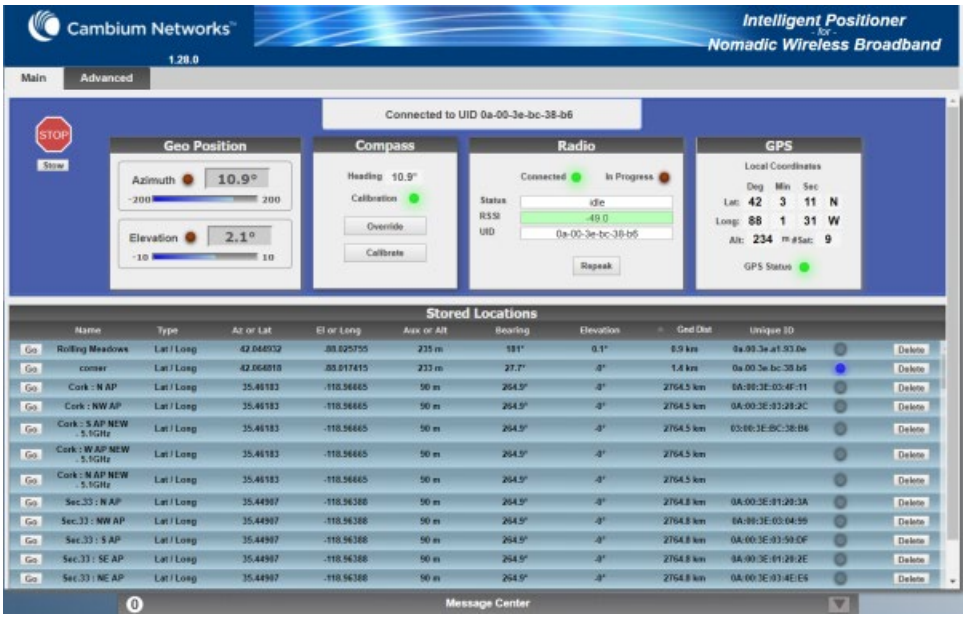
Error Signal

This message is displayed where the signal had peaked but dropped due to the noise floor. This error Usually indicates that the base station power went away or has reset.

Chapter 5: User Interface

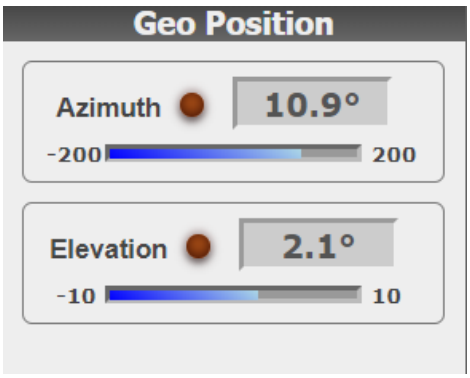
Main Page

This section provides a basic introduction to the Main page of the Intelligent Positioning System User Interface (UI). The Main Page provides key controls used for daily operations.



Geo Position panel

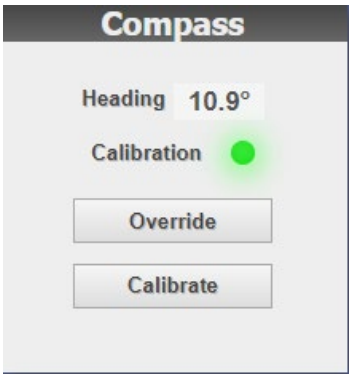
The GEO Position panel displays the Positioning systems Geo Position and pedestals position for Azimuth and Elevation. The LED turns Green if the system is moving, and turns Red if it is not moving.



Compass panel

The Compass panel displays the current status of the compass including Geo Azimuth heading. It also displays the calibration status. If the LED icon is amber, it means calibration is needed. Green means calibration is NOT required.

Calibrate – click “Calibrate Compass” to perform a compass calibration.



Controls panel

The Control panel consists of two features:

STOP Button – click on “STOP” to stop the movement of the positioning system.

Stow Button– click on “Stow” when the user wants to tear down the deployment and place the positioning system for shipping and storage.

Message Center panel

The Message Center panel displays the status of the alignment operation and prompt user to take next actions.

GPS/Target Location panel

Under normal operation, users do not need to interact with this panel. Users can enter the target location and click the Goto button to point the antenna to the target. The target location can then be stored.

If a user determines the GPS information provided by the Positioning System's GPS sensor is not accurate or if there is an error in the GPS (ex. the GPS LED icon is not displayed as green), the user can click the **GPS Override** button and enter the GPS information manually to override the readings provided by the Positioning system.

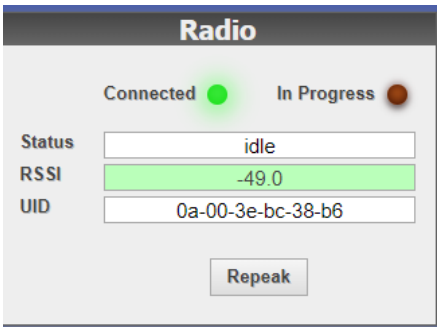
Stored Location window panel

When the Positioning system is in Idle state, click on any **GoTo** buttons on the list to point the antenna to the target direction. The location list can be uploaded from a spreadsheet and downloaded to the system. The list is sorted automatically based on distance from the current location, to target locations, with the nearest target listed at the beginning.

Radio Panel

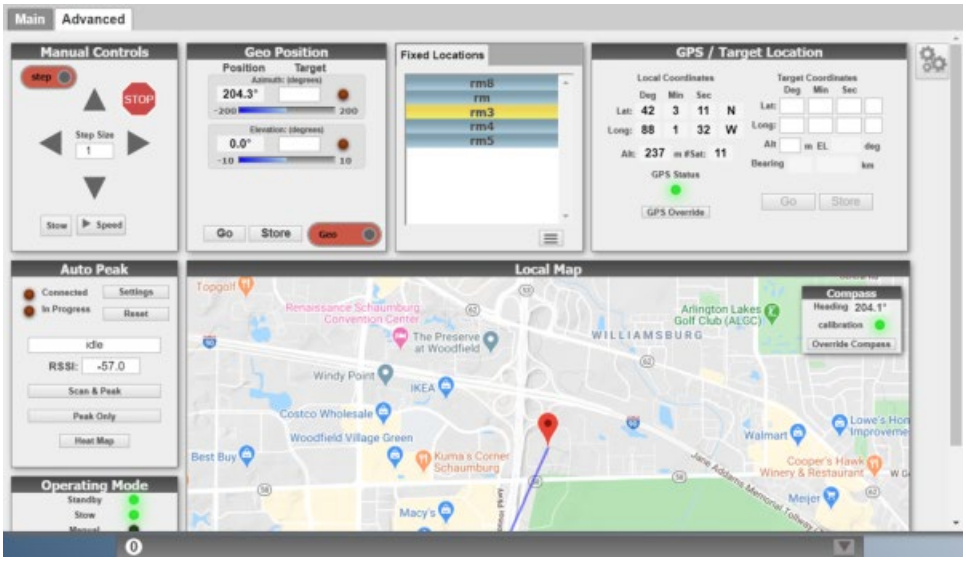
The Radio panel displays the status of the positioning system, the RSSI of the Subscriber Module (SM), and the MAC address of the Access Point (AP) that the SM is connected to. Click the **Repeak** button to determine if better performance can be achieved.

The positioning system will not perform final alignment if it doesn't have a TCP connection with the SM attached to it. Please ensure the Connected LED icon is green.



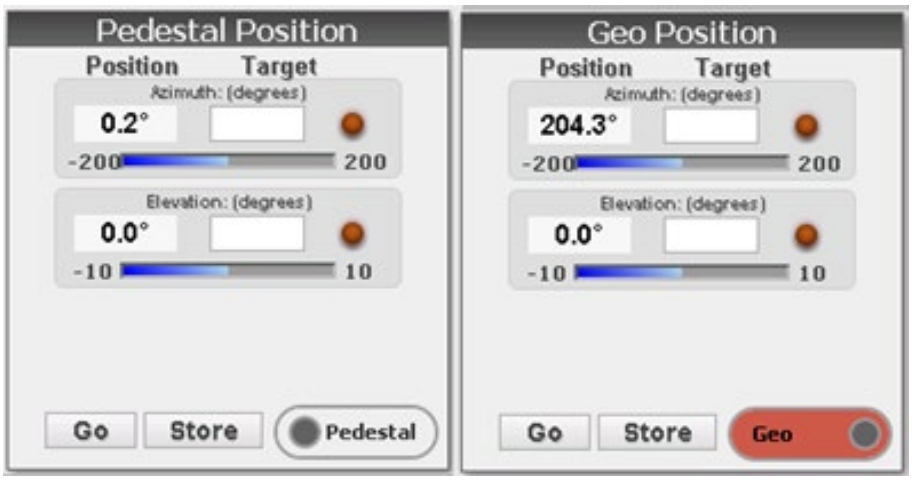
Advanced Page

The Advanced page is used by users to configure the system parameters, fine-tune the scan degree range, etc. to optimize the alignment performance.



Geo/Pedestal Position panel

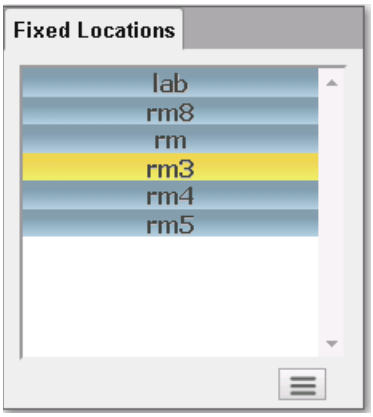
The Geo/Pedestal panel displays the antenna's current GEO and Pedestal position for azimuth and elevation. Users can enter the target azimuth, elevation, and optional polarization angles. Use the slide button to switch between the Geo Position and Pedestal position parameter screens.



An operator can enter the target Azimuth/Elevation parameters and click the Go button to point the Positioning system to the target. Operators can also click the Store to button to store the target point for future reference and use.

Fixed Locations panel

The Fixed Locations panel allows user-defined entry of Azimuth and Elevation pairs, or the Latitude and Longitude pairs to quickly recall and return to the stored entry point. This is the same window as the main Stored Location panel on the Main page.

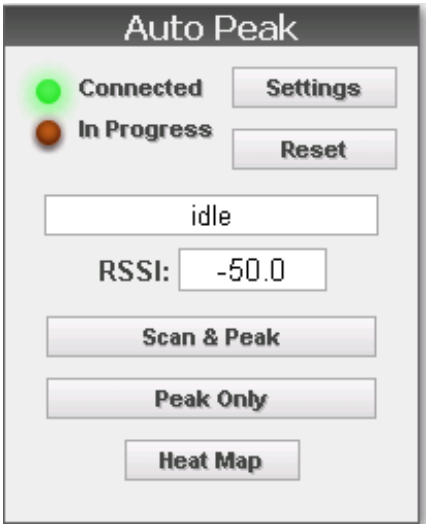


GPS/Target location panel

The GPS/Target Location panel displays the current latitude and longitude of the antenna position and allows manual entry of desired target latitude and longitude.

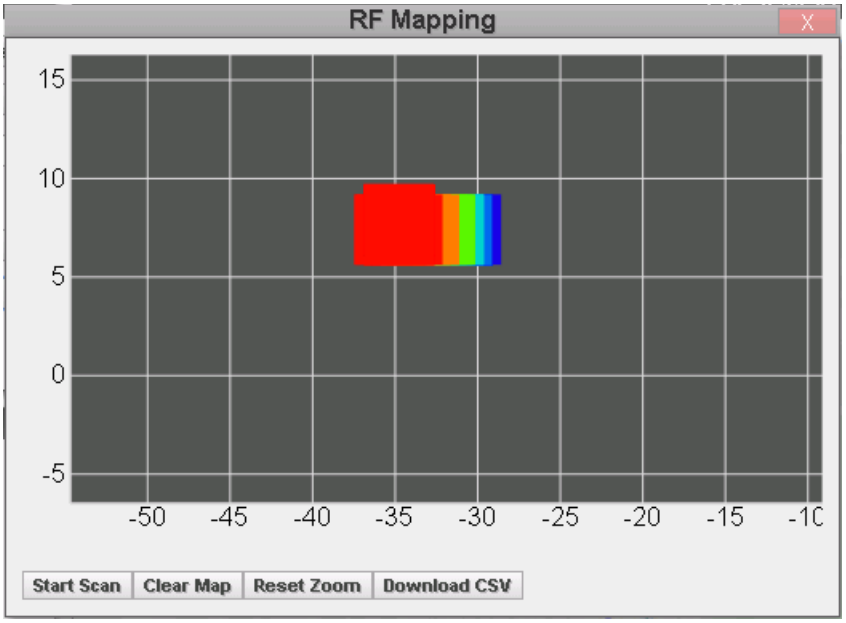
Auto Peak panel

The Auto Peak function requires a Radio Signal Strength feedback loop between the antenna positioning system and the installed radio. The positioning system queries the radio for an RSSI value via the SNMP protocol, and adjusts the direction accordingly to receive the maximum RSSI signal based on the SNMP value.



- **Connected LED**: The Connected LED reports whether the Positioning system can use SNMP to communicate with the attached radio. Green indicates that it is able to connect.
- **In Progress LED**: The In Progress LED reports when a peak, or seek process is in progress. The red color indicates there is no activity, and green color indicates the seek or peak activity is in progress.
- **Status window**: A Status window provides progress status to the user while the In Progress LED is green and display the message Seeking when it is in a seek mode, and changes to Peaking once it finishes seeking.
- **RSSI**: Displays the current Receive Signal Strength Indication (RSSI) value from the radio.
- **Scan & Peak**: Scans around the current heading to acquire a link. The scan area is specified in degrees under the Settings icon.
- **Peak Only**: The Peak Only setting executes an auto peak function to locate the highest signal.

- **Settings**: Allows set up of the radio connected to the Positioning system.
- **Heatmap**: Opens the RF Mapping window which plots a color-coded signal strength when the Positioning system is performing the alignment.



Auto Peak Settings panel

Click the **Setting** button in the Auto Peak panel to launch the Auto Peak Setting window.

Radio Settings

- **Radio Model**: Select the radio type that will be used with the network. When the radio type is selected, the correlated radio RSSI MIB ID field will be populated automatically in the Object ID field. The user selects "Custom" and manually enters the object ID to be used to gain signal strength.
- **Radio IP**: The IP address of the radio that is attached to the positioning system.
- **SNMP Community String**: SNMP community string.
- **SNMP Version**: Select the SNMP version here.
- **Antenna**: Radio antenna's beam width.

Scan/Peak Settings

- **Type**: The algorithm used by the Positioning system for scanning.
    - For wide beam antenna pattern (> 10 degrees beam width), use Linear Scan Type.
    - For narrow beam antenna pattern (< 2-degree beam width), use the Cochlear scan type. Otherwise, select based on the trial result.
- **Width**: Sets the scan width in degrees used for the Seek and Peak in the Auto Peak Control window on the Main control page.
- **Scan Step Az**: Sets the Azimuth step size in degrees used for the Seek and Peak in the Auto Peak Control window on the Main control page.
- **Reg Dwell**: The maximum amount of time the positioning system should wait for the radio to register. Note, the positioning system will move on if the radio registers before the timer expires.
    - Channel scan takes ~200ms for per channel. For example, if the PMP450 Subscriber Module is configured to scan 100 channels, you can change the dwell time to be ~20 seconds.
- **Step Dwell**: The amount of time the positioning system should wait for each step of Azimuth move.

Peak Settings

- **Peak Step Az**: Sets the Azimuth step size in degrees that are used for the final peaking in the Auto Peak control window on the main control page.
- **Peak Step El**: Sets the Elevation step size in degrees that are used for the final peaking in the Auto Peak control window on the main control page
- **Dwell Time**: Sets the dwell time between step sizes. It is used to let the positioning system settle in a location and to allow the radio to update its signal strength. The dwell time will vary with each radio type update rate for the radio signal strength.
- **Sidelobe Check**: If the main antenna beamwidth value is known, entering it in the system and enabling the Sidelobe check option can help verify that the main antenna beamwidth is on the main antenna lobe, and not on the sidelobe.

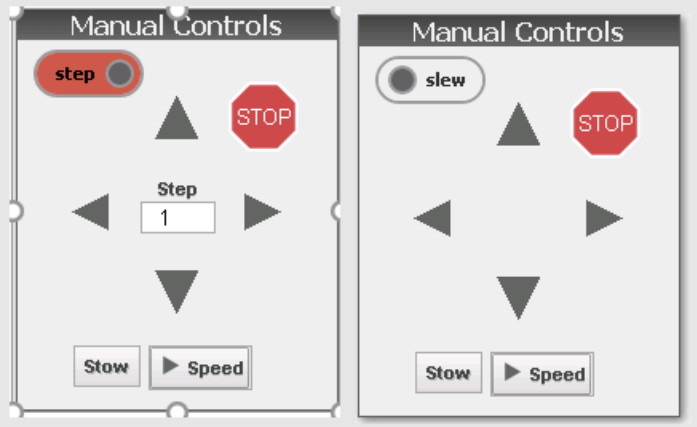
Threshold Re-peak

This setting allows the setup of a scheduled or routine peak process to maintain the highest quality of service. This is generally used with links that have motion such as Satellite, or Microwave links on an unstable platform. This is not recommended for a wide beamwidth radio such as a PMP 450i with integrated antenna.

- **Threshold Repeaking checkbox**: Places the peak process into a peaking mode of operation when threshold signal strength is detected.
- **Start**: RSSI value to trigger automatic repeaking.
- **Stop**: RSSI value to stop automatic repeaking.
- **Time Block**: Time interval to check for the need of repeaking.
- **Diversity**: In a link, while there is a Positioning system at both ends, one end should be configured as Even, and the other should be configured as Odd.
- **Advanced Settings**: Settings for MIB Object IDs (should not be changed unless necessary).

Manual Controls panel

Manual Controls window provides manual slew and step-size control for manual up, down, clockwise, and counter-clockwise commands. Optional polarization rotation is provided when installed.



Step/Slew select

It allows the user to select between a step or slew command control. The functions outlined in this table identify how the positioning system responds with Step selected in the manual controls window.

Step Size Selection (applicable only to Step selection)

Allows users to define step sizes in degrees. Users enter step size values that are applied to manual arrow direction commands. The example shows 1 degree per step.

Up Arrow

If the Step option is selected, the Up Arrow button moves the Positioning system's elevation antenna position in a positive direction (up) in step sizes equal to the defined step size. The system moves by the defined step size amount and then stops each time this button is pressed and will continue to accept this command until the travel limit in this direction is met.

If the Slew option is selected, pressing the Up Arrow button moves the elevation axis antenna's position in a positive direction (up). Press and hold the button to continue moving the system in an upwards direction until the travel limit is met or when the button is released.

Down Arrow

If the Step option is selected, the Down Arrow button moves the Positioning system's elevation antenna position in a negative (down) direction in step sizes equal to the defined step size. Each time the arrow is pressed, the system moves by the defined step size amount and then stops. The system continues to accept this command until the travel limit in this direction is met.

If the Slew option is selected, pressing the Down Arrow button moves the elevation axis antenna position in a positive direction (up). Press and hold the Down Arrow to continue moving in an downward direction until the travel limit is met or the directional arrow is released.

Left Arrow

If a step option is selected, moves the Positioning system's azimuth antenna position in a counter-clockwise direction in step sizes equal to the defined step size. Each time the arrow is pressed, the positioning system moves by the defined step size amount and then stops. The system continues to accept this command until the travel limit in this direction is met.

If slew is selected, moves the azimuth antenna position in a counter-clockwise direction (left). Press and hold the CCW arrow and the positioning system continues to move in a Counter-Clockwise direction until the travel limit is met or the directional arrow is released.

Right Arrow

If a step is selected, moves the positioning system's azimuth antenna's position in a clockwise direction in step sizes equal to the defined step size. Each time the arrow is pressed the system moves by the defined step size amount and then stops. The system continues to accept this command until the travel limit in this direction is met.

If slew is selected, moves the azimuth antenna position in a clockwise direction (right). Press and hold the CW arrow and the system continues to move in a clockwise direction until the travel limit is met or the directional arrow is released.

Emergency Stop Button

The emergency stop button stops travel in all directions when selected.

Speed Control

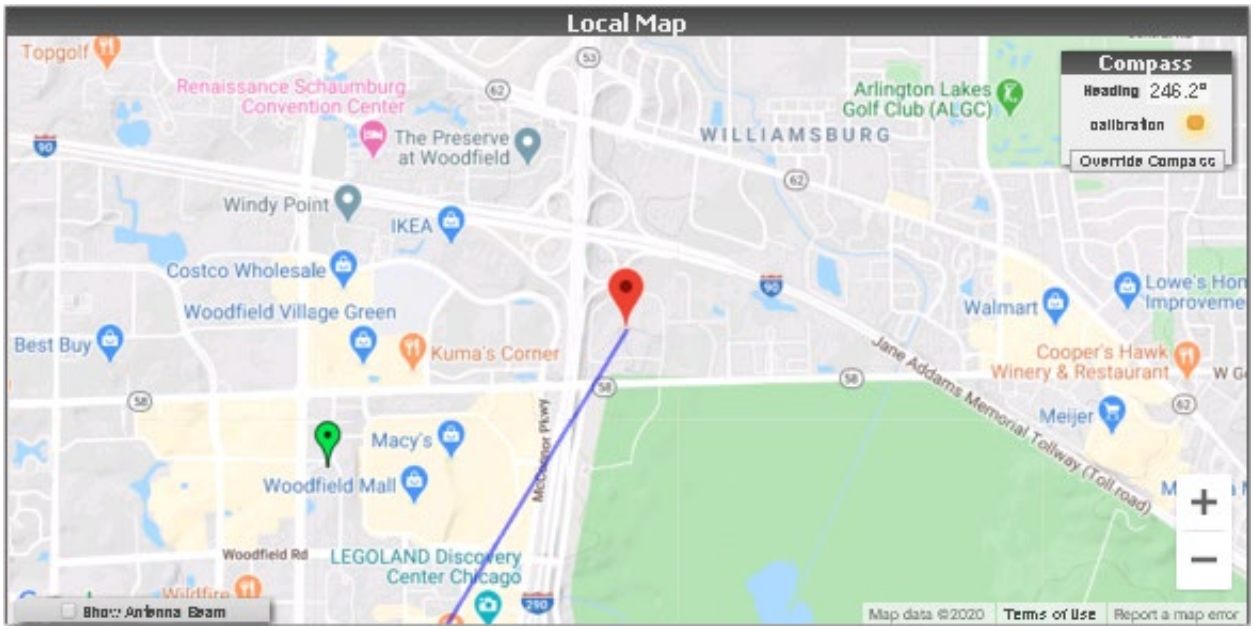
The speed control slider bar selects the velocity of the antenna positioning system. The far-right as shown in the manual is the fastest and the far left is the slowest. The slider bar has 4-speed locations. The speed control slider bar can change the system's velocity range from 2º/sec, 3.75º/sec, 5º/sec, and 7 degrees per second.

Operating Mode panel

The Operating Mode panel displays different modes and states of the Positioning system operations.

Local Map panel

The Local Map panel provides a visual representation of both ends of a link. The panel also displays the antenna positioning system's heading. The map is centered by default on the local end and available if the Positioning system has internet access.


Local Map
Topgolf
Renaissance Schaumburg Convention Center
The Preserve at Woodfield
Windy Point
IKEA
Costco Wholesale
Woodfield Village Green
Best Buy
Kuma's Corner
Macy's
Woodfield Mall
Woodfield Rd
LEGOLAND Discovery Center Chicago
Wildfire
McConnor Pkwy
WILLIAMSBURG
Arlington Lakes Golf Club (ALGC)
Walmart
Lowe's Hon Improveme
Cooper's Hawk Winery & Restaurant
Meijer
Jane Addams Memorial Tollway (Toll road)
Compass
Heading 246.2°
Override Compass
Show Antenna Beam
Map data ©2020
Terms of Use
Report a map error

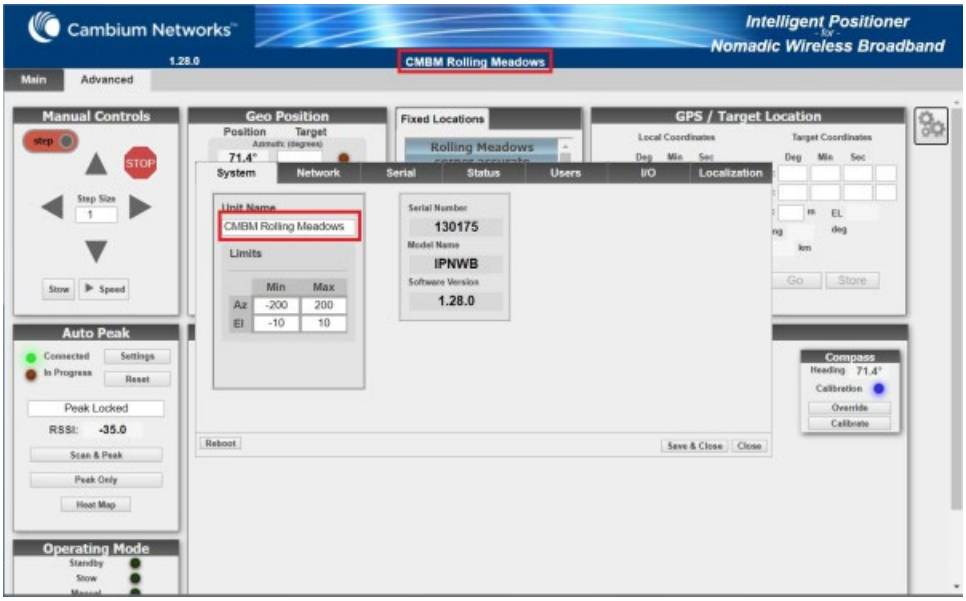
Chapter 6: Maintenance Operation

Optional System Settings

Delete this text and replace it with your own content.

Procedure

1. Navigate to the **Advanced** page. Click the **Gears** button.



Unit Name Setting: Unit Name setting allows setting the unit name so that it will be shown on the main page.

Limits: User-configurable travel limits. All entries are in degrees. Allows software adjustment to travel limits in Azimuth and Elevation. The default travel limits for each axis is the maximum physical travel limits. The "Save & Close" button must be clicked before updates are applied.

Reboot: Forces the on-board CPU to reboot.

Serial Number: Displays the Positioning system's serial number. This field is non-configurable and is the unique identifier used by Cambium to track warranty and software revisions.

Model Number: Displays the Model Number of the unit.

Software Version Number: Display's current software revision running on the LinkAlign digital controller.

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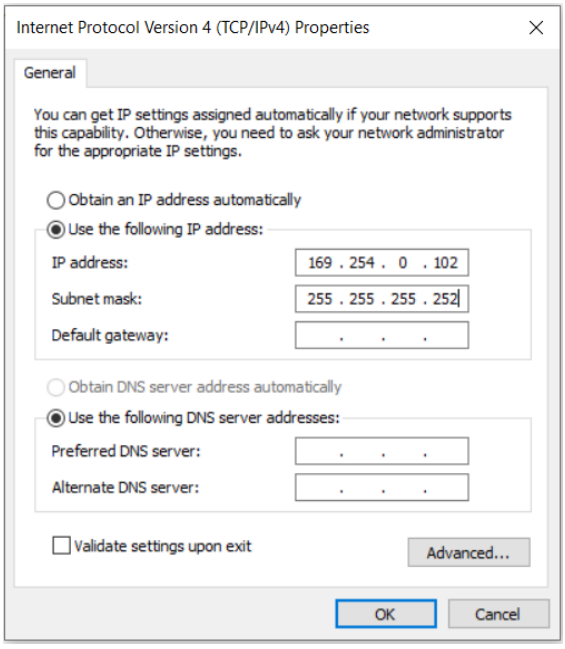
System Recovery

If you forget the Intelligent Positioning System's IP address, you can access the system by using the IP address 169.254.1.101 to access the system's Web UI to recover the information.

Procedure

1. Configure the management PC with the following IP address:



2. Connect the management PC to the Intelligent Positioning System.

3. Launch a web browser of your choice and enter **http://169.254.1.101** in the web browser's address bar.

4. Enter the log in credentials

User name: admin

Password: cambium

Updating Software

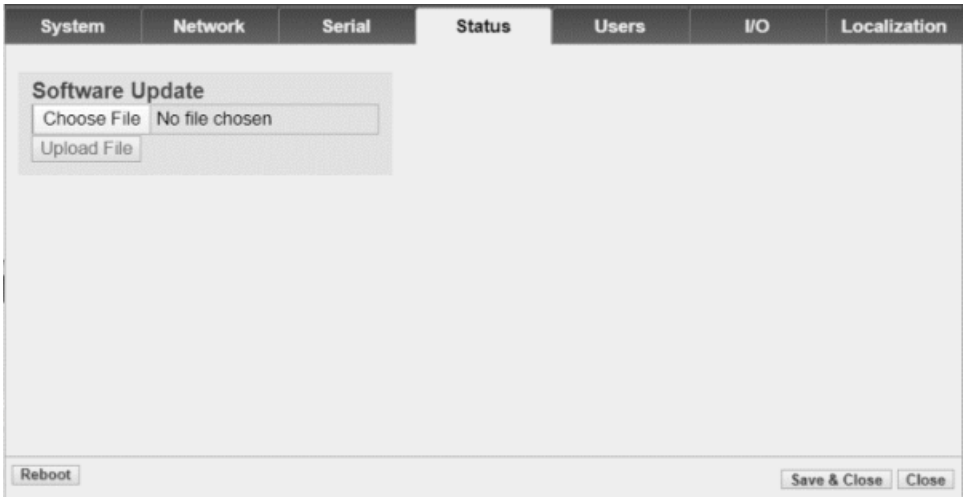
The Intelligent Positioning System's firmware is updated from the Settings page > Status tab.

Procedure

1. Go to the **Advanced** page, click the **Gears** icon.

2. Click the **Status** tab and select a file from your computer.

3. Click the **Choose File** button. Navigate to the folder to where the software file is located and select it.



3. Click the **Upload File** button to upload the file.

4. Once the software has fully uploaded, a message **Firmware Uploaded Successfully** will be displayed.

5. The Install button will appear below this message. Press the **Install** button to complete the update process.

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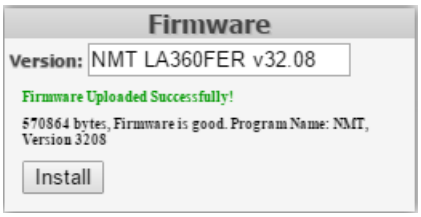


6. Reboot the system to complete the installation.

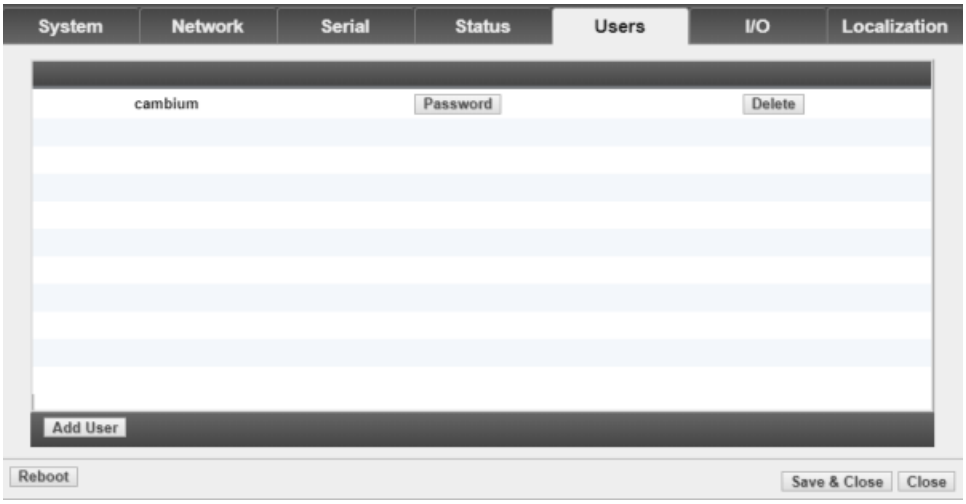
User Administration

Operators can add or remove users, change user passwords from the Settings page > Users page.

Procedure

1. Navigate to the **Advanced** page. Click the **Gears** button.

2. Click the **Users** tab to open the User administration page.



Adding Users

1. Click the **Add User** button
2. Enter user's first name and last name.
3. Click the **Save & Close** button to save the settings.

Deleting Users

1. Select a user from the list.
2. Click the **Delete** button.
3. Click the **Save & Close** button to save the settings.

Changing Users Passwords

1. Select a user from the list.
2. Click the **Password** button.
3. Enter a new password.
4. Click the **Save & Close** button to save the settings.