SidePilot

User Manual

App Version 1.21

Contents

Overview

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

It works with 3DR Solo, Arducopter and PX4 platforms via Wi-Fi or BLE.

NOTE: You must have either the BLE Repeater device that accompanies the app, or a Wi-Fi connection to your drone. You can purchase the repeater from here: http://sidepilot.net/store

Features:

- GPS Location of drone
- Set, edit and delete waypoints
- Arm/Disarm
- Display VFR information such as altitude, yaw, pitch and roll.
- Voice alerts for mode changes and other important information
- Edit Parameters
- Perform Pre-Flight checklist
- GPS Status of drone
- Distance from home/device
- Battery voltage display and warnings
- Calibration of battery monitor, accelerometer and radio limits
- Live video feed from drone
- Change and edit flight modes
- View advanced statuses about your drone such as IMU, vibration, RC input and output, etc.
- Download Data flash logs from your drone and export via email to view on PC
- Follow Me - Use your devices GPS to follow you at a set distance
- Solo video support
- Pre-Flight checklist current weather (wind direction, temperature and chance of rain) information and alerts based on your location
- Grid Waypoints - Create a survey grid to fly
- Tap to fly to point - Tap a location and your drone will fly there!
- And many more

Getting Started

Quick-start guide (3DR SOLO):

1. Turn on drone and connect using Wi-Fi
2. Start app and navigate to settings. Select 3DR Solo
3. Navigate to the Video Stream page and select settings. Select 3DR Solo and if you wish to have the video displayed on the main screen, enable that here.
4. Go back to the main screen and press the connect button on the top right. The app will begin displaying information about the drone.
5. If video on main screen has been enabled, rotate your device into landscape mode and the video feed will show. Triple tap this video to enlarge it.
6. For any other issues, please post on the forum at http://sidepilot.net/forum

Quick-start guide (Using the BLE Repeater):

1. Insert radio into BLE Repeater (Purchased from http://sidepilot.net/store)
2. Turn on drone and BLE Repeater
3. Start app and click the connect button on the top right. If the app does not connect to the BLE Repeater, ensure your Bluetooth is turned on, and that the BLE Repeater is enabled under settings/BLE Configuration.
4. The app should begin receiving data from the drone. If it does not, please ensure the radios are connected correctly and that the baud rate is set correctly in the BLE configuration under settings/BLE Configuration.

Quick-start guide (Using a Wi-Fi UDP connection):

7. Turn on drone and connect using Wi-Fi
8. Start app and navigate to settings. Select either Wi-Fi UDP or TCP.
9. Tap on Wi-Fi Settings and input the correct IP address and port that the MAVLink protocol is running over. (Usually listed in settings as the router IP, and a port of 14550)
10. Go back to the main screen and press the connect button on the top right. The app should begin displaying information about the drone. If not, double check your Wi-Fi settings.
11. For any other issues, please post on the forum at http://sidepilot.net/forum

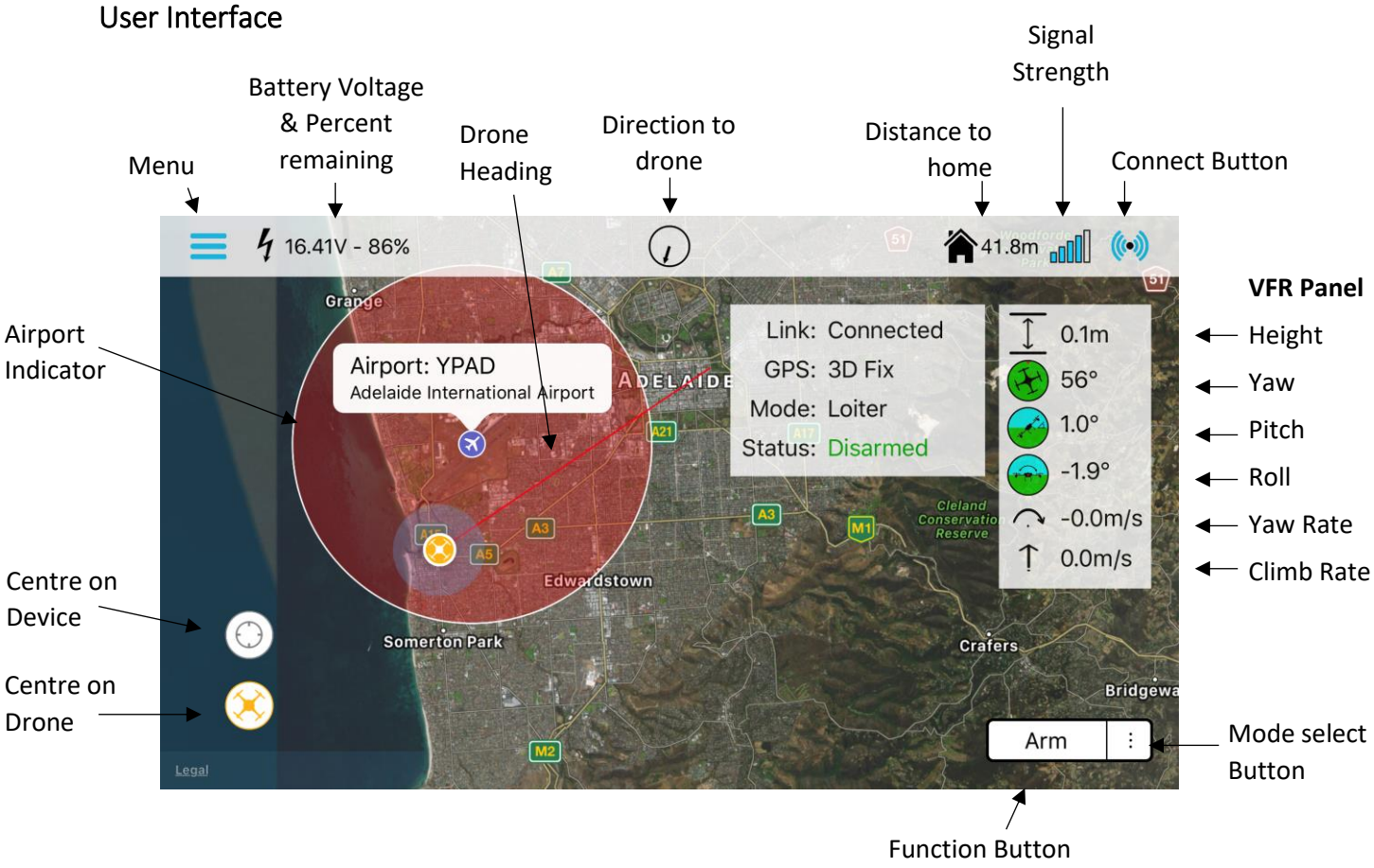
Please post suggestions and bug reports on the forums at http://sidepilot.net/forum

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

Note: All iOS Devices with Bluetooth Low Energy are supported, however 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.

Main Screen

User Interface



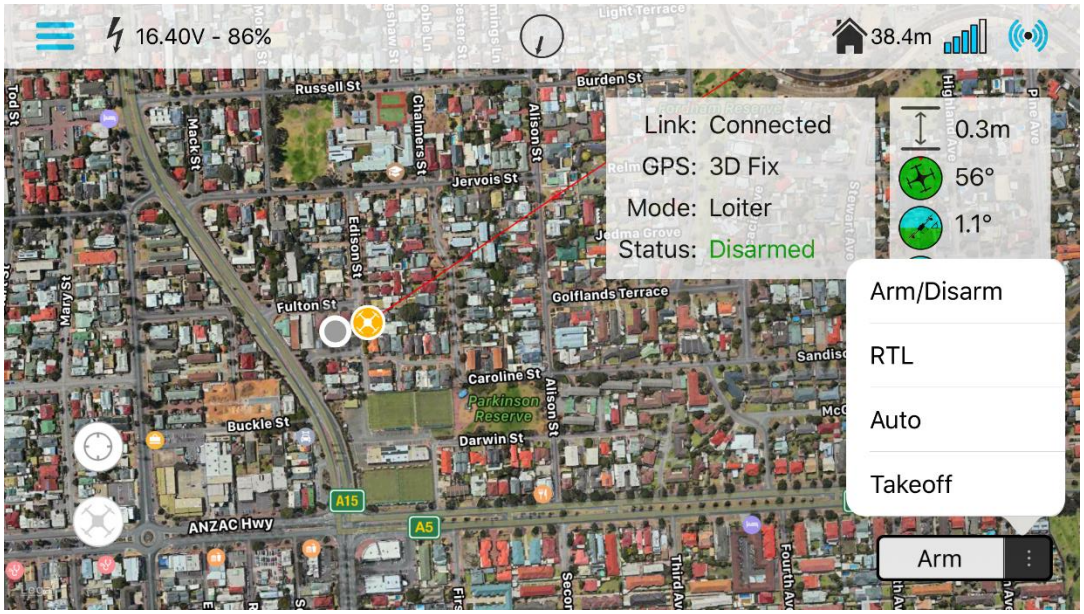
The Menu button will turn blue when connected to your drone and black when disconnected, same with the connection button.

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 Link status change to ‘Connected’ or go green if in portrait mode.

Modes

To select a mode, tap the mode select button and a menu will appear. Then select your desired mode. To perform the function of that mode, tap the function button which will be displaying the



name of the mode.

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. To disable this just delete all the items from the pre-flight checklist.

RTL:

Will perform the Return to Land function of your drone.

Auto:

Will enable auto mode to begin waypoint following.

Take off:

Takes off to a desired height.

Stabilize:

Enabled stabilize mode. This mode has no GPS hold or altitude hold and should be used by advanced operators.

Alt Hold:

Will hold your current altitude.

Loiter:

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

Follow:

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

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.

Orbit:

This mode enables you to orbit around a subject.

When selected, you have two parameters you can edit:

1. Orbit Radius (Between 0 and 100m)

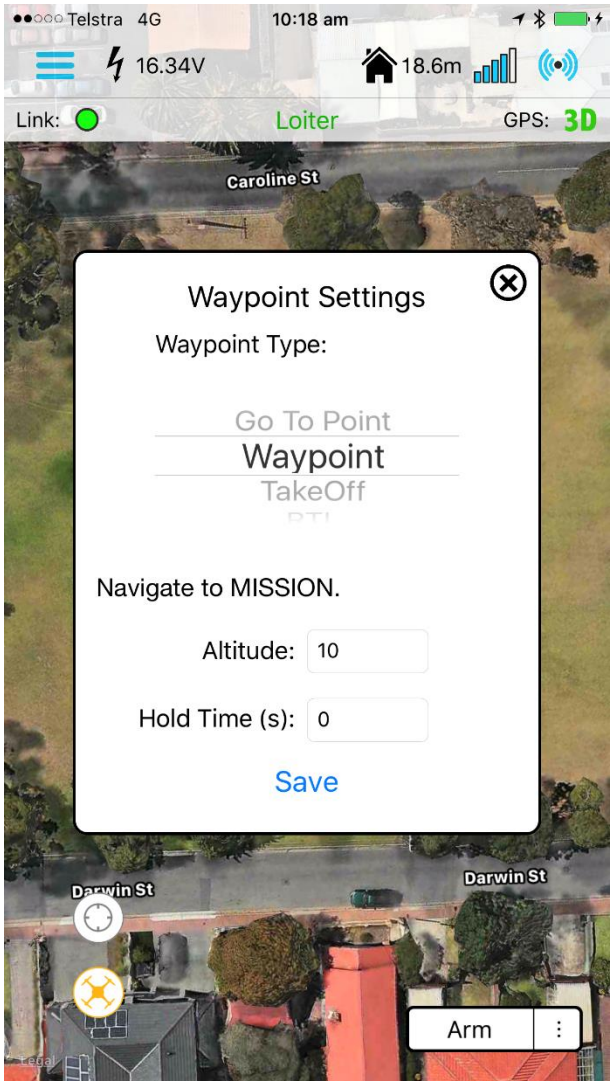
   You can set this to either 0 (Centre position will be where the drone is currently positioned), or to a distance that is extended from the front of the drone. Eg. The drone is 10m from a building that you wish to orbit, point at the building and set the radius to 10.

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 using the pitch stick of the drone (Right stick, forward and back). You can control the Rate by using the on-screen arrows. These increase/decrease the rate by 5deg/s per touch. You can also set the rate to 0 (pausing the drone) by using the pause button.

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. Select save. Your waypoint will be sent to the drone.

To edit a waypoint:

1. Select the waypoint you wish to edit. If it is one of the supported waypoints (Normal, Loiter, Take-off, Land or RTL), 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.

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 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!

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!

Grid (Survey)

Grid mode is a great 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.

Live Video

To be able to view your live video feed, follow the following steps:

1. Navigate to the Video Stream page.
2. Click on settings in the top right corner
3. Choose the stream type. If you are using a RTSP Stream, select HTTP. If you are using a MJPEG or UDP Stream (Such as from a raspberry pi), select MJPEG. If using a 3DR Solo, select 3DR solo.
4. Enter the URL address of the stream. For solo this will be disables.
5. If you wish to show the video on the main screen, enable this option here.
6. When you click save the stream should start straight away. If not, there is something wrong!
7. You can tap the video to pause/play the video stream. (Only MJPED and HTTP streams).

If you wish to view your video stream on the main screen and have enabled this in the settings, it will show up when the device is in landscape mode.

It is possible to switch the video feed and the map by **TRIPLE** tapping the video feed. To return, triple tap the **video** again.

ISSUES: If the video will not work, ensure you can view the feed in an app such as VLC or safari first. If still unable you may have a setting wrong, if you are able, then there is something wrong with the app. Please message me if that is the case.

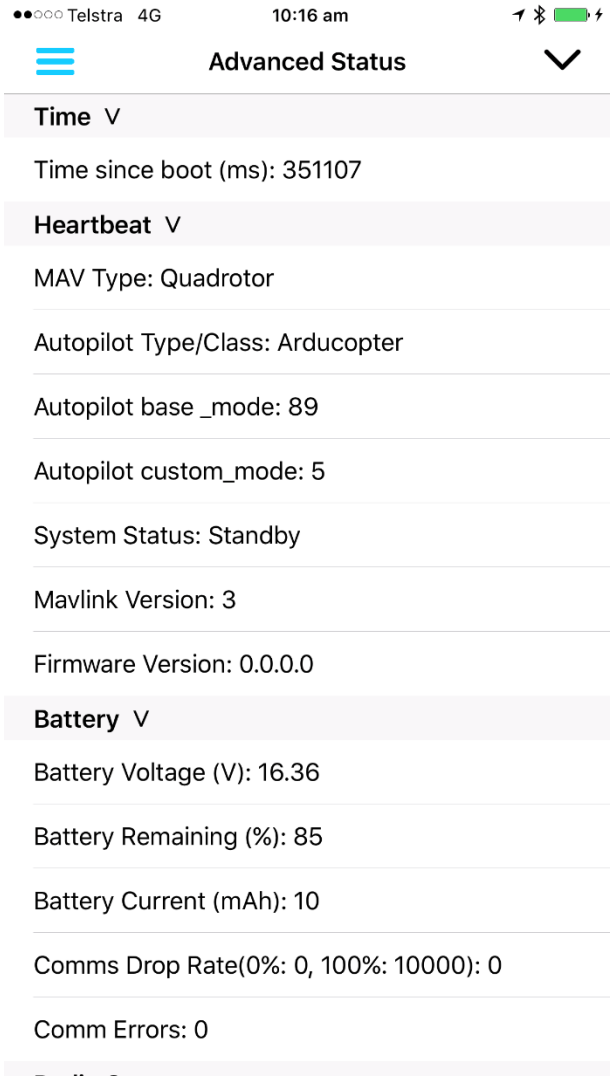
NOTE: Live video may be very intensive on your device. If you notice lag or slow performance it is recommended to disable live video and restart the app.

Messages

The messages view contains all messages sent from the drone to your device, these include things such as autopilot errors, waypoint notifications, mode changes etc.

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!

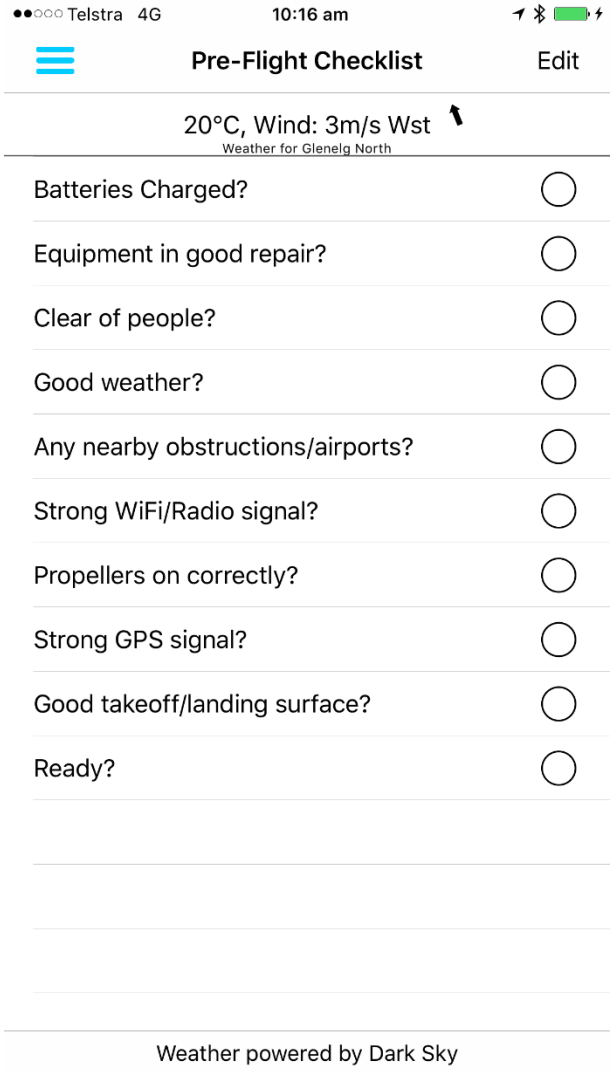
Advanced Status



The advanced statuses view contains a details list of sensor data captured from your drone and updates in real time. Items that can be seen include: Time, Heartbeat, Battery, Radio, Attitude, VFR, GPS, GPS2, Scaled Pressure, Raw IMU, RC Channels, Servo Outputs and Vibration data.

For more information on these please check the Arducopter or PX4 websites.

Pre-Flight Checklist



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

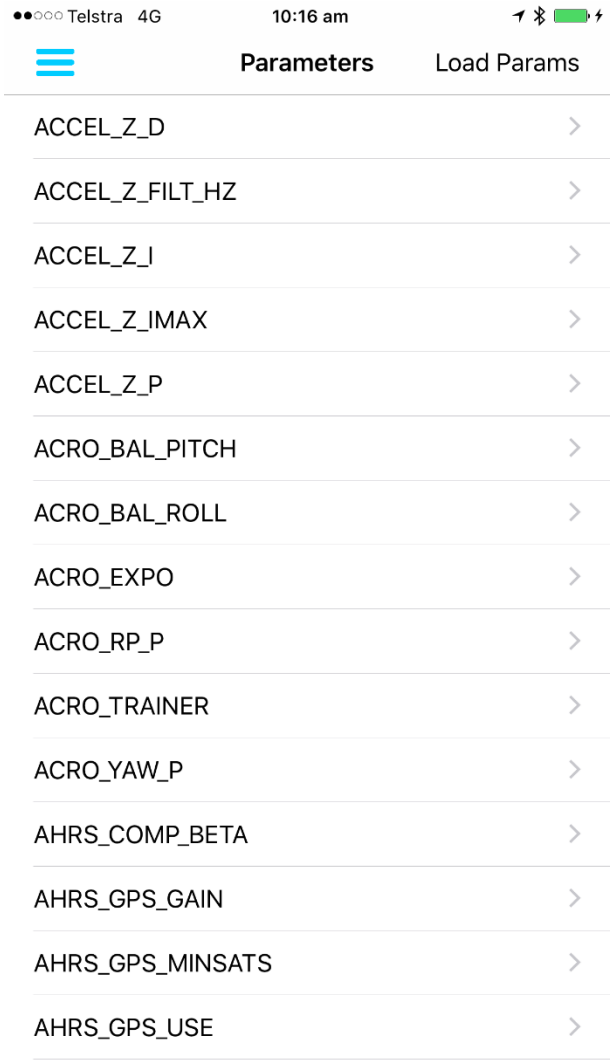
By alerting you before arming if not completed, this checklist enables both hobby and commercial pilots to safely perform their flights to regulation.

The top of the view displays the current weather information pulled from the DarkSky.net database 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 weather alerts, these will pop up and need to be dismissed before the user can continue, 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



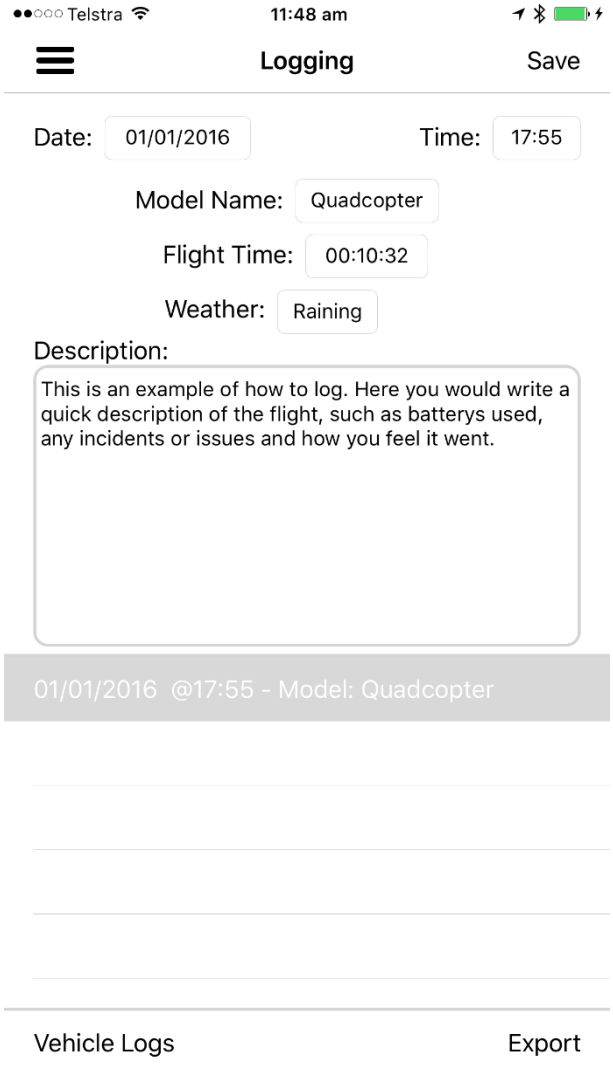
Loading

Simply tap the ‘Load Params’ button, and all the parameters will be downloaded and displayed. To search for a parameter, pull down on the list and a search box will appear

Editing

To change a parameter, tap on it and you will be given a description and a box with the current value in it. Tap the box to change the value and then hit save. This will then be sent back to the drone and enabled.

Logging



Flight Logs

Flight logs are a simple way to keep track 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.

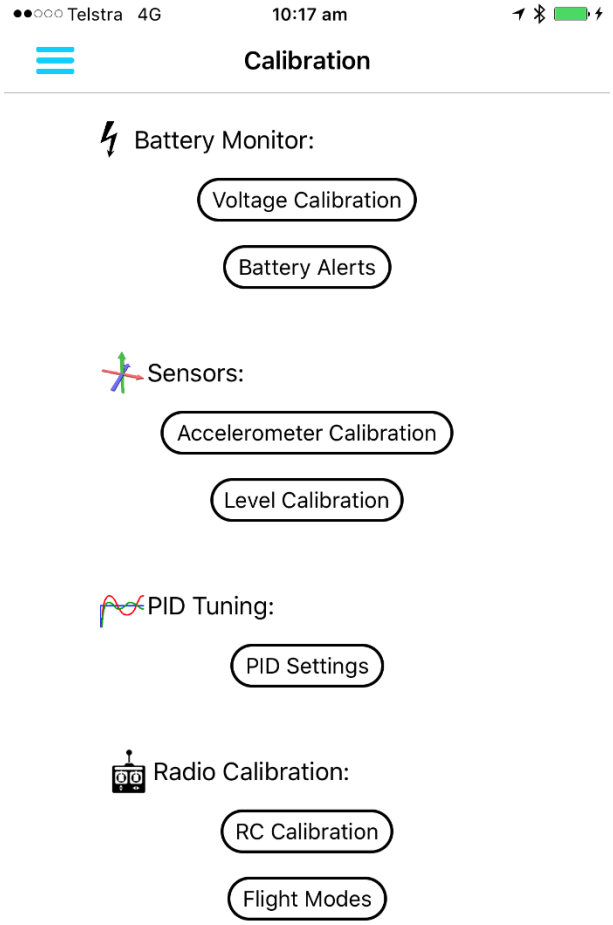
Once you are done with writing your log, tap the save button and it will be added to the list of logs. To edit or view an old log, just tap on it!

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!

Data Flash Logs

Data flash logs contain important flight information recorded by the autopilot. Normally to download these requires a computer. Now by tapping on Vehicle logs, you can download any Data Flash log that is stored on your autopilots memory. This can then be emailed to yourself or friends.

Calibration



Voltage Calibration

Allows you to enter the current voltage of your battery (measured with a Multimeter or another device) and will automatically calculate the voltage multiplier.

Battery Alerts

Battery alerts are banners that will appear on the main screen as well as a voice alert once your battery drops below custom thresholds. There are two levels of alert, Low and Critical. When your battery hits the low threshold, it will twice display a banner for 2 seconds. Once it hits critical threshold, it will be announced until the drone is landed.

Accelerometer Calibration

When calibrating the accelerometer, instructions will be provided on screen.

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.

PID Tuning

PID Tuning defines your drone's performance. Research PID tuning on the Arducopter website for more information. This view displays simple PID controls, for more in-depth directly edit the parameters on the Parameters page.

RC Calibration

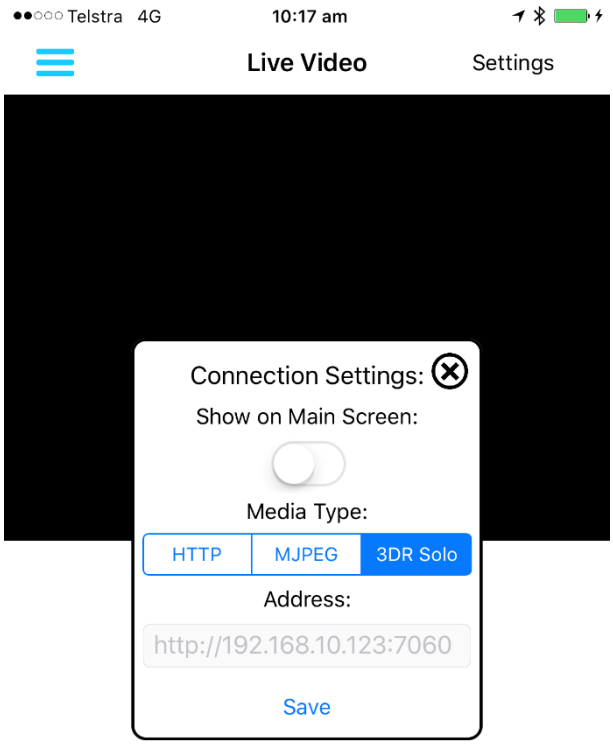
This view enables you to calibrate your RC transmitter endpoints. It will only save the values that are changed, so if you notice your yaw stick is not doing anything after a certain point, you can calibrate just the yaw stick and not have to worry about the others.

Flight Modes

Set the flight modes for your drone. This is used when changing flight modes using a 6-position switch setup.

Video Stream

View



Settings

Show on Main Screen:

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

HTTP:

HTTP video is used for RTSP video streams, including streams that end in .mp4. These are generally files and not used for drones, however the option is there.

MJPEG

MJPEG vide is used when streaming from a device such as raspberry pi using motion.

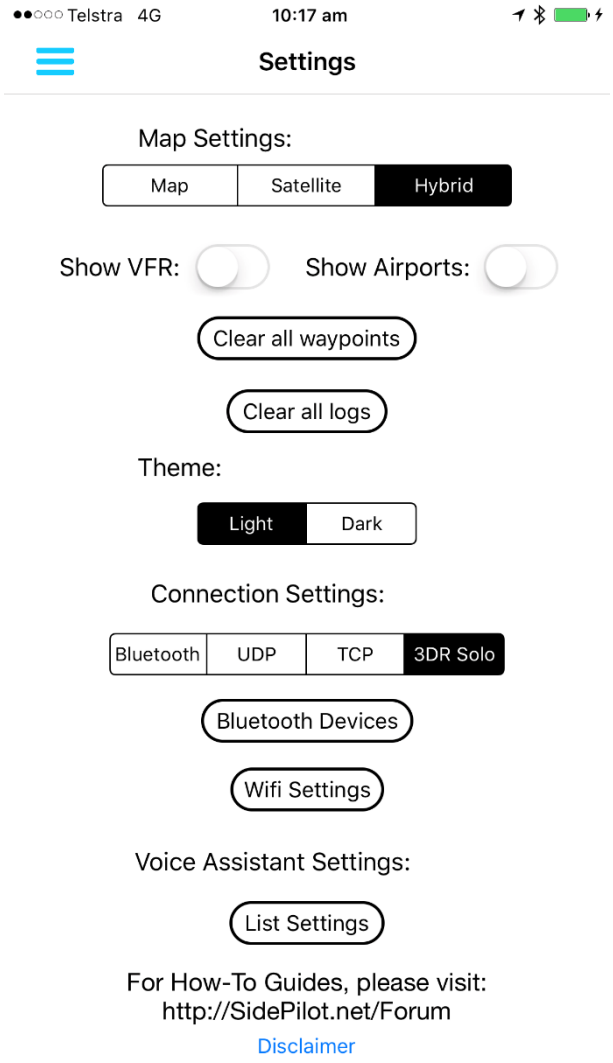
3DR Solo

3DR Solo enables the output of the video stream from a 3DR Solo. It can also be used for any RTP video stream over port 5600.

ISSUES: If the video will not work, ensure you can view the feed in an app such as VLC or safari first. If still unable you may have a setting wrong, if you are able, then there is something wrong with the app. Please message me if that is the case.

NOTE: Live video may be very intensive on your device. If you notice lag or slow performance it is recommended to disable live video and restart the app.

Help & Settings



Map Settings

Change between Apples default maps. Map is a regular vector map, Satellite is simple satellite imagery, and Hybrid (Default) is a combination of both.

VFR & Airports

Show VFR enables you to toggle the VFR view on the main screen on or off. This frees up the screen when not needed or on iPhone.

Show Airports enabled you to toggle showing the airport icons and radius on the main screen map. This is useful for if you are flying inside of the airport zone and wish to get rid of the red overlay.

Waypoints & Logs

These buttons do as they say, the ‘Clear Waypoints’ button will remove all waypoints from the device and drone. ‘Clear all logs’ will remove the user flight logs. This does not remove the data flash logs.

Theme

SidePilot supports two different themes, light and dark. They are exact opposites of one another and it is a personal preference of the user which the prefer.

Connection Settings

Bluetooth:

This setting enabled you to use the BLE Repeater that can be purchased from https://sidepilot.net/store

This device uses your own existing Sik Radio telemetry set to connect to your drone over long range. This is useful for custom drones.

Wi-Fi:

This enables you to connect to your drone if you have a Wi-Fi connection to it over either UDP or TCP.

3DR Solo:

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

Bluetooth Devices

This button opens a view for changing the settings on your BLE Repeater. Parameters such as the BLE Repeaters name, Baud Rate (Important if you have changed your baud rate from the usual 57600), and enabling the device for the app.

If changing the name of your BLE Repeater, not that it can take a long time for changes to be reflected in the app.

Wi-Fi Settings

This brings up a window with Wi-Fi settings such as the drones IP address and port that the MAVLink protocol is running over.

Voice Assistant 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.