# SidePilot

## User Manual

**App Version 2.1.2**

[Link to 3DR Solo Firmware Update Instructions](#)

# Contents

# Overview

This is the app for drone enthusiasts who wish to have a more portable ground station.

It works with ArduPilot platform via WiFi, Bluetooth or Cellular connection, including 3DR Solo.

Features:

- Supports ArduCopter, ArduPlane and ArduRover via MAVLink protocol.
- Displays current drone location, including telemetry such as altitude, yaw, pitch and roll.
- Internet ADSB integration to display nearby aircraft and provide warnings.
- Create, edit and delete Waypoints, GeoFences and Rally Points.
- Edit, save and load parameters.
- Perform a Pre-Flight checklist with live weather information.
- Low battery warnings and alerts.
- View onboard video, and live stream it to YouTube.
- Record telemetry logs and export for analysis.
- Follow Me - Have your drone follow you using your devices GPS location, or visually with Object Tracking.
- Orbit mode - Automatically orbit an object for a fantastic cinematic shots!
- Grid Waypoints - Create a survey grid to fly.
- Tap to fly - Tap a location on the map to send your drone there!
- Perform calibrations at the field.
- Enable RTK using imternet based NTRIP casters for RTCM.
- 3DR Solo LED Color control.
- 3DR Solo OTA Firmware Updates.
- And many, many more

# Getting Started

1. If using Wi-Fi, first connect to your drone's network using your iOS device's Wi-Fi settings.
2. Turn on your drone and open the SidePilot app
3. You will be presented with a screen for choosing your drone. Follow the prompts.
4. When launched, SidePilot will attempt to connect to your drone if already connected via WiFi. To connect manually, tap the connect button in the top right corner. You should begin receiving telemetry data. If not, you may need to change the connection settings in the settings menu.

Please post suggestions and bug reports to the [SidePilot Discord](#).

WARNING: Continued use of GPS running in the background can dramatically decrease battery life.

NOTE 1: iPads without cellular do not have GPS capability unless tethered to an iOS Device with cellular, and even then, it can be poor and not suitable for navigation.

NOTE 2: SidePilot collects anonymous analytics data regarding how the app is used and if any errors occur. All of this data is anonymous and stored securely. If you wish to opt out of these analytics, tap the 'Analytics' item in the settings menu, and follow the instructions. By allowing the use of these analytics, you help SidePilot become a better app!

# FAQ

Just some of the most common questions asked

Q – What drones does this app support?

    A – Any that run the ArduPilot flight controller firmware, such as ArduCopter, ArduPlane or ArduRover! Including the 3DR Solo.

Q – How does the app connect to the drone?

    A – Through either WiFi (TCP/UDP), a cellular connection or via a Bluetooth Serial repeater.

Q – How come your 'Shots' are different to 3DR's stock shots?

    A – SidePilot is designed for not just Solo, but other, DIY copters without a companion computer. Therefore instead of using the Solo's companion IMX computer to control the shots, SidePilot acts as the companion computer, sending commands to any drone, not just the 3DR Solo.

Q – How can I access telemetry logs?

    A – You can export telemetry, application log files from the Messages menu, by selecting the share button. You can export dataflash logs by first downloading them from your drone via the Vehicly Setup -> Vehicle Options -> Dataflash Logs menu, and then sharing them.

Q – I want feature X, why doesn't SidePilot have feature X?

    A – As you can imagine, theres only so many hours in a day to get features added, or I might have just not thought about it yet! Feel free to post any suggestions or improvements to the facebook page or email me at tom@sidepilot.net

# Main Screen

## User Interface

Signal
Strength

Battery Voltage
& Percent
remaining

Direction to
drone

Height
(AGL)

Distance to
home

Connect Button

Menu

Status Bar

Live Video

Centre on
Device

Centre on
Drone

'Shots'
Button

GPS: Unknown     Unknown     Air Spd: 0.0 kts     Boot Time: 00:00

0.0V – 0%     0.0 ft     0.0 m

Arm

Action Button

Action Menu
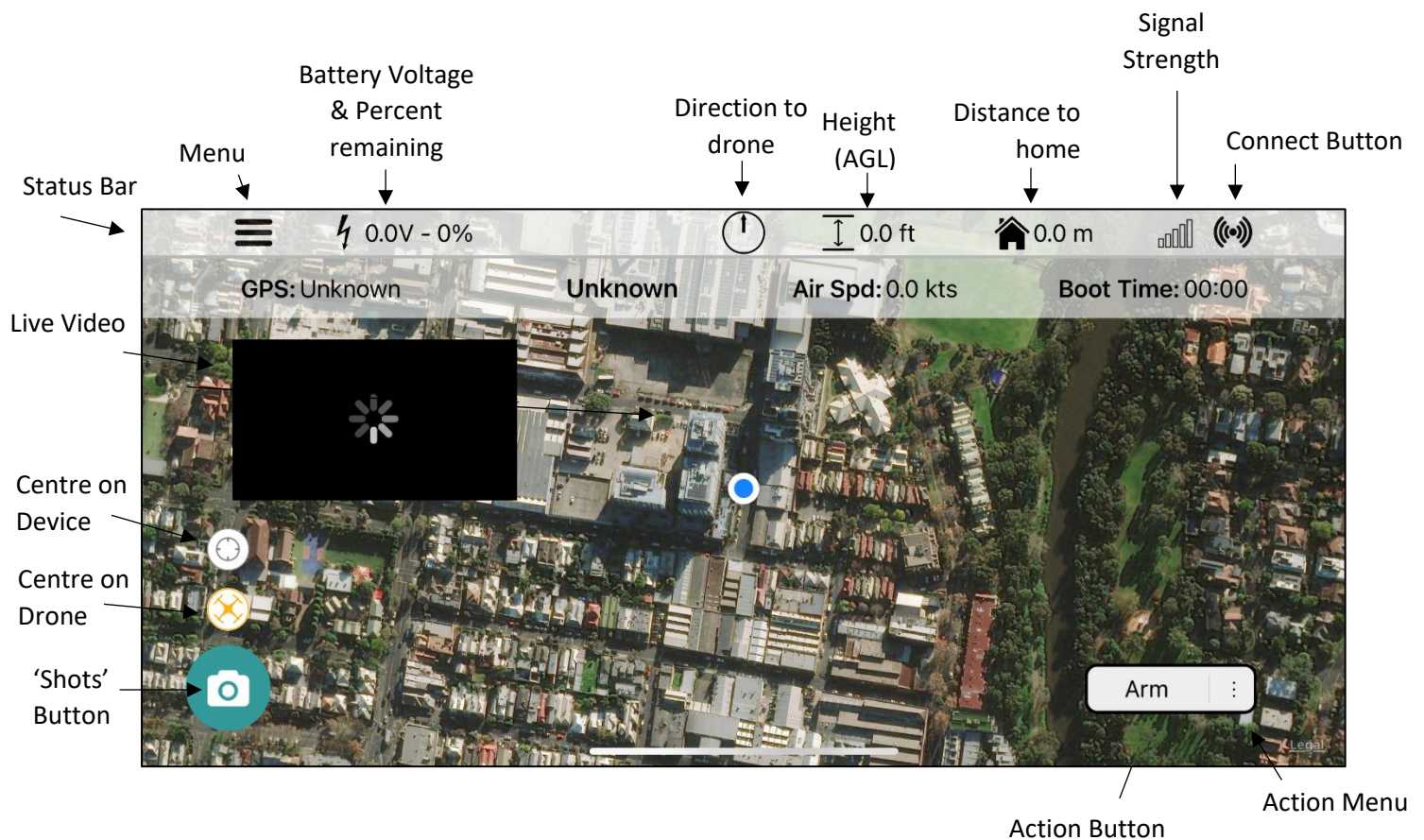
The Menu button will turn blue when connected to your drone and black when disconnected, same with the connection button.

## Connecting to your Drone

To connect to your drone, tap on the connect button in the top right corner. Once connected you should begin seeing the sensor values change on the main screen and the connect button will turn blue.

## Status Bar

The top status bar can be tapped to show more information such as GPS status, current mode and arm status, current speed and time since boot. Tapping the status bar will show a dropdown that shows more status's.

To modify what the top bar shows, tap and hold on the bar, then tap the position that you want to change. A dropdown with all options will appear:
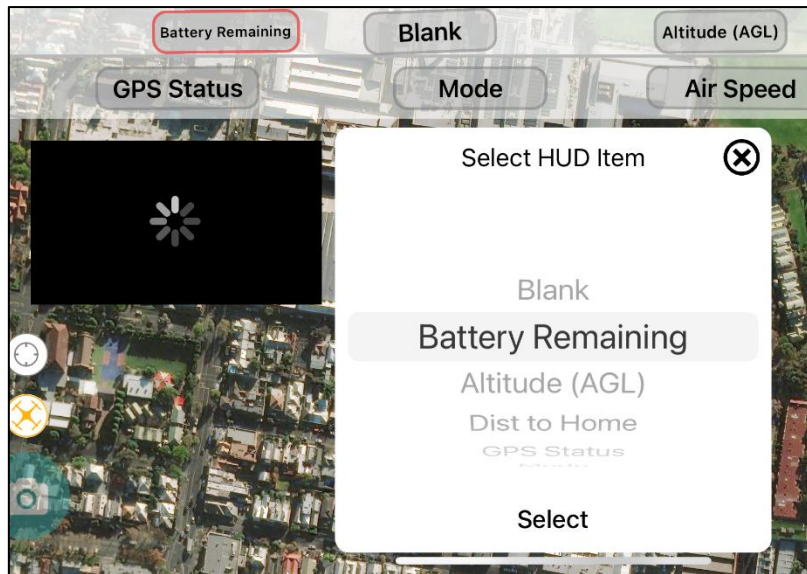
## Live Video

Live video can be seen on the main screen when 'Show on Main' is enabled in the Video settings menu.

**Resize Video**

To resize the video window, tap and drag the bottom right corner of the window. To make the video fullscreen, **TRIPLE** tap the video feed. It will then swap places with the map. To return just triple tap the VIDEO feed again.

**Clean Screen**

If you are using as smaller device, or simply have no need for the map or VFR, you can easily hide them by simply swiping in from the right edge and they will slide off the screen, giving you full screen video! To get them back, swipe in from the left edge. This will only work when the video feed is full screen.



Swipe in from the left to restore map and VFR

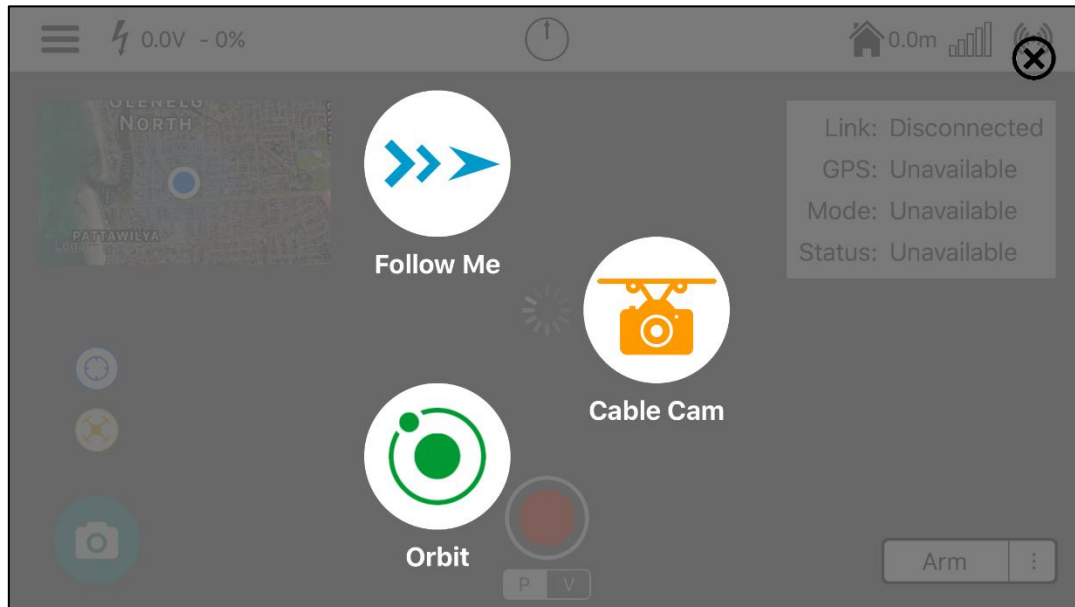Swipe in from the right to remove map and VFR

# Shots

SidePilot has advanced autopilot manoeuvres called 'Shots'. To access the Shots functionality, tap the camera icon in the bottom left corner.

This brings up the Shots menu.



In these modes, SidePilot acts as a companion computer, sending movement commands directly to the drone.

As of version 2.1.2, SidePilot has Four Shot modes, Follow Me, Orbit, Cable Cam and Panorama. More Shots are being developed!

## Orbit

This Shot enables you to orbit around a subject.

When selected, you have two parameters you can edit:

1. Orbit Radius (Between 0 and 100m)

   You can set this to either 0 (Centre position will be where the drone is currently positioned), or to a distance that is extended from the front of the drone. Eg. The drone is 10m from a building that you wish to orbit, point at the building and set the radius to 10.

2. Orbit Rate (from -90 to 90 deg/s)

   The orbit rate defines the rotational motion of the craft. When set to 0, the drone will stay still at the set radius from the centre.
   10-20 deg/s is a nice cinematic speed.

When Orbit mode is activated, you can control the Radius by dragging the handle of the circle displayed on the map screen. You can control the Rate by using your controllers roll stick.

[More info here](#)

## Follow Me

This mode enables Follow me! Ensure you have an accurate GPS lock on yourself before using.

There are three types of follow me:

**Static:**

Static altitude will hold the set altitude at all times, this is great if you are on flat ground.

**Dynamic:**

Dynamic altitude will hold the current altitude above the user with the iOS device. This is useful if you are traversing steep terrain.

When selected, you must choose a height to follow you at, and a 'leash' distance which the drone will keep from you. To tune the speed that your drone follows you at, change the values of the WPNAV_SPEED_ parameters.

The drone will automatically try to yaw to 'look' at what it is following, however it can be jittery. For smoother, better looking video, you can control the yaw of the drone using your transmitter. This enables you to better frame your Shot without having to worry about controlling the drones flight.

**Visual:**

Visual Follow me uses the camera feed and object tracking. It requires a live video feed to SidePilot. It will likely not work well with fast moving objects or if you are low to the ground and have the camera pointing directly forward.

When selected, drawing a box around the object you wish to track with your finger. Once you let go, follow me will begin and you will see the red box move with the object/person.

The drone flies based on where on the screen the object is, and its size relative to the starting position. If the object box (red) is smaller than when you drew it, it will translate forwards, if it is larger, it will translate backwards. Similarly, if the object is near the left side it will yaw left, right side and it will yaw right.

The responsiveness to these actions can be tuned by selecting the 'Visual Tuning' button, and dragging the tune sliders until the follow me behaves in a desirable manner.
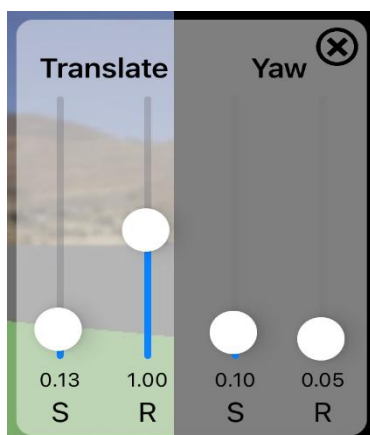


Where S represents the sensitivity, and R is the rate or speed multiplier of the movement.

E.g. to increase the sensitivity to the objects size (translate forward and back), increase the Translate S slider. To increase the speed at which the drone yaws left and right, increase the Yaw R sider.

## Cable Cam

This mode enables your drone to act as though it is riding on a virtual cable in the sky!

When selected, a button will appear on your screen saying 'Point 1'. Simply fly to where you want one end of your cable cam to be and tap this button. Then fly to the other end of the flight and tap the 'Point 2' button. Continue adding points until you are satisfied, then tap the finish button.

Each point will have a waypoint icon added to the map, showing its location. These can be moved by tapping and dragging them. The yaw position of the drone at each point is recorded and will move to that yaw angle each time it reaches the point.

On the screen, a red bar will appear. This indicates the distance between the first and second points, and where your craft is relative to them. The speed of the movement is also shown.

Below this red line, are arrows indicating forward (towards point 2) and backward (towards point 1) as well as a pause button. If you tap the pause button, the craft will stop where it is, however the set speed will not change. Simply tap either arrow or use the roll stick to start moving again.

It is possible to tap and drag the points displayed on the map to move them, however they will retain their original yaw orientation.

To exit Cable Cam mode simply click the Fly button.

## Panorama

There are three different panorama modes:

**Cylindrical:**

In this mode, you set how many photos you want taken in one full 360° rotation, then it will automatically take a photo, yaw to the next position then snap another photo. It will continue this until complete.

**Hemisphere:**

In this mode, it will set the camera to point directly forward, then begin the exact same as the cylindrical mode, however once one full rotation is complete, it will tilt the camera to 45° angle and do the same. Once that is complete it will tilt the camera directly downwards then snap a final image.

**Video:**

Video mode will begin recording a video, then do a slow, smooth 360° rotation before going back to loiter mode.

# Actions Button

To change the actions button, tap the '⋮' button to bring up the actions menu. Then select your desired action. Tap the action button to perform the action. The default actions available differ by vehicle. The copter options are explained below.
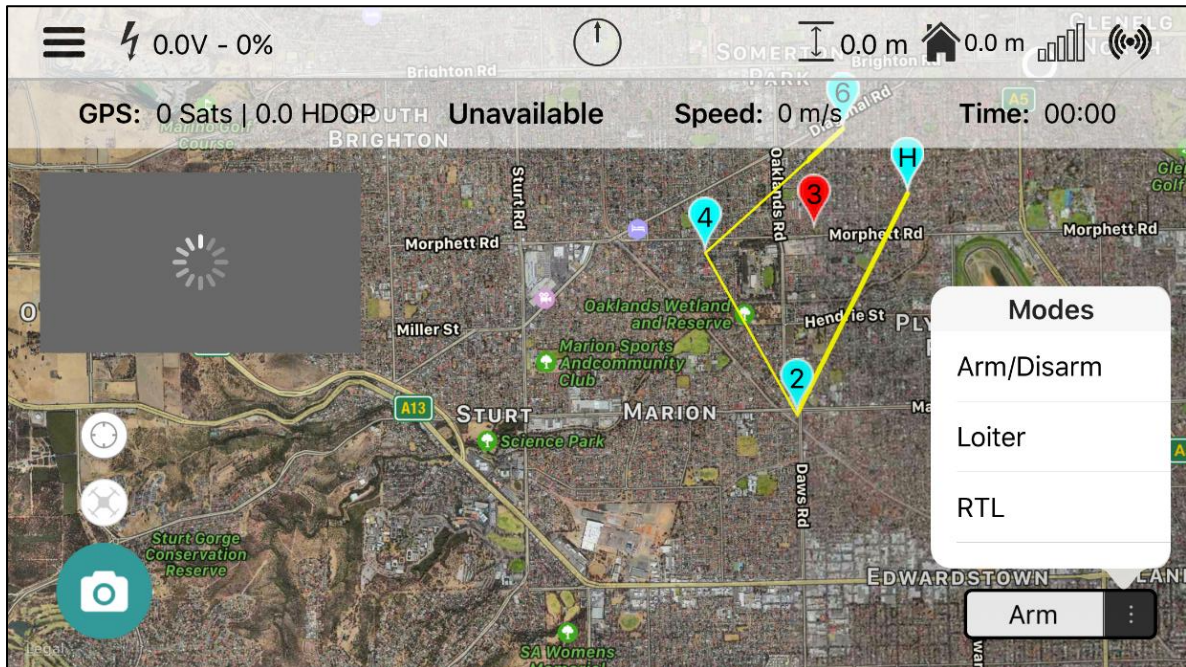


## Default System Actions

**Arm/Disarm:**

This will do as the title says, Arm if disarmed, or Disarm if armed. If arming, a check is performed to see if you have completed your pre-flight checklist and will give you a warning if not. You can disable this check under *Settings->App Behaviour -> Pre-flight checklist warning on arm*

**Loiter:**

Enables Loiter mode. You drone will hold its current position based off GPS and altitude readings.

**RTL:**

Will perform the Return to Land function of your drone.

**Start Mission:**

Will enable auto mode to begin a waypoint mission.

**Take off:**

Takes off to a desired height. The user is prompted on selection to enter a height.

**Land:**

Enters Landing mode, to land immediately.

**Stabilize:**

Enabled stabilize mode. This mode has no GPS hold or altitude hold.
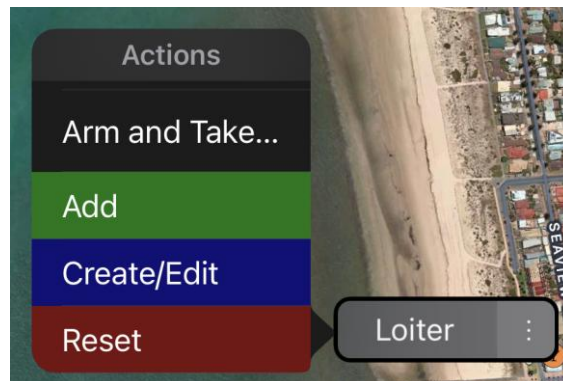
**Alt Hold:**

Will hold your current altitude, but does not control position.

**Camera Trigger:**

Triggers the camera if installed and configured per the ArduPilot camera configuration.

## Customize Actions

The action buttons are extremely customizable, and you can also create your own custom actions.



**Delete:**

To remove an action from the list, swipe left and select the red X.

**Add:**

Select 'Add' to pick additional actions to add to the list. There are default actions like 'Toggle Boat Mode', custom actions which you can define yourself, as well as the standard modes available for the UAS type you have.

**Create/Edit:**

This is where you can create or edit your own actions! By selecting 'Create New', you can then combine different actions to create your desired workflow. The options are endless!
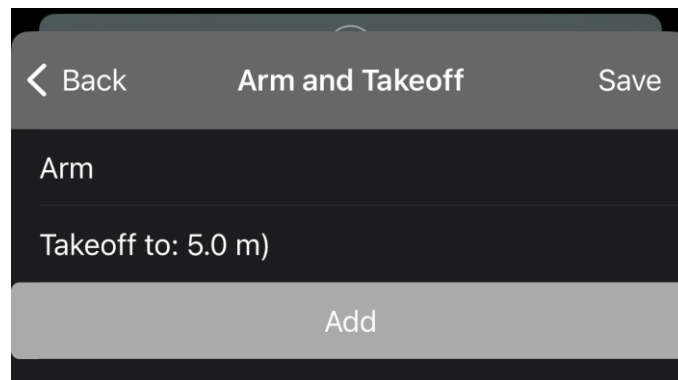


The actions available are:

       **DO ACTIONS**:

Mode Change – Changes to the selected mode.

Trigger Camera – Triggers the camera.

Set Servo – Sets a servo to the desired PWM.

Fly to Coordinates – Tells the drone to fly to the selected coordinates.

Arm/Disarm – Not recommended for custom action use.

Arm – Arms the drone.

Boat – Sets the INS_GYR_CAL parameter to disable startup Gyro calibration, allowing moving takeoffs.

Takeoff – Takeoff to a desired altitude.

Land – Land at the current location.

RTL – Return to Land/Home.

Yaw Left/Right – Yaw the selected number of degrees in the desired direction.

Yaw to Heading – Yaw to the selected heading.

Mavlink Command – Trigger a Mavlink command

**WAIT ACTIONS:**

Armed – Wait until armed successfully.

Landed – Wait until no longer airborne.

Time – Wait a number of seconds

Distance – Wait until flown a certain distance.

Target Waypoint – Wait until reached a selected target waypoint.

Reached Go To – Until it has reached the Fly To coordinates.

Airborne – Wait until airborne.

Finished Yaw – Wait until finished the yaw DO action.

**LOOP ACTION:**

Start – Sets the start of a looping action

Forever – Returns back to the Start loop action, forever.

# Iterations – Returns back to the Start loop action a selected number of times.
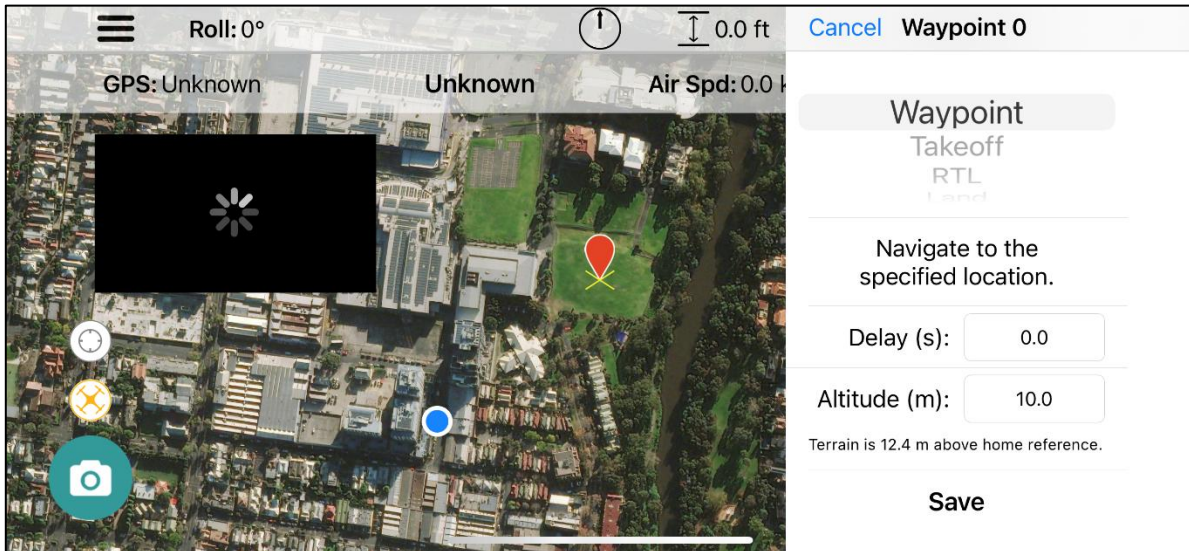
**CREATE ACTION:**

Create a waypoint – Adds a new mission waypoint at the current location.

With custom actions, it is important to always add the WAIT action where required. For example, if you have a DO Yaw Left 50 degrees action, you must then have a WAIT Finished

Yaw action otherwise it will perform the next DO action whilst still performing the Yaw action.

# Waypoints



**To begin adding waypoints:**

1. Tap and hold on the map on the location where you wish to place a waypoint.
2. Select the type of waypoint you wish to add
3. Select the Altitude of the waypoint, and if applicable the time to loiter at that waypoint.
4. If you wish to enter the exact coordinates of the waypoint, tap the icon on the top right of the window (not shown in image).
5. Select save. Your waypoint will be sent to the drone.

**NOTE**: ArduPilot does not climb to the set altitude first, it will move diagonally upwards/downwards to the first waypoint. If you must get to the correct height first, use the takeoff waypoint or a regular waypoint but at the same location.

**NOTE:** Some waypoint types do not have a location (such as Change Speed, RTL, etc). These are attached to the previous waypoint with a location and indicated by a + symbol on that waypoint. Tapping the location waypoint will display all attached waypoints.

**To edit a waypoint:**
1. Select the waypoint you wish to edit and tap the blue gear icon on the right.
2. Edit the waypoint as you wish, making sure to press save. The new waypoint/s will be sent to the drone. You can move the waypoint by tap, hold and dragging the waypoint on the map.

    **NOTE:** Waypoints can be moved by selecting and then dragging them around the map. For waypoints that are tied to another waypoints location, dragging will move the order so that they are applied to the closest one at the time.

**To delete a waypoint:**
1. Select the waypoint you wish to delete.

2. Tap on the red X on the left side. Your waypoint will be immediately deleted and all your existing waypoints will refresh from the drone.

**To delete ALL waypoints:**

1. Navigate to the Settings -> Mission Options page
2. Select Clear all waypoints. Confirm and all waypoints will be removed.

**To fly your mission:**

1. Select Auto in the mode menu
2. Tap the Auto function button
3. The drone will then begin to fly the mission. Be careful! It will not first climb to the desired height for the first waypoint and may fly at an angle!

**Special Waypoint Types**

**Loiter**

Loiter type waypoints will display with a ring around them to show their radius.

**Spline**

Spline waypoints will display with a splined path on the map. This is indicative of the path that will be followed by the vehicle; however, it is NOT the exact path that will be flown as this is dependant on many external factors.

**Rally Points**

Rally points a special waypoints that define additional Home locations for use during Return to Launch mode. When RTL is triggered, the vehicle will go to the closest Rally Point. Rally Points are Purple.

**WP From Waypoint**

WP from Waypoint creates a waypoint in a bearing and distance from an existing waypoint (Reference Waypoint). It then defines a heading to turn to (with 0 = pointing at Reference Waypoint), and a delay time to pause while at the waypoint.

## Fly To

To enable automatic fly to a desired point:

1. Tap and hold on the map where you wish to fly to just as if you were adding a waypoint.
2. Select the first option of Go to Point.
3. Enter the desired height (Default is the current height) and tap Go.
4. Your drone will then fly to the desired point. Be careful! It will not first climb to the desired height first and may fly at an angle!
5. When the point is reached, your drone will transition back to Loiter mode. If for some reason it doesn't, just manually change modes.

Grid (Survey)
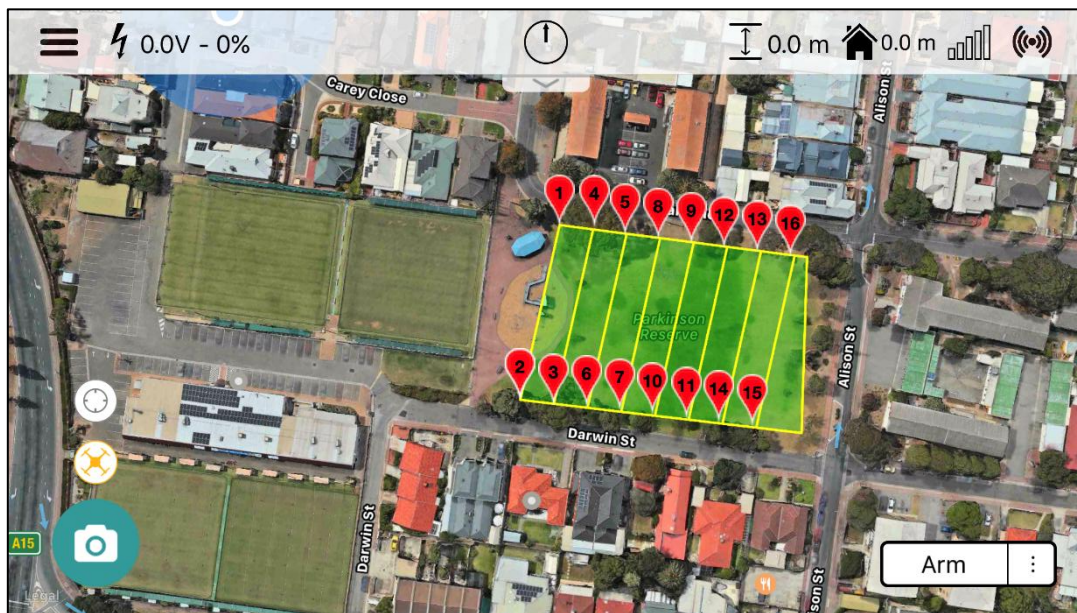


Grid mode is a easy way to setup a grid of waypoints for your drone to follow automatically.

To create a grid:

1. Tap and hold on the map where you wish to place your first point, just as if you were adding a waypoint.
2. Select the last option, Grid.
3. Select your desired distance between grid lines and tap Create
4. Place your next 3 points to create a polygon. Your drone will begin the survey from the first point to the last point, moving towards the second and third as it goes. If you wish to change any of these points, hold and drag them.
5. Tap Finish. A window will appear with your desired distance between camera triggers. If you do not wish to trigger the camera enter a value of 0. Tap continue.
6. Your grid will be displayed. It is recommended that if you wish to edit any of these points or add anything afterwards to disconnect and reconnect to the drone, this reloads them as regular waypoints.
7. To fly tap auto on the mode menu and tap auto on the function button. The drone will the fly the grid.

## GeoFence

It is easy to make GeoFence inclusion or exclusion zones in SidePilot by using the GeoFence tool on the main screen.
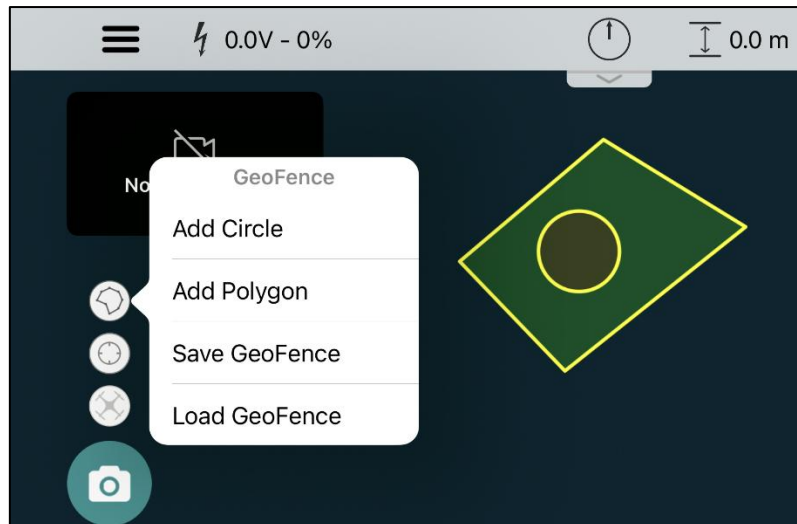
**Add Circle:**

Tap on the map to add a circle GeoFence. Use the red handle to drag the centre of the circle, or the outer radius to make it bigger/smaller. When done, tap Finish and set the circle as either an inclusion zone (Drone is allowed in the area), or exclusion zone (drone is NOT allowed in the area).

**Add Polygon:**

Tap on the map to add polygon points. You can also move points by tap and holding on them and then dragging. When done, tap Finish and set the polygon as either an inclusion zone (Drone is allowed in the area), or exclusion zone (drone is NOT allowed in the area).

**Save/Load GeoFence:**

As described, lets you save or load a GeoFence configuration for later use, or export it to another device. GeoFence files (.fen) may also be imported into SidePilot by using the system share tool and opening it with SidePilot.

**Maximum Distance Parameter GeoFence:**

If the FENCE_TYPE parameter is set to enable a cylindrical fence with a maximum FENCE_RADIUS, SidePilot will mark the map outside of this radius with either red or yellow, depending on if the FENCE_ACTION is just a warning (yellow), or a more serious action (red). A red ring will appear at a distance of FENCE_MARGIN from the edge of the circle to indicate the allowed flight area.

# Menu

## Messages

The messages view contains application and drone information, things such as autopilot errors, waypoint notifications, mode changes etc. When debug mode is enabled, it will also display verbose information on what SidePilot is doing. Swipe right on a message to see its applicable time. Tap and hold to copy a message to the clipboard.

This can be incredibly useful to keep an eye on how things are going. To clear the messages from the screen just tap the clear button!

The 'Share' button allows you to share either the latest application log (.sidepilot) file, or browse all of the available application log files, as well as telemetry log (.tlog) files.

These can also be found in the Files app in the SidePilot app folder. The debug-logs folder contains the application logs, and the tlog folder is the telemetry logs.

## Pre-Flight Checklist

The Pre-Flight Checklist view allows you to customise what you require before your flights!



By alerting you before arming if not completed, this checklist enables both hobby and commercial pilots to safely perform their flights to regulation.

The top of the view displays the current weather information pulled from the Apple WeatherKit API and displays it for the user. The current temperature, Wind speed and direction (relative to your devices direction! Just turn your phone and the arrow will always point in the direction the wind is blowing!) and if there is a chance of rain or snow, it will also display this.

If there are major weather alerts, these will pop up ensuring you have the best information possible.

Below the weather is the Pre-Flight Checklist. Each item can be tapped to be checked and unchecked. To customise this list, tap the edit button. Items can be added, deleted and rearranged as you like.

# Parameters
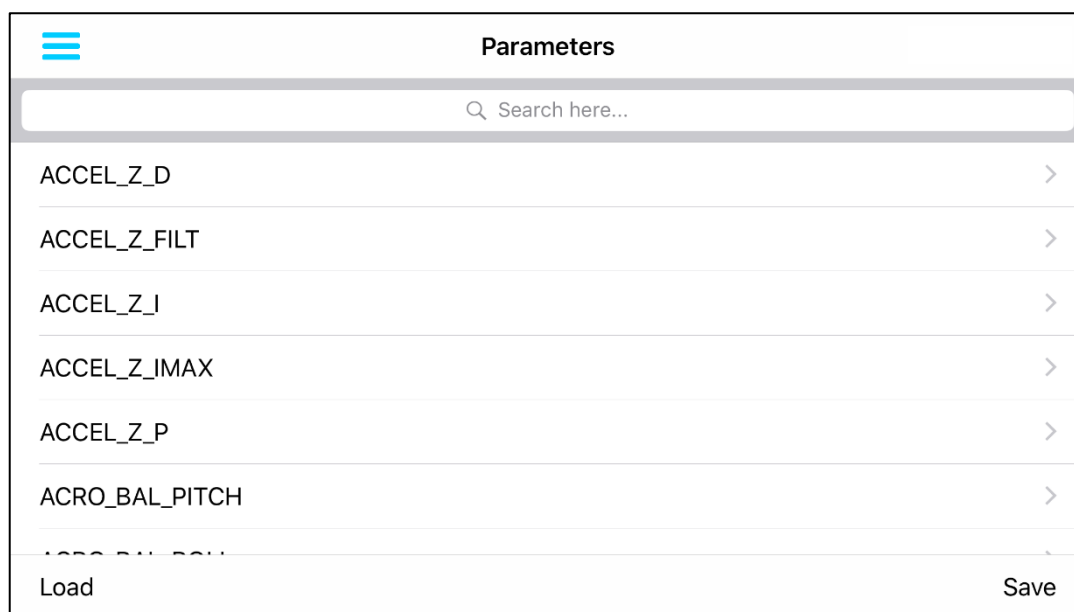


## Load Parameters from Drone

Pull to refresh the parameters, and all the vehicle parameters will be downloaded and displayed. To search for a parameter, pull down on the list and a search box will appear. This may take a long time over Bluetooth.

Tap on a parameter to edit it.

## Save

To save the current set of parameters, tap the 'Save to file' button on the lower right of the screen. Enter a name to remember the set by and tap save. These will be saved to your device.

## Load Saved

To load a saved parameter set, tap the 'Load from file' button on the lower left of the screen. You will then be presented with a list of parameter sets that are saved to your device. Tap the one you wish to load and then wait for all parameters to be transferred to the drone. This may take a few minutes.

You can also import .param files by sharing them with the SidePilot application using the iOS share sheet.

**Export**

You can export all of the saved parameter sets where you can then edit using a text editor/mission planner on PC, or import to SidePilot running on another device.

# Mission

| ☰ | **Waypoints** | Edit |
|---|---|---|
| Home Position - Will be set on arm | | |
| 1 - Normal, Alt:10 m, Delay:0.0s | | › |
| 2 - Camera Trigger for 50 m | | › |
| 3 - Normal, Alt:10 m, Delay:0.0s | | › |
| 4 - Camera stop Triggering | | › |
| 5 - Normal, Alt:10 m, Delay:0.0s | | › |
| 6 - Camera Trigger for 50 m | | › |
| Load | | Save |

In the mission menu, you can save and load waypoint missions, as well as see the order of the current waypoints. Pull to refresh the waypoint list.

## Edit

Tap the edit button to delete or reorder any waypoints that are currently loaded onto the drone.

## Go To (if in auto mode)

If the drone is in auto (mission) mode, you can tap on a waypoint in this menu to skip directly to it in the mission.

## Modify

To modify a waypoint, tap on it. This page also allows for direct coordinate entry, and the icon in the top right of the screen can be used to move the location of the waypoint on the map.

## Save

Tap this button to save the current waypoint set. Simply give the set a memorable name (Date, location etc.) and tap save. It will store the waypoint set in the devices memory. If creating waypoints offline, make sure you save them before connecting to the drone otherwise they will be overwritten. Rally Points are defined separately to waypoints, so if they exist, a prompt to select which to save will appear.

## Load

Tap this button to load any previously saved waypoint or rally sets. When you load a set, it will override the entire current one, so make sure to save it if needed. To delete any saved waypoint sets, tap the edit button on this screen and delete.

### Select for Export

Allows you to select which saved waypoint sets you would like to export, and then allows you to email them. These exported files are compatible with Mission Planner for editing/viewing.

**Import**

To import a waypoint set, send to your device via email or similar, then tap the share button on the attachment (Must be a .waypoints or .ral/.rally file). These files can be created using Mission Planner. SidePilot will show up as an option. Once tapped, it will add the waypoint set to the saved sets. If a set exists with the same name, it will be renamed with the current date and time.

# Logging

| ≡ | Logging | Save |
|---|---------|------|

| Date: | 01/01/2016 | Time: | 17:55 |
|-------|-----------|-------|-------|

Model Name: Quadcopter

Description:

Flight Time: 00:10:32

This is an example of how to log. Here you would write a quick description of the flight, such as batterys used, any incidents or issues and how you feel it went.

Weather: Raining

01/01/2016 @17:55 - Model: Quadcopter

## Flight Logs

Flight logs are a simple way to keep a historical record of your flights. It enables you to enter details on your flight such as the date, time, which drone you were flying, the total flight time (Automatically updates with the current life time that your drone has been turned on), the weather and a simple description of the flight.

Once you are done with writing your log, tap the save button and it will be added to the list of logs. To edit or view an old log, just tap on it!

If you wish to send logs to yourself or a friend, tap the export button on the bottom right, this will open an email view and you can email it off! If you received an email containing logs, you can either view it on excel on the computer, or if on another iOS device, you can import it to the SidePilot app. Perfect for if you have multiple devices!

# Vehicle Setup
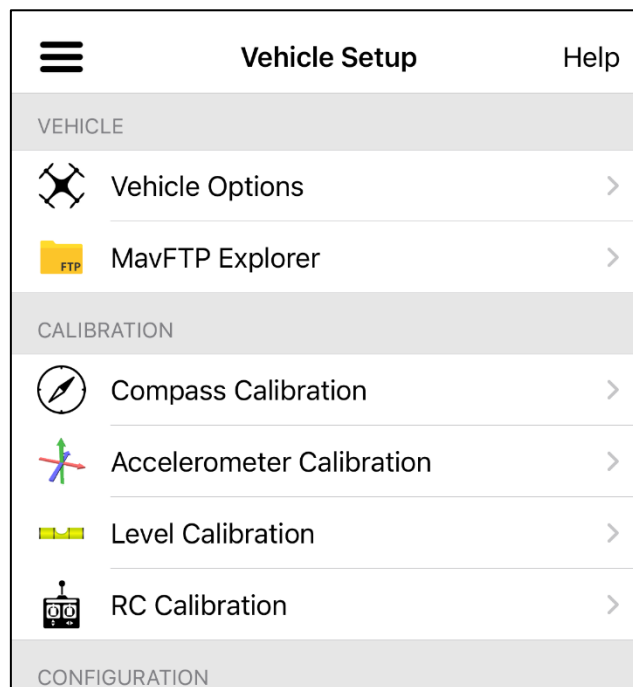


## Vehicle Options
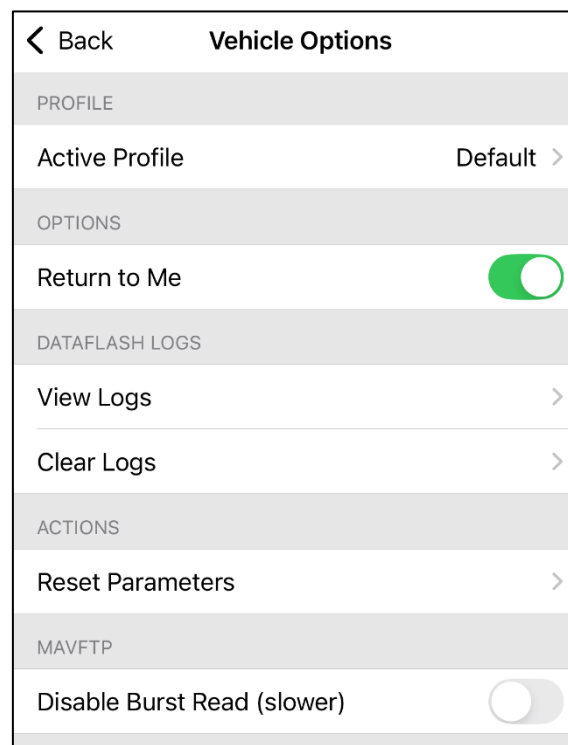


### Profile

Displays the active vehicle profile. Tap on this to rename the profile, change profiles or export the profile.

Profiles are stored as '.vehicle' (JSON) files in the SidePilot -> Profiles folder on the device.

A Vehicle Profile contains vehicle specific settings, allowing for easy transfer to other devices, or setup of multiple vehicles. Settings such as:

- Vehicle Setup options (return to me, default mission altitude, altitude reference)
- Video settings (type, url, aspect ratio, etc)
- Vehicle MAVLink options (target ID's, telemetry rates, protocol)
- Network settings (connection type, IP address and Port, forwarding options, etc).

**Return to Me**

When Return to Me is enabled and the drone is armed, the vehicles home location is constantly set to the users device location. The home location is updated whenever the users location changes more than 10 meters.

**View Logs**

Shows the dataflash logs saved in the vehicle. From here you can download them to your device. Data flash logs contain important flight information recorded by the autopilot. If supported, you can also do this via the MavFTP explorer.

**Clear Logs**

Clears all dataflash logs from the vehicle.

**Reset Parameters**

Resets the vehicles parameters to the default settings by setting the FORMAT_VERSION parameter to 0.

**MavFTP Disable Burst Read**

This option disables the use of MavFTP burst read mode. Only enable this if you are having issues with MavFTP reading files.

## MavFTP Explorer

Allows the rapid transfer of files to and from the autopilot file system via a familiar FTP based interface. Files such as dataflash logs, LUA scripts and more can be easily uploaded and downloaded from the autopilot.

## Compass Calibration

Tap the 'Compass Calibration' button to begin the calibration. If your drone has a buzzer attached, you should hear it 'chirping' during the calibration. Pick up the drone and begin rotating it on all axis.

Continue rotating until the red bar fills up completely then the drone will automatically reboot. This means that the calibration has been successful. You will also get an alert on your device.

## Accelerometer Calibration

When calibrating the accelerometer, instructions will be provided on screen. You will need to place your drone in the orientations the picture depicts as instructed and follow the prompts.

## Level Calibration

To calibrate level, ensure you drone is on a level surface and tap 'Level Calibration'. This will define the new level angle for your drone. Tap 'Continue' on the popped-up view. If this does not disappear after a second, try the Accelerometer Calibration.

## RC Calibration

This view enables you to calibrate your RC transmitter endpoints. It will only save the values that are changed, so if you notice your yaw stick is not doing anything after a certain point, you can calibrate just the yaw stick and not have to worry about the others.

## Airspeed Calibration (Only applicable to ArduPlane)

This calibrates the airspeed sensor of the drone if installed. Follow the instructions at this link, where this option replaces the 'Preflight Calibration' option of mission planner

## Waypoint Mission Options

This menu has settings that control how the vehicle behaves during waypoint (auto) missions.

**Altitude Frame**

Sets the default altitude reference frame to either AMSL (Above Mean Sea Level) or AGL (Above Ground Level). This controls your reference point when entering altitude values or displaying them.

**Default Altitude**

This sets the default altitude that is presented when creating a mission waypoint.

**Horizontal Speed Target**

This sets the WPNAV_SPEED parameter which defines the horizontal speed that the vehicle will attempt to maintain during a mission.

**Radius**

This sets the WPNAV_RADIUS parameter, which defines how close to a waypoint the vehicle must be for it to consider it as complete.

**Additional Paramters**

Other relevant mission/waypoint parameters are shown here, such as climb and acceleration targets.

**Clear All Waypoints**

Removes all waypoints from the vehicle. Does not delete waypoints saved to your device.

## GeoFence Setup

This menu has options specific to geofences.

**Breach Action**

Set the desired action when a geofence is breached.

**Maximum Radius**

Set the geofence radius from the home point.

**Maximum Altitude**

Set the geofence maximum altitude allowed above the home point.

**Fence Margin**

Sets a margin from the horizontal geofence boundary that is required before a breach occurs.

## Performance Tuning



These settings change certain parameters to tune your drone's performance as desired and are relatively self explanatory.

### Climb Sensitivity

Updates the climb P and I parameters (RATE_CLIMB_P, RATE_CLIMB_I).

### Roll/Pitch Sensitivity

Updates the roll and pitch P and I parameters (RATE_RLL_P, RATE_RLL_I, RATE_PIT_P, RATE_PIT_I).

### RC Roll/Pitch Feel

Updates Attitude control input time parameter to change the response to control inputs (ATC_INPUT_TC).

## Battery Configuration

This menu allows configuration of the ArduPilot battery specific parameters.

### Show Battery Alerts

Enable the display of battery alerts to the user in the app via the notification bar. This is triggered by the autopilot detecting low or critical battery states from the parameters set below.

### Battery Setup

Each battery has its own set of configurable parameters. The Flight Battery (Battery 1) is the default displayed here.

### Battery Monitoring

Set to the type of battery monitoring to perform on the selected battery. Regular voltage and current sensing modules utilise #4: Analog Voltage and Current.

**Other Parameters**

See the description in app for what the other options do.

## RC Flight Modes

(Not applicable to 3DR Solo Users) This screen allows you to change what flight modes can be selected using your radio transmitter.

## OpenDroneID Setup

This section allows you to setup an OpenDroneID module connected to your autopilot.

IMPORTANT: Your module must be enabled first using the ODID_ parameters in the parameters menu.

**Status**

Gives the reported status of the ID module.

**ODID Enabled**

This enables SidePilot to transmit ODID messages to the autopilot. To enable the ODID module itself, please go to the parameters menu and search 'ODID_'.

**Vehicle Type**

Set the RemoteID vehicle type that you have registered. In most cases this will be Copter or Plane.

**Vehicle ID**

Here you set the ID type (assigned by your local authority) and the UAS ID. These are checked against the type set to ensure they meet the criteria.

**Operator ID**

Here you set the ID type (assigned by your local authority) and the Operator ID. These are checked against the type set to ensure they meet the criteria.

**Flight Message**

Sets the broadcast message of the ODID module. This is a free text field limited to 23 characters.

**Advanced**

This menu allows for advanced configuration, such as rates, RemoteID class and swarm modes. Default TX Rate is 0.1 Hz and Location Rate is 1.0Hz as defined by the RemoteID standard.

**RemoteID BLE Scanner**

This allows you to check your module is working correctly by displaying the raw data from an ODID module. It only works with BLE 4.0, so modules that are only transmitting on WiFi or Bluetooth 5 will not appear.

# 3DR Solo Setup (if applicable)

Here you can set your 3DR Solo's settings.



## WiFi Settings

**Wifi SSID:**

Set this to be whatever you want your Solo's WiFi name to show up as. One thing is that it will be prefixed with 'SoloLink_', however this will be done automatically so don't enter it here! This will reboot the IMX in your controller and Solo so they will disconnect for 30 seconds.

**WiFI Password**

Default is 'sololink'.

**WiFi Country**

Select between United States, European Union, Australia & Japan. This sets your TX power to the maximum in that country. Hint: US has the highest which gives the maximum range.

**Solo WiFi Auto-connect**

When enabled, a prompt will appear when opening SidePilot to connect to Solo WiFi. It will only appear after SidePilot has been connected to Solo at least once.

## Configuration

**Units**

Sets the units that the controller will display. Make sure to change this both here and in the App settings.

**Controller Settings**

Here you can calibrate the Solo Controller, and set actions for each button. For the A and B buttons you have 3 different button press 'events' These are Press, Short hold and long hold. For all other buttons, you can only change the events listed. You can also set a GoPro time offset if using a GoPro in the Solo Gimble.

**LED Configuration**

Here you can set the color and properties of the LED's of your 3DR Solo. There are a few premade color themes which you can try out, or create your own by tapping the color next to the arm you wish to change in the Solo diagram. You have many options here such as:

**Color:**

- You can set the color from the color wheel and slider on the left side.

**Pattern:**

- Solid
- Strobe
- Double Flash

**Strobe Speed:**

- Slow
- Fast
- Very Fast

**Phase Offset (Alternate):**

- This mode gives a 180° Phase offset of the flashing of this LED compared to normal. This allows you to alternate strobes between arms. (If you don't understand just try it!)

As soon as you tap 'Apply' the correct LED will be set as desired (If connected).

Once you have your desired LED configuration, you can save it using the save button in the top right. You will be asked to give it a name. If you choose a name that is already taken (Unless it's a stock layout), the new one will overwrite the old one.

If you want this LED layout to appear everytime you use the Solo, enable the 'Always Enabled' switch. Now each time you connect to the Solo using SidePilot, it will change the LED's over to the desired layout.

NOTE: If using Auto or Guided modes, your LED's will not change to flashing, this is normal and expected.

NOTE: To get back the stock layout, you just need to restart Solo.
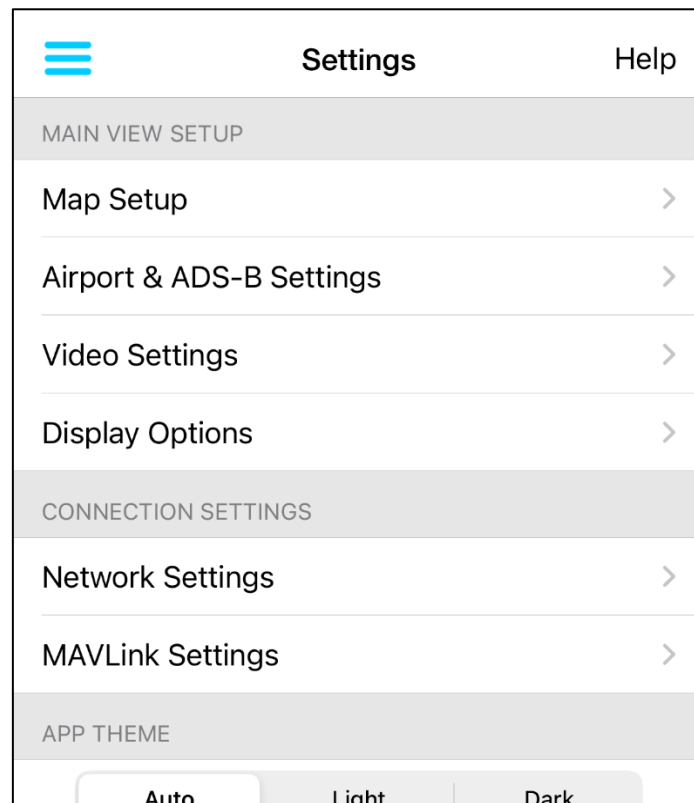
**GoPro Options**

This allows you to change which MAVLink component ID SidePilot associates with a GoPro. The default is 154 and shouldn't be changed unless you know what you are doing.
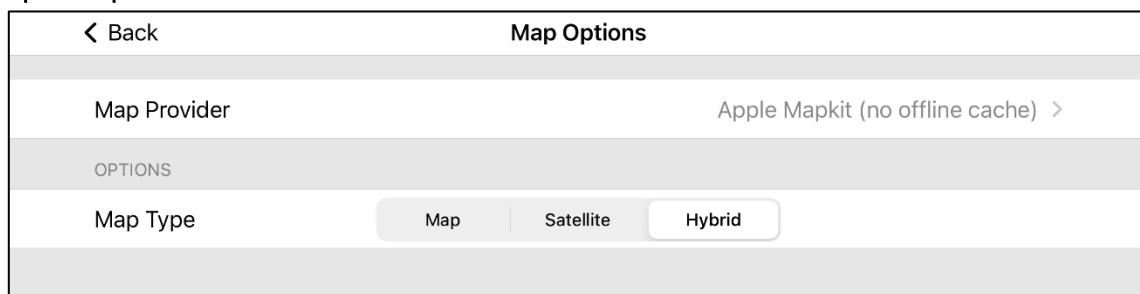
## 3DR Firmware

**Link to 3DR Solo Firmware Update Instructions**

# App Settings

The Settings menu gives you fine control over SidePilot and its interface.



## Map Setup



This menu gives you options on how the map is displayed on the main screen.

**Map Provider**

Allows you to select the map tile provider.

Some map providers allow for offline map caching, by selecting the 'Download Offline Area' button, moving to the area you wish to download and selecting 'Done' to save. This removes the need for an internet connection when operating your drone.

Custom map tile servers can be used, with instructions on how to set this up here.

**Airports**

Airport information is provided by OurAirports.com and are separated into five categories dependant on their classification; Large, Medium, Small, Heliport and Other.

You can control specific settings for each of the types of airport.

**Enable** – This enables or disables the showing of this type of airport on the map

**Circle Scheduled** – This enables or disables showing a 5km (3nm) circle around the airport. Scheduled means that this airport has regular flights scheduled.

**Circle Unscheduled** – This enables or disables showing a 5km (3nm) circle around the airport. Unscheduled means that this airport has NO regular flights scheduled.

## ADS-B Settings

ADS-B data is provided either by using a serial MAVLink ADS-B receiver such as the uAvionix PingRX or from the internet using one of the available providers.
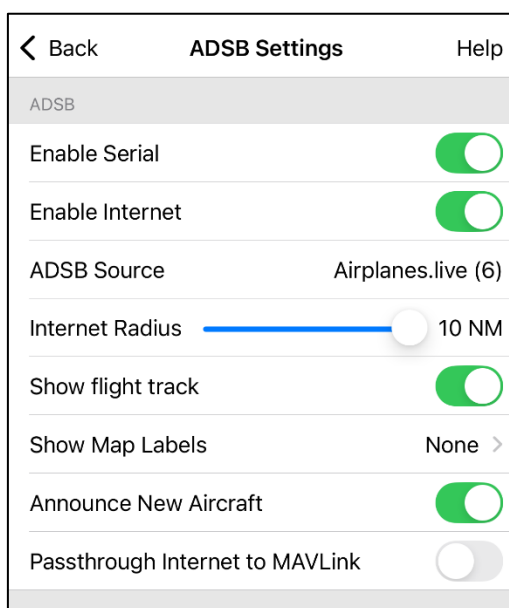


**Enable Serial**

This enables the use of a serial ADS-B device like the PingRX

More information on uAvionix PingRX can be found here: https://www.uavionix.com/products/pingrx/

and Arducopter installation instructions here:

http://ardupilot.org/copter/docs/common-ads-b-receiver.html

**Enable Internet**

This enables the use of internet based ADS-B providers.

**ADSB Source**

Select which internet ADSB source you wish to use. Automatic mode will query all ADSB sources, and select the one that returns the highest number of aircraft. It will re-query all sources every minute to ensure it is always using the one with the most aircraft. You can also manually select the source by selecting it from the list.

The source list is refreshed on each app launch, with the current list of providers being:

- Airplanes.live
- ADSBEchance.com
- Adsb.fi
- Adsb.lol

NOTE: Each of these providers run off an enthusiast community to provide the world with ADSB data from aircraft. This is only possible by people who setup receiver stations which can receive ADSB data from aircraft and 'feed' it back to the community. Anyone can setup a feeder station, more details can be found on the website of each respective provider.

**Internet Radius**

This sets the radius that the internet API will search for aircraft, to a maximum of 20 nautical miles.

**Show On Ground**

Show aircraft that are on the ground.

**Show Flight Track**

This shows a line of where each aircraft has flown since you began tracking it. It is colour coded for different altitudes.

**Show Map Labels**

Select from different parameters to show them alongside the aircraft icon on the map at all times. Current parameters available for selection are;

- Callsign
- Altitude
- Aircraft Type
- Speed
- Flight Number (if available)
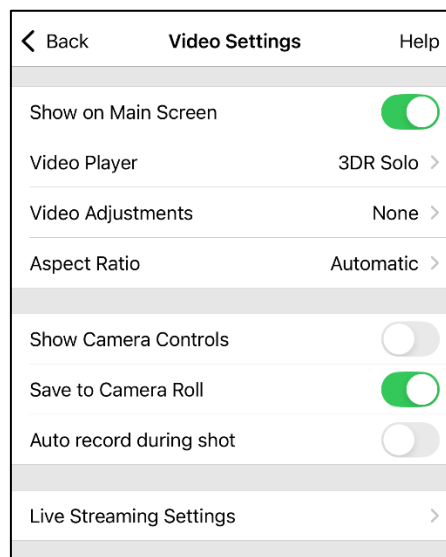- Photo (if available from hexdb.io)

**Announce new Aircraft**

This enables the device to 'speak' when it detects a new aircraft.

**Passthrough Internet to MAVLink**

Sends Internet based ADSB data to the drone, allowing the drone to detect and avoid aircraft without having an ADSB receiver installed.

## Video Settings



This menu allows you to set video settings for the main screen

**Show on Main Screen:**

This will enable the video to be viewed on the main screen when the device is in landscape mode.

**Video Player**

You can select between RTP (3DR Solo), Universal (GStreamer) or HDMI (iPad Only).

- RTP (3DR Solo) displays RTP video feed from the entered port. This is tailored to the 3DR Solo video feed, so may not work as expected for other RTP sources.
- Universal uses GStreamer to display a video feed from nearly any source, including RTSP streams.
- HDMI is only supported on iPad, and can use a HDMI to USB-C capture cable to display video from a HDMI source.

**Stream URI (Universal player):**

Set the URI of the video feed. This is the URI that you would feed into GStreamer on your PC/MissionPlanner. If using basic RTSP, you can just enter the RTSP://IP:PORT/ENDPOINT and it will automatically add the required GStreamer components.

Otherwise if using a full GStremer URI, ensure it ends with '! videoconvert ! video/x-raw,format=BGRA ! appsink name=outsink' for SidePilot to display the video.

For example to display an RTSP stream from a stream IP of 192.168.144.25 on port 8554, you could enter: 'rtspsrc location=rtsp://192.168.144.25:8554/stream latency=0 ! rtph264depay ! avdec_h264 ! videoconvert ! video/x-raw,format=BGRA ! appsink name=outsink'.

**Video Adjustments:**

You can apply adjustments to the video feed, based on the orientation of your camera. The available options are Flip, Mirror or Flip + Mirror.

**Aspect Ratio:**

Set the aspect ratio of the video feed. Affects the aspect of the video displayed on the main screen.

**Show Camera Controls:**

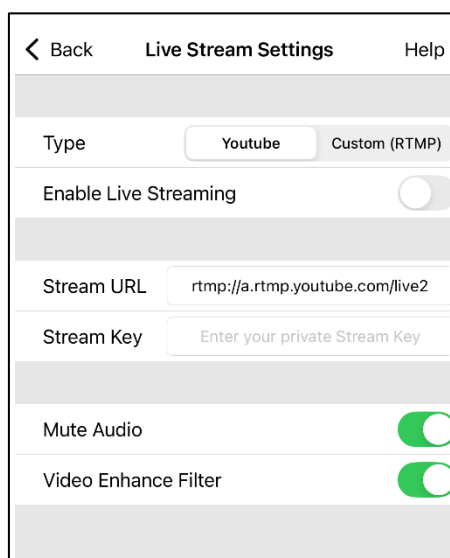Show or hide the camera shutter and mode buttons on the video feed.

**Save to Camera Roll:**

Enables saving video to the camera roll. Note: This is only saving the video feed, it will be lower quality than what will be on the device itself.

**Automatically record video during shots:**

This option enables the device to automatically trigger the camera to begin recording (If using supported firmware and camera) when a shot is started.

## Live Streaming Settings



NOTE: Live video may be very intensive on your device. If you notice lag or slow performance it is recommended to close all current applications. Some older devices will run slower than newer devices.

**YouTube:**

To use YouTube live streaming, you must first go to your YouTube dashboard in safari (https://www.youtube.com/live_dashboard). On this page, you can set the title, description and other settings before going live. You will also get the Stream URL and Stream Key from this page.

Options include:

- Stream URL:
    o Set the streams URL

- Stream Key:
  - Set the streams key (from YT dashboard)

**Setup**

To begin live streaming video to YouTube, enter the Stream URL and Stream Key into the Live Stream settings in the Video Settings menu. These can be found on your YouTube dashboard.

**RTMP:**

RTMP is used for streaming to custom services that support RTMP streams.

Options Include:

- Stream URL:
  - Sets the streams URL, depending on the streaming server, this may include the stream key in the URL.

**Setup**

RTMP livestreaming is similar to the YouTube setup, but just with a URL instead (If you have a stream key as well, you can either use the YouTube setting or append the key to the end of the URL with a '/'). Enter the Stream URL in the Live Stream settings in the Video Settings menu.

Then navigate back to the main screen, while live streaming is enabled, the recording button will be blue.

To begin the live stream, tap the record button. This will start the stream and send a camera trigger command as well.

If swapping batteries, be sure to not tap the disconnect button. Once your vehicle turns back on and reconnects to the controller, the live stream will continue and SidePilot will reconnect automatically.

NOTE: It is recommended to test this before use!

**Mute Audio:**

Mute all audio of the stream. If disabled, audio comes from your iOS devices microphone, not your drone so be careful! This feature can be turned on/off during the stream.

**Video Enhance Filter:**

Applies automatic filtering to the video stream. You will not see the effect directly on your device. This enhances the viewers experience as they won't just get the raw video feed. In some cases, it may be unsuitable so make sure to check the stream if possible.

Enhancements are made automatically to:

- Saturation
- Contrast
- Highlights & Shadows

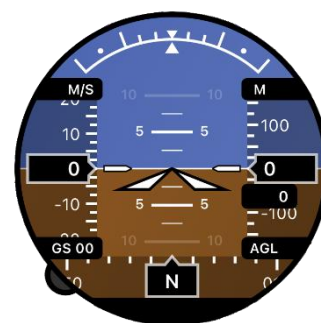This feature can be turned on/off during the stream.

## Display Options



**Display**

### Attitude Indicator

Set the displayed attitude/PFD indicator. Select between:

- Basic PFD (displays roll, pitch, yaw and vertical rate)
- Advanced PFD (mimics a real aircraft primary flight display).



*Advanced PFD*

### Show GeoFence Controls

Displays the GeoFence button on the right side of the main screen. This lets you setup GeoFence inclusion and exclusion zones, similarly to setting up a waypoint mission.

### Show Historic GPS Track

The SidePilot map will display a historic track of where the drone has been for the past 1 minute.

**Behaviour**

### Display notifications on bottom bar

This controls whether or not the orange notification bar appears on the main screen when SidePilot receives a 'EMERGENCY', 'CRITICAL' or 'ALERT' status message from the drone. Not recommended to turn off.

### Pre-flight checklist warning on Arm

This setting toggles whether SidePilot will display a warning when attempting to arm your drone when the Pre-Flight Checklist is not complete.

## Network Settings



This menu defines the network connection used to communicate with your drone.

**UDP**

Enter in the port that the autopilot MAVLink feed is broadcasting on.

If using a device that requires SidePilot to send first, enable the 'UDP Forced IP' option and enter in the devices IP Address. This is similar to the MissionPlanner UDPCI connection option.

**TCP**

Enter in the IP Address and Port of the autopilot.

**3DR Solo**

Sets all settings to be compatible with the 3DR Solo.

**Bluetooth**

This setting enabled you to connect to a Bluetooth device that is sending MAVLink such as a HM-10 Serial bridge, TBS Crossfire,  or other Bluetooth enabled telemetry radio.

**BLE Setup**

Searches for Bluetooth devices nearby and presents them in a table. Tap on the device you wish to connect to, and its settings will appear.

You will need to tell SidePilot the correct characteristics that correspond to the TX and RX ports on the device. Do this by tapping on the characteristic (e.g. FFE1) and selecting the UART Function (RX, TX or Combined).

Selecting 'Auto Detect' will attempt to find a characteristic by sending a request to all available characteristics with an identifier tag. It then listens to all characteristics,

and which ever one responds it identifies as the RX characteristic, and the corresponding identifier tag as the TX characteristic.

If using a DIY Generic BLE module such as the HM-10, here's some tips:

- Ensure you have set the correct baud rate of the module. It needs to match both the flight controller's serial rate, and the telemetry modules rate (if using one).
- The Service UUID should be set to "FFE0"
- The TX/RX characteristic UUID should be "FFE1"

If you have any issues setting up Bluetooth, please contact [tom@sidepilot.net](mailto:tom@sidepilot.net) and I'll see what I can do.

**Telemetry Forwarding**

Setup Telemetry Forwarding to enable SidePilot to forward MAVLink packets to another GCS or device over UDP/TCP. This may be useful to send data to a remote server for data logging, a remote GCS for control, or even to control the vehicle remotely using ZeroTier VPN or similar to establish a connection between two devices running SidePilot.

## MAVLink Settings



This contains SidePilot's MAVLink options.

**Protocol**

Defines which MAVLink protocol to use when talking to your drone. This is recommended to be left at auto, where it will detect which protocol the drone is sending through and adjust accordingly.

**My System ID & Component ID**

This defines the system ID and component ID that SidePilot is using. By default a system ID of 254 and Component ID of 190 is recommended for GCS.

**Target System ID & Component ID:**

This is the target system that SidePilot is controlling. This is used for situations where you may have multiple MAVLink devices talking to each other so that SidePilot controls the correct one. The default is a system ID of 1 and Component ID of 0.

**NTRIP RTK Injection**

This section allows you to connect to a NTRIP Caster and send RTCM corrections via MAVLink to an RTK GPS connected to your drone.

A list of publicly available casters can be seen by tapping the 'Load Casters' button. This will show you any of your saved casters, as well as public casters you can load. Some public casters may require a username and/or password.

If your caster uses SSL/TLS secure connection, you must select the 'is TLS' option, otherwise a connection won't be made. To view all Mount Points available on the selected caster, tap 'Find Mount Points'. This will present a list sorted by distance to you.

To check if your caster settings are configured correctly, tap the 'Test Caster' option. This will present a screen showing the live Caster feed, which messages are being sent, the station details, and a list of available constellations and corresponding Satellite ID's.

Once configured correctly, enable the 'Active' option, and SidePilot will connect to the caster and send RTCM corrections to your drone when it is connected.

*NOTE: SidePilot will give you a warning if the caster station is >35km from your drone position, as this is usually too far to produce accurate RTK, and may cause congestion on the radio link.*

**Packet Signing**
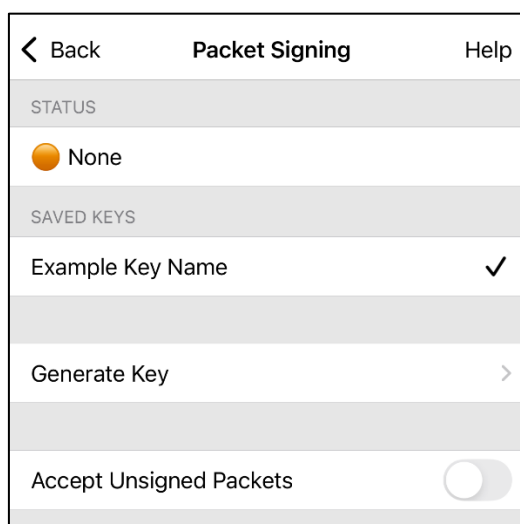


Sign MAVLink packets to ensure the vehicle only accepts packets from a verified source. This does NOT encrypt the data, just merely controls if the autopilot will respond to MAVLink commands or not. SidePilot will only respond to unsigned packets if 'Accept Unsigned Packets' is enabled.

If SidePilot receives signed packets, it will search the saved keys for a valid key. If one is found it will use it. If not, a notification will be displayed.

When packet signing is in action (SidePilot is either receiving signed packets or sending signed packets), the RSSI icon on the main map screen will display a lock icon with the status of the signing:

Signing Active 

Bad Signature 

Other Error 

Missing Key

**Datastream Message Rates**



Modify the standard telemetry rates the SidePilot requests from the autopilot. You can also add custom MAVLink messages here. It is not recommended to change the 'STANDARD' rates as SidePilot uses these for loading information into the application. 0 = Disabled.

**Enable Request DataStreams:**

SidePilot regularly requests different messages to be sent to it, such as location, battery status and many more. This setting can disable this, which is useful when using another primary GCS such as MissionPlanner which also requests datastreams.
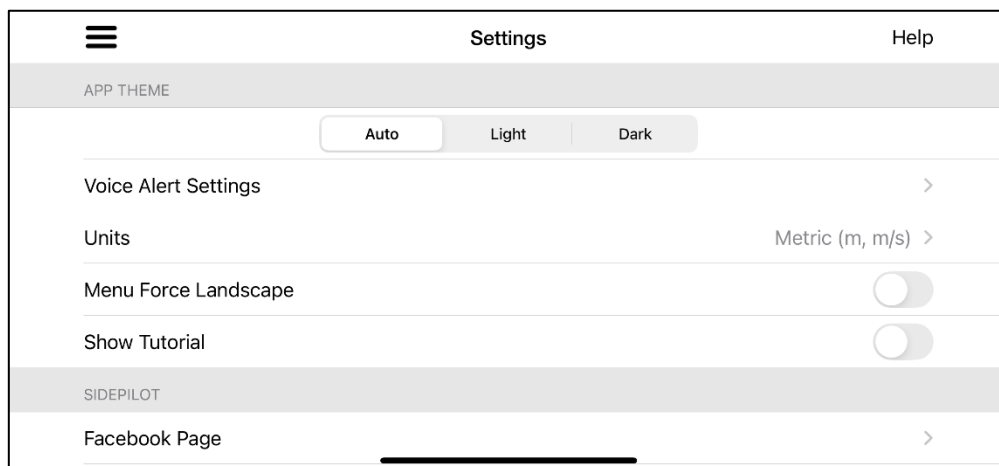
**Enable Command Ack Resend:**

When sending Commands, SidePilot will listen for Command Acknowledgements from the autopilot. If not received, it will resend the command up to 5 times before giving up.

**Raw MAVLink data**

Here you can see the raw MAVLink messages being received by SidePilot.

## App Theme



**Appearance:**

SidePilot has a Light and Dark theme. Auto mode will use the iOS devices mode.

**App Icon:**

Here you can change the SidePilot app icon to match the vehicle you are flying. SidePilot will prompt you to change icons if a vehicle with a different icon is detected.

**Voice Alert Settings:**

These settings let you change the announcement voice. You can enable/disable the voice announcements, change the volume of the voice, as well as change the gender of the voice.

**Units:**

These settings allow you to set the units displayed in the user interface. You can pick from predefined Imperial or Metric, or fine tune specific units as desired.

**Menu Force Landscape:**

Enabled by default, this force the UI to be locked in landscape mode. If disabled, it follows the orientation lock of the device. All but the main screen can be rotated between portrait and landscape.

**Show Tutorial:**

Show the onboarding tutorial on the main screen the next time SidePilot restarts.

# Debug Mode

To enable more comprehensive messaging, you can enable Debug mode by tapping 3 times on the word 'Settings' in the title of the settings menu.

This enables:

- More granular messages to appear in the Messages page.
- FPS and CPU counter is displayed in the bottom right corner of the video feed.
- Debug messages are included in the analytics sent to us, enabling us to view if there are any issues occurring. This can be useful if you have a problem you wish to show us and we cannot replicate the issue.

Debug mode will persist throughout restarts of the app with a warning dialog appearing each time.

# 3DR Solo Firmware Upgrade

To open the firmware upgrade menu, go to '3DR Solo Setup' in the Menu, then scroll to the bottom where there is the '3DR Solo Firmware Upgrade' button. Tap this.



**How to use:**

Tap the desired file to download it to your device. When downloaded a green tick mark will appear to the right of the file.

To upload the package to your Solo, tap it again. A description will pop up and confirm the upload. Please read this to ensure you are uploading the correct package and following the instructions.

To delete a file, swipe in from the right.

**Custom Packages:**

NOTE: ADVANCED USERS ONLY!

If you have a custom package you wish to upload (OpenSolo DIY versions), tap the 'Add Custom URL' button. This must be a link to the file with a .zip extension. If using a Github link, ensure you are using the 'raw' URL. This can be done by changing 'blob' to 'raw' in the URL.

Instructions for how to format the files for a custom package can be found here.

Some useful custom packages such as the BMSOne Li-ion parameters can be found here. Copy the file link and paste into the 'Add Custom URL' section of SidePilot.

It is also possible to upload the unzipped package folder containing the correct format to the SidePilot -> solo-upgrade folder in the Files app.

# Open Solo 4 Installation Instructions

*Note: If you are doing a brand new green cube install, please be sure to start off with the [New Green Cube Instructions]. This warning does not apply to stock solos and existing green cube solos.*

**Please read all the instructions carefully prior to beginning. Skipping steps or doing things out of order will generally result in failure that is difficult to diagnose and repair.**

***These instructions are for SidePilot only. Please ensure your mobile device has the latest version of SidePilot installed via the Apple App Store.***

1. **Download packages:** If you haven't recently downloaded the latest files, you will need to do this first.
   - First open SidePilot and navigate to the *Help & Settings -> 3DR Solo Setup -> 3dr Solo Firmware Update* page. *Note: Your connection type will need to be set to '3DR Solo' for this menu to appear*
   - Download the *Open Solo 4.0.0 Clean Install* packages (solo and controller) by tapping the packages. The installation packages are ~75MB each, so it will take a little longer to download than you may be used to. A green tick will appear next to the package when downloaded.
   - If you have the HERE GPS or retractable landing gear mods, also download those parameter packages.
   - You do *not* need any ArduCopter parameter package or the ArduCopter firmware package for this process.
2. **Connect:** Once you've downloaded both, connect your mobile device to the Solo WiFi and make sure SidePilot says connected to vehicle. Again, your solo and controller must be fully charged, powered on, paired, connected, and not malfunctioning. You may need to press the connect button in SidePilot to force it to connect.
3. **Install Controller Package:** Navigate back to the firmware upgrade menu in SidePilot, tap the *Open Solo 4.0.0 Clean Install (Controller)* package that you previously downloaded.
   - Press install. Press install again when prompted again to confirm. *This is your last chance to change your mind*.
   - Be patient while numerous large files are extracted and scripts execute. Do not push buttons, exit the app, mess with the Solo, etc. Let it do its thing. Until it says it has completed.
   - SidePilot will tell you when the whole process is complete.
   - **DO NOT REBOOT THE CONTROLLER YET!** You must do the install for both the controller and the copter before rebooting anything. Once SidePilot tells you the install is complete, leave the controller and move on to the copter install.

4. **Install Copter Package:** From the firmware upgrade menu in SidePilot, tap the *Open Solo 4.0.0 Clean Install (Copter)* package that you previously downloaded.
   o Press install. Press install again when prompted again to confirm. *This is your last chance to change your mind*.
   o Again, be patient while numerous large files are extracted and scripts execute. Do not push buttons, exit the app, mess with the Solo, etc. Let it do its thing. Until it says it has completed.
   o The solo will click and lights will go disco. At this time, ArduCopter firmware is being pre-installed on the Cube. This step takes about 1 minute and SidePilot will tell you when the whole process is complete.
   o *Stock cube users upgrading from the old firmware:* you will not get any happy tones to indicate firmware loading completed, and the lights will stay disco. This is not a problem, and this is why we're pre-loading the firmware now.
   o Once SidePilot tells you the install is complete**, you must continue to wait a few minutes** to allow the autopilot to install. After approximately 10 minutes, continue to the next step.
5. **Reboot:** Power cycle the Solo and controller once the SidePilot installation packages have both completed successfully. When they power back on, they will automatically begin installation.
   o *Unlike in Open Solo 3, the recovery partition will not be updated to Open Solo 4 during the install process. Updating the recovery partition will be done later very easily. You will likely hear the cube reboot and flash its lights twice (firmware install and parameter reset). You will see the controller reboot and say update success once.
   o It is difficult to know exactly what stage it is at since it can't speak and isn't telepathic. The process takes about 6 minutes on both the solo and the controller. So just wait about 6 minutes.
6. **Pair:** Hit the pair button under the Solo with a small pointy poking apparatus like a paper clip for 2 seconds to get the controller and solo re-paired. When the controller tells you it has detected the solo, hold the A and B button for 3 seconds... which is the second set of vibrations... until the the screen says pairing in progress. If they are not pairing, they may have timed out. Reboot both and try again.
7. **Reconnect mobile device:** You will need to reconnect your mobile device to Solo's WiFi now. This installation process reset the WiFI to defaults. The default password is `sololink`.
8. **Load applicable parameter packages:** If you have a HERE GPS/Compass or a retractable landing gear mod, you will need to install some applicable parameter packages now. If you have none of these modifications, you can skip this step.
   o Tap each package in the SidePilot Firmware Updates menu to install the parameters. You do not need to reboot in between
   o If you have the HERE gps/compass, load the *HERE Compass Parameters* package.
   o If you have the landing gear mod, load the *Landing Gear Parameters* package.
   o You do *not* need to load the ArduCopter parameters or ArduCopter firmware packages!!!
   o Reboot the solo after loading all the applicable parameter packages.

9.  **Verify:** In the SidePilot firmware upgrade menu, you can verify everything installed by looking at the listed version information on the bottom panel.
10. **Update Factory Reset Partition:** In the Solo Firmware Upgrade menu, there is a copter and controller package called *Open Solo Update Factory Reset Partition*. Run each one to update your factory reset (recovery) partitions. This will allow the Solo automatically reset back to a clean Open Solo 4 if you ever do a factory reset. *Note, this does not actually install anything. It just runs a script that updates the recovery partition's file system. There no clicks, beeps, blinks, or bangs. SidePilot will tell you when it is done, and that's it.*

## Installation Complete!

Proceed to the [Post Install Instructions](#).

Any other questions, please ask on the SidePilot
Discord, or send via email to

tom@sidepilot.net