BOUNCE IMAGING

OPERATING
MANUAL

Recce360 Mini Mk2

Recce360 TW

ATAK Bounce Viewer Plugin

	RECCE360 MINI	RECCE360 TW	LAND SHARK K-9 CAMERA	THERMAL POLE CAMERA
CAMERAS	6x monochrome WVGA sensors (up to HD Panoramic total resolution)			Dual 320x240 Thermal Image Sensors
LEDS	96W IR peaking at 850nm	96W IR peaking at 850nm White light distraction LEDs	96W IR peaking at 850nm Two additional forward facing emitters	N/A
FRAME RATE	10+ FPS Omnidirectional / VR video fully stitched with under 0.25s latency			9 FPS
TRANSMISSION RANGE	Up to 120ft	Up to 400ft	200+ft	Up to 120ft
DURABILITY	Tested for more than 25 drops onto concrete from 7ft (exceeds mil spec 810-G for drops)		Rugged & stabilized for dog's movements	6ft Extendable Tactical Pole & Hard Case Included
BATTERIES	Dual 920mAH Lithium-ion	Dual 2000mAh Lithium-ion with protection circuit	4x 1800mAh Lithium-ion with protection circuit	Dual 1800mAh Lithium-ion with protection circuit
RUN-TIME	2 hours	1-1.5 hours running both camera and internal MANET radio (2W transmission power)	4 hours with LEDs, up to 8 hours without	~4 hours
COMPATIBLE TABLETS/ SMARTPHONES	Android/iOS & ATAK			Android/iOS
POLE/TETHER ATTACHMENT	Standard 1/4-20 thread			
CHARGING	Standard USB-C port (car charger optional) for 12/15V Power Delivery USB-C charging			
WARRANTY	1 year limited			
WEIGHT	.8lbs	1.7lbs	Under 2lbs	2.5lbs

1. Background

Bounce Imaging systems are used across a range of tactical environments and use cases:

THROW UP FOR AERIAL VIEW

Throw ball in the air over highest obstacle. Use it to look over a wall in real time or in recorded video at the top of the camera's arc.

ATTACH VIA POLE MOUNT

Attach the ball via the mounting point to our tactical pole and use it as a pole cam to look in crawl spaces, attics, and around corners for an instant 360° view.

LOWER INTO TUNNEL

Attach to tether and lower it down into a spider hole or cave entrance. You can stay oriented even if the tethered camera is spinning.

THROW INTO ROOM/ BARRICADED SHOOTER

Throw into a room before making entry. Most adversaries will assume the camera is a grenade and give it room. You get intel of where they are and communicate with 2-way audio before taking action against the objective.

CALL OUT SUPPORT

Communicate with friendly forces on the objective and see what they are seeing within the structure or instruct civilians to leave or stay out of the way.

ALTERNATE UAS/UGV SENSOR

Attach via magnet or standard tripod mount to UAS/UGV. Provides easy-to-use alternative sensor or deployable payload.

2. Equipment Overview

Both the Recce360 Mini Mk2 and the Recce360 TW provide users with real-time, omnidirectional video. They feature extended range, a speaker and microphone for two-way audio, encryption over the 802.11 Wi-Fi feed, and user-friendly ruggedized ports and switches. Additionally the Recce360 TW can act as a node in a MANET network and transmit video data over it.

2.1 Recce360 Mini Mk2

2.1.1 Top view

Fig 1. Top view Recce360 Mini Mk2

A. Power button/charger socket protection flap. When pressed this controls the power button. When the flap is lifted (see figure 2), it exposes the USB-C charging port and indicator LEDs.

B. Orientation groove, a guide to quickly find the tether mount (C).

C. Tether mount. This holds a standard ¼-20 thread that can be used to attach a tether, tripod mount, pole mount, or another accessory. Another tether mount is located on the other side of the camera.

D. Lens.

E. Illumination LEDs.

A

B

C

D

Fig 2. Controls view Recce360 Mini Mk2

Components behind the protection flap.

A.   Back of the protection flap.
B.   Power button/indicator control.
C.   LED status indicators/charge indicator.
D.   Charging socket (USB-C).

2.1.3 Bottom view

Fig 3. Bottom view Recce360 Mini Mk2

A.   Speaker/microphone grid. The speaker and microphone are located behind this grid.
B.   Orientation groove, a guide to quickly find the tether mount (C).
C.   Accessories Mounting Point. This holds a standard ¼-20 thread that can be used to attach a tether, tripod mount, pole mount, or another accessory. Another mount point is located on the other side of the camera.
D.   Lens.
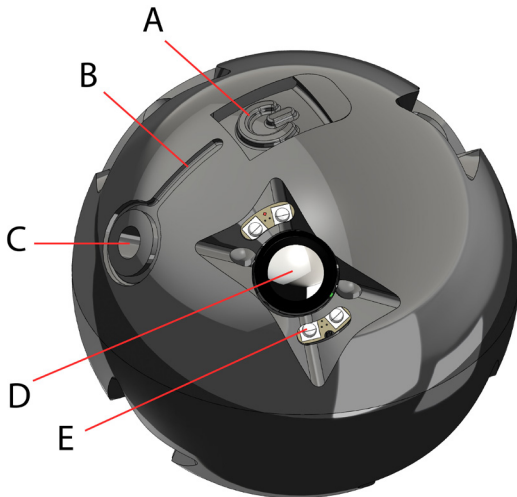E.   Illumination LEDs.

2.2 Recce360 TW
2.2.1 Top view
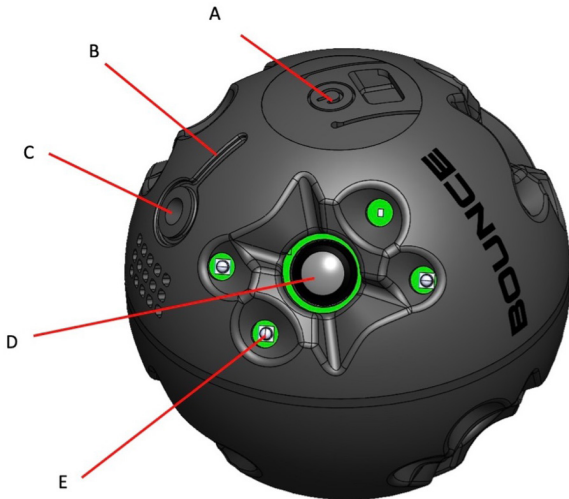
Fig 4. Top view Recce360 TW

A.   Power button/charger socket protection flap. When pressed this controls the power button. When the flap is lifted (see figure 2), it exposes the USB-C charging port and indicator LED's.

B.   Orientation groove, a guide to quickly find the tether mount (C).

C.   Accessories Mounting Point. This holds a standard ¼-20 thread that can be used to attach a tether, tripod mount, pole mount, or another accessory. Another mount point is located on the other side of the camera.

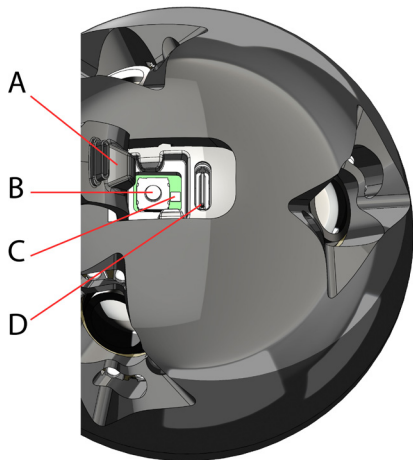D.   Lens.

E.   Illumination LEDs.
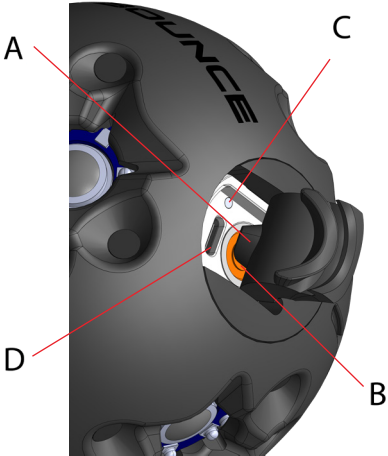
Fig 5. Controls view Recce360 TW
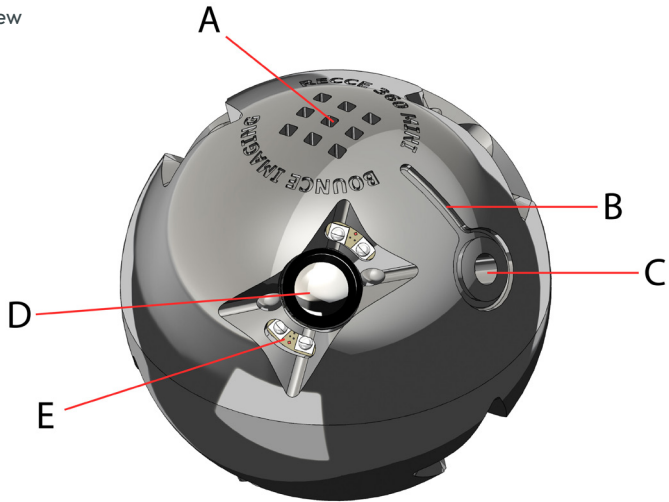
Components behind the protection flap.

2.2.3 Bottom view
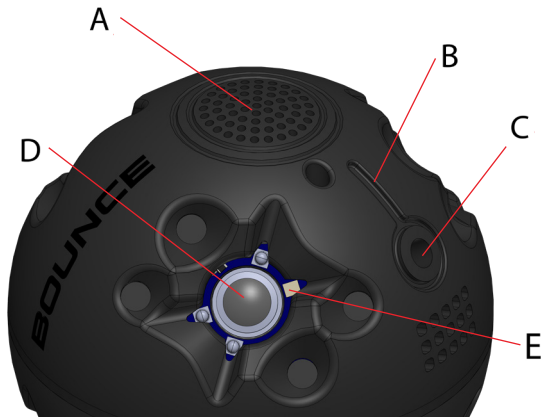
Fig 6. Bottom view Recce360 TW

A. Speaker/microphone grid. The speaker and camera are located behind this grid.
B. Orientation groove, a guide to quickly find the tether mount (C).
C. Tether mount. This holds a standard ¼-20 thread that can be used to attach a tether, tripod mount, pole mount, or another accessory. Another tether mount is located on the other side of the camera.
D. Lens.
E. Illumination LEDs.

2.3 USB Programming Dongle

This physical device can be used to configure the Recce360 TW on a MANET Network. It can also be used to upgrade the camera software. All required software packages and instructions are available in the USB Dongle QuickStart Guide. Not all kits include this dongle per customer instructions.

Fig 7. Top view USB Dongle

3. Camera Physical Operating Instructions

3.1 Unpacking
The camera comes in an IP67-protected case. After the case is opened, the camera can be taken out of the case without further precautions. Before powering up the camera, it is recommended to fully charge the camera (see section 3.2).

3.2 Charging
To charge the camera plug in the USB connector of the supplied charger in the charging socket (controls view - D). When the camera is charging, an indicator LED (controls view - C) will be lit. The Recce360 Mini has a green charging indicator. **It is important that only the supplied charger is used with the camera, as some commercially available USB-C chargers will not provide enough voltage (12V Power Delivery) to charge the camera.**

When the camera has finished charging the batteries the indicator light will automatically be turned off. When there is an error charging the batteries, the LED indicator will flash.

3.3 Power up
To power up the camera, press the power symbol on top of the camera (top view - A). There will be tactile feedback from the switch below the rubber (controls view - B) when pressed. Keep pressing until the haptic feedback from the integrated vibration motor is felt. The motor will vibrate once.

The camera is now powered up. After power-up, it takes on average between 10 and 20 seconds before the camera has booted up and is ready to connect to an end user device. Note: For Recce360 TW models, the MANET module will take at least 60 seconds to boot up and join the network.

3.3.1 Checking power state

The camera power state can also be checked without shutting it down or powering it up. When opening the protection flap (top view - A), short-press the button (controls view - B). If the LED indicator lights (controls view - C) flash, the camera is powered up.

3.3.2 Battery run time

Battery run times vary by camera system, and are impacted by the manner of use of the camera. The minimum continuous run time for the Recce 360 Mini Mk2 is 60 minutes, but can last for up to 120 minutes with power saving measures in place. The minimum continuous run time of the Recce 360 TW is 60 minutes, but can last up to 180 minutes with power saving measures in place. The camera offers several ways to save power and extend battery run time.

After the camera is powered up, it will enter a power-saving state in which the camera runs at 1 Frame per Second (FPS), with stitching of panoramic video disabled. LED illumination will also be inactive unless the default setting is modified.

If a device connects to the camera's Wi-Fi without starting a video stream, this will not cause the camera to switch to a different state. As soon as a connected Wi-Fi device requests a stream from the camera, the camera will switch to an active mode. In active mode, the frame rate is at maximum, and stitching of panoramic video is enabled. Unless the stream from the app is stopped (or the app is exited, or the device moves out of range), the stream will remain active.

If there are no active stream requests from devices, the camera will switch back to the power-saving state.

Disabling the camera illumination will increase the run time, as will activating the power save mode in the app. The power save mode in the app will enable a lower framerate while the camera is active (when devices are receiving the stream). It will not affect behavior when the camera is not in active mode.

To summarize, run time can be extended by:

- Having no active streams from the camera
- Turning off LED illumination
- Enabling power saver mode while receiving

3.3.3 Thermal protection

The camera has two thermal protection mechanisms.

Thermal throttle

To prevent the camera from overheating while powered, the camera is equipped with a built in overheating protection, in the form of a gradual thermal throttle. This will reduce the frame rate as the camera heats up. The thermal throttle will never lower the frame rate below 1 fps.

Thermal shutdown

Despite thermal throttle, the camera might still overheat because of environmental conditions or long run times when directly connected to a power supply. Thermal shutdown can be triggered if:

- Internal temperature rises above the thermal protection threshold. When the camera has reached the maximum thermal throttle level, if this does not stabilize the temperature, the temperature might reach a critical point. At this temperature, the camera is automatically shut down to prevent permanent damage to the camera and batteries.
- A combination of internal temperature and runtime above the threshold. This protection is configured to limit run time to approximately 10 hrs if the camera is run at room temperature.

After thermal shutdown, the camera should be shut down (press button) and left to cool down for thirty minutes, before charging or running it for a longer period.

3.4 Power down
To power down the camera, press the power symbol on top of the camera (top view - A). There should be tactile feedback from the switch below the rubber (controls view - B) when pressed. Keep pressing until the haptic feedback from the integrated vibration motor is felt. The motor will vibrate three times to indicate successful camera shutdown.

3.5 Attaching accessories
Accessories can be attached to the tether/tripod mount (top view - C, bottom view - C). The mounts have a standard internal thread (1/4-20). This is the same as a standard camera tripod thread but must be long enough to pass through the rubber.

The Recce360 Mini has two mount points on opposite sides. There is no preferred mount point. The two mount points can be used at the same time to attach multiple accessories.

To attach an accessory, screw it down clockwise, into the mount. The accessory mounting screw will reach a stopping point within the mounting point after a few turns. **Do not overtighten the accessory into the mounting point as this can cause damage.**

When using accessories, note that these connect to the camera below the protective rubber. This means that the camera is not protected from shocks and drops exerted on the accessory when attached.

4. MANET Communication Module

The Recce360 TW has a built-in TrellisWare Module (TW-650) that can connect to radios supporting the TSM waveform, such as the TrellisWare TW-950 Shadow or the L3Harris AN/PRC-163. To configure the module to work within your MANET network please utilize the USB Dongle described in section 2.3 to connect the Camera system to a computer.

The camera system should be configured in the same network manner as the TrellisWare radios being used in conjunction with the camera.

Refer to the following technical notes on the MANET support site (https://support.trellisware.com/ for configuration instructions:

1. TN-0113 - TW Management Tool v1.2.1
2. TN-0114 - TrellisWare Network Controller.
3. TW Radio Basic Start Guide.

4.1 Presets

The high-level configuration parameters of a Preset configuration are:

- Having no active streams from the camera
- Turning off LED illumination
- Enabling power saver mode while receiving

Each parameter contains sub-parameters defined to design and implement a Preset.The Bounce Imaging systems integrated with TW radio modules come with five Presets available, four factory Presets from TrellisWare Technologies and one Bounce Imaging internal preset example.

- FACTORY-WB.
- FACTORY-4M.
- FACTORY-WB-FCC
- FACTORY-4M-FCC
- Bounce_TTL1_OTA9_LL

The Bounce_TTL1_OTA9_LL Preset is designed to provide a high data throughput and low latency in a 1-hop network. High priority is given to data communication services like streaming video in this configuration. The Preset is briefly described on the following page.

Preset Info

Preset Name: Bounce_TTL1_OTA9_LL

Max 1-Hop Data Rate
13916 kbps

Max Multi-Hop Data Rate
N/A

Max PLI Update Rate
228 nodes/sec

Concurrent Data Sources
177

Data Usage
- Data
- Voice
- PLI/Status

Max Data Rate (kbps)
- Unicast
- Multicast

Data Delay (ms)
- Delay

Waveform

Waveform Mode	TSM	Network TTL Override	1	COMSEC Name	6E811566A6E31BD	
Center Frequency	1785.000 MHz	PLI Class	1 (Lowest)	Network Key Name	758277F19E27DC3	
Bandwidth	20 MHz	Time Quality Threshold	0	Network Key	758277F19E27DC3FE16E01	
Transmit Power	2.0 W	Software Compatibility	6.2.x (OTA 9)	Data Key	6E811566A6E31BD230689B	
HDR				Clonable		

Regenerate Keys   Export Keys

Voice

Channels 1   Talk Groups 1   Codec MELPe

Advanced

Mission Profile	Max 1-Hop Data Rate	Min 1-Hop Latency	Max PLI Update Rate	Concurrent Data Sources
Basic Profile	16125 kbps	30 ms	228 nodes/sec	110
High Mobility/Large Area	15418 kbps	30 ms	456 nodes/sec	110
Reduced Latency	13916 kbps	20 ms	228 nodes/sec	177
Low Latency/High # Streams/High Mobility	13209 kbps	21 ms	456 nodes/sec	177
High User Count/High Mobility/Dense Area	14800 kbps	31 ms	456 nodes/sec	106
High User Count/High # Streams/Dense Area	12635 kbps	21 ms	456 nodes/sec	171
Company/Fast PLI	10691 kbps	36 ms	1368 nodes/sec	98
Battalion/Balanced I	12856 kbps	33 ms	912 nodes/sec	102
Battalion/Balanced II	11442 kbps	33 ms	1368 nodes/sec	102
Battalion/Fast PLI	8570 kbps	38 ms	1825 nodes/sec	92

- Waveform: TSM to achieve maximum data throughput.
- Center Frequency: 1785 MHz, optimum antenna return loss.
- Bandwidth: 20 MHz to allow more burst modes and achieve higher data throughput in a 1-hop network. The more burst modes available, the more data the frames can carry
- Transmit Power: 2.0 W Transmit Power for maximum link range
- Network TTL Override: Set to 1 to define the maximum hop TTL to 1 hop for highest data throughput
- PLI Class: PLI set to 1 (lowest) for lowest network resources allocation.
- Software Compatibility: 6.2 x (OTA9) latest available OTA (Over The Air) control software capabilities
- Voice: Low priority, the number of channels and talk groups are set to 1 to use the less resources available in the network
- Mission Profile: set to Reduced Latency to allow high data throughput and low latency in a 1-hop network

The network configuration is highly versatile and allows the user to select from many configurations depending on their specific criteria and needs. For more and detailed information of the network configuration and capabilities the following technical notes are suggested:

- TrellisWare, TN-0144 - TSM Mission Profiles.
- TrellisWare, TN-0139 - High Data Rate.
- TrellisWare, TN-0124 - Packet Processing Rule (PPR).
- TrellisWare, TN-0134 - Spectrum Pipelining.

5. ATAK, Android, and iOS Instructions

Bounce Imaging offers a set of mobile applications that allow users to interact with the cameras and video data. **This manual focuses on the Bounce Viewer ATAK Plug-in.** The following QR codes redirect to download pages of the Bounce Viewer Android and iOS versions respectively. This commercially available software can be used to connect supported Android or iOS phones to your Bounce Imaging Camera systems. An ATAK plug in is also available and described in detail below.

5.1 Installation

5.1.1 Installing the ATAK Android App
The Team Awareness Kit for Android (ATAK) application, auxiliary/plug-in applications, and supporting documentation are available for download at TAK.gov. The Bounce Viewer ATAK Plugin is available at: https://tak.gov/plugins/bounce-viewer?product_variant=ATAK-MIL .
Please note that your agency might have its own application store or artifact repository.

Download the .apk installer(s) to the Windows/Mac/Linux device, transfer them via USB cable to an Android device and launch the installer.

Use the Android file manager to locate the folder containing the ATAK apk. Select the ATAK apk and respond to installation prompts. Once ATAK has been installed, select the apk for any desired plug-ins to initiate the installation. ATAK requires that the release numbers of any plug-ins match the release number of ATAK.

When ATAK is launched for the first time, a passphrase prompt may appear if it detects encrypted data from a previous ATAK installation. To continue using this data with the new ATAK installation, enter the passphrase and select OK. Otherwise, select Remove and Quit to discard the old data, and then relaunch ATAK. To quit ATAK while leaving the existing data intact, select Quit. Note that the prompt will reappear on next launch unless the encrypted data is removed, or the correct passphrase is supplied.

5.1.2 Installing the Bounce Viewer ATAK Plugin
Download the .apk installer(s) to the Windows/Mac/Linux device, transfer them via USB cable to an Android device and launch the installer. Once installed, the ATAK engine will prompt the user to load the installed plugin into ATAK. Alternatively, the plugin can be directly downloaded from tak.gov.
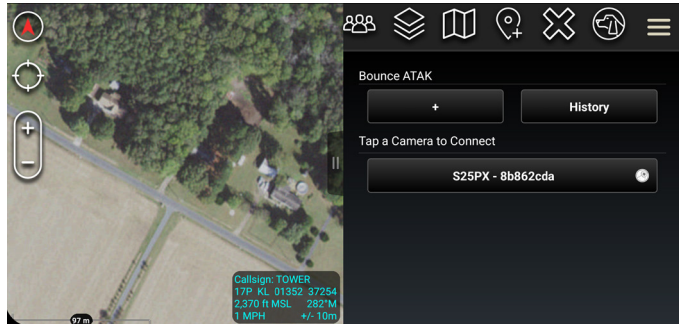
5.1.3 Running Bounce Viewer ATAK Plugin
Selecting the hamburger menu in the top right corner will open the available plugins that have been loaded into the ATAK system. Scroll down and select the Bounce ATAK icon to start the Bounce Imaging plugin.
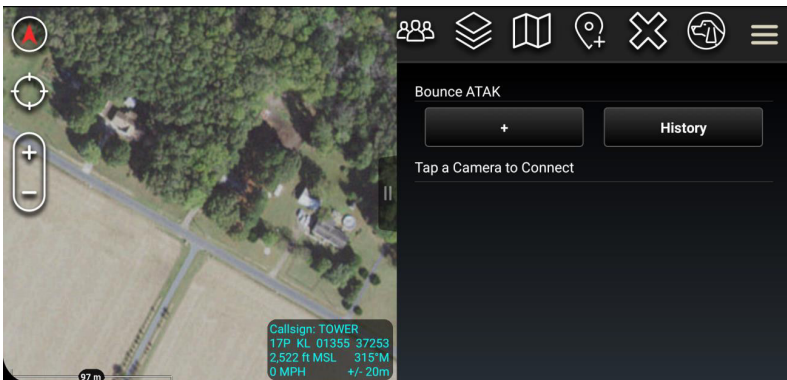
When opened, you will be able to add cameras, with the plus icon button (+) or access your video recordings with the "History" button. A list of the added cameras will appear on screen.

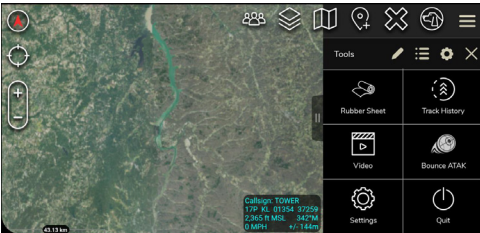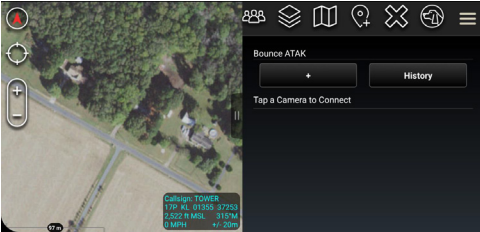Selecting a camera will display a set of connection options.

Selecting the Wi-Fi icon will establish a Wi-Fi connection to the corresponding Bounce Imaging camera and begin recording to the user device.
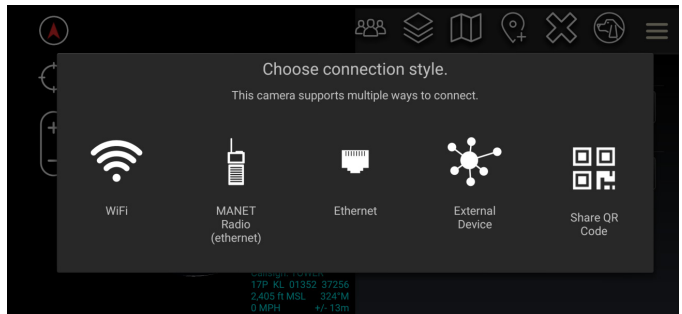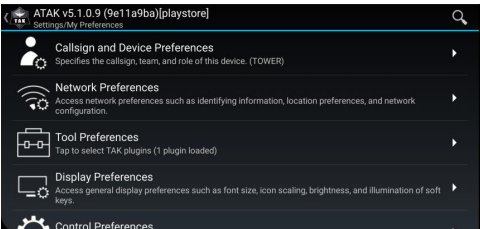
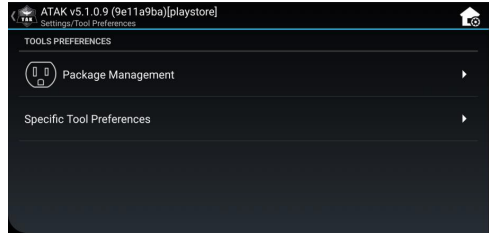## 5.1.4 Accessing the Bounce Viewer ATAK Plugin Settings

Tap on the Hamburger Menu
(=) on the upper right corner.
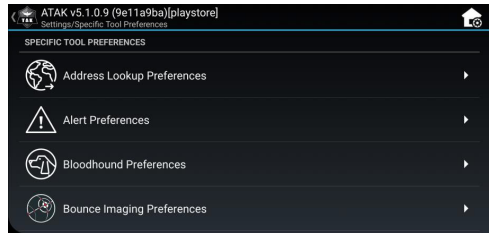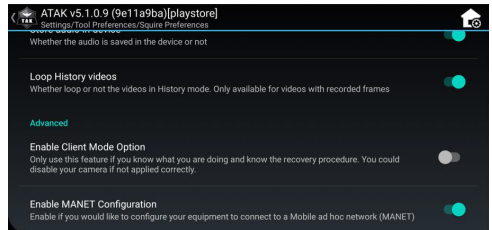

Scroll down to Settings

Select Tool Preferences

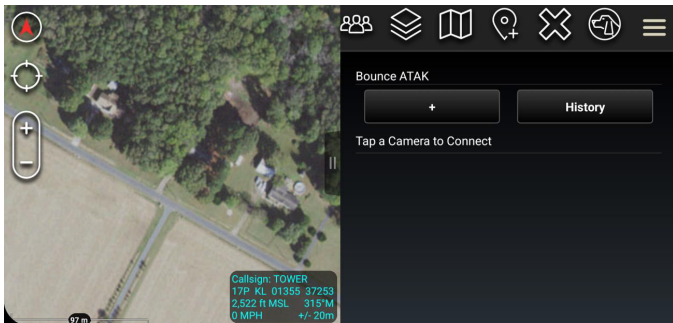Go to Specific Tool Preferences.

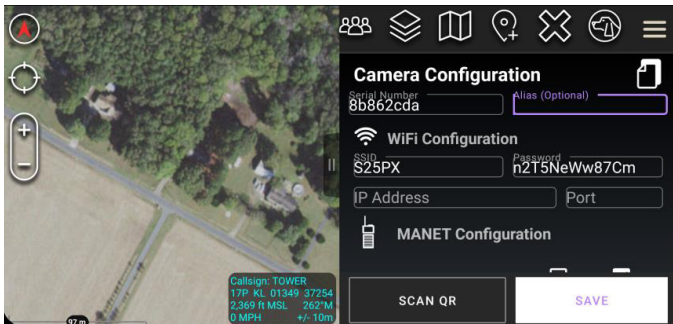Bounce Imaging Preferences.

Settings for the Bounce ATAK plugin.

5.2 Camera Managment

5.2.1 Setting Up ATAK Plugin for use with built in TrellisWare module (on Recce 360 TW).

Open the Bounce ATAK plugin and tap on the plus (+).

Tap on SCAN QR. Point your smartphone or tablet's camera to the QR code located under the lid. Once the code is scanned, the Serial Number, SSID and password will be filled in. Additionally, you can add an alias. To finish please tap the SAVE button at the bottom right.

The camera will now show up in the Bounce ATAK plugin. Your camera is now available to connect to your EUD.
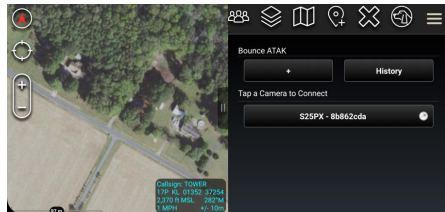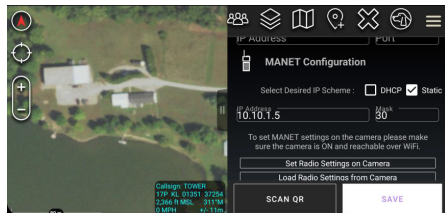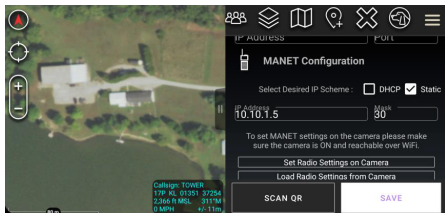

5.2.2 TrellisWare Configuration.

Swipe right on the camera you added on the previous step. Tap on the blue EDIT button.
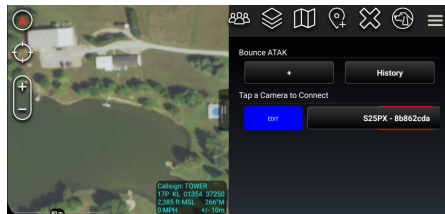
Scroll down to the MANET Configuration section. Type in the desired configuration for the MANET radio you wish to connect to. Enter the IP address you would like the Recce360 TrellisWare camera to use on MANET connection.

Make sure your camera is powered on and reachable over the camera's WiFi (Set on Access Point Mode). Tab on SET RADIO SETTINGS ON CAMERA.
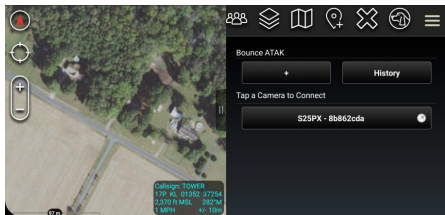
5.2.3 Sharing Camera Details (QR Code).

Open the Bounce ATAK plugin and tap on the previously stored camera.
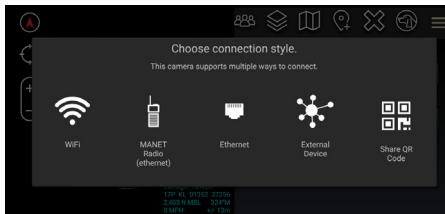
Tap on the Share QR Code option.

The Camera QR and text will show on screen, you can use it to add this camera to a different smartphone or tablet.

5.3 Camera Connection

5.3.1 Wi-Fi Connection.

Open the Bounce ATAK plugin and tap on the previously stored camera.

Tap on the WiFi option.
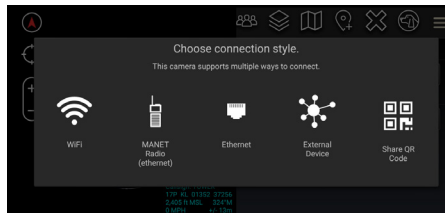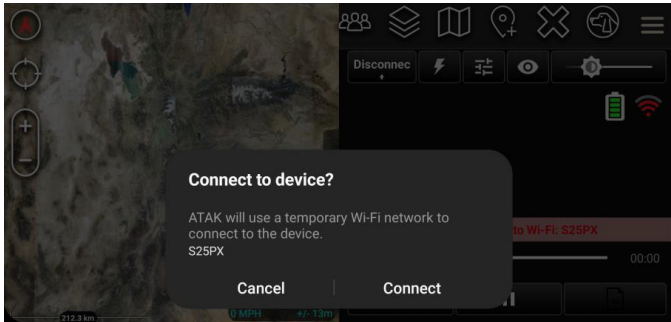
Please select Connect if you get this pop-up dialog.
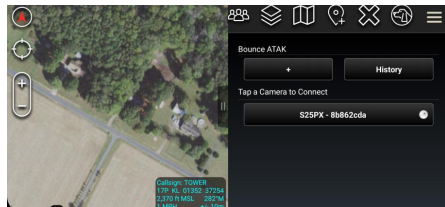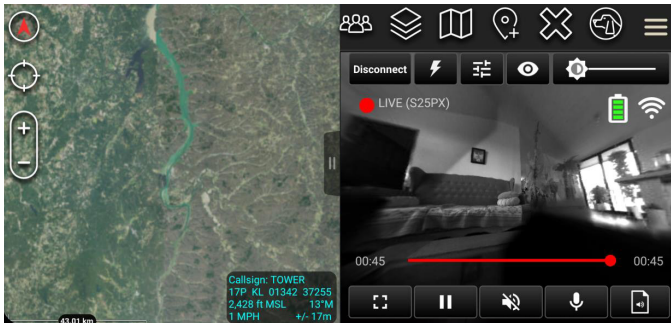

You will now see the camera video feed on the plugin.
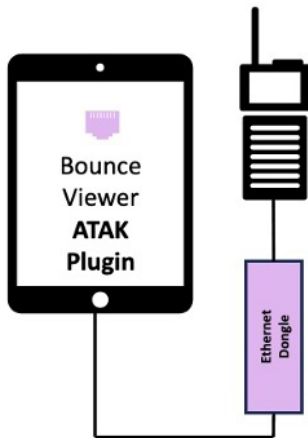
Plug in the TrellisWare radio to the Ethernet adapter. Connect same Ethernet adapter to the Android Device.
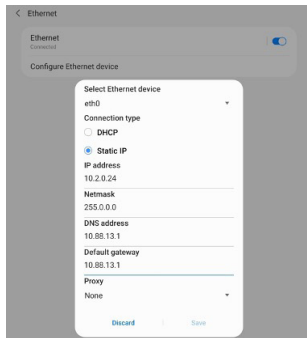
Go to your Mobile Device's Settings App and look for the "Connections" or similar section. Find and enable the ethernet option. You might need to look in the "More Connection Settings" section. Enter the ethernet settings and fill in the following:

- Connection type: Static IP.
- IP address: 10.2.0.24
- Netmask: 255.0.0.0
- DNS address: 10.88.13.1
- Default gateway: 10.88.13.1
- Proxy: None
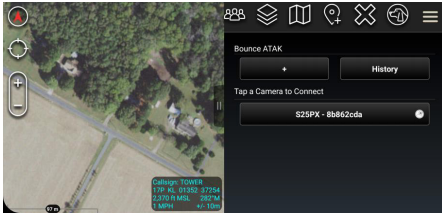
Open the Bounce ATAK plugin and tap on the previously stored camera.
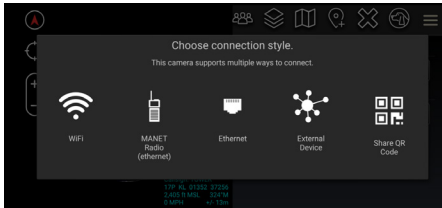
Tap on the MANET Radio (ethernet) option

You will now see the camera video feed on the plugin.

5.4 Camera Operation

5.4.1 Main Player

1. Disconnects from the camera and stays in the same screen where you can review the received video.
2. Flash: Opens the LED options. Turns yellow if the camera LEDs are ON.
3. Settings: Shows additional camera settings including High Quality, Battery Saver, Single Camera Mode and Motion Detection.
4. Visualization Options: Visualization Options: Shows additional view options including 4-panel mode, Wide Angle Mode and Dog Mode.
5. Brightness Slider: Changes the video brightness (digital gain).
6. LIVE indicator: LIVE when the player is active and PAUSED otherwise. Also shows the SSID of the camera you are connected to. Only visible when the camera is connected and receiving video.
7. Battery: Shows the battery level of the connected camera.
8. Connection status: The icon is filled-white if the connection is established, and it will show a red animation if the connection was lost.
9. Playback controls: Used to navigate to a different position in timeline of the current video
10. Full Screen: It sets the player to Full Screen Mode.
11. Pause the camera feed.
12. Mute/Unmute the audio received from the camera. WARNING: Toggling while near your camera will result in severe feedback.
13. Microphone: Keep pressed to send audio to the camera using the Android device microphone. Only available for cameras with speakers.
14. Pre-Recorded Commands: Displays set of pre-recorded commands in multile languages to play over the camera speaker.

5.4.2 Camera Settings

1. High Quality: Turn the camera High Quality Mode ON/OFF for 2x the resolution of reduced frame rate.
2. Battery Saver: Turn the camera Battery Saver Mode ON/OFF to increase battery life by decreasing the frame rate.
3. Single Camera Mode: Turn Single Camera Mode ON/OFF. When single camera mode is enabled, the camera only sends the video from one of the lenses. You can select which imager.
4. Motion Detection: Enables/Disables real time motion detection on the camera.


5.4.3 Visualization Options

1. Panels Mode: Splits the video into 4 different panels allowing you to point each panel to a different direction of the field of view.
2. Wide Angle: Increases the field of view, allowing you to see more areas of the video at the same time.
3. Dog Mode: When enabled, the video won't self-stabilize horizontally, the video will rotate with the camera.

5.4.4 CRITICAL: Infrared LED Illumination Modes (Pulse vs NVG)

1. Your cameras use powerful infrared (850nm) LEDs to illuminate dark spaces and take clear images while in motion. These LEDs can operate in three modes which also affect exposure time. Which mode is used can have dramatic implications depending on whether or not you are engaged in activities using night vision goggles (NVGs). The modes are:

2. FLASH: In this mode, the LEDs will pulse at a very high power level multiple times per second. This will provide the best illumination, especially if the camera is in motion. However, the power of the LEDs and the rapid pulsing can be extremely visible or blinding to NVGs worn at close range (note: they can also be used to distract/blind an adversary with NVGs).

3. NVG: In this mode, LEDs are run continuously but at a much lower power level. To compensate for lower illumination, the camera is set to a longer exposure. This should get good visibility in dark spaces when the camera has already stopped moving (e.g. in the middle of a room), and will not interfere with NVGs, but will experience blur in motion.

4. NVG Ultra Dark: For the darkest environments, the LEDs will run continuously at a higher power level than NVG mode and with an even longer exposure. This should be helpful in the darkest environments but will be very likely to result in blur if in motion and will be over-exposed/whited-out in a well-lit environment. This mode may also reduce camera runtime.

5. It is essential to select LED modes in the context of your operations and equipment to maximize safety and effectiveness.

Flash status and on/off (yellow if active)
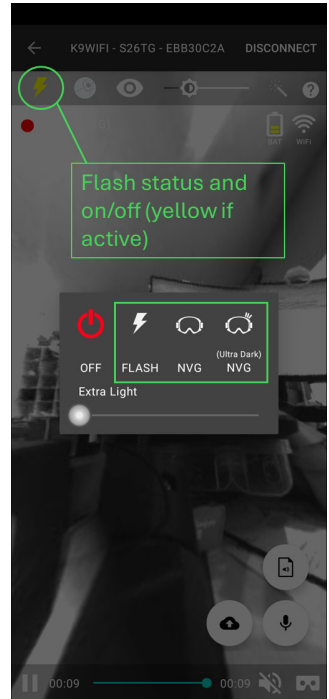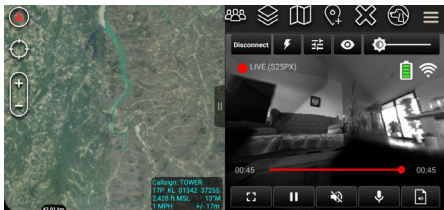
5.4.5 Audio

5.4.5.1 Sending pre-recorded commands.

Once connected to the camera, select the audio file button on the bottom right corner.
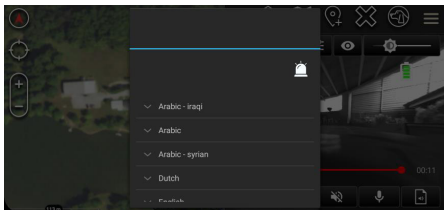
The Plugin will show an Expandable Language List. Tap on the arrow to expand the commands of the desired language.
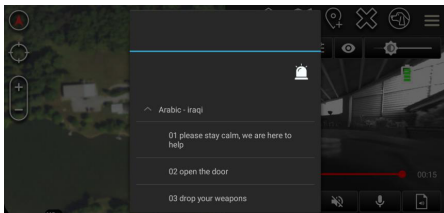
Tap on the desired command to play it on the camera.

Tap on the Siren Button to play the siren sound on the camera.
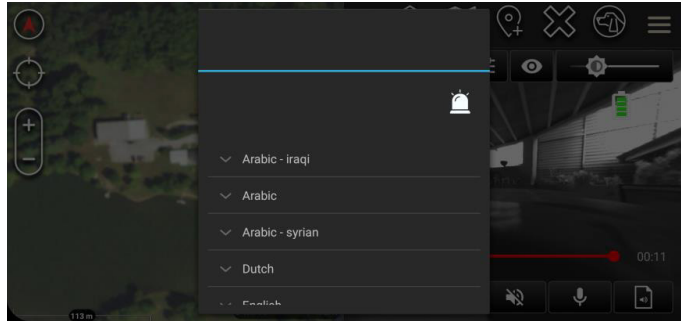
5.4.5.2 Sending live audio.

Once connected to the camera, press and hold the microphone button then talk into your device's microphone. Release the button once you are done.

Note: Playing device audio while your viewing device is close to the camera will result in loud feedback.
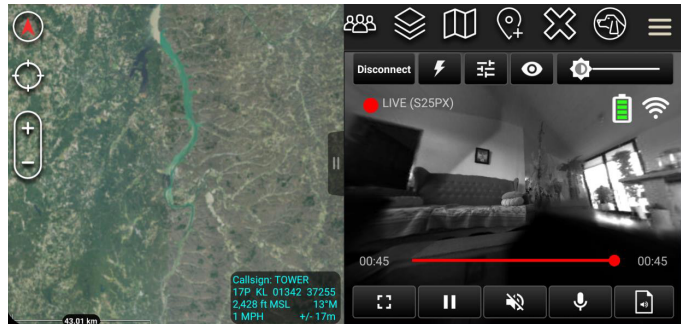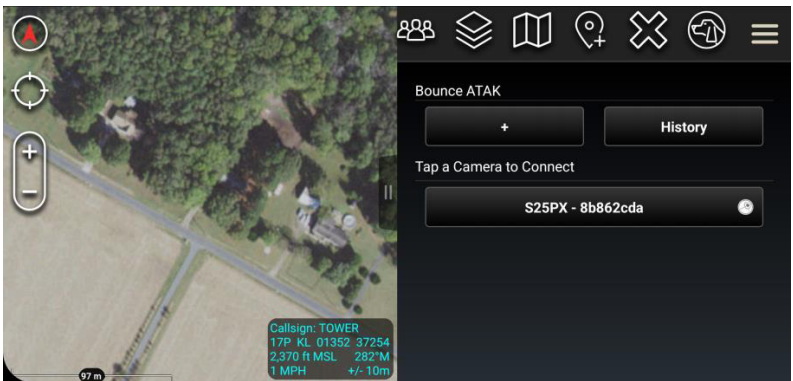
5.5 Video Playback

Open the Bounce ATAK plugin and tap on History.

Tap on the video you would like to watch.
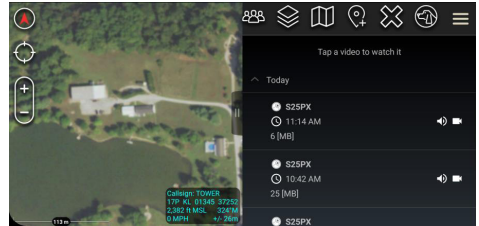
The video will show on screen. A label under the top controls indicates you are playing a recording rather than viewing a live stream.
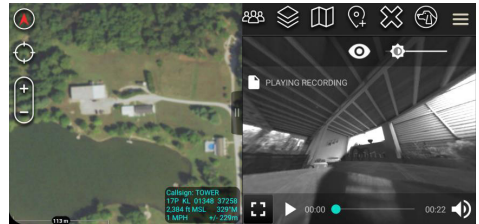
5.6 Video Sharing
Choose the App you would like to share the videos with (e.g Signal or your Gmail).
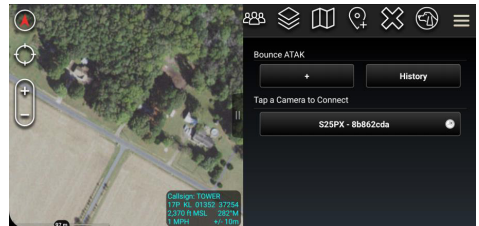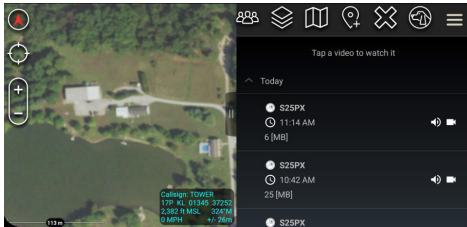
Long press on the video you would like to share.
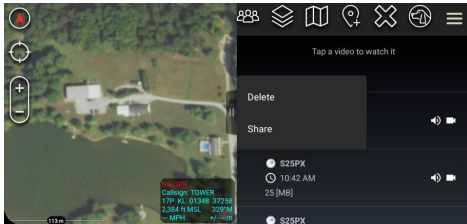
Tap on Share.
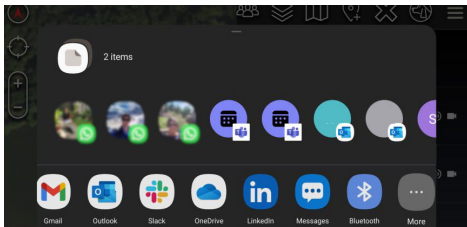
Choose the App you would like to share the videos with (e.g Signal or your Gmail).

5.7 Wi-Fi Modes

5.7.1 Enable Wi-Fi Mode Selection Settings.

Navigate to the Bounce Viewer ATAK Plugin Settings as explained in section 5.1.4. Scroll down to Advanced Settings and check the Enable Client Mode Option.
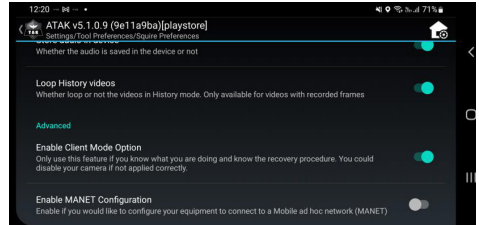
5.7.2 Set Camera to Client Mode.

Open the Bounce ATAK plugin and tap on the previously stored camera.
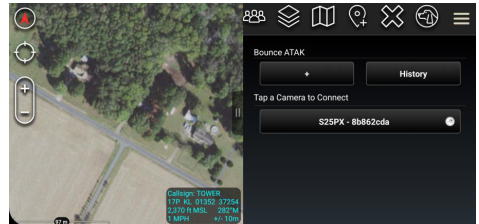
Tap on the Change Wi-Fi Mode option.
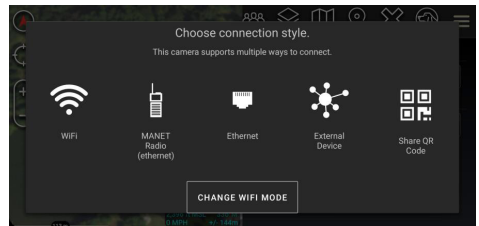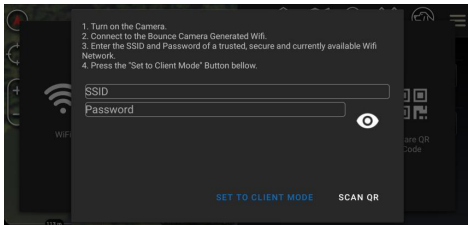
If you have a QR code for the network you wish to join, tap on SCAN QR to load the SSID and Password. If you do not have a QR code, please type in the credentials.
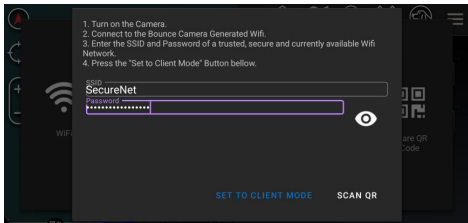
Follow the displayed instructions and tap on the Set to Client Mode button.
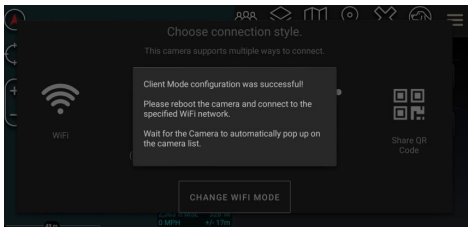
Wait for the success message.

Press the power button to turn the camera off and then turn it on again.
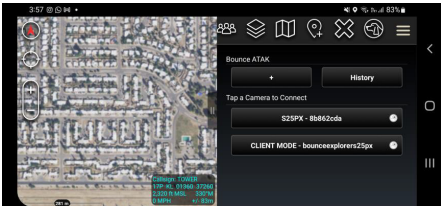
Connect your viewing device to the desired network (SSID and password you just entered). Go back to the home screen of the plugin. If the camera is active it should pop up once discovered
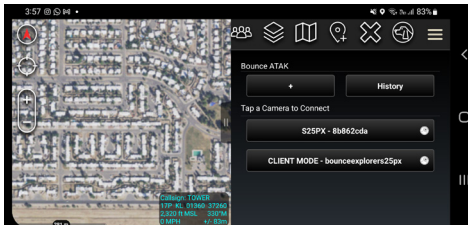
5.7.3 Set Camera Back to Access Point Mode.

On the home screen of the plugin, select the desired camera, that was previously set to Client Mode. Tap on it.
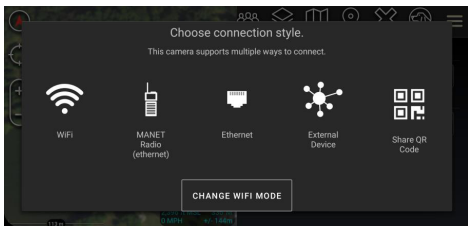
Tap on the Change Wi-Fi Mode option.
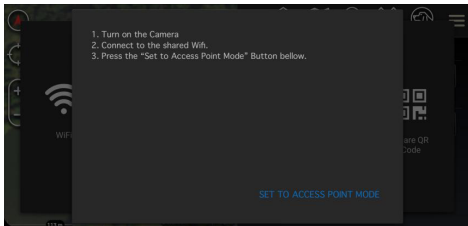
Follow the displayed instructions and tap on the Set to Access Point Mode button.

Wait for the success message.
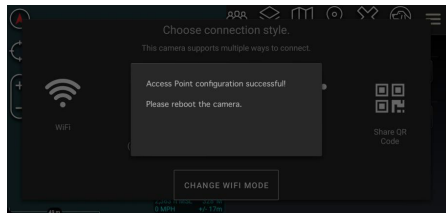
Press the power button to turn the camera off and then turn it on again.

5.7.4 Back Up Procedure for Access Point Mode Reset.

If you cannot connect to the camera or need to reset at any time you may use the 30-30-30 method outlined here. For this you will need a clock with a second counting ability. Turn on the camera. After exactly 30 seconds turn the camera off. Repeat this process 3 times. After the 4th boot cycle the camera will revert to its default access point.
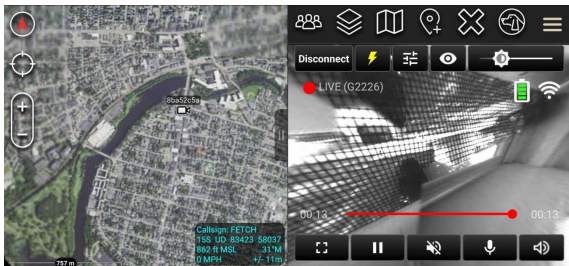
5.8 GPS

When the plugin is connected to the camera, a Cursor-on-Target (CoT) is seamlessly integrated into the ATAK map. This CoT, resembles a camera icon and displays the camera's serial number, and it is precisely positioned at the coordinates reported by the camera to the plugin.

5.8.1 Hide the camera's SSID.

On the home screen of the plugin.
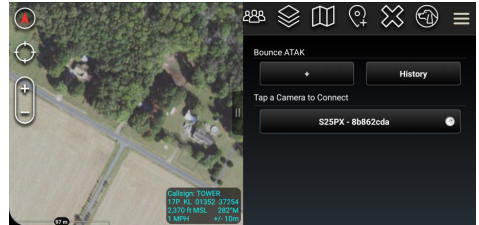
Choose the camera from which you wish to hide the SSID. Swipe left on the previously added camera.
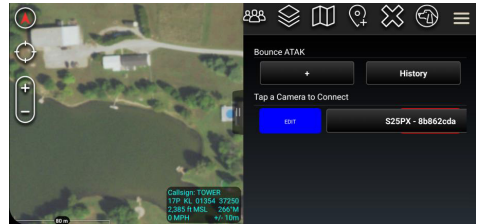
Tap on the HIDDEN button.
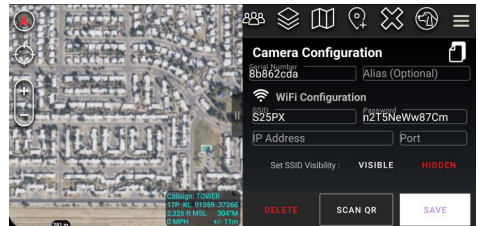
Press the power button to turn the camera off and then turn it on again.

The SSID should not be visible in the list of available networks on either the Android device or any other device. However, you should still be able to connect to the camera through the ATAK plugin.

5.8.2 Back Up Procedure for Visible SSID Reset.

Follow the steps outlined in the previous section, but this time, tap on the "VISIBLE" button instead of the "HIDDEN" one.

6. Troubleshooting and diagnostics

As stated above, the camera does not have any field serviceable parts. The information below can be used to assess whether the camera is operating as intended, and conduct user-level troubleshooting. It may also be used as a reference procedure to diagnose or report a problem to the Bounce Imaging support team.

6.1 Battery and charging

Issue: **The charging LED does not light up when connecting a charger**
Verify the original Bounce charger is used, and that it is plugged into a wall socket. When using a different charger or power supply, please note: There exist different types of USB-C chargers. The connected charger has to be capable of supplying a 12V or 15V charge voltage.

Issue: **The camera runs shorter than expected.**
To verify runtime: make sure the camera is properly charged (see section 3.2). Turn on the charged camera, and connect to a receiving device. The on-screen battery indicator should show a fully charged battery. Let the camera and connected device run until the battery runs out. Make sure there is enough free storage on the device. When the camera has stopped, open history and open the last recorded video. By checking the video length, the runtime can be verified.

6.2 Power up - power down

Issue: **The camera does not power up**
Make sure the camera can be properly charged (see sections 3.2 and 6.1). Disconnect the charger, and press the power button. Make sure the button below the rubber is fully pressed (there should be a tactile click when pressed). Keep the button pressed for 5 seconds. Check the led indicator lights (controls view - C). Tap the button again. Check if the led indicators are flashing. If the indicators flash in response, the camera is powered up. If there is no haptic feedback from the vibration motor on power-on or power-off there might be a problem with the vibration motor, but the camera may be operating normally otherwise.

Issue: **The camera does not power down**
Let the camera run until the battery is depleted. Charge the camera, power on, and try to power off. Power off should work properly now.

6.3 Connecting to the camera
Issue: **The app does not receive video from the camera**
Sections 3.4.1 explains the connection process.

1. Verify the camera is properly charged and powered up (see sections 3.2 and 3.3).
2. Open the protection flap, and short-press the button (fig. 2 - B). Verify if the led indicator lights (fig. 2 - C) are flashing.
3. Make sure the Wi-Fi is enabled on the mobile device, and flight mode is disabled.
4. Open the Bounce Viewer app, select "connect", select the Wi-Fi tab, and locate the right camera. If the camera is not present, add it. Tap the right camera and select "Search and connect." At this point, the app will instruct the device to connect to the camera Wi-Fi network and start receiving the video. On Android this is automatic, on iOS, this is a manual step. If there is no video data received (the in-app Wi-Fi indicator signal keeps flashing red), tap "disconnect" in the app and continue to the next step.
5. Open the Wi-Fi connection dialog on the mobile device. Verify if the camera's access point is visible. This is usually in the form S[XXXX] (i.e. S222S). Note that it might take some time before the mobile device has detected the access point, wait at least a minute if it is not visible right away. When not visible retry on another device.
6. Connect to the camera Wi-Fi by selecting the right access point name in the Wi-Fi connection dialog on the mobile device.
7. If you are prompted for the passphrase, fill in the middle section of the text below the QR code inside the box. (i.e. in G222S-012345678912-6ba504ea the passphrase is 012345678912). Note that usually, the app takes care of this by scanning the QR code. On Android devices, the Wi-Fi connection is added automatically, after which the connection is made automatically when pressing "connect" in the app. On iOS, the connection with the Wi-Fi must be initiated manually. The first time the passphrase must be entered as well. For this, the Bounce app, places the passphrase in the clipboard, after which it can be pasted in the passphrase dialog. If you are prompted that this network does not have an internet connection, select that you want to remain connected.
8. You should now be connected to the camera Wi-Fi, continue to step 4. If this does not succeed, "forget" the network on the mobile device and start over with step 4.

6.4 Image quality
Issue: **Black screen, lines in image, or solid color screen**
Make sure the camera is at room temperature for at least an hour, and that is properly charged and powered up (see sections 3.2 and 3.3). If that does not resolve the problem, leave it powered up for 15 minutes, and power cycle. Check if the problem is resolved or not. A black screen could also indicate that a VPN is active. If so, disable the VPN or enable split tunneling

Issue: **Ghosting in the panorama** (objects overlapping or not aligning at the imager boundaries)
Power up the camera and connect to it from the app. Point the suspected imager boundary at an object approximately 2-3 meters (6-12 ft) away from the camera. Check if there is no significant ghosting/overlap of the object on the boundary.

If this resolves the ghosting/overlap, the camera is functioning as expected. Due to the optics and algorithms employed to minimize latency, the boundary between imagers is an approximation of reality. This causes objects that are very near to the camera to not properly align. Note that despite the misalignment, it is very improbable that near objects disappear. This might only happen with very small objects that are very near to the camera.

If this does not resolve the problem, it is likely the camera has taken a significant impact and needs to be recalibrated at the factory.

6.5 Audio quality
Issue: **Clicking noise audio from the camera** (camera microphone)
Clicking noise can be caused by the inductors driving the illumination LEDs if the illumination mode is in flash mode. This is inherent to the camera design and cannot be changed. A solution might be to disable the illumination.

Issue: **Bad audio from the camera** (camera microphone)

1. Verify that the audio grid (bottom view - A) is not blocked.

2. Ensure the camera is properly charged (see sections 3.2 and 6.1). Connect from the receiving device to the camera.

3. Verify that the audio is not muted and the playback volume on the receiving device is set to max. Try another receiving device or camera to compare.

4. If the audio quality issue is not resolved, try again in an area with little signal interference to see if that resolves the issue.

Issue: **Bad audio to the camera** (camera speaker)

1. Verify that the audio grid (bottom view - A) is not blocked.

2. Ensure the camera is properly charged (see sections 3.2 and 6.1). Connect from the receiving device to the camera.

3. Verify that the microphone on the mobile device is not obstructed or blocked.

4. Playback a pre-recorded audio sample to the camera (like the siren). If it doesn't sound good there might be a mechanical problem with the speaker.

5. If the audio quality issue is not resolved, try again in an area with little signal interference.

6.6 Range - frame rate
Issue: **Shorter range than expected**
Check range in a controlled environment whether all the illumination LEDs are working:

1. Ensure the camera is properly charged (see sections 3.2 and 6.1). Connect from the receiving device to the camera.

2. Place the camera approximately 1m (3ft) or more from the ground in an open outdoor area with little signal interference.

3. At close range, verify functionality by checking for smooth (10 fps) received video data.

4. Move further away from the camera while checking the received video data. At some distance, the frame rate will drop significantly to approximately 1 fps. That distance from the camera defines the range, for diagnostic purposes.

Issue: **Low frame rate**

1. Turn off the camera.

2. Ensure the camera is properly charged at room temperature.

3. After charging is complete, disconnect the charger and wait at least one hour.

4. Connect from the receiving device to the camera and verify frame rate is ~ 10 FPS..

5. If the frame rate is not normal, perform a range check.

6.7 Scene illumination
Issue: **Scene not well illuminated**
Verify that all the illumination LEDs are working:

1. Ensure the camera is properly charged (see sections 3.2 and 6.1). Connect from the receiving device to the camera.

2. Verify the illumination is enabled (yellow lightning symbol in app). If the camera flash mode is enabled, this will cause a clicking

   sound. If the camera is in continuous illumination mode a very faint high pitched sound may be heard.

3. By pointing a regular digital camera (from a UVG mobile device) at the illumination LEDs (top view - E) in a dark room, the functionality can be verified because those cameras should be able to pick up near - infrared light.

4. Check the functionality of every LED (4 around every lens) and see if any are damaged or obscured.

6.8 Other Issues and Factory Repair Process

Bounce Imaging cameras undergo extensive automated and manual testing before they leave our factory. Nonetheless variations in components, storage, or field use can lead to malfunctions in any electronic systems. Please see section Troubleshooting and Diagnostics for detailed information on common issues and questions.

For evaluation and repair of systems, emailing support@bounceimaging.com will allow for the creation of an RMA ticket and any shipping labels. Please provide:

- Serial number of the system
- Your name/organization
- Description of the issue
- Return address in case we need to analyze the system at a repair facility (we have facilities in New York and Massachusetts)

Support personnel will provide information on the repair and evaluation process, including (if relevant) any expected part or labor costs for repairs not covered under the standard warranty terms.

Basic terms and conditions of sale are always available at:
https://bounceimaging.com/about-us/purchase-terms-and-conditions/

7. Safety Information, Warnings, and Warranty Repair

7.1 General
Thank you for your purchase of a Bounce Imaging system. We are committed to supporting your use of our technology in your missions as safely and effectively as possible and provide a series of resources below to do so. Please do not hesitate to reach out to us with any questions or concerns especially with respect to the safe operation of the system.

7.2 Technical Support and Warranty Repairs
Bounce Imaging is available to support users in understanding the operational use and nominal parameters of their systems. Extensive manuals and explainer videos are available at: https://bounceimaging.com/tutorials/

For any questions, our website at https://www.bounceimaging.com will have the most up-to-date contact information.

Phone Support: (202) 968-2416 (generally staffed at minimum M-F 0900-1700 Eastern)
Email Support: support@bounceimaging.com

7.3 Safety Information and Warnings

7.3.1 General Use

- Always read the instructions carefully before using the camera.
- Do not submerge camera in water.
- Avoid exposing the camera to extreme temperatures, direct sunlight, high humidity, or extreme shocks..
- This camera is a unibody device. Do not attempt to disassemble or repair the camera yourself. Refer all servicing to qualified service personnel. Attempting to do so would void warranty.

7.3.2 Lithium-Ion Batteries and Electrical Safety

- This camera is equipped with dual 950mAh or 2000mAh lithium-ion batteries that are not user-removable. Tampering with or attempting to remove the batteries may void the warranty and could damage the camera.
- Do not attempt to disassemble, crush, or puncture the batteries.
- Do not expose the camera or its batteries to high temperatures, such as extended direct sunlight, fire, or other sources of extreme heat. This can lead to battery swelling, leakage, or explosion.
- Only charge the battery using the provided charger or a compatible one recommended by the manufacturer.

- If the camera or batteries overheat, emit a strange odor, or appear deformed, stop using the camera immediately and contact the manufacturer for support.
- At the end of the camera's life, or if it requires service or replacement, consult the manufacturer or a professional service center for safe disposal or recycling of the batteries.
- Do not dispose of the camera in household waste. Follow local regulations for electronic waste disposal.
- Please be aware of IATA and other restrictions on the transport of goods with integrated lithium-ion batteries. More information can be found at https://www.iata.org/en/publications/store/lithium-battery-shipping-regulations/
- Do not use the camera with a charger if the power cord or plug is damaged. Regularly inspect charging equipment for any signs of damage.
- Ensure the camera and its accessories are compatible with the voltage of your electrical outlet.
- Do not attempt to eject, replace, or open the battery.
- Do not puncture the camera.
- Do not store the camera at temperatures above 60°C (140°F).
- By adhering to these guidelines, you ensure the safe use and longevity of your camera's integrated lithium-ion batteries and general electrical safety.

CAUTION: THERE IS A RISK OF EXPLOSION IF BATTERIES ARE TAMPERED WITH. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS PROVIDED.

7.3.3 Handling and Maintenance

While these cameras are ruggedized and tested to a drop rating, they are electronic cameras and thus vulnerable to impacts exceeding tested ratings. Where possible:

- Handle the camera with care to avoid damaging the lenses.
- Keep the camera clean and avoid touching the lenses with your fingers. Microfiber cloth or lens cleaning cloths should be appropriate for cleaning the lenses and surface rubbers. Chemical cleaning agents are not recommended.
- Store the camera in a dry, dust-free environment.
- Avoid pointing the camera directly at the sun or other strong light sources for extended periods of time, as this may damage the image sensor.
- Keep the camera out of the reach of small children.
- Handle the camera with care to avoid damaging the lenses.
- Avoid immersion of the camera in water, especially salt water or water with other impurities
- Avoid using the camera near or exposing it to strong magnetic fields, as these may damage internal components

Despite a rugged device design that complies with the specified drop and water conditions, it is not recommended to expose the camera to frequent or lengthy:

- Adverse weather or environmental conditions, such as heavy rain or snowstorms.
- Repeated drops from above 3 meters.

7.3.4 Local laws and regulatory compliance

The use of cameras is regulated in many geographies and organizations. Be aware of these and be sure to comply with relevant privacy laws and regulations when capturing images or videos.

7.3.5 Wireless Interference

This camera operates using wireless communication technologies. While designed to minimize interference with other electronic devices, it is possible that this camera could cause or be affected by interference under certain conditions. Please be aware of the following:

- The wireless signals from the camera can potentially interfere with the operation of medical devices such as pacemakers or hearing aids. Keep the camera at a safe distance from such devices as recommended by their manufacturers.
- Avoid using the camera in close proximity to other devices that emit strong electromagnetic fields, such as microwaves, Wi-Fi routers, or large electronic appliances. This can help prevent potential interference.
- Be mindful of restrictions on the use of wireless devices in places like hospitals and aircraft, where wireless operation might interfere with navigation or medical equipment.
- The camera may experience interference from other wireless devices operating on similar frequencies. If you notice inconsistent camera behavior or loss of signal, consider changing your location or turning off other nearby wireless devices.
- If you experience consistent interference, try moving the camera or the connected device to a different location to improve wireless signal quality.
- If you believe that this camera is causing harmful interference to other wireless communications, or if you notice significant degradation in your camera's wireless performance, please contact the manufacturer for support and guidance.

Please consult the detailed specifications of your camera for more information on its wireless capabilities and guidelines for optimal operation.

7.3.6 Operational Security
These systems are often employed in complex or contested environments. Please be aware that while we work to minimize them, like any electronic system, the operation of this system may generate electromagnetic or visual signatures. Please carefully review the manual to understand those possible signatures to avoid unintended detection. Specific examples include:

- Radio frequency emissions from the communications systems on the devices
- Light emission (primarily in the near-infrared spectrum) from camera illuminators
- Audio from the two-way audio system on the device
- Reflections from the lenses on the device

7.3.7 Information Security
This camera is designed to operate in a trusted network environment. This means that the information on the label inside the box (e.g. the QR code and text that contains the Wi-Fi SSID and passphrase) should be kept confidential. Someone with access to this data can connect to the camera while it is active and in range. Bounce Imaging keeps no records of the random passphrases.

In the default configuration, all Wi-Fi data is protected by WPA/WPA2. In addition to this, data traffic between the camera and receiving device is encrypted.

When the recording of audio and video is enabled in the app (default configuration), the received audio and video is stored on the receiving device only (not on the camera itself). It is recommended to enable the available device-encryption options, secured with strong passwords or equivalent measures.

7.3.8 Export controls
The products and mobile software may be subject to United States export control laws, including the U.S. Export Administration Act and its associated regulations, and may be subject to export or import regulations in other countries. To the extent this applies to your situation, please be aware of associated user responsibilities and the specifics of the specific system you are using.

BOUNCE IMAGING

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This document contains comprehensive instructions for unpacking, setting up, calibrating, powering up, operating, powering down, storing, maintening, and troubleshooting of the equipment. It also includes illustrated steps for controlling the cameras from an Android device running the Bounce Viewer ATAK Plugin. For the closure, the manual outlines safety guidelines for operating the system.