

Garuda Robotics

Cerana **ONE** Pro

Unmanned Aircraft System

User's Manual



Model: Cerana ONE Pro
Version: 1.0
Manual version: 1.1
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About This Manual

Thank you for purchasing Cerana ONE Pro UAS by Garuda Robotics.

This user's manual provides the basic information you need to set up, operate and maintain your UAS. **On its own, this manual does not provide sufficient information for safe and compliant drone operations.**

This UAV is a sophisticated device. It is solely intended for commercial use by trained and licenced professionals. Always ensure that before conducting any UAS operations, you have fully read and understood this manual, with focus on the following sections:

- **Before You Fly;**
- **Compliance;**
- **Acceptable Use Policy; and**
- **Warranty.**

The information contained in this manual has been verified to be accurate at the time of publishing. Download the latest version of this manual from garuda.io/cerana

Some sections of this manual may be annotated with one or more of the following icons:



NOTE: A NOTE Indicates important information that helps you make better use of your UAS.



CAUTION: A CAUTION indicates potential damage to hardware or loss of data if instructions are not followed.



WARNING: A WARNING indicates a potential for property damage, personal injury, or death.

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Updates to operations software may have been implemented since the time of writing this user manual. As a result, there may be differences across images and/or terms used in this document and in the actual operations software. Unless the changes are critical, new updates will be included in the next version of this manual. Critical updates will be communicated to users in the form of amendment bulletins to highlight the changes.



WARNING: All after-sales servicing and support (if any) must be carried out by Garuda Robotics or its appointed agents. Any unauthorised disassembly, modification, or attempted updates to Cerana ONE Pro may result in personal injury and/or void your warranty.

About Your UAS

Cerana ONE Pro is an industrial grade quadrotor multicopter UA designed for BVLOS flights in autonomous and manual modes, with redundant onboard 5G cellular connectivity enabling remote operation for up to 40 minutes.

Cerana ONE Pro is an X4 quadcopter, equipped with the highly advanced flight control computer (FCC). This FCC allows Cerana ONE Pro to operate fully autonomously, semi-autonomously or manually depending on operator requirements.

Cerana ONE Pro features a compute module (Garuda CoPilot Computer, or GCC) which extends the flight management capabilities of the platform, allowing for unlimited operating range through a centralised operation centre via 5G cellular network technology.

Cerana ONE Pro's forward and downward facing cameras provide the operator real-time video streams viewable from anywhere in the world.

Additional forward depth perception is provided to the Detect and Avoid (DAA) subsystem with a pair of synchronised stereo cameras and a 112° wide Radar to avoid obstacles in flight.

With a wide variety of interchangeable payloads and high loading capability, Cerana ONE Pro is a multi-role platform capable of being deployed in service of myriad use-cases.

All Cerana ONE Pro systems are designed, built and tested in-house by Garuda Robotics. Cerana ONE Pro is designed and made with pride in Singapore.

Features

- Dual batteries for power redundancy
- Dual RTK GNSS setup using high sensitivity, multi-constellation (GPS, GLONASS, Galileo & BeiDou) receivers
- Forward obstacle avoidance sensors
- Automatic Return-to-Launch (traditional), or Backtrack-to-Launch (pilot directed, or automatic)
- Failsafe detection and recovery from low battery, RC signal loss, and geofence breach
- BVLOS ready (when piloted using Plex Horizon GCS in drone operations centre, and connected via cellular signals)



WARNING: Full BVLOS operations with Cerana ONE Pro are still under testing and development. Please consult with your local civil aviation authority should you intend to perform any form of BVLOS operations!

Before You Fly

Ensure that:

1. You are familiar with your local unmanned aerial vehicle (UAV) regulations and only operate Cerana ONE Pro within the permissible scope of operation granted to you by the appropriate authorities;
2. You and your team have read and understood this user manual and are familiar with the UAS;
3. You have obtained all necessary training, permits, insurance, and authority clearance;
4. You have completed all necessary pre-flight checks; and
5. All safety precautions are taken to ensure the safety of the public and all involved personnel.



WARNING: It is the UAS operator's responsibility to be familiar and operate Cerana ONE Pro in accordance with the local unmanned aviation rules and regulations. Failure to comply may result in voiding of warranty and/or legal penalties. Please refer to the Appendices for further details.



NOTE: It is highly recommended, and may also be a regulatory requirement, that a comprehensive pre-flight checklist be developed and customised for your specific context. Such a checklist will typically include regulatory, environmental, risk, and platform assessments. Garuda Robotics assists many clients with the development, automation, and management of such checklists. Write to sales@garuda.io for more information.

Package Contents

Your Cerana ONE Pro typically ships with the components shown below.



Note: Some items may be optional and may not ship with your UAS. Some components may not be available in certain countries.

Contact support@garuda.io with any queries on the parts included in your configuration.

Cerana ONE Pro UAV



Set of 2 Batteries



4-way Balanced AC/DC Battery Charger



HereLink Transmitter



USB charging cable



Additional Package Contents

Depending on your purchase, you will see your selected payload components as well

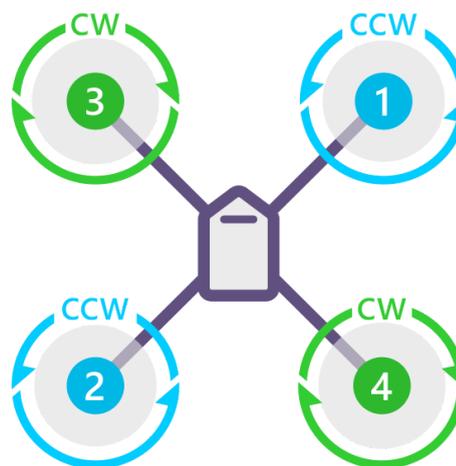
10x Zoom Camera



Additional batteries, propellers, and other accessories may be purchased from Garuda Robotics or authorised resellers.

Aircraft Specifications

| | | |
|---------------------------------|--|----------------------------|
| Dimensions | Unfolded, propellers included, 950 × 950 × 450 mm (L×W×H) | |
| | Folded, propellers included, 500 × 380 × 230 mm (L×W×H) | |
| Diagonal Wingspan | Propellers included, 1344mm | |
| Weight | 3.7 kg (without batteries) | |
| | 6.3 kg (with batteries) | |
| Max Payload | 1.2 kg | |
| Max Takeoff Weight (MTOW) | 7.5 kg | |
| Max Speed & Max Wind Resistance | Horizontal | 12.0 m/s (23 knots) |
| | Ascent (Vertical) | 2.5 m/s |
| | Descent (Vertical) | 1.5 m/s |
| Max Pitch Angle | 35° | |
| Max Height (Service Ceiling) | 3,000 m Above Mean Sea Level | |
| Flight Time | 42 minutes with no payload | |
| | 25 minutes with a ClearCam Ultra 10x (510g) | |
| Operating temperature | -10 °C to 50 °C (14 °F to 122 °F) | |
| Rotor | Diameter: 508mm (20") Material: Carbon Fibre Reinforced Polymer | |
| Frame | Material: | Carbon Fibre and Aluminium |
| | Layout: | Quad X |
| | The motor numbers and rotation direction as follows: | |



QUAD X

| | |
|--|--|
| Flight Control Computer (FCC) Model | Mayan Robotics Control Zero H7 |
| FCC Inertial Measurement Unit (IMU) System | Triple Redundant IMU system 3 x Accelerometer 3 x Gyroscope 2 x Magnetometer 2 x Barometer |
| FCC Modes | AltHold (Non-GNSS assisted) Loiter (GNSS assisted) Auto Return-to-Launch |
| FCC Firmware | ArduCopter (ArduPilot) 4.3.3 |
| Capable GNSS | Dual F9P (GPS, GLONASS, BeiDou, Galileo) RTK ready Redundant GNSS units to provide additional failover |
| Hovering Accuracy | ± 2.5 m (Horizontal) with GPS only |
| RTK Positioning Accuracy | ± 0.025 m + 1 ppm CEP (Horizontal) with RTK enabled and fixed. Requires RTK Base Station and/or NTRIP service |
| Sensing Cameras | Forward sensing: 1080p camera 60° (H) x 40° (V) FOV |

| | |
|--------------------------|--|
| | Downward sensing: 1080p camera 60° (H) x 40° (V) FOV Stereo depth camera |
| Forward Radar | Transmit Band: 76.0 - 77.0GHz Output Power(EIRP): 29.8dBm Range: 0.2 - 80m ±0.1m |
| Radar Antenna Beam Width | Azimuth: 112° Elevation 14° |
| Onboard Computer | Garuda CoPilot Computer Embedded (Version 2.0) Quad-core ARM A57 @ 1.43 GHz 128-core NVIDIA Maxwell GPU 4GB DDR4 64GB SD storage |
| GCC SIM Card | Up to 2 x Nano SIM |
| GCC Antennas | 8 Antennas Frequency (MHz): 600 - 6000 Peak Gain (dBi): 5.0 VSMR: ≤ 3.0 Application: 5G/4G/3G/2G Impedance (Ω): 50 Connector: IPEX IV 2 antennas required for each 4G connection, 4 antennas required for each 5G connection. 8 antennas required for redundant 5G connections. |
| GCC Modems | 2x 5G modems Capable Radio Frequencies: VLOS Control, Telemetry, Video (ISM / SRD Bands) 2.400 - 2.4835 GHz EVLOS / BVLOS Control, Telemetry, Video (3G, 4G LTE, 5G Bands) 5G NR (Bands n1, n2, n3, n5, n7, n8, n12, n20, n25, n28, n38, n40, n41, n48, n66, n71, n77, n78, n79) 5G NR NSA (Bands n38, n41, n77, n78, n79) 5G NR SA (Bands n1, n2, n3, n5, n7, n8, n12, n20, n25, n28, n38, n40, n41, n48*, n66, n71, n77, n78, n79) LTE-FDD (Bands 1, 2, 3, 4, 5, 7, 8, 12, 13, 14, 17, 18, 19, 20, 25, 26, 28, 29, 30, 32, 66, 71) LTE-TDD (Bands 34, 38, 39, 40, 41, 42, 43, 48) |

| | | |
|-------------------------|--|--------------------|
| | WCDMA (Bands 1, 2, 3, 4, 5, 8, 19) | |
| Radio Power Limits | ISM / SRD Bands | ≤ 100 mW EIRP |
| | LTE Bands | ≤ 200 mW EIRP |
| GCC Operating System | Ubuntu 18.04 LTS | |
| GCC Messaging Subsystem | Robot Operating System (ROS) Version 2 | |
| | DDS Middleware | |



CAUTION: You are responsible for ensuring that the payload does not exceed the above payload limits. The Maximum Take-off Weight (MTOW) of the UAS must not exceed 13kg.

Battery Specifications

| | | |
|-----------------------|--|------------------|
| Quantity per set | 2 | |
| Type | Lithium Polymer 6S | |
| Capacity | 10,000 mAh | Total 20,000 mAh |
| Nominal Voltage | 22.2V | |
| Discharge Rating | 25 C | |
| Net Weight | 1.3 kg | Total 2.6 kg |
| Operating Temperature | -20°C to 50°C (-4°F to 122° F) | |
| Connector | XT90 | |
| Charger | AC/DC 4X100W 6 Cell Balanced Battery Charger | |
| Charging Time | ~ 1 Hour | |

Remote Control Specifications



| | | | |
|---------------------------------|---|------|---------------|
| Model | Herelink HX4-06075 | | |
| Screen Size and Control Surface | 5.5-inch touch screen 2 x Hall Effect Gimbal with removable stick 1 x Scroll Wheel (left) 6 x Bottom Buttons 1 x Top Button (right) | | |
| Operating Radio Frequency | 2.4 Ghz (ISM / SRD) | | |
| | Single channel multiplexed Video, Data, and Control | | |
| Receiver Sensitivity | -99dBm @ 20MHz BW | | |
| Interference Recovery | < 1 second | | |
| Transmission Range from UAV | Singapore (IMDA): | 14km | < 20 dBm EIRP |
| | US (FCC): | 20km | < 26 dBm EIRP |
| | Europe (CE): | 12km | < 18 dBm EIRP |
| | China (SRRC): | 12km | < 18 dBm EIRP |
| Minimum Latency | 110 ms | | |
| HDMI Inputs on UAV | 2 HDMI inputs for 1080p @ 60fps video transmission | | |
| | 1 HDMI input preconfigured for GCC screen streaming (for forward and downward cameras) | | |
| Other Ports on Receiver | Wi-Fi, Bluetooth, USB | | |
| Power | Built-in 4950 mAh Lithium Polymer Battery | | |
| Charging | Micro USB port (5V, 2A) | | |

Compatible Ground Control Stations (GCS)

VLOS Flights

Mission Planner

Requires Windows Laptop

Download link:

<https://firmware.ardupilot.org/Tools/MissionPlanner/MissionPlanner-latest.msi>

Installation guide:

<https://ardupilot.org/planner/docs/mission-planner-installation.html>



QGroundControl (default GCS on Transmitter)



For more compatible GCS for VLOS operation, contact us for details.

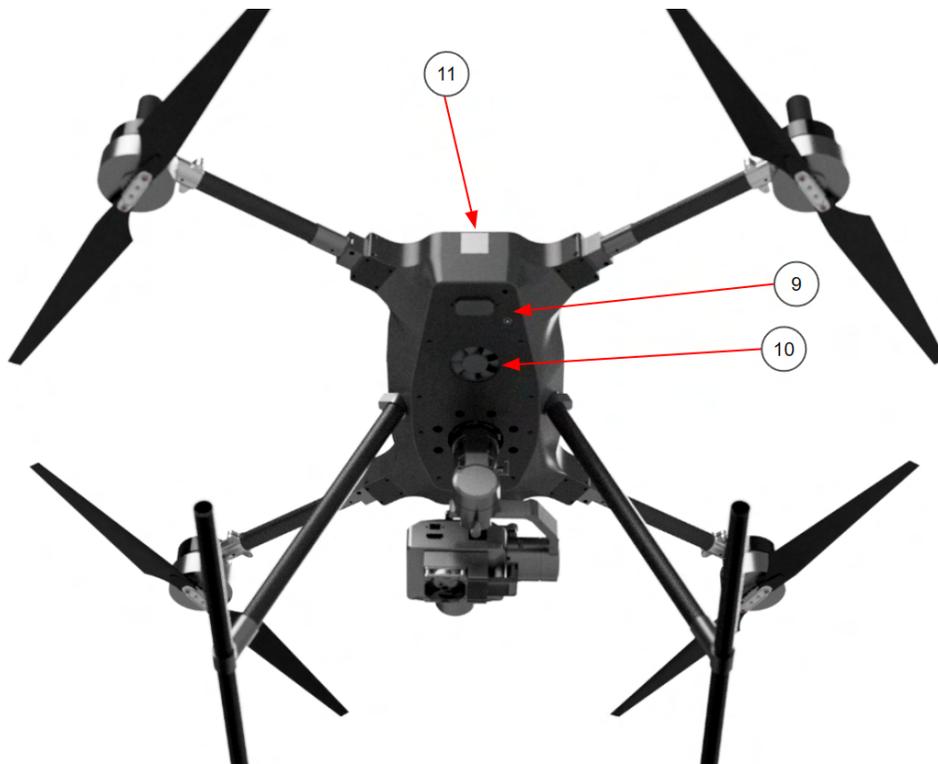
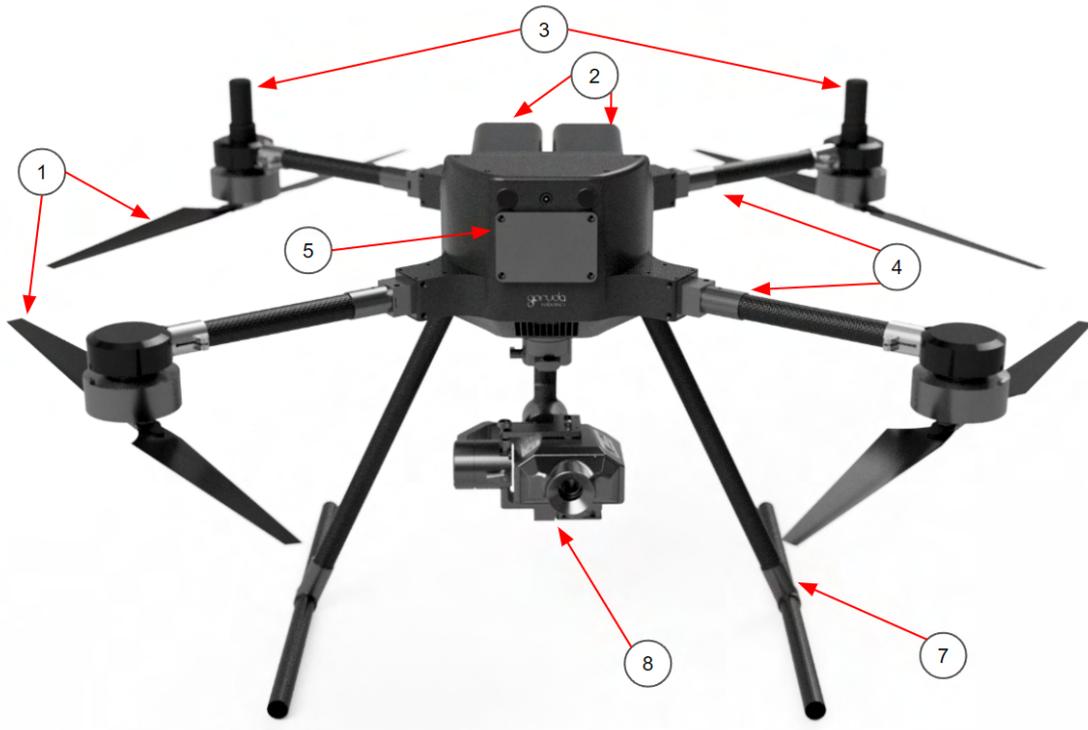
BVLOS Flights

Plex Horizon version 1.2.0 and above

See <https://garuda.io/plex-horizon/tech-spec> for recommended hardware setup.

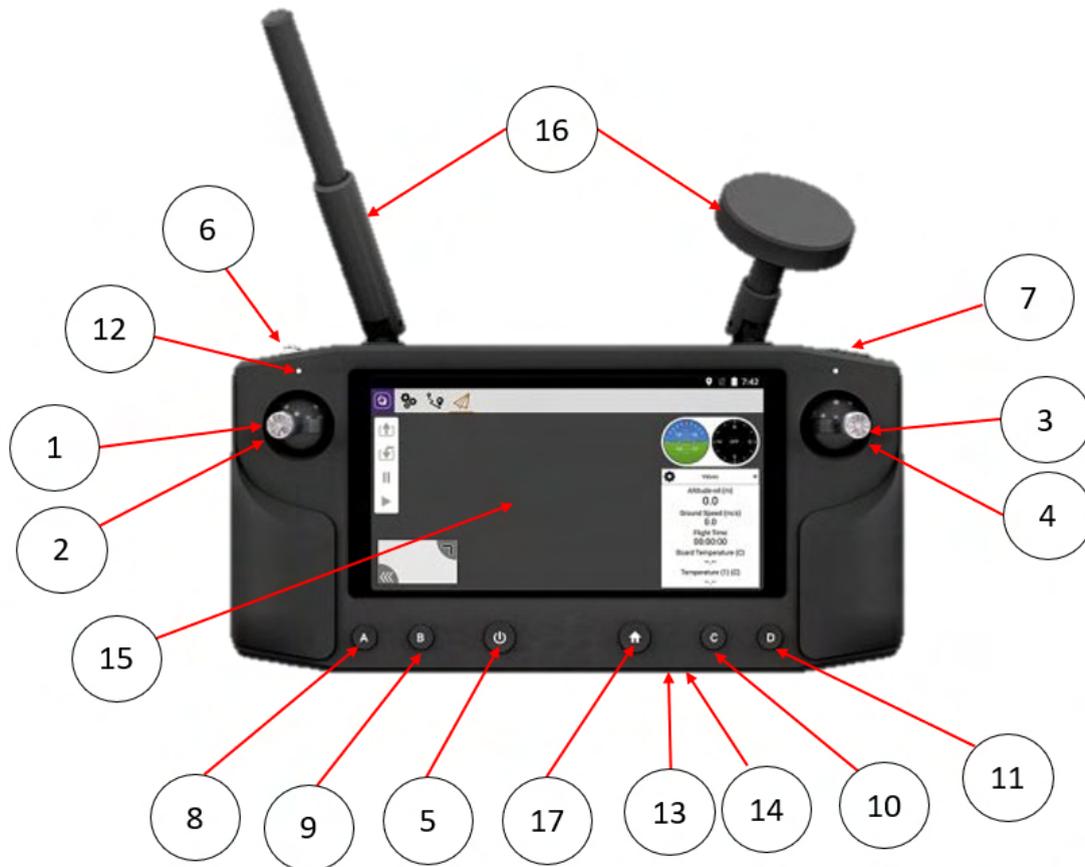
Identifying Parts and Controls

UAV Parts



| Label | Description | Details |
|--------------|----------------------------------|--|
| 1 | Foldable Propellers x 4 | Able to stow propellers easily for transportation |
| 2 | 22v 10000 mAH batteries x 2 | 2 x battery holders |
| 3 | GNSS Antenna x 2 | 2 x Helical Antenna for GNSS and RTK |
| 4 | Foldable arms x 4 | To allow easy storage of UAV |
| 5 | Stereo, HD mini Camera and Radar | Located at the front of UAV |
| 6 | Battery Connector | 2 x XT90 battery connector |
| 7 | Landing Gear | 2 x Landing gear |
| 8 | Gimbal Camera | Located under the UAV |
| 9 | Downward sensor and camera | Located at the bottom of UAV |
| 10 | DC 12V exhaust fan | Located at the bottom of UAV |
| 11 | Nano SIM card Slot | For insertion of SIM card to enable 5G communication |

Transmitter Control



| Label | Description | Details |
|-------|-----------------|---|
| 1 | Throttle Stick | Controls the ascend and descend rate of the UAV |
| 2 | Yaw Stick | Controls the yaw rotation speed and direction of the UAV |
| 3 | Pitch Stick | Controls the pitch angle and forward/backward speed of the UAV |
| 4 | Roll Stick | Controls the roll angle and left/right speed of the UAV |
| 5 | Power Button | Turn on and off the transmitter (Long Press) Turn on and off the display (Short Press) |
| 6 | Scroll Wheel | <i>Configurable</i> |
| 7 | Shoulder Button | <i>Configurable</i> |
| 8 | Button A | Non-GPS Flight Modes |

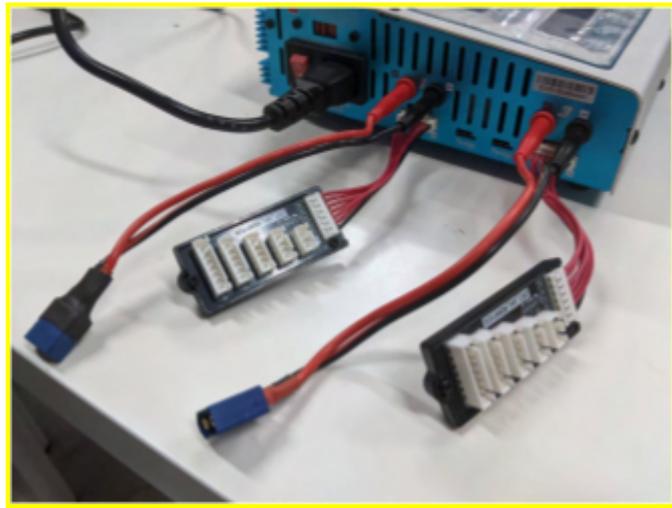
| | | |
|-----------|---|---|
| | | Alt Hold (Short Press) Stabilise (Long Press) |
| 9 | Button B | GPS Flight Modes Loiter (Short Press) Position Hold (Long Press) |
| 10 | Button C | Autonomous Flight Modes Auto (Short Press) RTL (Long Press) |
| 11 | Button D | <i>Configurable</i> |
| 12 | Status LED | To determine charging status |
| 13 | Micro USB Port | For charging |
| 14 | MicroSD Card Slot | For storing Maps and Telemetry logs |
| 15 | 5.46" 1080P capacitive touch screen | For input |
| 16 | Antenna | |
| 17 | Home | To return to home page |

Setting Up the Aircraft

Step 1: Initial Hardware Setup

Charging the Batteries

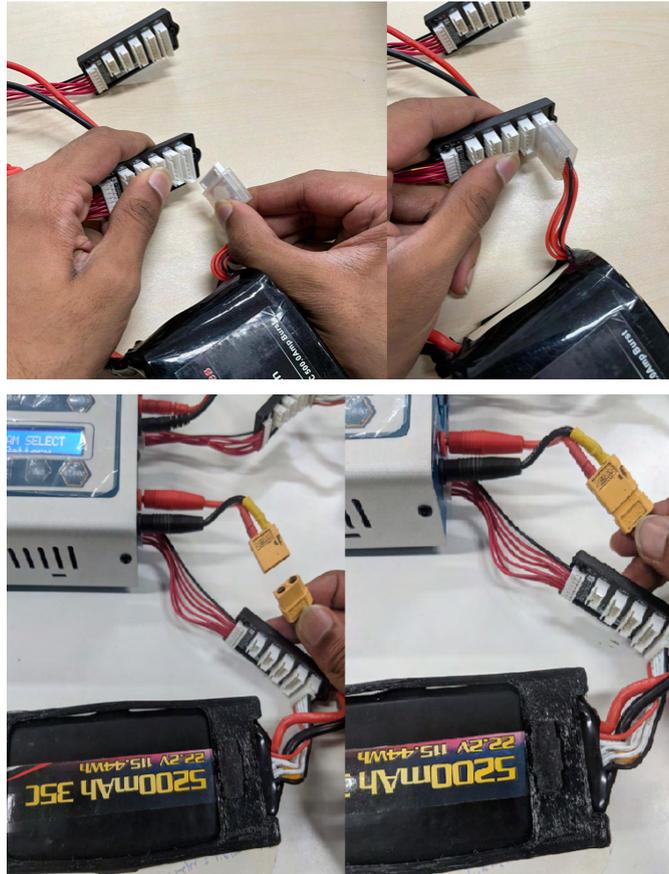
- 1 Plug in the XT-90 lead and balance board into the charger as shown for all batteries.



- 2 Power on the charger after plugging it into the mains outlet.



- 3 Plug the balance port connector and XT-90 connector into the charger respectively.



- 4 Plug in all the batteries into the charger as shown.

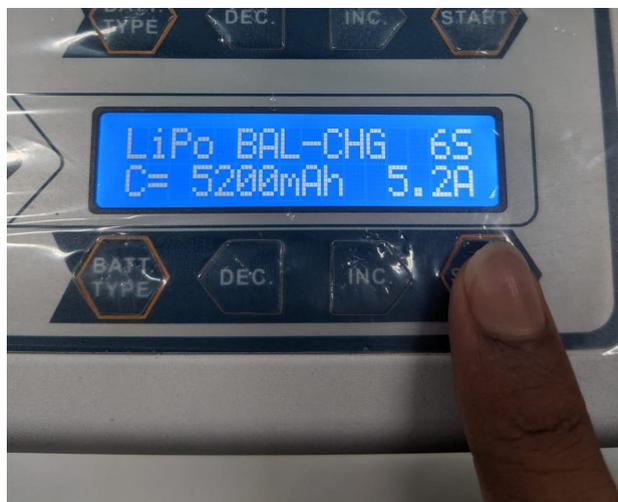


- 5 Press "BATT TYPE" once and program select "Lipo Battery". After finishing selection, Press "START" once.

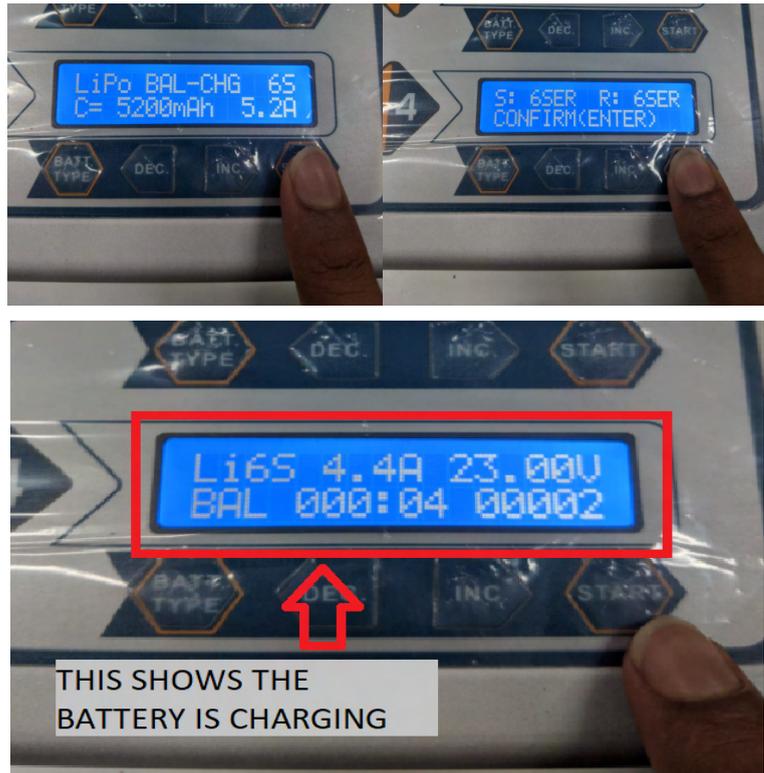


- 6 Press "START" once again and select "6S". (Use "DEC." and "INC." to change selection for each option.)

Press "START" again and select "BAL-CHG" and do the same for "C=10000mAh"



- 7 After all selection is done, Press and hold "START" for at least 3 seconds until there is a beep sound. and press "START" once again to confirm and it will begin charging



- 8 Batteries charging completed. The charger will make a beep sound with a tune.

(Remember to press "BATT TYPE" first to return to main settings before unplugging.

To cancel/stop charging, press "BATT TYPE" once and it will return back to main settings.



- 9 After the battery is fully charged, remove the battery and switch off the charger.

- 10** To check the voltage value on each individual cell, press "INC" while the battery is charging.



Maximum Voltage for each must not exceed 4.2V!



WARNING: Take care when handling and charging Lithium Polymer batteries. Do not overcharge the batteries or leave them charging unattended. Store batteries in a cool, dry place away from heat.

Step 2: Setting up the HereLink Transmitter



Charging the Transmitter

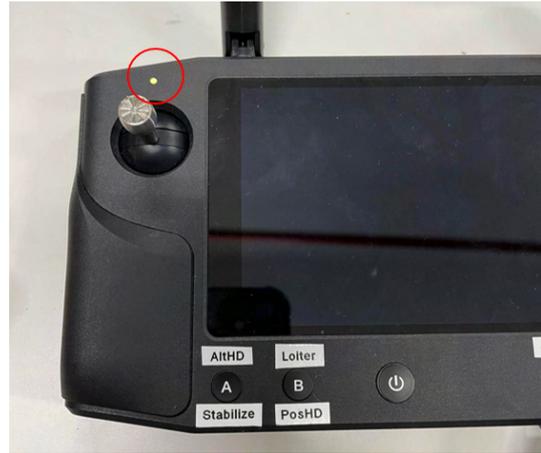
- 1 Lift the rubber cover and plug the micro-b USB to the HereLink Transmitter



- 2 The battery percentage of the transmitter will appear for a few seconds.
(To check the battery percentage again, press the Home button)



- 3 The LED will appear green while it is charging on the top of the left joystick.



Powering up Transmitter

- 1 Press and hold the Home button for 3 seconds.
It will show the homepage of the transmitter.



Launching QGroundControl app

- 1 Select the 'QGroundControl' app.



- 5 Ensure the UAV is powered and wait for the QGroundControl to detect the UAV.

Once the UAV is detected, it will start downloading its parameters.

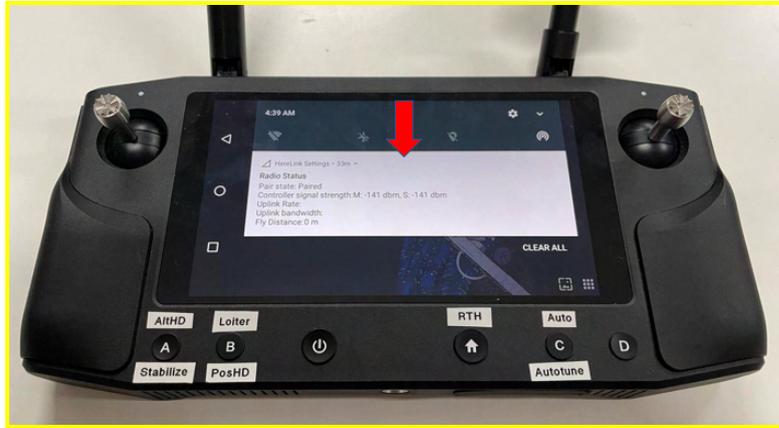


- 3 Once the download is completed, you will see the video streaming and telemetry updating live on the transmitter.



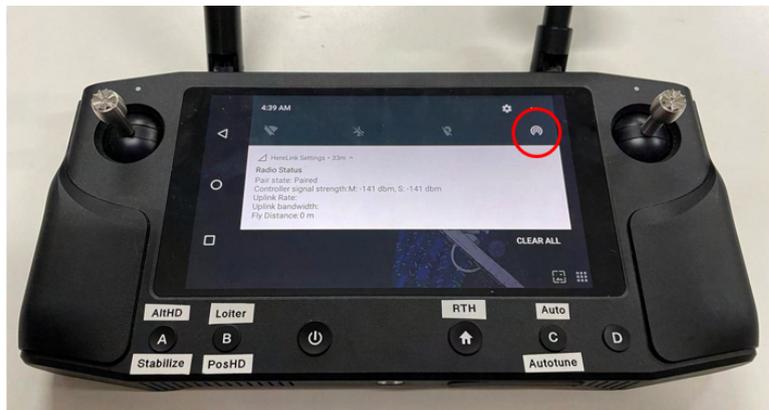
Activating Hotspot (AP) for wireless telemetry connection

- 1 Swipe down from the top of the screen.

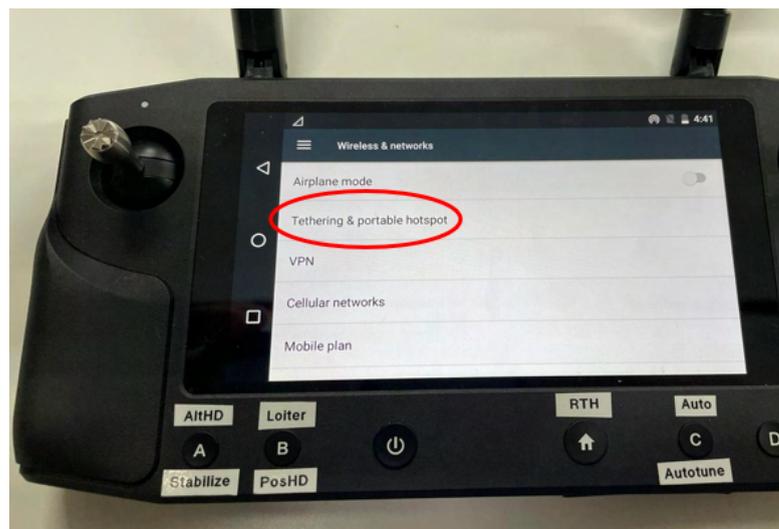


- 2 Press and hold on the hotspot icon to access its settings

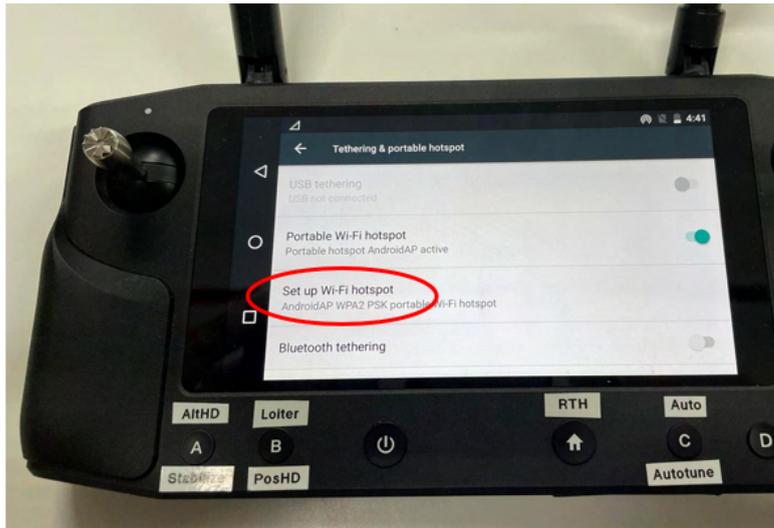
Press on this icon to toggle the hotspot if you do not need to access the settings.



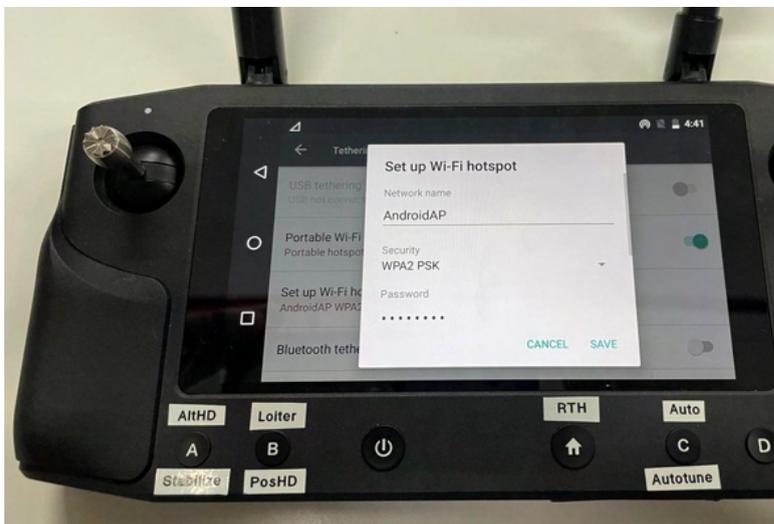
- 3 Select 'Tethering & portable hotspot'



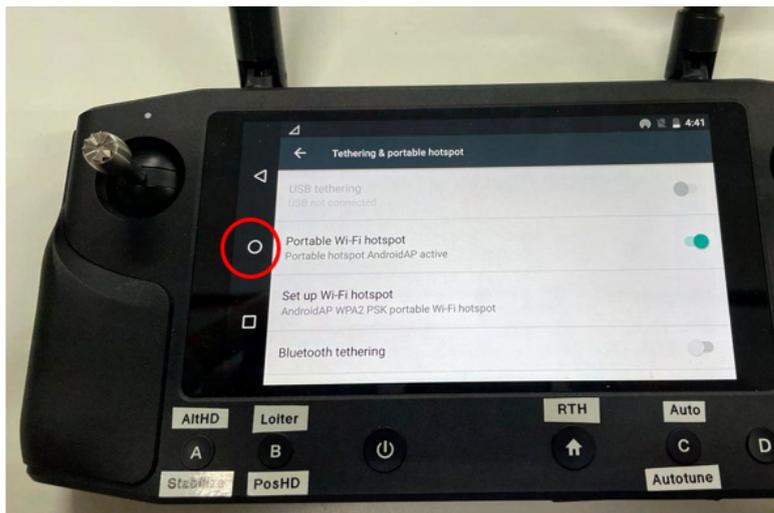
- 4 Select 'Set up Wi-Fi hotspot'



- 5 You may change or read the password of the hotspot from this menu to connect your device to the transmitter.



- 6 Press O to return to home.



Connecting Ground Control Station to Transmitter

- 1 Open up Mission Planner. (Make sure the UAV is power up and QGC is running on the transmitter with hotspot activated)



- 2 Go to your system's WiFi connections and search for the AP and connect.

Type in the password and press next.



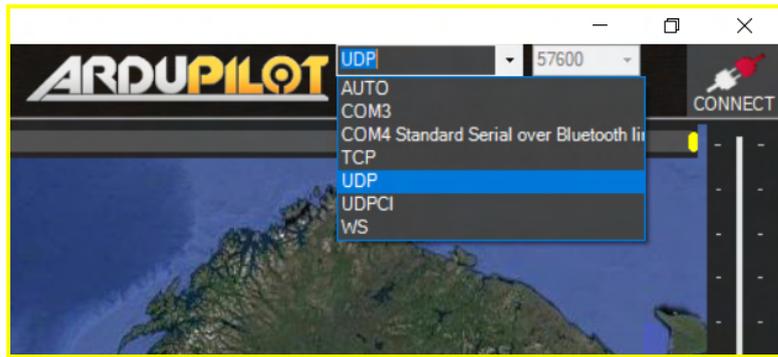
- 3 Mission planner should automatically connect to UDP once WiFi connection has been established with the transmitter.

Once connected, you are ready to connect to Mission Planner.

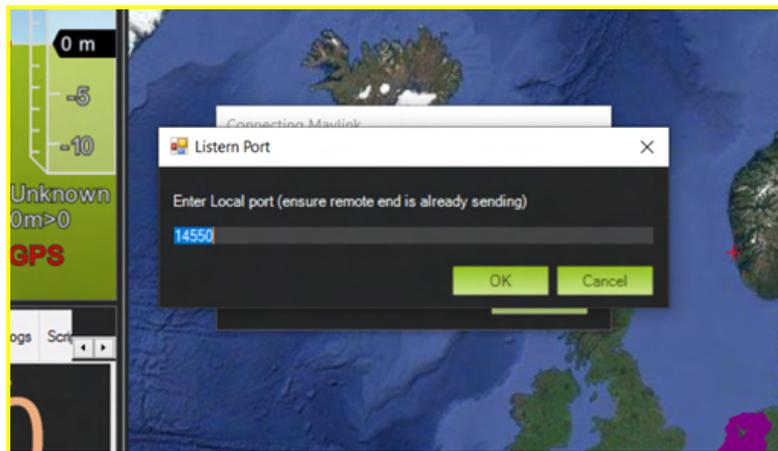
If it does not, continue with the following to manually connect.



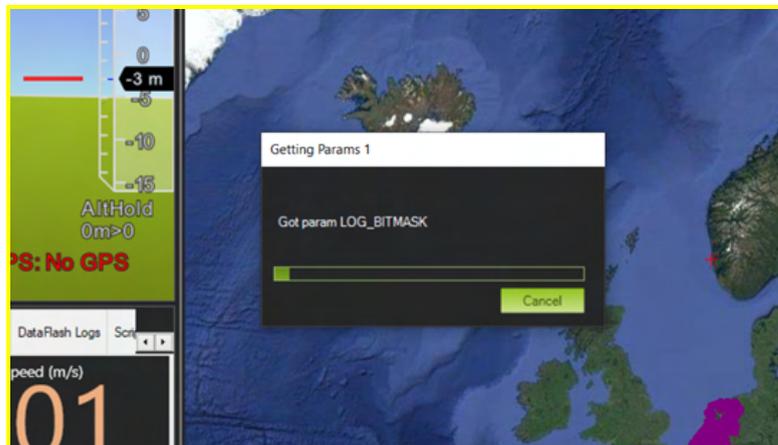
- 4 Select 'UDP' and press Connect.



- 5 Put as default (14550) and press OK.



- 6 Wait for the Mission Planner to load the parameters.



- 7 The Mission Planner is ready to use.



Operating the UA

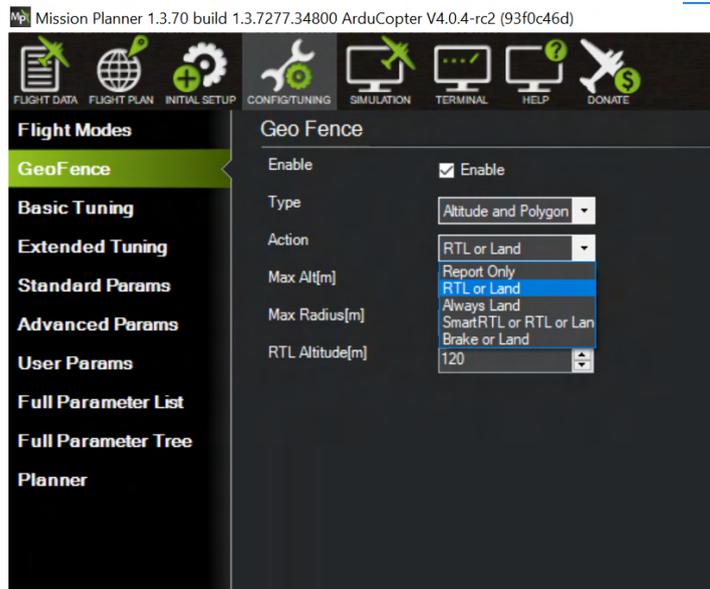
Failsafe settings

- 1 Ensure the failsafe settings are set accordingly.

The recommended failsafe settings are listed below:

The following are the recommended failsafe settings to employ and are pre-configured as such. However, not all settings are the most ideal for all scenarios and pilots should change the settings accordingly to their needs.

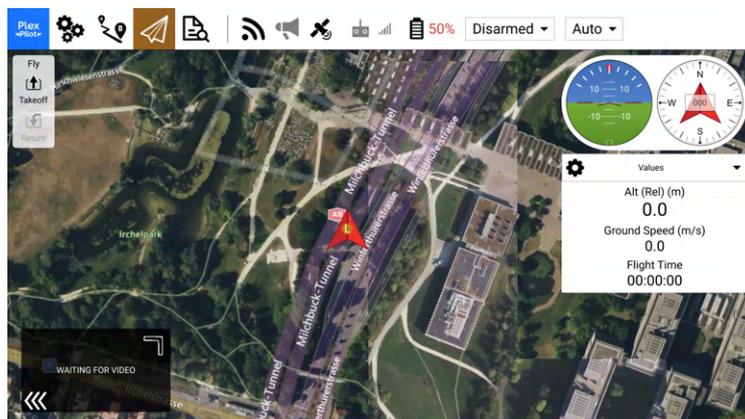
| Aircraft | | |
|-------------------------------|-------------------|-----|
| Radio Failsafe | Enable always RTL | |
| Geo Fence Failsafe | RTL or Land | |
| Battery Low Voltage | 21.5 | V |
| Battery Low reserved mAh | 6000 | mAh |
| Battery Low Action | Return to Launch | |
| Battery Critical Voltage | 19 | V |
| Battery Critical reserved mAh | 2000 | mAh |
| Battery Low Action | Land | |





Arming the UA

- 1 Ensure that there are no error messages from the GCS, and the intended flight mode is correctly selected.



- 2 Just before arming, ensure that the UA is clear from any personnel or obstacles.

This diagram is for illustrative purposes. Local regulations may differ.



- 3 Once Pre-Flight Checks have been completed, arm the UA by pushing the left stick down and right to its maximum and hold it. The UA should arm and spin the motors. Gently release the stick back to centre, or hold it at low throttle.



- 4 Check that all motors are spinning correctly and smoothly, before raising the throttle.

Refer to Aircraft Specification at page 10.

- 5 Give a firm throttle up by raising the left stick up until the UA starts to lift off the ground. Continue holding the throttle up until desired altitude is reached.



CAUTION: The sticks are stepped and the amount of deflection on the stick determines the percentage of input commanded to the UA. Exercise caution and familiarise yourself with the characteristics of the UAV before pushing the sticks to their maximum.

Care and Maintenance

Cerana ONE Pro is a sophisticated aerial vehicle with sensitive components. Although it is designed to operate in a variety of environmental conditions, you should take proper care of your UAV to enable it to perform optimally.



WARNING: Cerana ONE Pro contains Lithium Polymer rechargeable batteries. Follow the recommended procedures for safely charging and operating your UAV.

General Care

- 1 Do not disassemble Cerana ONE Pro. Unauthorised disassembly of the UAV will void its warranty.

 - 2 Do not insert foreign objects into Cerana ONE Pro.

 - 3 To prevent electric shock, explosion, or other injury, do not operate Cerana ONE Pro if it has been damaged in any way, whether by immersion in liquid, crushed by mechanical forces, etc.

 - 4 Do not subject Cerana ONE Pro to extreme forces such as crushing, bending, puncturing, or shredding.

 - 5 Avoid placing heavy objects on Cerana ONE Pro.

 - 6 Avoid dropping Cerana ONE Pro.

 - 7 Store Cerana ONE Pro in a cool dry place when not in use.
-

Operating Environment

- 1 Do not submerge Cerana ONE Pro in liquids of any form. The UAV is designed to resist splashes but is not waterproof.

 - 2 Avoid using Cerana ONE Pro in extremely dusty conditions. The UAV is designed with limited dust resistance, but using it in environments with plenty of fine particles may cause its performance to degrade over time.

 - 3 Do not expose Cerana ONE Pro to environments that contain fine metallic particles or any other substances that may lead to electric short circuits.

 - 4 Do not expose Cerana ONE Pro to corrosive environments.

 - 5 Keep Cerana ONE Pro away from heat sources, combustible gases, and liquids.
-

Charging and Power

- 1** Do not leave the batteries unattended while charging. Do not charge the batteries overnight.

 - 2** Stop charging the batteries once it is fully charged.

 - 3** Always charge the LiPo batteries in a ventilated area. Do not place the batteries under pillows, blankets, fabrics, or other flammable materials while charging.

 - 4** If you will not be using Cerana ONE Pro for an extended period, the battery should be discharged to approximately 50% charge before storage.
-

Troubleshooting

This section describes common problems you may encounter while using Cerana ONE Pro.

Diagnosing Common Problems

Use the Cerana ONE Pro status indicator to quickly determine the operating condition of the UAV.

| Indicator Sequence | Status | Actions |
|-------------------------------|---|---|
| Fast Blinking of Red and Blue | Initialising gyroscopes (after every power up) | Leave Cerana ONE Pro still and level while it initialises the sensors. |
| Fast Blinking Blue | Disarmed, no GPS lock found | Go outdoors |
| Solid blue | Armed with no GPS lock | Fly with caution as there is no GPS positioning capability with the UA. |
| Double flashing yellow | Failing pre-arm checks (system refuses to arm). | Check error messages and resolve the error if possible. |
| Single Flashing yellow: | Failsafe activated | Reboot FCC |
| Flashing red and yellow | EKF or Inertial Nav failure | Reboot FCC |
| Blinking Green | Disarmed (ready to arm), GPS lock acquired. Quick double tone when disarming from the armed state. | Ready to Arm |
| Fast Blinking Green | Same as above but GPS is using SBAS (so should have better position estimate). | Ready to Arm |
| Solid Green | Armed with GPS lock acquired. | Ready to fly! |

Appendices

Compliance

Depending on where you purchased and/or fly Cerana ONE Pro, you may need to comply with additional legal requirements:

All locations

Cerana ONE Pro is linked to your Garuda Plex company account. By using this UAS, you consent to the Garuda Plex Terms of Use (<https://garuda.io/terms>) and Data Privacy Policy (<https://garuda.io/privacy>), which may be updated from time to time. The privacy of your flight data is governed by these terms.

Garuda Plex (Solo, Pro, and Live tiers) is currently hosted in Singapore data centres. Clients with additional data privacy requirements can upgrade to Garuda Plex Enterprise tier for deployment as a Private Cloud service, or leverage Singtel's 5G Paragon platform. Write to sales@garuda.io for more information.

Singapore

For VLOS operations and EVLOS operations, please refer to **CAAS ANR 101 Unmanned Aircraft Operations**. In particular, you will need to build your own Operations Manual using information from this User's Manual.

For BVLOS operations, please refer to **CAAS ANR 101-2-2(0) Beyond Line Of Sight Operations** for the full compliance details and application process.

Malaysia

For VLOS operations and EVLOS operations, please refer to **Civil Aviation Regulation 2016 (MCAR) Regulation 140-144** for compliance details and use the standard application process.

For BVLOS operations, please refer to **CAAM CAD 6011 Part V - Special Use Projects** for the full compliance details and application process.

Bhutan

Please refer to **BCAA Bhutan Air Navigation Regulation, Section 4 General Aviation, Chapter 12 UAS Operations** (under MTOW 6kg to 25kg special circumstances) for compliance details and application process for all types of operations.



Note: Garuda Robotics makes a reasonable effort to ensure the information contained in this section is up to date at the time of publishing. The user of the UAS bears final responsibility for ensuring compliance with all applicable local regulations.

Garuda Robotics assists many customers with the efficient development of Operations Manuals and contingency planning for emergency scenarios. Write to sales@garuda.io for more information.

Preflight Checklists (Illustrative)

These excerpts from Garuda Robotics' internal pre-flight checklists are used by our operators and crews during deployments to conduct some of the required checks prior to the flight in accordance with our operational procedures.

All crew members must fully understand the required procedures to conduct the checks before using any checklists.



CAUTION: These checklists are presented primarily for illustrative purposes and are not intended to be comprehensive or customised to your specific context. Please see the **'Before You Fly'** section for further information.

Date: _____

Deployment: _____

Flight Engineer SETUP CHECKS

| | Description | | Checked By: _____ | Verified By: _____ |
|--------------------------|---|--------------------------------|----------------------|-----------------------|
| Setup | Telemetry Connectivity | Check | | |
| | GCS Battery Level | Check | | |
| Failsafe settings | RC Failsafe (1.RTL / 2.Land / 3.Carry on Mission) | Verify 1 / 2 / 3 | | |
| | Low Battery Failsafe (1.RTL / 2. Land) | Verify 1 / 2 | | |
| | Low Battery Voltage and Capacity | Verify _____ V _____ mAh | | |
| GeoFence settings | Pre-arming checks set to "1" | Check | | |
| | Geofence enabled | Check | | |
| | GeoFence Type (Any combination) (1.Altitude & Circle 2. Polygon) | Verify 1 / 2 | | |
| | Max Altitude | Verify _____ m | | |
| | RTL Altitude | Verify _____ m | | |
| | Max Radius; or GeoFence Polygon written | Verify _____ m | | |

| | | | | |
|-----------------------|---|-------------------|--|--|
| | Action (1. RTL or Land / 2. Report Only) | Verify 1 / 2 | | |
| Telemetry Data | Battery Voltage | Verify _____ V | | |
| | Horizon/Axis | Check | | |
| | No Error Message | Check | | |

RC Pilot SETUP CHECKS

| | Description | | | | Checked By: _____ | Verified By: _____ |
|---------------------------|---------------------------|-------------|----------------|---------|----------------------|-----------------------|
| Platform Checks | Physical Inspection of UA | | | Check | | |
| | Cracks | Loose Parts | | | | |
| | | | | | | |
| | Payload | | | Check | | |
| | Secured | Operational | SD-card | | | |
| | | | | | | |
| | Motor Mount | | | Check | | |
| | Level | Secured | | | | |
| | | | | | | |
| | Propellers | | | Check | | |
| | Direction | Secured | No Cracks | | | |
| | | | | | | |
| | Battery | | | Check | | |
| | Secured | Connect | No Smoke/Smell | | | |
| | | | | | | |
| | CG Check | | | Perform | | |
| Transmitter Checks | Physical Inspection | | | Check | | |
| | Cracks | Loose Parts | | | | |
| | | | | | | |

| | | | | |
|--|---------------------------|-------------------|--|--|
| | Transmitter Battery Level | Verify ----- V | | |
| | Connectivity with UA | Verify | | |
| | Flight Mode Switch Toggle | Verify | | |
| | Trims - Neutral | Verify | | |

Battery Identifier

mAh used

Acceptable Use Policy

A user of Cerana ONE Pro shall not, either directly or indirectly:

- A. modify, reverse-engineer, adapt, or redistribute Cerana ONE Pro;
- B. manufacture, assemble, disassemble, sell, export, or supply Cerana ONE Pro;
- C. allow Cerana ONE Pro to be operated or maintained by unauthorised personnel;
- D. use Cerana ONE Pro for any purpose other than in accordance with your regulatory permit, including renting, selling, leasing or directly or indirectly charging others for the use of Cerana ONE Pro;
- E. remove, circumvent, impair, bypass, disable or otherwise interfere with any feature of Cerana ONE Pro;
- F. misrepresent or make false or misleading claims regarding Cerana ONE Pro;
- G. use Cerana ONE Pro for any illegal activity, unlawful purpose, or purposes prohibited by these Terms or in breach of these Terms;
- H. use any device, software, exploits, or routine, including any virus (e.g. Trojan horse, worm, time bomb, or any other methods not specifically mentioned herein) intended to damage or interfere with the proper operation of Cerana ONE Pro or to intercept or expropriate any data from Cerana ONE Pro;
- I. use Cerana ONE Pro in any manner that could damage, disrupt, disable, overburden, or impair the operation of Cerana ONE Pro or interfere with any person's use of Cerana ONE Pro;
- J. use Cerana ONE Pro to acquire, access, or process data not intended for you.

In applicable jurisdictions, you are to ensure that any tracking devices required by regulatory authorities for UAS Traffic Management (UTM) are adequately secured to Cerana ONE Pro before the conduct of each flight.

In the unfortunate event that Cerana ONE Pro is involved in any accident, loss, or theft, promptly report the details of the incident by emailing support@garuda.io.

Warranty

The warranty policy that applies to your UAS depends on where it was purchased and where it is intended to be used. Your sales agreement may also contain additional or varying terms. These policies are summarised in the following table:

| | |
|--|--|
| Common Terms | <p>All UAVs are covered by a one month warranty against manufacturing defects.</p> <p>This warranty does not cover wear and tear experienced in the course of normal usage. It does not cover failure or damage caused by improper usage.</p> <p>Batteries are consumable items which degrade over time. If your battery needs to be replaced due to normal wear and tear, the cost of parts and labour are not covered by the warranty.</p> <p>Unauthorised modification or use that exceeds the Acceptable Use Policy will void your warranty.</p> |
| <p>Purchased in Singapore</p> <p>From Garuda Robotics Pte Ltd</p> | <p>Please allow one month for warranty exchange at Garuda Robotics Service Center.</p> |
| <p>For use in Singapore</p> | |
| <p>Purchased in Malaysia</p> <p>From Garuda Robotics (M) Sdn Bhd</p> | <p>Please allow three months for warranty exchange. You are responsible for bearing shipping and handling charges to Singapore and back to Malaysia.</p> |
| <p>For use in Malaysia</p> | |
| <p>All International Orders</p> | <p>Your warranty policy will be stated in the terms of sale by the respective provider.</p> |
| <p>All purchases via our international resellers</p> | <p>Please check with your sales representative.</p> |

Support

For all technical support matters, please contact support@garuda.io.

For all warranty exchanges, please schedule a drop off time at Garuda Robotics Service Center:

67 Ayer Rajah Crescent #06-25
Singapore 139950