



SOFTWARE OPERATIONS MANUAL

WISPr CLOUD

User Manual v1.0

September 12, 2019

Notice

All instructions and documents are subject to change at the sole discretion of Autonomous Industrial Solutions. For up to date product information, visit www.wisprsystems.com and go to the support page



WARNING

Read the entire user manual to become familiar with the operation and features of this product before use. Failure to operate the product as directed can result in damage to the product, cause damage to personal property and cause serious injury. This is a sophisticated and technical product. It must be operated with caution and good judgement and requires some basic mechanical aptitude. Failure to operate this product in a safe and responsible manner could result in injury or damage to the product or other property. This product is not intended for use by children or persons under the age of 18. Be sure to only use genuine WISPr Systems components. Do not alter this product in any way outside of the documents provided by WISPr Systems. These safety guidelines contain instructions for safety, operation and maintenance. It is essential to read and follow all the instructions and warnings in the user manual, prior to assembly, setup or use, in order to operate the product correctly and avoid damage or serious injury.

Pre-Flight Checklist:

- Ensure that you have your FAA Part 107 License
- Be familiar with FAA Part 107 rules and regulations
- Ensure your aircraft is registered with the FAA
- Ensure weather conditions are suitable for flight
- Ensure that you are NOT under the influence of alcohol, drugs, or any medications that could impair your abilities to operate the UAV safely
- Ensure that you are using only genuine WISPr Systems parts and that all the parts are free from damage or broken components.
- Ensure the Remote, Battery, and mobile devices are fully charged
- Ensure propellers are mounted correctly and confirm the propeller attachment is secured to the motor attachment.
- Ensure you are flying OUTSIDE of restricted areas and No Fly Zones
- Ensure that you are operating within local and federal laws and regulations
- Ensure that you have obtained any appropriate authorizations
- Be aware of your surroundings and understand the risks associated with operating UAV
- Be familiar with the WISPr Systems User Manual

Safety Regulations

General

DO NOT store the WISPr System's drones near any electromagnetic or magnetic fields, heavy machinery, large electric motors, high voltage sources, server rooms, sound equipment, laptops, batteries, or any other sources of interference.

You should not be under the influence of drugs, alcohol, or any medications that could impair your ability to operate the UAV safely.

Never use the WISPr System's drones for illegal operations.

Always have a flight plan.

DO NOT fly near or within a no-fly zone.

DO NOT fly above authorized altitude.

DO NOT fly aircraft out of your line of site.

Maintain contact with controller for entire flight.

Become familiar with operating drone and its controls before using the WISPr System's drones.

Never fly near or interfere with manned aircraft operations.

Always follow local and federal regulations.

Please Read entire user manual to become familiar with the features of this product before operating.

Failure to operate the product correctly and responsibly can result in damage to the product or personal property and cause serious injury.

The WISPr System's drones must be operated with caution and common sense and requires some basic mechanical ability.

This product is not intended for use by children and should never be used near children or pets/animals.

DO NOT alter product in any way.

Use only provided genuine WISPr Systems products.

Read manual prior to assembly and/or use.

The WISPr Systems' drones is not a toy and should only be used for it's specified purpose.

Manual Use:

Legend



Tips



Warning



Important

Read Before Use:

Unpacking the WISPr Pogo

WISPr Pogo Operational Manual

FAA Regulations - https://www.faa.gov/uas/commercial_operators/become_a_drone_pilot/

Watch Before Use:

All the following videos can be found at: <https://wisprsystems.com/support/>

Calibrating the WISPr Pogo

Initial Setup/Breakdown

GPS LED Description

Hand Controls and Keyboard Controls

Connecting WISPr OS to CPE

Takeoff, Landing, and In-Flight Controls (Surveying)

Reviewing Logs, Updating, and Uploading Survey Logs

Return to Launch/Geofence Failsafe Settings

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WISPr OS & CLOUD License agreement	Error! Bookmark not defined.

WISPr CLOUD

The WISPr CLOUD is a CLOUD service hosted by WISPr Systems. It is used to configure and store tower coordinates and pre-configured automated tests. These towers and tests are downloaded to the WISPr OS and used during flight. After a flight is finished, flight logs and pictures captured during flight can be uploaded to the CLOUD to be viewed at any time. Other features on the WISPr CLOUD include adding other users, adding subscribers that are linked to towers, pre-configured tests, and logs, and purchasing the WISPr OS subscription for your WISPr Pogo.

To access the WISPr CLOUD, open an internet browser and go to the web address, cloud.wispr.systems. Once the WISPr CLOUD has loaded, click “Login”



Login to the WISPr CLOUD using the account email and password used to create your WISPr CLOUD account.

WISPr Cloud

cloud.wispr.systems/login

SUPPORT LOGIN

WISPr

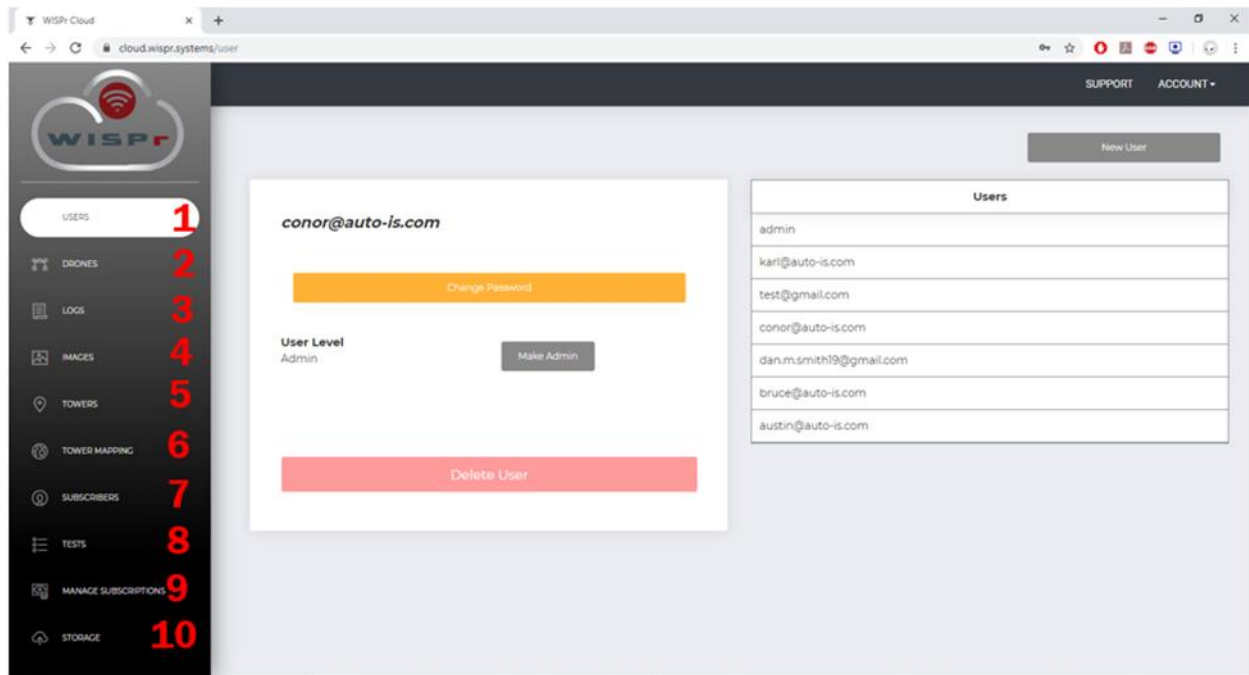
Email

conor@auto-is.com

Password

Login Register Forgot Password

Dashboard

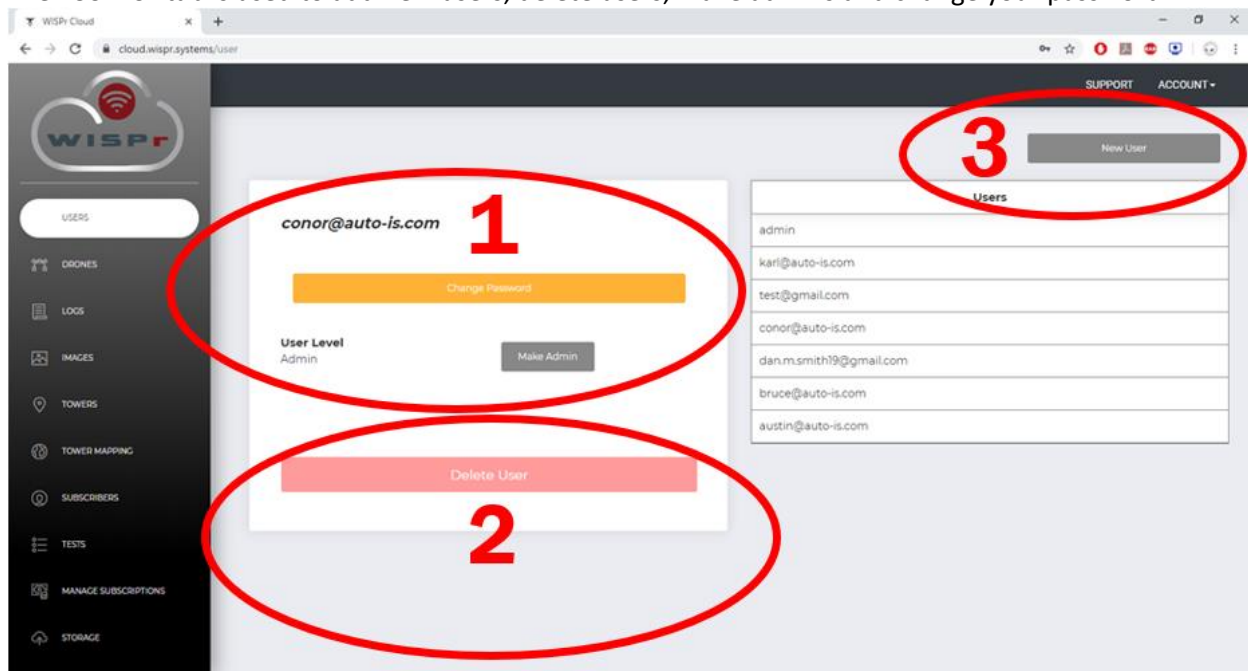


Menu list:

1. Users
2. Drones
3. Logs
4. Images
5. Towers
6. Tower Mapping
7. Subscribers
8. Tests
9. Manage subscriptions
10. Storage

USERS

The "USERS" tab is used to add new users, delete users, make admins and change your password.



Options:

1. Change password and/or make admin
2. Delete User
3. Create New User

CHANGE PASSWORD AND/OR MAKE ADMIN

To change your password, you have to be logged in under your account. If you have forgotten your password, please use the Forgot Password button on the Login page. Once logged in, go to the "USERS" page using the side menu. Once on the "USERS" page, click change password. Enter your new password and confirm your password, then click submit.

conor@auto-is.com

Change Password

New Password

Confirm Password

Submit

To promote another user to admin, select that user and click the "Make Admin" button.

****You must be an admin to promote another user to admin.****

The screenshot shows a user profile for **conor@auto-is.com**. It includes a yellow "Change Password" button. Below the email, it says "User Level: Not Admin" and there is a grey "Make Admin" button.

DELETE USER

Users with admin privileges cannot be deleted. To delete a non-admin, select the user from the user list and click the red "Delete User" button.

The interface is split into two panels. The left panel shows the profile for **test@gmail.com**, which is not an admin. It has a yellow "Change Password" button, a grey "Make Admin" button, and a red "Delete User" button. The right panel is a table titled "Users" listing all system users.

Users
admin
karl@auto-is.com
test@gmail.com
conor@auto-is.com
dan.m.smith19@gmail.com
bruce@auto-is.com
austin@auto-is.com

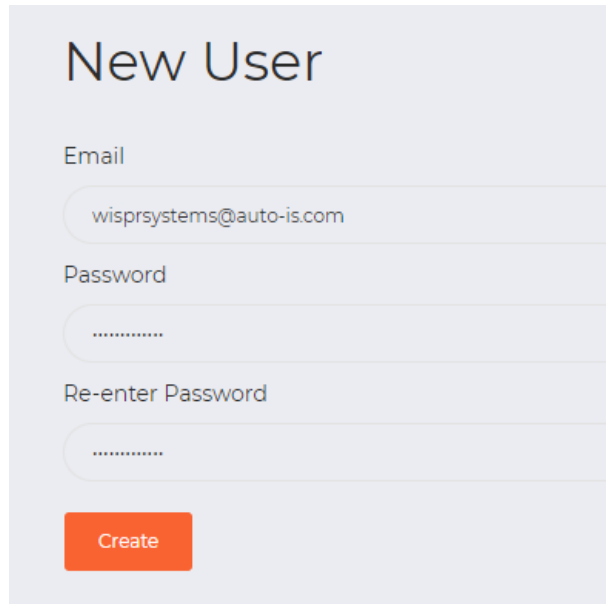
CREATE NEW USER

To create a new user, click the "New User" button

The interface shows a grey "New User" button at the top right. Below it is a table titled "Users" containing a list of current users.

Users
admin
karl@auto-is.com

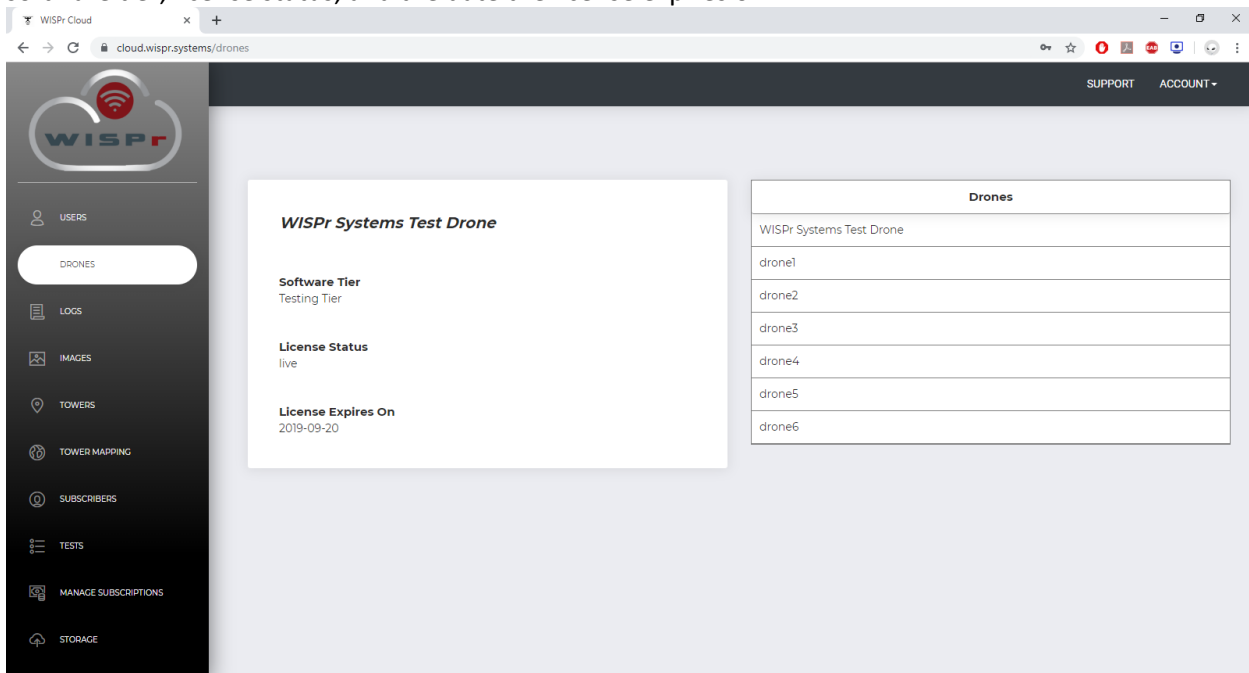
Enter the email of the new user you would like to create. Then enter a password for the user, then re-enter the password for the user and click “create”.



A registration form titled "New User" with a light gray background. It contains three input fields: "Email" with the value "wisprsystems@auto-is.com", "Password" with masked characters, and "Re-enter Password" also with masked characters. An orange "Create" button is at the bottom.

DRONES

The “DRONES” page lists all the drones connected to your account. Click on a drone to show the software tier, license status, and the date the license expires on.



A screenshot of the WISPr Cloud web application. The browser address bar shows "cloud.wisprsystems.com/drones". The left sidebar has a dark background with the WISPr logo and a menu with items: USERS, DRONES (highlighted), LOGS, IMAGES, TOWERS, TOWER MAPPING, SUBSCRIBERS, TESTS, MANAGE SUBSCRIPTIONS, and STORAGE. The main content area has a dark header with "SUPPORT" and "ACCOUNT" links. Below the header, there's a white card for "WISPr Systems Test Drone" showing "Software Tier: Testing Tier", "License Status: live", and "License Expires On: 2019-09-20". To the right is a table titled "Drones" with 7 rows: "WISPr Systems Test Drone" and "drone1" through "drone6".

Drones
WISPr Systems Test Drone
drone1
drone2
drone3
drone4
drone5
drone6

LOGS

Flight logs uploaded from the WISPr OS will appear in the “LOGS” section of the WISPr CLOUD

Select a customer to view specific logs for that customer

Search by log name, date, or customer

Select Customer Reset Selected Customer

Search

Log Name	Customer	Log Date	Date Uploaded		
1567535465.flight.log	Conor Ferguson	Sep 03 2019	Sep 3 2019	VIEW FULL LOG	DELETE
test1.flight.log		Sep 04 2019	Sep 4 2019	VIEW FULL LOG	DELETE
test1-1567627209.flight.log		Sep 04 2019	Sep 4 2019	VIEW FULL LOG	DELETE
test1-1567627346.flight.log		Sep 04 2019	Sep 4 2019	VIEW FULL LOG	DELETE
test1-1567627578.flight.log		Sep 04 2019	Sep 4 2019	VIEW FULL LOG	DELETE
AbtTestLag.flight.log	Austin Ratcliffe	Sep 05 2019	Sep 5 2019	VIEW FULL LOG	DELETE
NTSabrt.flight.log	Austin Ratcliffe	Sep 05 2019	Sep 5 2019	VIEW FULL LOG	DELETE
NRSabrt.flight.log	Austin Ratcliffe	Sep 05 2019	Sep 5 2019	VIEW FULL LOG	DELETE
Apabrt.flight.log	Austin Ratcliffe	Sep 05 2019	Sep 5 2019	VIEW FULL LOG	DELETE
Bug1.flight.log	Austin Ratcliffe	Sep 05 2019	Sep 5 2019	VIEW FULL LOG	DELETE
1567820434.flight.log		Sep 06 2019	Sep 6 2019	VIEW FULL LOG	DELETE
1567820691.flight.log		Sep 06 2019	Sep 6 2019	VIEW FULL LOG	DELETE

You can search by subscriber name or by flight log name. You may also sort by log name, subscriber name, and date.

Select a customer to view specific logs for that customer

Search by log name, date, or customer

Select Customer Reset Selected Customer

Search

Search

Conor Ferguson

Bruce d

Travis Ferguson

Larry Deer

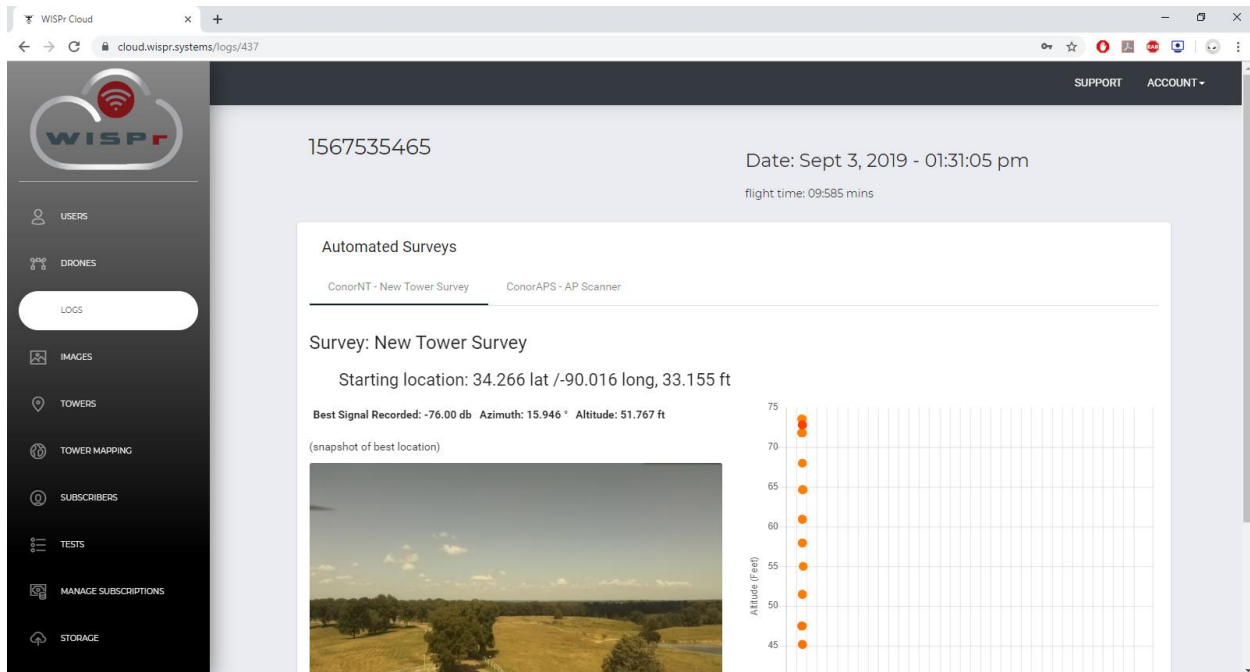
Austin Ratcliffe

Log Name	Customer	Log Date	Date Uploaded		
test1-1567627346.flight.log		Sep 04 2019	Sep 4 2019	VIEW FULL LOG	DELETE
test1-1567627578.flight.log		Sep 04 2019	Sep 4 2019	VIEW FULL LOG	DELETE
AbtTestLag.flight.log	Austin Ratcliffe	Sep 05 2019	Sep 5 2019	VIEW FULL LOG	DELETE
NTSabrt.flight.log	Austin Ratcliffe	Sep 05 2019	Sep 5 2019	VIEW FULL LOG	DELETE
NRSabrt.flight.log	Austin Ratcliffe	Sep 05 2019	Sep 5 2019	VIEW FULL LOG	DELETE
Apabrt.flight.log	Austin Ratcliffe	Sep 05 2019	Sep 5 2019	VIEW FULL LOG	DELETE
Bug1.flight.log	Austin Ratcliffe	Sep 05 2019	Sep 5 2019	VIEW FULL LOG	DELETE
1567820434.flight.log		Sep 06 2019	Sep 6 2019	VIEW FULL LOG	DELETE
1567820691.flight.log		Sep 06 2019	Sep 6 2019	VIEW FULL LOG	DELETE

Click "VIEW FULL LOG" to open a log. The date and time of the survey will appear in the top right. Change between automated tests by clicking on the tabs at the top of the log.

Below is a "New Tower Survey" flight log.

- Hover over points on the graph to see the data for that particular point.
- Best Signal Recorded is above the picture
- The picture is a snapshot taken at the best signal point.



Below is an example of the AP Scanner flight log.

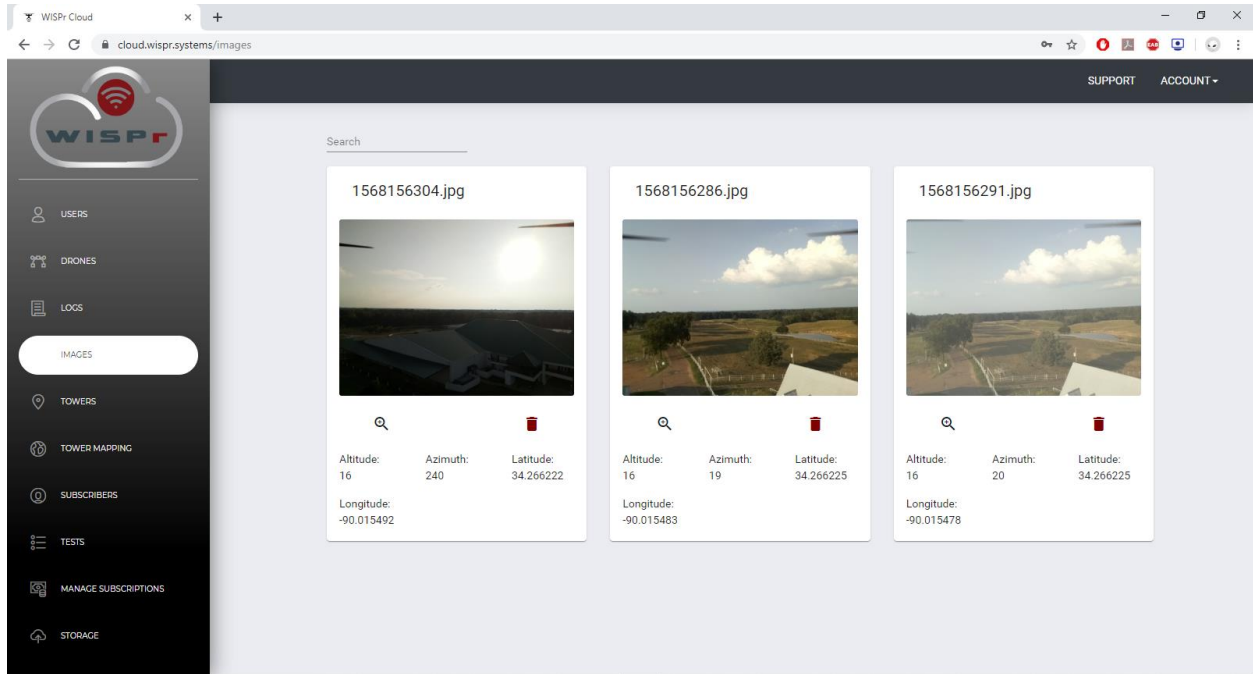
- List the SSID of the access points found
- Signal strength
- SNR (Cambium) or Capacity (Ubiquiti)
- Azimuth
- Altitude

The screenshot shows the WISPr Cloud web interface. The browser address bar displays 'cloud.wispr.systems/logs/437'. The left sidebar contains navigation links: USERS, DRONES, LOGS (highlighted), IMAGES, TOWERS, TOWER MAPPING, SUBSCRIBERS, TESTS, MANAGE SUBSCRIPTIONS, and STORAGE. The main content area shows a flight log for ID '1567535465' dated 'Sept 3, 2019 - 01:31:05 pm' with a 'flight time: 09:585 mins'. Under the 'Automated Surveys' section, the 'ConorAPS - AP Scanner' tab is active. It displays coordinates 'Latitude: 34.2662338' and 'Longitude: -90.0155469'. A table lists four detected access points, all with SSID 'WISPR_AP_0' and signal strength '-87'.

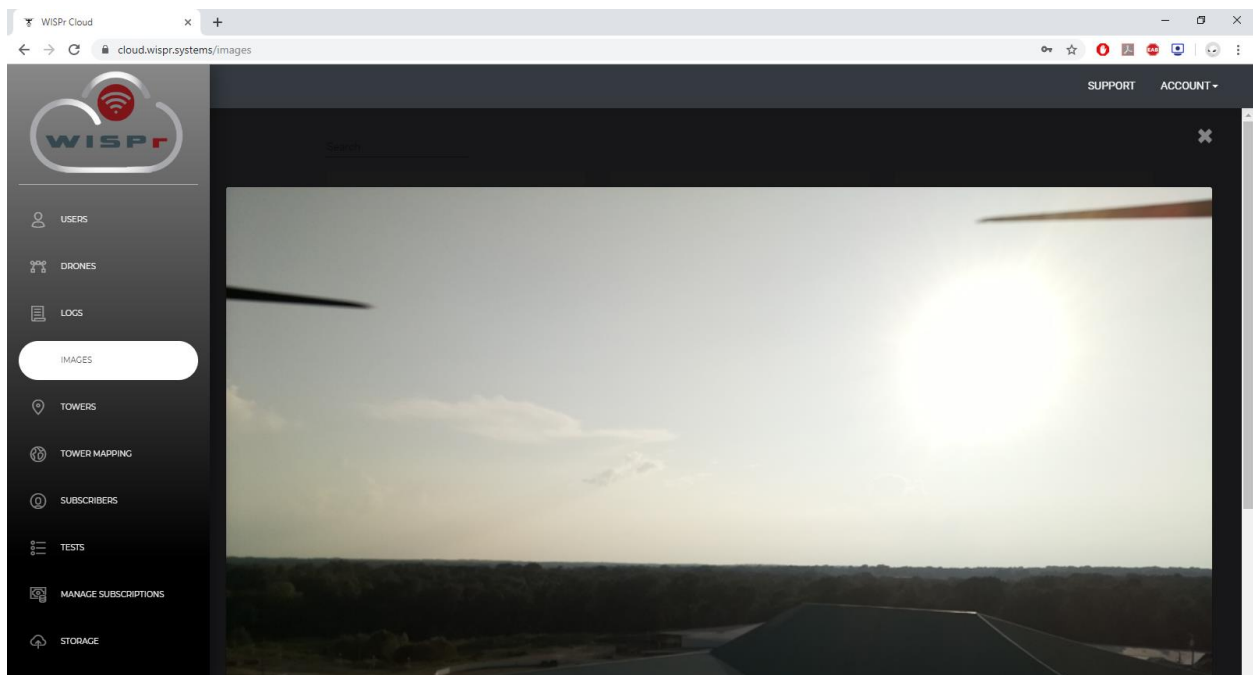
SSID	Signal Strength (db)	SNR (db)	Azimuth (°)	Altitude (ft)
WISPR_AP_0	-87	10	231	119
WISPR_AP_0	-87	10	334	122
WISPR_AP_0	-87	10	50	119
WISPR_AP_0	-87	10	16	119

IMAGES

Pictures uploaded from the WISPr OS will contain metadata which is stored with each picture taken. The altitude, azimuth, latitude and longitude are stored with each picture taken.



Click picture to enlarge the photo and to exit that view click the 'x' button above the top right of the picture.



TOWERS

The WISPr CLOUD stores tower coordinates to be used during flight and when configuring autonomous surveys. You can manually enter in each new tower or upload a .json file to populate.

Enter the tower name, height of tower, latitude, and longitude, and add subscribers correspond to that tower, then click "Add New Tower"

The screenshot shows the WISPr Cloud interface. On the left is a sidebar with navigation links: USERS, DRONES, LOGS, IMAGES, TOWERS (highlighted), TOWER MAPPING, SUBSCRIBERS, TESTS, MANAGE SUBSCRIPTIONS, and STORAGE. The main content area features a 'Add New Tower' form with fields for Name, Latitude, Altitude (ft), Longitude, and an 'Add Subscriber' dropdown. Below the form is a table of existing towers.

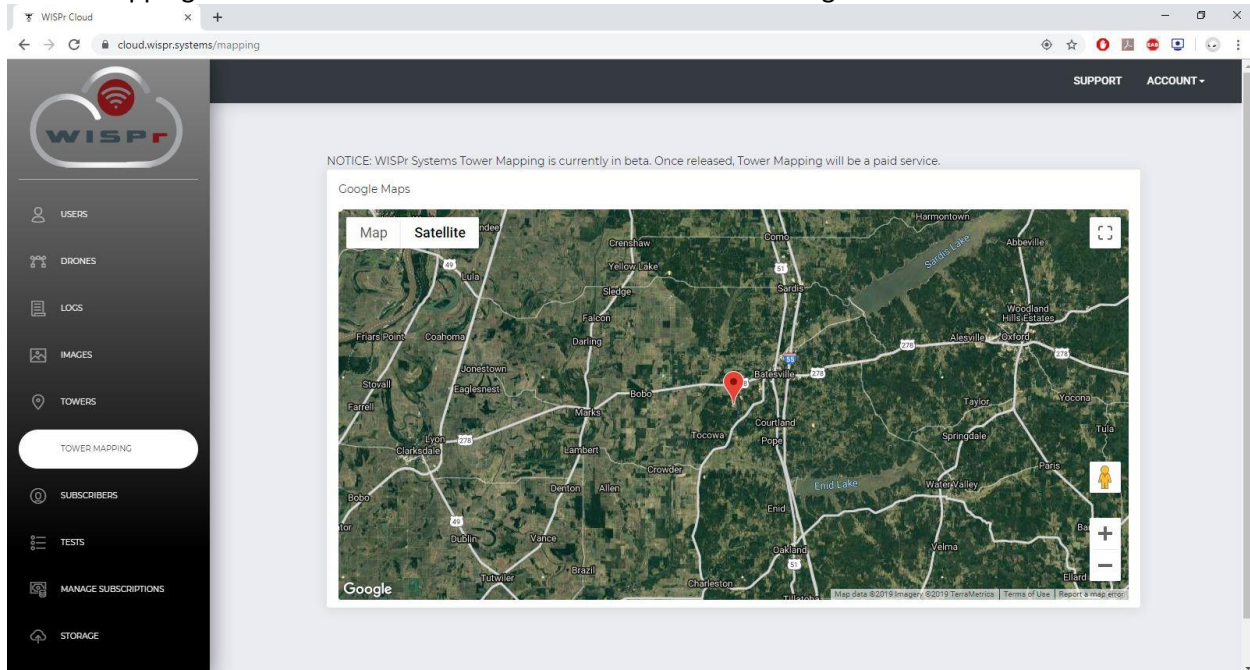
Tower Name	Latitude	Longitude	Altitude			
CrowderTowerWISPR	34.173889	-90.134444	50	VIEW SUBSCRIBERS	EDIT	DELETE
BatesvilleIndustrialWISPR	34.342222	-89.923056	50	VIEW SUBSCRIBERS	EDIT	DELETE
BatesvilleShurfordWISPR	34.316666	-89.943889	50	VIEW SUBSCRIBERS	EDIT	DELETE
HaysTower	34.394444	-90.078611	100	VIEW SUBSCRIBERS	EDIT	DELETE
RedHillTowerWISPR	34.364444	-89.986944	50	VIEW SUBSCRIBERS	EDIT	DELETE
LakeCarolineWater	32.574651	-90.150575	100	VIEW SUBSCRIBERS	EDIT	DELETE
TowerHwy22	32.568172	-90.166246	400	VIEW SUBSCRIBERS	EDIT	DELETE

To edit a tower location, click edit. A pop-up will appear that allows you to make changes to the tower. Click "Save" to save the new tower information.

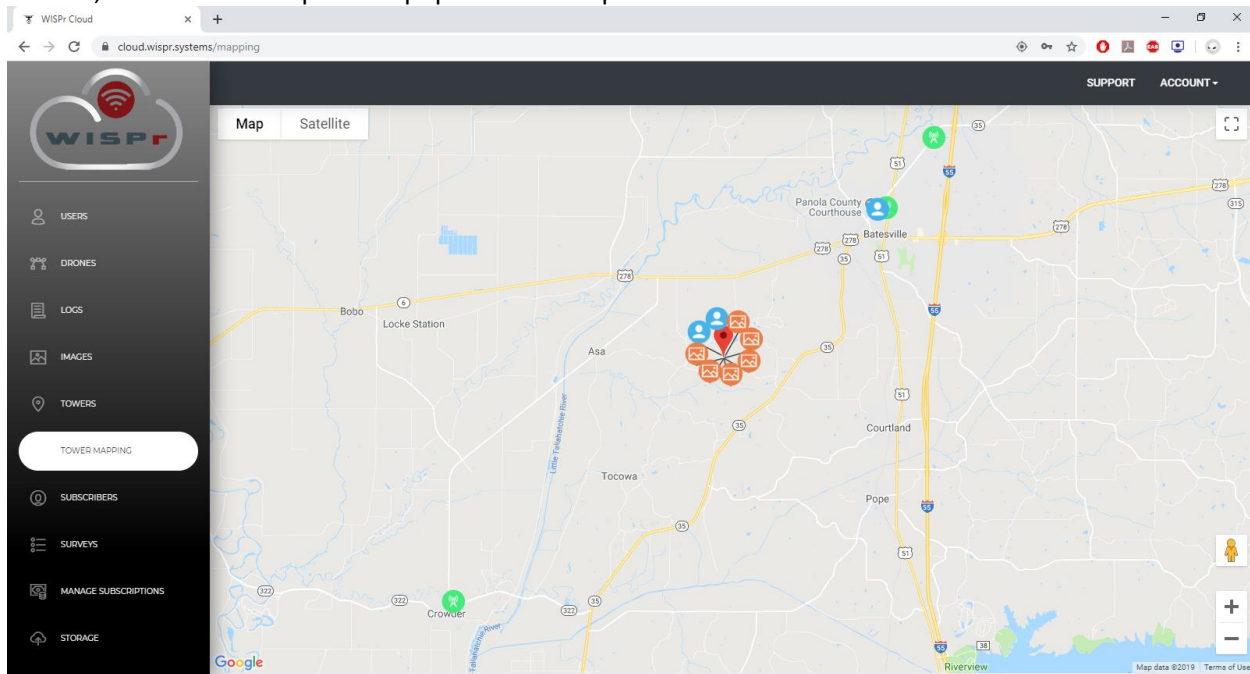
This screenshot shows the same WISPr Cloud interface as before, but with an 'Edit Tower' pop-up form open. The form is pre-filled with the details of 'CrowderTowerWISPR': Name (CrowderTowerWISPR), Latitude (34.173889), Longitude (-90.134444), and Altitude (50 ft). The 'Add Subscriber' dropdown is set to 'Conor Ferguson, Austin'. The form has 'Save' and 'Cancel' buttons at the bottom. The background table of towers is visible but slightly dimmed.

TOWER MAPPING

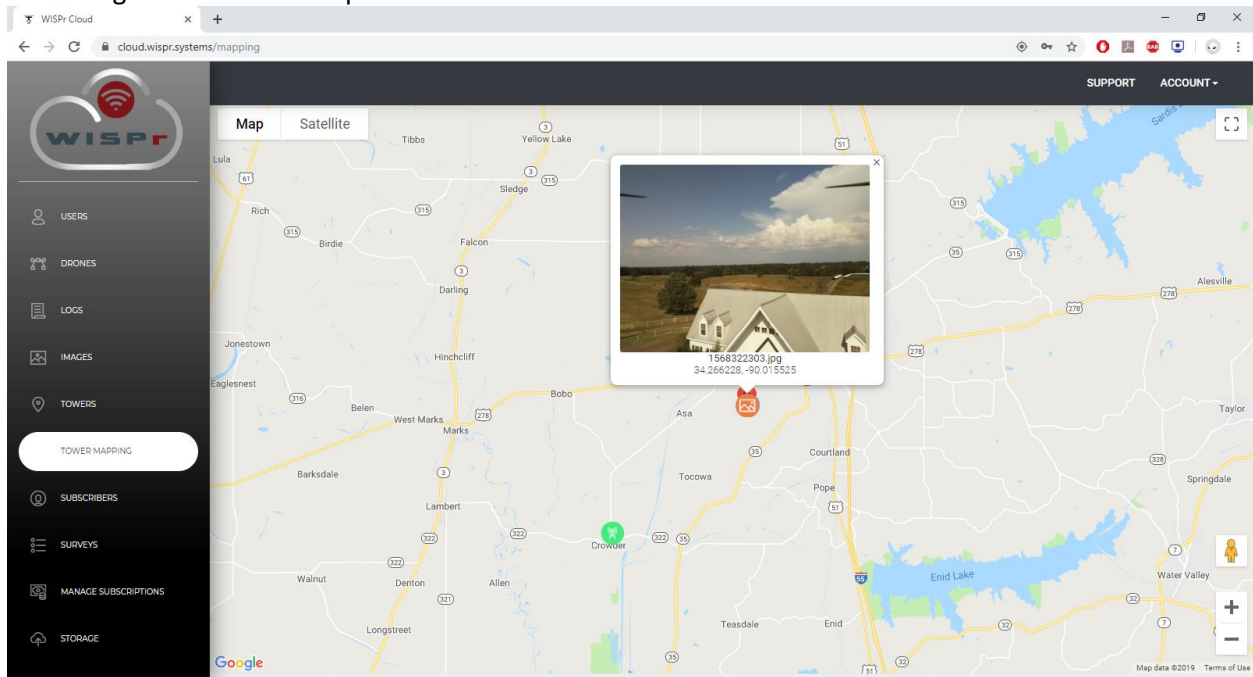
Tower Mapping is in beta and is offered for a limited time free through the WISPr CLOUD.



Towers, subscribers and pictures populate the map.



Click image icon to view the picture.



SUBSCRIBERS

The WISPr CLOUD stores subscribers to be used during flight and when organizing preconfigured autonomous test and flight logs. You can manually enter in each new or old subscribers, or upload a .json file to populate. An example of the .json file format will be located at the end of this manual.

Enter the subscribers name, address, zip code, what tower(s) correspond to that subscriber and you have the option to add the Powercode, Sonar or VISP ID (to use when connecting API to the WISPr CLOUD), then click “Add”.

The screenshot shows the WISPr Cloud web application interface. On the left is a dark sidebar with navigation icons and labels: USERS, DRONES, LOGS, IMAGES, TOWERS, TOWER MAPPING, SUBSCRIBERS (highlighted), TESTS, MANAGE SUBSCRIPTIONS, and STORAGE. The main content area has a dark header with 'SUPPORT' and 'ACCOUNT' links. A white modal form titled 'Add New Subscriber' is centered, containing input fields for Name, Address, Zip, Powercode ID, Sonar ID, and Visp ID, along with a dropdown for 'Add Tower' and an 'Add' button. Below the modal is a red 'Delete' button. At the bottom is a table of subscribers with columns: Name, Address, Zip, PowerCode ID, Sonar ID, and Visp ID. The table contains three rows of data.

Name	Address	Zip	PowerCode ID	Sonar ID	Visp ID
<input type="radio"/> Conor Ferguson	562 Cutting Horse Lane	38606	10002	2552	4225
<input type="radio"/> Bruce d	101 Waterford LN	39110	2001		
<input type="radio"/> Travis Farnsworth	205 Court Street	38606	1225001	20008	65503

SURVEYS

Create autonomous surveys in the CLOUD to be run on the WISPr OS.

You can search through pre-configured surveys using the subscribers name or by the name of the log.
You can edit survey entries.

The screenshot shows the 'View Saved Surveys' page in the WISPr Cloud interface. The page has a sidebar with navigation options: USERS, DRONES, LOGS, IMAGES, TOWERS, TOWER MAPPING, SUBSCRIBERS, SURVEYS (highlighted), MANAGE SUBSCRIPTIONS, and STORAGE. The main content area is titled 'View Saved Surveys' and includes a search bar and a 'Reset Selected Customer' button. Below this is a table of surveys:

Name	Type	Data	Customer
Alt	Go To	View Test	
Az	Go To	View Test	Austin Ratcliffe
AzAlt	Go To	View Test	Austin Ratcliffe
Coord	Go To	View Test	Austin Ratcliffe
CoordAlt	Go To	View Test	Austin Ratcliffe
Az	New Tower Survey	View Test	Austin Ratcliffe
Tower	New Tower Survey	View Test	Austin Ratcliffe
Az1	AP Scanner	View Test	Austin Ratcliffe
Az12	AP Scanner	View Test	Austin Ratcliffe

To view pre-configured surveys, click the view test button and information about the pre-configured survey will appear.

The screenshot shows the 'View Test' modal for a survey named 'ConorSurveyAPS - AP Scanner'. The modal displays the following information:

- Altitude: 75
- Time Per Scan: 20
- Input Type: coordinates
- Latitude1: 34.173889
- Longitude1: -90.134444
- Tower1: CrowderTowerWISPR
- Latitude2: 34.394444
- Longitude2: -90.078611
- Tower2: HaysTower
- Latitude3: 34.364444
- Longitude3: -89.986944
- Tower3: RedHillTowerWISPR
- Latitude4: 34.316666
- Longitude4: -89.943889
- Tower4: BatesvilleShurfordWISPR

The modal also includes a 'Close' button at the bottom.

To configure a “New Tower Survey”, first correspond the survey to a subscriber and enter a log name. Next, enter a maximum and minimum altitude and a tower coordinate or azimuth in the direction of the access point you plan on connecting to. Click “Save New Tower Survey” to save the survey.

Rotate to the azimuth or tower coordinates

Maximum selected altitude

Strongest signal point

Minimum selected altitude

50' from obstructions

New Tower Survey

When the survey is pre-configured in the WISPr CLOUD, a maximum and minimum altitude is selected by the user.

Next, select either an azimuth or tower coordinate of the access point in which you want to connect.

The drone flies up to the maximum altitude selected, then rotates and locates either the tower coordinate or azimuth selected.

The CPE then connects to the access point on the tower and the WISPr OS records signal from the maximum altitude down to the minimum altitude.

After reaching the minimum altitude the drone flies back up to point in which the signal was strongest.

At this point the survey is complete.

WARNINGS

Make sure you are running this survey in an open area at least 50 feet from any obstructions (trees, people, houses, buildings, vehicles, etc.)

Do not fly directly over roof unless you are a minimum of 20 feet; propeller wash can cause the POGO to crash.

- USERS
- DRONES
- LOGS
- IMAGES
- TOWERS
- TOWER MAPPING
- SUBSCRIBERS
- TESTS
- MANAGE SUBSCRIPTIONS
- STORAGE

View Saved Tests
Configure New Tests

Configure New Tower Survey
Configure AP Scanner
Configure Near Roof Surveys
Configure GoTo

The automated New Tower Survey tests the signal strength between two antennas. The drone goes to the maximum height, then turns to a given azimuth or latitude and longitude. It waits 10 seconds to allow time to locate the configured CPEs signal. It then lowers 3 feet at a time, logging the signal strength between the CPEs.

Log Name

Minimum Altitude ft
Enter Altitude Between 15 and 180 ft

This is the minimum altitude the drone will autonomously fly to. Check carefully for low-altitude obstacles.

Add Subscriber Reset

Maximum Altitude ft
Enter Altitude Between 15 and 180 ft

This is the maximum altitude the drone will autonomously fly to. Check carefully for high-altitude obstacles.

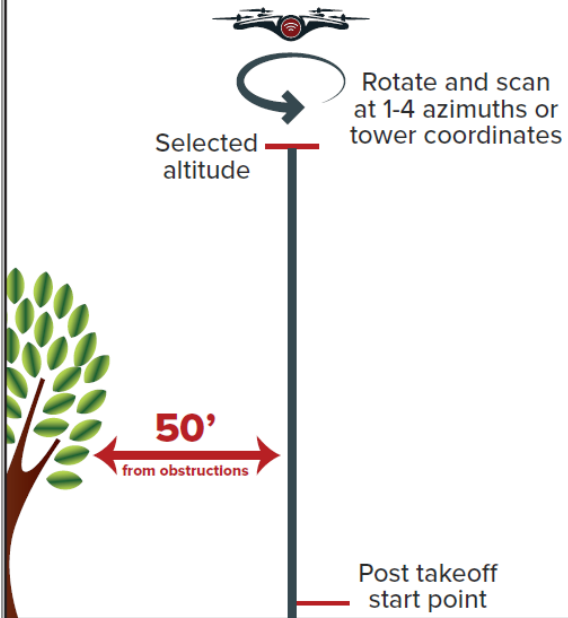
Input Azimuth

Azimuth degrees
Enter Starting Azimuth Between 0 and 360 Degrees

Input Tower Coordinates

SAVE NEW TOWER SURVEY

To configure a “AP Scanner”, first correspond the survey to a subscriber and enter a log name. Next, enter an altitude in which you want the survey to take place. Next, enter 1-4 tower coordinate or azimuths in the direction you want to survey. Click “Save AP Scanner” to save the survey.



AP Scanner

AP SCANNER

When the survey is pre-configured in the WISPr CLOUD, an altitude is selected by the user.

Next, select either 1-4 azimuth(s) or tower coordinate(s) of the access point(s) in which you want to scan for, and the time in which you want to scan either 30 seconds to 1 minute.


The drone flies up to the altitude selected then rotates, locates each tower coordinate(s) or azimuth(s) selected, and scans at each point(s) for the time frame selected. The CPE will receive all access points available in the frequency range of the CPE used. All access points will be saved to the logs with signal strength, azimuth, and altitude in which the access point is located.

When the survey is done the drone stays at the location in which the survey ended.

WARNINGS

Make sure you are running this survey in an open area at least 50 feet from any obstructions (trees, people, houses, buildings, vehicles, etc.)

Do not fly directly over roof unless you are a minimum of 20 feet; propeller wash can cause the POGO to crash.



- USERS
- DRONES
- LOGS
- IMAGES
- TOWERS
- TOWER MAPPING
- SUBSCRIBERS
- TESTS
- MANAGE SUBSCRIPTIONS
- STORAGE

View Saved Tests
Configure New Tests

Configure New Tower Survey
Configure AP Scanner
Configure Near Roof Surveys
Configure GoTo

The AP Scanner function receives an altitude, time to scan, and up to four azimuths. The UAV first flies to the given altitude. It then rotates to the starting azimuth. It hovers at that azimuth for the given Time to Scan. It then logs the found SSIDs, along with their signal strength and other important data. It repeats this process for all given azimuths.

Leave azimuth/coordinate fields empty if you do not wish to scan four different azimuths.

Add Subscriber
Reset

☐ Input Altitude

Time to Scan

Altitude
Enter Altitude Between 15 and 180 ft

Enter Time Spent Scanning at Each Bearing, Between 5 and 60 seconds

Input Azimuth
Input Tower Coordinates

Azimuth 1
Enter Starting Azimuth Between 0 and 360 Degrees

Azimuth 2
Enter Second Azimuth Between 0 and 360 Degrees

Azimuth 3

Azimuth 4

To configure a “Near Roof (New Tower Survey)”, first correspond the survey to a subscriber and enter a log name. Next, enter a relative altitude (30 feet maximum) and a tower coordinate or azimuth in the direction of the access point you plan on connecting to. Click “Save Near Roof Survey” to save the survey.

Survey only goes 30 feet above starting point to complete

Increases altitude in 5' increments

20' from obstructions

Rotate to azimuth or tower coordinate

Near Roof Survey

NEAR ROOF Single Access Point

When the survey is pre-configured in the WISPr CLOUD, an altitude is selected by the user.

Next, select an azimuth or tower coordinate of the access point in which you want to connect.

The drone first locates the tower coordinate or azimuth selected and continuously tries to connect to the access point in question.

Once the drone has reached 30' above the starting location, the WISPr OS no longer scans, and the survey is complete.

WARNINGS

Make sure you are running this survey in an open area at least 20 feet from any obstructions (trees, people, houses, buildings, vehicles, etc.)

Do not fly directly over roof unless you are a minimum of 20 feet; propeller wash can cause the POGO to crash.

WISPr Cloud

cloud.wispr.systems/tests

SUPPORT ACCOUNT

View Saved Tests Configure New Tests

Configure New Tower Survey Configure AP Scanner **Configure Near Roof Surveys** Configure GoTo

The automated Near Roof Surveys start at the drone's current position, turn toward a specified tower/azimuth, and increase altitude 5ft at a time while logging the signal strength for either a single AP or multiple APs. It pauses every 5 ft for 15-30 seconds to allow time to discover remote APs.

Log Name Add Subscriber Reset

Single AP (Single Tower Survey) Multiple APs (AP Scanner)

Relative Altitude ft
Enter a relative altitude between 5ft and 30ft.
This is the relative altitude the drone will fly up from its starting location. For example, if a relative altitude of 15ft is entered and the test is started when the drone is at 45ft, the drone will test signal strength from 45ft to 60ft.

Input Azimuth Input Tower Coordinates

Azimuth degrees
Enter Starting Azimuth Between 0 and 360 Degrees

SAVE NEAR ROOF SURVEY

To configure a “Near Roof (AP Scanner)”, first correspond the survey to a subscriber and enter a log name. Next, enter a relative altitude (30 feet maximum) and a tower coordinate or azimuth in the direction of the access point you plan on connecting to. Click “Save Near Roof Survey” to save the survey.

Near Roof Survey

NEAR ROOF Multi Access Points

When the survey is pre-configured in the WISPr CLOUD, an altitude is selected by the user.

Next, select an azimuth or tower coordinate of the access point in which you want to connect.

The drone first locates the tower coordinate or azimuth selected and continuously scans for access point in that direction.

Once the drone has reached 30' above the starting location, the WISPr OS no longer scans, and the survey is complete.

WARNINGS

Make sure you are running this survey in an open area at least 20 feet from any obstructions (trees, people, houses, buildings, vehicles, etc.)

Do not fly directly over roof unless you are a minimum of 20 feet; propeller wash can cause the POGO to crash.

To pre-configure a Go-To simply enter a name and a corresponding subscriber. Enter Altitude and/or Azimuth or tower coordinate. Click “Save Go-To” to save the pre-configured test.

The screenshot shows the WISPr Cloud web interface in a browser window. The URL is `cloud.wispr.systems/tests`. The interface has a dark sidebar on the left with the WISPr logo and a menu of options: USERS, DRONES, LOGS, IMAGES, TOWERS, TOWER MAPPING, SUBSCRIBERS, TESTS (highlighted), MANAGE SUBSCRIPTIONS, and STORAGE. The main content area is titled 'Configure New Tests' and has four tabs: 'Configure New Tower Survey', 'Configure AP Scanner', 'Configure Near Roof Surveys', and 'Configure GoTo' (which is active). Below the tabs, there is a text block explaining the GoTo function: 'The GoTo Function will autonomously fly the drone to the altitude entered. It will then turn towards either an azimuth or tower coordinates (latitude/longitude). If tower coordinates are entered, it will also display the distance to the tower.' The form contains a 'GoTo Name' input field, an 'Add Subscriber' dropdown menu, and a 'Reset' button. There are two checkboxes: 'Input Altitude' and 'Input Azimuth/Tower Coordinates'. The 'Input Altitude' section has an 'Altitude' input field with a unit of 'ft' and a note 'Enter Altitude Between 15 and 180 ft'. The 'Input Azimuth/Tower Coordinates' section has two input fields: 'Input Azimuth' and 'Input Tower Coordinates'. The 'Input Azimuth' section has an 'Azimuth' input field with a unit of 'degrees' and a note 'Enter Starting Azimuth Between 0 and 360 Degrees'. At the bottom of the form is a large red button labeled 'Save GoTo'.

MANAGE SUBSCRIPTIONS

Manage WISPr OS drone subscriptions through the CLOUD. Each drone must have a subscription.

The screenshot shows the 'Manage Subscriptions' interface in the WISPr Cloud. On the left is a sidebar with navigation links: USERS, DRONES, LOGS, IMAGES, TOWERS, TOWER MAPPING, SUBSCRIBERS, TESTS, MANAGE SUBSCRIPTIONS (highlighted), and STORAGE. The main content area has a 'Purchase Subscription' button at the top right. Below it, the 'Testing Tier' details are shown: Subscription Amount \$0, Next Billing Date 2019-10-04, and Last Billing Date. A table lists the subscription for 'WISPr Systems Test Drone' with status 'live' and next billing date '2019-09-20'. At the bottom are 'Update Card' and 'Cancel Subscription' buttons.

Name	Status	Next Billing Date	Drone
Testing Tier	live	2019-10-04	
Testing Tier	live	2019-09-20	WISPr Systems Test Drone

STORAGE

If you ever go over the 5GB storage given with the WISPr CLOUD, you must purchase more to continue to store more data. This can be done from here.

The screenshot shows the 'Storage' interface in the WISPr Cloud. The sidebar is identical to the previous page. The main content area shows 'Current Tier - 0' and 'Status - live'. It indicates 'Currently using: 46.80 MB / 5 GB'. A table lists three storage tiers with their respective sizes and monthly rates. Each tier has a 'Purchase' button. A note at the bottom states: '***Customer is required to pay the Stripe fee of %2.9 + 30¢'.

Tier	Storage Size	Monthly Rate	
Tier 1	10 GB	\$4.99	<button>Purchase Tier 1</button>
Tier 2	100 GB	\$10.99	<button>Purchase Tier 2</button>
Tier 3	1 TB	\$49.99	<button>Purchase Tier 3</button>

***Customer is required to pay the Stripe fee of %2.9 + 30¢