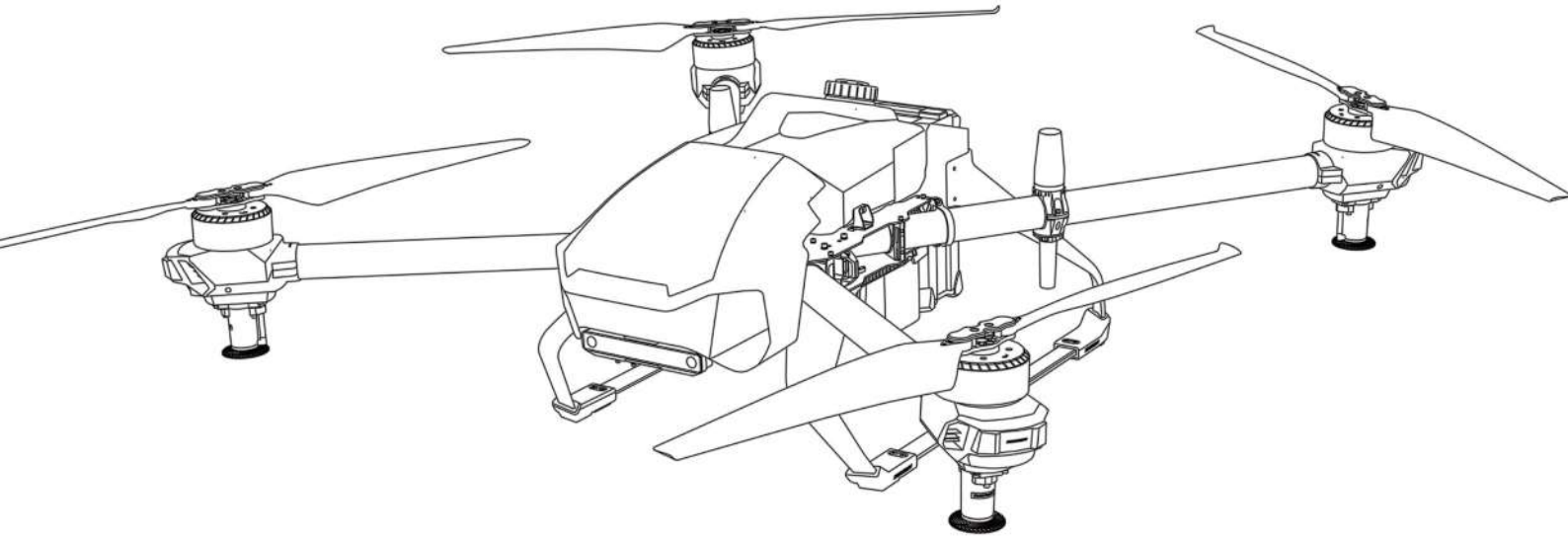
# XAG P-SERIES

## P10/20/30 RTK V1.6

### Pilot Operating Handbook

2019.07



MAKE AGRICULTURE SMARTER
AUSTRALIA

**Searching for Keywords**

Search for keywords in this Pilot Operating Handbook.

**Navigating to a Topic**

View a complete list of topics in the table of contents. Click on a topic to navigate to that section.

**Printing this Document**

This document supports high resolution printing

# Using this Pilot Operating Handbook

## Legends

Warning

Important

Hints & Tips

## Before Flight

Pilot Operating Handbook have been produced to help operators make full use of the XAG P-Series RTK Agricultural UAV

Watching all the tutorial videos is recommended. Afterwards, prepare for your first flight following the instruction. Refer to this Handbook for more comprehensive information.

## Watch the video tutorials

Please watch the tutorial video below to learn how to use XAG P-SERIES RTK Agricultural UAS correctly and safely

https://www.youtube.com/watch?v=gF15fb_WWRI

Subscribe to our YouTube Channel for future updated Videos

## Download the XAG APP

Be sure to use A2 Pilot phone to download the necessary APP to operate XAG P-Series UAV

- Operation
- Firmware Center
- RTK Setting
- Mapping
- Container Tool

Contents



# Product Profile

This chapter describes the features of the XAG P-Series RTK UAV, contains the diagrams of the aircraft and remote controller with component explanations

# Product Profile

## Introduction

XAG P-Series RTK UAV is a battery-powered multi-rotor aircraft designed for agricultural applications in variety of environments and terrains. P-Series Agricultural UAS is equipped with the new SUPERX RTK Flight Control System and XAI agricultural intelligence engine. P-Series redefines the technological boundaries of the UAV industry with advanced industrial designs, dynamic propulsion system, and complete water-resistant performance. P-Series inherits the DNA of XAG design, integrated body with enclosed avionics structure, harnessed physical strength and sensory intelligence. Adopting carbon aluminum composite reinforces the reliability of P-Series' overall structure, able to survive harsh operating environment and rough handling.

SUPERX RTK flight control system unifies the new hardware structure and high-performance industrial sensors by few taps, P-SERIES can fly autonomously and avoid obstacles. Safety risk will be minimized with the unique AI Fault Prediction.

Spraying life into the field. iRASS intelligent centrifugation technology significantly enhances spraying precision of P-SERIES. The new macromolecule-atomizing disk weighs only 5.2g, can response to commands (e.g. stop and resume) within 1 second, which is the potent solution to avoid spraying overlaps or misses. Exclusive AI Diagnose & Prescription technology will provide adaptive spraying services for various crops and pest diseases, revolutionized precision spraying

Intelligent Chemical Container of P-Series automatically senses chemical density, temperature, and volume, accurate and reliable. During the flight, container's information is updated uninterruptedly. Allowing the aircraft to adjust the chemical output and differentiate flying routines, in order to prevent chemical overdose and protect our environment.

## Feature Highlights

### Intelligent Flight Battery:

The XAG™ Battery System for P-Series Agricultural UAS includes Li-Po Smart Batteries (440Wh, 660Wh, 710Wh, 800Wh) and different charging solutions, battery cost reduction up to 70%; multiple in-field charging methods further reduce the cost of large-scale operations. Development of XBMS by XAG was to increase the battery efficiency significantly and maximizing the operation lifespan with self-balancing function and self-heating functions to operate in the low-temperature environment to ensure stable flight.

### RTK Positioning and High Precision Navigation System

- ✓ Equipped with GNSS RTK high precision navigation system, SUPERX RTK provide centimeter-level accuracy for UAS, and capable of using Cloud RTK flying mode, meaning RTK Portable base may not be required in area that has cellular network coverage.
- ✓ Two independent onboard GNSS RTK antennas enable UAS to identify its nose direction without compass, supports UAS to be operate in magnetic interference environment.

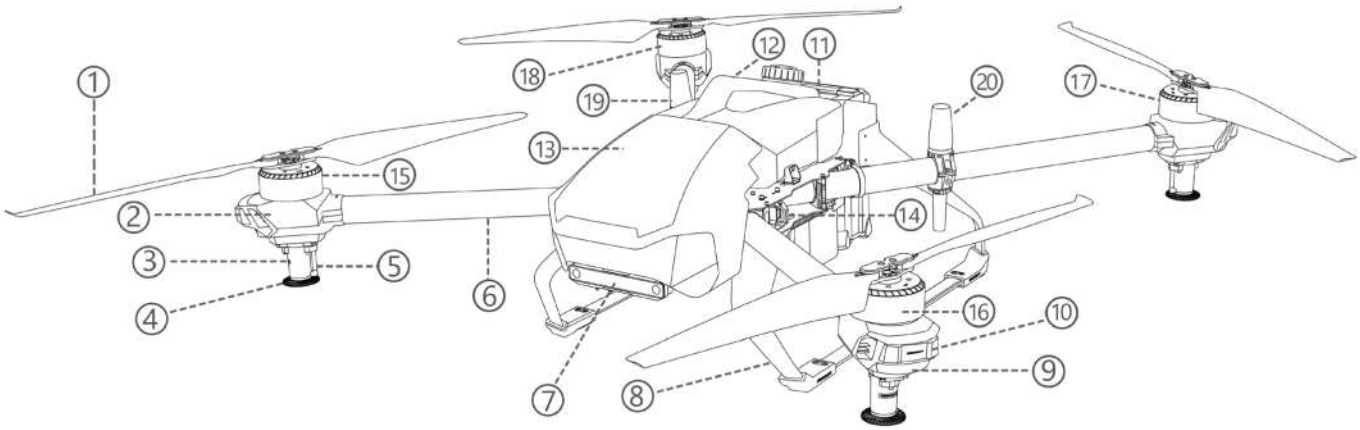
### Radar Terrain Tracing and Optic Positioning

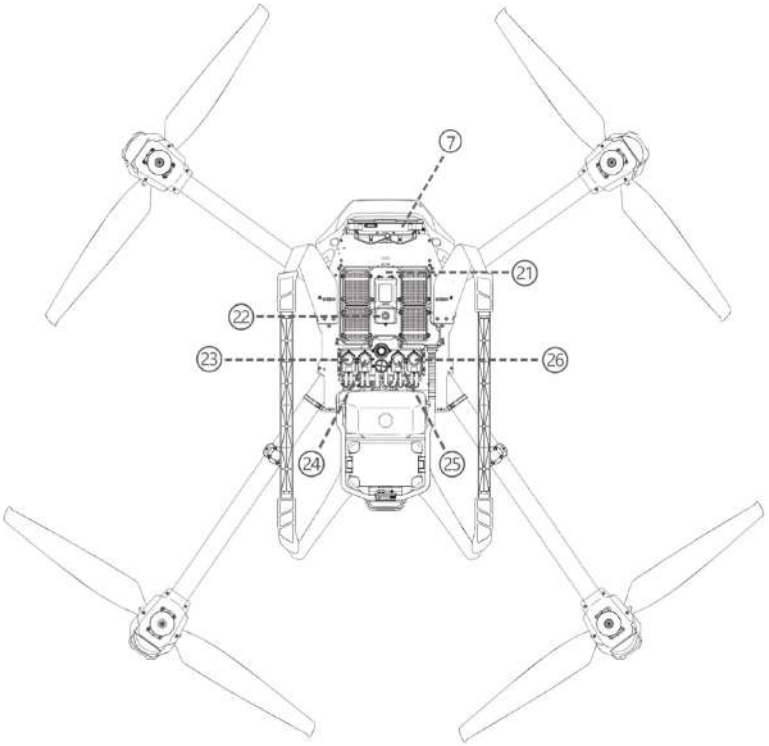
- ✓ Millimeter Wave Radar can accurately detect the terrain up to 30 meters difference in altitude, it is suitable for various terrains including rugged terrain.
- ✓ Omni bearing 40° terrain sensing; terrain deviation ⩽ 10cm.
- ✓ When GNSS RTK or GPS is interfered, optic positioning module will be activated automatically to assist the localization of UAS to ensure reliable operation during day and night.
- ✓ Radar sensor is specially designed to be water resistant, easily being operated in harsh weather and environment.

### APAS Obstacle Avoidance and AI Fault Prediction

- ✓ APAS (Advanced Pilot Automatic System) Obstacle Avoidance System enables UAS to identify obstacle (radium ⩾5cm) 20 meters away and detour around it automatically.
- ✓ Near-infrared illumination technology makes obstacle avoidance possible even at night.
- ✓ With ultra strong data link, the flight log can be transmitted to cloud server in real-time. XAG™ AI will then analyze in real-time the potential faults, alerting and notifying operators in advance.

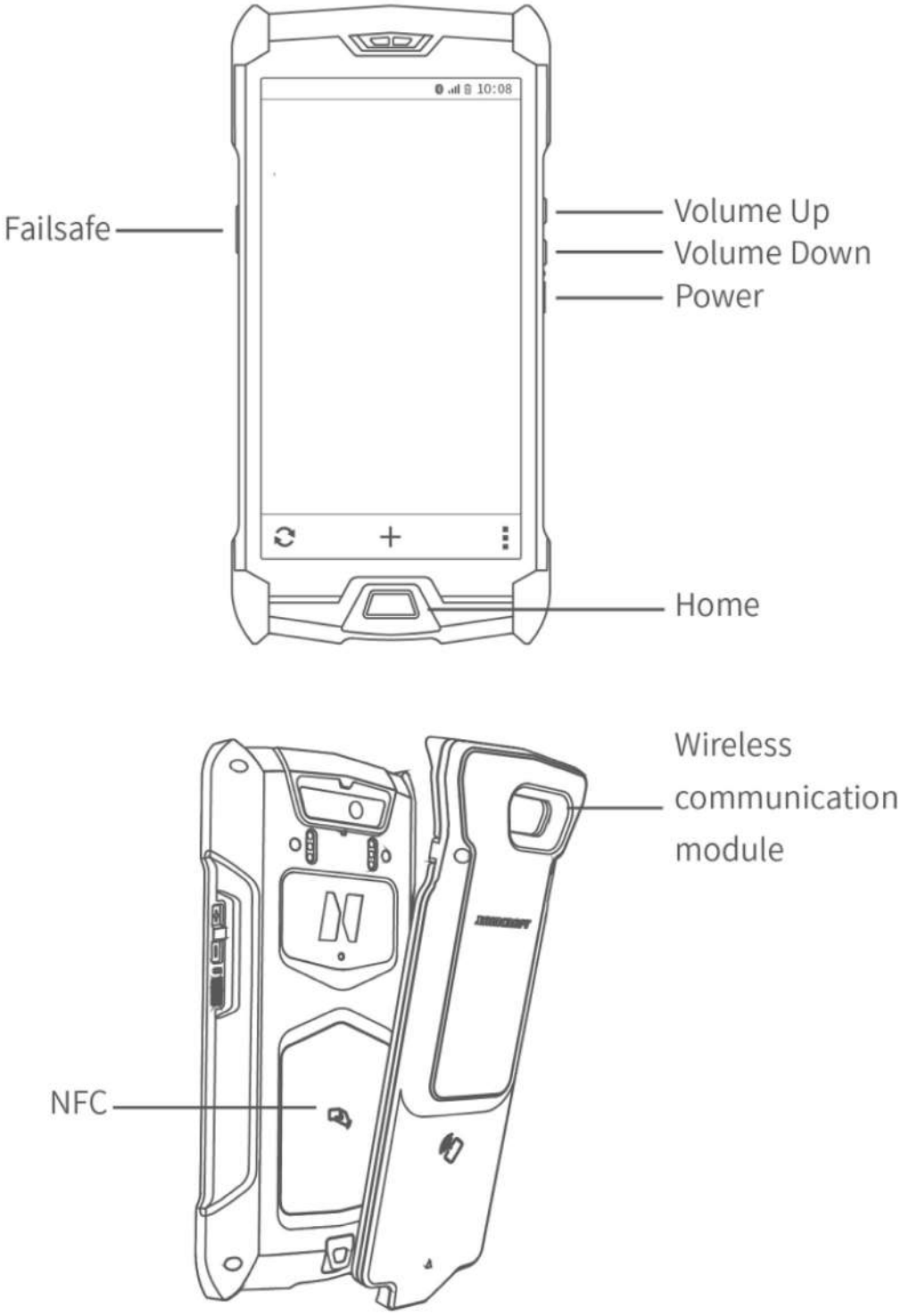
## Diagram – P-SERIES Airframe



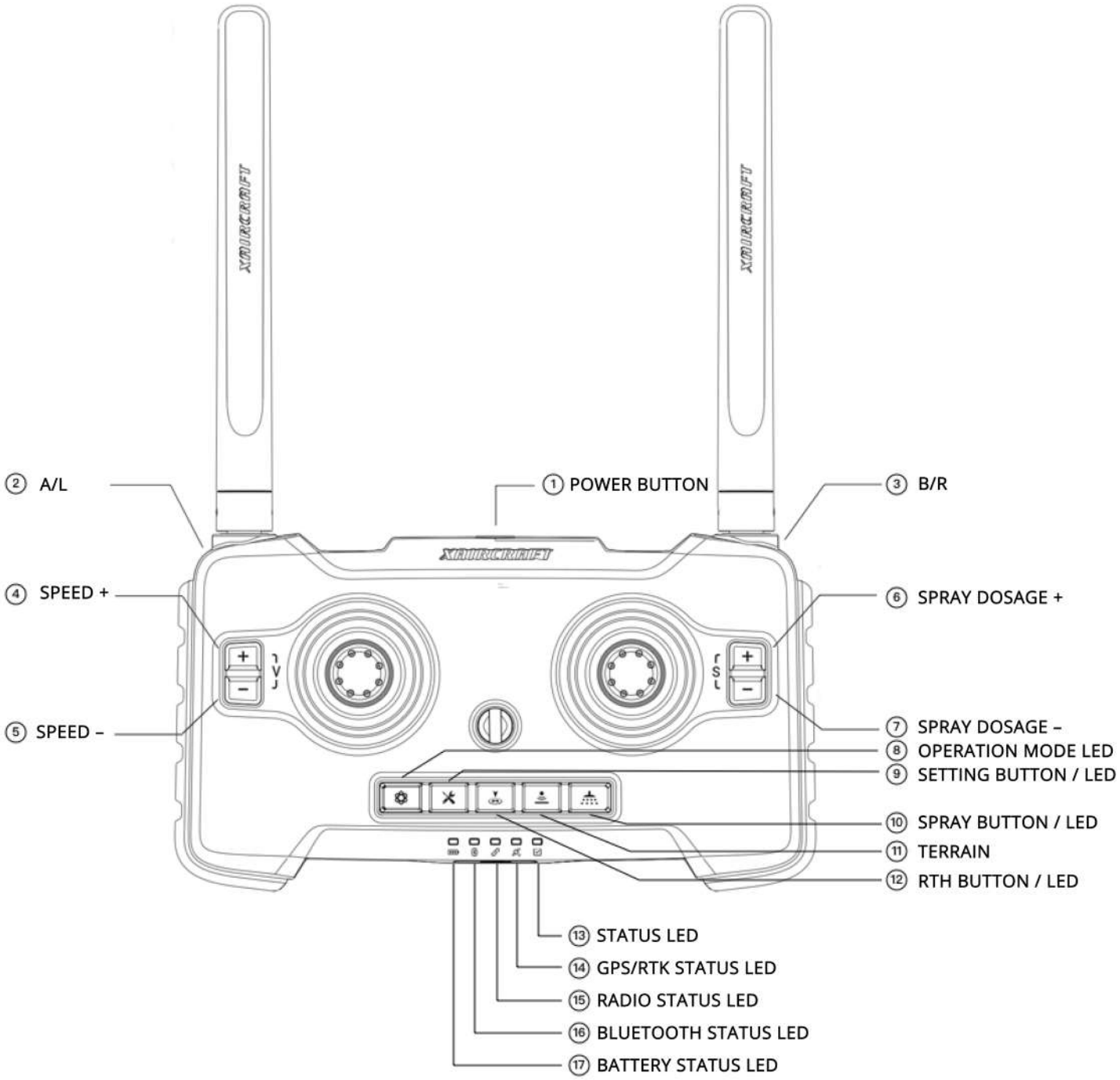

1) Propellers
2) Motor Protective Casing
3) Nozzles
4) Atomization Disc
5) Pump Cable
6) Frame Arms
7) XCOPE
8) Landing Gear
9) Orientation LEDS
10) Motor Protective Rubber
11) XAG Smart Battery
12) Liquid Tank
13) Aircraft Hood
14) Secure Bracket
15) M1 Motor
16) M2 Motor
17) M3 Motor
18) M4 Motor
19) Antenna (R)
20) Antenna (L)
21) Radar
22) Optic Flow
23) M1 Pump
24) M2 Pump
25) M3 Pump
26) M4 Pump

Diagram - A2 Pilot phone



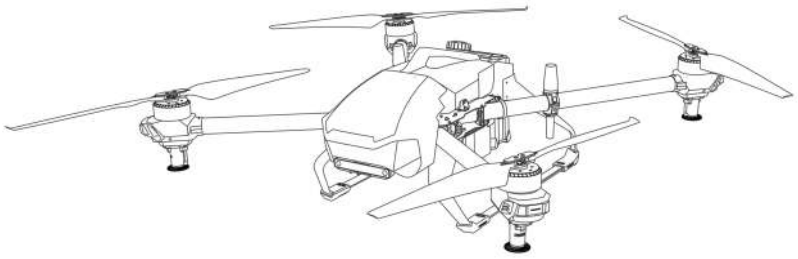
## Diagram - ARC1 Remote Controller



# Aircraft

This chapter describes the features of the Flight Controller and A2 Pilot phone



# Aircraft

## XAG User Account

XAG UAS Operators are required to register an Account at XAG User Registration Website

https://agri.xaircraft.com/pm/#!/register

XAG User Account Permission

XAG Users are classified into different levels based on their operating experience and their ability. Account Permission will directly affect what and how many systems could the user operate simultaneously.

| User Account Permission | Trainee | Operator | Trainer |
|---|---|---|---|
| Single Aircraft | ✓ | ✓ | ✓ |
| Night Operation | | ✓ | ✓ |
| Swarm Operation | | ✓ | ✓ |
| Provide Training to inexperience User and approves training achievement | | | ✓ |

## Device Security & Activation

UAS developed by XAG are precision industrial grade UAS equipped with RTK, to ensure public security and operation safety. It can only be operated by certified personnel who have completed the theoretical and practical courses in this field and has the comprehensive ability requirements for the profession. All XAG UAV requires activation before any flight operation.

### Device Activation

XAG UAV requires activation prior to any operations, and activation codes are provided to owner separately from this Handbook. Device activation code maybe provided differently depends on your region and your local distributor. Please contact your local distributor for more information…

### Device Ownership & Right-of-Use

The Device owner has the operation rights to the activated device, but the device right-of-use could be temporary leased or transferred to other operators. Device owner are able to monitor the real-time and last

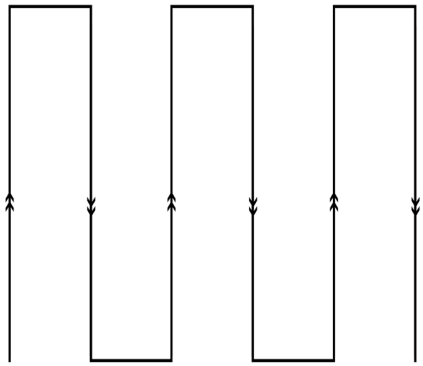
known status of the UAV, and has the ability to lock the device if there are any illegal or inappropriate activities.

## Operation Mode

SUPERX RTK flight control system unifies the new hardware structure and high-performance industrial sensors by few taps, P-SERIES can fly autonomously and avoid obstacles. Safety risk will be minimized with the unique AI Fault Prediction. XAG P-Series uses a XAG dedicated SUPERX RTK flight control system, providing multiple operation modes: Standard Pattern, Custom Waypoint, Spot Spray and Manual Mode.

### Standard Pattern:

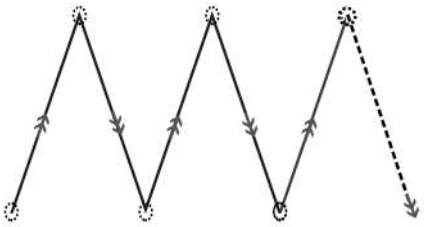
Standard Pattern Operation mode guides the aircraft to travel along a system generated and operator approved flight route. The flight routes are generated after each corners of the field are recorded, and flight parameters confirmed. In this operation mode, operator are able to edit the parameters of Spray Width, Boundary Safe Distance, Obstacle Safe Distance, No Spray Safe Distance for the field, and parameters of Speed, Height, Terrain Following, Dosage and Atomization ration for the UAV. In this operation mode, the aircraft will maintain distance from the vegetation in a zigzag route.



Standard Pattern Mode

### Custom Waypoint

Waypoint operation mode is recommended for operators who wish to apply liquid based material on specific area in a Point to Point mode..



Custom Waypoint Mode

## Spot Spray

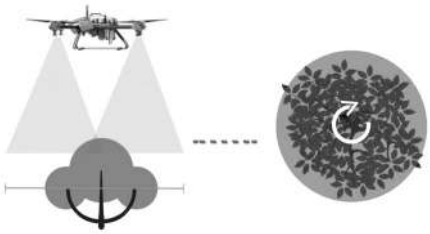
XAG Spot Spray operation mode is based on precision mapping and autopilot navigation to apply liquid precisely on the exact location of 240 Spot/Trees per hour

If the Spot Diameter < Spray Width, UAV will perform Spiral Spray
If the Spot Diameter > Spray Width, UAV will perform Rotary Spray

UAV will automatically apply fixed volume on each spot, hence reducing chemical wastage. Spot Spray operation mode is recommended for operators who wish to apply chemical on specific location instead of the whole field.

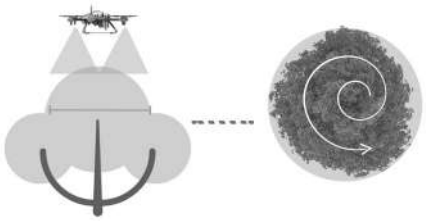
Please watch the tutorial video from the link below to better understand our Spot Spray Operation mode
https://www.youtube.com/watch?v=jBdE5l1upuQ

Spot Spray Mode – Spiral Spray



Spot Diameter < Spray Width

Spot Spray Mode – Rotary Spray



Spot Diameter > Spray Width

## Manual Mode:

Manual Operation Mode was reintegrated into XAG Unmanned Aerial System due to the regulations set forth by government and regulatory agencies; it was designed to allow users to take control of aircraft in case of emergency. In Manual operation Mode, Operators are able manually adjust the flight parameters to start and stop Spraying, Spray rate, Flight speed, Terrain Following, Return-to-Home.

**WARNING**

**Based on the statistics on XAG UAS usage, 90% of accidents are caused by human error. XAG does not recommend operating XAG Unmanned Aerial System in Manual Mode and bear no responsibility for actions undertaken in Manual Mode.**

## Flight Recorder

Flight data is automatically recorded to the internal storage of the aircraft. You can connect the aircraft to a computer via the USB port and export this data via A2 Pilot phone.

## Empty Tank Warning

Intelligent Chemical Container of P-Series Agricultural UAV automatically senses chemical density, temperature, and volume. Container's information is updated uninterruptedly and viewable by XAG A2 APP – Operation during the flight. XAG Operation APP will indicate when the liquid container is empty, and the aircraft will return home and land automatically.

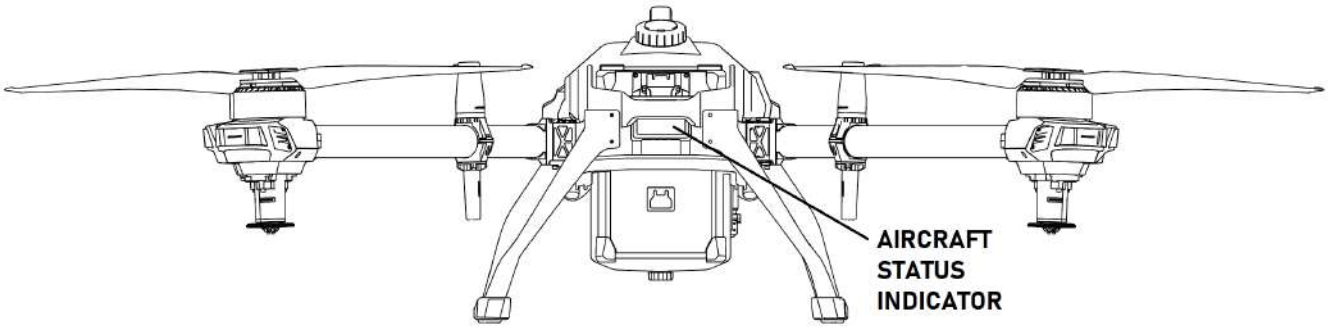
## Operation Resumption

XAG Unmanned Aerial System supports the function of Operation Resumption. The Operation Resumption functions allow the operator to temporarily pause during the operation (e.g. AI Fault Detection, Insufficient Battery & Liquid to finish the task or other unexpected). XAG UAS automatically calculate pre-flight and record breakpoint during operation without the needs of any manual recording.

## Terrain Tracing System

XAG Terrain Tracing Radar uses Millimeters Wave can accurately detect the terrain up to 30 meters difference in altitude, suitable for various terrains including rugged terrain. The System can accurately detect the distance between the aircraft and the landscape or vegetation to ensure aircraft safety and even spraying. The function is enabled by default, and can be disabled or adjusted prior to the Operation in XAG A2 APP – Operation, when enabled, the aircraft will maintain the preset parameters above the surface.

## Aircraft Status Indicator




The Rear LED shows the status of the aircraft. The Aircraft Status indicators communicate the system status of the flight controller.

Refer to the table below for more information about the Aircraft Status Indicators.

| | | | |
|---|---|---|---|
| **Normal** | | | |
| Ⓖ..Ⓖ..Ⓖ.....Ⓖ..Ⓖ..Ⓖ | Green | Flash x 3 | GPS Mode |
| Ⓡ..Ⓡ.....Ⓡ..Ⓡ..... | Red | Flash x 2 | Safe Mode |
| Ⓦ..Ⓦ.....Ⓦ..Ⓦ..... | White | Flash x 2 | Firmware Updating |
| Ⓡ_____ | Red | Solid | Aircraft self-check incomplete |
| **Warning** | | | |
| Ⓨ..Ⓨ..Ⓨ..Ⓨ..Ⓨ..Ⓨ..... | Yellow | Fast Flash | GPS Heading Error<br>⩾40°, Aircraft will hover for 30sec then descend<br><40°, Aircraft will continue its task with yellow Fast Flash Warning |
| Ⓟ..Ⓟ..Ⓟ..Ⓟ..Ⓟ..Ⓟ..... | Purple | Fast Flash | FC Formatted or Abnormal Parameters |
| Ⓑ..Ⓑ..Ⓑ..Ⓑ..Ⓑ..Ⓑ..... | Blue | Fast Flash | ESC Error |
| Ⓡ..Ⓡ..Ⓡ.....Ⓡ..Ⓡ..Ⓡ | Red | Flash x 3 | Critical Low Battery Warning<br>When the battery ⩽ 15%, Battery low voltage warning activated. |

## Return-to-Home (RTH)

Return-to-Home (RTH) function brings the aircraft back to the aircraft take-off location. There are three types of RTH: Smart RTH, Low Battery RTH, and Failsafe RTH. This section describes these three RTH types in detail.

### Smart RTH

Operator may use the Return-to-Home option on the A2 Pilot phone, the aircraft will then automatically return to Home and land automatically.

### Low Battery RTH

Low Battery RTH is a failsafe triggered when the P-Series UAV reaches a level where it may affect the safe return of the aircraft. Operator will be notified when the battery is running low, and the aircraft will automatically return Home to the take-off-point. The aircraft will land automatically, operator can resume the mission after a replacement battery is installed.

### Failsafe RTH

Failsafe RTH is automatically active when the aircraft detects abnormal condition in the aircraft or the flight environment had exceeded the normal operation parameters. The aircraft will return home automatically to the take-off-point.

## Attaching and Detaching the Propellers

### Attaching the Propellers

Rotate the propeller in the locking direction.

### Detaching the Propellers

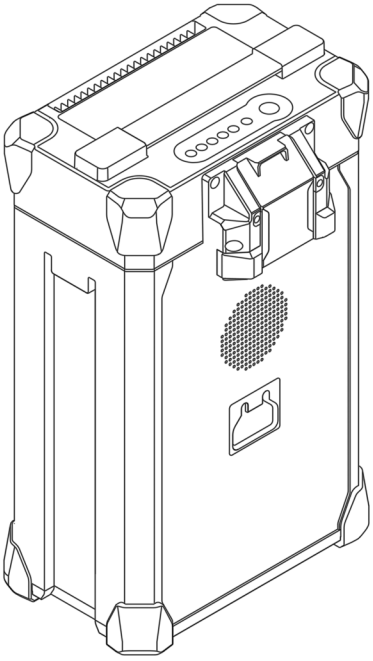
Hold the motors and rotate the propeller in the unlock direction.

**WARNING**

- **Propeller blades are sharp; please handle with care**
- **Only use XAG approved propellers. DO NOT mix propeller types**
- **To avoid injury, stay clear of spinning motors. DO NOT touch the propellers when they are spinning.**
- **Ensure to check that the propellers and motors are installed firmly and correctly before each flight**
- **Ensure that are propellers are in good condition before each flight. DO NOT use aged, chipped, or broken propellers.**

# Smart Battery

This chapter describes the features of the XAG Smart Battery, contains the diagrams of the P-Series Battery with component explanations



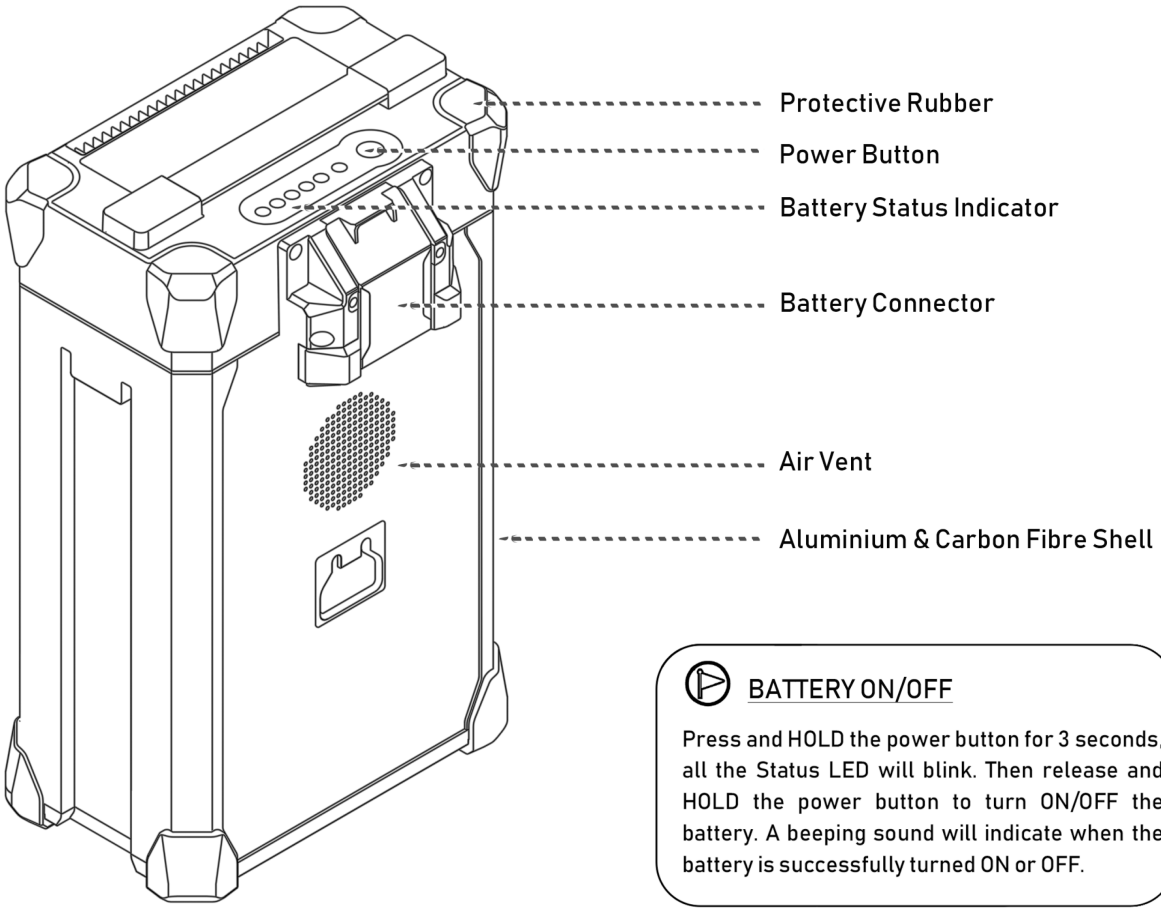
# Smart Battery

## XAG Smart Battery

P-Series Smart battery features upgraded battery cells and XAG Battery Management System (XBMS), providing up to 25 minutes of mission time, servicing area up to 2 ha per mission. All XAG P-Series Smart Batteries have additional self-balancing and self-heating function to increase battery life and efficiency, and ensuring stable operation during low temperature environment.

### XAG Smart Battery Functions

| | |
|---|---|
| 1. Battery Level Display: | The LED indicators display the current battery level. |
| 2. Auto-Discharging: | To prevent swelling, the battery automatically discharges to 30% of total capacity when it is idle. |
| 3. Balanced Charging: | Automatically balances the voltage of each battery cell when charging. |
| 4. Overcharge Protection | Charging automatically stops when the battery is fully charged. |
| 5. Operating Temperature: | The Aircraft will only operate when the temperature is between -10°C to 40°C |
| 6. Over Current Protection: | The battery stops charging when a high amperage (more than 10A) is detected |
| 7. Over Discharge Protection: | Over discharging can seriously damage the battery. Current output will be cut off when the battery cell is discharged to 2.8V when not in flight mode. Battery voltage below 2 V may cause a safety hazard. To prevent this, the battery will not be able to charge if the voltage of a single battery cell is below 2 V. Avoid using any batteries matching this description. |
| 8. Short Circuit Protection | Automatically cuts the power supply when a short circuit is detected. |
| 9. Battery Cell Damage Protection | A2 Pilot phone displays a warning message when a damaged battery cell is detected. |
| 10. Communication | Information pertaining to the battery's voltage, capacity, current, etc is transmitted to the A2 Pilot phone |
| 11. Heating: | Batteries are able to work even in cold weather, ensuring a safe flight. |




**BATTERY ON/OFF**

Press and HOLD the power button for 3 seconds, all the Status LED will blink. Then release and HOLD the power button to turn ON/OFF the battery. A beeping sound will indicate when the battery is successfully turned ON or OFF.

Battery Level Indicators while charging (Battery)

| LED 1 | LED 2 | LED 3 | LED 4 | LED 5 | Battery Level |
|---|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ | 0%-10% |
| ○ | ○ | ○ | ○ | ○ | 10%-30% |
| ● | ○ | ○ | ○ | ○ | 30%-50% |
| ● | ● | ○ | ○ | ○ | 50%-70% |
| ● | ● | ● | ○ | ○ | 70%-90% |
| ● | ● | ● | ● | ○ | 90%-100% |
| ● | ● | ● | ● | ● | Fully Charged |

Battery Level Indicators

| LED 1 | LED 2 | LED 3 | LED 4 | LED 5 | Battery Level |
|---|---|---|---|---|---|
| ○ ○ | ⊘ | ⊘ | ⊘ | ⊘ | Battery Locked |
| ○ | ⊘ | ⊘ | ⊘ | ⊘ | Low Voltage |
| ● | ⊘ | ⊘ | ⊘ | ⊘ | 10%-30% |
| ● | ● | ⊘ | ⊘ | ⊘ | 30%-50% |
| ● | ● | ● | ⊘ | ⊘ | 50%-70% |
| ● | ● | ● | ● | ⊘ | 70%-90% |
| ● | ● | ● | ● | ● | 90%-100% |

**IMPORTANT**

- XAG Battery Operation:

  During Operation, Operators MUST NOT use any Battery with less than 30% Power

- XAG RTH Regulation:

  During Operation, When the battery have less than 15% power, Aircraft must RTH

- Battery Storage:

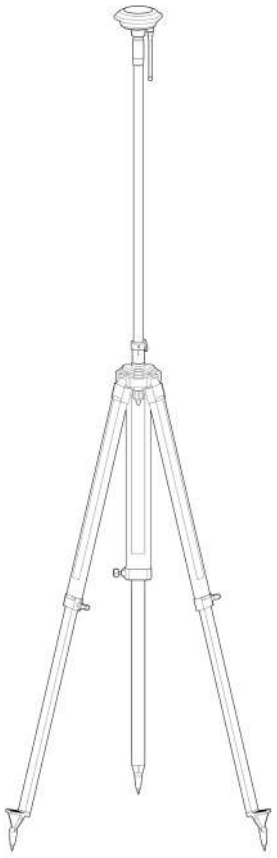
  Battery should be stored in a cool environment between 18°C to 30°C and avoid direct exposure to the sun. The battery will automatically discharge when it is idle, the battery level should be checked on a fortnightly basis, and recharge when battery level is <30%, The Battery should be placed flat or vertically, and it should not be placed sideway. If there are any problems, you should contact the support personnel to arrange maintenance

- Battery Maintenance:

  To maximize and prolonging battery life, operators should ensure the battery is free of smudges, and cleaned regularly. Handle with care and prevent dust from entering the Battery connector port.

# RTK

This chapter describes the features of the XAG RTK Module, contains the diagrams of the RTK Ground Module with component explanations



# GNSS RTK

## XAG GNSS RTK

Real-time kinematic (RTK) positioning is a satellite navigation technique used to enhance the precision of position data derived from satellite-based positioning systems (global navigation satellite systems, GNSS) such as GPS, P-Series UAV integrated with GNSS RTK is an quad copter UAV that were developed by XAG to achieve precision agricultural application, and requires RTK Referencing to achieve centimeter level precision. With anti-magnetic interference ability, it allows P-Series to keep a steady flight even in complex geomagnetic environments such as Mining area, and high-voltage power line.

## DIAGRAM – RTK Ground Module

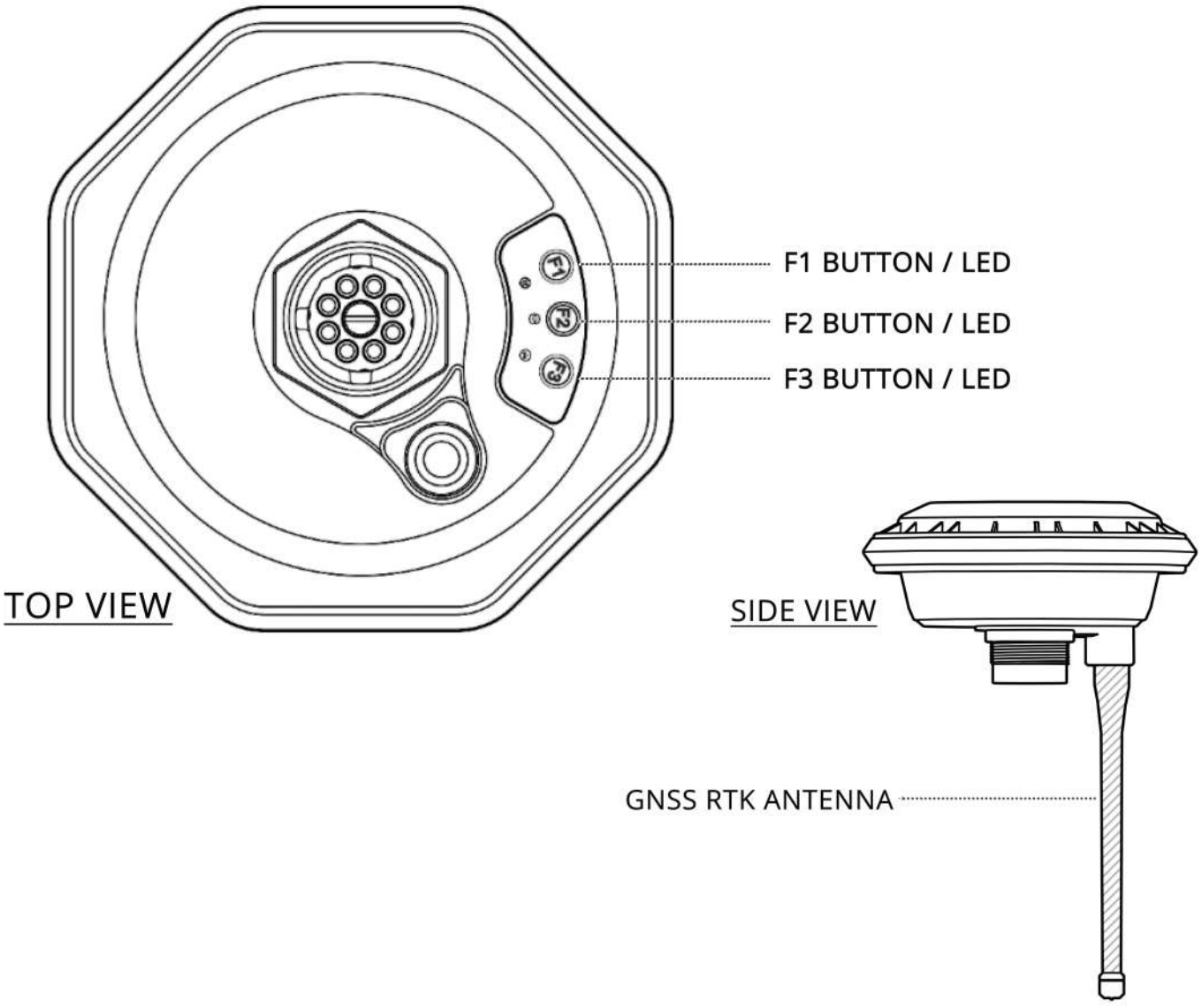
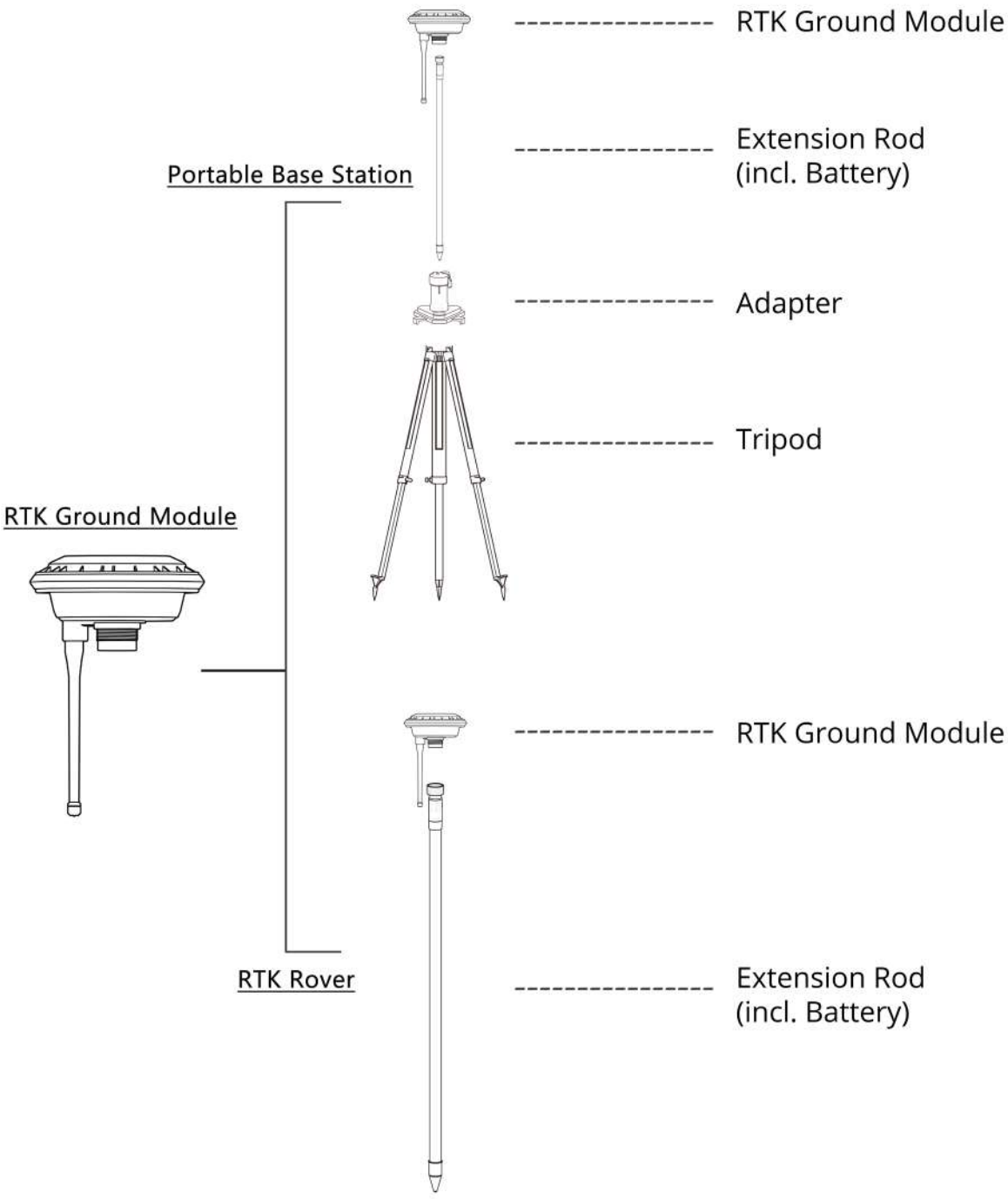


DIAGRAM - GNSS RTK Rover & Portable Base Station



| RTK Status Indicator | | | |
|---|---|---|---|
| Ⓡ_____ | RED | LED Solid | Normal Operation |
| Ⓡ..... Ⓡ..... Ⓡ..... | RED | LED Flashing | Low Battery Voltage |
| ⊗ | BLUE | LED Off | GPS is not working |
| Ⓑ..... Ⓑ..... Ⓑ..... | BLUE | LED Flash x 1 | GPS is in float mode |
| Ⓑ Ⓑ..... Ⓑ Ⓑ..... | BLUE | LED Flash x 2 | Received RTK data, but didn't enter RTK mode |
| Ⓑ Ⓑ Ⓑ..... Ⓑ Ⓑ Ⓑ ..... | BLUE | LED Flash x 3 | Module is in Portable base station mode |
| Ⓑ_____ | BLUE | LED Solid | RTK Fixed |
| Ⓨ..... Ⓨ..... Ⓨ..... | YELLOW | LED Flash x 1 | Failed to connect to network |
| Ⓨ Ⓨ..... Ⓨ Ⓨ..... | YELLOW | LED Flash x 2 | Connecting network |
| Ⓨ Ⓨ Ⓨ..... Ⓨ Ⓨ Ⓨ ..... | YELLOW | LED Flash x 3 | Network connected, but fail to gain RTK data |
| | Buzzer beeping | | Input position for base station is too far away from the true position<br><br>Low Battery alarm. The battery voltage is lower than 12.5V |

| Operation Mode (LED Indicator) | | | |
|---|---|---|---|
| L1 ICON | L 1 | Flashes | Mode |
| Ⓡ | RED | LED Flash x 1 | Mapping |
| Ⓡ.. Ⓡ | RED | LED Flash x 2 | Portable Base Station |
| Ⓡ.. Ⓡ.. Ⓡ | RED | LED Flash x 3 | Fixed Base Station |

| Boot Mode (LED Indicator) | | | |
|---|---|---|---|
| Ⓡ | RED | LED Flashing | Module is in BOOT mode |
| Ⓑ | BLUE | LED Flashing | Module Updating |
| Ⓨ | YELLOW | LED Flashing | Built-in Module Updating |

**HINTS & TIPS**

RTK Base Station Setup

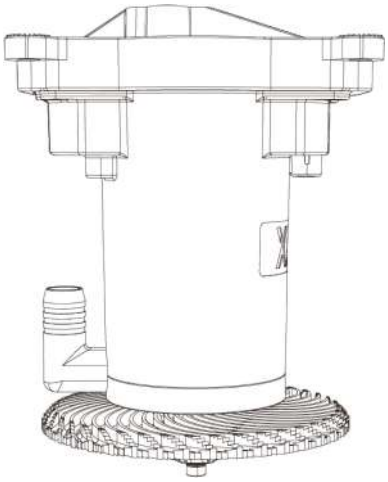
- RTK Base stations need to be set up in open areas with no obstruction in its immediate proximity.
- To be set up at the highest terrain possible.
- Tripod needs to be properly setup and ensure it is stable.
- The level bubbles within 1 ° range.

Battery Inspection

- Inspect the battery level to ensure there are sufficient powers for the planned task.
- For long duration task, it is recommended to connect the RTK Station with an external Power Bank to ensure the RTK station have sufficient battery for the whole task.

# CDA Nozzles

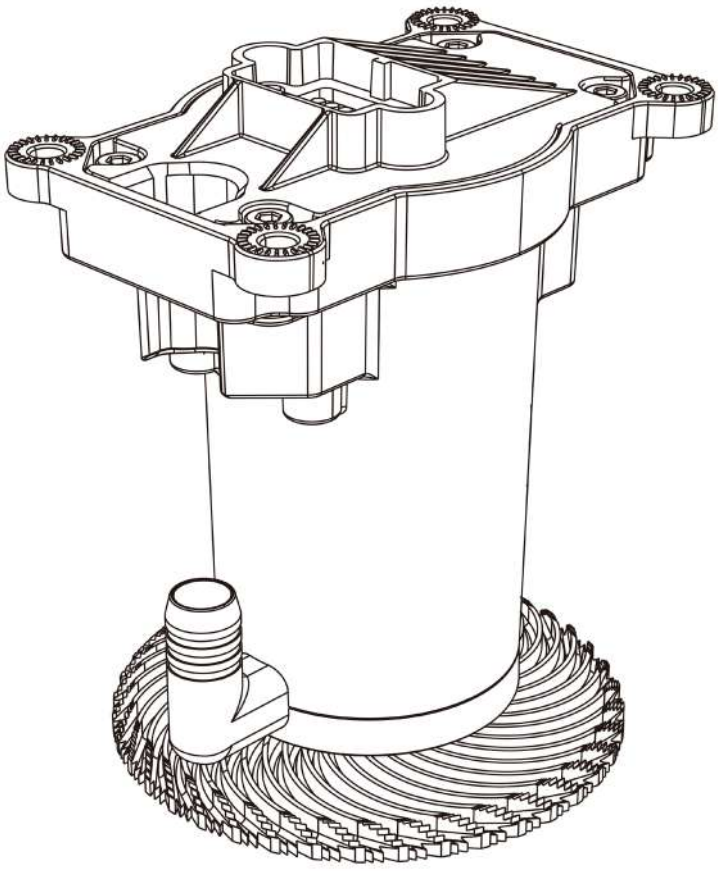
This chapter describes the features of the XAG CDA Nozzles, Spray Swath, and Atomization Level



# CDA Nozzles

XAG CDA Nozzles enables the use of low and ultra-low volumes of spray liquid. This logistical advantage can be of critical importance in crop protection, allowing effective spraying programmes to be undertaken quickly in non-mechanized agriculture and greater spraying productivity in mechanized agriculture. Being able to apply pesticides accurately, quickly and cost - effectively when needed gives the opportunity of fully implementing Integrated Pest Management programmes, with reduced overall pesticide usage.

## DIAGRAM – CDA Nozzles



| XAG P-Series Spray Swath | | | |
|---|---|---|---|
| Height | P10 Swath | P20 Swath | P30 Swath |
| 1.0m | 1.5m | 2.0m | 2.5m |
| 1.5m | 2.0m | 2.5m | 3.0m |
| 2.0m | 2.5m | 3.0m | 3.5m |
| 2.5m | 3.0m | 3.5m | 4.0m |
| 3.0m | 3.5m | 4.0m | 4.5m |
| 3.5m | 4.0m | 4.5m | 5.0m |

| XAG Atomization Level Table | | | |
|---|---|---|---|
| Level | RPM | 2017 | 2018 |
| 1 | 1000 | | 550 um |
| 2 | 2000 | | 285 um |
| 3 | 3000 | 235 um | 200 um |
| 4 | 4000 | 195 um | 165 um |
| 5 | 5000 | 165 um | 150 um |
| 6 | 6000 | 150 um | 135 um |
| 7 | 7000 | 140 um | 125 um |
| 8 | 8000 | 125 um | 120 um |
| 9 | 9000 | 120 um | 115 um |
| 10 | 10000 | 115 um | 110 um |
| 11 | 11000 | 110 um | 105 um |
| 12 | 12000 | 105 um | 100 um |
| 13 | 13000 | 100 um | 95 um |
| 14 | 14000 | 95 um | 95 um |
| 15 | 15000 | 95 um | 90 um |
| 16 | 16000 | 90 um | 85 um |

**IMPORTANT**

The Recommended Spray Height is 2.0M

These Charts is for reference ONLY

# Liquid Container

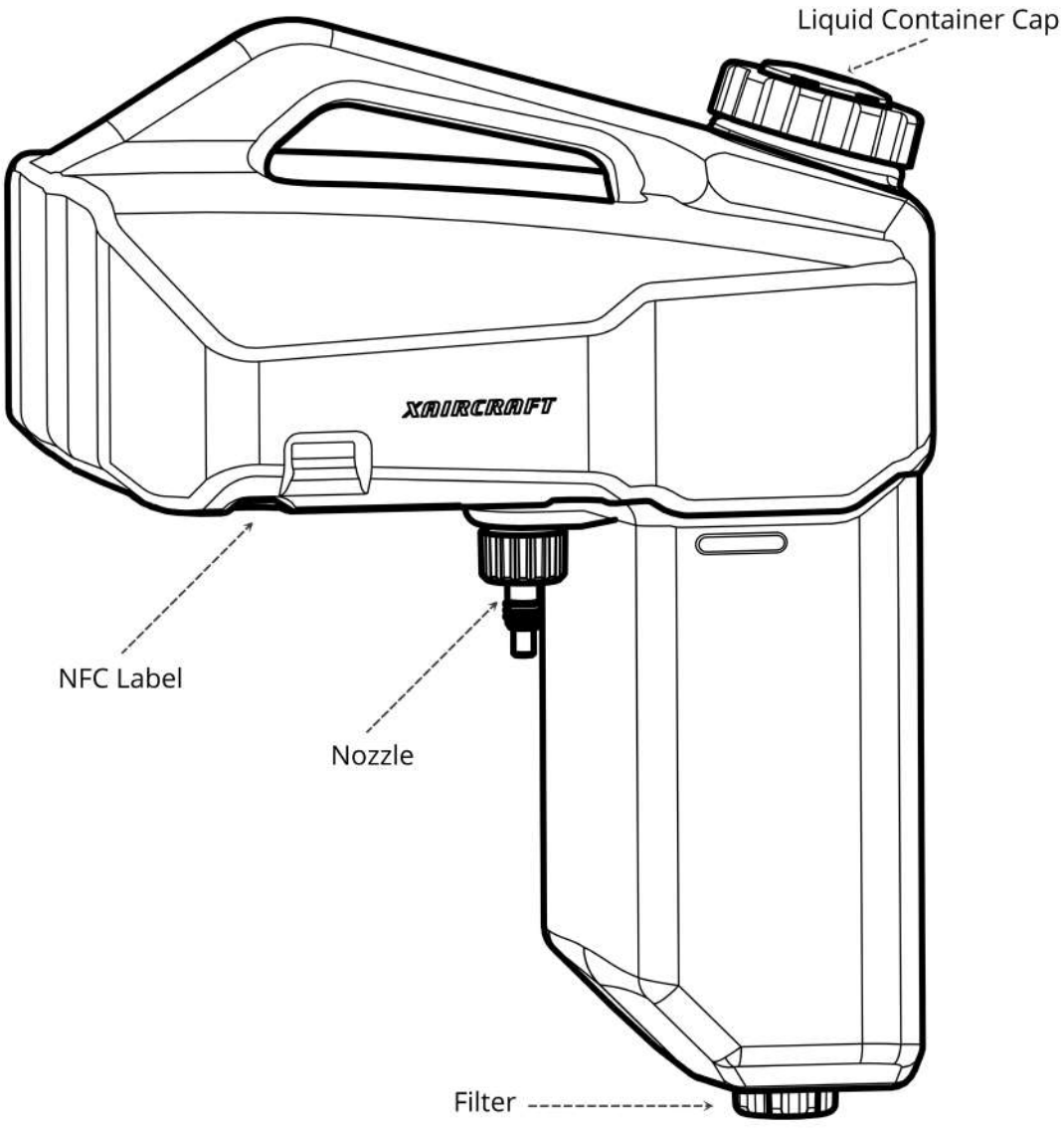
This chapter describes the features of the XAG Liquid Container, contains the diagrams of the 12L Liquid Container with component explanations

# Liquid Container

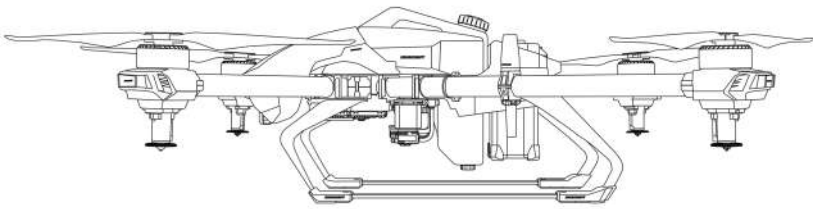
XAG Intelligent Chemical Container of P-SERIES automatically senses chemical density, temperature, and volume, Accurate and Reliable. During the flight, container's information is updated uninterruptedly. Allowing the aircraft to adjust the chemical output and differentiate flying routines, in order to prevent chemical overdose and protect our environment

## DIAGRAM – Liquid Container



# Flight

This chapter describes safe flight practices



# Flight

Ensure that all flights are carried out in an open area. It is important to understand basic flight guidelines for the safety of both you and those around you.

## Flight Environment Requirements

1. Do not use the aircraft in severe weather conditions. These include wind speeds exceeding 8.0 m/s, snow, rain and fog.
2. When flying in open areas, tall and large metal structures may affect the accuracy of the onboard compass and GPS system
3. Avoid obstacles, crowds, high voltage power lines, trees, and bodies of water.
4. Minimize interference by avoiding areas with elevated levels of electromagnetism, including base stations and radio transmission towers.
5. Aircraft and battery performance is subject to environment factors such as air density and temperature. Be very careful when flying at high altitudes, as battery and aircraft performance may be affected.
6. The compass and GNSS will not work in Polar Regions.

## Flight Limits and NO-Fly Zones

All unmanned aerial vehicle (UAV) operators should abide by all regulations set forth by government and regulatory agencies including CASA and ICAO. In Australia, there are two major types of airspace: controlled, and uncontrolled. Controlled airspace in Australia is actively monitored and managed by air traffic controllers.

### Uncontrolled Airspace

You must carry and use a radio if you are flying at or in the vicinity of a certified, registered or military aerodrome that is non-controlled. Carriage and use of radio reduces the risk of mid-air collisions by maximizing separation at aerodromes without air traffic control services. These procedures are enshrined in Civil Aviation Regulations 166, A-E and supporting Civil Aviation Advisory Publications, CAAPs 166-1 and 166-2.

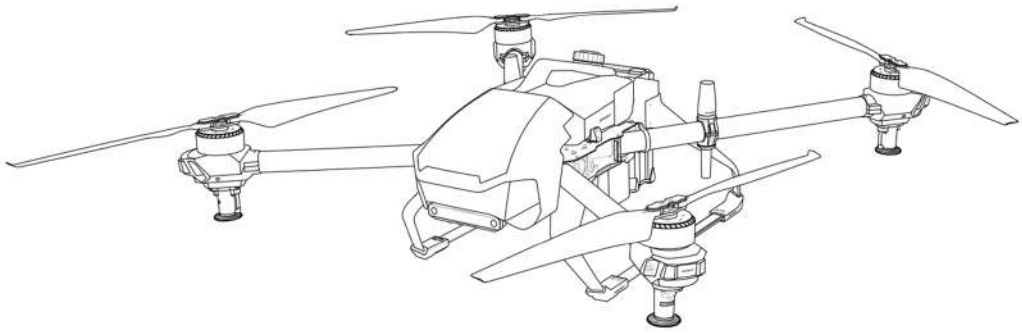
### Controlled Airspace

CASR Part 101 (101.080) requires permission from air traffic control these applications will be assessed by Airservices and if approved, permission is granted to the RPAS operator via CASA. All applications for operations within 3NM of a controlled aerodrome or above 400FT within controlled airspace must be forwarded to the CASA RPAS Office in the first instance. Visit 'Flying drones/remotely piloted aircraft in Australia' (www.casa.gov.au) for more information.

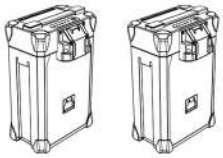
Airservices may approve commercial operations for UAS operations within 3NM (5.5KM) of the movement area of a controlled aerodrome. Some applications are unable to be approved due to the nature of the operation and/or proximity to the aerodrome. Where approved, the RPAS operation may be subject to restrictions of, but not limited to, geographic lateral limits, vertical (altitude) limits, a specific time block and specific communication requirements.

Equipment Checklist

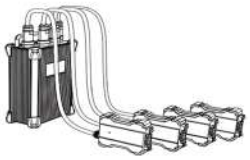
# P30 2018 Agricultural UAV



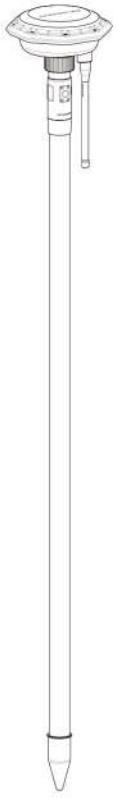
12L Liquid Container
×1



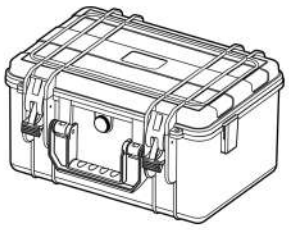
Battery
×2



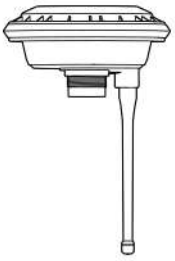
Battery Charger
×1



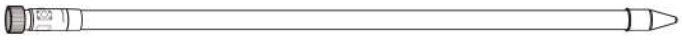
## GNSS RTK ROVER ×1



RTK Carrying Case
×1



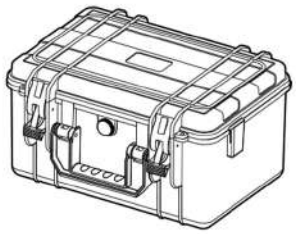
RTK Ground Module
×1



GNSS RTK Extension Rod
(incl. Battery)
×1

# GNSS RTK
# PORTABLE BASE STATION

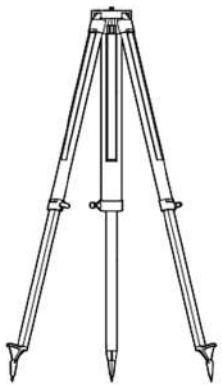
RTK CARRYING CASE
× 1



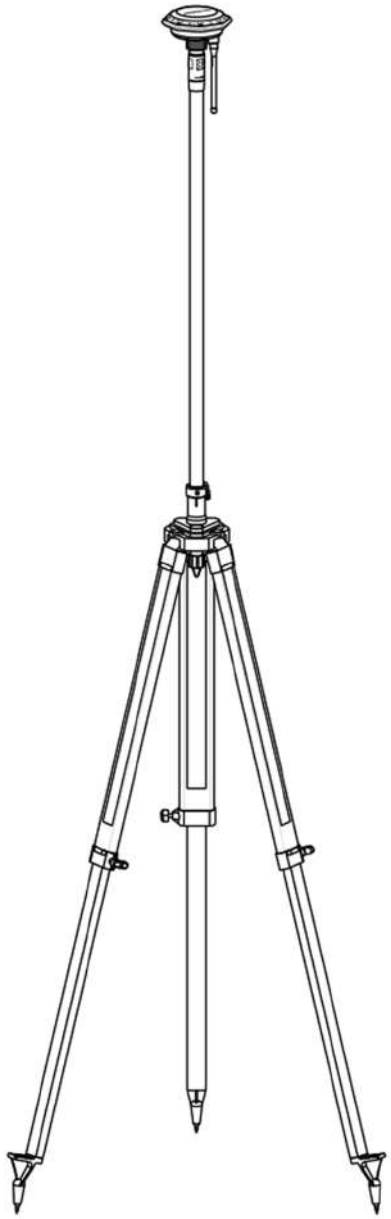
GNSS RTK
GROUND MODULE
× 1

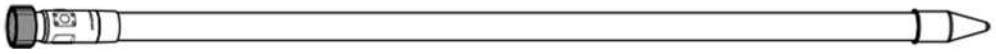
A2 PILOT PHONE
× 1

PART 1
ADAPTER × 1



PART 2
TRIPOD × 1





GNSS RTK EXTENSION ROD
(INCL. BATTERY)
× 1

**IMPORTANT**

1. **Ensure Remote Controller, XAG P-Series Smart Battery, RTK Smart Battery are fully charged**
2. **Propellers are mounted correctly and firmly**
3. **Motors can start and are functioning normally**
4. **UAS Battery is properly inserted and secured**
5. **Liquid Container is properly inserted and secured**
6. **A2 Pilot phone is successfully connected to the aircraft.**

# XAG A2 APP

This chapter describes XAG A2 APP and Task Procedures

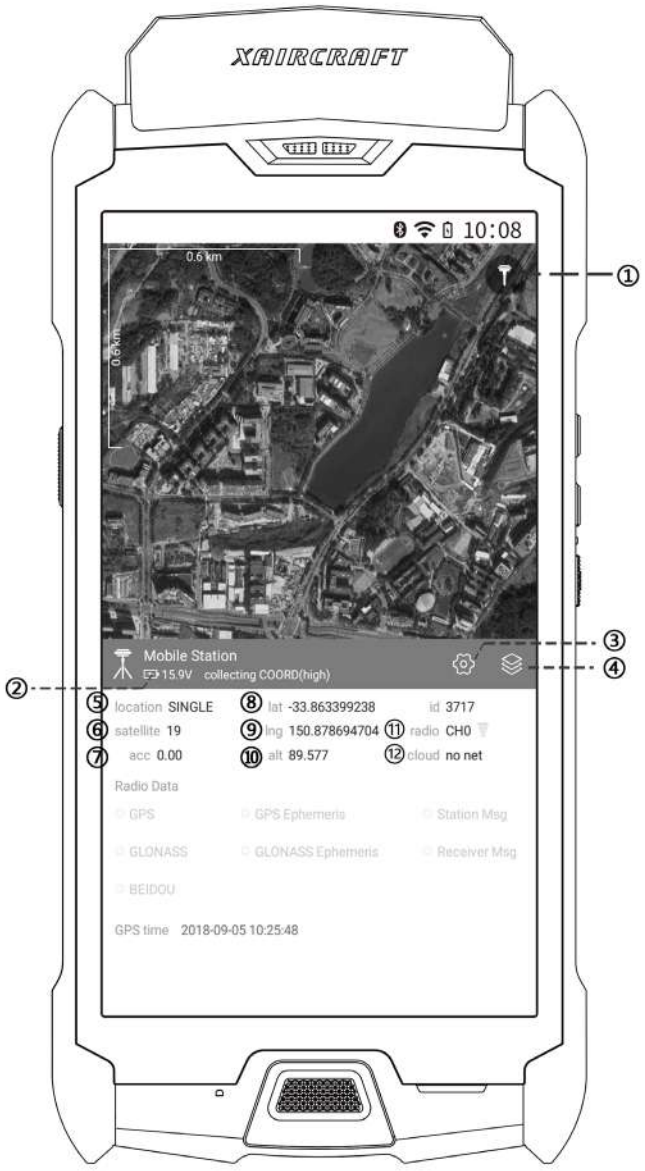

 

# XAG A2 APP

XAG A2 APP is designed for XAG UAS system and is able to display, manage, monitor and configure various settings. After planning a task via the APP, operator can operate XAG UAS autonomously following the automatically generated flight route.

## A2 APP INTERFACE - RTK SETTING

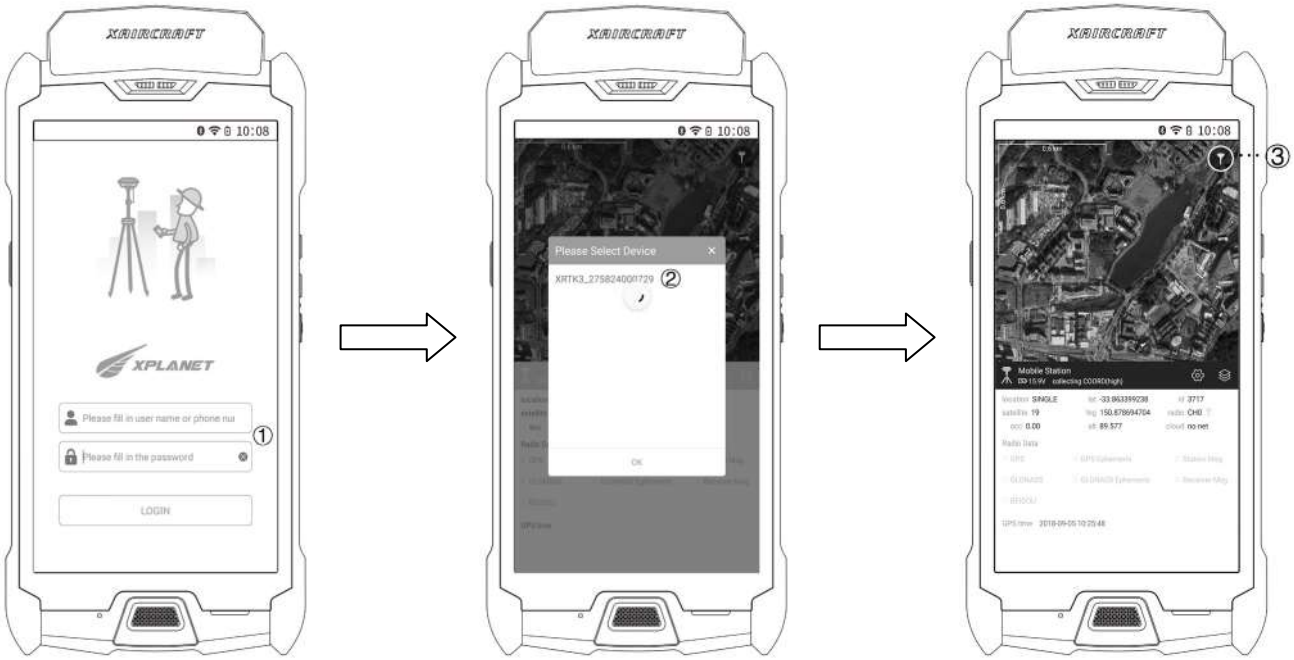
RTK SETTING APP is the main application developed by XAG specifically for XAG Autonomous UAS, this application would allow operator to enhance the precision of position data derived from satellite-based positioning systems (global navigation satellite systems, GNSS) and achieve RTK. Operators are enabled to access and connect to these available RTK Reference point available within range.




1. RTK Real-Time Position
2. Battery Remaining Voltage
3. RTK Settings Menu
4. Module Information
5. Location Status
6. No. of Positioning Satellites
7. Positioning Accuracy
8. Station Latitude
9. Station Longitude
10. Station Altitude
11. Station Current Channel
12. Cloud RTK Status

## INSTRUCTION – RTK SETTING

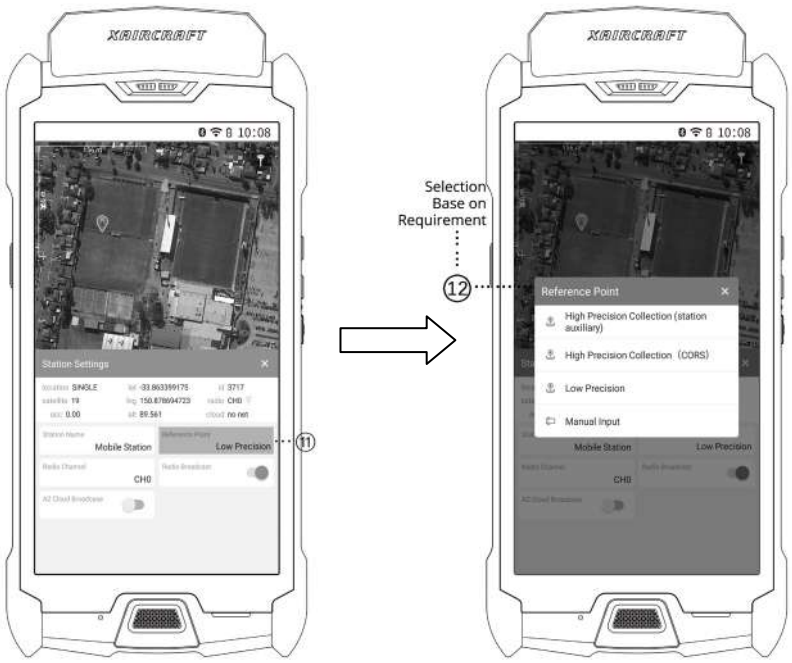
XAG UAS equipped with RTK is an quad copter UAV developed by XAG. It was a purposely designed UAV for fully autonomous flight operation and precision aerial application. The fully autonomous flight operation requires precision accuracy to assist the operation of UAS. Once these processes are completed, Operator will be able to beginning mapping in Mapping APP and pre-plan for operation.



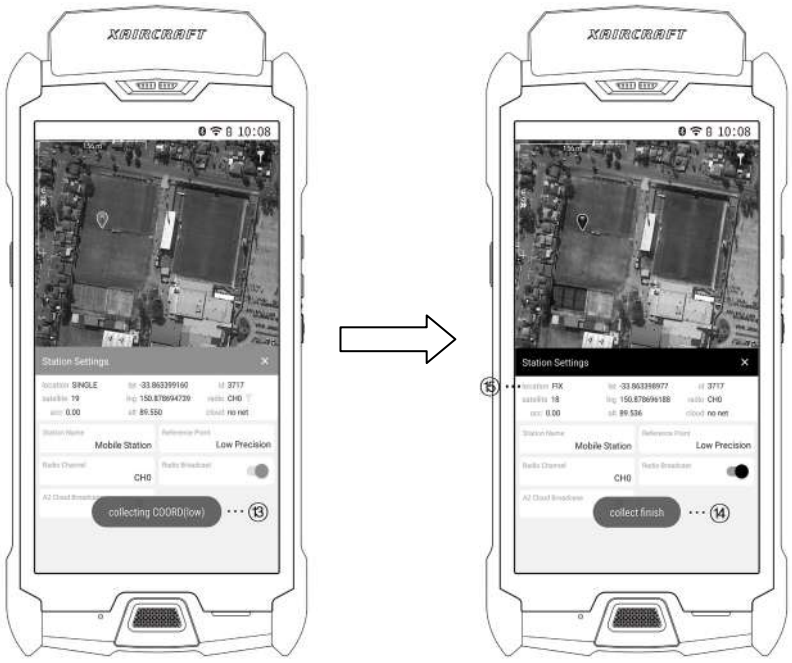

1. Open RTK Setting APP and Login with your Username and Password
2. Once login is successful, operator will require to Select the corresponding RTK Station
3. Select this Icon to Position to Station Real-Time Position


4. The Real-Time Position of the RTK Portable Base Station are displayed here
5. Open RTK Module Information to inspect Device Information and Battery Information
6. Device Information
7. Battery Information
8. Select “RTK Settings Menu”
9. Operators are able to manually adjust RTK Station Name
10. Editing Station name will allow you to identify the station for future easy reference




11. Operators are able to manually adjust RTK **Reference Point** Setting
12. Select one type of Reference point for RTK Station
13. RTK Station is now collecting coordinate from Satellite
14. RTK Station had finished Coordinate collection from Satellite
15. RTK Location is now fixed and ready for UAV Operation



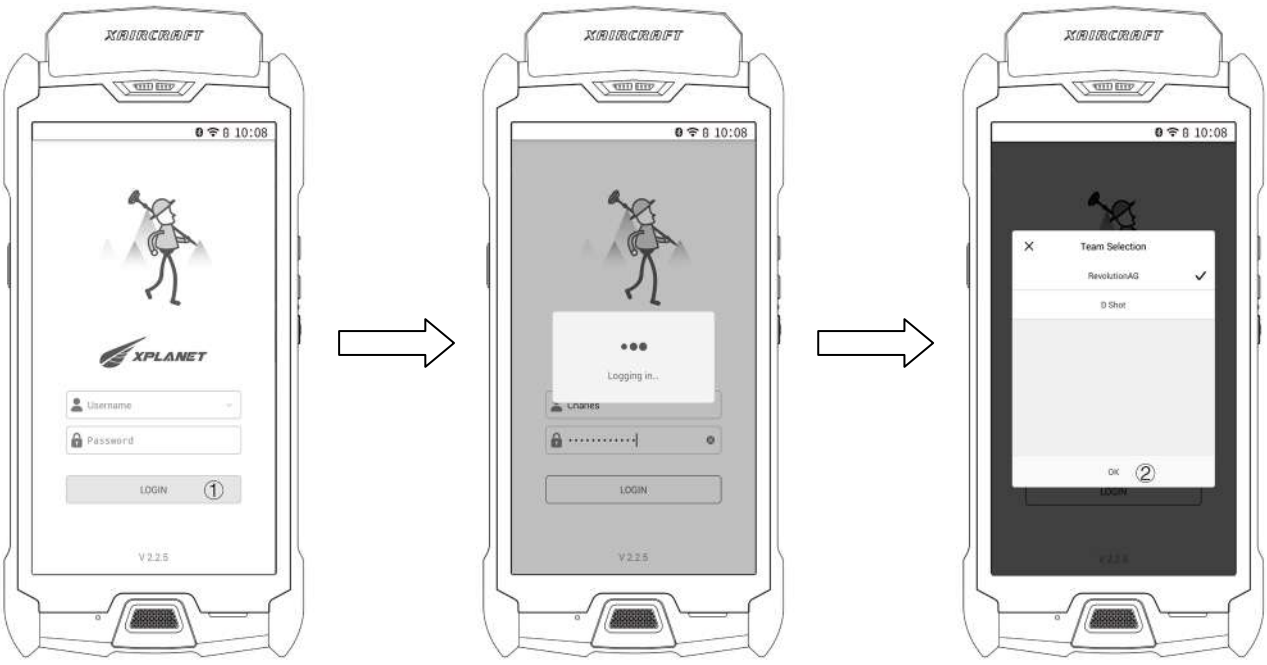
# A2 APP INTERFACE - MAPPING

Mapping APP is the main application developed by XAG XPlanet specifically for XAG P-Series Autonomous Agricultural UAS, this application would allow operator to Create & manage Task, access the server for historical task list, and map the operation area based on the different operation mode.


1. Current Position
2. Map Settings
3. Full/Half Map
4. Measurement Tools
5. Create Farm Task
6. Create New Task
7. Refresh Button
8. Task Information
9. Total No. of Fields
10. Total Acreage Size
11. Task Detail

## INSTRUCTION - MAPPING

XAG P-Series RTK equipped with the SUPERX RTK flight control system is an agricultural quad copter UAV developed by XAG. It was a purposely designed UAV for fully autonomous flight operation and precision aerial application. The fully autonomous flight operation requires a preplan flight route and operation mode and could be planned and generated by XAG A2 APP - Mapping, Operator can access the RTK Rover and plan their field with the use of RTK Rover and A2 Pilotphone. Instructions on how to create and operate their Rover as listed below:

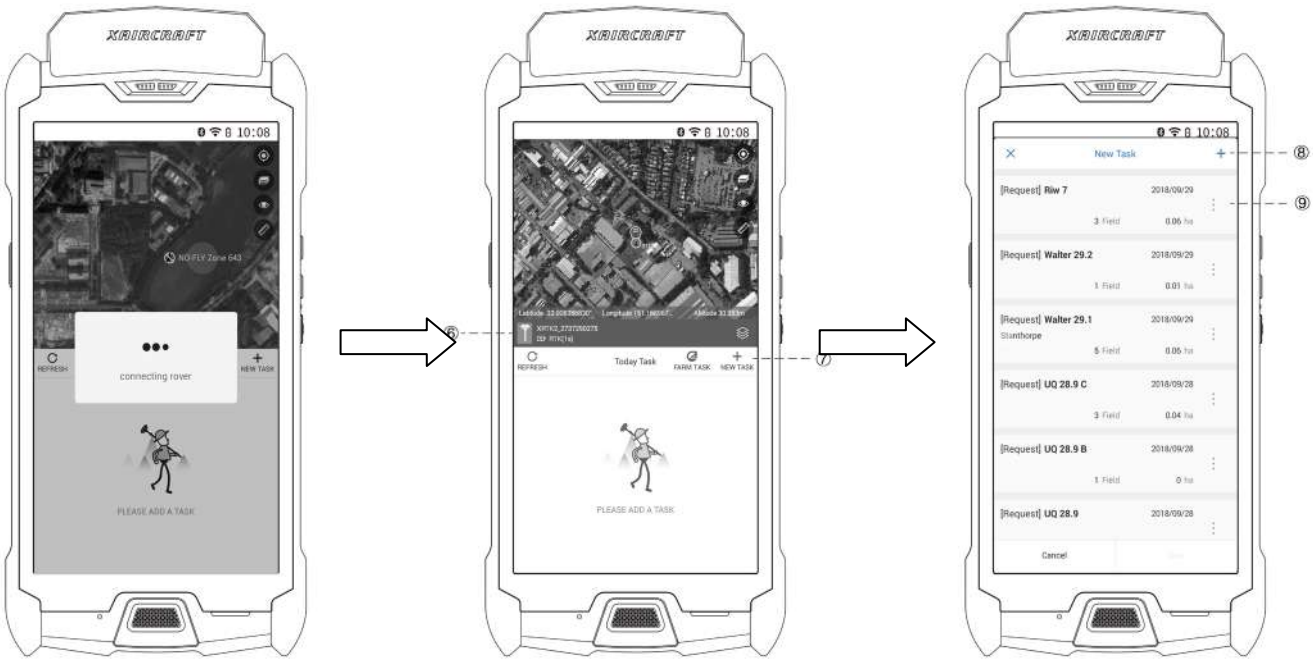



**Mapping APP Login** **Accessing Server** **Team Selection**

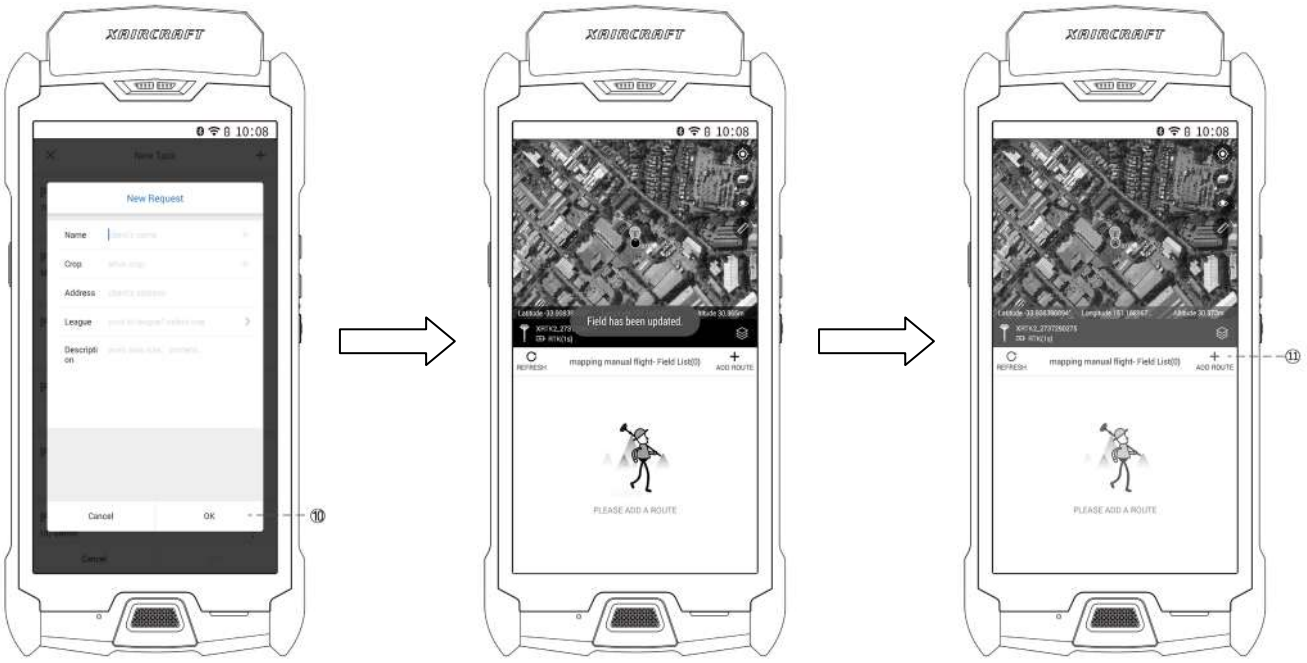
1. Open Mapping APP and log in with your Username and Password;
2. Once Login successful, operator will require to Select the correct Operation Team


**Mapping APP Main Menu** **User Menu** **Rover Connection**

3. Operator is now directed to the Mapping APP Main Menu
   From the Right side of the A2 Pilot Phone, Swipe left to Open user Menu
4. Please ensure your Rover is turned on, then select "Connect Rover"
5. Operator will require to Select the corresponding RTK Rover, then select "OK"
6. When the Rover is successfully connected, your Rover will be shown on a blue banner shown as above.
7. Select "+ NEW TASK" to create a new task
8. Create a new Task by selecting this "+" Icon (Go to Step **) or
9. Create a Task by Historical Task

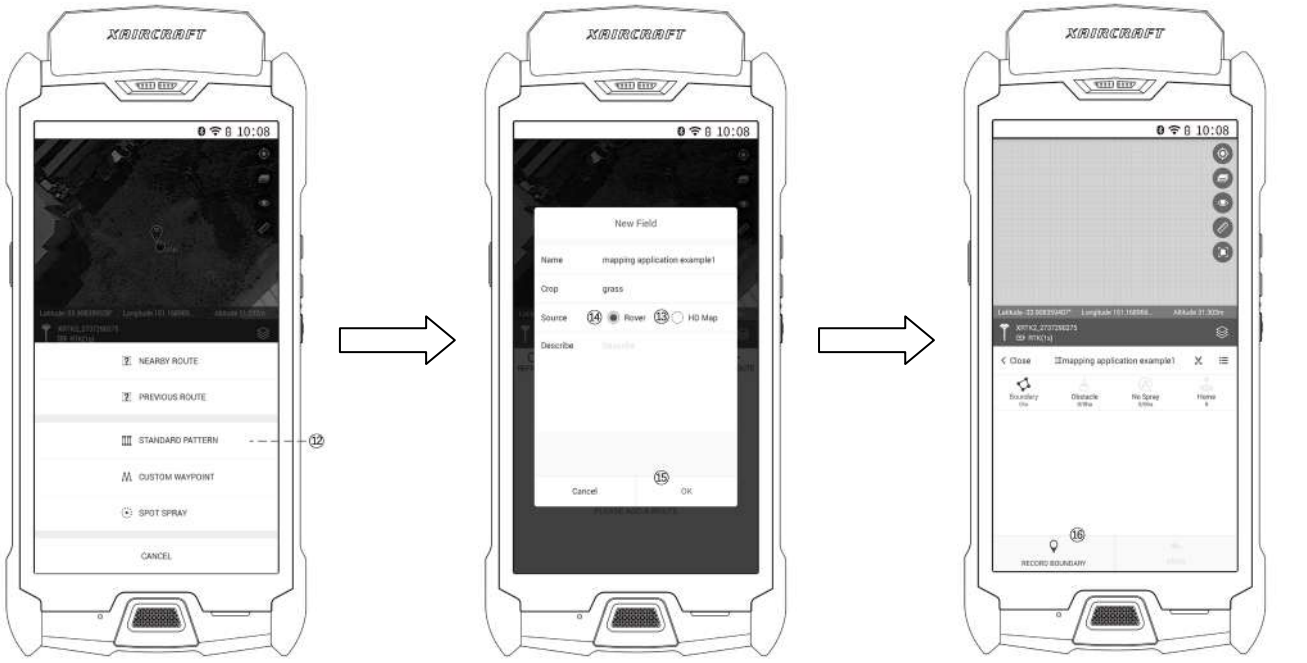



**Connecting to RTK Rover** **+ NEW TASK** **Accessing Server**



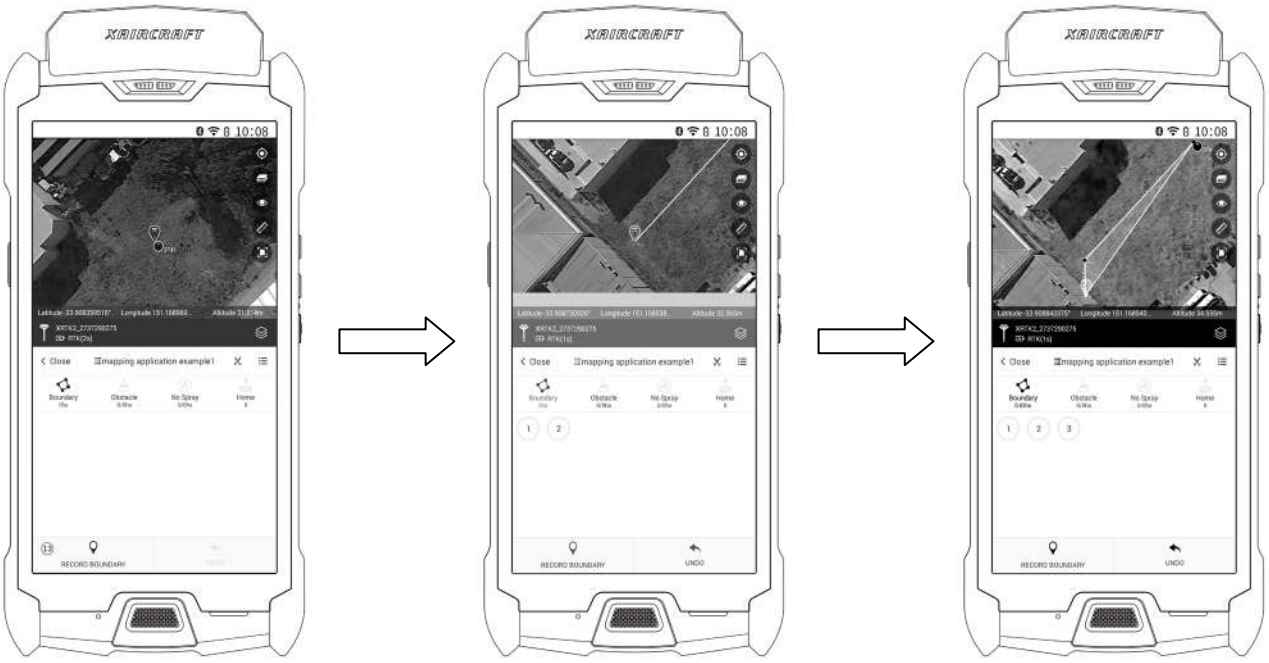

**Task Menu** **Creating Task** **Field List & Add Route**

10. Fill in the Information and Select "OK", File is now updated on XAG Cloud
11. Create a new Route by "+ ADD ROUTE"
12. Select the desired Pattern based on your Task (In this handbook, we will be demonstrating how to create a standard pattern Route for the Task)
13. In this Field Details, operator are able to choose whether to create the standard pattern by HD Map generated by XAG C-Series GeoSurvey, OR
14. Create Standard pattern by Rover
15. Enter the remaining details, and select "OK"
16. Select "RECORD BOUNDARY" to start recording the corners of your Task Field
    Depending on your cellular connectivity, Map might take a few minutes to load.
    Repeat Process until all the corners of your Field had been recorded.




**Route Type Selection** **Field Details** **Boundary Mapping Menu**

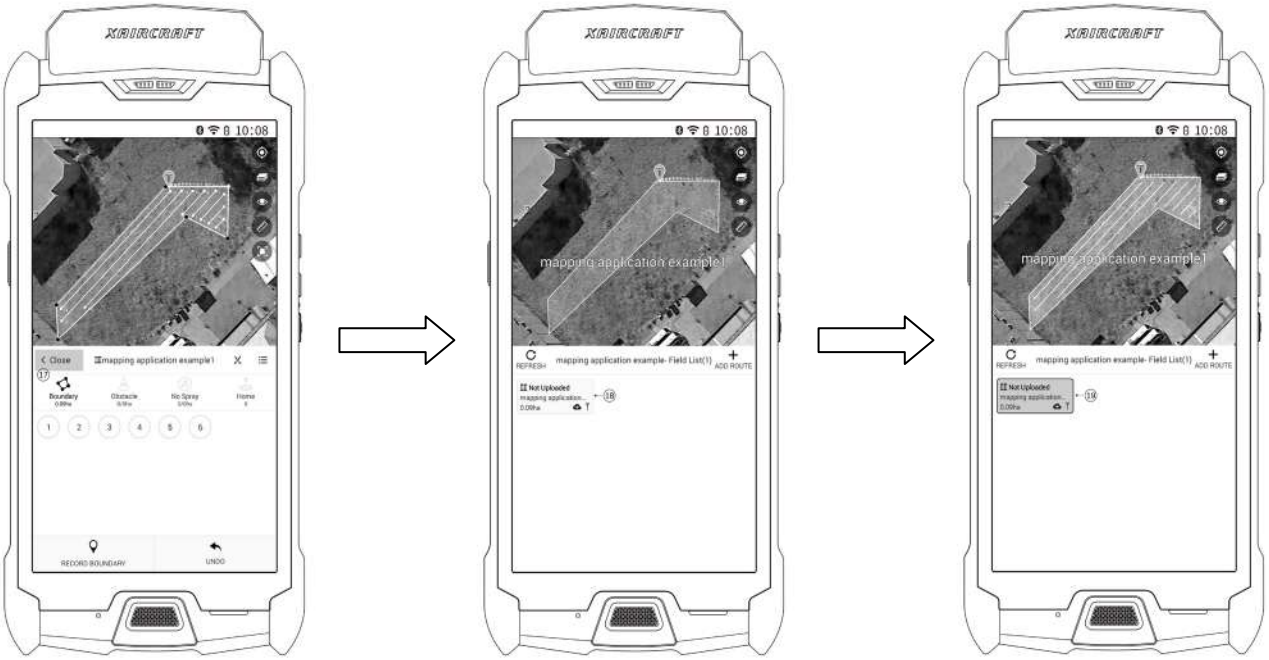


**Recording Corners** **Recording Corners (Continue)** **Recording Corners (Continue)**

17. When all the corners of your field had been recorded. Select one of the outer boundary to generates Flight Path, then Select “Close” to return to Field List

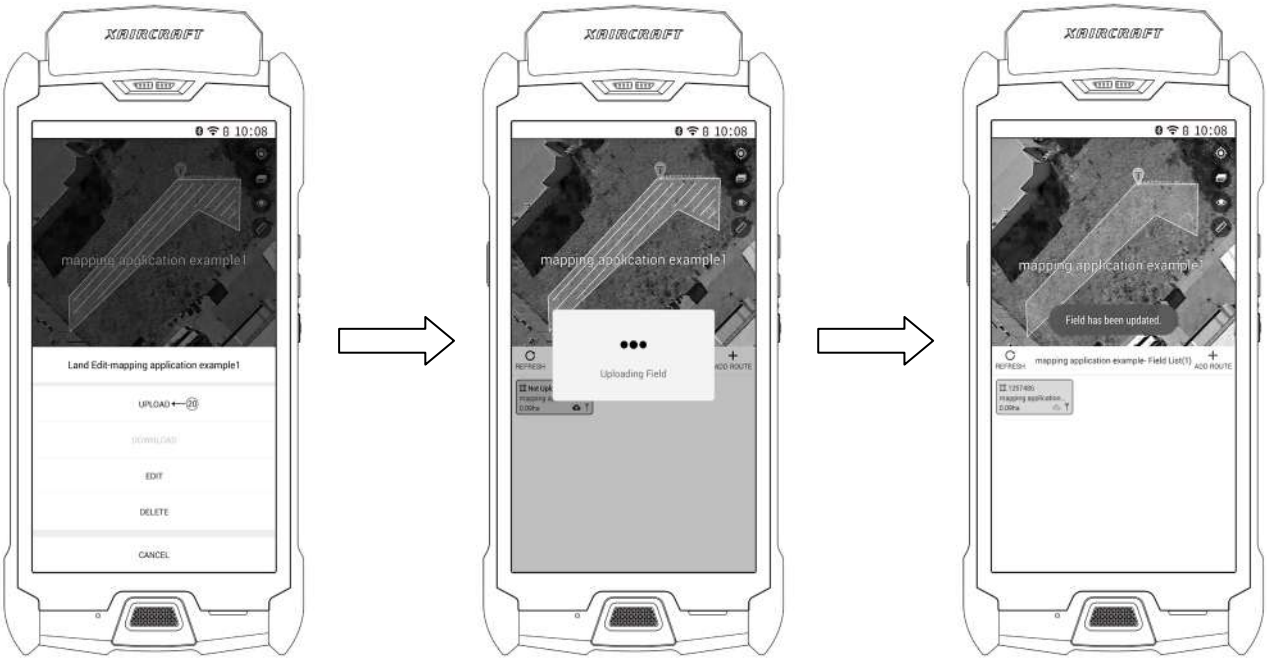
**Recording Corners (Continue)** **Recording Corners (Continue)** **Recording Corners (Continue)**




**Return to Field List** **Select and Press Route** **Opening Option list**

18. Select and Press the Mapping Route you have created until the field is highlighted.
19. When the Route shown in the screen is highlighted, long press the route until an option list appear
20. Upload your Route Data for your Field
21. The Field is now uploading to XAG Cloud and will be available for you once the upload is completed. Operator may now leave the Mapping APP and your created field will now be ready to be operated in the Operation APP

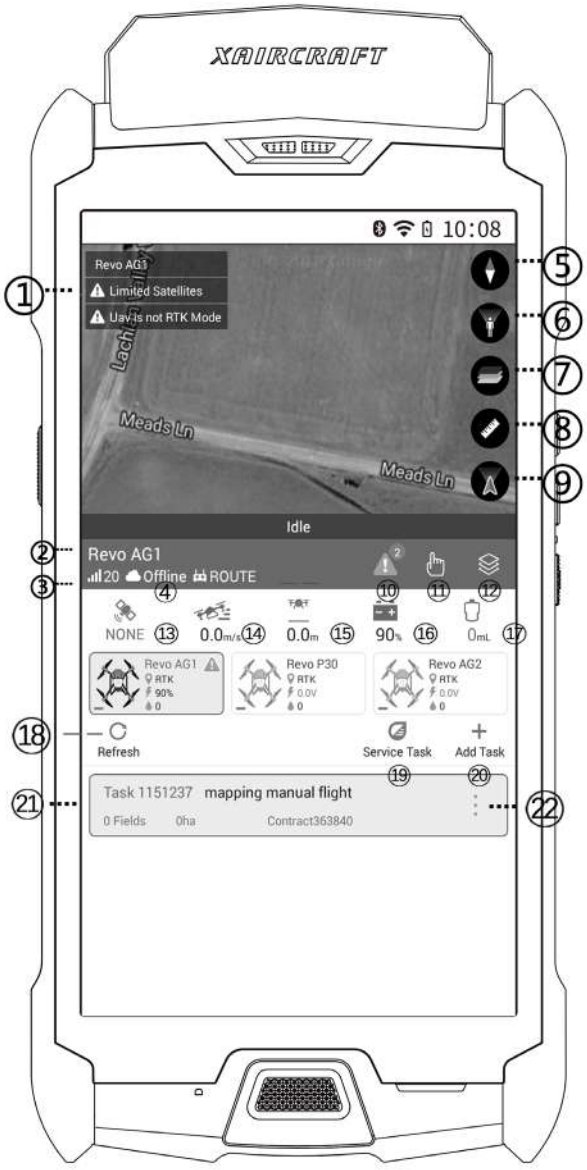



**Upload Route** **Route is now uploading to XAG Cloud** **Mapping COMPLETED**

# A2 APP INTERFACE - OPERATION

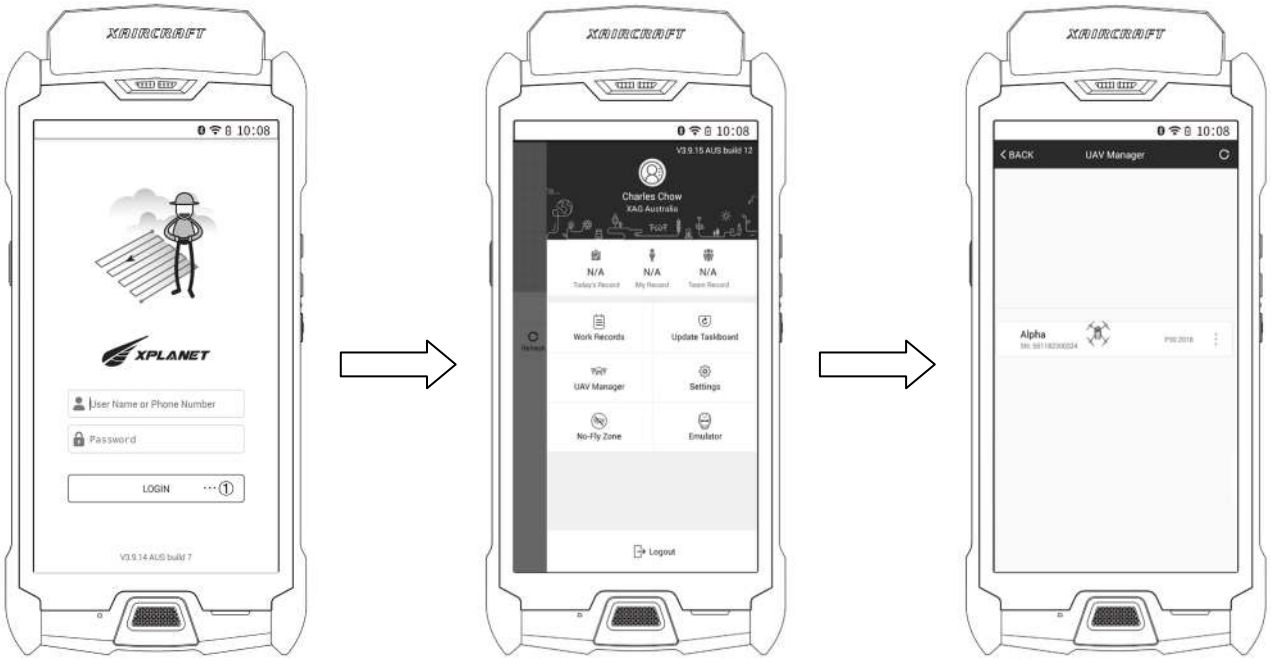
Operation APP is the main application developed by XAG XPlanet specifically for XAG P-Series Autonomous Agricultural UAS, this application would allow user to Create & manage Task, monitor the status of each individual aircraft, and adjust parameters and operate of the UAV.




1. Warning Notification
2. Name of the Selected UAV
3. Radio Status
4. Cloud RTK Status
5. Lock North up Mode
6. Current Position
7. HD/Normal Map
8. Measurement Tools
9. Position to UAV Position
10. Warning Notification
11. UAV Commands
12. UAS Module Information
13. RTK Status
14. Flight Speed
15. Flight Altitude
16. Remaining Battery
17. Remaining Capacity
18. Refresh Button
19. History Task
20. Create New Task
21. Task Details

## Pairing Aircraft

Operator using the XAG P-Series Plant Protection UAV for the first time, operator would needs to pair their aircraft with their account




**Operation APP** **User Menu** **UAV Pairing**

UAV Pairing Procedure

SETP 1 - Open & Login to Operation APP

STEP 2 - From the Right side of the A2 Pilot Phone, Swipe Left to Open User Menu

STEP 3 - Select & Open UAV Manager

STEP 4 - Hold and Drag UAV into Top Section to PAIR UAV

STEP 5 - Follow the on-screen instruction,

- DO NOT TURN ON UAV until Pairing Process Begin
- After the UAV is successfully paired, Verbal Notification will notify Operator that the UAV is successfully connected.
- If the UAV is not successfully paired, Operator would needs to repeat the pairing process.

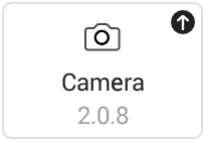
## Pre- Flight Checklist

Prior to beginning any aircraft operations, it is necessary to undertake a pre-flight check of the aircraft. The following is a pre-flight checklist that had been recommended by XAG prior to any operation. Operator can inspect the aircraft conditions by opening **UAS Module Information** from Operation APP.


### UAV Overall Status

This interface provides basic information about the status of individual Component and its version.

**If there is any module requires update, there would a Green ↑ icon on the top right corner.**





### GNSS RTK Module

Open GNSS RTK Module and confirm:

1. GNSS RTK is successfully connected and appear as "Normal"
2. Ensure there are sufficient Satellites for RTK (GPS satellites is ⩾ 10, and stable)


## Battery Module

Open Battery Module and confirm:

1. Remaining Battery (SOC) is ⩾ 30%
2. Ensure there are sufficient Battery for your Task


## Propulsion Module

Open Propulsion Module and perform Motor Test:

1. Select “Test”
2. Operators can Test the Motor by selecting the specific Motor or Test All Motor simultaneously

| WARNING |
| --- |
| **Please stand clear from Aircraft during Motor Testing** |


**Testing Individual Motors**

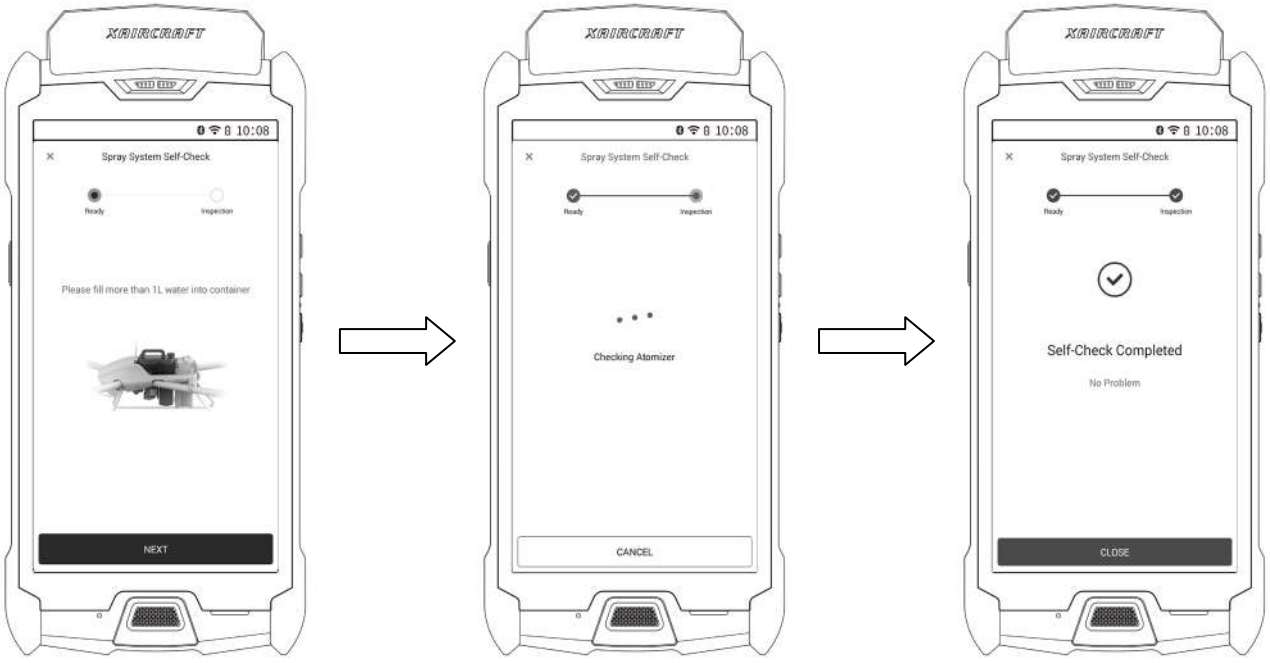

**Testing All Motors**


### Spray System Module

Open Propulsion Module and perform Nozzle Test:

1. Select “Auto Check”
2. Follow the On-screen instruction and perform the system check on Spray System. If there are any problems listed, please perform additional manual check and replace the parts required.

| WARNING |
| --- |
| **DO NOT USE chemical for Spray System Testing** |




**Self-Check Preparation** **Self-Check in Progress** **Testing Result**


Terrain Tracing Module

This interface provide basic information about the Status of Terrain Tracing Component,

Confirm the Status is “OKAY


XCOPE Obstacle Avoidance Module

Open XCOPE Module and confirm the Status is OK

.


Data Link Module

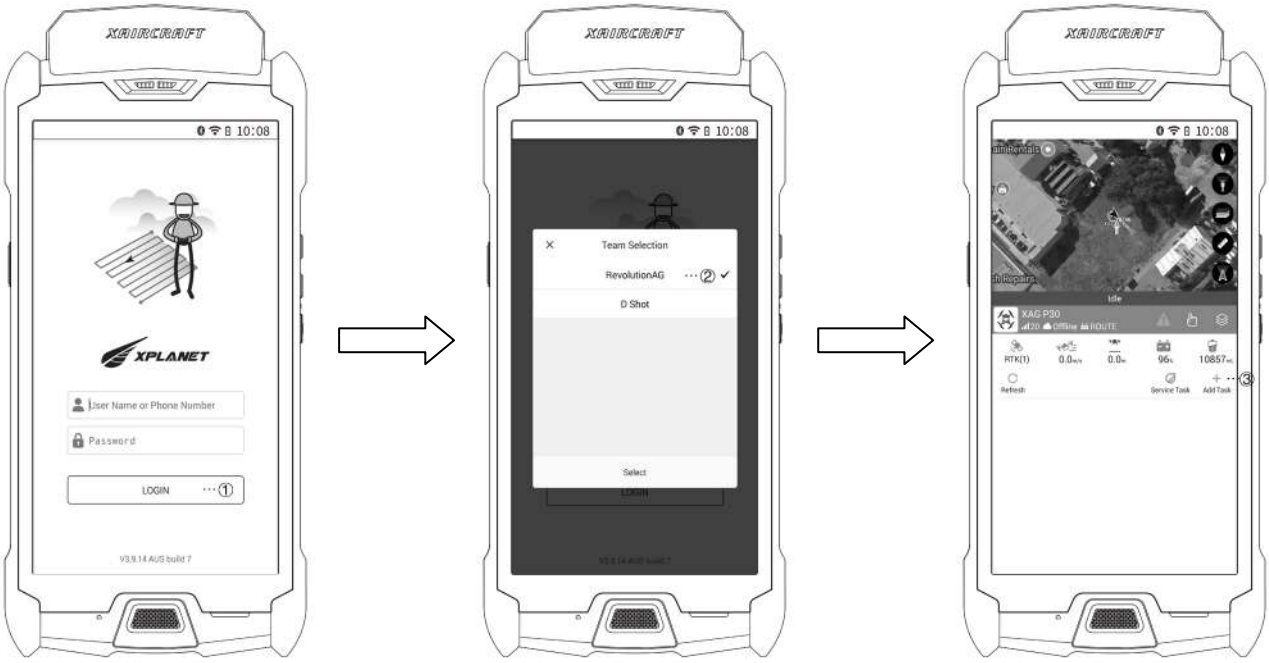
This interface provides basic information about the status of Data Link between the Aircraft and the A2 Pilot Phone.

**WARNING**

- **Confirm the Operation Area is within the RTK Coverage radius**
- **Ensure Aircraft is in GPS Mode (Aircraft Status Indicator – Green Flash x 3)**
- **Ensure Flight Route Safety (Position, Size and Height)**
- **Propellers are in good condition and firmly secured**
- **Nothing obstructing the motors**
- **Motors are in good condition and working**
- **Strong GNSS Satellites**

## INSTRUCTION - OPERATION

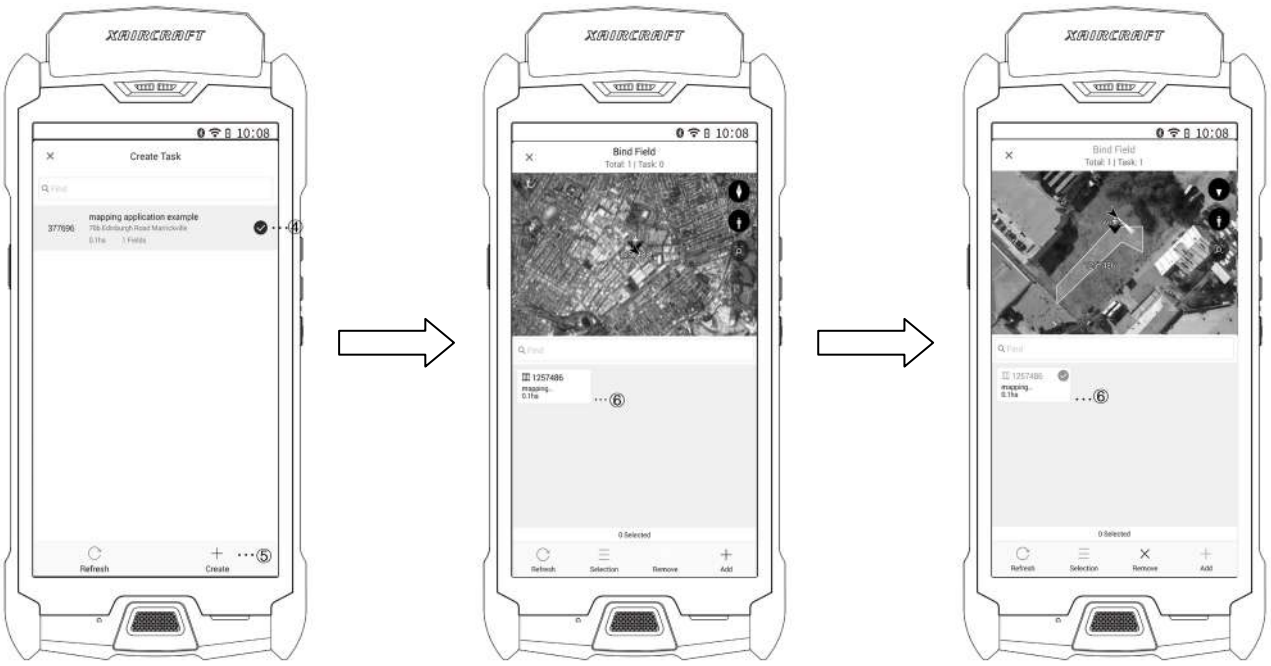
XAG P-Series RTK equipped with the SUPERX RTK flight control system is an agricultural quad copter UAV developed by XAG. It was a purposely designed UAV for fully autonomous flight operation and precision aerial application. The fully autonomous flight operation are created, managed and operated by XAG A2 APP – Operation, Operator can access and manage their daily Task with an XAG account. Instructions on how to create and operate their mission are listed below:




**Operation APP Login** **Team Selection** **Operation APP Main Menu**

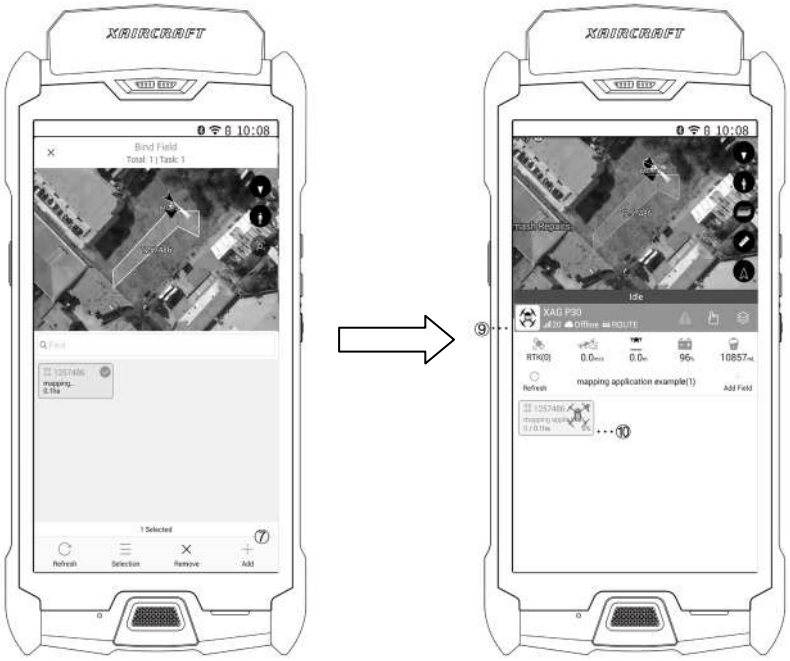
1. Open Operationy APP and Login with your Username and Password
2. Once login is successful, Please select the corresponding Team
3. Operator is now directed to the Operation APP Main Menu

   Add a New Task by selecting “ADD TASK”



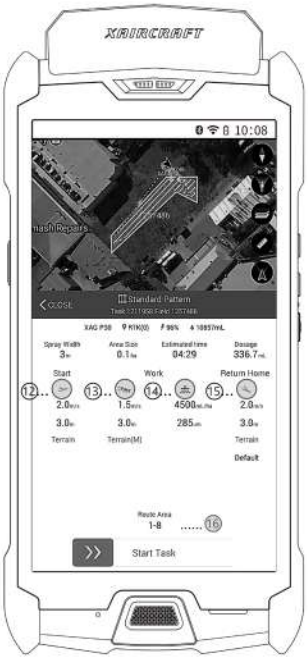

Task Menu | Click the Task and position Map to Field Location | Select & Highlight the Field

4. Select the ***Task*** (Task listed in this Task Menu are created from Mapping APP)
5. Then select "***Create***"
6. Task is now Added and will display Field that had been previously mapped
7. Select the ***Field*** and Select ***+ ADD***
8. The Field is now bonded to this Task
9. ***Press & Hold the UAV***
10. Drag the UAV into the Field
11. Operator is now direction to Operation Overview




Add the Field to Task | Assigning UAV to Field




## Operation Overview

Open Propulsion Module and perform Motor Test:

12. Operation Flight Parameters – Enroute
13. Operation Flight Parameters – Application
14. Operation Flight Parameters – Spray
15. Operation Flight Parameters – RTH
16. Operation Flight Parameters – Flight Route


## Operation Flight Parameters - Enroute

This interface provides basic information about the current Enroute settings for the Task. Click on this section to adjust the settings.

## Speed

Speed of the Aircraft from Take-off point to Mission Point.

## Height

Height of the Aircraft from Take-off point to Mission starts point.

## Terrain

### Enable:

If Terrain Setting is enabled, the aircraft will travel to the Mission start point following the terrain on the preset height.

### Disable:

If Terrain Setting is disabled, the aircraft will travel to the Mission start point following the preset height based on the RTK Station.

## Guide Point Mode

### Mode A:

Aircraft will take-off at the preset height and readjust to operation height at mission start point.

### Mode B:

Aircraft will take-off at the preset height and readjust to operation height at guide point and continue to mission start point at operation height.


## Operation Flight Parameters - Application

This interface provides basic information about the current Operation settings for the Task. Click on this section to adjust the settings.

## Speed

Speed of the Aircraft during Application

## Height

Height of the Aircraft during Application

## Terrain

**Enable:**

If Terrain Setting is enabled, the aircraft will follow the terrain on the preset height during Operation.

**Disable:**

If Terrain Setting is disabled, the aircraft will follow the preset height based on the RTK Station.

## Sensibility

**Low**

Response to change in terrain elevation slowly, recommended for terrain with rapid change in elevation in order to maintain a stable altitude.

**Medium**

Response to change in terrain elevation moderately, recommended for terrain with moderate change in elevation in order to maintain a stable altitude.

**High**

Response to rapid change in terrain elevation, recommended for terrain with gradual change in elevation in order to maintain precise altitude.

## Obstacle Avoidance

**Enable:**

If enabled, the aircraft will avoid any obstacles that had been previously marked by Mapping APP and obstacles that were detected by the APAS Obstacles Avoidance.

**Disable:**

If disabled, the aircraft will ONLY avoid any obstacles that had been previously marked by Mapping.


## Operation Flight Parameters - Spray

This interface provides basic information about the dosage settings for the Task. Click on this section to adjust the settings.

## Dosage

This setting will allow operators to adjust the dosage setting for the UAV to operation in the selected field. Setting are adjustable in mL per ha.

## Atomization

This setting will allow operators to adjust the atomization rate for the UAV in the selected field. Settings are adjustable in between 85 – 550 µm.

.


## Operation Flight Parameters - RTH

This interface provides basic information about the current RTH settings for the Task. Click on this section to adjust the settings.

## Speed

Speed of the Aircraft from Field to Home Point

## Height

Height of the Aircraft from Field to Home Point

## Terrain

### Enable:

If Terrain Setting is enabled, the aircraft will return to the Home Point following the terrain on the preset height.

### Disable:

If Terrain Setting is disabled, the aircraft will return to the Home point following the preset height based on the RTK Station.

## Home Point

### Default

Aircraft will return to original Take-off point.

### Custom:

Aircraft will be redirected to the new position preset by operator upon flight completion.

## Guide Point Mode

### Mode A:

Aircraft will readjust height to preset height before returning to home point.

### Mode B:

Aircraft will readjust height to preset height at Guide point before returning to home point.


## Operation Flight Parameters –Flight Route

This interface provides basic information about the dosage settings for the Task. Click on this section to adjust the settings.

## Standard Pattern

Operator may operate the UAV into a Standard pattern application where the aircraft will operate in an even route pattern within the selected field.

## Border Pattern

Operator may operate the UAV into a Border pattern application where the aircraft will only follows the border of the selected field.

## Start Point

This setting will allow operators to adjust the starting point of the UAV

## Return Point

This setting will allow operators to adjust the return point of the UAV


**Start Button Swipe Right to Start Task** **Safety Checklist** **Confirmation and Start**

17. After Operator are satisfy with the Operation Parameters
    *Swipe Right* on *Start Task* to Begin Safety Checklist
18. Perform Visual Inspection and Confirm there are nobody within 10m of the UAV
19. Perform Visual Inspection and Confirm there are nobody within Flight Route
20. Once Visual Inspection is completed, Operator can now select *Start* to Begin Task
21. The Flight Route is now uploading to the UAV
22. P-SERIES UAV will begin operation in 5 seconds.
23. Task Status should now displayed as "Task Running"
24. Select this icon to open the operation status and monitor the aircraft operation.


**Task Confirmation – Uploading Route** **Task Confirmation – Starting in 5 Seconds** **Task is now Running**


Operation Status

During Operation, It is recommended that operator should monitor the progress of the UAV, and prepare for any unexpected. Operator may command the UAV to:

1. RETURN HOME
2. FORCE LAND
3. PAUSE & RESUME

**WARNING**

- Confirm the Operation Area is within the RTK Coverage radius
- Ensure Aircraft is in GPS Mode (Aircraft Status Indicator – Green Flash x 3)
- Ensure Flight Route Safety (Position, Size and Height)
- Propellers are in good condition and firmly secured
- Nothing obstructing the motors
- Motors are in good condition and working
- Strong GNSS Satellites

## Emergency Procedure

In the event of emergency during Autonomous Operation, users can use the Operation APP Failsafe Option on the A2 Pilot phone to temporary hover or force land the aircraft. The following images describe how to operate during Emergency


### Emergency Landing

During Operation, if an emergency occurred. Operators have the option to press and Hold the Failsafe button on the Left-side of the A2 Pilot Phone, and Drag the UAV from Top to bottom into Landing or temporary pausing any aircraft operation by “Pause”

## Post-Flight Recommendation

Upon Task completion, the aircraft will return to home and land automatically. Once the operation had been completed, or the user of a different chemical are required, XAG recommends the pilots to clean out any possible residue that may remain within the Aircraft and the liquid container. Any residues remaining within the aircraft may pose hazardous to other operating personnel and shorten the operating lifespan of your aircraft. Please follow the instructions below for in-field cleaning:


### Spray System Module

Open Propulsion Module and perform Nozzle Test:

1. Select “Manual Check”
2. Follow the On-screen instruction and perform the system check on Spray System. This functions would allow the pilot to dispense and clean the inner tube from any remaining residue

| WARNING |
| --- |
| **USE ONLY Water for Nozzle Cleaning** |

# Appendix

## Specifications

| P-SERIES Aircraft | | | |
|---|---|---|---|
| Model | P10 2018 RTK | P20 2018 RTK | P30 2018 RTK |
| Dimensions (With Propellers) | 1460*1410*383mm | 1831*1831*472mm | 1945 * 1945 * 440mm |
| Dimensions (Without Propellers) | 1027*946*345mm | 1190*1181*426mm | 1252* 1252* 390mm |
| Body Material | Carbon Fiber + Aluminum Alloy | | |
| Net Weight (Kg) | 10 | 13 | 15 |
| Max Takeoff Weight (MTOW) | 20 | 24.9/28 | 38.5 |
| Max Payload(Kg) | 6 | 8/10 | 15 |
| Flight Controller | SUPERX2 RTK PRO | | SUPERX 3 RTK |
| Night Operation | YES | | |
| APAS Obstacle Avoidance | NO | OPTIONAL | YES |
| MMW Radar Terrain Tracing | YES | | |
| Terrain Tracing Accuracy (m) | ⩽0.1 | | |
| Terrain Tracing Detection Range (m) | ⩽30 | | |
| Navigation Method | GNSS RTK | | |
| Spray Width (m) | 2.5 | 3.0 | 3.5 |
| Efficiency (ha/mission) | 0.7 | 1.3 | 2.0 |
| Operation Efficiency (ha/hr) | 2.6 | 4.0 | 5.3 |
| Max Speed | 8m/s | | |
| Max Flight Time (with XAG Battery) | 20 Minutes | 25 Minutes | 30 Minutes |
| Operating Temperature | -10°Cto 45°C | | |

| P-Series Smart Battery | | | | |
|---|---|---|---|---|
| Model | B12400 | B12620 | B12710 | B12800 |
| Battery Type | Lipo | Lipo | | Lipo |
| Dimension | 183*137*261mm | 183*137*277mm | | 183 * 137 * 302mm |
| Net Weight | 3.85kg | 4.6kg | 5kg | 5.4 kg |
| Rated Capacity | 10000mAh (440Wh) | 14000mAh (620Wh) | 16000mAh (710Wh) | 18000mAh (800Wh) |
| Voltage | 44.4 V | | | |
| Discharge Current | 60 A | 70 A | | 80 A |
| Discharge Power | 3000 W | | | |
| Discharge Temperature | 10°C to 55°C | | | |
| Charging Voltage | 50.4 V | | | |
| Charging Current | 10A | 14A | | 15 A |
| Charging Power | 500W | 700W | | 750 W |
| Charging Temperature | 10°C to 45°C | | | |
| Operating Temperature | -10°C to 45°C | | | |
| Operating Humidity | 30 to 80 %RH | | | |
| Storage Temperature | -10°C to 30°C | | | |
| Storage Humidity | 30 to 50 %RH | | | |

| Propulsion System | | | |
|---|---|---|---|
| Motor Type | Brushless Motor | | |
| Motor Rated Power | 500W | 750W | 900W |
| Motor Drive | FOC | | |
| Motor Lifetime (h) | ⩾ 200 | | |
| Propeller Dimension | 24 inch | 32 inch | 34 inch |
| Propeller Material | Plastic | Carbon Fiber | Carbon Fiber |

| Spraying System | | | |
|---|---|---|---|
| Volume | 6L | 10L | 15L |
| Standard Operation Payload | 6Kg | 10Kg | 15kg |
| Nozzle Type | Rotary Atomization | | |
| Payload Type | Water / Emulsifiable oil / Oil / Powder | | |
| Droplet Size (μm) | 85-550 | | |

| Remote Controller – A2 Pilot Phone | |
|---|---|
| Model | A2 Pilot Phone |
| Dimension | 152.5mm * 76mm * 25.2mm |
| Weight | 261g |
| Ingress Rating | IP 67 Ingress Protection Rating |
| System | Processor: Qualcomm MSM8916<br>RAM: 2Gb LPDDR3<br>ROM: 16Gb eMMC |
| Extended Storage: | Micro SD 64Gb |
| Display Screen | 5inch, 1280 x 720<br>Touch Screen<br>Multi-touch Capacitive Screen |
| Radio Multi-Touch | Frequency Range: 921MHz – 924MHz<br>Receiving sensitivity:-110dBm<br>Maximum Power output: 20mW |
| Network Type | LTE FDD BAND 1/3 |
| Bluetooth | Bluetooth 4.0 |
| WLAN | IEEE 802.11 b/g/n |
| GPS | GPS + GLONASS + BEIDOU, AGPS |
| NFC | 13.56MHz<br>ISO14443A/B<br>ISO15693<br>NFC |
| Sensor | G-Sensor<br>Electronic compass<br>Gyroscope<br>Radial Sensor<br>Proximity Sensor |
| Interface | USB: Micro USB 2.0 OTG<br>STM Card Slot: Micro Card Slot<br>T Card Slot: TF |
| Lithium Polymer Battery | 4660mAh |

| | |
|---|---|
| Standby time | > 300 hours |
| Operate Duration | > 5 hours |
| Charging Time | < 5 hours |
| Operating Temperature | -20°C to 55°C |
| Storage Temperature | -40°C to 70°C |
| Humidity | 5%RH – 95%RH |

| Remote Controller – ARC1 | |
|---|---|
| Model | ARC1 |
| Dimension | 171*105*74mm |
| Weight | 432g |
| Rated Capacity | 2600 mAh |
| Voltage | 7.6V |
| Bluetooth | 4.0 BLE 6.0mw |
| GPS | GPS + GLONASS + BEIDOU |
| Operating Temperature | -20°C to 60°C |
| Charging Temperature | 0°C to 45°C |
| Charging Voltage | 9.0 V |
| Charging Current | 1.5 A |
| Charging Power | 13.5 W (Maximum) |

| GNSS RTK Ground Module | |
|---|---|
| Model | XRG94GJP |
| DC Input | 5.8V 1.5A |
| Signal Tracking | GPS L1/L2<br>GLONASS L1/L2<br>BEIDOUE B1/B2 |
| Horizontal Positioning Accuracy | 1cm + 1ppm |
| Heading Accuracy | ± 0.4° |
| First Time Positioning Duration | Cold Boot: < 50s<br>Warm Boot: < 35s |
| RTK Input | RTCM 3.2 |
| Radio Frequency | 925 to 928 MHz |
| Raido Frequency Range | 3km LOS |
| Radio Receiving Sensitivity | -110dBm |
| Radio Maximum power output | 20mW |
| Network | LTE FDD Band 1/3 |
| Connectors | 8 POP PINS |
| Operating Temperature | -40°C to 85°C |
| Storage Temperature | -55°C to 95°C |
| Bluetooth | BT 4.0LE |

| GNSS RTK Extension Rod + Battery | |
|---|---|
| Model | B4100 |
| Battery Type | Lithium Polymer Battery |
| Dimension | 45 * 45 * 1166mm |

| | |
|---|---|
| Net Weight | 1.2 Kg |
| Rated Capacity | 7500mAh |
| Voltage | 14.4 V |
| Discharge Current | 1.0 A |
| Discharge Temperature | -10° to 45° |
| Charging Voltage (USB Type-C) | 12.0 V |
| Charging Temperature | 10° to 45° |
| Storage Temperature | -10°C to 35°C |
| Storage Humidity | 30 to 50 %RH |

| Smart Battery Charger – Power Hub | |
|---|---|
| Model | CM4750 |
| Dimension | 164.8 * 106.8 * 301.5mm |
| Net Weight | 3.4 kg |
| Output Power | 756 W |
| Output Current | 15 ± 0.2A |
| Output Voltage | DC 50.4 ± 0.2 V |
| Input Current | 9A (Maximum) |
| Input Voltage | AC 90-260V |
| Operating Temperature | -20°C to 45°C |
| Storage Temperature | -20°C to 45°C |
| Storage Humidity | 10 to 90 %RH |
| Safety Standard | GB 4943+, ISO6469-3 |

## XAG Firmware Update

Use XAG A2 Pilot phone Firmware Center app  to update any XAG product

Firmware Update

1. Open APP – Firmware Center
2. Select the Product to Update (XAG P-Series UAV, RTK Station, A2 Pilot Phone, or XPilot)
3. Follow the On-screen instruction

Restart the Module Component after the firmware upgrade is completed

The content of this Pilot Operating Handbook are subject to change

Download the latest version from

**********

If you have any question about this document, please contact your supplier or contact us by sending an enquiry in the following method:

P: +61 2 9168 7918

E: Info@xagaustralia.com.au