



Flight Deck

Mission Planning & Flight Software

USER MANUAL

Flight Deck 2.3 | March 2023

Vision Aerial Flight Deck 2.3.0 Release Notes

Overview

Release Date: 2/16/21

Starting Serial Number: 20161

Vision Aerial Flight Deck 2.3.0 is now available for general use. This new release includes Remote ID functionality, bug fixes, safety enhancements, and improvements to the user experience.

What's New

- Parameter updates can now be pushed to systems deployed in the field. When GCS is connected to Wifi and Flight Deck is initially started, if Vision Aerial has entered new system parameters in a parameter database for this specific vehicle, the users will be prompted to accept the updates. If the user declines to take the updates, the user will be re-prompted each time Flight Deck is started. If the user wishes for this prompt to cease, the user will need to contact Vision Aerial and have the system parameter change backed out of the parameter database.
- FAA Remote ID compliance features added.
- Optimized “Battery Percentage Remaining” for new Drive System and updated safety margins.
- Altitude Hold Mode was removed from the User Interface as a selectable option. The UAS will continue to revert to Altitude Hold in the event the GPS signal is lost.
- Removed Auto Takeoff feature from user interface.
- Removed LiPo battery functionality.
- Added support for Airpixel Mavcam software that overlays on top of Flight Deck. This allows users the option to control a payload from the GCS. This also allows for in-image geotagging and gimbal angle.

Top Resolved Issues

- Users no longer have to send drone in for service when basic parameter updates are needed.

How to Upgrade Your Unit

Contact the Service Department at (406) 518-1302 or email service@visionaerial.com to schedule an upgrade.

Open Issues

- Android OS updates may uninstall Flight Deck software.
- Geofence language and functionality is not intuitive to users.
- For users with Herelink 1.0: An error message will pop up on the initial startup, “Flight Deck Detected problems with app native libraries (please consult log for detail)” libQGroundControl.so; text relocations.” There is no impact to the Flight Deck software. This is an Android Operating system error that will only be resolved by changes to Android software. Disregard this message and close the error window when this appears.
- On units with cameras running survey missions, photos are sometimes not taken at the start and endpoints because photos are triggered by distance covered.
- When connected to the internet, maps sometimes load inconsistently.
- If the user backs out of the app to the Android desktop, the telemetry may disconnect.

- Remote ID requires the opening of the Radio Status screen before the RID health icon will appear.

General Advisories

- Battery percentage remaining calculation is no longer being supported for legacy LiPO batteries. Inaccurate battery remaining percentage may occur if a LiPo battery is being used. Users should use the voltage remaining number instead.
- Drone and operator's location is now viewable to others with Remote ID phone apps.

How to Report Bugs or Request Features

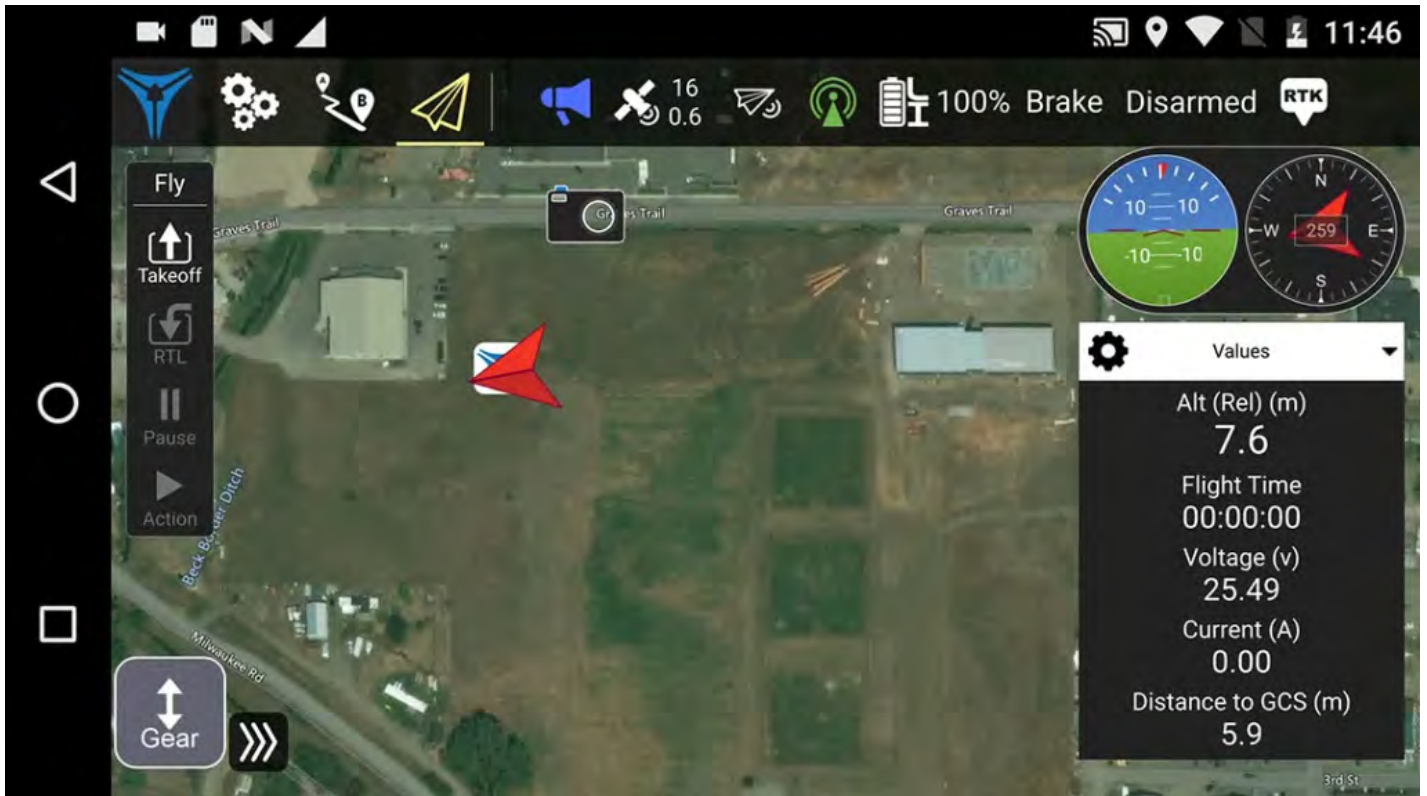
If you have any suggestions for improving Flight Deck, please email production@visionaerial.com.

Vision Aerial Flight Deck Overview

Vision Aerial's *Flight Deck* provides full flight control and vehicle setup for Vision Aerial platforms. It is intuitive for beginners, while still delivering professional features for experienced pilots.

Key Features:

- Mission planning for autonomous flight.
- Flight map display showing vehicle position, flight track, waypoints and instrumentation.
- Video streaming with instrument display overlays.
- Runs on Ground Control Stations included with Vision Aerial drones.



Getting Started with Flight Deck

Starting fall of 2021, all vehicles come with Flight Deck pre-installed on the ground control station. These instructions will help you get started with Vision Aerial Flight Deck.

Older vehicles may be updated to use Flight Deck. Please [contact Vision Aerial](#) if you would like to update your vehicle.

Flight Deck is based on the open source software [QGroundControl](#). It has been customized to Vision Aerial vehicles and modified based on user feedback.

Getting started is easy.

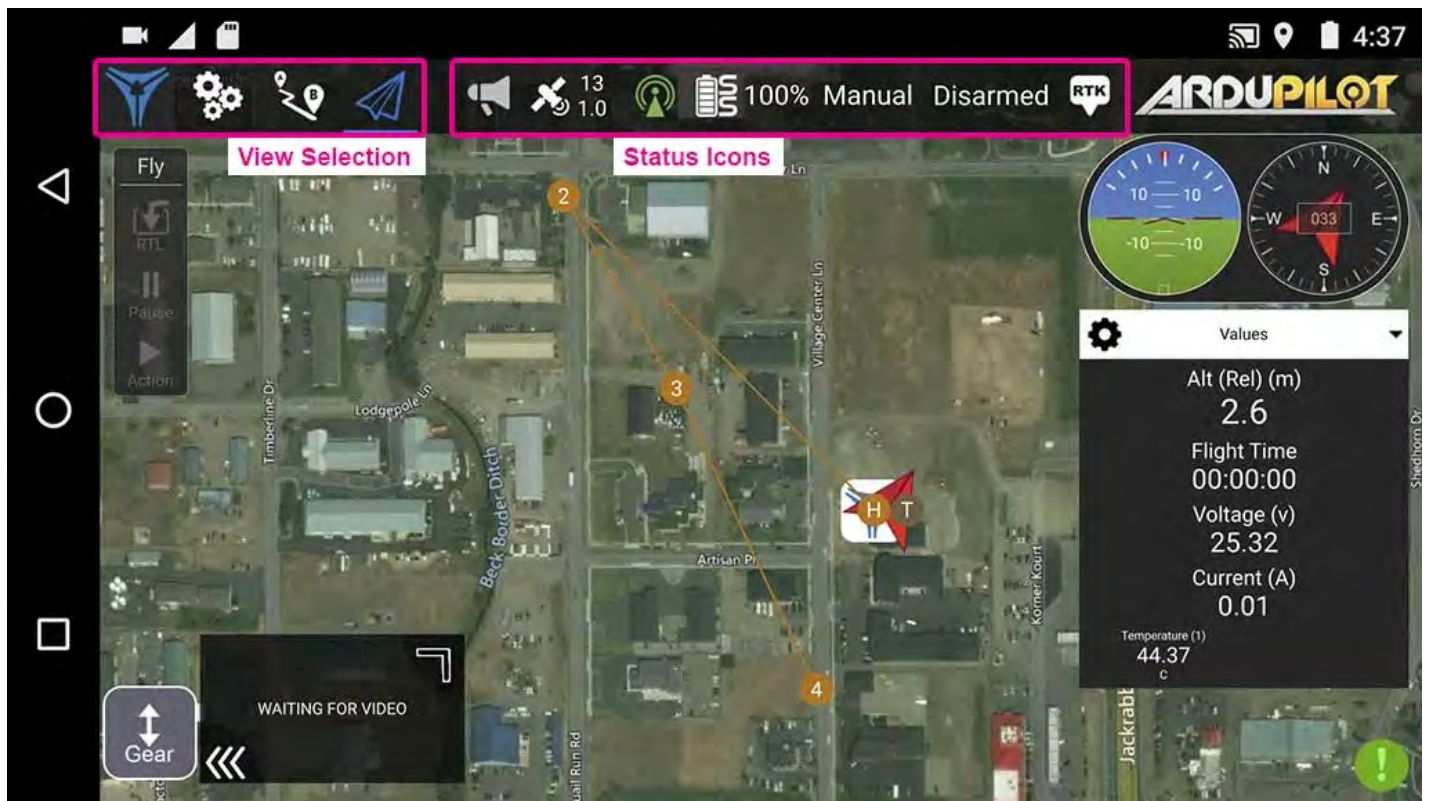
1. Turn on your ground control station.
2. Click on the Flight Deck icon to launch it.
3. Plug in the flight battery on your vehicle.



Click on the Flight Deck icon to launch the application.

⚠️ Note: An error message will pop up on the initial startup:
"Flight Deck Detected problems with app native libraries (please consult log for detail)" libQGroundControl.so; text relocations."
There is no impact to the software. Disregard this message and close the error window when this appears.

That's it! Your vehicle will run through its normal setup and preflight process. Once the preflight is complete, Flight Deck will display the Home View on the screen.



The main controls you see on the screen are as follows:

- Use the toolbar to switch between the main views:
 - Application Settings: Configure the application.
 - Vehicle Setup: Configure your vehicle.
 - Plan: Create autonomous missions.
 - Fly: Monitor your vehicle while flying, including streaming video.
- Click the *Status icons* on the toolbar to find out the status of the connected vehicle.

You may also download and install Flight Deck for Windows, Android, or IOS devices. See instructions for download and installation.

⚠ Note: This guide is a work in progress. Please [contact us](#) if you notice any errors or omissions.

Download and Install Flight Deck

System Requirements

All Vision Aerial platforms version 2.1 or greater will come with *Flight Deck* as the standard operating software on the Herelink ground control station. *Flight Deck* can also be used for mission planning on mobile devices or as a desktop application.


Any modern computer or mobile device should be able to run *Flight Deck*. The performance will depend on the system environment, 3rd party applications, and available system resources. More capable hardware will provide a better experience.

For the best experience and compatibility, we recommend the newest version of your operating system.

Windows

Flight Deck can be installed on 64-bit versions of Windows:

1. Flight Deck 2.0 [Download the zipped folder here](#).
2. Extract contents FlightDeck-installer.exe and the PDF instruction document.
3. Double click the executable to launch the installer.
4. If you run into errors, please review the PDF instructions in the zipped folder.

 NOTE: The Windows installer creates 3 shortcuts: **Flight Deck**, **GPU Compatibility Mode**, **GPU Safe Mode**. Use the first shortcut unless you experience startup or video rendering issues.

Android

Vision Aerial Flight Deck is not yet available from the Google Play Store.

iOS

Vision Aerial Flight Deck is not yet available on the Apple Store.

Flight Deck Toolbars and Menus

The main toolbar provides access to select the different application views, and high level status information for connected vehicles. The toolbar is the same in all views except for “Plan View” (which has a single icon to take you back to “Fly” view).

View-Select Icons

The following icons are used to switch between the main *Views*. These are displayed even if no vehicle is connected.



Settings

Configure the application.



Vehicle Setup

Configure your vehicle.



Plan

Create autonomous missions.

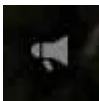


Fly

Monitor the vehicle while flying, including streaming video.

Status icons

Status icons are displayed when *Flight Deck* is connected to a vehicle. These show the high level status of the vehicle and can be clicked to see more detailed information.



Vehicle Messages

Click to show a dropdown of messages from the vehicle. This will change to a Yield sign if there are critical messages.



GPS Status / RTK GPS Survey-In Status

Shows you satellite count and current hdop. Shows you progress of RTK GPS Survey-In process.



RC RSSI

RS signal strength information.



Battery

Remaining battery percent.



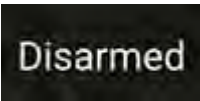
Flight Mode

Current flight mode. Click to change flight mode.



RTK Status

Status of RTK satellites and time zeroed in.



Disarmed/Armed

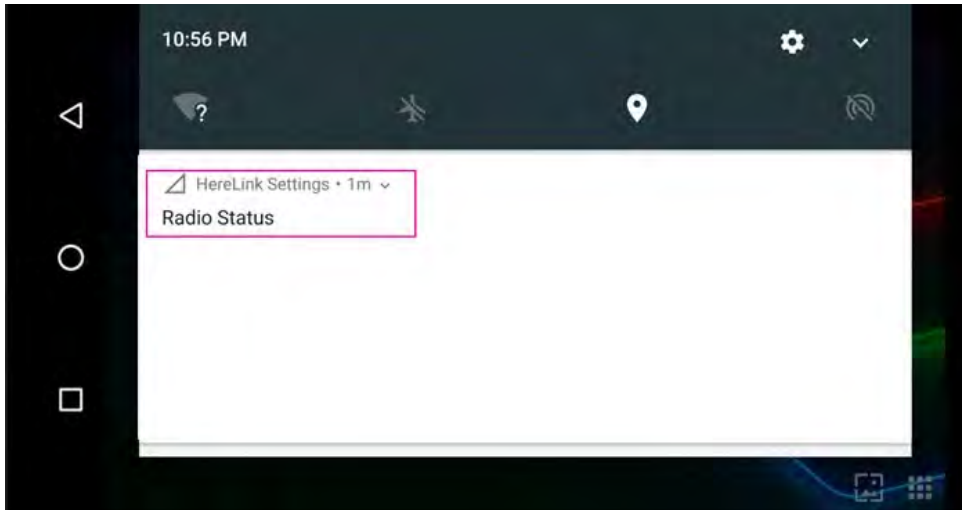
Displays arming status or enable Emergency Disarm.

Remote ID Functions

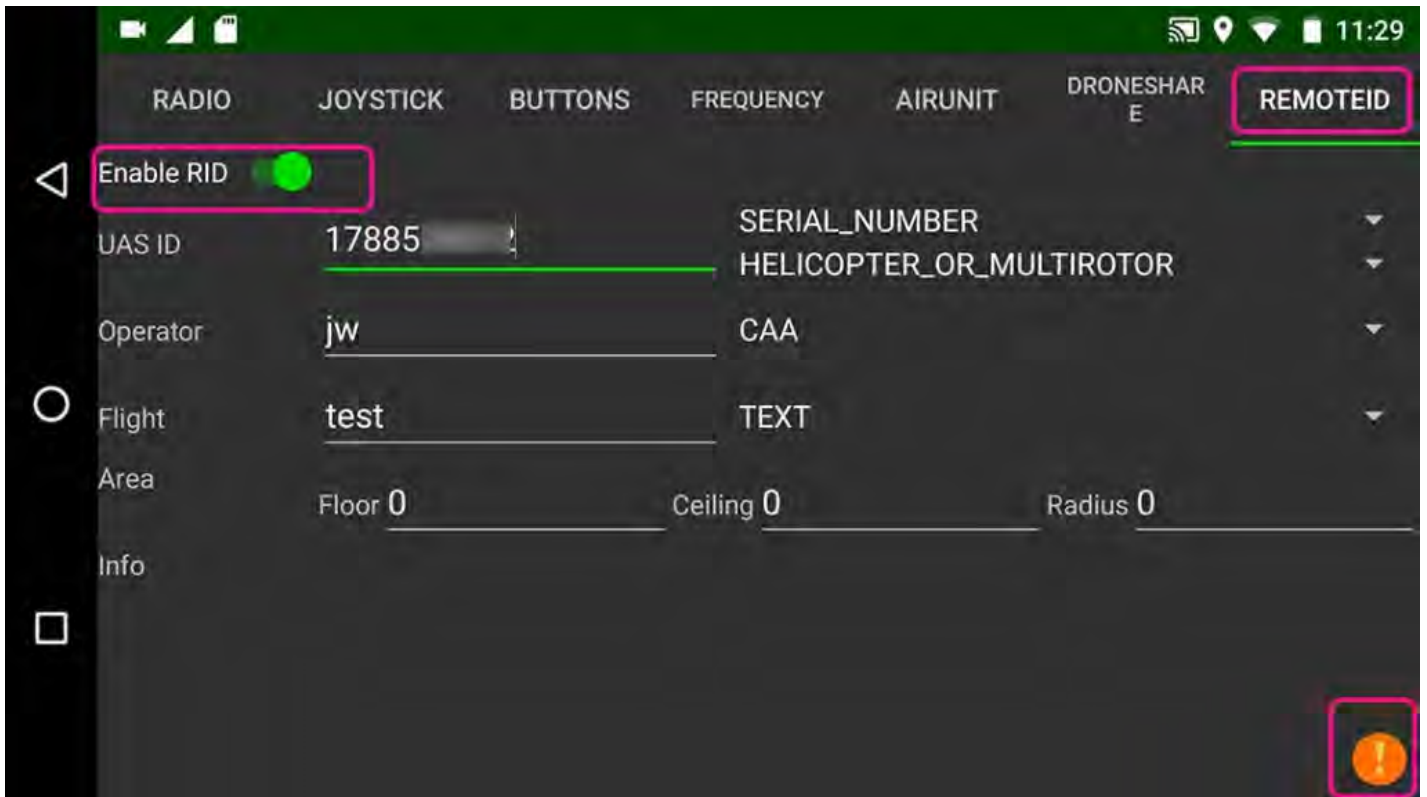
Initial Remote ID Setup

When you first receive your drone, you will need to provide identification information for Remote ID broadcast compliance.

1. Open Flight Deck on your ground control station (GCS).
2. On the GCS, swipe down from the top navigation bar on the screen to open Quick Settings.
3. Under HereLink Settings, tap “Radio Status.”



4. Select the “Remote ID” tab at the top right of the screen.



When Remote ID is enabled, the slider will be green.

5. Ensure Remote ID is ENABLED by tapping on the slide switch icon. The icon will become green when it is enabled.
6. Enter the following information into the editable fields on the left side:
 - **UAS ID:** (Required) This number is a combination of Vision Aerial’s FAA Manufacturer ID and the serial number of the UAS. The number format is 10-digits, and starts with **17885**_____. Your serial number can be found engraved on the bottom of your UAS. Enter the UAS serial number directly after the Manufacturer ID, without a space. (For example, if your serial number is “20010” the number you will enter is “1788520010”).

- **Operator:** (Required) Enter the FAA Operator Identifier Number of the Pilot In Command (PIC). The Operator Identification Number is provided by the FAA when the PIC registered to fly drones.
- **Flight:** (Optional) This is a description of the flight purpose and can also be an emergency description, or an extended flight status description. The description can be specific to the current mission and updated for each flight by the operator, or can be generic so it doesn't need to be updated every time.
- **Area:** (Optional) This is optional information and is not used by the RID system or required by the FAA. If used, the editable fields of Floor, Ceiling, and Radius can be entered.

7. The drop down lists on the right side of the screen are defined by the manufacturer and do not need to be changed by the operator. However, if they do become changed for some reason, the default settings are as follows:

The lists are not labeled and are accessed by tapping on the down arrows.

First arrow

- NONE: If this option is selected, the aircraft will not arm.
- **SERIAL_NUMBER: In the USA, this option should be selected** since it identifies that the editable field to the left is the UAS serial number.
- CAA_REGISTRATION_ID: This option is for Canadian users.
- UTM_ASSIGNED_UUID: This option is for International users.
- SPECIFIC_SESSION_ID

Second arrow

- (Required) This pull down list shows a large number of types of aircraft. For a Vision Aerial UAS, "**HELICOPTER_OR_MULTIROTOR**" should be selected list.

Third arrow

- This list only has one selection and it should be set to "CAA."

Fourth Arrow

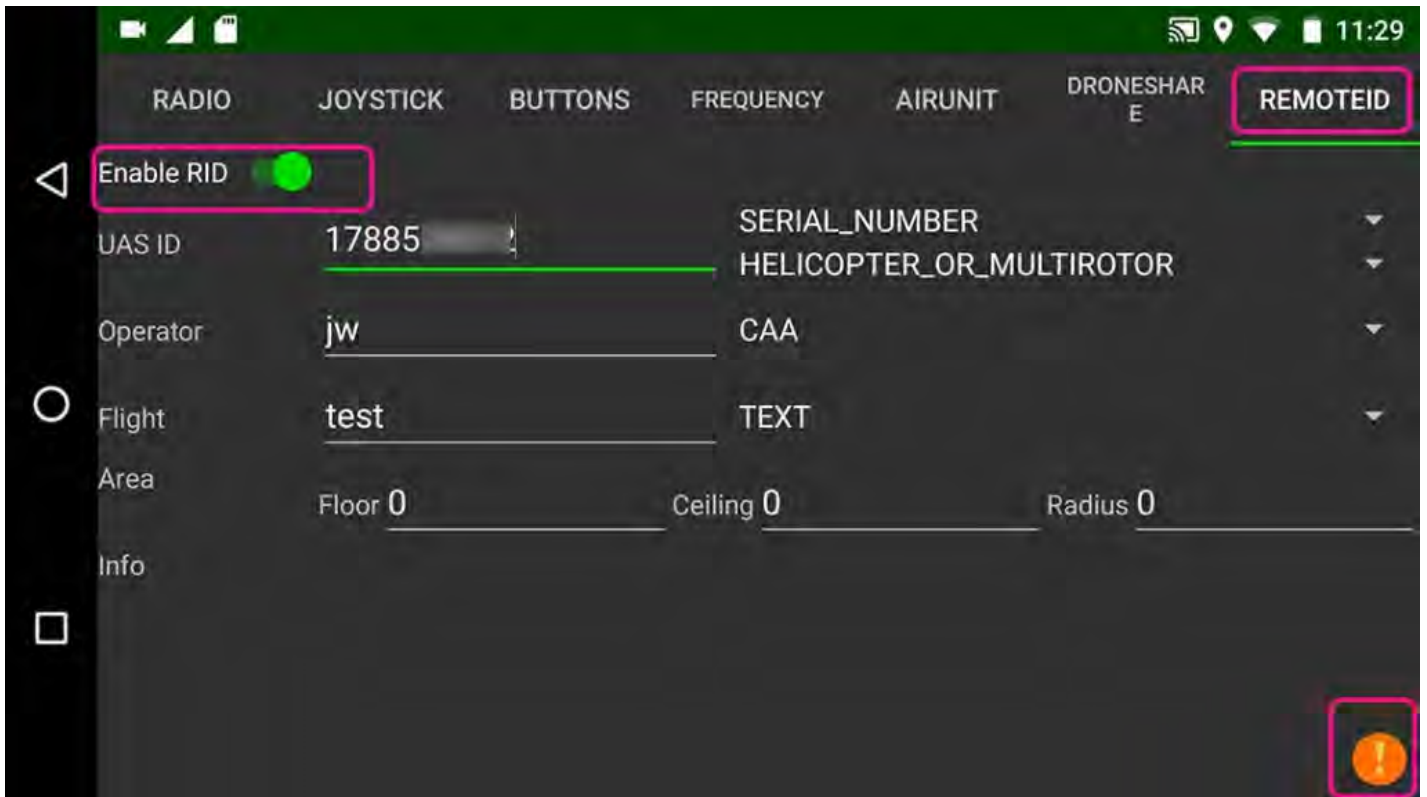
This field is used to describe the information in the Flight editable field to the left. The list contains the following elements:

- **TEXT:** This is the default selection. If the information in the "Flight" editable field contains a description of the flight, the TEXT element of the list should be selected.
- **EMERGENCY:** If the information in the Flight field contains a description of an emergency status during a flight, the EMERGENCY element of the list should be selected.
- **EXTENDED_STATUS:** If the information in the Flight field contains an extended status description of the flight, the EXTENDED_STATUS element of the list should be selected.

Remote ID Verification

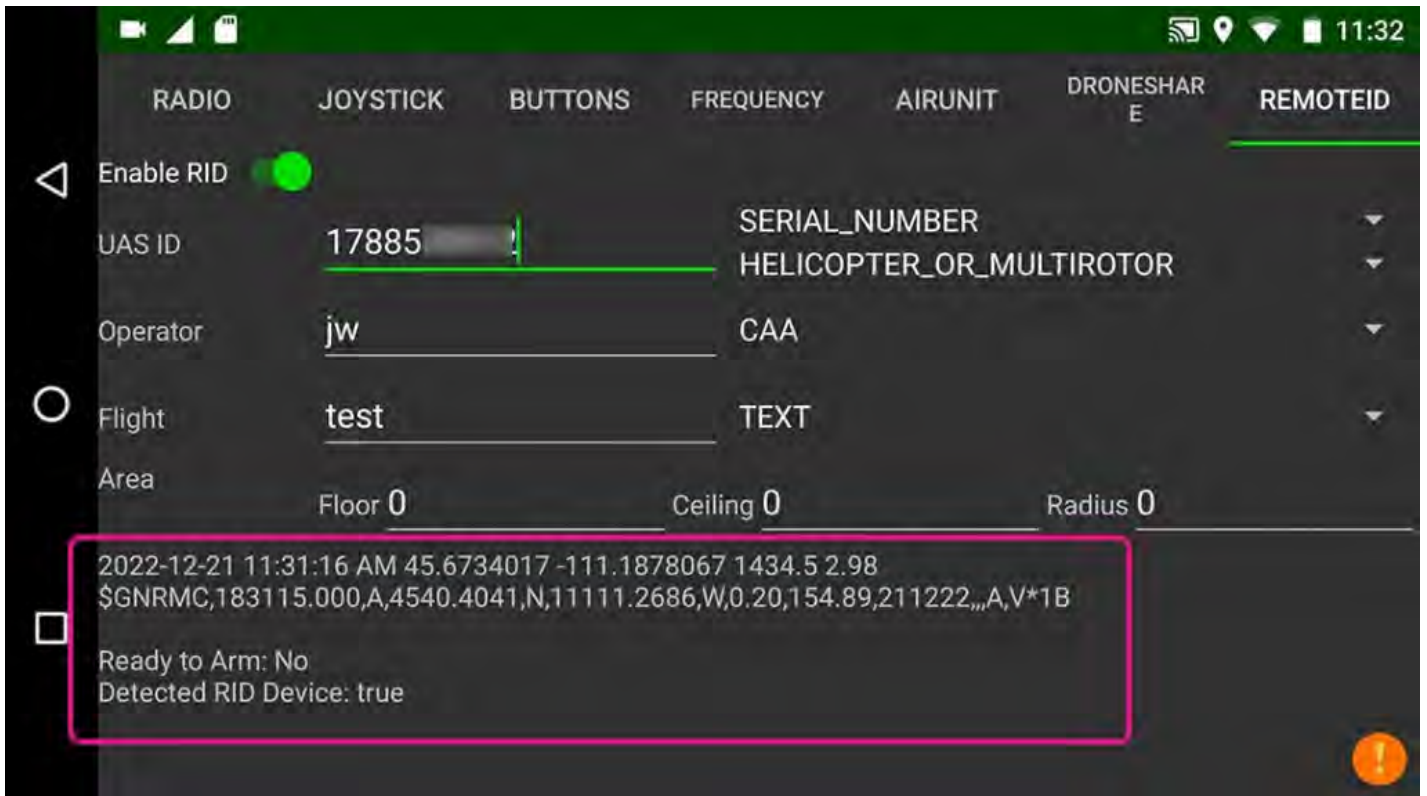
As part of your preflight check, you should ensure that Remote ID is functioning properly and provides the correct information.

1. Open Flight Deck on your GCS.
2. On the GCS, swipe down from the top navigation bar on the screen to open Quick Settings.
3. Select HereLink Settings, "Radio Status."
4. Select the "Remote ID" tab at the top right of the screen.
5. Ensure Remote ID is ENABLED.



When Remote ID is enabled, the slider will be green.

Before the Remote ID starts searching for a link, the exclamation point icon in the lower right will start out RED. Then, turns to ORANGE as it is gathering info. GREEN when the system is good to go.

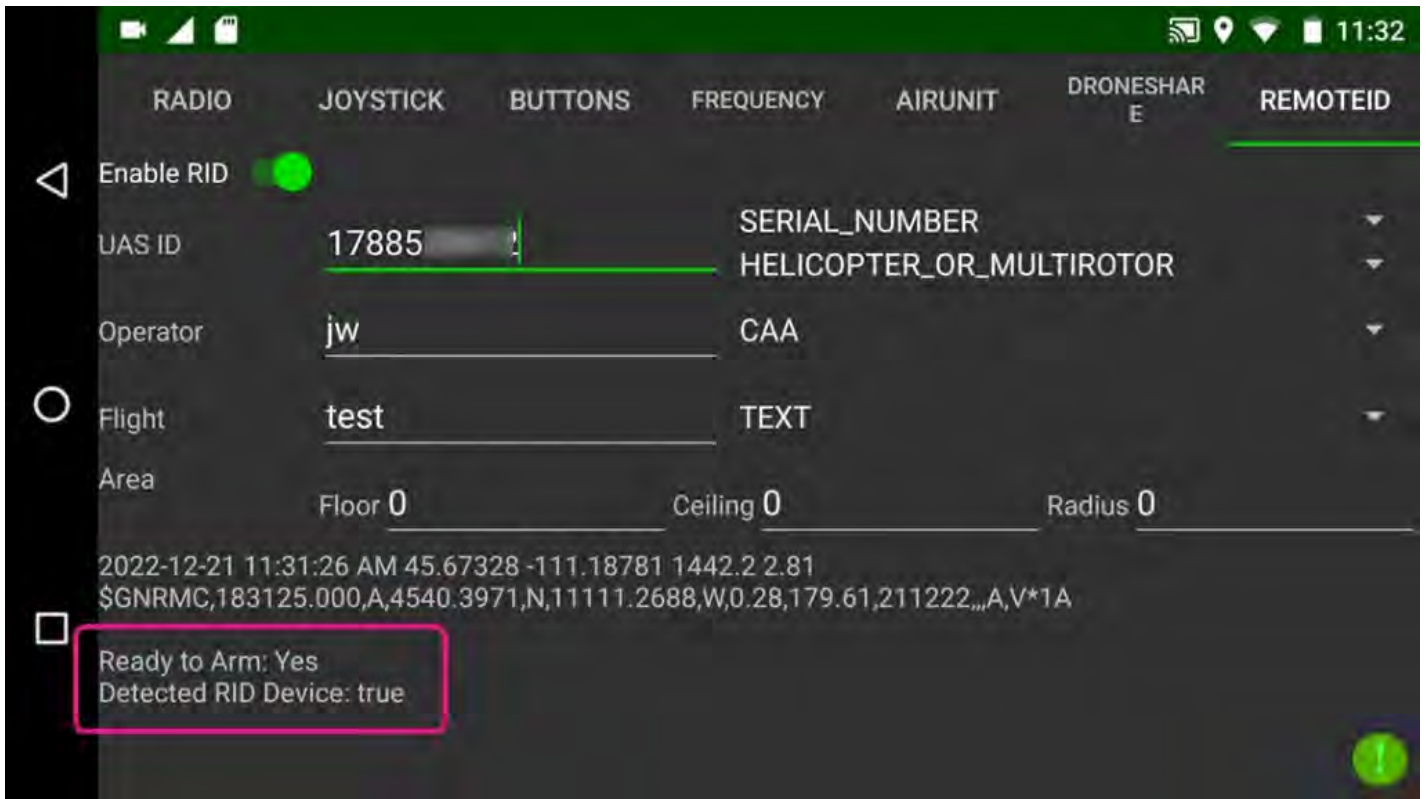


While the system is gathering information, status will update on the lower portion of the screen.

6. When the system is ready, the following should be displayed in the Info section.

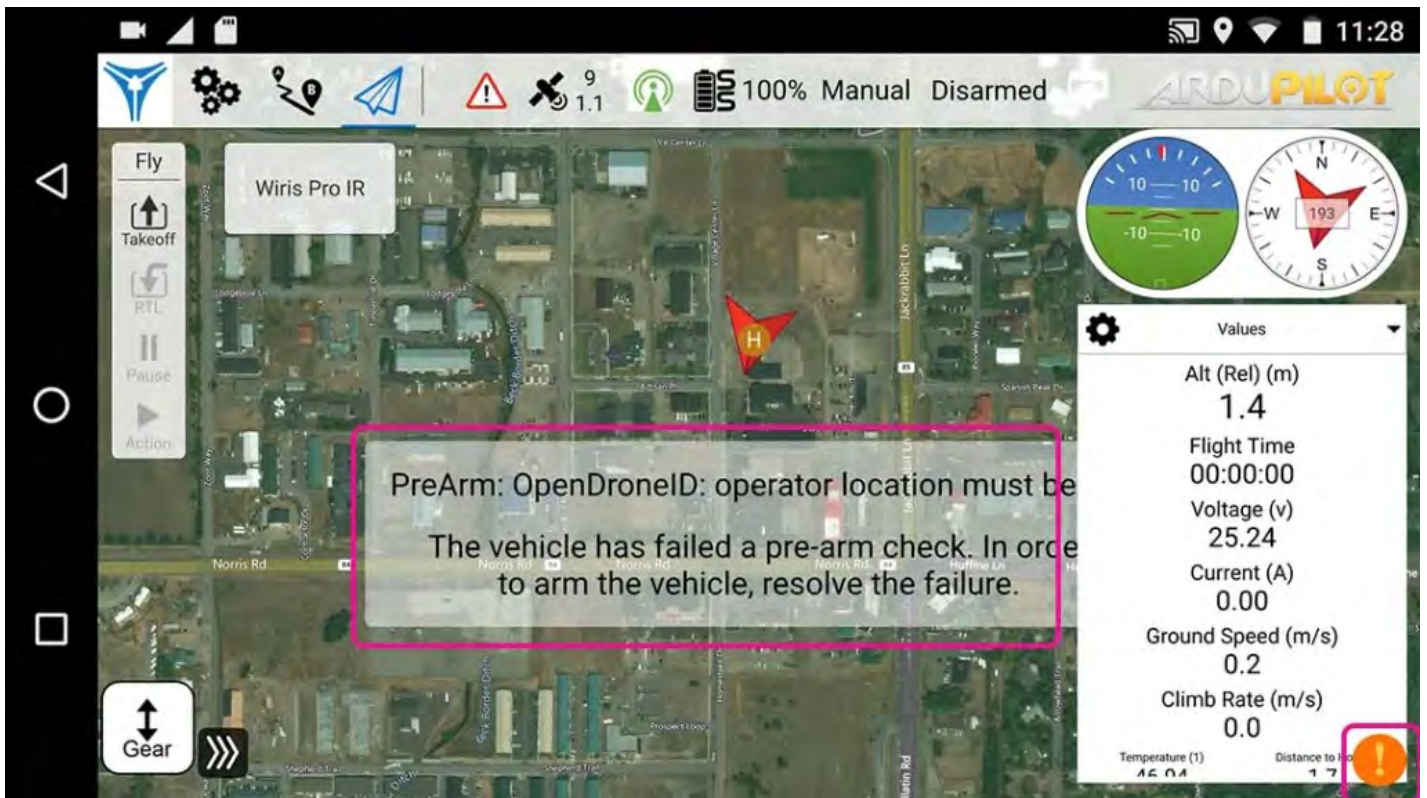
“Ready to Arm: Yes”

“Detected RID Device: True”

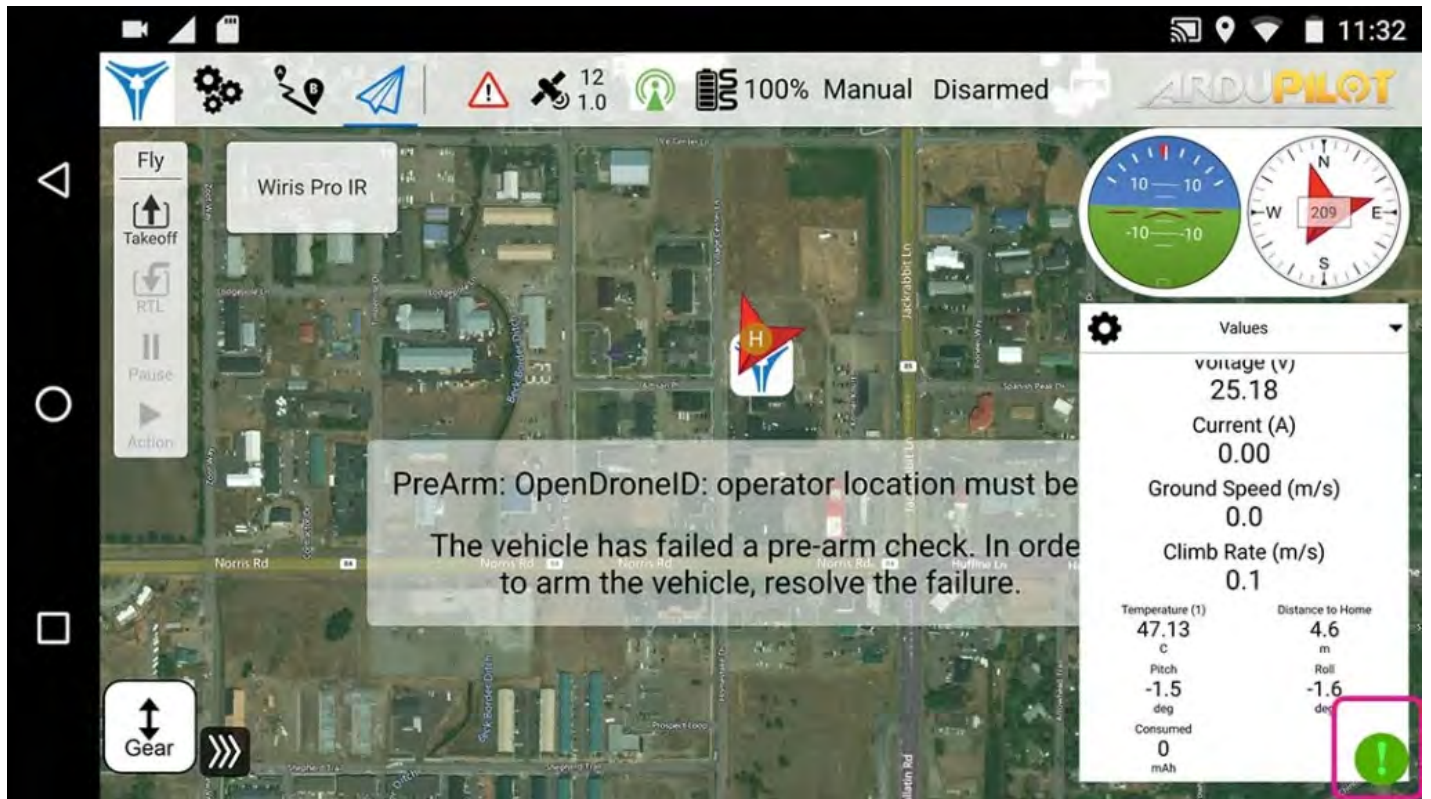


7. Exclamation point at the bottom right of the screen will turn from ORANGE to GREEN when RID is ready.

In the Flight Deck Fly View, the Remote ID status indicator appears on the lower right hand corner of the screen.



Orange exclamation in lower right corner indicates an error.



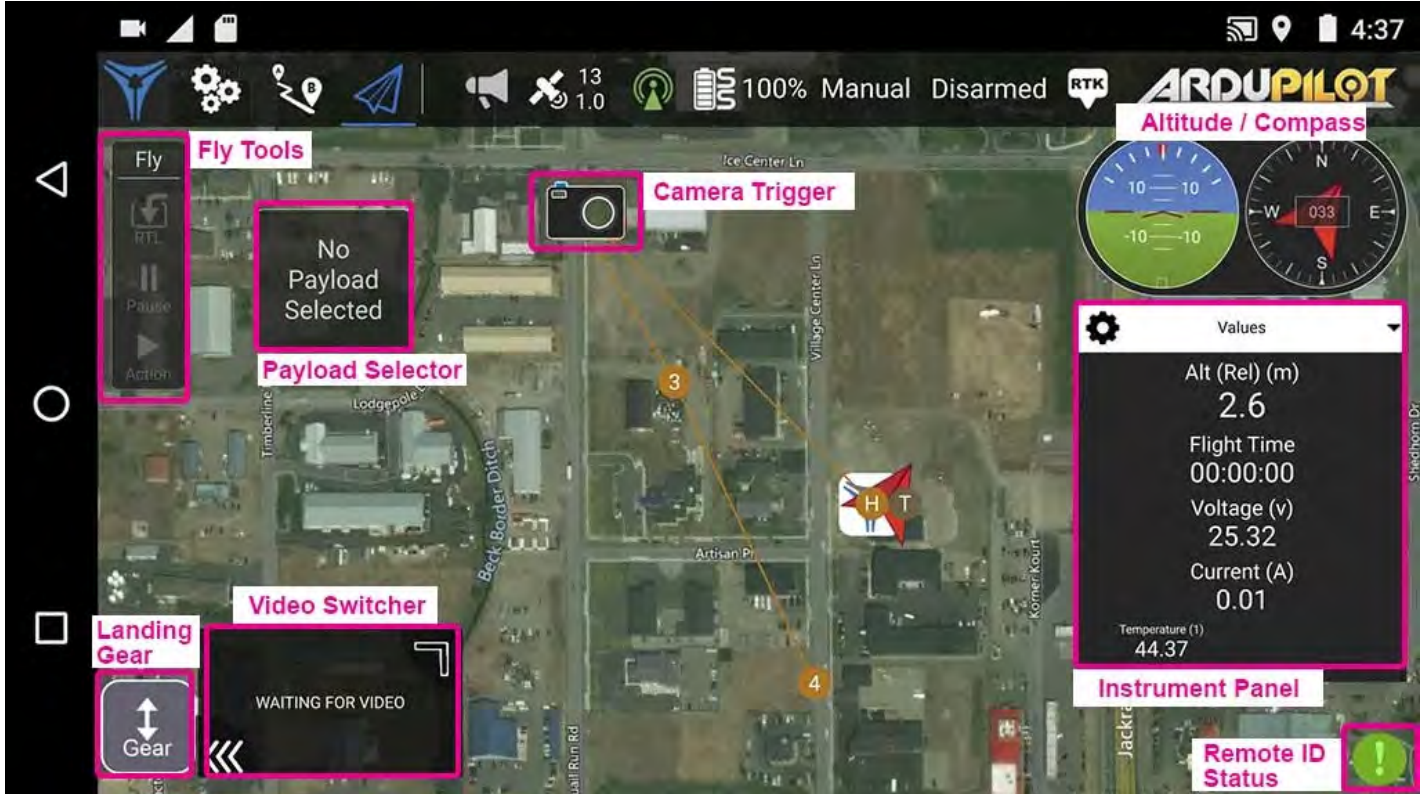
Green exclamation in lower right corner indicates Remote ID is functional.

Fly View

The Fly View is used to command and monitor the vehicle when flying.

Features include:

- Control missions: start, continue, pause, and resume.
- Guide the vehicle to arm/disarm/emergency disarm, land, change altitude, go to a particular location, and return/RTL.
- Switch between a map view and a video view (if a video device is connected).
- Display video, mission, telemetry, and other information for the vehicle.



UI Overview

The screenshot above shows the main elements of the fly view:

- **Map:** Displays the positions of the vehicle and the mission.
 - You can drag the map to move it around (the map automatically re-centres after a certain amount of time).
 - Once flying, you can click on the map to set a Go to or Orbit at location.
- **Fly Toolbar:** Key status information for sensors (GPS, battery, RC control), and vehicle state (Flight mode, Armed/Disarmed status).
 - Select the sensor indicators to view more detail.
 - Press the *Flight Mode* text (e.g. “Brake”) to select a new mode. Not every mode may be available.
 - Press the *Armed/Disarmed* text to toggle the armed state. If flying you can press this text to *Emergency Disarm*.
- **Fly tools:** You can use these to:
 - Land (at current location of aircraft).
 - Pause/restart the current operation (e.g. landing, or the mission).
 - Safety return (also known as RTL or Return).
 - The *Action* button offers other appropriate options for the current state (these overlay the *Confirmation Slider*). Actions include changing the altitude or continuing a mission.
 - *Landing Gear* button controls the position of the landing gear.
- **Instrument Panel:** Displays vehicle information including: telemetry, camera, video, system health, and vibration.
- **Payload Selector:** Click and hold to access the payload menu to select the payload and options.
- **Video/Switcher:** Toggle between video or map in a window.
 - Press the element to switch *Video* and *Map* to foreground.
 - RTSP video streaming over your vehicle’s UDP connection. Directly connected UVC devices are also supported. See the Video section for more information.
 - A Telemetry Overlay is automatically generated as a subtitle file.
- **Confirmation Slider:** Confirms requested actions. Slide to start operation. Press **X** to cancel.

⚠ **Note:** There are a number of other elements that are not displayed by default/are only displayed in certain conditions.

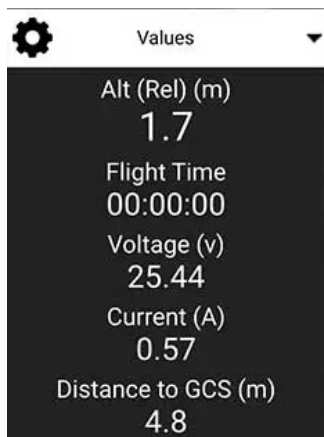
Instrument Panel

The instrument panel displays information about the current vehicle, including telemetry, camera, video, system health, and vibration information.

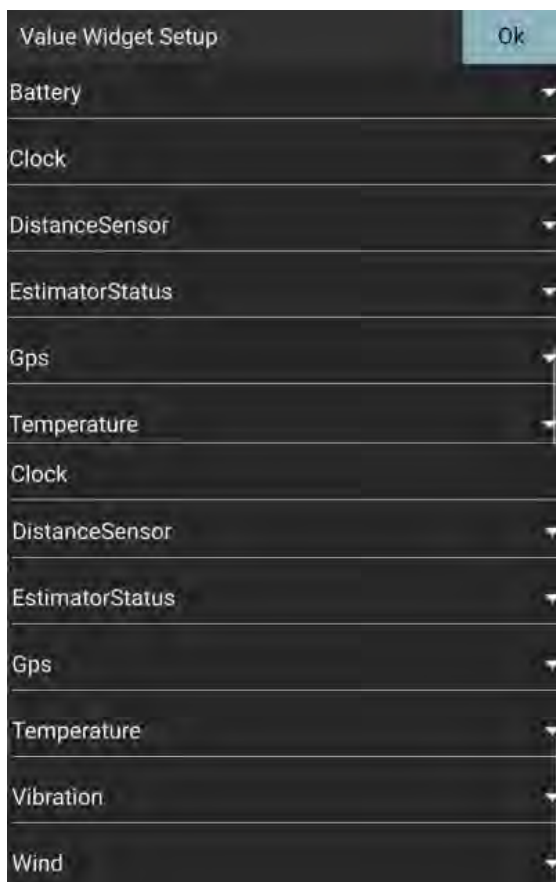
The default view displays vehicle telemetry. Use the dropdown menu on the right to select other options.

Values (Telemetry)

The values widget shows telemetry information; by default the altitude, flight time, voltage, and current.



You can configure what information is displayed by pressing the small gear icon on the top left of the values panel. A set of sub items will be revealed.



Press on each menu item to reveal the settings. Each value can be displayed in normal or "large" size (large size shows just one value per row in the page, while normal shows 2).

Value Widget Setup
Ok

Select the values you want to display:

Vehicle

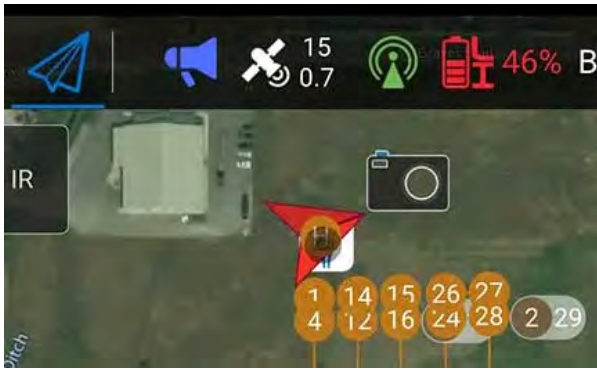
<input type="checkbox"/>	Roll	<input type="checkbox"/>	Large
<input type="checkbox"/>	Pitch	<input type="checkbox"/>	Large
<input type="checkbox"/>	Heading	<input type="checkbox"/>	Large
<input type="checkbox"/>	Roll Rate	<input type="checkbox"/>	Large
<input type="checkbox"/>	Pitch Rate	<input type="checkbox"/>	Large
<input type="checkbox"/>	Yaw Rate	<input type="checkbox"/>	Large
<input type="checkbox"/>	Ground Speed	<input type="checkbox"/>	Large
<input type="checkbox"/>	Air Speed	<input type="checkbox"/>	Large
<input type="checkbox"/>	Climb Rate	<input type="checkbox"/>	Large
<input checked="" type="checkbox"/>	Alt (Rel)	<input checked="" type="checkbox"/>	Large
<input type="checkbox"/>	Alt (AMSL)	<input type="checkbox"/>	Large
<input type="checkbox"/>	Flight Distance	<input type="checkbox"/>	Large
<input checked="" type="checkbox"/>	Flight Time	<input checked="" type="checkbox"/>	Large
<input type="checkbox"/>	Distance to Home	<input type="checkbox"/>	Large
<input type="checkbox"/>	Heading to Home	<input type="checkbox"/>	Large
<input checked="" type="checkbox"/>	Distance to GCS	<input checked="" type="checkbox"/>	Large
<input type="checkbox"/>	Hobbs Meter	<input type="checkbox"/>	Large

Payload Selector

Press and hold to access the payload menu. Select a pre-defined payload or add a new one by entering custom values. Once a payload is selected, the name of the payload will appear in the widget.

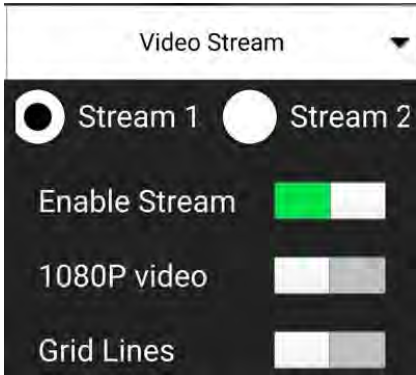
Camera

For cameras connected directly to the Flight Controller the only available option is camera triggering:



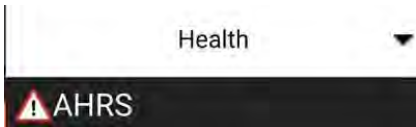
Video Stream

The video page is used to enable/disable video streaming. When enabled, you can start/stop the video stream and enable a grid overlay.



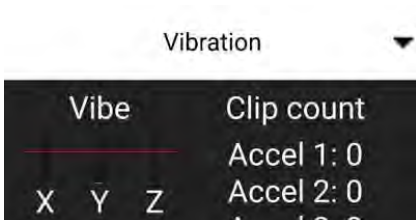
Health

The health page shows you the health of the systems within your vehicle. If any systems change to unhealthy, Flight Deck will switch to this automatically.



Vibration

The vibration page shows current vibration levels and clip counts.



Actions/Tasks

The following sections describe how to perform common operations/tasks in the Fly View.

Many of the available options depend on the vehicle's current state.

Arm

Arming is done by either starting a mission or initiating the takeoff sequence.

Arming a vehicle starts the motors in preparation for takeoff.

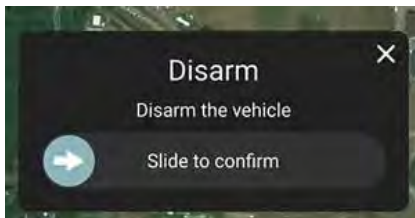
To arm the vehicle, select **Disarmed** in the *Fly Toolbar* and then use the confirmation sider.



Vehicles disarm automatically if you do not take off after a few seconds.

Disarm

Disarming the vehicle stops the motors. To disarm the vehicle select **Armed** in the *Fly Toolbar* when the vehicle is **landed**.



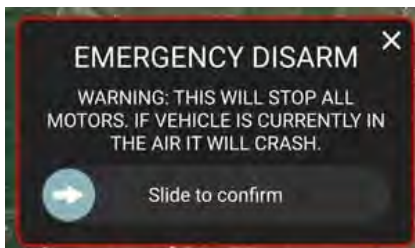
Disarming the vehicle while it is flying is called an Emergency Disarm.

Emergency Disarm

Emergency disarm is effectively the same as disarming the vehicle while you are flying. **Your vehicle will crash!**

⚠ WARNING: Initiating Disarm while the vehicle is in flight will cause it to lose power and descend uncontrollably. Your vehicle will crash!

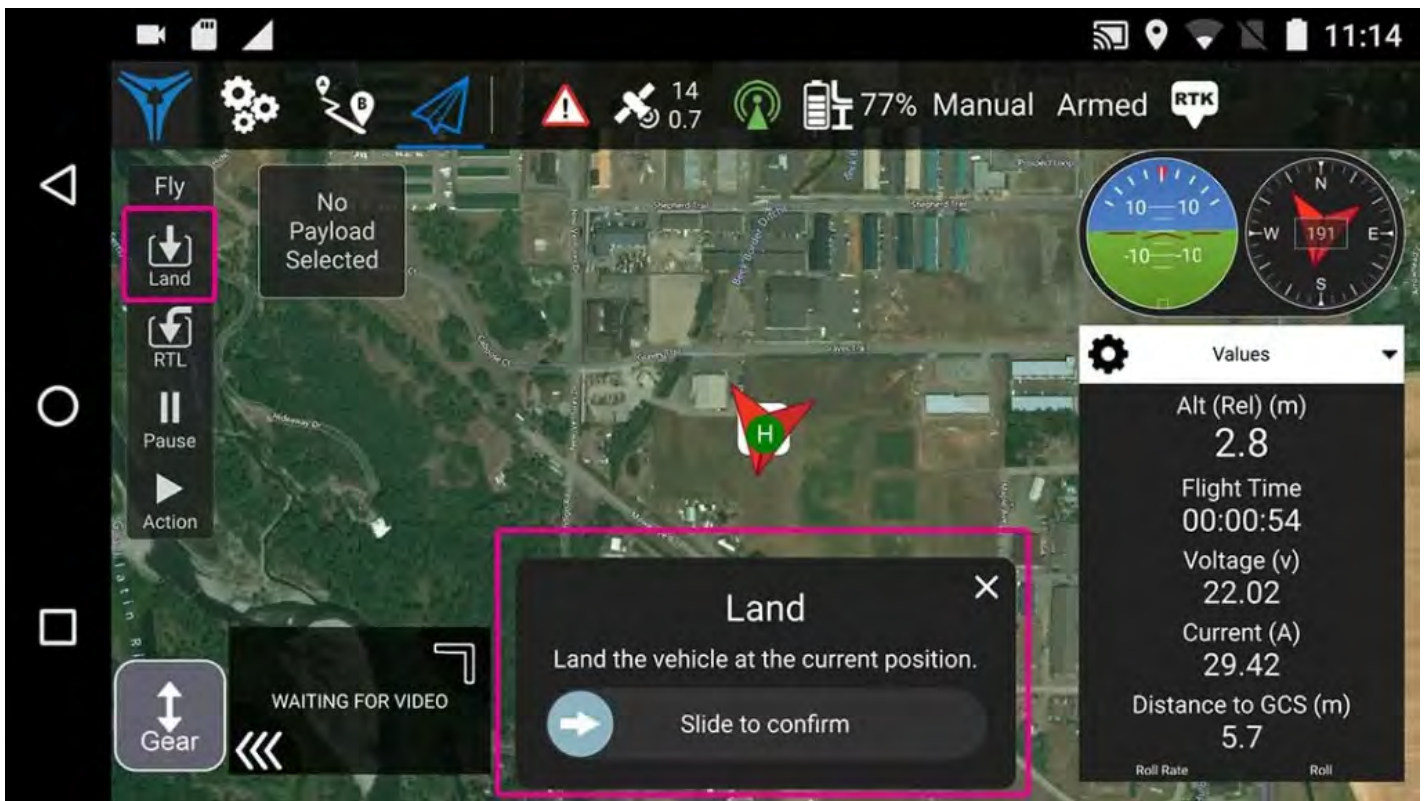
To disarm the vehicle select **Armed** in the *Fly Toolbar* when the vehicle is flying.



Land

You can land at the current position at any time while flying:

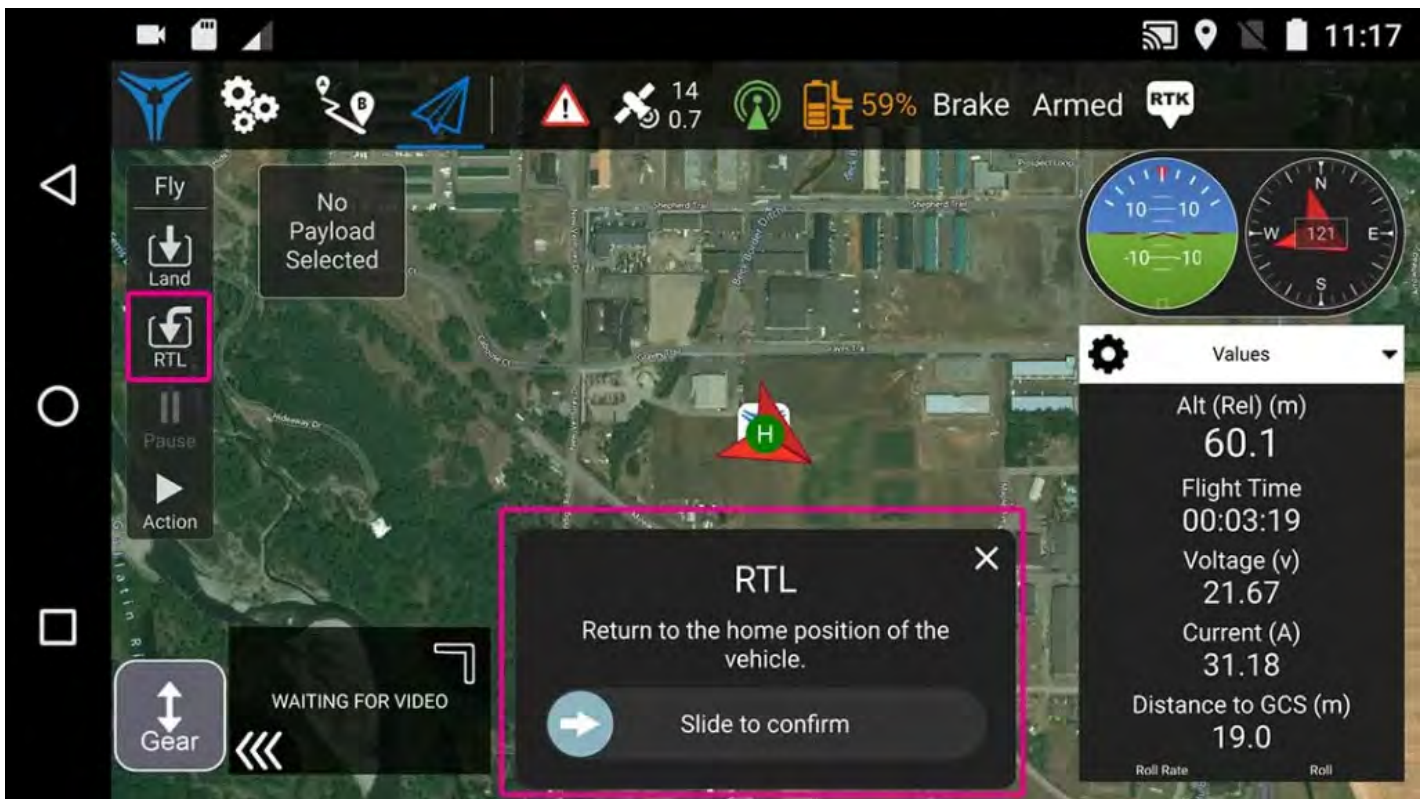
1. Press the **Land** button in the *Fly Tools* (this will toggle to a **Takeoff** button when landed).
2. Confirm landing using the slider.



RTL/Return

Return to the home position at any time while flying:

1. Press the **RTL** button in the *Fly Tools*.
2. Confirm RTL using the slider.

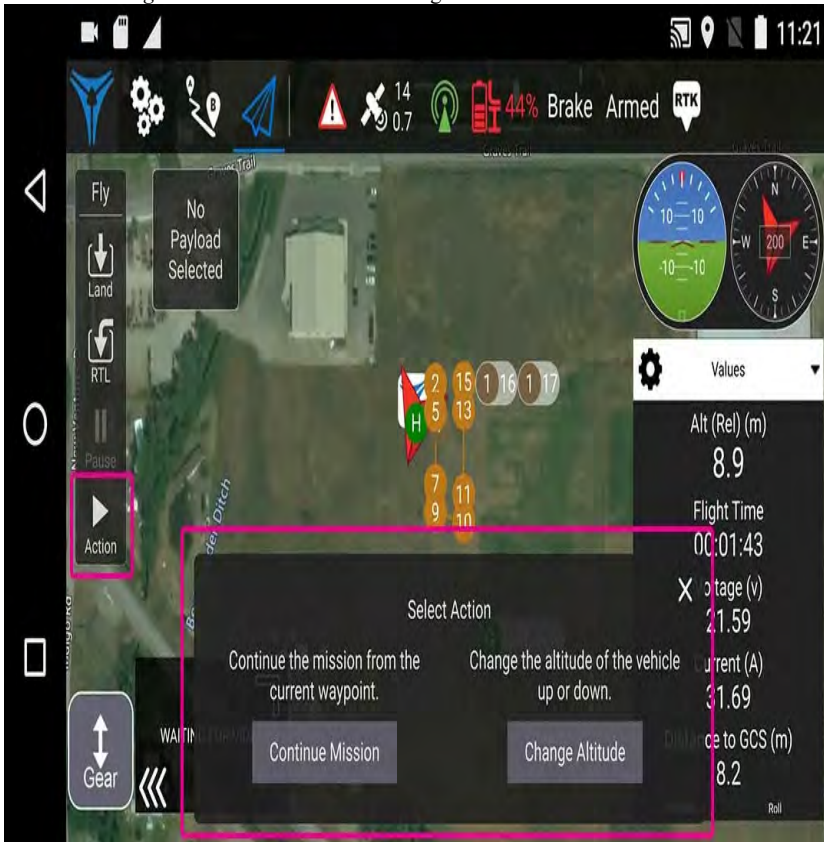


The vehicle may also land at the home position, depending on its type and configuration.

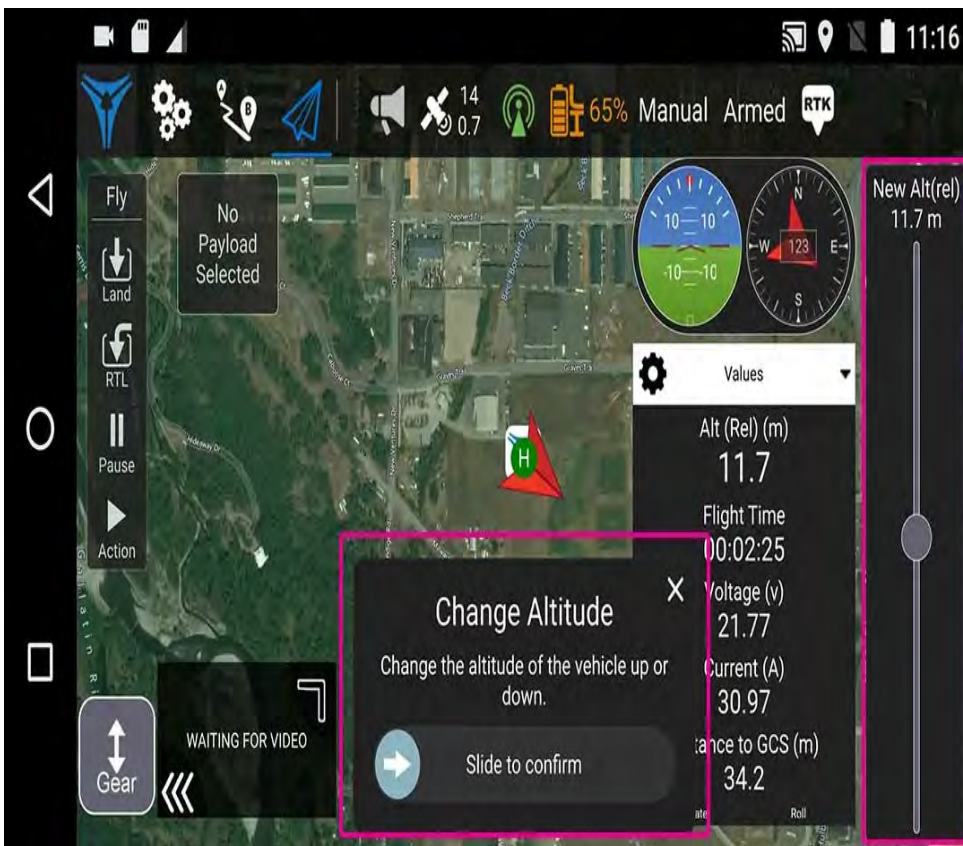
Change Altitude

You can change altitude while flying, except during a mission:

1. Press the **Action** button on the *Fly Tools*
2. Select the *Change Altitude* action from the dialog.



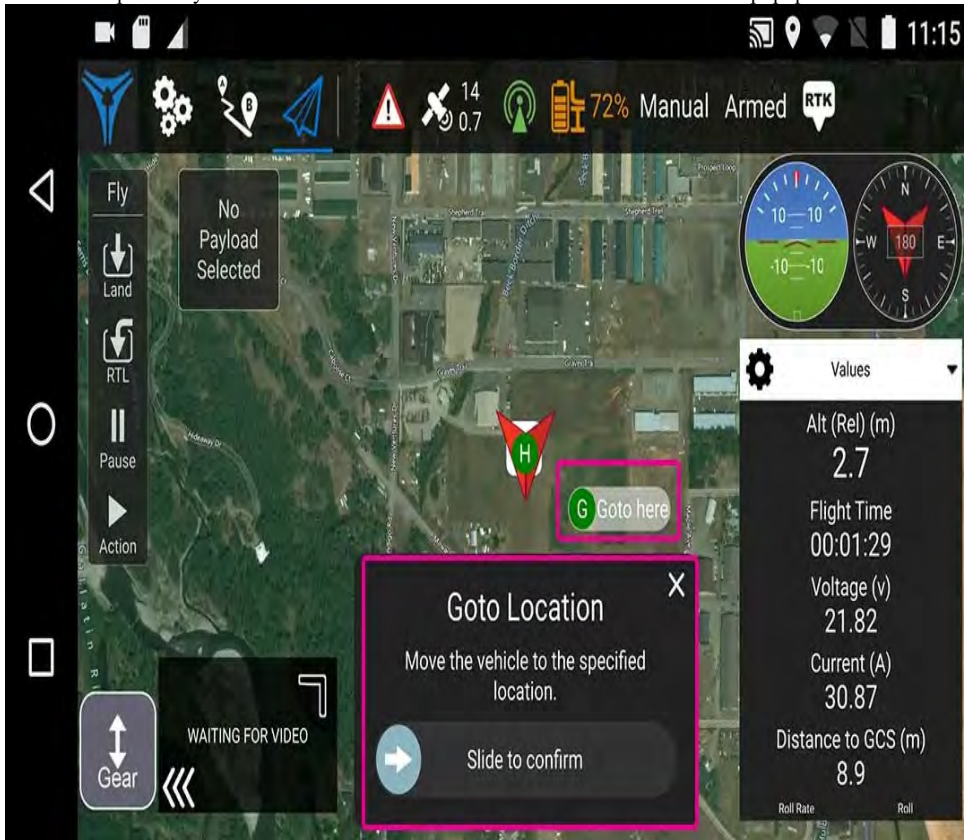
- 3.
4. Move the vertical slider to the desired altitude, then drag the confirmation slider to start the action.



Go To Location

After taking off you can specify that you want to fly to a particular location.

1. Press the map where you want the vehicle to move and select **Go to location** on the popup.



2. The location will be displayed on the map, along with a confirmation slider.

3. When you're ready, drag the slider to start the operation (or press the **X** icon to cancel it).

Note: Goto points must be set within 1 km of the vehicle.

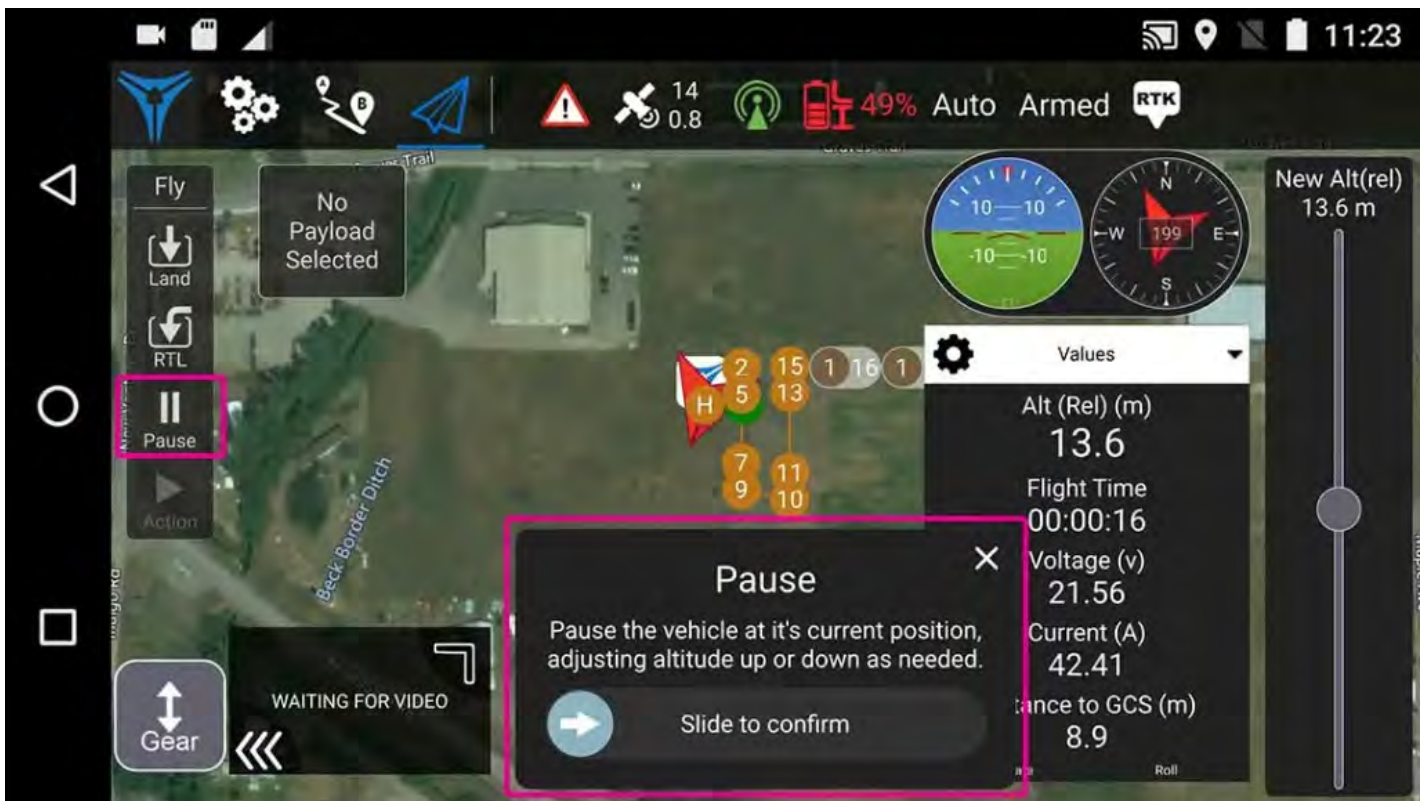
Pause

You can pause most operations, including taking off, landing, RTL, and missions. When an operation is paused, the vehicle will hover in place.

⚠ NOTE: You cannot pause a *Goto location* operation.

To pause:

1. Press the **Pause** button in the *Fly Tools*.
2. Optionally set a new altitude using the right-side vertical slider.
3. Confirm the pause using the slider.



Landing Gear

Deploy (extend) the landing gear by tapping the **Gear** button.

Retract (collapse) the landing gear by pressing and dragging up the **Gear** button.



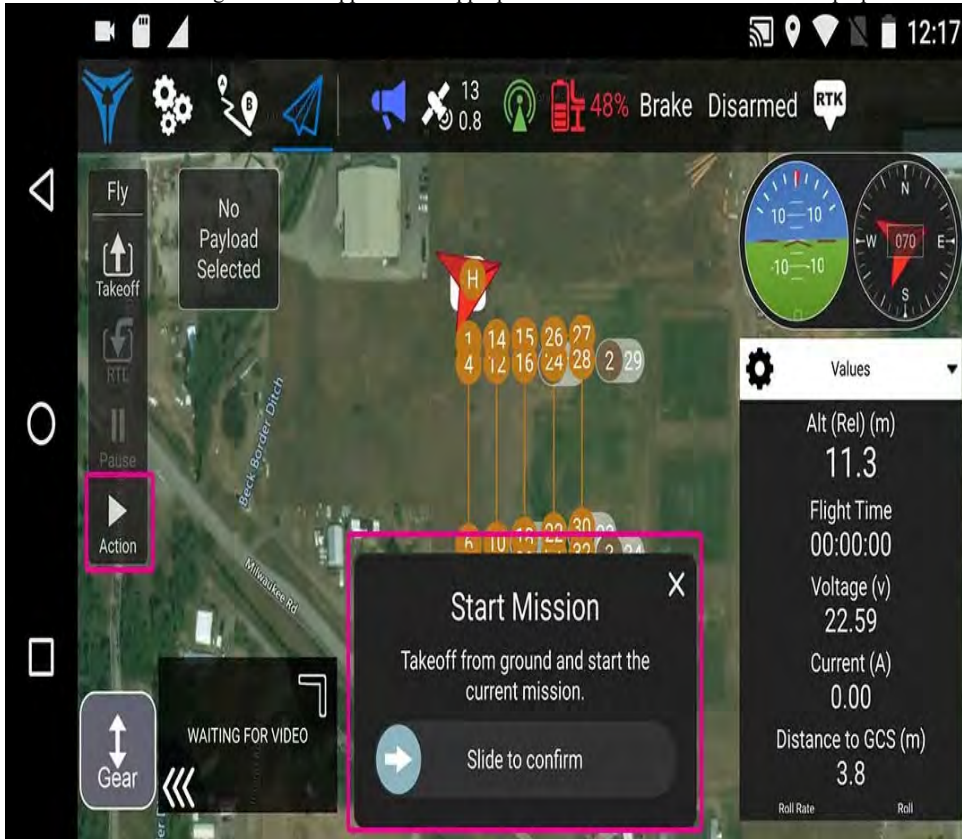
Missions

Start Mission

If you are starting a mission Flight Deck will require the pilot to ascend to 10 m before you can auto start the mission.

To start a mission:

1. Takeoff to 10 m
2. The Start Mission dialogue box will appear when appropriate altitude is achieved if there is a preplanned mission.



3. When the confirmation slider appears, drag it to start the mission.

Continue Mission

You can *continue* mission from the *next* waypoint when you're flying (the *Continue Mission* confirmation slider is often displayed by default after you takeoff).

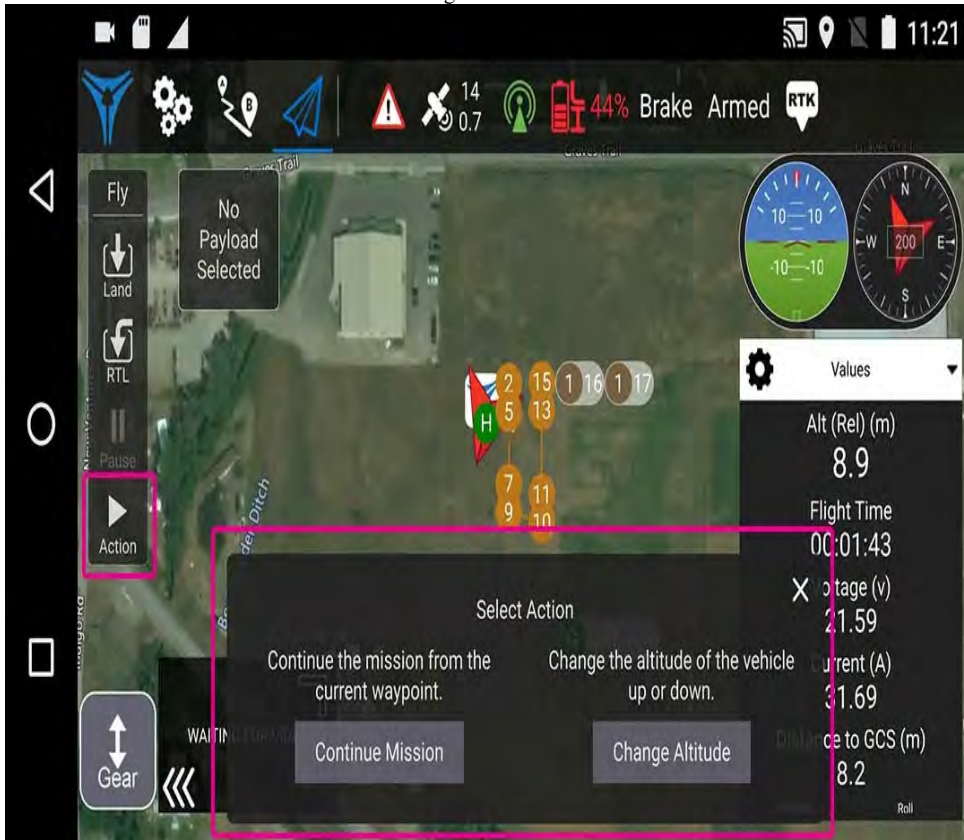
⚠️ Note: You can select a waypoint to start in the middle of a previously planned mission. This is useful when swapping batteries or breaking a large mission into smaller portions.

Continue and Resume mission are different! Continue is used to restart a mission that has been paused, or where you have taken off, so you've already missed a takeoff mission command. Resume mission is used when you've used a RTL or landed midway through a mission (e.g. for a battery change) and then wish to continue the next mission item (i.e. it takes you to where you were up to in the mission, rather than continuing from you place in the mission).

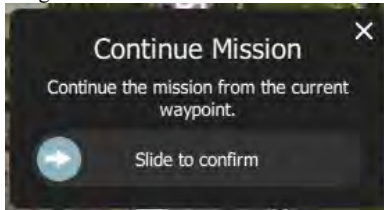
You can continue the current mission while (unless already in a mission!):

1. Press the **Action** button on the *Fly Tools*

2. Select the *Continue Mission* action from the dialog.



3. Drag the confirmation slider to continue the mission.



Display Video

When video streaming is enabled, *Flight Deck* will display the video stream for the currently selected vehicle in the “video switcher window” at the bottom left of the map. You can tap the switcher to toggle *Video* and *Map* to the foreground (the video is in the foreground below).

You can further configure video display using controls on the switcher:

- Resize the switcher by dragging the icon in the top right corner.
- Hide the switcher by pressing the toggle icon in the lower left.
- Double tap the video for a full screen display.

Record Video

Record Video from PWM Signal

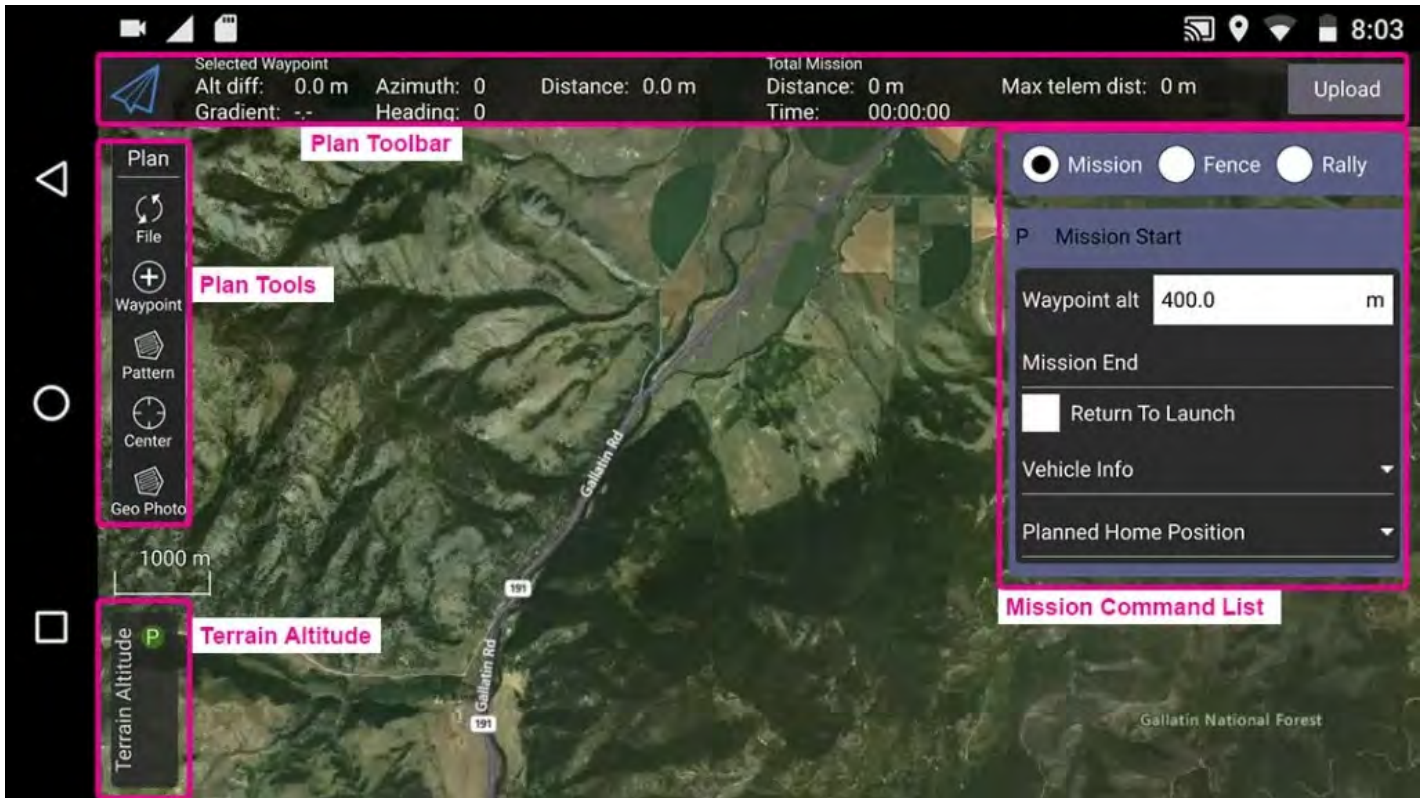
If the camera supports MAVLink based communication, the camera icon will change into a record button that allows you to record video.

Note: Each camera will function somewhat differently.

Mission Planning

The *Plan View* is used to plan *autonomous missions* for your vehicle. They can either be programmed on the ground control station or programmed on a desktop and uploaded to the GCS. Once the mission is planned and sent to the vehicle, you switch to the *Fly View* to fly the mission.

GeoFence and Rally Points are not currently supported.



UI Overview

The screenshot above shows a simple mission plan. It starts with a takeoff at the Planned Home position (H), flies through three waypoints, and then lands.

The main elements of the UI are:

- **Map:** Displays the numbered indicators for the current mission, including the Planned Home. Click on the indicators to select them (for editing) or drag them around to reposition them.
- **Plan Toolbar:** Status information for the currently selected waypoint relative to the previous waypoint, as well as statistics for the entire mission (e.g. horizontal distance and time for mission).
 - **Max telem dist** is the distance between the Planned Home and the furthest waypoint.
 - When connected to a vehicle it also shows an **Upload** button, can be used to upload the plan to the vehicle.
- **Plan Tools:** Used to create and manage missions.
- **Mission Command List/Overlay:** Displays the current list of mission items (select items to edit).

It shows you information related to the currently selected waypoint as well as statistics for the entire mission.

Planning a Mission

The basic steps to create a mission are:

1. Change to *Plan View*.
2. Add waypoints or commands to the mission and edit as needed.
3. Upload the mission to the vehicle.
4. Change to *Fly View* and fly the mission.

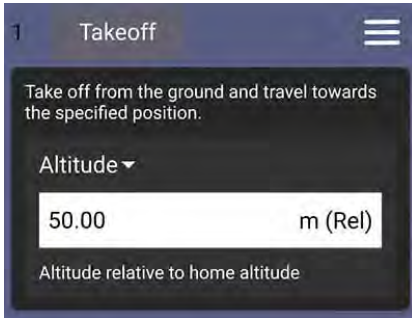
The following sections explain some of the details in the view.

Planned Home Position

The *Planned Home* shown in *Plan View* is used to set the approximate start point when planning a mission. It is used to estimate mission times and to draw waypoint lines.



You should move/drag the planned home position to roughly the location where you plan to take off. The altitude for the planned home position is set in the Mission Settings panel.



The Fly View displays the *actual* home position set by the vehicle firmware when it arms (this where the vehicle will return in Return/RTL mode).

Plan Tools

The plan tools are used for adding individual waypoints, easing mission creation for complicated geometries, uploading/downloading/saving/restoring missions, and navigating the map. The main tools are described below.

Center map helps users better view and navigate the *Plan view* map (they don't affect the mission commands sent to the vehicle).

Add Waypoints

Click on the **Add Waypoint** tool to activate it. While active, clicking on the map will add a new mission waypoint at the clicked location. The tool will stay active until you select it again. Once you have added a waypoint, you can select it and drag it around to change its position.

File (Sync)

The *File tools* are used to move missions between the ground station and vehicle, and to save/restore them from files. The tool displays an ! to indicate that there are mission changes that you have not sent to the vehicle.

Before you fly a mission you must upload it to the vehicle.

The *File tools* provide the following functionality:

- Upload (Send to vehicle)
- Download (Load from vehicle)
- Save/Save as to File, including as KML file.
- Load from File
- Remove All (removes all mission waypoints from *Plan view* and from vehicle)

Importing Missions, Using Load from File

To import mission plans from other programs:

1. Export the mission as a .plan file
2. Transfer the file from another device to the Herelink Ground Control Station by saving it onto the Herelink's micro SD card in the following directory:
Flight Deck > Mission Plans
3. Go to Plan > File > Load from File and select the mission

Pattern

The Pattern tool simplifies the creation of missions for flying complex geometries, including surveys and structure scans.

Terrain Altitude

This tool is intended to provide a visual indicator of the distance between the vehicle and terrain variations.

Once a mission is uploaded to the vehicle, select the file tab and then select download. This will download and convert the survey mission to a waypoint mission, allowing the pilot better terrain awareness during automated flights.

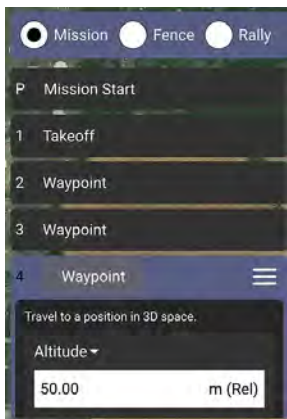


Changing Camera or Payload

To change the camera or payload, go to the Vehicle Settings > Payload Setup menu.

Mission Command List

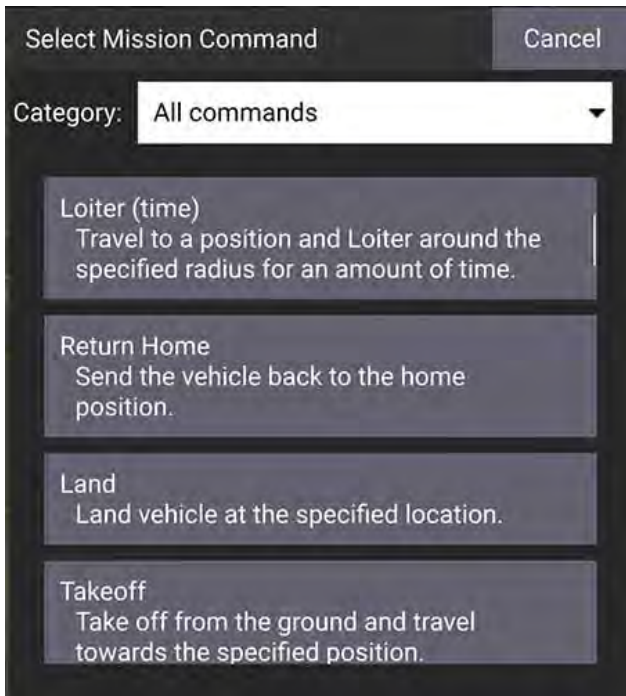
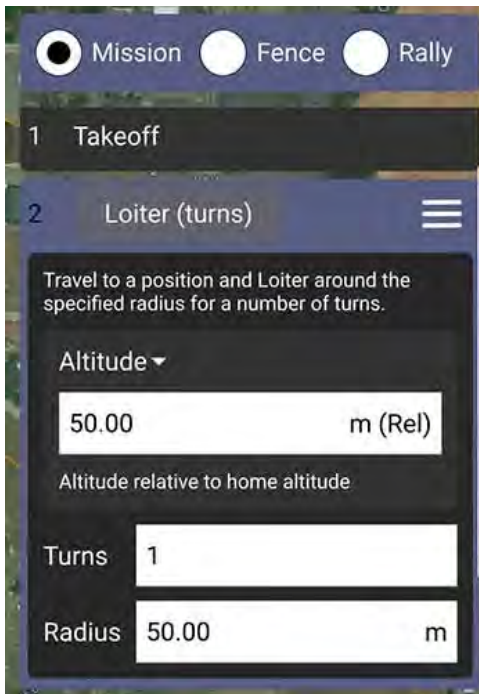
Mission commands for the current mission are listed on the right side of the view. At the top are a set of options to switch between editing the mission. Within the list, you can select individual mission items to edit their values.



Mission Command Editors

Click on a mission command in the list to display its editor (in which you can set/change the command attributes).

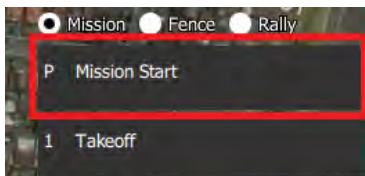
You can change the **type** of the command by clicking on the command name (for example: Loiter (turns)). This will display the *Select Mission Command* dialog shown below. By default this just displays the “Basic Commands”, but you can use the **Category** drop down menu to display more (e.g. choose **All commands** to see all the options).

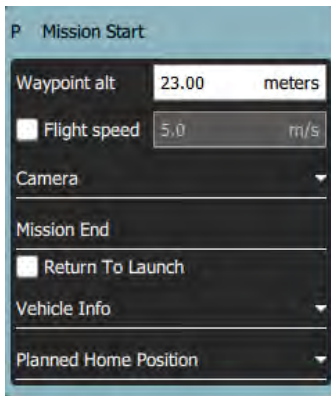


Click the command name to insert it into the mission plan. Once added, command-specific options will be available.

Mission Settings

The *Mission Start* panel is the first item that appears in the mission command list. It may be used to specify a number default settings that may affect the start or end of the mission.





Mission Defaults

Waypoint alt

Set the default altitude for the first mission item added to a plan (subsequent items take an initial altitude from the previous item). This can also be used to change the altitude of all items in a plan to the same value; you will be prompted if you change the value when there are items in a plan.

Flight speed

Set a flight speed for the mission that is different than the default mission speed.

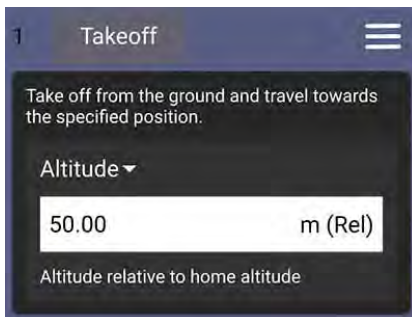
Mission End

Return to Launch after mission end

Check this if you want your vehicle to Return/RTL after the final mission item.

Planned Home Position

The Planned Home Position section allows you to simulate the vehicle's home position while planning a mission. This allows you to view the waypoint trajectory for your vehicle from takeoff to mission completion.



This is only the *planned* home position and you should place it where you plan to start the vehicle from. It has no actual impact on flying the mission. The actual home position of a vehicle is set by the vehicle itself when arming.

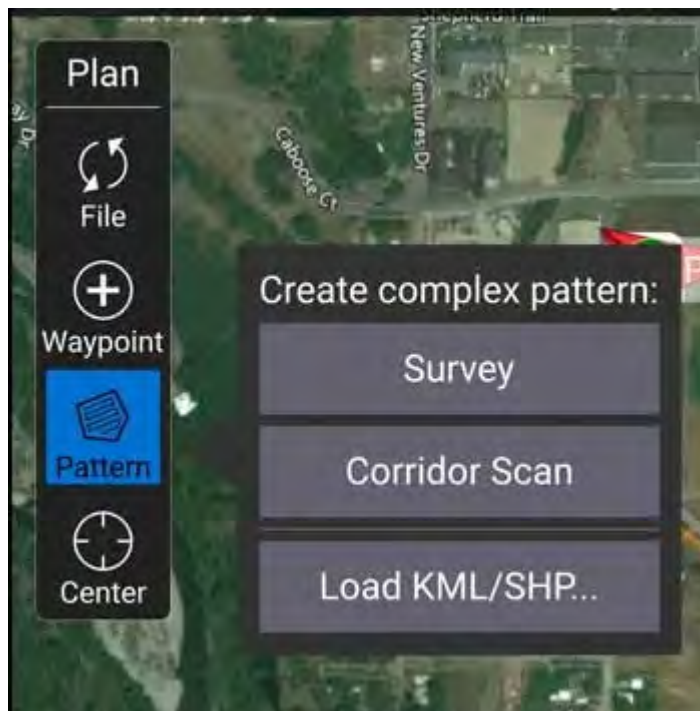
The section allows you to set the **Altitude** and **Set Home to Map Centre** (you can move it to another position by dragging it on the map).

Camera

The camera section allows you to specify a camera action to take, control the gimbal and set your camera into photo or video mode.

Mission Planning – Patterns

The *Pattern tools* allow you to specify flight patterns for applications like photogrammetry and inspections.



Pattern	Description
Survey	Create a grid flight pattern over a polygonal area. You can specify the polygon as well as the specifications for the grid and camera settings appropriate for creating geotagged images. Useful for photogrammetry, scanning, mapping, and surveying applications.
Corridor Scan	Create a flight pattern that follows a poly-line (for example, to survey a road). Useful for inspection applications.

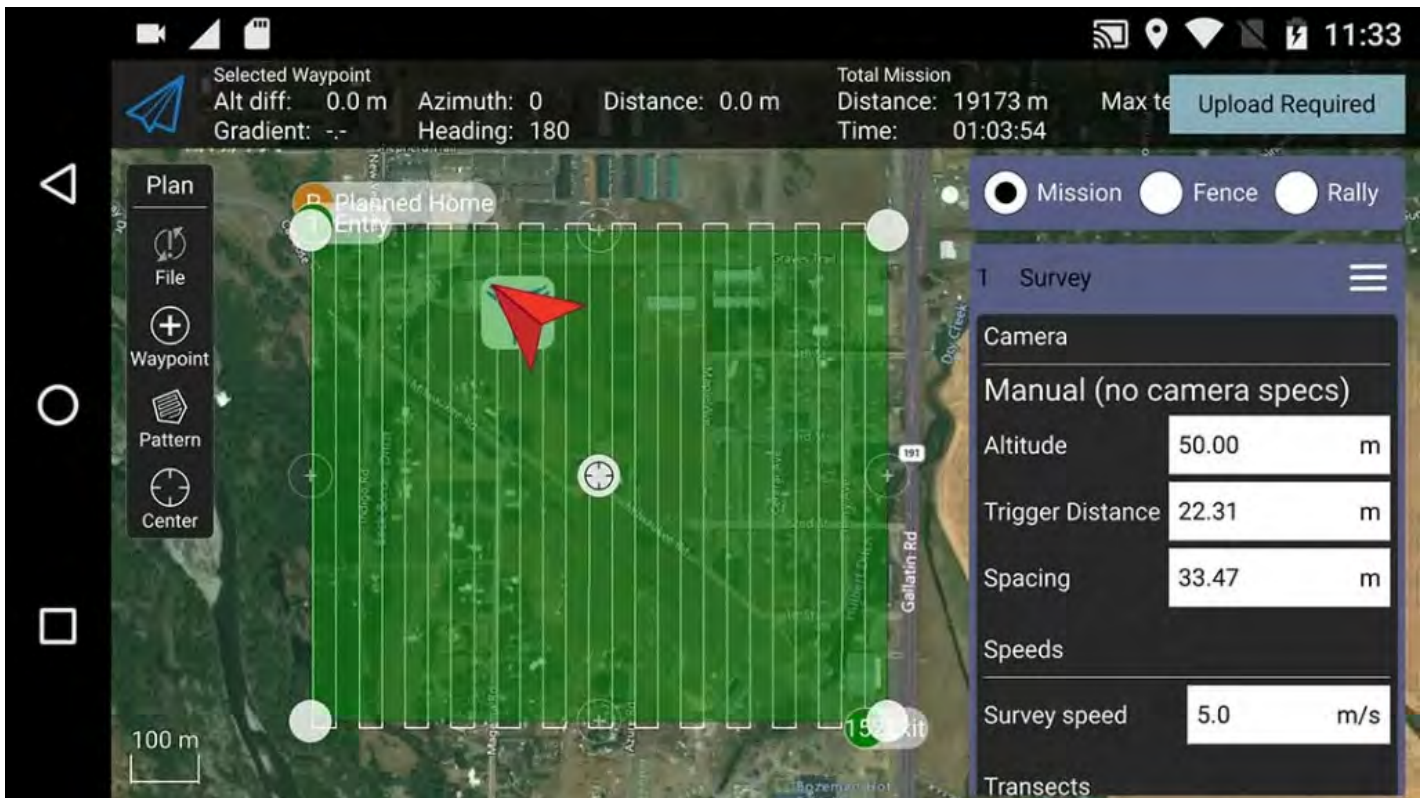
Mission Planning – Survey Patterns

A survey allows you to create a grid flight pattern over a polygonal area. You can specify an arbitrary polygon, the angle and other properties of the grid, and camera settings appropriate for creating geotagged images.

⚠ WARNING: If the survey area has significant elevation variation then consider enabling Terrain Following.

When planning a Survey using camera specifications, the ground under the survey area is assumed to be flat (the same altitude as the launch/home location). If the ground elevation under the survey is either higher or lower than the home location the effective overlap in images will be less or more (respectively) than calculated. If ground elevation under the survey area is *significantly* higher than the home location **you could inadvertently plan a mission path that causes the vehicle to fly into the ground or other obstacles.**

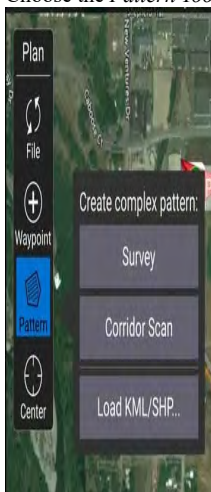
Using terrain following ensures that the survey more closely matches the desired altitude above the terrain, and reduces the likelihood of running into the ground or other obstacle.



Creating a Survey

To create a survey:

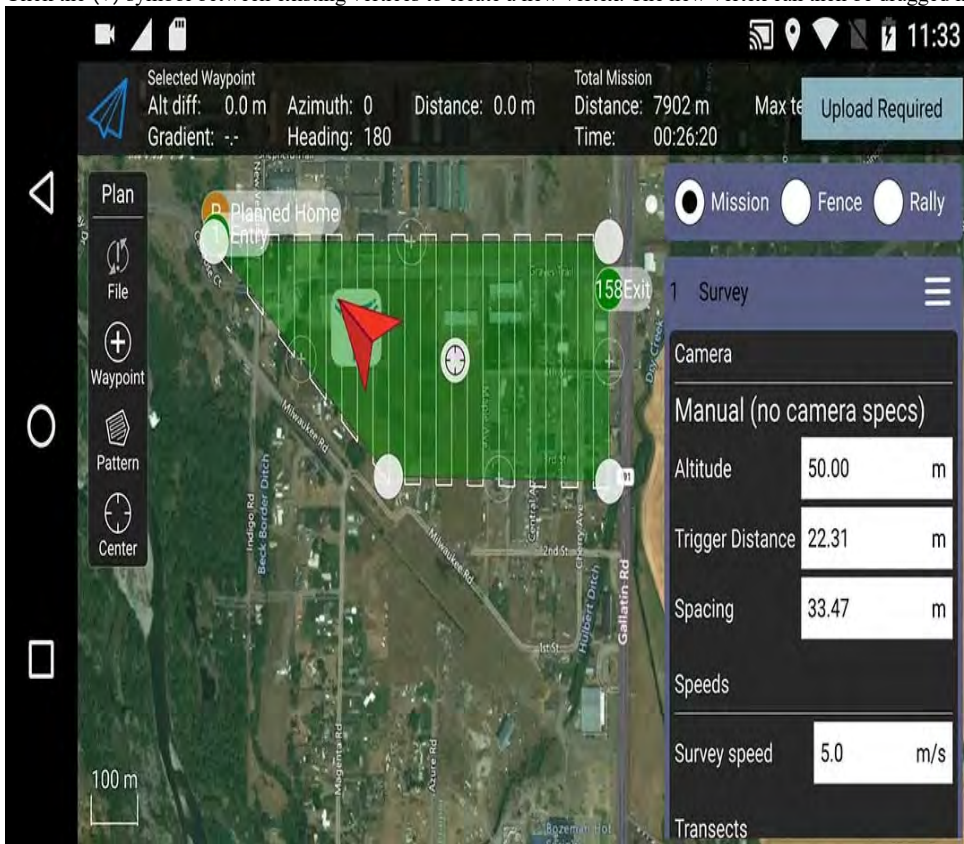
1. Open Plan View *Plan Tools*.
2. Choose the *Pattern Tool* from the *Plan Tools* and then select *Survey*.



This will add a survey grid to the map, and a *Survey* item to the mission list (on the right).

3. On the map drag the vertices to change the shape of the polygon.

4. Click the (+) symbol between existing vertices to create a new vertex. The new vertex can then be dragged into a new position.



Settings

The survey can be further configured in the associated mission item (in the mission item list on the right hand side of the *Plan View*).

1 Survey

Camera

Manual (no camera specs)

Altitude 50.00 m

Trigger Distance 22.31 m

Spacing 33.47 m

Speeds

Survey speed 5.0 m/s

Transects

Angle 0.0 deg

Turnaround dist 10.00 m

Rotate Entry Point

Hover and capture image

Refly at 90 deg offset

Images in turnarounds

Relative altitude

Terrain

Vehicle follows terrain

Statistics

Survey Area 200325.14 m²

Photo Count 645

Photo Interval 2.9 secs

Trigger Distance 14.59 m

Camera

Camera triggering behavior depends on the camera/camera settings. You can select an existing camera, custom camera, or manually enter the settings. The list of available cameras is accessed by clicking on the Payload Selector.

Known Cameras

Camera

Sony NEX-5R 20mm

Landscape Portrait

Front Lap Side Lap

Overlap 70 % 70 %

Select one:

Altitude 1058.62 m

Ground Res 25.0 cm/px

Custom Camera

Selecting the custom camera option allows you to specify the settings for a new camera.



The screenshot shows the 'Camera' settings menu with 'Custom Camera' selected. It features two radio buttons for 'Landscape' (selected) and 'Portrait'. Below are input fields for 'Sensor' (7.60 mm width, 5.70 mm height), 'Image' (4000 px width, 3000 px height), and 'Focal length' (5.2 mm). There are also 'Front Lap' and 'Side Lap' sections, both with 'Overlap' set to 70%. At the bottom, 'Select one:' has two options: 'Altitude' (684.21 m) and 'Ground Res' (25.0 cm/px).

The camera-specific settings are:

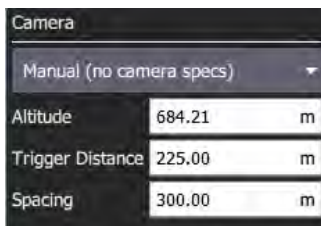
- **Sensor width/height** – The size of the image sensor of the camera.
- **Image width/height** – The resolution of the image captured by the camera.
- **Focal Length** – The focal length of the camera lens.

The default settings can be tuned for your survey using the configuration options:

- **Landscape/Portrait** – Camera orientation relative to the “normal” orientation of the vehicle.
- **Overlap** – Overlap between each image capture. This can be configured separately for when flying along grid lines or across them.
- Select one of:
 - **Altitude** – Survey altitude (ground resolution will be calculated/displayed for this altitude).
 - **Ground resolution** – Ground resolution for each image (altitude required to achieve this resolution calculated and shown).

Manual Camera

The manual camera option allows you to specify desired survey height, trigger interval, and appropriate grid spacing for your camera.



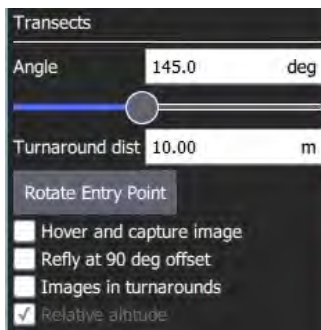
The screenshot shows the 'Camera' settings menu with 'Manual (no camera specs)' selected. It features three input fields: 'Altitude' (684.21 m), 'Trigger Distance' (225.00 m), and 'Spacing' (300.00 m).

The configurable options are:

- **Altitude** – Survey altitude to fly the whole grid.
- **Trigger Distance** – The distance over ground between each camera shot.
- **Spacing** – Distance between adjacent grid (flight path) lines across the corridor.

Transects

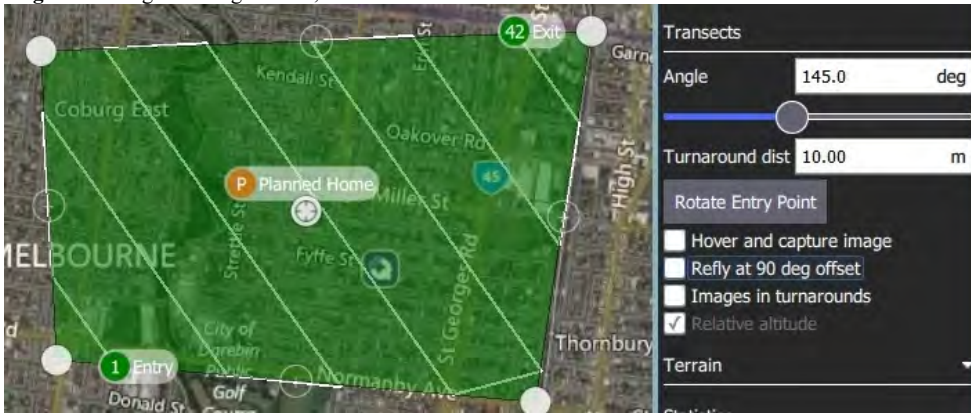
The *Transects* section is used for grid settings that are independent of the camera used.



The screenshot shows the 'Transects' settings menu. It features an 'Angle' input field (145.0 deg) with a slider below it, and a 'Turnaround dist' input field (10.00 m). There are four checkboxes: 'Rotate Entry Point' (checked), 'Hover and capture image' (unchecked), 'Refly at 90 deg offset' (unchecked), and 'Images in turnarounds' (unchecked). A 'Relative altitude' checkbox is also present and checked.

The configurable options are:

- **Angle** – The angle of the grid lines, relative to North.



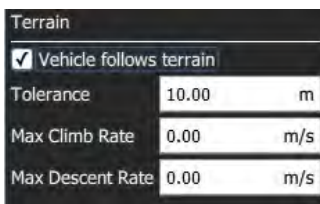
- **Turnaround dist** – Amount of additional distance to add outside the survey area for vehicle turn around.
- **Rotate Entry Point** – Press button to swap the start and end point of the survey.
- **Hover and capture image** – Hover to capture images.



- **Refly at 90 degree offset** – Check to reflly the whole mission at a 90 degree offset.
- **Images in turnarounds** – Check to take images when turning
- **Relative altitude** – Check to make specified altitudes relative to home (if unchecked they are AMSL).

Terrain

By default, a flying vehicle will follow the survey path at a fixed altitude. Enabling *Terrain Following* makes the vehicle maintain a constant height relative to the ground.



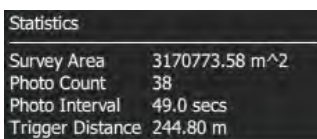
Terrain following uses terrain heights queried from *AirMap* servers.

The configurable options are:

- **Vehicle follows terrain** – Check to enable terrain following (and display the following options).
 - **Tolerance** – The accepted deviation in altitude from the target altitude.
 - **Max Climb Rate** – Maximum climb rate when following terrain.
 - **Max Descent Rate** – Maximum descent rate when following terrain.

Statistics

The *Statistics* section shows the calculated survey area, photo interval, photo spacing, and planned photo count.

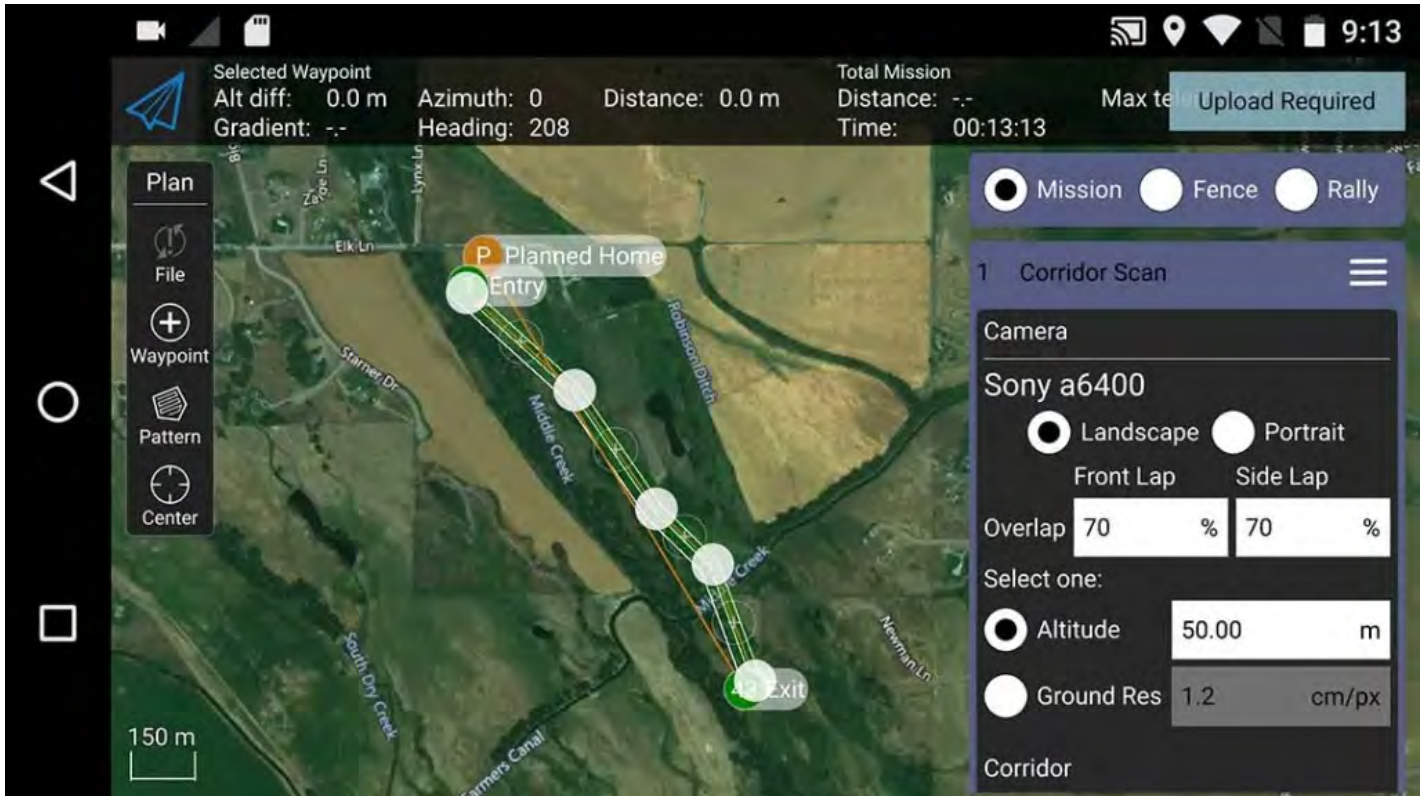


Mission Planning – Corridor Scan

A corridor scan allows you to create a flight pattern that follows a poly-line. This can be used to survey a road.

! WARNING: When planning a Corridor Scan using camera specifications the ground elevations under your survey area are assumed to be at the same altitude as your launch location. If the ground elevation under your survey area is either higher or lower than your launch location the effective overlap in your images will be less or more (respectively) than calculated.

If ground elevation under your survey area is significantly higher than your launch/home location **you could inadvertently plan a mission that causes the vehicle to fly into trees, obstacles, or the ground.** Use Terrain Follow to create a survey that more closely maintains the desired altitude above terrain that has significant elevation differences from your launch/home altitude.

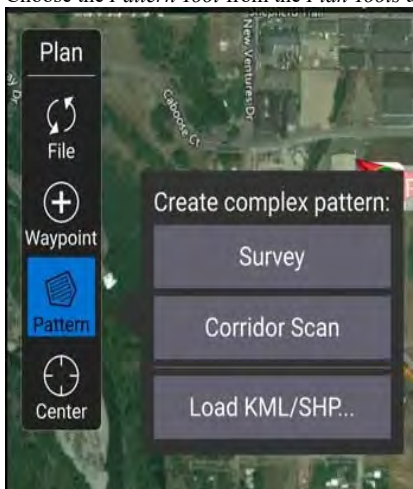


You can specify the path, the width of the corridor, and camera settings appropriate for creating geotagged images.

Creating a Scan

To create a corridor scan:

1. Open Plan View > *Plan Tools*.
2. Choose the *Pattern Tool* from the *Plan Tools* and then select *Corridor Scan*.



- This will add a corridor to the map, and a *Corridor Scan* item to the mission list (on the right).
3. On the map drag the ends of the corridor to the start and end positions of the scan, respectively.
4. Click the (+) symbol at the centre of a line to create a new vertex. The new vertex can then be dragged into position to follow the path of the desired corridor.

The corridor scan settings are covered in the next section.

Settings

The corridor scan can be further configured in the associated mission item (in the mission item list on the right hand side of the Plan View).

Camera

Camera triggering behavior depends on the camera/camera settings. You can select an existing camera or manually enter the settings. See Payload Selector for more information.

Known Cameras

When a known camera is selected, you can generate a grid pattern based on the camera's specifications.

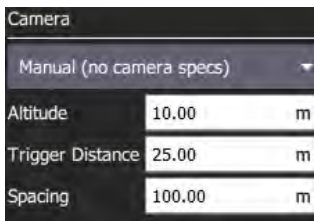


The configurable options are:

- **Landscape/Portrait** – Camera orientation relative to the “normal” orientation of the vehicle.
- **Image Overlap** – Overlap between each image.
- Select one of:
 - **Altitude** – Survey altitude (ground resolution will be calculated/displayed for this altitude).
 - **Ground resolution** – Ground resolution for each image (altitude required to achieve this resolution calculated and shown).

Manual Camera

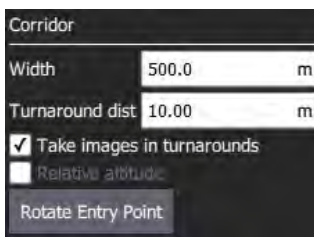
The manual camera option allows you to specify desired survey height, trigger interval, and appropriate grid spacing for your camera.



The configurable options are:

- **Altitude** – Survey altitude.
- **Trigger Distance** – The distance over ground between each camera shot.
- **Spacing** – Distance between adjacent grid (flight path) lines across the corridor.

Corridor



The configurable options are:

- **Width** – Set the width of the scan around the polyline that defines the path.
- **Turnaround dist** – Amount of additional distance to add outside the survey area for vehicle turn around.
- **Take images in turnarounds** – Check to enable image capture a turnaround points.
- **Relative altitude** – Check to specify a relative altitude. This is only supported for manual grids that are not using terrain following.
- **Rotate entry point** – Press button to swap the start and end point of the corridor scan.

Terrain Following

By default, a flying vehicle will follow the corridor path at a fixed altitude. Enabling Terrain Following makes the vehicle maintain a constant height relative to the ground.

Terrain	
<input checked="" type="checkbox"/> Vehicle follows terrain	
Tolerance	10.00 m
Max Climb Rate	0.00 m/s
Max Descent Rate	0.00 m/s

Terrain following uses terrain heights queried from *AirMap* servers.

The configurable options are:

- **Vehicle follows terrain** – Check to enable terrain following (and display the following options).
 - **Tolerance** – The accepted deviation in altitude from the target altitude.
 - **Max Climb Rate** – Maximum climb rate when following terrain.
 - **Max Descent Rate** – Maximum descent rate when following terrain.

Statistics

The *Statistics* section shows the calculated survey area, photo interval, photo spacing, and planned photo count.

Statistics	
Survey Area	3499357.94 m ²
Photo Count	1420
Photo Interval	5.0 secs
Trigger Distance	25.00 m

Mission Planning – Using geoPDF and geoTIFF

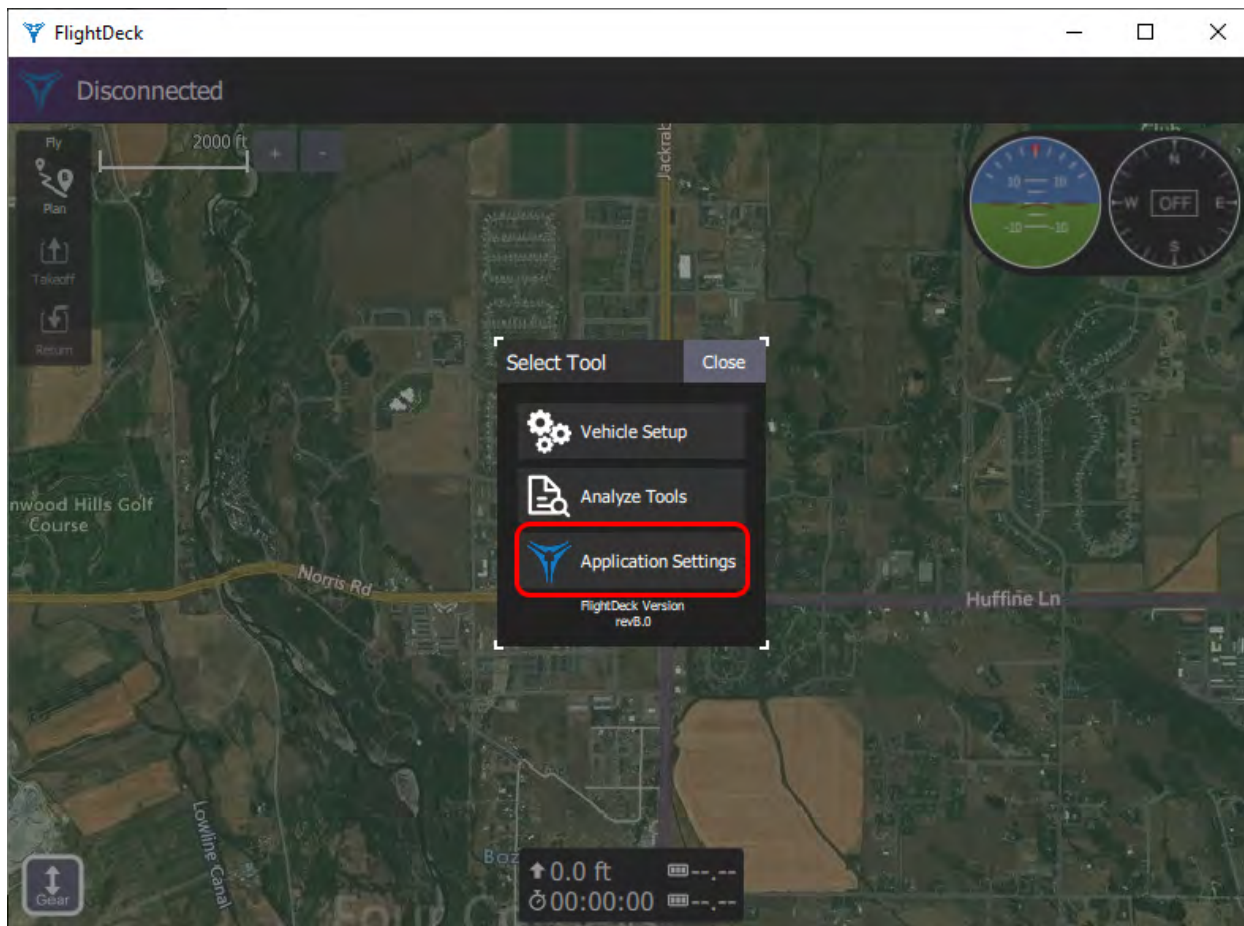
These instructions will help you overlay geoPDF files to the map display of your GCS. This feature is useful because it expands the capabilities of live tracking to specialized or custom maps. This conversion process is made simple in Flight Deck Desktop, which can be [downloaded here](#).

We recommend making a folder titled “geoPDF” on your desktop or somewhere easily accessible. Place all files you wish to upload to your Ground Control Station (GCS) here.

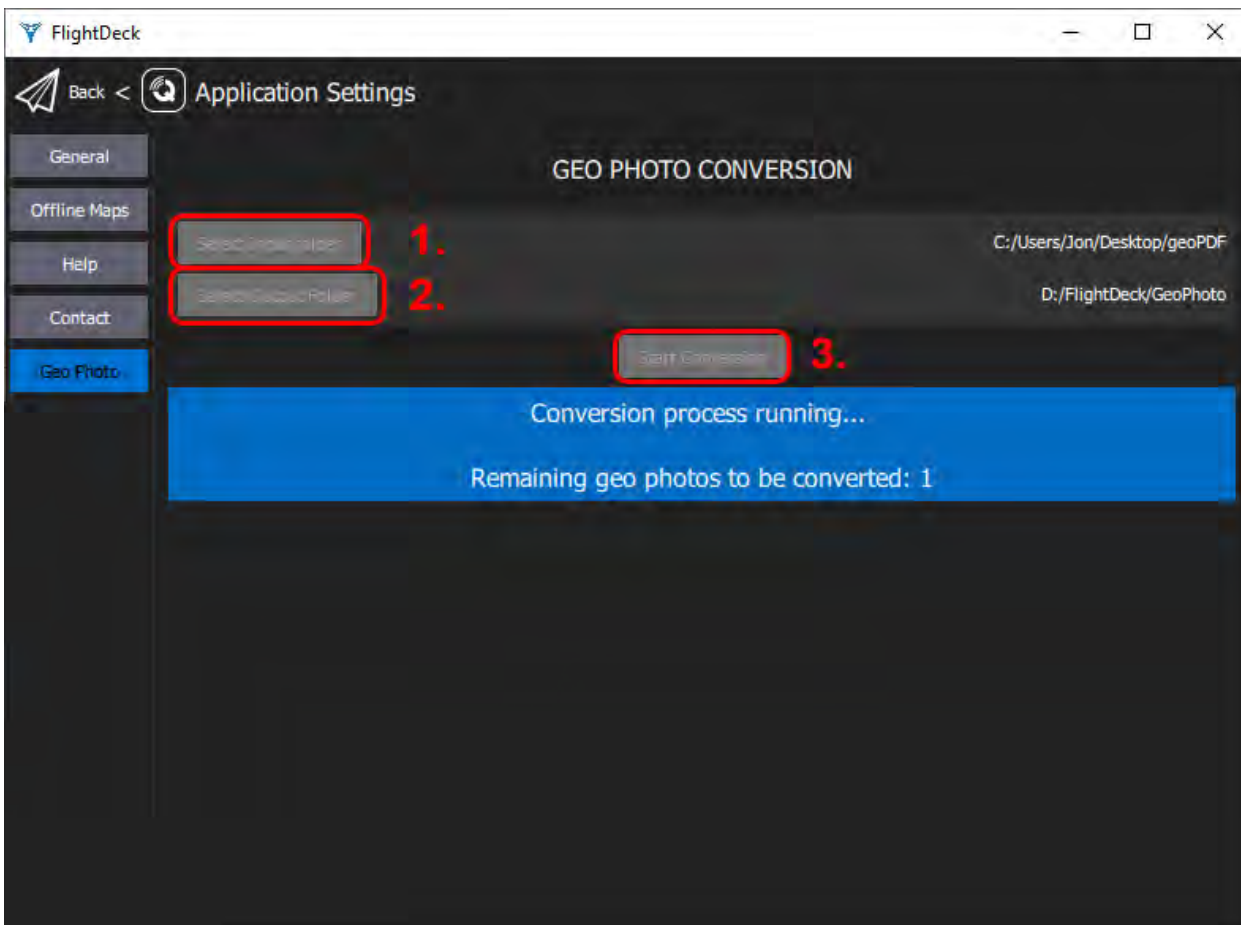
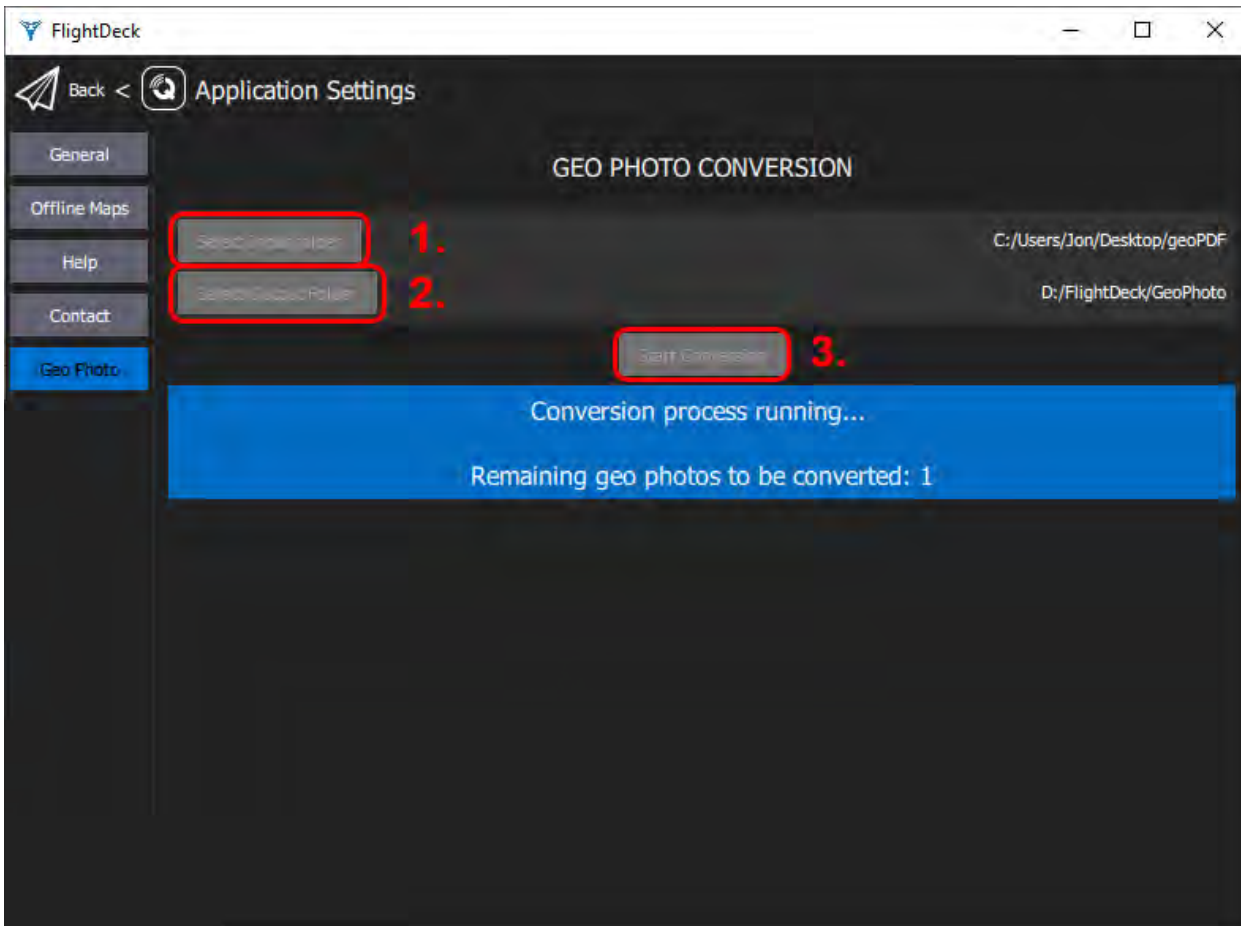
⚠️ Note: Your GCS automatically creates the proper file tree for your Micro SD card, but you must power cycle the GCS first. You must complete this step before moving on.

Remove the Micro SD card from your GCS and insert it into your computer.

Open the desktop version of Flight Deck, then click the Vision Aerial logo in the top left corner, followed by *Application Settings*.



Click on *Geo Photo* to access the options.

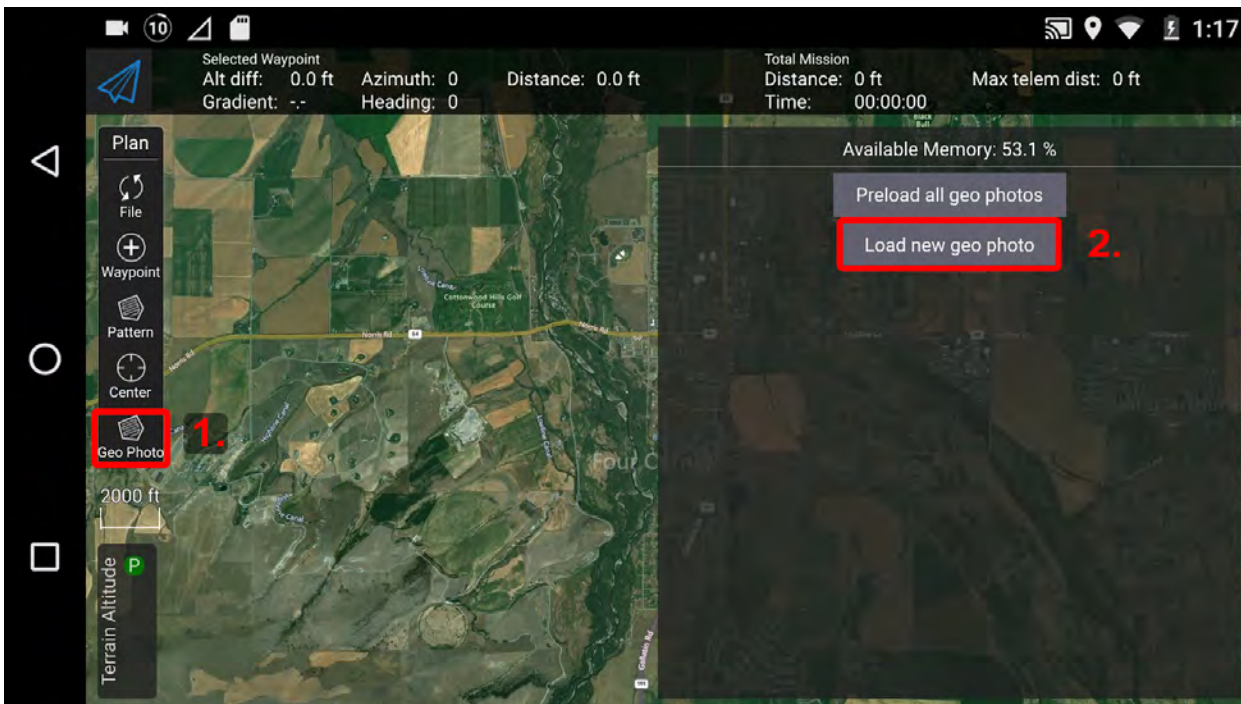


After navigating to the Geo Photo menu:

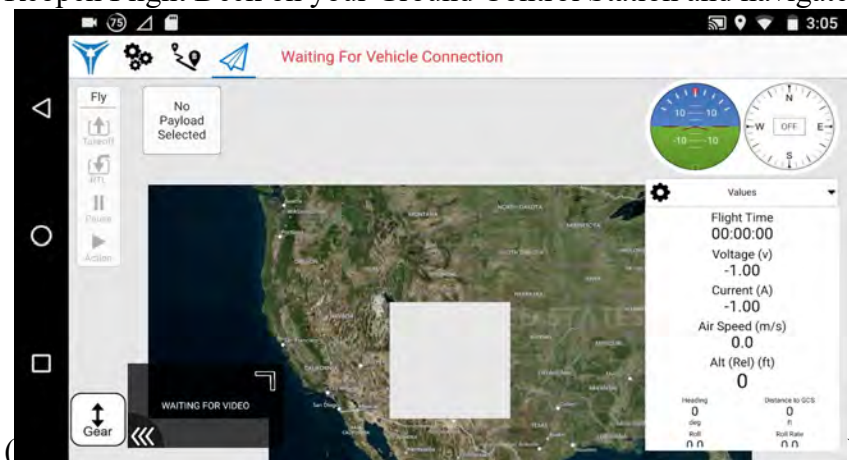
1. Specify the folder to convert. This is the same geoPDF folder from your desktop.
2. Specify the output location to your Micro SD card. The file path should be:
 - > USB Drive > FlightDeck > GeoPhoto
3. Start Conversion. This process allows for multiple file conversions. Depending on size, some files may take several minutes to complete.
4. Once your files have been converted, close out of FlightDeck Desktop.

⚠️ Note: Prior to removing your Micro SD card, *REMEMBER TO CLICK “SAFELY REMOVE HARDWARE.”* Failure to do so may result in corrupt files.

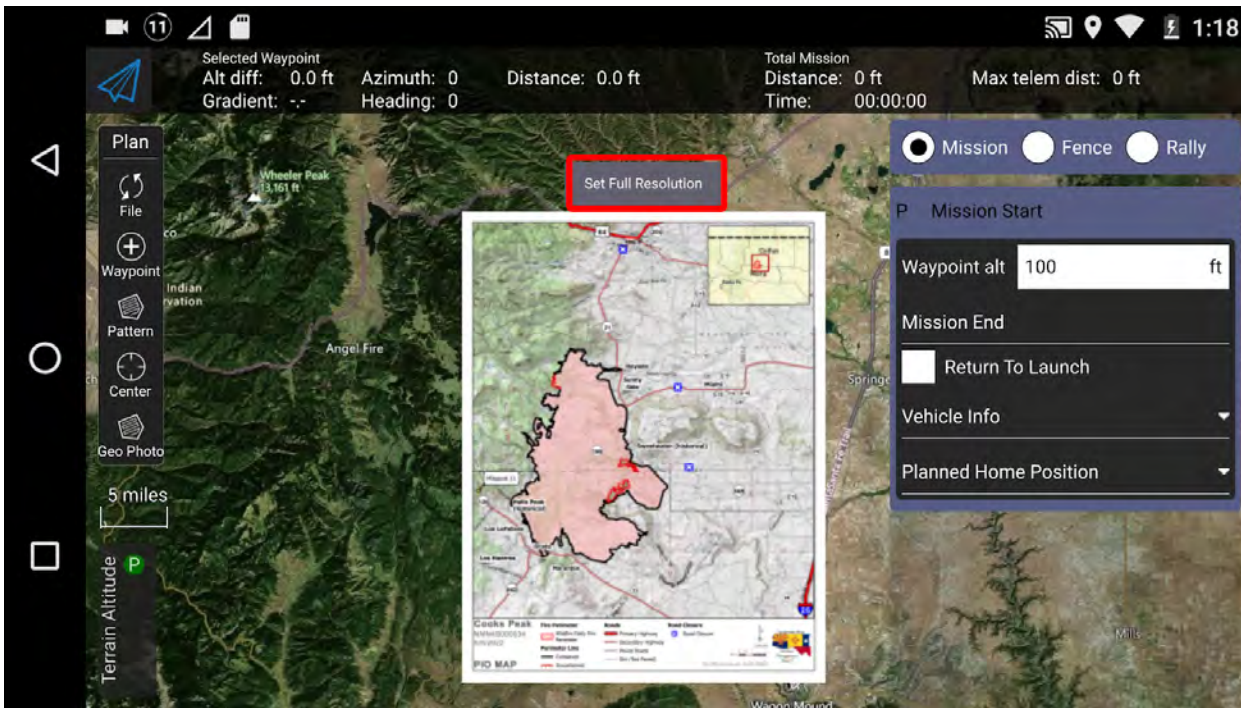
Insert the Micro SD card into your GCS and power cycle it, because Flight Deck will not see the new files until the device has been restarted.



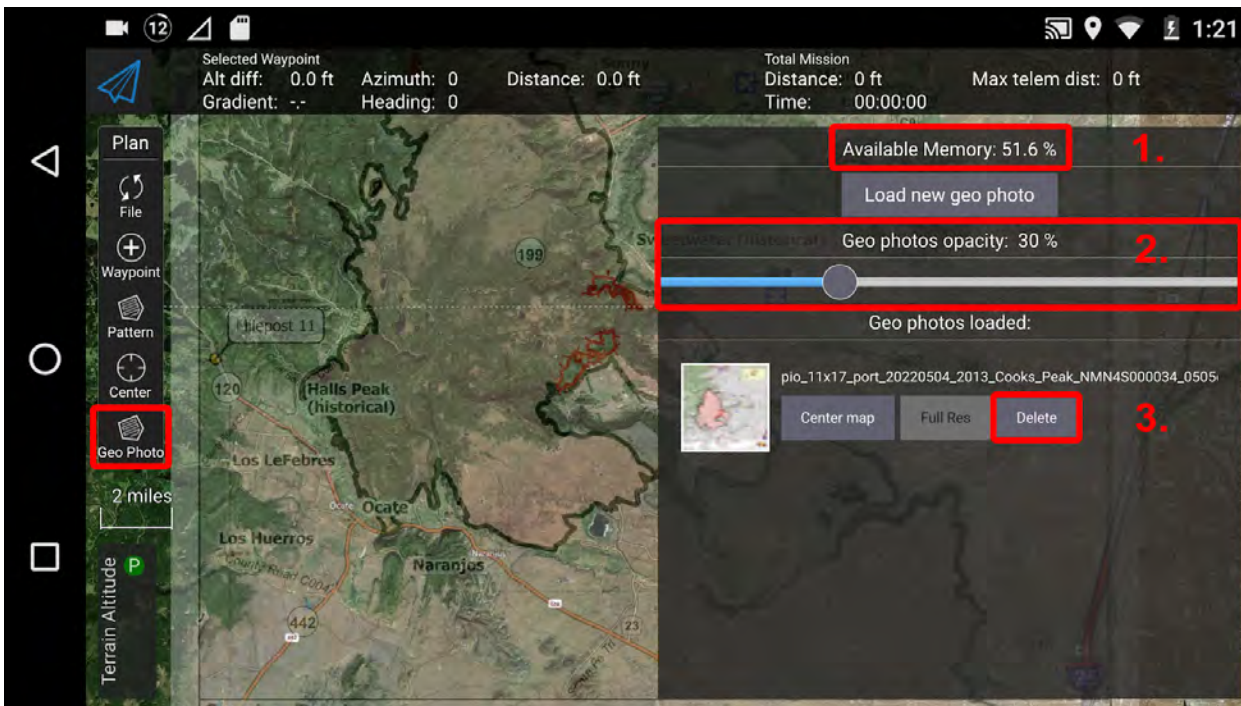
Reopen Flight Deck on your Ground Control Station and navigate to the mapping tab.



1. Select *Geo Photo*
2. Select *Load New Geo Photo*
3. Select the file you want to overlay.



Note: A black rectangle may appear until the file finishes loading. Additionally, the files will load in a lower resolution to conserve device memory on the GCS. To increase resolution, click “See Full Resolution.”



Navigating back to the *Geo Photo* tab, you will see:

1. Device memory remaining.

! **Note:** *IT IS ADVISABLE TO KEEP AVAILABLE MEMORY ABOVE 20%.*

2. **Opacity adjustment.** This feature allows you to overlay several maps on top of each other.

3. **Delete tab.**

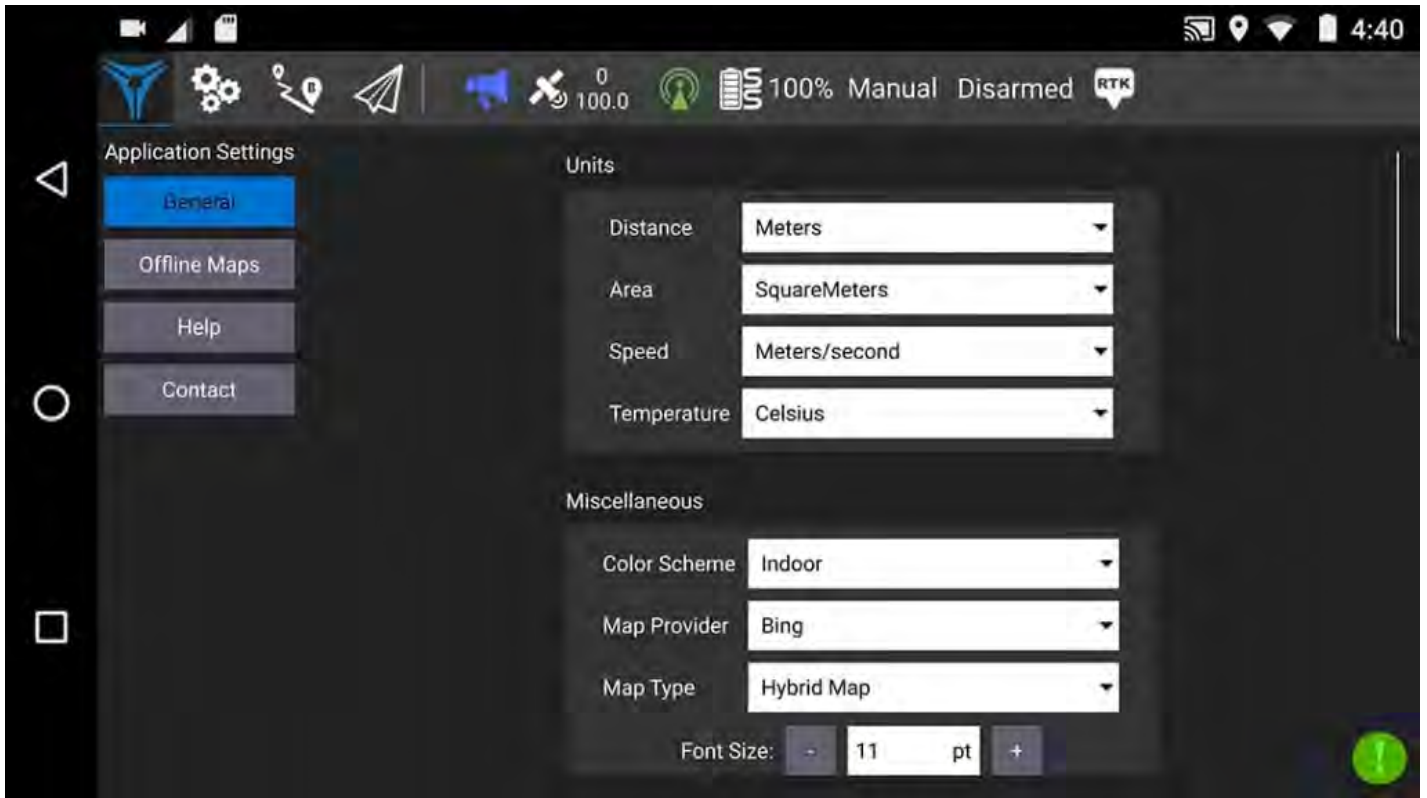
! **Note:** This button does not delete the map from the device, but simply removes it from the screen.

Application Settings

Settings View

The *Settings View* is used to configure the settings for the *Flight Deck* application (rather than a specific vehicle). You do not have to have a vehicle connected to change these values.

You can switch between the various settings options by clicking the buttons in the left sidebar.



Settings Options

General

The main application configuration settings. These are used to specify: display units, autoconnection devices, video display and storage, RTK GPS, etc.

Offline Maps

Allows you to cache maps for use while you have no Internet connection.

Help

Provides information for support options.

Contact

Vision Aerial contact information.

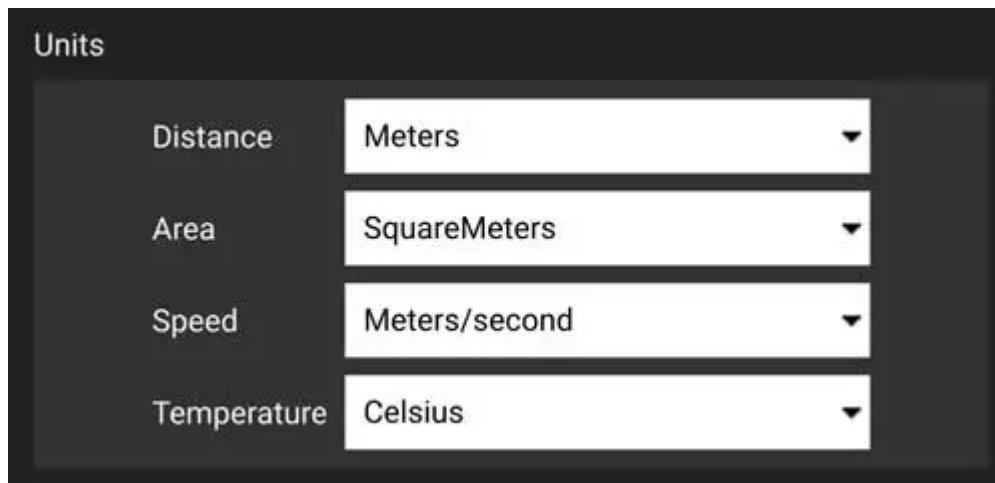
Application Settings – General

The general settings (**SettingsView > General Settings**) are the main place for application-level configuration. Settable values include display units, autoconnection devices, video display and storage, RTK GPS, brand image, and other miscellaneous settings.

⚠ Note: Values are settable even if no vehicle is connected. Settings that require a vehicle restart are indicated in the UI.

Units

This section defines the display units used in the application.



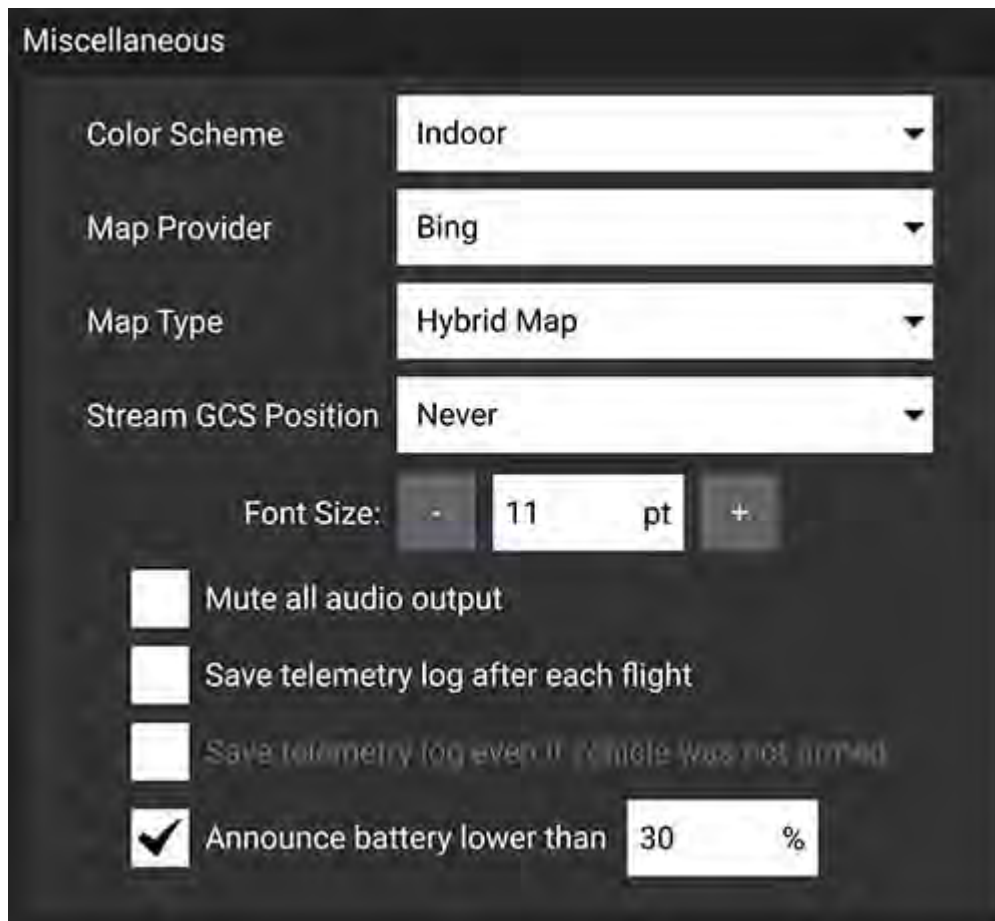
Units	
Distance	Meters ▼
Area	SquareMeters ▼
Speed	Meters/second ▼
Temperature	Celsius ▼

The settings are:

- **Distance:** Meters | Feet
- **Area:** SquareMetres | SquareFeet | SquareKilometers | Hectares | Acres |SquareMiles
- **Speed:** Metres/second | Feet/second | Miles/hour | Kilometres/hour | Knots
- **Temperature:** Celsius | Fahrenheit

Miscellaneous

This section defines a number of miscellaneous settings, related to font sizes, color schemes, map providers, map types, telemetry logging, audio output, low battery announcement levels, default mission altitude, mission autoloading, default application file load/save path, and more.



The settings are:

- **Color Scheme:** Indoor (Dark) | Outdoor (Light)
- **Map Provider:** Google | Mapbox | Bing | Airmap | VWorld | Eniro | Statkart
- **Map Type:** Road | Hybrid | Satellite
- **Font Size:** UI font sizes
- **Mute all audio output:** Turns off all audio output.
- **Check for Internet Connection:** Uncheck to allow maps to be used in places where map tile downloads are likely to fail (stops the map-tile engine continually rechecking for an Internet connection).
- **Save telemetry log after each flight:** Check to automatically save flight logs.
- **Announce battery lower than:** Battery level at which *Flight Deck* will start low battery announcements.

Plan View



The settings are:

- **Default Mission Altitude:** The default altitude used for the Mission Start Panel, and hence for the first waypoint.

RTK GPS

This section allows you to specify the RTK GPS “Survey-in” settings, to save and reuse the result of a Survey-In operation, or to directly enter any other known position for the base station.

RTK GPS

Perform Survey-In

Survey in accuracy (U-blox only) 2.00 m

Minimum observation time 180 secs

Use Specified Base Position

Base Position Latitude 0.000000000

Base Position Longitude 0.000000000

Base Position Alt (WGS84) 0.00 m

Base Position Accuracy 0.00 m

Save Current Base Position

The *Survey-In* process is a startup procedure required by RTK GPS systems to get an accurate estimate of the base station position. The process takes measurements over time, leading to increasing position accuracy. Both of the setting conditions must be met for the Survey-in process to complete. For more information see [GPS- How it works](#) (ArduPilot docs).

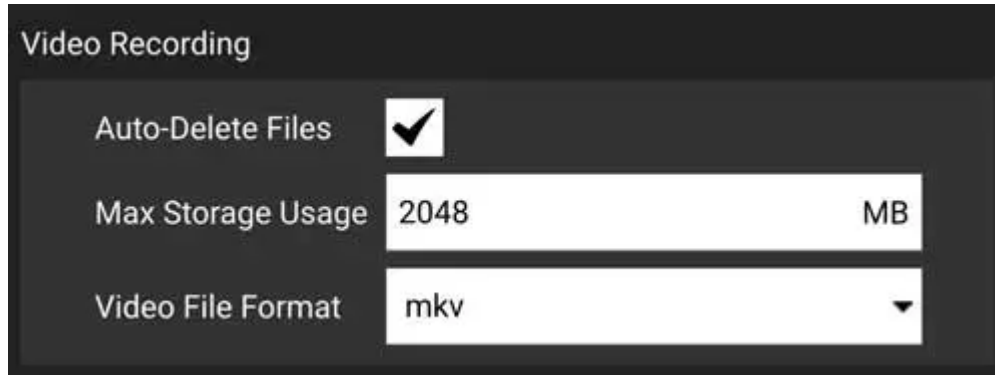
In order to save and reuse a base position (because Survey-In is time consuming!) perform Survey-In once, select *Use Specified Base Position* and press **Save Current Base Position** to copy in the values for the last survey. The values will then persist across Flight Deck reboots until they are changed.

The settings are:

- Perform Survey-In
 - **Survey-in accuracy (U-blox only):** The minimum position accuracy for the RTK Survey-In process to complete.
 - **Minimum observation duration:** The minimum time that will be taken for the RTK Survey-in process.
- Use Specified Base Position
 - **Base Position Latitude:** Latitude of fixed RTK base station.
 - **Base Position Longitude:** Longitude of fixed RTK base station.
 - **Base Position Alt (WGS94):** Altitude of fixed RTK base station.
 - **Base Position Accuracy:** Accuracy of base station position information.
 - **Save Current Base Position** (button): Press to copy settings from the last Survey-In operation to the *Use Specified Base Position* fields above.

Video Recording

The *Video Recording* section is used to specify the file format and maximum allocated file storage for storing video. Videos are saved to a sub-directory (“Video”) of the Application Load/Save Path.



The image shows a settings panel titled "Video Recording" with a dark background. It contains three settings:

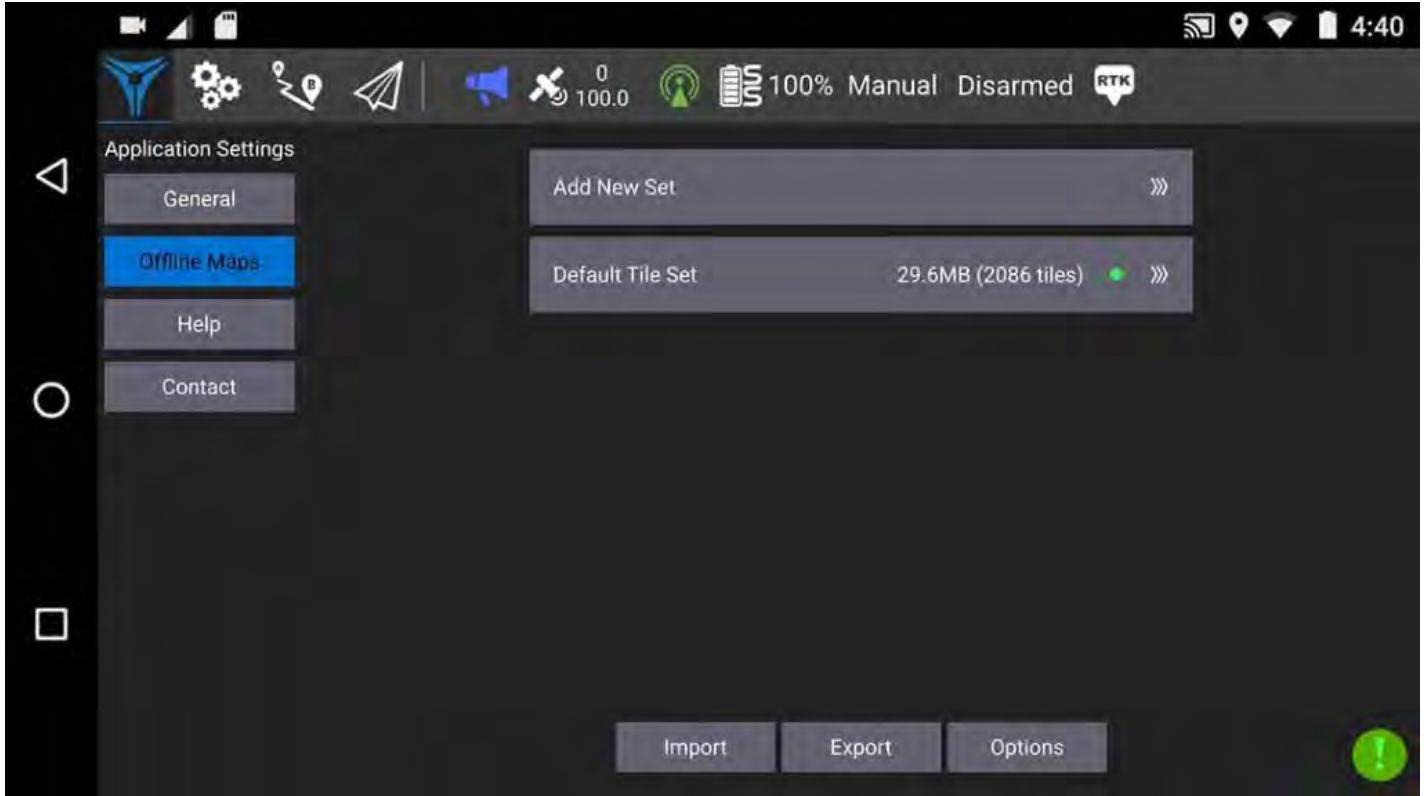
- Auto-Delete Files:** A checkbox that is checked, indicated by a white checkmark in a black square.
- Max Storage Usage:** A text input field containing the number "2048" and the unit "MB" to its right.
- Video File Format:** A dropdown menu with "mkv" selected and a small downward-pointing triangle on the right side.

The settings are:

- **Auto-Delete Files:** If checked, files are auto deleted when the specified amount of storage is used.
- **Max Storage Usage:** Maximum video file storage before video files are auto deleted.
- **Video File Format:** File format for the saved video recording: mkv, mov, mp4.

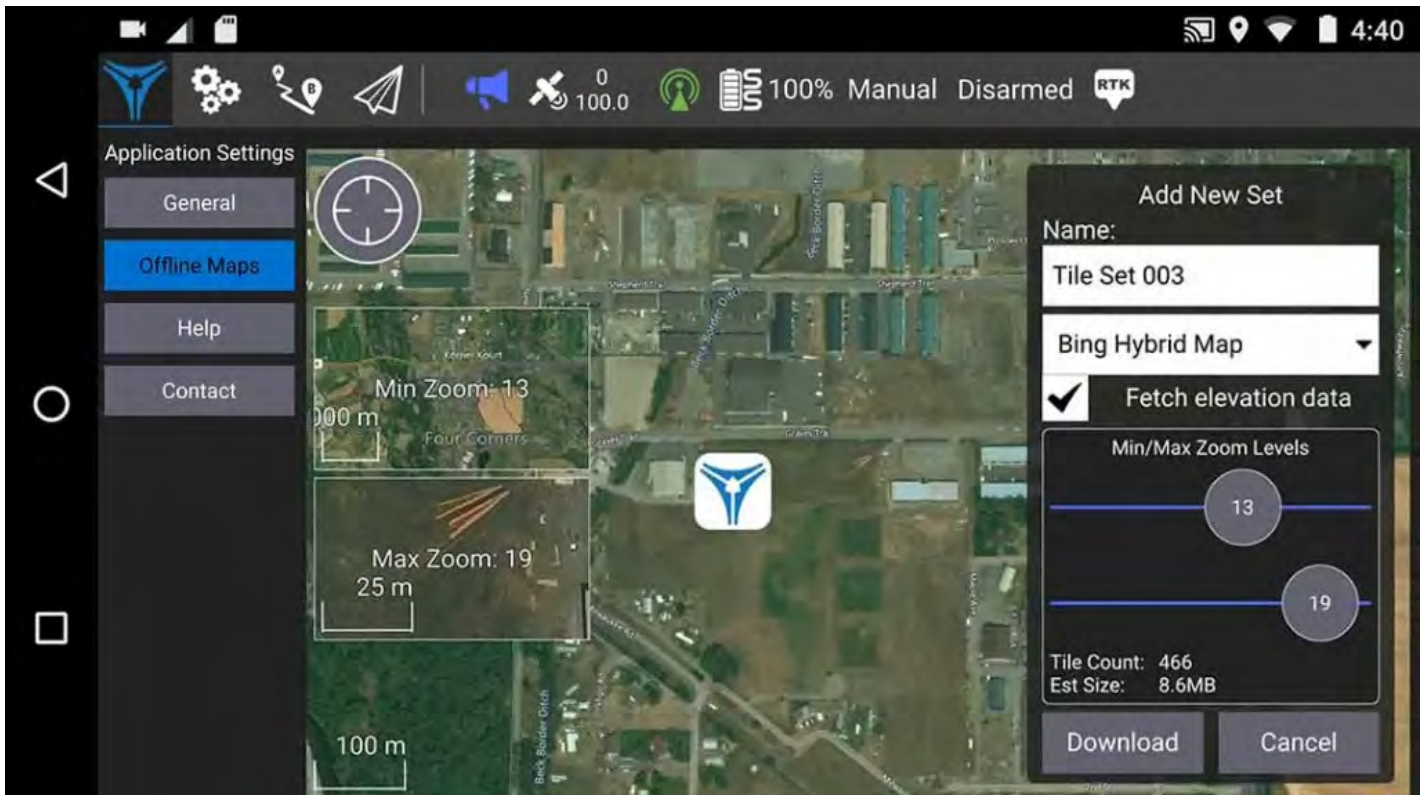
Application Settings – Offline Maps

Offline Maps allows you to cache map tiles for use when not connected to the internet. You can create multiple offline sets, each for a different location.



Add new set

To create a new offline map set, click “Add new set”.



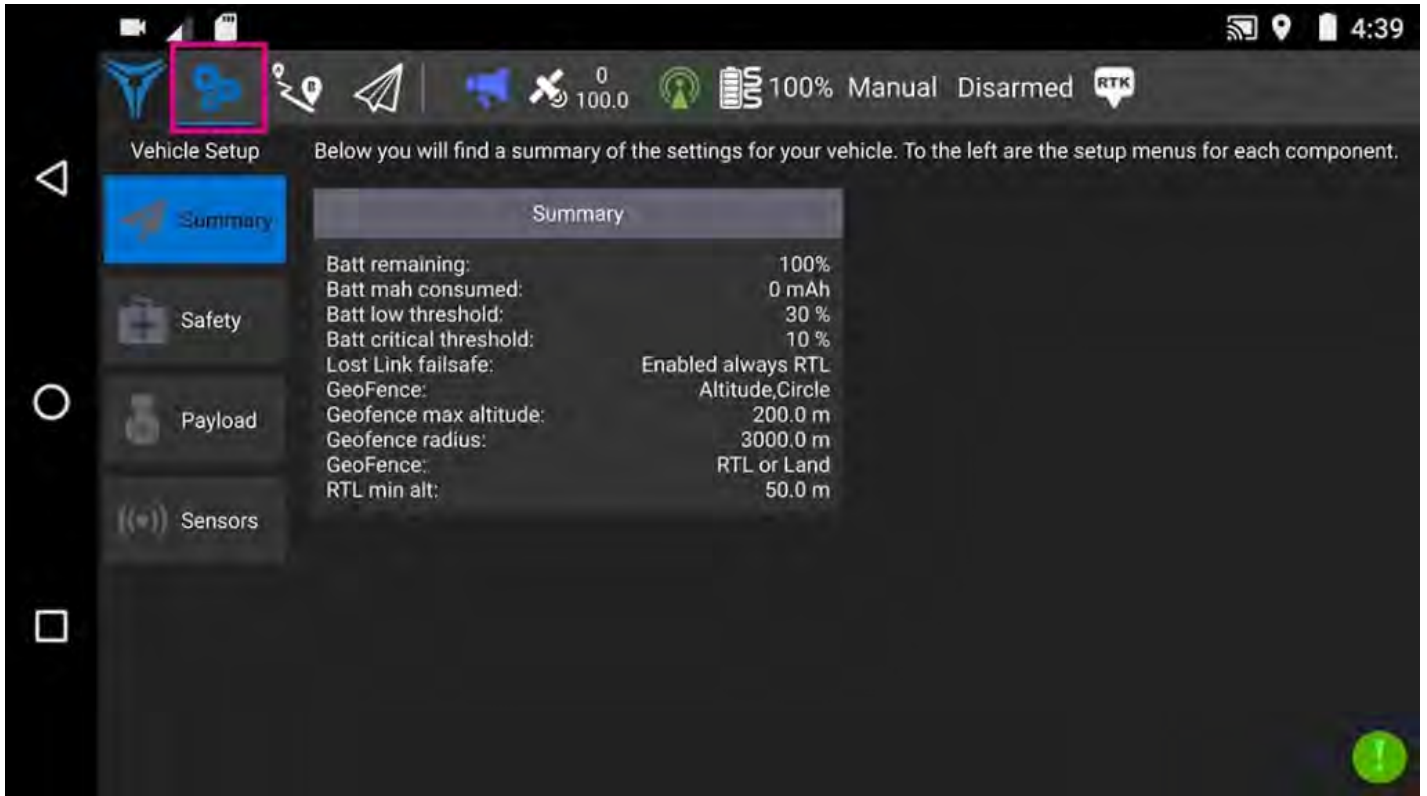
From here you can name your set as well as specify the zoom levels you want to cache.

Move the map to the position you can to cache and then set the zoom levels and click **Download** to cache the tiles.

To the left, you can see previews of the min and max zoom levels you have chosen.

Vehicle Setup

In the vehicle setup menu, you will find a summary of settings, safety settings, payload setup, and sensor information.



Summary

The summary menu displays basic safety parameters for your vehicle.

Safety

View and change safety features and failsafe settings.

Payload

Configure payload and options.

Sensors

Adjust sensor configuration and settings.

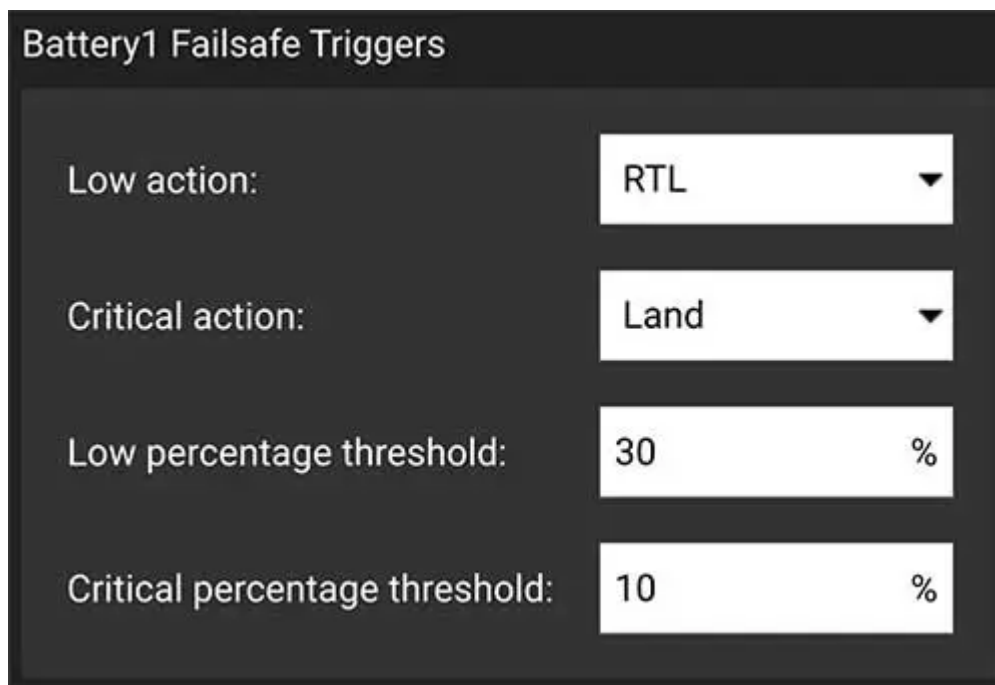
Vehicle Setup – Safety

The safety menu is where all the general safety settings are located. Please carefully consider the implications of each value before changing it. If you have questions, please contact Vision Aerial prior to changing any settings.

⚠ Warning: Changing the safety settings could cause your drone to crash and may void your warranty. Use extreme caution when changing the safety settings.

Battery Failsafe Triggers

The most basic and important failsafes are triggered by battery levels. The settings on this menu will determine how the vehicle responds to low battery and critically low battery thresholds.



The screenshot shows a dark-themed menu titled "Battery1 Failsafe Triggers". It contains four settings, each with a white input field and a dropdown arrow:

Setting	Value	Unit
Low action:	RTL	
Critical action:	Land	
Low percentage threshold:	30	%
Critical percentage threshold:	10	%

By default, Low battery triggers RTL (Return to Launch). When a vehicle goes into RTL, it will notify the user, climb in altitude, return to the launch location, and then gently descend to the ground.

When the battery becomes critically low, the aircraft will land in its current position.

By default, the low percentage threshold set to trigger RTL is 30%. Critically low battery is set to 10%.

⚠ Warning: Changing these settings is NOT recommended. The manufacturer's warranty is voided if these settings are changed.

General Failsafe Triggers

The general failsafes include actions to take when there is a problem with the ground control station. The Ground Station failsafe is for a problem with the telemetry. By default, it is set to Always RTL.

If the connection between the ground control station and the drone is compromised, this triggers a lost link failsafe. By default, the failsafe for Loss of Link with the controller is set to Always RTL.

General Failsafe Triggers

Ground Station failsafe:	Enabled always RTL ▼
Lost Link failsafe:	Always RTL ▼

GeoFence

For general safety purposes, a geofence sets the maximum distance a Vision Aerial drone can travel from the ground control station as well as altitude.

GeoFence

- Circle GeoFence enabled
- Altitude GeoFence enabled
- Report only
- RTL or Land

Max radius:	3000.000	m
Max altitude:	200	m

Return to Launch

The Return to Launch settings specify how the drone will respond when RTL is triggered.

 **Warning: Changing these settings may void your manufacturer warranty.**

Return to Launch

Return at current altitude

Return at specified altitude: m

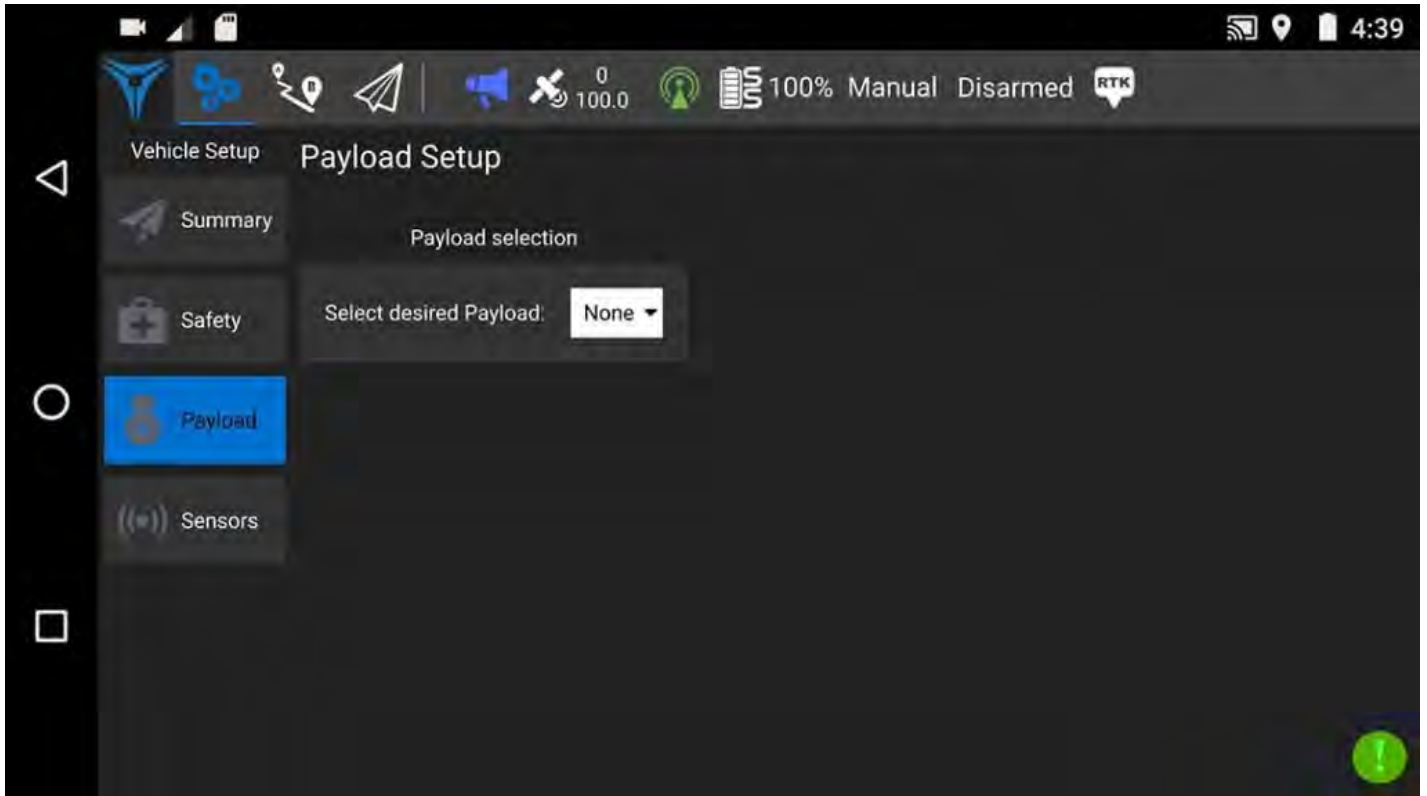
Loiter above Home for: s

Land with descent speed: m/s

Final loiter altitude: m

Vehicle Setup – Payloads

The Payloads screen allows you to add and configure cameras and sensors. A list of known cameras is available, and you can also configure your own.



Selecting Known Payloads

Payloads that are preconfigured in the system include: Sony RX0, Sony RX1Rii, Sony a6000, Sony s6400, Sony a6500, Sony a7Riv, Sony R10C, Workswell WIRIS Pro, Workswell WIRIS Security, and the MicaSense RedEdge MX.

As new cameras and sensors are integrated they will be added to this list in subsequent releases of Flight Deck.

Just select the desired payload from the dropdown menu for its settings to be available in Mission Planning.

Once a payload has been selected, a Payload information box will appear with the specifications for that camera or sensor.

Payload selection

Select desired Payload: Sony a6400 ▾

Payload information

Payload name:	Sony a6400
Sensor Width:	23.5 mm
Sensor Height:	15.6 mm
Image Width:	6045 px
Image Height:	4003 px
Focal Length(16-500):	16 mm
Minimum trigger interval:	2 sec

Adding New Payloads

Select "Add Payload" from the list. Populate the fields with the configuration information. If any values are incorrect or missing, variables in the Mission Planning such as Ground Sample Distance and trigger distance may be incorrect.

Most of these values can be found on the sensor manufacturer's product information sheet.

Payload Setup

Payload selection

Select desired Payload:

Add Payload ▾

NEW Payload information

Payload name:

Sensor Width:

 mm

Sensor Height:

 mm

Image Width:

 px

Image Height:

 px

Min Focal Length:

 mm

Max Focal Length:

 mm

Default Focal Length:

 mm

Minimum trigger interval:

 sec

Save

Vehicle Setup – Sensors

The Sensors Setup screen allows you to calibrate the sensors within your vehicle. Items that can be calibrated include the accelerometer, compass, level horizon, and pressure.

- A red dot indicates that this sensor must be calibrated before flight.
- A green dot indicates that this sensor has been calibrated.

To calibrate a sensor, click on the button, and follow the steps presented.

