U.S. Department
of Transportation
**Federal Aviation
Administration**

800 Independence Ave., S.W.
Washington, D.C. 20591

October 1, 2015

Exemption No. 13051
Regulatory Docket No. FAA−2015−2789

Mr. Paul Kolfenbach
31926 Rosales Ave
Murrieta, CA 92563

Dear Mr. Kolfenbach:

This letter is to inform you that we have granted your request for exemption. It transmits our decision, explains its basis, and gives you the conditions and limitations of the exemption, including the date it ends.

By letter posted to the public docket on July 13, 2015, you petitioned the Federal Aviation Administration (FAA) for an exemption. You requested to operate an unmanned aircraft system (UAS) to conduct aerial photography, cinematography, videography, mapping, crop surveying, and inspections.

See the docket, at www.regulations.gov, for the petition submitted to the FAA describing the proposed operations and the regulations that the petitioner seeks an exemption.

The FAA has determined that good cause exists for not publishing a summary of the petition in the Federal Register because the requested exemption would not set a precedent, and any delay in acting on this petition would be detrimental to the petitioner.

Airworthiness Certification

The UAS proposed by the petitioner is a DJI Phantom 2 Vision+.

In accordance with the statutory criteria provided in Section 333 of Public Law 112−95 in reference to 49 U.S.C. § 44704, and in consideration of the size, weight, speed, and limited operating area associated with the aircraft and its operation, the Secretary of Transportation has determined that this aircraft meets the conditions of Section 333. Therefore, the FAA finds that relief from 14 CFR part 21, *Certification procedures for products and parts,*

Subpart H—Airworthiness Certificates, and any associated noise certification and testing requirements of part 36, is not necessary.

The Basis for Our Decision

You have requested to use a UAS for aerial data collection[1]. The FAA has issued grants of exemption in circumstances similar in all material respects to those presented in your petition. In Grants of Exemption Nos. 11062 to Astraeus Aerial (*see* Docket No. FAA−2014−0352), 11109 to Clayco, Inc. (*see* Docket No. FAA−2014−0507), 11112 to VDOS Global, LLC (*see* Docket No. FAA−2014−0382), and 11213 to Aeryon Labs, Inc. (*see* Docket No. FAA−2014−0642), the FAA found that the enhanced safety achieved using an unmanned aircraft (UA) with the specifications described by the petitioner and carrying no passengers or crew, rather than a manned aircraft of significantly greater proportions, carrying crew in addition to flammable fuel, gives the FAA good cause to find that the UAS operation enabled by this exemption is in the public interest.

Having reviewed your reasons for requesting an exemption, I find that—

- They are similar in all material respects to relief previously requested in Grant of Exemption Nos. 11062, 11109, 11112, and 11213;
- The reasons stated by the FAA for granting Exemption Nos. 11062, 11109, 11112, and 11213 also apply to the situation you present; and
- A grant of exemption is in the public interest.

Our Decision

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. 106(f), 40113, and 44701, delegated to me by the Administrator, Mr. Paul Kolfenbach is granted an exemption from 14 CFR §§ 61.23(a) and (c), 61.101(e)(4) and (5), 61.113(a), 61.315(a), 91.7(a), 91.119(c), 91.121, 91.151(a)(1), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b), to the extent necessary to allow the petitioner to operate a UAS to perform aerial data collection. This exemption is subject to the conditions and limitations listed below.

Conditions and Limitations

In this grant of exemption, Mr. Paul Kolfenbach is hereafter referred to as the operator.

[1] Aerial data collection includes any remote sensing and measuring by an instrument(s) aboard the UA. Examples include imagery (photography, video, infrared, etc.), electronic measurement (precision surveying, RF analysis, etc.), chemical measurement (particulate measurement, etc.), or any other gathering of data by instruments aboard the UA.

Failure to comply with any of the conditions and limitations of this grant of exemption will be grounds for the immediate suspension or rescission of this exemption.

1. Operations authorized by this grant of exemption are limited to the DJI Phantom 2 Vision+ when weighing less than 55 pounds including payload. Proposed operations of any other aircraft will require a new petition or a petition to amend this exemption.

2. Operations for the purpose of closed-set motion picture and television filming are not permitted.

3. The UA may not be operated at a speed exceeding 87 knots (100 miles per hour). The exemption holder may use either groundspeed or calibrated airspeed to determine compliance with the 87 knot speed restriction. In no case will the UA be operated at airspeeds greater than the maximum UA operating airspeed recommended by the aircraft manufacturer.

4. The UA must be operated at an altitude of no more than 400 feet above ground level (AGL). Altitude must be reported in feet AGL.

5. The UA must be operated within visual line of sight (VLOS) of the PIC at all times. This requires the PIC to be able to use human vision unaided by any device other than corrective lenses, as specified on the PIC's FAA-issued airman medical certificate or U.S. driver's license.

6. All operations must utilize a visual observer (VO). The UA must be operated within the visual line of sight (VLOS) of the PIC and VO at all times. The VO may be used to satisfy the VLOS requirement as long as the PIC always maintains VLOS capability. The VO and PIC must be able to communicate verbally at all times; electronic messaging or texting is not permitted during flight operations. The PIC must be designated before the flight and cannot transfer his or her designation for the duration of the flight. The PIC must ensure that the VO can perform the duties required of the VO.

7. This exemption and all documents needed to operate the UAS and conduct its operations in accordance with the conditions and limitations stated in this grant of exemption, are hereinafter referred to as the operating documents. The operating documents must be accessible during UAS operations and made available to the Administrator upon request. If a discrepancy exists between the conditions and limitations in this exemption and the procedures outlined in the operating documents, the conditions and limitations herein take precedence and must be followed. Otherwise, the operator must follow the procedures as outlined in its operating documents. The operator may update or revise its operating documents. It is the operator's responsibility to track such revisions and present updated and revised documents to the Administrator or any law enforcement official upon request. The

operator must also present updated and revised documents if it petitions for extension or amendment to this grant of exemption. If the operator determines that any update or revision would affect the basis upon which the FAA granted this exemption, then the operator must petition for an amendment to its grant of exemption. The FAA's UAS Integration Office (AFS−80) may be contacted if questions arise regarding updates or revisions to the operating documents.

8. Any UAS that has undergone maintenance or alterations that affect the UAS operation or flight characteristics, e.g., replacement of a flight critical component, must undergo a functional test flight prior to conducting further operations under this exemption. Functional test flights may only be conducted by a PIC with a VO and must remain at least 500 feet from other people. The functional test flight must be conducted in such a manner so as to not pose an undue hazard to persons and property.

9. The operator is responsible for maintaining and inspecting the UAS to ensure that it is in a condition for safe operation.

10. Prior to each flight, the PIC must conduct a pre-flight inspection and determine the UAS is in a condition for safe flight. The pre-flight inspection must account for all potential discrepancies, e.g., inoperable components, items, or equipment. If the inspection reveals a condition that affects the safe operation of the UAS, the aircraft is prohibited from operating until the necessary maintenance has been performed and the UAS is found to be in a condition for safe flight.

11. The operator must follow the UAS manufacturer's maintenance, overhaul, replacement, inspection, and life limit requirements for the aircraft and aircraft components.

12. Each UAS operated under this exemption must comply with all manufacturer safety bulletins.

13. Under this grant of exemption, a PIC must hold either an airline transport, commercial, private, recreational, or sport pilot certificate. The PIC must also hold a current FAA airman medical certificate or a valid U.S. driver's license issued by a state, the District of Columbia, Puerto Rico, a territory, a possession, or the Federal government. The PIC must also meet the flight review requirements specified in 14 CFR § 61.56 in an aircraft in which the PIC is rated on his or her pilot certificate.

14. The operator may not permit any PIC to operate unless the PIC demonstrates the ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption, including evasive and emergency maneuvers and maintaining appropriate distances from persons, vessels, vehicles and structures. PIC qualification flight hours and currency must be logged in a manner consistent with 14 CFR § 61.51(b). Flights for the purposes of training the operator's PICs and VOs

(training, proficiency, and experience-building) and determining the PIC's ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption are permitted under the terms of this exemption. However, training operations may only be conducted during dedicated training sessions. During training, proficiency, and experience-building flights, all persons not essential for flight operations are considered nonparticipants, and the PIC must operate the UA with appropriate distance from nonparticipants in accordance with 14 CFR § 91.119.

15. UAS operations may not be conducted during night, as defined in 14 CFR § 1.1. All operations must be conducted under visual meteorological conditions (VMC). Flights under special visual flight rules (SVFR) are not authorized.

16. The UA may not operate within 5 nautical miles of an airport reference point (ARP) as denoted in the current FAA Airport/Facility Directory (AFD) or for airports not denoted with an ARP, the center of the airport symbol as denoted on the current FAA-published aeronautical chart, unless a letter of agreement with that airport's management is obtained or otherwise permitted by a COA issued to the exemption holder. The letter of agreement with the airport management must be made available to the Administrator or any law enforcement official upon request.

17. The UA may not be operated less than 500 feet below or less than 2,000 feet horizontally from a cloud or when visibility is less than 3 statute miles from the PIC.

18. If the UAS loses communications or loses its GPS signal, the UA must return to a pre-determined location within the private or controlled-access property.

19. The PIC must abort the flight in the event of unpredicted obstacles or emergencies.

20. The PIC is prohibited from beginning a flight unless (considering wind and forecast weather conditions) there is enough available power for the UA to conduct the intended operation and to operate after that for at least 5 minutes or with the reserve power recommended by the manufacturer if greater.

21. Air Traffic Organization (ATO) Certificate of Waiver or Authorization (COA). All operations shall be conducted in accordance with an ATO-issued COA. The exemption holder may apply for a new or amended COA if it intends to conduct operations that cannot be conducted under the terms of the enclosed COA.

22. All aircraft operated in accordance with this exemption must be identified by serial number, registered in accordance with 14 CFR part 47, and have identification (N−Number) markings in accordance with 14 CFR part 45, Subpart C. Markings must be as large as practicable.

23. Documents used by the operator to ensure the safe operation and flight of the UAS and any documents required under 14 CFR §§ 91.9 and 91.203 must be available to the PIC at the Ground Control Station of the UAS any time the aircraft is operating. These documents must be made available to the Administrator or any law enforcement official upon request.

24. The UA must remain clear and give way to all manned aviation operations and activities at all times.

25. The UAS may not be operated by the PIC from any moving device or vehicle.

26. All Flight operations must be conducted at least 500 feet from all nonparticipating persons, vessels, vehicles, and structures unless:
    a. Barriers or structures are present that sufficiently protect nonparticipating persons from the UA and/or debris in the event of an accident. The operator must ensure that nonparticipating persons remain under such protection. If a situation arises where nonparticipating persons leave such protection and are within 500 feet of the UA, flight operations must cease immediately in a manner ensuring the safety of nonparticipating persons; and
    b. The owner/controller of any vessels, vehicles or structures has granted permission for operating closer to those objects and the PIC has made a safety assessment of the risk of operating closer to those objects and determined that it does not present an undue hazard.

    The PIC, VO, operator trainees or essential persons are not considered nonparticipating persons under this exemption.

27. All operations shall be conducted over private or controlled-access property with permission from the property owner/controller or authorized representative. Permission from property owner/controller or authorized representative will be obtained for each flight to be conducted.

28. Any incident, accident, or flight operation that transgresses the lateral or vertical boundaries of the operational area as defined by the applicable COA must be reported to the FAA's UAS Integration Office (AFS−80) within 24 hours. Accidents must be reported to the National Transportation Safety Board (NTSB) per instructions contained on the NTSB Web site: www.ntsb.gov.

If this exemption permits operations for the purpose of closed-set motion picture and television filming and production, the following additional conditions and limitations apply.

29. The operator must have a motion picture and television operations manual (MPTOM) as documented in this grant of exemption.

30. At least 3 days before aerial filming, the operator of the UAS affected by this exemption must submit a written Plan of Activities to the local Flight Standards District Office (FSDO) with jurisdiction over the area of proposed filming. The 3-day notification may be waived with the concurrence of the FSDO. The plan of activities must include at least the following:
    a. Dates and times for all flights;
    b. Name and phone number of the operator for the UAS aerial filming conducted under this grant of exemption;
    c. Name and phone number of the person responsible for the on-scene operation of the UAS;
    d. Make, model, and serial or N−Number of UAS to be used;
    e. Name and certificate number of UAS PICs involved in the aerial filming;
    f. A statement that the operator has obtained permission from property owners and/or local officials to conduct the filming production event; the list of those who gave permission must be made available to the inspector upon request;
    g. Signature of exemption holder or representative; and
    h. A description of the flight activity, including maps or diagrams of any area, city, town, county, and/or state over which filming will be conducted and the altitudes essential to accomplish the operation.

31. Flight operations may be conducted closer than 500 feet from participating persons consenting to be involved and necessary for the filming production, as specified in the exemption holder's MPTOM.

Unless otherwise specified in this grant of exemption, the UAS, the UAS PIC, and the UAS operations must comply with all applicable parts of 14 CFR including, but not limited to, parts 45, 47, 61, and 91.

This exemption terminates on October 31, 2017, unless sooner superseded or rescinded.

Sincerely,

/s/
John S. Duncan
Director, Flight Standards Service

Enclosure

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RE: Exemption Request Section 333 of the FAA Reform Act of 2012

Attachments: 1) Phantom 2 Vision + Owners Manual V1.6
2) Phantom 2 Quick Start Manual V1.7
3) Phantom 2 Flying Flowchart V1.0

References: 1) FAA Exemption No. 11138, Regulatory Docket No. FAA-2014-0481 in the matter of the petition of DOUGLAS TRUDEAU.
2) FAA Exemption No. 11136, Regulatory Docket No. FAA-2014-0508 in the matter of the petition of ADVANCED AVIATION SOLUTITIONS LLC.
3) FAA Exemption No. 11080, Regulatory Docket No. FAA- 2014-0355 in the matter of the petition of FLYING CAM INC.
4) FAA Exemption No. 11405, Regulatory Docket No. FAA-2015-0118 in The matter of the petition of BRIAN CHERRY.

Dear Sir or Madam,

In accordance with the FAA's Guidelines for Submitting a Petition for Exemption under

Section 333 of the FAA Modernization and Reform Act of 2012, I Paul Kolfenbach, referred to hereafter

as the petitioner, request exemption from the following sections of Title 14, Code of Federal

Regulations §§

61.113(a); 61.113(b); 91.119(c); 91.121; 91.151(a); 91.405(a); 91.407(a); 91.409(a); 91.409(a)(2);

91.417(a) & (b);

In order to operate small unmanned aircraft systems (UAS) commercially in airspace regulated by the Federal Aviation Agency (FAA) for the purposes of aerial photography, cinematography, Videography, mapping, crop surveying, inspections and other flight operations that could be Performed safely and more cost effectively with the use of small UAS at low altitude within the U.S. national airspace system as compared to a manned aircraft. Operations will be performed only at the request of and with the authorization and permission of clients or their authorized agents in order to facilitate commerce and raise awareness of the beneficial uses of small unmanned air systems. So long as such operations are conducted within and under the conditions outlined herein or as may be established by the FAA as required by Section 333. The conditions identified and proposed by the petitioner are drawn from references 1-3.

The FARS

The petitioner seeks exemption from the above mentioned FARs for the following reasons;

61.113(a) & 9b); The petitioner requests relief in order to facilitate the utilization of pilots who hold a Private Pilots (or greater) certificate. Any pilots operating under this exemption would be required to comply with any conditions as set forth and in a similar fashion to the previously granted exemptions.

91.119(c) As discussed in Exemption 11138 (DOUGLAS TRUDEAU), operations conducted closer than 500 feet to the ground may require that the UA be operated closer than

500 feet to essential persons, or objects that would not be possible without additional relief. The petitioner requests modification, waiver or exemption and clarification concerning the terms "congested areas" and "densely populated". The petitioner requests waiver for this condition to allow reasonable operations in areas of subdivisions and neighborhoods if required.

91.121 As discussed in Exemption 1138 (DOUGLAS TRUDEAU) is inapplicable since the UAS does not have an altimeter but instead utilizes electronic GPS with barometric sensors for altitude information.

91.151(a) As discussed in Exemption 11136 (ADVANCED AVIATION SOLUTIONS LLC) prior relief has been granted for manned aircraft to operate at less than the prescribed minimums, including Exemption Nos, 2689, 5745, and 10650. In addition, similar UAS-specific relief has been granted in Exemption Nos, 8811, 10808, and 10673 for day time VFR conditions. The UAS provides battery power reaming in percent to the PIC. The UA batteries provide approximately 25 minutes of powered flight. Information provided in the operating documents discuss procedures regarding remaining battery power management. Those documents contain a condition in which the PIC will initiate a landing procedure when battery remaining reaches a specified level. Given the limitations on proposed operations and the location of those proposed operations, the FAA found that a reduced minimum reserve for flight in day time VFR conditions was reasonable.

91.405(a); 91.407(a)(1); 91.409(a)(1) & (2); 91.417(a) & (b) As discussed in Exemption 1138 (DOUGLAS TRUDEAU). The petitioner proposes to inspect and ensure that the UAS is in a condition for safe flight in accordance with the operating documents. The FAA found that adherence to the petitioner's operating documents and the conditions and limitations specified, describing the requirements for maintenance, inspection and recordkeeping, were sufficient to ensure that safety would not be adversely affected.

The UAS

The DJI Phantom 2 vision + advanced is a highly successful consumer grade small rotorcraft in the quadcopter configuration with an advertised weight of less than 44 ounces (1242g) designed primarily to carry aloft a high definition camera. It has an advertised maximum speed of less than 30 knots (15m/s) and a maximum climb rate of less than 1200 feet per minute (6m/s). It is powered by four electric motors with a distance between motors of less than 14 inches ((350m).

exemption(s), should need arise. Operations within class B airspace are requested due to the lack of mode C transponder.

Public interest

Use of the UAS in lieu of a manned aircraft would enhance safety and reduce the environmental impact as compared to similar operations conducted with manned aircraft of greater proportions, carrying a crew and flammable fuel. Additionally, use of the UAS in order to facilitate commerce could lead to economic growth. Operations for this petition will enable service for property owners or their designees seeking an enhanced perspective for characteristics, amenities and benefits of their desired photographic subjects that cannot be displayed through ground level videography/photography. Aerial photography is a valuable marketing tool that can lead to increased commerce and enhance personal photography. Crop surveying applications could lead to decreased use of pesticides and fertilizer and conservation of water as well as increased crop yields and decreased costs. Aerial surveying and inspections can increase work site efficiency, improve volumetric estimations and reduce risk. The petitioner will provide clients with photographic data for these purposes on a "for hire" basis acting as an independent contractor. A visual observer will be utilized. Liability insurance will be obtained commensurate with the granting of this request for exemption. Flight data including UA flight time, Control Unit operation time, incident, accident and details concerning any deviations from normal operations will be available to FAA for use in collecting data regarding the use of the UAS as part of this application. This data may be submitted to FAA via traditional means (COA monthly reports), or other means as the Administrator may require.

Conclusion

The petitioner is requesting this exemption for the purposes of "aerial photography, cinematography, videography, mapping, crop surveying, inspections and other flight operations. The reason for such a general and broad based request is that the petitioner wishes to utilize a business strategy of horizontal integration and maximize economies of scope in order to capitalize on opportunities as they may arise in the future, without the long turnaround time associated with additional exemptions. The petitioner's business model is based on the idea of offering ad hoc small UAS services to individuals or companies, who wish to employ these services as a safe, effective and legal option to enhance their business or hobby. The petitioner's own market research shows pent up demand for these services currently exist, in the real estate market and other markets are just beginning to emerge. Although videography and photography

are included in the request, the primary objective will be aerial survey of farm crops for precision agriculture. The petitioner has identified university's and other agencies that could benefit from the operation requested in this application.

A quick internet search will show that many are currently operating similar UAS in exactly the same fashion without, it is assumed FAA authorization. The petitioner has refrained from engaging in commercial use of the UAS. The primary purpose of seeking this exemption is to obtain the capability to offer those services while remaining in compliance. The petitioner has over 7 years in the radio control model aircraft hobby, along with 25 years of flight experience in both general and commercial aviation, holds an AIRLINE TRANSPORT PILOTS LICENSE (#1635701) Sea Plane rating, four type ratings and over 14,000 hours of flight time in both domestic and international operations.

Respectively submitted,

Paul Kolfenbach

Paul Kolfenbach

SOLO™

User Manual

3DR

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1 Introduction

We designed Solo to be the perfect aerial-video tool. It's powerful, simple and reliable with intuitive Smart Shots inspired by our favorite cinema pilots. With Solo, you don't need a professional camera crew, you can get the perfect shot every time. We're excited to share our passion with you and help you see your world from a new perspective. Join us in capturing the next evolution of creative videography.

1.1 System Overview

The Solo system includes Solo, the controller, the "3DR Solo" app, and you. As the operator, you interact with the controller and app on the ground, and the controller communicates with Solo during flight.

1.1.1 Solo

Solo is a small unmanned aerial vehicle powered by four motors and four propellers. Solo's onboard computers control navigation, attitude, and communications in flight while sending real-time telemetry and video output and receiving control inputs over the 3DR Link secure Wi-Fi network. Solo is optimized for capturing aerial video using a GoPro® HERO camera.

1.1.2 Controller

The controller provides control mechanisms and displays in-flight data on a full-color screen. Using twin long-range antennas, the controller acts as the central hub for all communication on the 3DR Link network, receiving all communications from Solo and the app, forwarding telemetry outputs to the app, and managing the transmission of all control inputs to Solo.

1.1.3 App

The "3DR Solo" app outputs a live video stream from an onboard GoPro® camera to an Android or iOS device. The app allows you to view the live video with overlaid telemetry and access a simplified graphic interface for controlling Solo's advanced functions. The app also connects to the 3DR Link network to receive video and telemetry outputs and send control inputs.

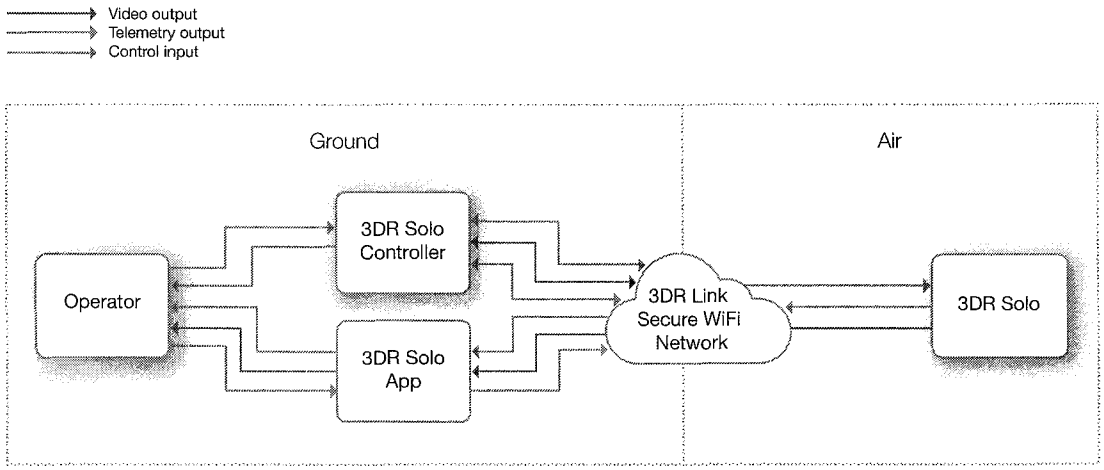


Figure 1.1.3.1: Solo System Context Diagram

1.2 Aircraft Overview

1.2.1 Smart Battery

The battery connects to Solo's battery bay. Solo's power button is located on the battery; Solo can only be powered when the battery is connected.

1.2.2 Motors and Propellers

Solo's arms are labeled one through four on the ends of the arms. Motors on arms #1 and #2 spin counterclockwise and use clockwise-tightening propellers with silver tops. Motors on arms #3 and #4 spin clockwise and use counterclockwise-tightening propellers with black tops.

1.2.3 Orientation LEDs

Each arm contains an LED for ground-to-air directional awareness; the two front arms (#1 and #3) display white, and the two rear arms (#2 and #4) display red. This LED scheme mimics the headlight and taillight style of a car.

1.2.4 Fixed Camera Mount and HDMI Cable

Solo includes a GoPro® The Frame fixed mount to mount a GoPro® HERO camera. The HDMI cable connects to the GoPro® to output video during flight.

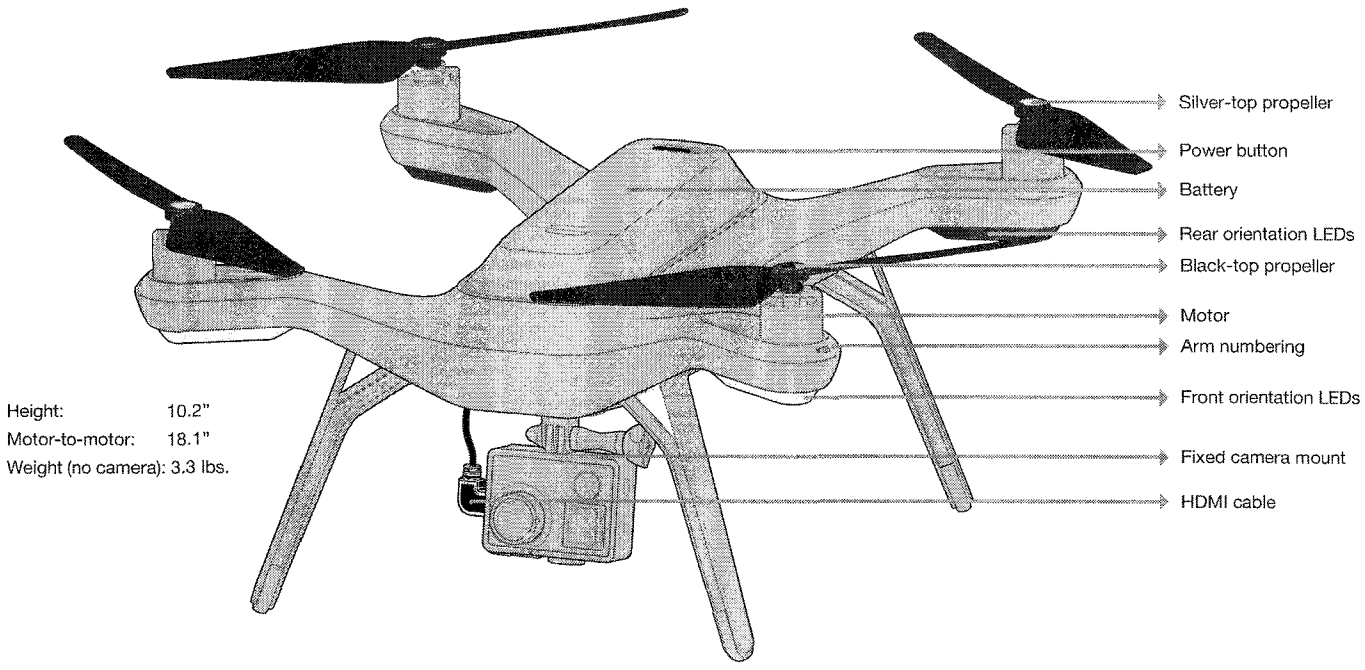


Figure 1.2.4.1: Solo Overview

1.3 Controller Overview

1.3.1 Mobile-Device Holder

Mount an Android or iOS device to run the Solo app and effortlessly integrate the app into the controller's operational flow. A user-supplied smartphone or tablet is required to initialize Solo and use Smart Shots.

1.3.2 Joysticks

The controller's left and right joysticks provide direct manual control of Solo and physical control mechanisms for using Smart Shots.

1.3.3 Screen

The controller's full-color screen provides live in-flight data and prompts for correct operation of Solo.

1.3.4 Power Button

Press the power button once to check the controller's battery level. Hold the power button until you see the controller startup screen to power on the controller.

1.3.5 Fly Button

The Fly button lets you control Solo's main flight functions: starting motors, takeoff, land, and activating standard flight.

1.3.6 Return Home

The Return Home button allows you to end your flight automatically at any point by returning Solo to its original launch point and landing.

1.3.7 Pause Button

The Pause button is Solo's emergency air brake. Press Pause to stop Solo and hover in place at any time.

1.3.8 Option Buttons

The A and B buttons change functionality based on where you are in the operational flow. The screen will show the currently assigned functions of A and B at all times. You can program A and B to specific functions using the app. By default, the A button is assigned to Cable Cam and the B button is assigned to Orbit.

1.3.9 Antennas

The controller's long-range dipole antennas communicate with Solo during flight. See Section 3.12 for proper antenna configuration.

1.3.10 Gimbal Controls

The paddle, buttons, and dial on the top of the controller are used to control the Solo Gimbal. They can also be used in some Smart Shots.

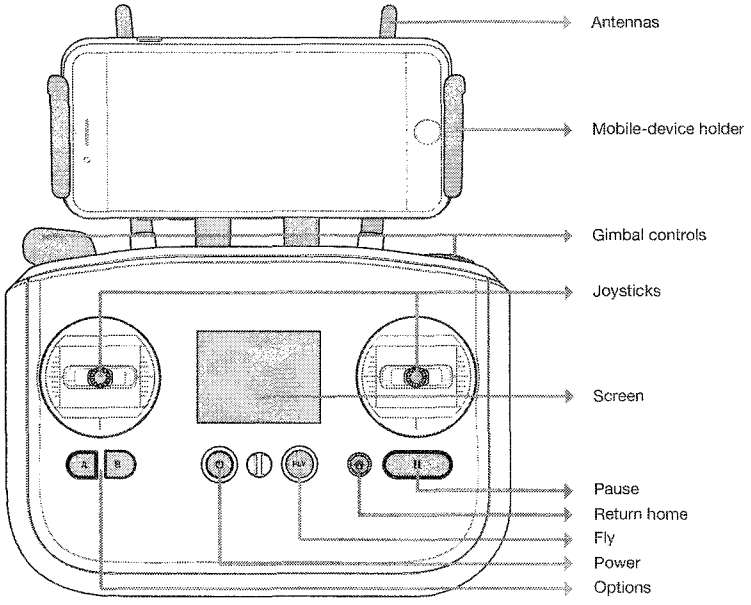


Figure 1.3.10.1: Controller Overview

1.4 Operating Parameters

The following operating parameters apply to Solo. Always operate Solo within these parameters. Solo's performance and behaviors are not guaranteed when conditions violate the parameters listed below.

Figure 1.4.10.1: Solo Operating Parameters

Estimated flight time	up to 25 minutes*
Default maximum altitude	150 ft. (46 m) above ground level**
Range	.5 miles*** (.8 km)
Payload capacity	1 lb. (450 g)
Cruise speed	18 mph (8 m/s)
Maximum speed	33 mph (15 m/s)****
Wind speed limitation	25 mph (11 m/s)
Operating temperature	32° F - 113° F (0° C to 45° C)

*Flight time varies with payload, wind conditions, elevation, temperature, humidity, flying style, and pilot skill. Listed flight time applies to elevations less than 2,000 ft above sea level.
**See Section 7.7 to adjust maximum altitude.
***Depending on environmental conditions
****This top speed corresponds to Solo when operating in Fly mode. Maximum speeds for advanced modes may vary, see Section 7.1 for more information.

1.5 Autopilot

Solo uses a Pixhawk 2 autopilot running ArduPilot Copter software. ArduPilot is open-source flight control based on the MAVlink communication protocol. Pixhawk 2 runs an ARM Cortex-M4 STM32F427 processor with 2 MB of flash memory and 256 KB of RAM. Combined with an array of CAN, I2C, SPI, PWM, and UART interfaces, Pixhawk 2 uses a suite of onboard sensors to calculate Solo's orientation and motion in flight. This data is input into ArduPilot's inertial navigation and position estimation algorithms and combined with control inputs to send commands to Solo's propulsion system.

1.6 Propulsion

Solo uses four brushless 880 K_v motors and four self-tightening propellers for propulsion. For control and aerodynamic efficiency, two motors spin clockwise and two motors spin counterclockwise. Navigation in the air is achieved by mixing propulsion of the four motors to actuate flight control along the roll, pitch, and yaw axes.

Each of the four motors is numbered by the marking on the arm. These numbers correspond to the autopilot calculations for these commands and are used for indicating motor replacement procedures. Each motor is controlled by an ESC (Electronic Speed Controller) that regulates the rotation of the motors to achieve the speed commanded by the autopilot.

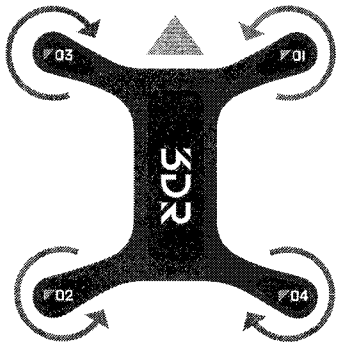


Figure 1.6.10.1: Solo Motor Order

1.7 LED Meanings

Solo's four LEDs indicate its status during startup and in flight.

- Solid white (front) and red (back): Ready to fly, standard flight configuration
- Pulsing white (front) and red (back): Solo is flying under autopilot control
- Flashing red alternating front and back: Controller signal lost
- Flashing rainbow: Update in progress
- Solid green, then turning off one-by-one: Startup successful
- Solid green without turning off automatically: Startup unsuccessful, please restart Solo

2 Setup

This sections covers everything you need to set up Solo out of the box.

2.1 In the Box

Solo includes the drone, controller, propellers (four plus two spares), Solo charger, and controller charger.

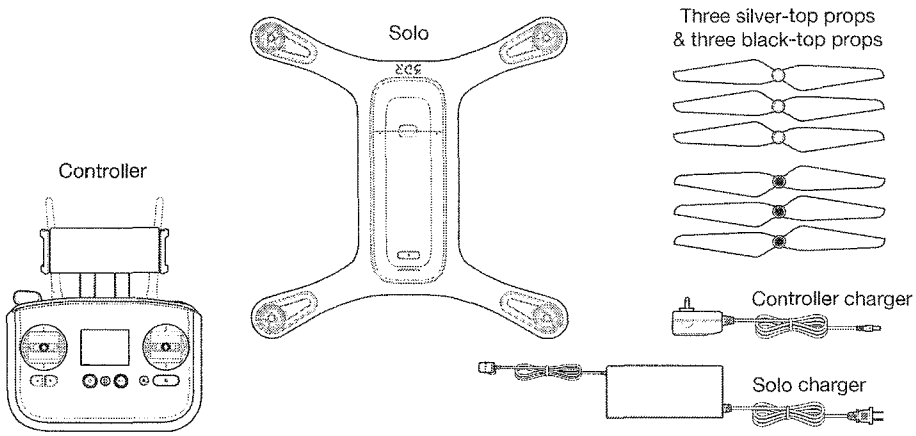


Figure 2.1.10.1: Solo Parts

2.2 Battery

Solo is powered by the rechargeable Solo Smart Battery that provides up to 25 minutes of flight time per full charge. (Keep in mind that flight time depends on payload, wind conditions, elevation, temperature, humidity, flying style and pilot skill, so the actual flight time may vary.) As a lithium polymer battery, the Solo Smart Battery requires specific handling practices to ensure safe operation and prevent accidents. For more information about battery safety, see Section 3.10.

2.2.1 Charging

The level of the battery is indicated by the lights below the power button. Press the power button once to display the current power level. The Solo battery ships with approximately 50% charge, so charge fully before your first flight for maximum flight time.

Remove the battery from Solo before charging by holding the release button and sliding the battery towards the back of Solo. Charge the battery using the designated Solo charger only; using a different charger can damage the battery or cause a fire.

To charge the battery, connect the Solo charger to the battery and a wall outlet. While charging, the indicator lights pulse at the current level. There is an additional indicator on the battery charger that turns from red to green when the battery is fully charged. The battery takes approximately 1.5 hours to charge to 100%.

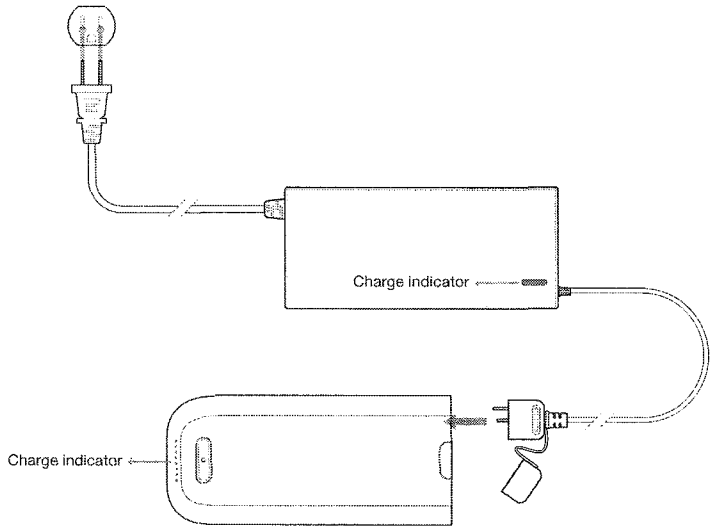


Figure 2.2.1.1: Solo Battery Charging

2.2.2 Powering

To power Solo, insert the battery into Solo's battery bay and slide the battery forward until it clicks into place. Press and hold the battery power button to turn on Solo. When Solo powers on, the battery will display an LED animation and you will hear the startup tone. Only power Solo using the designated 3DR Solo Smart Battery; using a different battery can permanently damage Solo.

Make sure Solo is level before powering on and keep Solo still during startup and while the sensors initialize. Moving Solo during this process causes the sensors to calibrate incorrectly and can create a preflight error or affect in-flight performance.

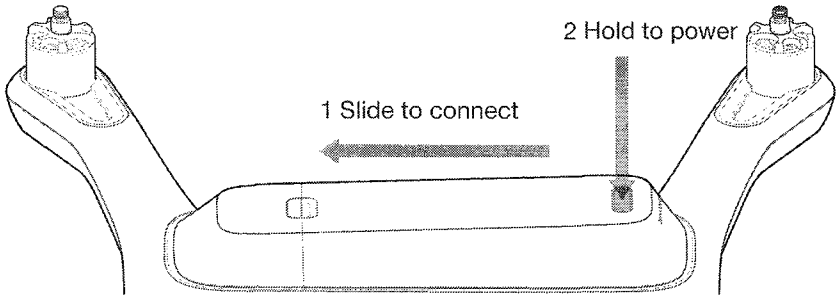


Figure 2.2.2.1: Powering Solo

2.3 Controller

The Solo controller includes a pre-installed rechargeable lithium ion (Li-ion) battery.

2.3.1 Charging

Charge the controller using the designated controller charger only; using a different charger can damage the controller or cause a fire.

To charge the controller, connect the controller charger to the barrel jack on the side of the controller and to a wall outlet. To check the battery level of the controller, press the power button. A fully charged controller lasts for approximately 6 hours. Always check the controller's battery level before you fly, and recharge when prompted by the controller. The controller takes approximately 3 hours to charge to 100%.

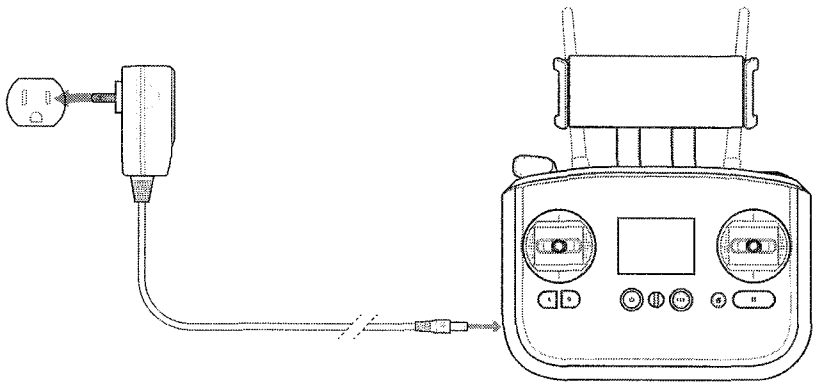


Figure 2.3.1.1: Controller Charging

2.3.2 Powering

To power on the controller, press and hold the controller power button until you see the startup screen.

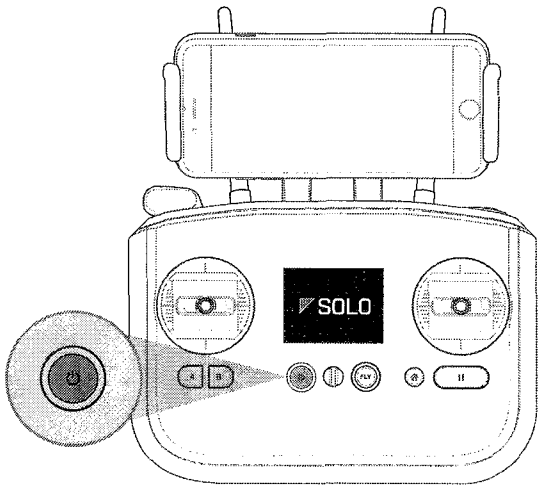


Figure 2.3.2.1: Power On Controller

2.4 Propellers

Solo uses two types of self-tightening propellers, indicated by the color of the circle at the center of the propeller.

2.4.1 Attaching

Attach the propellers with silver tops to the motors with a silver dot on the top of the motor shaft, and attach the black-top propellers to the motors with black dots. Make sure to remove the paper labels from the motors before attaching the propellers.

Silver-top propellers tighten clockwise; black-top propellers tighten counterclockwise. Check the lock and unlock icons on each propeller to see the correct directions for tightening and removing.

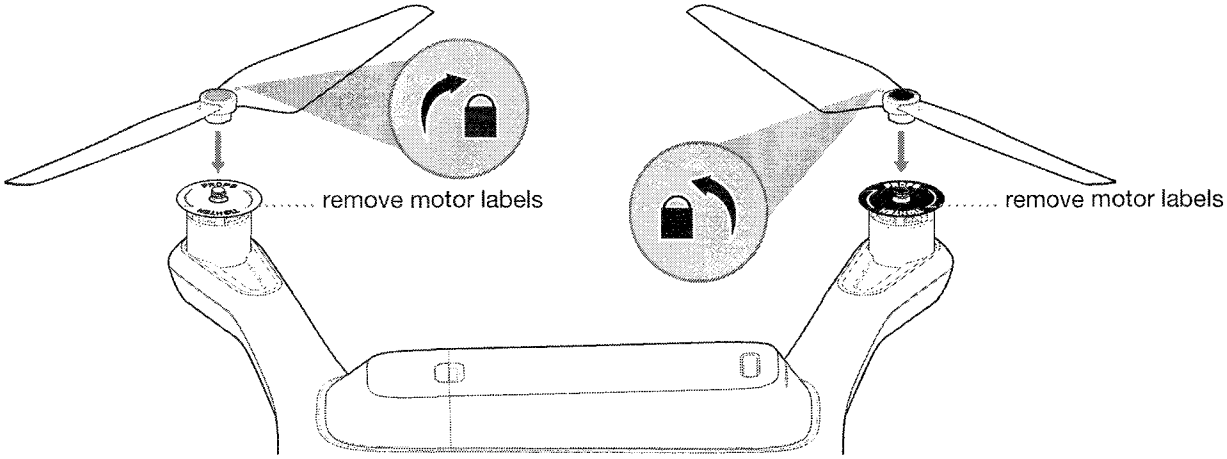


Figure 2.4.1.1: Attach Propellers

2.5 Camera

Solo includes a fixed GoPro® The Frame™ mount for your GoPro® HERO 3, 3+ or 4.

2.5.1 Attaching

To attach the camera to the GoPro® The Frame™ fixed mount, insert your GoPro® upside down and connect the Solo HDMI cable to the camera.

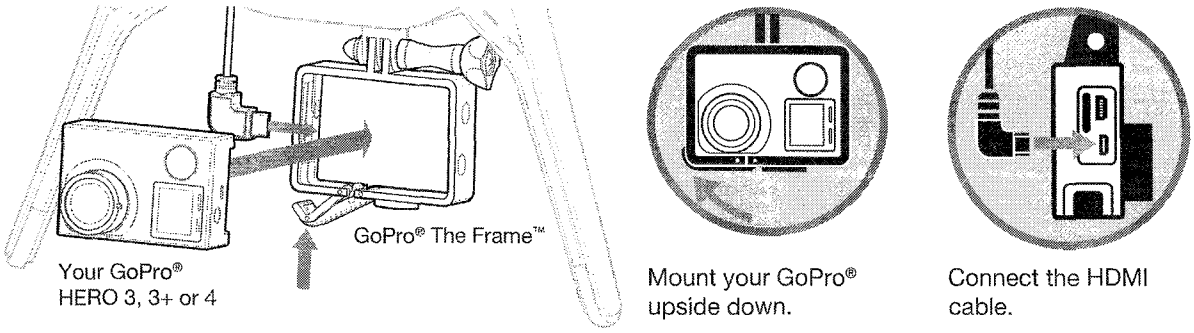


Figure 2.5.1.1: Attach Camera

2.5.2 Settings

For best results, adjust the camera settings for inverted orientation and medium field of view. (Setting the field of view to medium ensures that you won't see the propellers in the frame.)

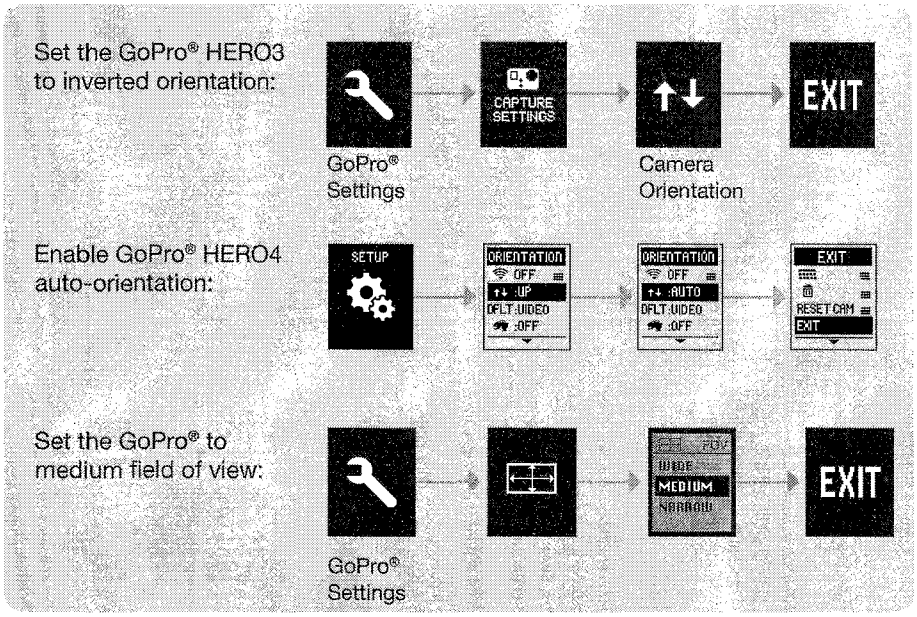


Figure 2.5.2.1: Camera Configuration Process

Make sure that the Wi-Fi on your GoPro® is turned OFF. It can interfere with Solo's communication signals and cause unexpected behavior.

2.6 Mobile App

"3DR Solo" provides a streaming video link to a mobile device and a simple graphic interface for interacting with Smart Shots and other advanced Solo features.

2.6.1 Install

Visit 3dr.com/soloapp or download "3DR Solo" from the App Store or Google Play Store. 3DR Solo works with iOS 8.0 or later and Android 4.3 or later. For Android, you must also install the "3DR Services" app to your device.

2.6.2 Connect to Solo

To connect the app to Solo's 3DR Link Wi-Fi network, access the Wi-Fi settings on the mobile device and select Solo_Link-####. Enter the temporary password "sololink". Once connected, return to the app to continue. Both Solo and the controller must be powered on to connect to the app.

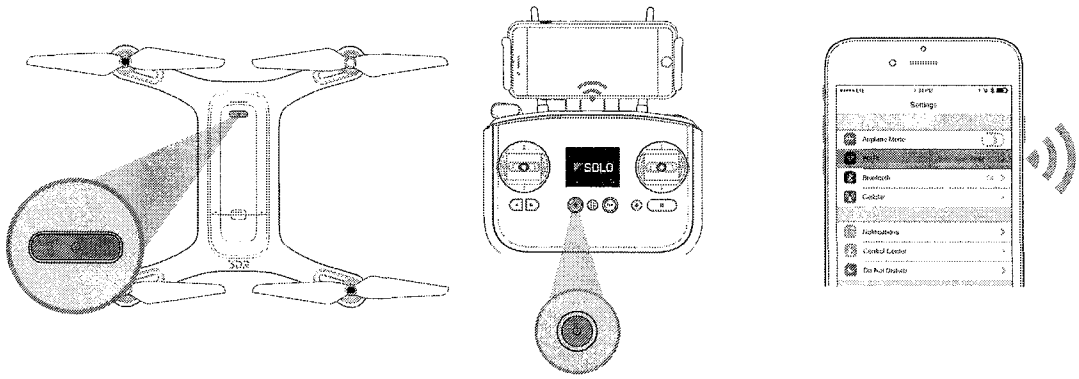


Figure 2.6.2.1: Connect to Solo Link

2.6.3 Change SoloLink Password

Once connected to Solo Wi-Fi, change your password to secure your SoloLink network. Select the Settings menu from the top-left drop-down, and choose Solo to access the options for your drone.

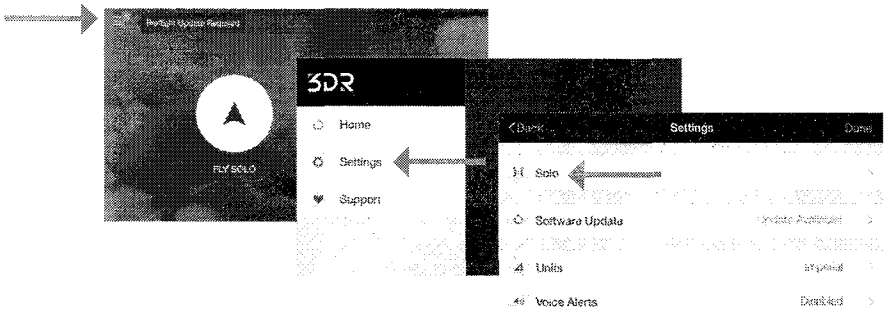


Figure 2.6.3.1: App - Settings Menu

In the Solo menu, select Wi-Fi Settings, and set a new password. The password should be between 8 and 32 characters with no spaces. Select Apply to enable your changes. If you forget your SoloLink password, perform the factory reset procedure in Section 9.7 to reset the password to the temporary password (sololink).

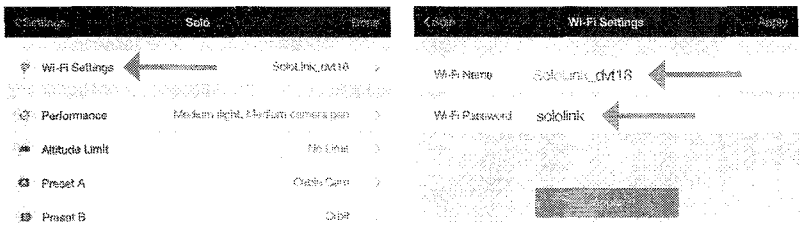


Figure 2.6.3.2: App - Wi-Fi Settings

2.6.4 Update

Before your first flight, use the app to perform the required first-flight update. The controller will prompt you for the update with the preflight update alert. Ensure that both the controller and Solo are powered, the controller has at least 50% battery remaining, and the app is connected to Solo Wi-Fi. The total update process can take up to 10 minutes.

Figure 2.6.4.1: Controller Preflight Update Prompt

To start the update, open the Settings menu in the app, and select Software Update.

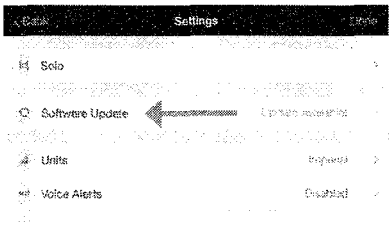


Figure 2.6.4.2: App - Software Update

Before starting the update, you'll need to connect your device to the Internet and download the update. Select Download Update to start the process, then exit the app and connect to the Internet.

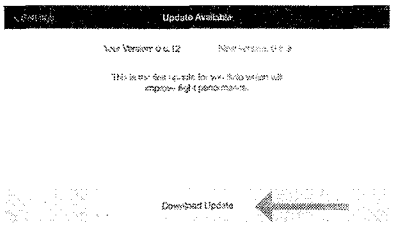


Figure 2.6.4.3: App - Download Update

The app will show the following display while the update is downloading.

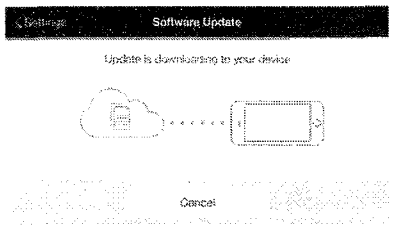


Figure 2.6.4.4: App - Update Download in Progress

When the download is complete, the app will prompt you to re-connect to Solo Wi-Fi in your device's Wi-Fi settings.

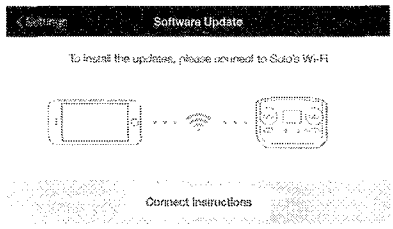


Figure 2.6.4.5: App - Reconnect to Solo Wi-Fi

When the app detects an active connection with the controller, it will prompt you to begin the update. (Solo and the controller must be powered on to connect to Solo Wi-Fi.) Select Begin to start the update.

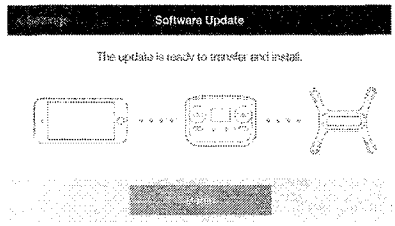


Figure 2.6.4.6: App - Start Update

While the update is in progress, the controller will show the controller updating display. The controller will complete a full restart as part of the update process, which can take up to 5 minutes.

Figure 2.6.4.7: Controller - Updating

Because the controller must restart as part of the update process, your device will lose its connection to Solo Wi-Fi. When you see the display below, select Next to continue.

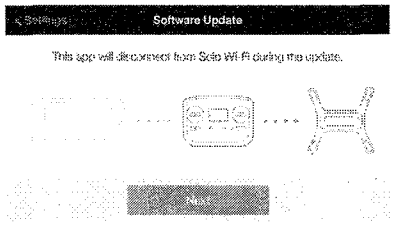


Figure 2.6.4.8: App - Update Disconnection Confirmation

The controller will restart and display a green checkmark to indicate that the controller was updated successfully. When you see the green checkmark on the controller, re-connect to Solo Wi-Fi in the app and press A on the controller to continue the update.

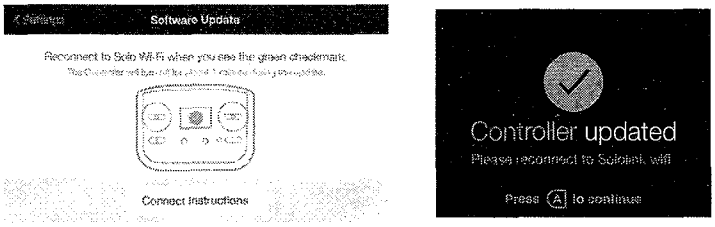


Figure 2.6.4.9: Controller Update Complete Displays

After pressing A, Solo will restart to complete the update. The controller will display waiting for Solo while Solo restarts.

Figure 2.6.4.10: Controller - Waiting for Solo

When the update is complete, Solo's LEDs will turn green, the controller will return to the standard takeoff screen, and the app will show that the software is up to date. After displaying green, Solo's LEDs will return to the standard white-and-red pattern. If you do not see white-and-red LEDs after a few minutes following the update, restart Solo.

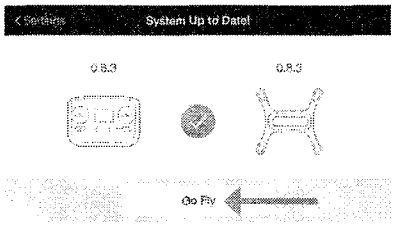


Figure 2.6.4.11: App - Update Success

2.6.5 View Video

After the update is complete, select Fly Solo to view video in the app. Solo, the controller, and the GoPro® must be powered to view video. Verify that you can view video before your first flight. If the video is inverted, see section 2.5.2.

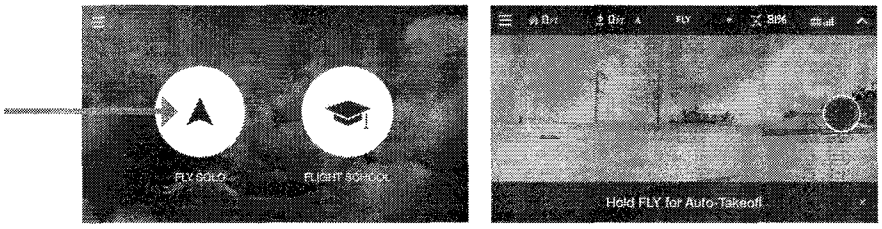


Figure 2.6.5.1: App - Viewing Video

3 Safety

The following best practices will help ensure safe, successful flights and help reduce the risk of accident and serious injury. Always fly under adult supervision and with your full attention at all times. Do not fly under the influence of drugs or alcohol or when your ability to operate Solo safely is impaired. Use your common sense to avoid unsafe situations and always operate Solo responsibly.

⚠ Read and understand these important safety instructions before your first flight to help reduce the risk of accident and serious injury.

3.1 Location

Don't fly Solo indoors. Always fly outside in clear, open areas at a safe distance from yourself, other people, power lines, animals, vehicles, trees, and buildings. When flying in areas with potential hazards, maintain 100 feet (30 m) from any people, vehicles, or structures. As the operator, you are responsible for navigating Solo to avoid obstacles, including during Smart Shots.

Don't fly within 5 miles of an airport or within any airspace restricted by your local, state, or national airspace authority. As the operator, you are responsible for knowing and understanding the regulations that govern small unmanned aircraft like Solo in your jurisdiction.

3.2 Environmental Awareness

Don't fly Solo in extreme weather conditions such as rain, high winds, snow, or fog. Extreme weather conditions can permanently damage Solo or cause instability in flight.

Before flying, determine the boundaries of the safe flying area at your location. Be aware of any risks, including bodies of water, structures, trees, power lines, etc, and designate a few areas where you can land Solo in case of an unsafe situation. Throughout your flight, be prepared to recover Solo manually or use an emergency procedure if Solo flies outside the safe flying area.

3.3 Visual Line of Sight

Always fly Solo within your visual line of sight. Don't let Solo get so far away from you that you cannot see its orientation or so that any physical obstructions block your view of Solo.

⚠ Physical obstructions can also block communication signals with the controller, causing Solo to attempt to Return Home along an obstructed path

3.4 Flight School

If you're new to flying, review the video tutorials in the Flight School area of the app before your first flight. Flight School provides useful tips for learning to operate Solo safely and correctly.

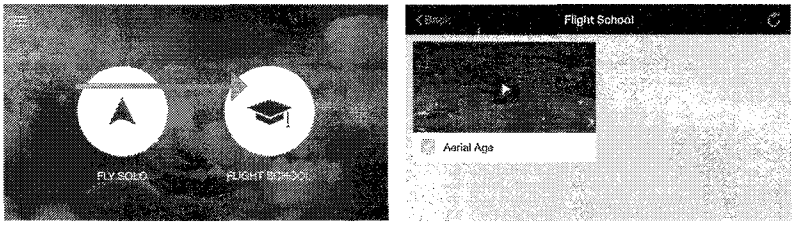


Figure 3.4.5.1: App Flight School

3.5 Propellers

Spinning propellers can cause serious injury. Never touch moving propellers or place any objects in the way of the propeller arcs while Solo is powered.

To avoid hazardous contact with Solo's high-speed propellers, always power off Solo before handling Solo or the propellers. When prompted to start motors before takeoff, always ensure that the propellers are clear of any obstructions and at least 20 feet away from any people, animals, or property before activating. Do not touch moving propellers or approach Solo while the propellers are spinning.

After landing or returning home, Solo will automatically detect the landing and stop the motors. Do not approach Solo until the propellers stop spinning, and always power off Solo before picking it up.

3.6 GPS

Solo requires an active GPS signal for flight. After powering on, Solo can take up to 5 minutes to acquire a strong GPS lock. Always choose a flying location with a clear view of the sky to improve GPS signal strength. The following requirements define a GPS lock:

- Reported horizontal position accuracy < 16 ft. (5 m)
- Reported speed accuracy < 2 mph (1 m/s)
- Number of satellites ≥ 6
- Difference between GPS and inertial navigation vertical velocity < 2 mph (1 m/s)

3.7 Home Position

Solo's home position is the latitude and longitude coordinates of the launch point used by the autopilot as the end point of a return-home command. The autopilot saves the home position at the location where the motors are started *only after achieving GPS lock*. The location of the home position depends on GPS signal strength and is usually within 1 to 2 meters of accuracy. Always take off from an open location with a clear path for Solo to return home safely. For home position safety in advanced mode, see Section 7.4.

3.8 Altitude Limit

Always fly at appropriate altitudes for your flying location and local regulations. Solo cannot avoid obstacles on its own, so always select altitudes that avoid any obstacles, such as trees, buildings, and power lines.

Solo includes a safety fence enabled by default at 150 ft. (46 m). If Solo reaches the altitude limit, Solo will stop ascending and limit throttle input to stay below the altitude limit. FAA regulations mandate a maximum altitude of 400 ft. to avoid potential conflicts with manned aircraft and represents a safe line-of-sight altitude.

3.9 Emergency Procedures

If you experience a problem in flight, use one of the following emergency procedures to stop Solo, end your flight, or shut off the motors.

3.9.1 Pause

The controller's Pause button allows you to stop Solo mid-air. Solo will hover at the paused location until given another command. Use the Pause button to stop Solo from hitting an obstacle or to re-orient Solo for navigation. Press Pause during Return Home or Land to pause Solo and stop the landing. Pause is available only with GPS lock.

3.9.2 Regain Manual Control

Keep the controller easily accessible at all times during flight, including during Smart Shots, and be prepared to regain manual control at any time. To return to standard flight during Smart Shots, Return Home, or Land, press the Fly button.

3.9.3 Return Home

If Solo acquired GPS lock prior to takeoff, press the controller's Home button to return Solo to the launch point and land. Use return home after receiving a low battery notification or to end your flight easily. Solo will not avoid obstacles while returning home; always verify that the return path is clear before activating Return Home.

3.9.4 Land

To land Solo at its current position, press and hold the Fly button. If Solo does not have GPS lock, there will be no automatic positioning as Solo descends, and drifting may occur depending on environmental conditions.

3.9.5 Motor Shutoff

In the event that Solo's motors do not stop after landing or for an emergency in-flight kill switch, Solo includes an emergency motor shutoff procedure. To shut off the motors at any time, either in flight or on the ground, hold the A, B, and Pause buttons at the same time. An initial screen will appear on the controller to confirm the shutoff command; continue to hold A, B, and Pause buttons to activate motor shutoff. Use the emergency motor shutoff only as a last resort.

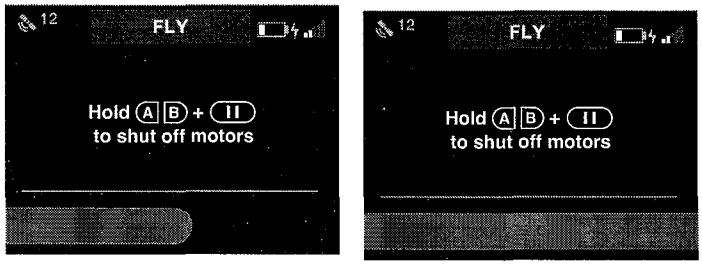


Figure 3.9.5.1: Controller - Motor Shutoff

3.10 Flight Battery

Use caution when handling the Solo Smart Battery; lithium polymer batteries can cause a fire if handled incorrectly. Never alter, puncture, throw, bend, or impact the battery. Keep the battery away from liquids, fire, microwaves, and other hazardous or combustible materials. Don't expose the battery to extreme temperatures. If the battery is hot to the touch, wait for it to cool before using or charging.

Inspect the battery before and after each flight. It is possible for the battery to be damaged in shipping, use or charging. If you notice any abnormal features such as damage to the exterior shell, swelling, deformation of the battery, abnormal smell, leakage, or other unexpected behavior, do not use the battery! These can be signs of serious damage that can cause the battery to catch fire. To prevent a hazard in case of fire or explosion, disconnect the battery, and place the battery in a safe area outside of any buildings or vehicles and away from flammable materials. Do not dispose of the battery in the trash; dispose of the battery at local battery recycling center as soon as possible. In the US and Canada, visit call2recycle.org to find a location.

For long term storage, store the battery in an 64° F to 82° F environment, between 45-85% relative humidity and with 50% charge. Always make sure to store the battery in a place where it won't be exposed to extreme temperatures or direct sunlight.

3.11 Controller

The controller's rechargeable lithium ion (Li-ion) battery is housed inside the controller, accessible by the battery door on the back of the controller. The controller battery is pre-attached to the controller, and shouldn't be disconnected unless:

- You plan to store the controller for over three months without using it. In this case, disconnect the battery from the controller and leave the battery inside the controller to store it.
- You need to replace or upgrade the controller battery. Upgraded controller batteries with double the capacity are available from store.3dr.com or an authorized retailer. In the case where you need to store the extra controller battery, store it in location where it will not come into contact with metal objects or other batteries. If the battery's connector comes into contact with a metal object, it can short circuit the battery and cause a fire.

Keep the controller away from liquids, fire, microwaves, and other hazardous or combustible materials. Don't expose the controller to extreme temperatures. If the controller is hot to the touch, wait for it to cool before using or charging. Perform periodic visual inspections of the controller battery to check for any damage, and handle the controller battery using the same safety precautions as the flight battery.

3.12 Antenna Configuration

For the strongest connection to Solo, position the antennas down and away from the controller so they are approximately perpendicular with Solo in flight, and tilt each antenna out and away from one another at a 20° angle.

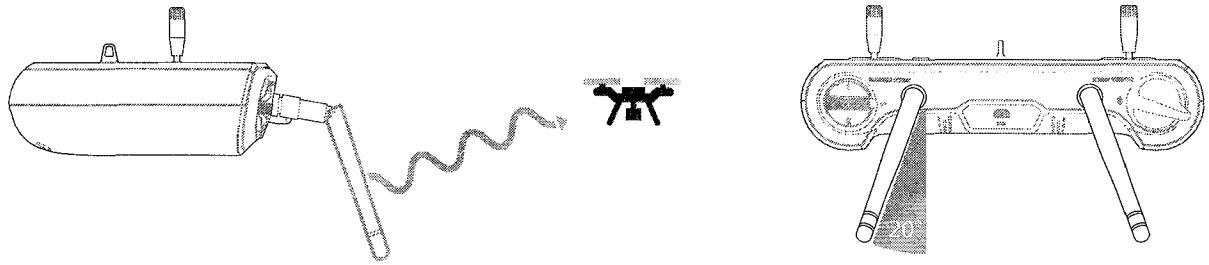


Figure 3.12.5.1: Controller Antenna Orientation

4 First Flight

This section covers basic Solo flight procedures, including takeoff, landing, and manual control.

4.1 Preflight Checklist

Before flying, check the following conditions.

4.1.1 Location

» Your current location and environmental conditions are suitable for flight. (Section 3.1)
» Solo is on a level surface at a clear launch point a sufficient distance from yourself and others. (Section 3.1)

4.1.2 Components

» The propellers are correctly attached. (Section 2.4)
» The propellers can spin smoothly and without obstruction when turned.
» No components on Solo appear loose or damaged.
»

4.1.3 Power

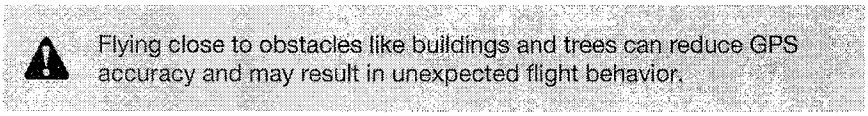
» The controller is powered on with at least 50% charge. (Section 2.3)
» Solo is powered on with a fully charged battery. (Section 2.2)

4.1.4 Video (Optional)

» The Solo app is connected to Solo and streaming video. (Section 2.6)
» The GoPro® is recording.

4.2 Takeoff

The takeoff process has two steps: start motors then take off. Always place Solo at a clear launch point for takeoff, at least 20 feet away from you, other people, and structures.



4.2.1 Activating Motors

When Solo is ready to fly, the controller will prompt you to hold the Fly button to start Solo's motors. Hold Fly until the propellers spin. Solo is now active, ready for takeoff, and needs to be treated with appropriate caution to avoid safety hazards. Press the Pause button anytime Solo is on the ground with the motors spinning to stop the motors.

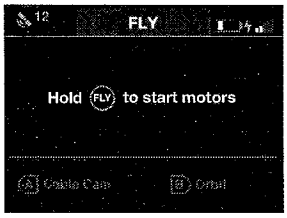


Figure 4.2.1.1: Controller - Start Motors Prompt

Spinning propellers can cause serious injury! Always make sure Solo is clear of any obstructions and all people and animals are away from Solo before spinning the props.

4.2.2 Initiating Takeoff

Hold Fly again to initiate takeoff. Solo will rise to 10 feet (3 m) and hover until receiving further control inputs.

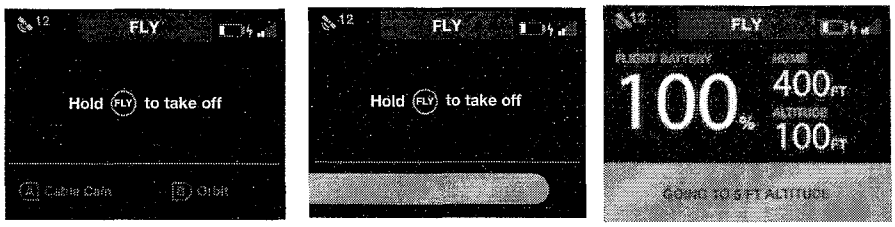


Figure 4.2.2.1: Controller - Takeoff Prompts

Be aware of Solo's orientation before takeoff so you can safely navigate Solo up and away from you once it's in the air. If Solo is facing towards you at takeoff, move the right stick back; if Solo is facing away from you, move the right stick forward.

4.3 Landing

Hold the Fly button to land Solo at its current location.

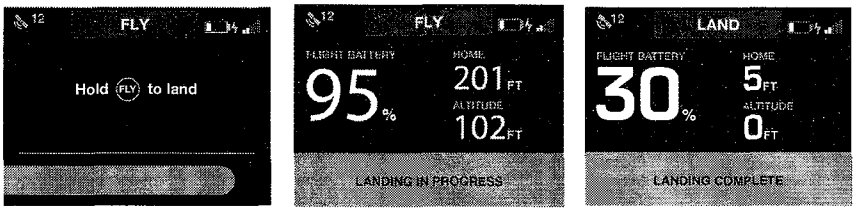


Figure 4.3.2.1: Controller - User-Initiated Landing

When commanded to land, Solo will land at the current location, wherever it is. Always make sure there is a clear path to a safe landing point directly below Solo before landing.

After landing, the propellers will stop spinning automatically; wait until the propellers stop spinning before approaching Solo. If the propellers do not stop, press the controller's Pause button or use the emergency shutoff option described in Section 3.9.5.

Never approach Solo while the propellers are spinning. After an auto-landing or return-to-home, always wait until the propellers stop before approaching or touching Solo.

4.4 Return Home

The Home button ends your flight automatically by returning Solo to the home position (launch point) and landing.

When commanded to Return Home, Solo:
1 Achieves a minimum altitude of 49 feet (15 m) or maintains current altitude if above 98 feet.
2 Moves to launch point and hovers for 5 seconds.
3 Lands at the home point.

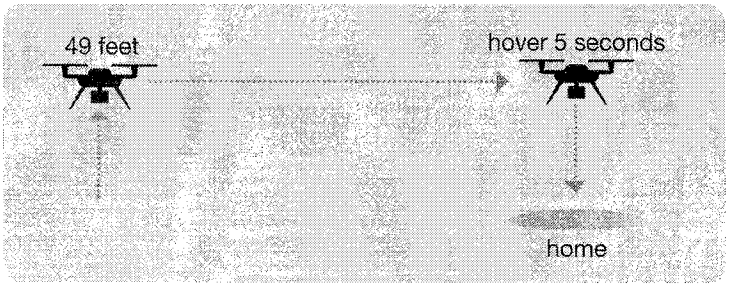


Figure 4.4.2.1: Return Home Behavior

Always verify that there is a clear path to the home point before activating Return Home.

4.5 In-Flight Data

Use the controller's main data display to monitor Solo's status in flight.

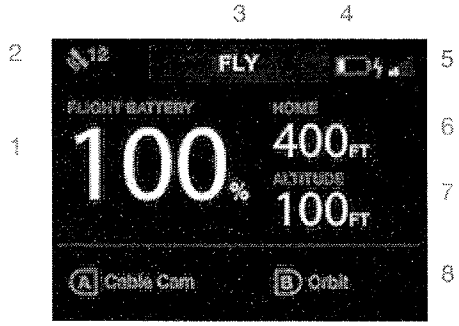


Figure 4.5.2.1: Controller - In-Flight Data

1 Flight battery percentage remaining
2 GPS signal strength and number of active satellites
3 Active mode or Smart Shot ("Fly" indicates standard flight.)
4 Controller battery level
5 Solo Wi-Fi signal strength
6 Horizontal distance from the home position (launch point)
7 Current altitude
8 Currently assigned functions of controller A and B buttons

4.6 Joystick Control

The controller's two joysticks allow you to navigate Solo in flight. The left stick controls Solo's altitude and rotation.

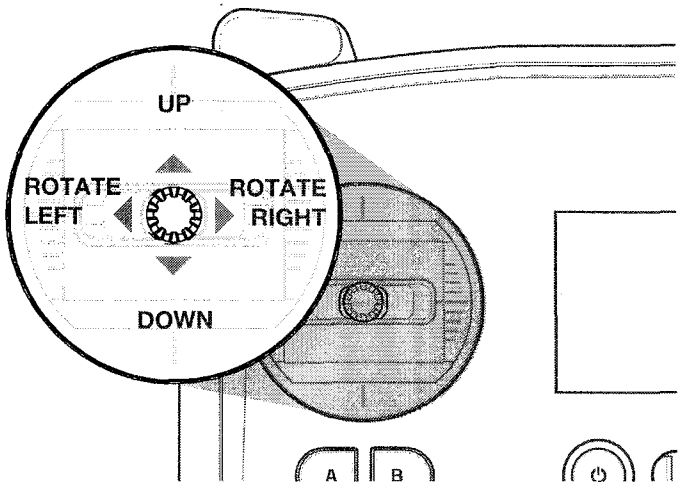


Figure 4.6.2.1: Controller Left Joystick

Move the left stick vertically to control Solo's altitude and acceleration.

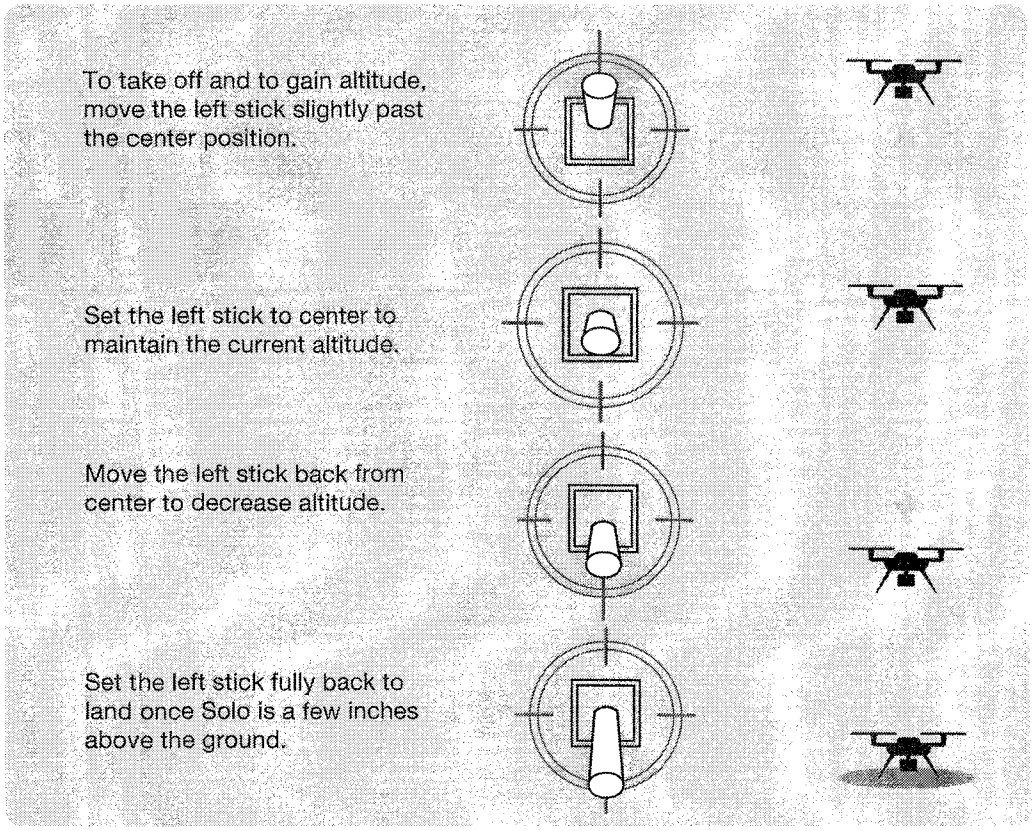


Figure 4.6.2.2: Throttle Joystick Behaviors

Move the left stick horizontally to rotate Solo and control orientation.

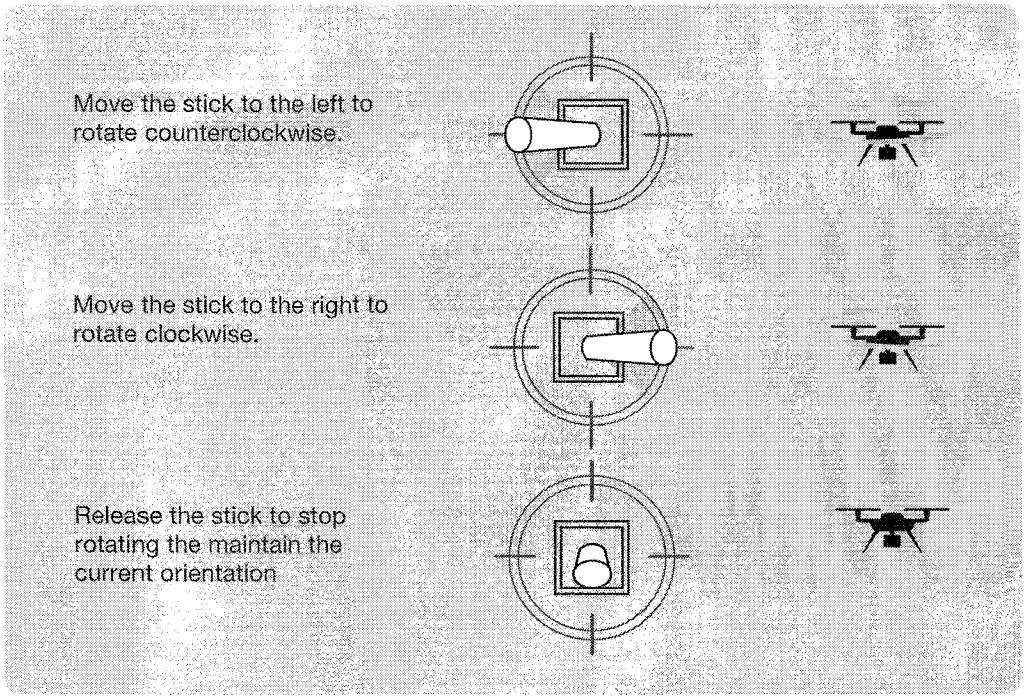


Figure 4.6.2.3: Yaw Joystick Behavior

Use the right stick to fly Solo forward, back, left, and right. These movements are relative to Solo's current orientation, so always maintain awareness of Solo's forward-facing direction before using right-stick controls.

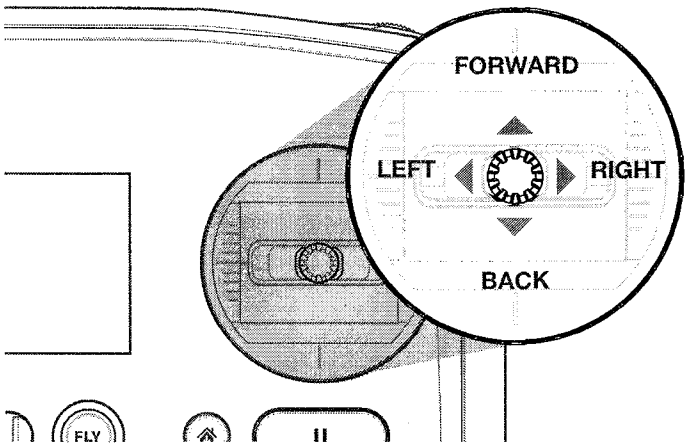


Figure 4.6.2.4: Controller Right Joystick Controls

Move the right stick vertically to control pitch.

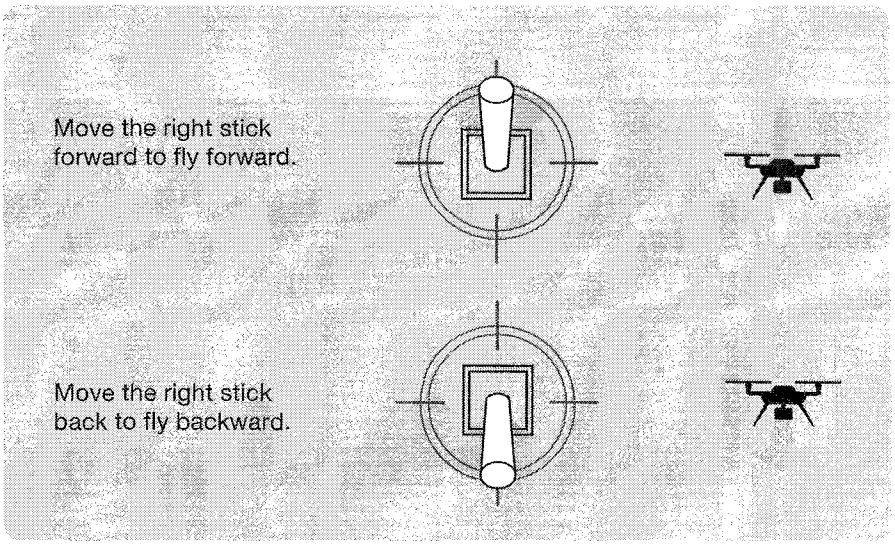


Figure 4.6.2.5: Pitch Joystick Controls

Move the right stick horizontally to control roll.

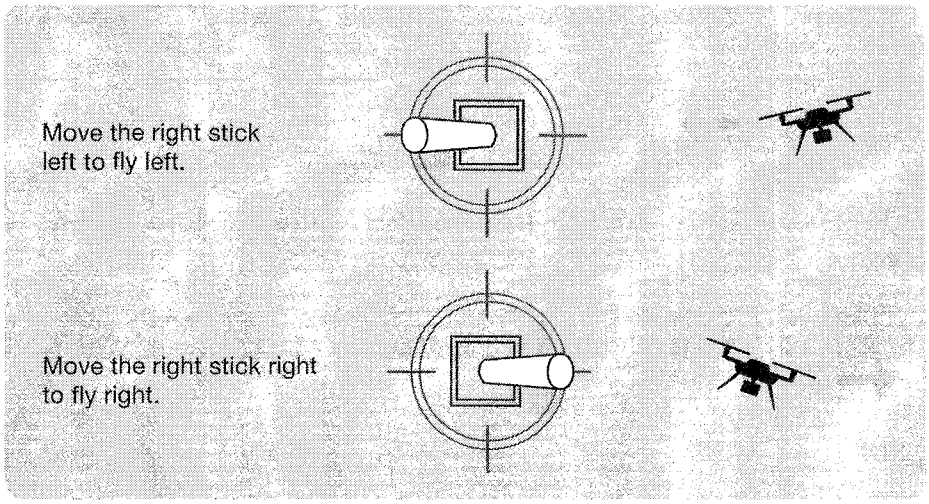


Figure 4.6.2.6: Roll Joystick Controls

If you're new to drones, take some time to learn the basics before your first flight. Visit 3dr.com/solo/info or check out Flight School in the Solo app to learn about flight controls and best practices.

4.7 App Interface Overview

The Solo app provides a simplified interface for viewing Solo's video feed and managing Smart Shots.

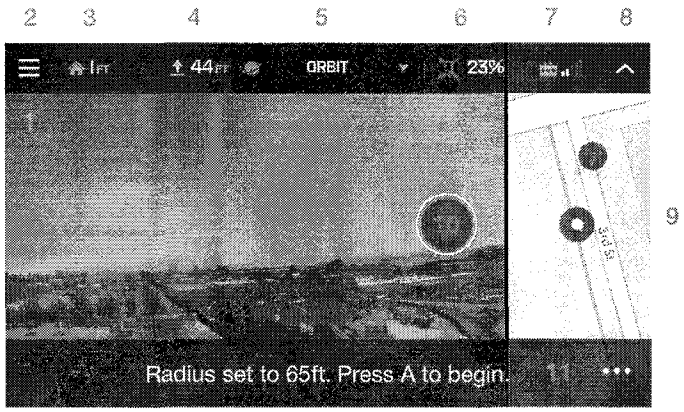


Figure 4.7.2.1: App - Main Interface

1 Live video feed
2 Main menu
3 Horizontal distance from home
4 Altitude
5 Shot List
6 Flight battery percentage remaining
7 Controller signal strength
8 Hide telemetry bar
9 Map view
10 Start/stop recording to mobile device
11 Alerts and instructions

4.7.1 Map View

To access the small map view, swipe left from the right edge of the app. Swipe left again to full-screen the map, and tap the video display to hide the map. The map view is available only with GPS lock and on devices with cellular Internet.

4.7.2 Shot List

To access the Shot List, select the active mode or shot from the title bar. Choose from Selfie, Cable Cam, Orbit, and Follow to start a shot, or select Fly for standard flight.

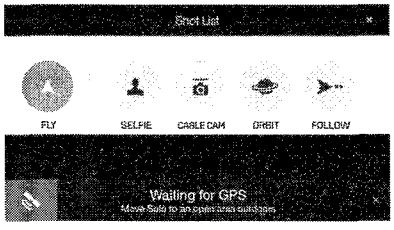


Figure 4.7.2.1: App - Shot List

5 Smart Shots

Solo's Smart Shots automate video capturing to make it easy to get stunning aerial video. Cable Cam and Orbit are automatically assigned to the controller's A and B buttons. Use the app to access Selfie or Follow. Smart Shots are available only with the Solo app.

When using Smart Shots without a Solo Gimbal, Solo cannot ensure that the subject is in the frame at all times. When attempting Smart Shots without a Solo Gimbal, adjust the camera mount so the camera is fixed at an appropriate angle to improve the chances of keeping the subject in the frame.

5.1 Selfie

In Selfie, Solo flies a smooth up-and-back path to capture a subject in a cinematic establishing shot. Before starting a selfie, always ensure that there is a clear path 200 feet (61 m) behind and above Solo. Once Selfie is activated, Solo will fly up and away from the subject to a point 164 feet (50 m) from the subject at 82 feet (25 m) altitude.

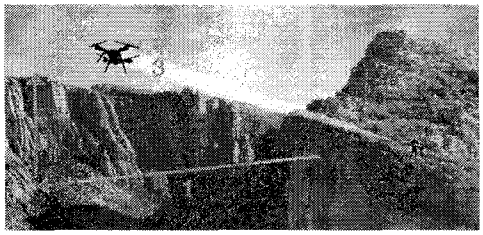


Figure 5.1.2.1: Selfie Path and Settings

1 Distance out (default 164 ft.)
2 Altitude up (default 82 ft.)
3 Flight path

> **Always ensure that there is a clear path 200 feet (30 m) behind and above Solo before starting Selfie. Press Pause at any time during Selfie to stop Solo. Press Fly at any time to switch to manual control.**

5.1.1 Selfie Setup

To start Selfie, fly Solo to a starting point, facing the subject from approximately 10 feet away, and select Selfie from the Shot List. The app will prompt you to press the right arrow to start the selfie.

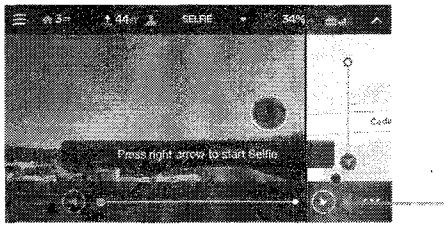


Figure 5.1.1.1: App - Selfie Activation

5.1.2 Selfie Operation

Tap the forward and back arrows in the app to fly Solo along the Selfie path. The default cruise speed when using the app to control Solo in Selfie is set to 9 mph (4 m/s).

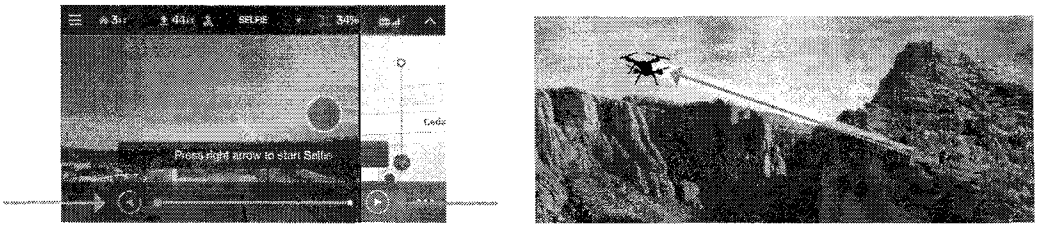


Figure 5.1.2.1: App - Selfie Control

To control Selfie using the controller, use the right stick to move Solo forward and back along the Selfie path. Press Pause at any time to stop Solo; press Fly to exit to standard flight.

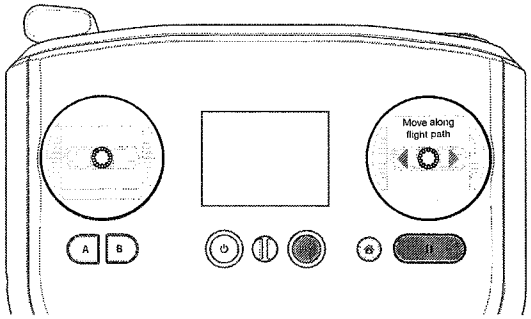


Figure 5.1.2.2: Controller - Selfie Control

5.1.3 Settings

To access the settings from the in-flight Selfie interface, select the option icon with the three dots in the bottom-right. Use the sliders to adjust distance out, altitude up, and cruise speed. Select Selfie How-To for instructions and tips.

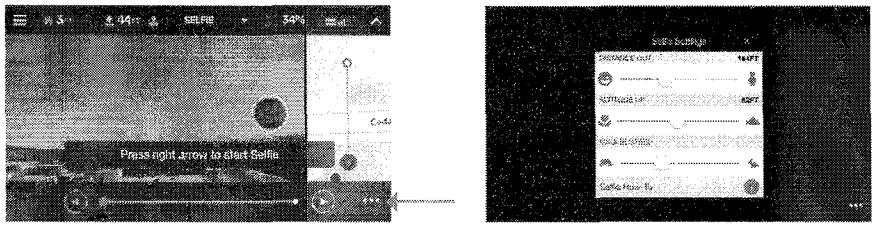


Figure 5.1.3.1: App - Selfie Settings

5.2 Cable Cam

Cable Cam creates a smooth shot by flying Solo along an invisible cable between any two preset points.

5.2.1 Starting Cable Cam

Press A on the controller, or select Cable Cam from the Shot List on the app. Both devices will prompt you to fly Solo to your first point and press A to save it as the first Cable Cam point. Then fly to your second point and press B to save the second point. Try adding a difference in altitude or orientation between the two points for an impressive cinematic effect.

Figure 5.2.1.1: App - Cable Cam Setup

5.2.2 Cable Cam Operation

To control Cable Cam through the app, tap the right arrow to move towards point A and tap the left arrow to move towards point B. Cable Cam's default cruise speed is set to 9 mph (4 m/s).

Always ensure that there is a clear path between points A and B before starting Cable Cam.

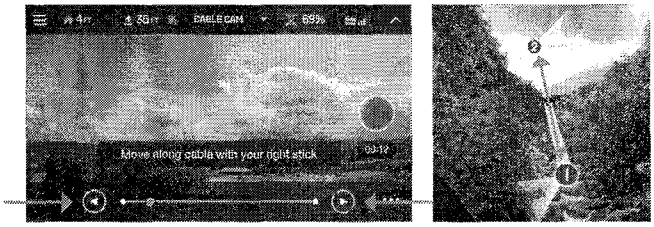


Figure 5.2.2.1: App - Cable Cam Controls

To operate Cable Cam using the controller, move the right stick to the left to fly towards point A and to the right to fly towards point B. Release the right stick to pause along the cable. Use the left stick to temporarily override the camera and look left and right. Press Pause at any time to stop Solo; press Fly to exit to standard flight.

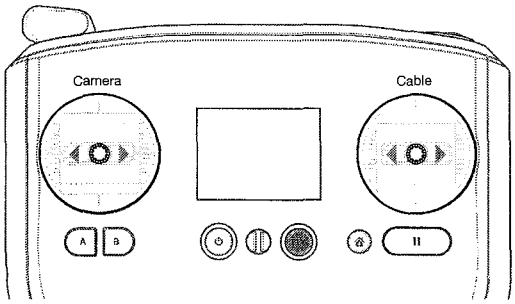


Figure 5.2.2.2: Controller - Cable Cam Controls

5.2.3 Cable Cam Settings

To adjust Cable Cam's options, select the settings menu in the bottom-right corner. Automatic view lock prevents left-stick camera control during Cable Cam. Choose Fly Counterclockwise and Fly Clockwise to customize the direction Solo rotates between your A and B points. Select Cable Cam How-To for instructions and tips.

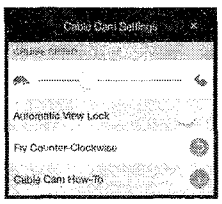


Figure 5.2.3.1: App - Cable Cam Settings

5.3 Orbit

Use Orbit to fly Solo along a preset circle while fixing the camera on a central target.

5.3.1 Starting Orbit

Select Orbit from the Shot List. The app will display the currently set radius of the orbit and show the location of the subject on the map. Fly Solo to correct the subject's position on the map if necessary then press A on the controller to lock onto the subject. The app will display a Subject Locked confirmation once the orbit subject is set. To adjust the position of the subject during Orbit, move the center point on the map.

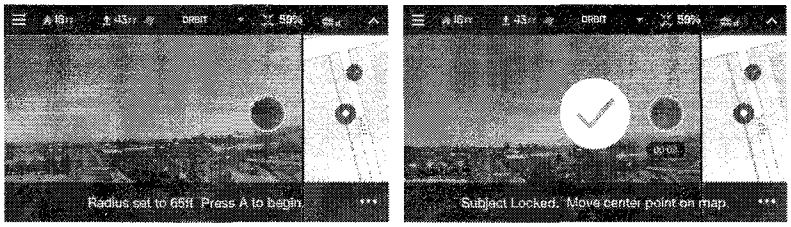


Figure 5.3.1.1: App - Orbit Setup

> Solo will orbit at a constant altitude relative to its launch point, not taking into account changes in ground level. Be aware of any elevations changes at your location that would affect Solo. Always ensure there is a clear path for Solo before starting Orbit.

5.3.2 Orbit Operation

Tap the left and right arrows to fly Solo along the Orbit path. The default cruise speed for Orbit is 2.2 mph (1 m/s).

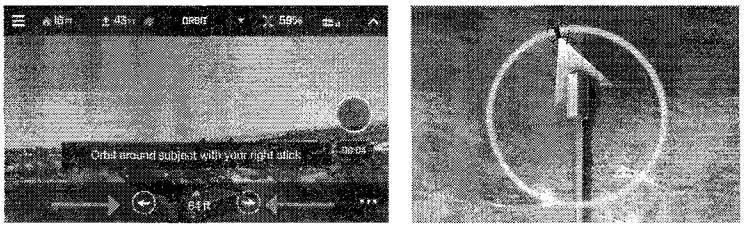


Figure 5.3.2.1: App - Orbit Controls

To control Orbit using the controller, move the right stick left and right to fly Solo along the Orbit path. Move the right stick up to reduce the radius of the orbit and move Solo closer to the subject; move the right stick down to increase the radius and move Solo away from the subject.

Move the left stick left and right to temporarily override the camera's lock on the subject and look left and right. Move the left stick up and down to adjust Solo's altitude. Use the paddle on the top of the controller to raise and lower the altitude of the target. Press Pause at any time to stop Solo; press Fly to exit to standard flight.

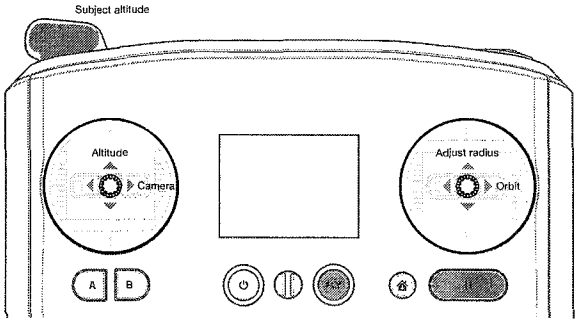


Figure 5.3.2.2: Orbit Controls

5.3.3 Orbit Settings

Select the Orbit Settings Menu to adjust Solo's default cruise speed in Orbit.

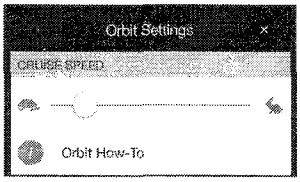


Figure 5.3.3.1: App - Orbit Settings

5.4 Follow

Follow creates a virtual tether between Solo and your mobile device, allowing Solo to track you as you move. If the Follow subject is engaged in an activity that prevents them from using the controller, you are required to use a safety pilot during Follow. The subject will carry the mobile device and be followed by Solo, and the safety pilot will hold the controller and be ready to regain manual control at any time.

Don't allow more than 500 feet of distance between the controller and the mobile device; however, specific range limits depend on the device being used. If too much distance is allowed between the controller and the mobile device, the device could lose connection with the controller.

Always ensure that there is a clear path for Solo during Follow. It will not avoid obstacles that come into the flight path as a result of following the subject.

5.4.1 Follow Setup

To start Follow, select Follow from the Shot List in the app and navigate Solo to face the subject. Tap the instructional bar to begin following.

Figure 5.4.1.1: App - Follow Setup

5.4.2 Follow Operation

Once activated, Solo will automatically follow the mobile device wherever the subject carries it. In the app, the subject can press the left and right arrows to orbit Solo around them. On the controller, move the right stick up and down to adjust the following distance, and move the right stick left and right to orbit around the subject. Use the left stick to adjust Solo's altitude during Follow and to override the camera tracking and temporarily pan the camera left and right. At any time during Follow, press Pause to stop Solo and the camera will continue to track the subject. Press Fly to return to standard flight.

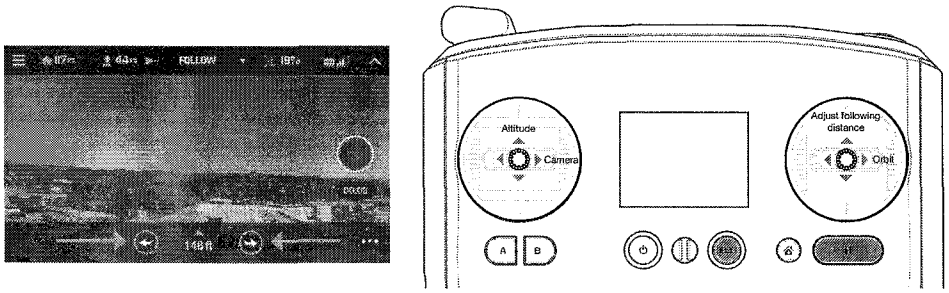


Figure 5.4.2.1: Follow Controls

5.4.3 Follow Settings

Select the Settings menu to adjust the default cruise speed during Follow. Follow's default cruise speed is set to 2.2 mph (1 m/s).

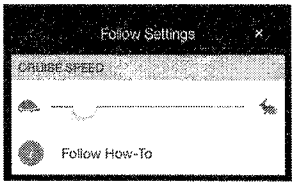


Figure 5.4.3.1: App - Follow Settings

6 Alerts

The following alerts will appear on the controller in the event of a preflight or in flight error. Always monitor the controller for alerts and perform the recommended actions.

6.1 Preflight Errors

Before starting the motors, Solo runs a series of automatic checks to ensure that the system is ready for flight.

6.1.1 Calibration

The following errors indicate that a preflight check is in progress: altitude calibrating, calibrating solo, and calibrating compass. Please wait for the error to clear before continuing.

Figure 6.1.1.1: Controller - Calibration in Progress Alerts

If Solo is not placed on a level surface, you will receive the following alert to move Solo to a level surface for takeoff.

Figure 6.1.1.2: Controller - Uneven Surface Alert

If Solo requires manual calibration, the following alert messages show the displays for compass and level calibrations. Refer to Section 9.2 for compass and level calibration instructions.

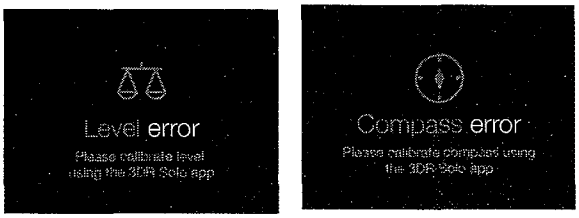


Figure 6.1.1.3: Controller - Re-Calibration Required Alerts

In the case of a calibration or sensor error during startup, restart Solo to clear the following alerts.

Figure 6.1.1.4: Controller - Calibration Error Alert

6.1.2 Service Alerts

The following alerts indicate a system error that requires service. Use the app to submit a trouble ticket with 3DR Support or contact an authorized Solo Service Center to service Solo and clear the alert. A control stick error can occur either in flight or before takeoff. If the control stick error is received in flight, Solo will return home and land.

Figure 6.1.2.1: Controller - Service Alerts

6.2 In-Flight Errors

During flight, the controller monitors Solo's GPS signal, controller signal, flight battery level, and controller battery level.

6.2.1 Altitude Limit

If Solo reaches the altitude limit during flight, it will maintain and not exceed that altitude and the controller will display the following alert.

Figure 6.2.1.1: Controller - Altitude Limit Alert

6.2.2 App Connection

The controller will display the following banner-style alerts in the event that the Solo app is connected to or disconnected from Solo. We recommend having an active connection to the Solo app at all times during flight. Refer to Section 2.6 for connecting to Solo Wi-Fi with the app. Solo will not return home if the connection to the app in lost during flight.

Figure 6.2.2.1: Controller - App Connection Alerts

6.2.3 Controller Signal Alerts

Flying behind solid objects, like buildings and trees, blocks communication signals between Solo and the controller. Always maintain visual contact with Solo to ensure that the signal is unobstructed. Cell phone towers and nearby Wi-Fi signals can cause interference with the communication system and decrease its range. Avoid flying in populated areas to avoid sources of interference.

If the controller becomes unpaired from Solo during flight, the controller will display the following alert and Solo will Return Home. See Section 9.3 for pairing instructions.

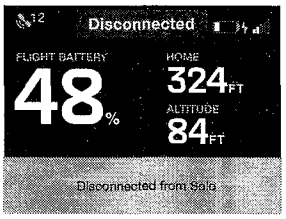


Figure 6.2.3.1: Controller - Controller Disconnected Alert

If the signal between Solo and the controller is lost during flight, the controller will display the controller signal lost alert and Solo will Return Home. If signal is recovered while returning home, the controller will display the signal recovered alert and provide the option to regain manual control by pressing the Fly button.

Figure 6.2.3.2: Controller - Controller Signal Alerts

6.2.4 GPS Signal Alerts

If GPS is lost during flight, Solo will switch into Fly:Manual. In the event of a loss of GPS, we recommend landing Solo and waiting to acquire GPS lock before taking off again.

In Fly:Manual, Solo uses the same joystick controls as in standard flight (displayed as "Fly"), but it does not include any GPS positioning. Therefore, in Fly:Manual, Solo will not hold its position when the right stick is released, and you must maintain close control over roll, pitch, and yaw. Without GPS, Pause, Return Home, and Smart Shots are not available. During Land, Solo will not be able to maintain position due to the lack of GPS positioning and will drift according to wind and other environmental conditions. If another alert occurs while Solo is in Fly:Manual, Solo will not be able to Return Home and will instead initiate a non-positioned landing at the current location.

If GPS is recovered in flight, Solo will switch from Fly:Manual to standard flight (Fly), and GPS positioning will activate. The following displays show (from left to right) the GPS lost alert, Solo in Fly:Manual, and GPS recovered alert. Always choose a location with a clear view of the sky to improve GPS signal strength.

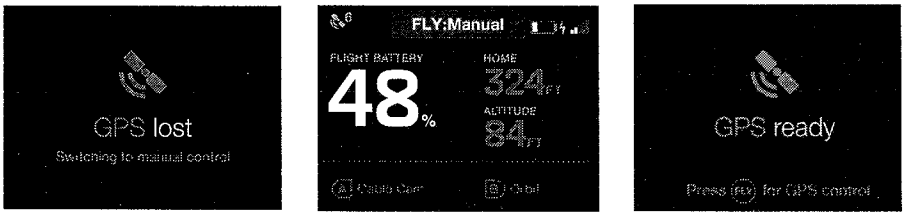


Figure 6.2.4.1: Controller - GPS Signal Alerts

6.2.5 Flight Battery Alerts

The controller monitors the Solo battery during flight and provides alerts when the battery reaches critical levels. At 25% and 10% power remaining, the controller will provide a land-soon alert recommending that you end your flight to prevent an automatic landing.

Figure 6.2.5.1: Controller - Low Battery Alerts

If the battery reaches 5%, Solo will Return Home to prevent a crash. After landing, turn off Solo immediately; if the battery level reaches 0% at any time, irreversible damage will occur and the battery should be recycled.

Figure 6.2.5.2: Controller - Critical Battery Alert

6.2.6 Controller Battery Alerts

When the controller battery reaches 10% of its remaining charge, the controller will display an alert to notify you to charge the controller at your next opportunity. At 5%, the controller will prompt you to end your flight and charge the controller. If the controller battery reaches a critical level in flight, Solo will Return Home. The following displays show (left to right) the 10%, 5%, and 0% alerts

Figure 6.2.6.1: Controller - Controller Battery Alerts

7 Advanced Settings

This section provides instructions for accessing and using Solo's advanced features and settings.

7.1 Advanced Flight Modes

Are you a quadcopter pro? We designed Solo to be simple and reliable, but also really fun to fly. Solo includes five advanced flight modes: FLY:Manual, stabilize, acro, sport, and drift.

Advanced flight modes are for experienced operators only. Do not attempt to fly in any advanced modes unless you are comfortable flying multicopters without positioning and altitude assistance.

7.1.1 Fly:Manual

Fly:Manual mode is a version of standard flight without GPS lock. In Fly:Manual, the throttle stick controls altitude the same way as standard flight (Fly mode). However, Fly:Manual includes no GPS positioning so that, when you release the right stick, Solo will not hold its position; it will drift according to wind conditions and existing momentum. When flying in Fly:Manual, make constant adjustment to the right stick to control Solo's position and use the left stick to maintain Solo's orientation.

7.1.2 Stabilize

Stabilize mode provides full manual control without autopilot assistance. In stabilize, the autopilot regulates Solo's roll and pitch angles so that Solo returns to level when you release the right stick. The throttle stick controls power and acceleration directly; it does not correspond to altitude. Stabilize requires fine-tuned control of both the left and right sticks to fly Solo. Stabilize does not require GPS lock.

7.1.3 Drift

Drift modes requires GPS lock and provides a plane-like flying experience. Drift is ideal for navigating Solo using the video feed. This is known as first-person view (FPV) and provides an immersive flying experience. In drift, Solo combines roll, pitch, and yaw onto the controller's right stick. To navigate Solo in drift, move the right stick to initiate a coordinated turn in that direction. Releasing the right stick will cause Solo to drift to a stop over a two-second period. Solo does not automatically control altitude in drift, and will require constant adjustments to the throttle stick when flying in drift.

7.1.4 Acro

Acro is the most advanced of Solo's flight modes. It provides unrestricted control over Solo's roll and pitch angles. Acro is intended for performing aerial acrobatics, flips, and maneuvers requiring extreme angles. There is no altitude or position assistance in acro, so be prepared to make constant adjustment to both sticks. Acro is a copter-frame oriented mode, meaning that, in acro, Solo will always respond to controls relative to its own orientation. Acro does not require GPS lock.

Do not fly in acro unless you are an extremely experienced operator. Without the proper skills, crashes in acro are highly likely.

7.1.5 Sport

Sport mode in a modified version of acro that includes altitude assistance and earth-frame orientation. With altitude assistance, the throttle stick behaves the same in sport as it does in standard flight (Fly mode). Earth-frame orientation differs from copter-frame orientation in that the direction of yaw rotation is in relation to the earth instead of in relation to the copter itself. For example, if Solo is pitched forward in sport mode and left yaw is applied, Solo will maintain the same pitch angle and rotate around the vertical axis. As opposed to in acro's copter-frame orientation, in which, in the same situation, Solo will perform a cartwheel. Sport does not require GPS lock.

7.2 Enabling Advanced Flight Modes

To unlock Solo's advanced flight modes, use the app to select Advanced Settings from the Settings menu. Toggle the Enable Advanced Flight Modes option to gain access to Solo's advanced modes.

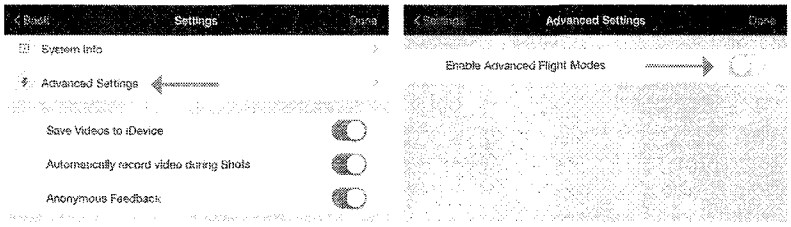


Figure 7.2.5.1: App - Advanced Settings

7.3 Accessing Advanced Flight Modes

Once enabled, advanced flight modes can be accessed only be assigning them to the controller's A and B buttons using the app. In the app, select Preset A or Preset B from the Solo menu. (The app must be connected to Solo to apply button assignments.) Once assigned, use the controller to activate advanced modes during flight.

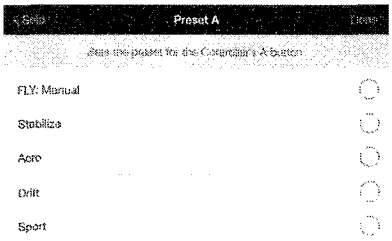


Figure 7.3.5.1: App - A and B Presets

7.4 Home Position Safety

Fly:Manual, stabilize, acro, and sport modes do not require GPS lock. To take off without GPS lock, Solo must be set to one of these modes. Without an active GPS signal, Return Home, Pause, and Smart Shots will be disabled. If you choose to take off without GPS lock, Solo will not save a home position at the launch point. If Solo acquires GPS lock mid-flight, the autopilot will save a home position at that location. To prevent a potentially unsafe situation, do not use Return Home if Solo did not acquire GPS prior to takeoff.

If Solo did not acquire GPS lock prior to takeoff, do not use Return Home.

7.5 Performance Adjustment

The Solo app includes options to adjust Solo's performance to suit your flying style. To access the performance sliders, select Performance from the Solo menu. The flight slider controls how fast Solo flies and how responsive it is to controls. The camera pan slider regulates the speed that Solo rotates. Move the slider towards the turtle for slower, more cushioned movement, or move the slider towards the rabbit for faster, more responsive movement.

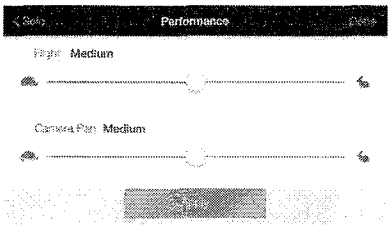


Figure 7.5.5.1: App - Performance Sliders

7.6 Units

To change the units in the Solo app from imperial to metric, select Units from the Settings menu.

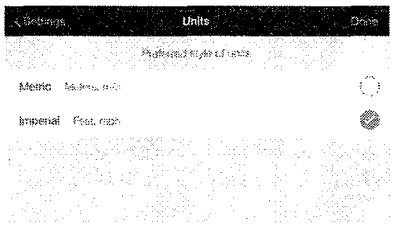


Figure 7.6.5.1: App - Change Units

7.7 Maximum Altitude Adjustment

To adjust the altitude limit, select Altitude Limit from the Solo menu. If you choose to select No limit, ensure that you always operate Solo within your visual line of sight and in compliance with local regulations.

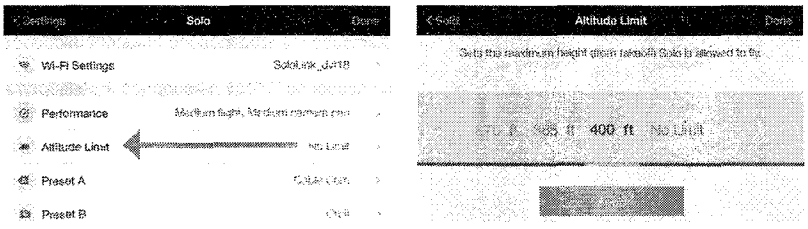


Figure 7.7.5.1: App - Altitude Limit

8 Support

3DR Support is here to help you get the most out of Solo. If you have any questions, please contact us at support@3dr.com or give us a call at 1 (855) 982-2898 (toll free in the US and Canada) or direct at +1 (858) 225-1414. To submit a support request through our website, visit 3dr.com/support.

Use the Solo app to submit a trouble ticket and your flight logs will automatically be sent to 3DR Support. To submit a support request within the Solo app, select Support from the main menu, and select Log Trouble Ticket.

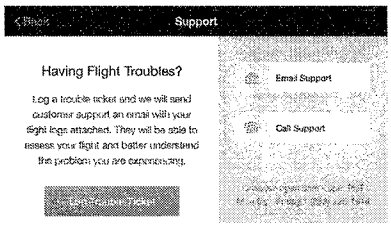


Figure 8.7.5.1: App - Submit Trouble Ticket

9 Maintenance

This section covers basic operational maintenance procedures for Solo. For repairs not covered in this manual, contact 3DR Support or an authorized Solo Service Center.

Solo's exterior components are designed to absorb impact from hard landings and protect the core electronics. If damage is sustained to Solo's legs or motors, replace them with official 3DR parts from store.3dr.com or an authorized retailer. 3DR offers an extended controller battery upgrade with double the capacity so you can fly more between charges. Before opening the battery bay or performing any maintenance on Solo, always ensure that Solo is powered off with the battery removed.

9.1 Controller Battery Replacement

To replace the controller battery, open the battery door on the back of the controller. Remove the foam block and disconnect the battery from the port in the side of the battery compartment. To install a battery, connect the battery to the controller, and, for standard-size controller batteries, use the foam block to pad the empty space in the compartment. See Section 3.11 for information on safely storing spare controller batteries.

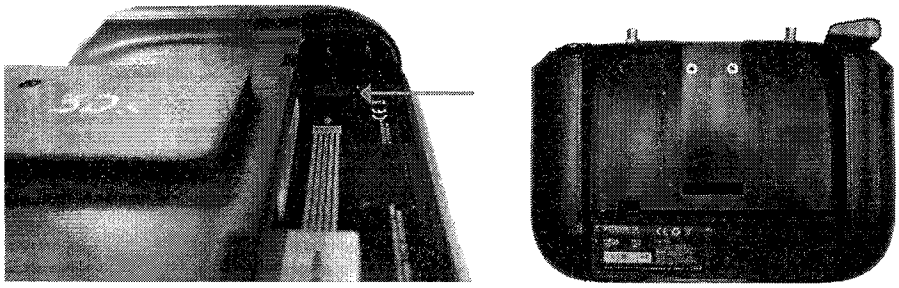


Figure 9.1.5.1: Controller Battery Installation

9.2 Calibrations

Use the Solo app to perform compass and level calibrations when prompted by the controller. Remove Solo's propellers before performing calibrations.

9.2.1 Compass Calibration

To calibrate Solo's compass, connect the app to Solo Wi-Fi and select Compass Calibration from the Solo menu. Ensure that Solo and the controller are powered on with the propellers removed. Solo requires an interference-free environment for compass calibration, so ensure that you are away from metal buildings, reinforced concrete, or other metal structures before starting calibration.

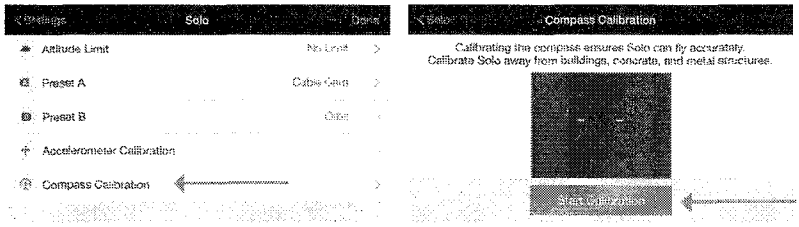


Figure 9.2.1.1: App - Compass Calibration Setup

The app will prompt you to rotate Solo end-over-end multiple times until the bar at the top of the screen is completely green. If the calibration fails, move to a different location and try again.

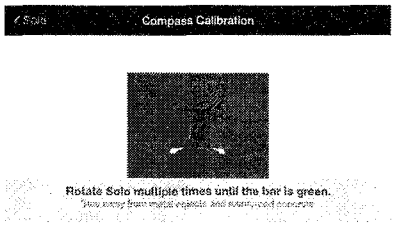


Figure 9.2.1.2: App - Compass Calibration Procedure

9.2.2 Level Calibration

A level calibration zeroes Solo's accelerometers to recognize static states. To perform a level calibration, remove the propellers from Solo and connect the app to Solo Wi-Fi. Select Level Calibration from the Solo menu, and follow the prompts to place Solo perfectly still on each side in turn. In each step, wait a few seconds after moving Solo to press Next.

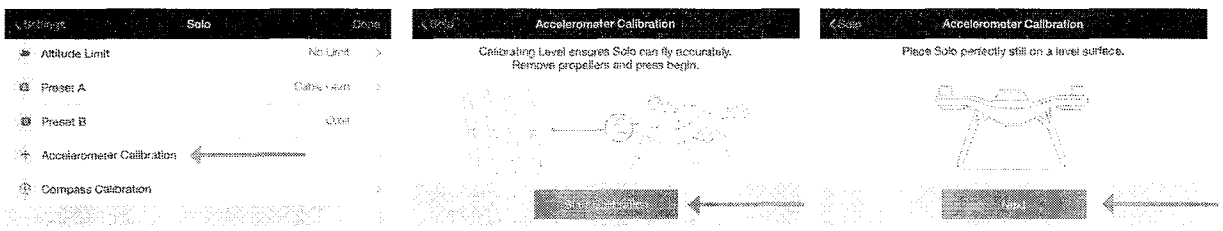


Figure 9.2.2.1: App - Level Calibration

9.3 Pairing

To pair a controller with Solo, power both the controller and Solo. Power off any other Solos or controllers in the vicinity. Once powered, use a paper clip to press the pair button on the underside of Solo to activate pairing mode.

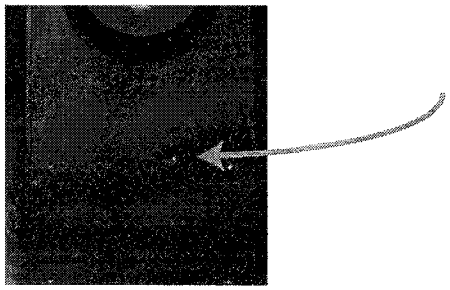


Figure 9.3.2.1: Solo Pair Button

The controller will automatically detect Solo and prompt you to pair. This can take up to 3 minutes. Hold the A and B buttons on the controller to start pairing. To cancel pairing, press B.

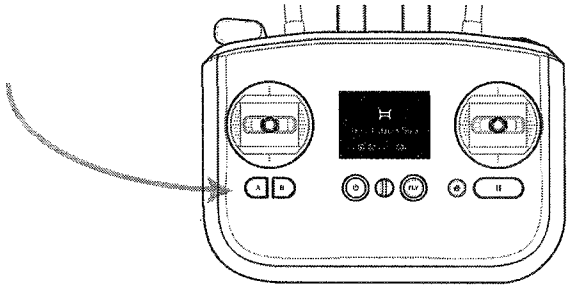


Figure 9.3.2.2: Controller Pairing Procedure

9.4 Legs

Solo uses three unique types of legs: 2 legs with an antenna module (#1 and #2), a leg without any electronic components (leg #3), and a leg with a compass module (leg #4). Replacements for all types of leg can be purchased from store.3dr.com or an authorized retailer.

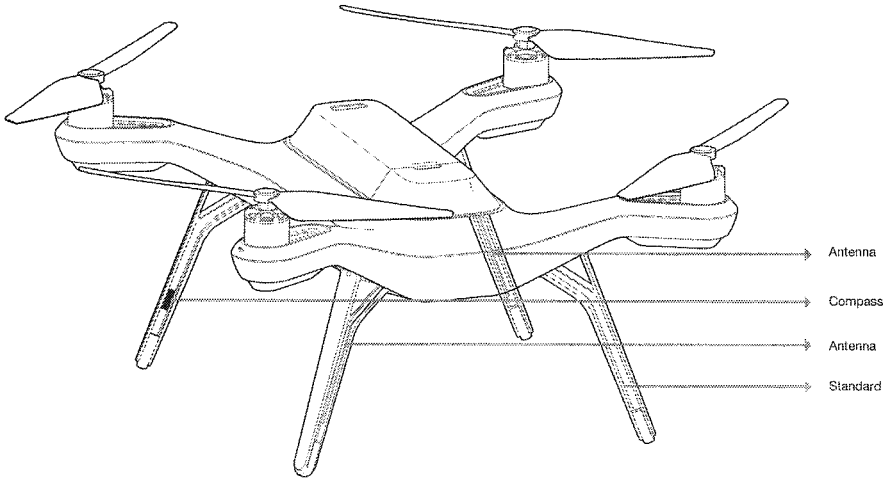


Figure 9.4.2.1: Leg Types

9.4.1 Leg #3

To replace a standard leg, use a #2 Phillips screwdriver to remove the two screws, detach the old leg, and attach the new leg using the provided screws.

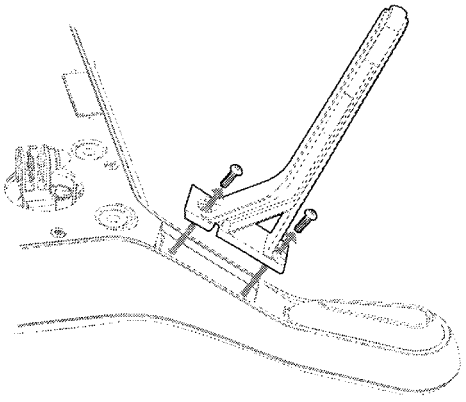


Figure 9.4.1.1: Standard Leg Replacement Process

9.4.2 Legs #1 and #2 with Antennas

To replace a leg with an antenna module where the antenna is physically undamaged, you'll need to remove the antenna from the old leg before replacing it.

To detach the antenna, remove the plastic sheet from the leg (1) and detach the antenna from the Velcro by carefully pulling the cable (2). Follow the standard leg replacement procedure to detach the old leg (3).

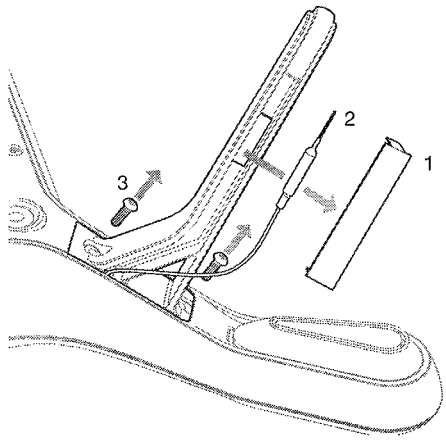


Figure 9.4.2.1: Detaching the Antenna from the Leg

Attach the new leg by threading the antenna cable through the notch in the top of the leg (1) and securing the leg using the provide screws (2).

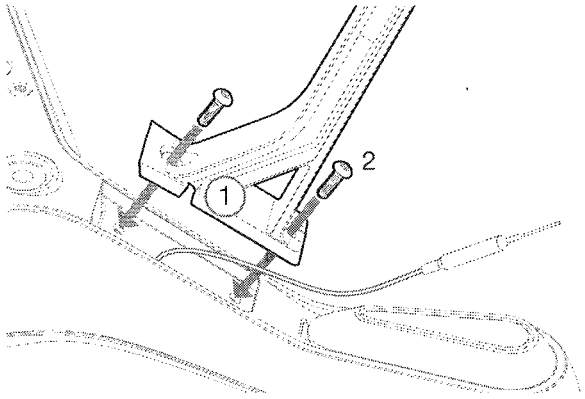


Figure 9.4.2.2: Attaching a New Leg with an Existing Antenna

To secure the antenna to the new leg, use the provided Velcro to attach only the yellow-backed Velcro strip to the Velcro on the antenna. Then remove the backing and attach the Velcro and antenna to the inside of the leg, placing the tip of the antenna 5 mm from the edge of the rubber foot (1) as shown below. Fold the ends of a provided plastic sheet at right angles (2), remove the adhesive backing, and stick the plastic sheet to the leg so it secures the antenna in place (3).

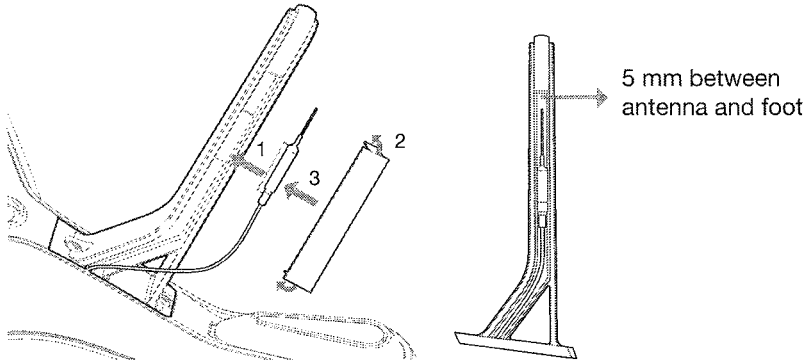


Figure 9.4.2.3: Attaching an Existing Antenna to a New Leg

9.4.3 Leg #4 with Compass

Solo's right-rear leg (#4) contains the compass module. Start by detaching the leg from the arm as you would a standard leg, but the leg will not be removable until you disconnect the compass from Solo. To access the compass connector, you'll need to remove the battery tray from Solo. See Section 9.5 for battery tray removal instructions.

With the battery tray removed, locate the compass connector in the corner of the board closest to the leg being replaced. Disconnect the compass connector from the board by holding down the tab on the far side of the connector and lifting up the connector. Since the space between the arm and the connector is limited, it may help to use a screwdriver to press the tab.

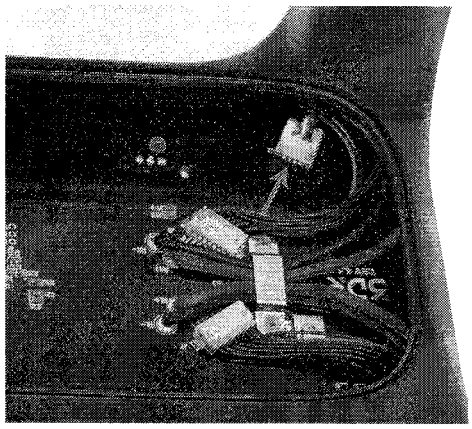


Figure 9.4.3.1: Compass Connector on Mainboard

With the compass disconnected, remove the old leg and cable from Solo. Place the new leg into position and thread the new compass cable through the arm where it can connect to the board. Connect the compass connector in the same place as the old compass.

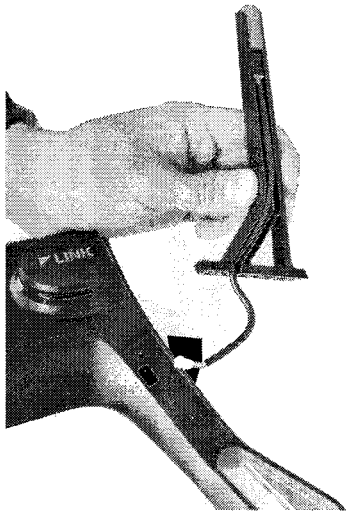


Figure 9.4.3.2: Insert New Leg with Compass

Secure the new leg in place and replace the battery tray.

9.5 Battery Tray

The battery tray holds the battery and GPS in place, and allows you to access the main electronics bay. This section covers how to remove to tray to access the interior of Solo.

9.5.1 GPS Cover

The GPS cover is the flat, black end cap in front of the battery tray. To remove it, use a small, flat prying tool to loosen the four clips along the back edge of the cover.

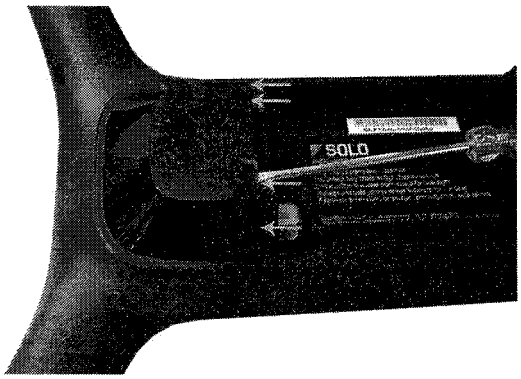


Figure 9.5.1.1: GPS Cover Removal

9.5.2 Battery Tray Removal

To detach the battery tray and access Solo's main electronics bay, use a small Philips screwdriver to remove the 7 screws securing the battery tray to Solo.

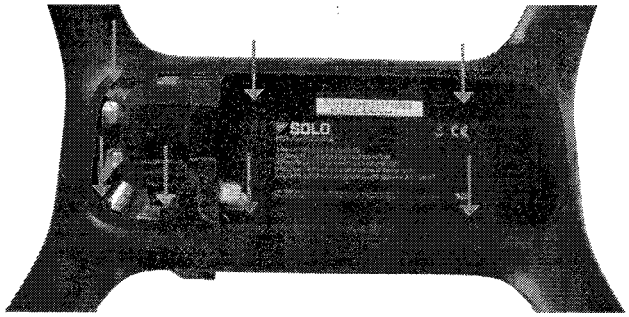


Figure 9.5.2.1: Battery Tray Removal

The battery tray will still be connected to Solo via the GPS cable, so carefully lift out the tray just enough to access the board beneath.

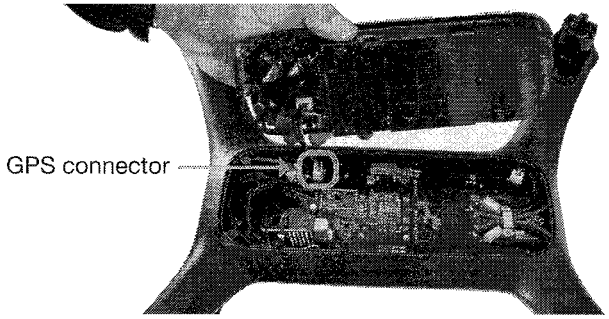


Figure 9.5.2.2: Battery Tray Detachment

9.6 Motors

Replacement motors are available as clockwise and counterclockwise Motor Pods. Use a counterclockwise Motor Pod to replace motors #1 and #2, and use a clockwise Motor Pod to replace motors #3 and #4. Replace motor pods every 150 hours of flight or when they can no longer turn smoothly.

To replace a Motor Pod, first, use a small, flat prying tool to remove the LED cover form the underside of the arm.

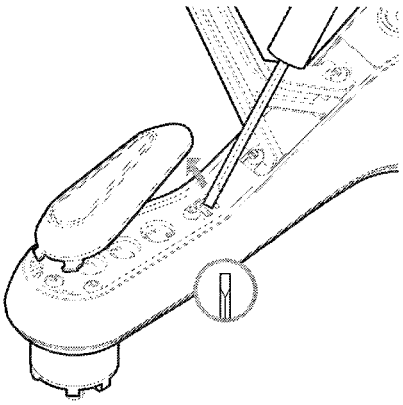


Figure 9.6.2.1: LED Cover Removal

Use a #2 Phillips screwdriver to remove the four screws securing the pod to the arm.

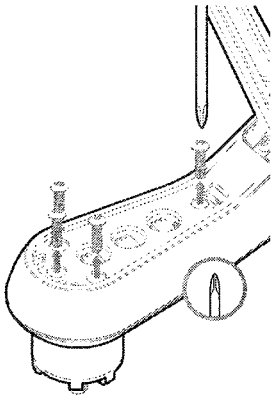


Figure 9.6.2.2: Motor Pod Removal

Disconnect the wide beige connector, the red wire and the black wire to remove the old motor pod. To remove the wide beige connector (DF13), carefully lift the edges of the connector away from the pod until they pop out, then remove the connector. Don't pull on the wires! The connector can break easily if force is used to remove it.

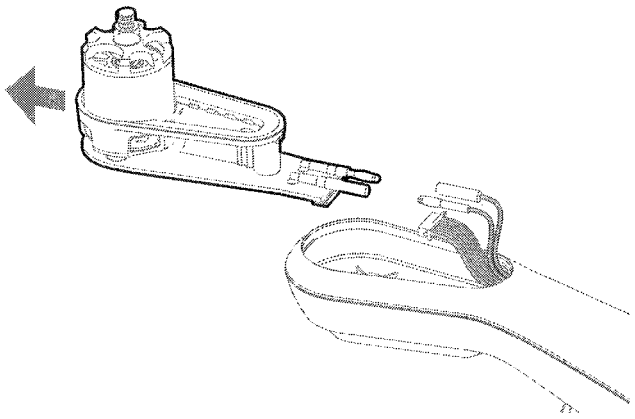


Figure 9.6.2.3: Motor Pod Disconnection

Connect the 3 cables from the arm to the new motor pod. Tuck the cables inside the arm and set the new pod into place.

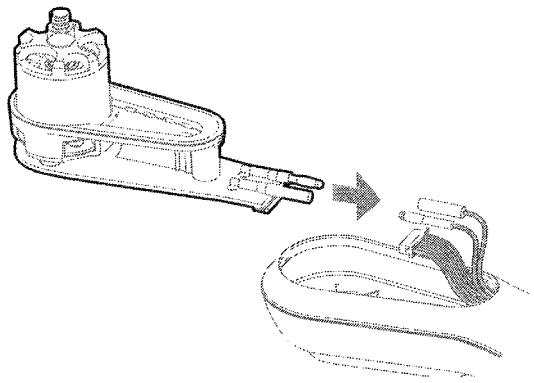


Figure 9.6.2.4: Motor Pod Connection

Turn over Solo and secure the new motor pod into place using the 4 provided screws. Do not reuse the screws from the old Motor Pod. Finally, snap the LED cover back into place.

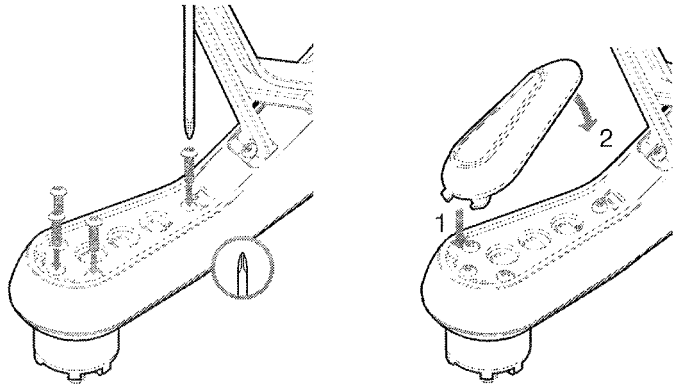


Figure 9.6.2.5: Motor Pod and LED Cover Attachment

9.7 Factory Reset

Contact customer support before performing a Factory Reset. This procedure can cause irreparable damage to Solo.

Performing a factory reset restores Solo and the controller to their state prior to the first flight update. Use a factory reset if you forget your Solo Wi-Fi password or need to restore Solo's factory settings.

9.7.1 Controller

To reset the controller, start with the controller powered off. Hold the power and Fly buttons simultaneously until you see the controller-updating display (Figure 2.6.4.7). The controller will restart, taking up to 5 minutes, then display the green checkmark and prompt you to press A to continue (Figure 2.6.4.9). When the reset procedures is complete, the controller will display the preflight-update display (Figure 2.6.4.1). Complete the update process described in Section 2.6.4 to prepare Solo for flight.

9.7.2 Solo

As part of the reset procedure for Solo, Solo will be un-paired from the controller. Start by powering off Solo. Use a paperclip or similar tool to press and hold Solo's pair button (Figure 8.3.2.1) while powering on Solo. Release the pair button after you see the internal LED adjescent to the Pair button start rapidly flashing orange. This signals the factory reset procedure is now underway.

After a few minutes, Solo's main LEDs will start flashing different colors in a rotating pattern as the reset nears completion. Once Solo emits an initialization tone, the factory reset is complete, and Solo is now ready to be paired with the controller; follow the instructions in Section 9.3 to pair Solo with the controller. If the rotating light pattern stops, but Solo doesn't emit an initialization tone, power off and power on Solo and follow the pairing instructions in Section 9.3.

10 Appendix

10.1 Specifications

Solo is a quad-rotor aerial vehicle powered by the 3DR Pixhawk 2 autopilot system and APM:Copter flight control software. Solo communicates with the controller and Solo app over the 3DR Link secure Wi-Fi connection.

Autopilot:	3DR Pixhawk 2
Flight code:	ArduPilot Copter
Control:	3DR Solo Controller
Wireless communication:	3DR Link 1.0
Frequency:	2.4 GHz
Height:	10 in. (25 cm)
Motor-to-motor dimension:	18 in. (26 cm)
Propulsion:	880 K_V motors, two clockwise rotating motors and two counterclockwise rotating motors
Propeller:	10 in. x 4.5 in. (25 cm x 11.4 cm)
Weight with battery:	3.3 lbs. (1.5 kg)
Controller battery life:	3 hours
Extended controller battery life:	6 hours
Controller battery:	Li-ion 2600 mAh 7.2 Vdc (5200 mAh for extended battery)
Power:	Electric (rechargeable lithium polymer battery)
Battery:	Lithium polymer, 5200 mAh, 14.8 Vdc
Battery weight:	1 lb. (.5 kg)
Estimated flight time:	25 minutes*
Maximum altitude:	328 ft. (100 m)
Range:	.5 miles** (.8 km)
Payload capacity:	1.1 lbs. (500 g)
Cruise speed:	5.7 mph (2.5 m/s)
Maximum speed:	55 mph (25.5 m/s)
Maximum climb rate:	11 mph (5.0 m/s)
Maximum descent rate:	5.5 mph (2.5 m/s)
Headwind limitation:	25 mph (11 m/s)
Crosswind limitation:	25 mph (11 m/s)
Camera:	Streaming video compatible with GoPro® HERO 3, 3+ or 4 Full compatibility with GoPro® HERO 3+ or 4
Solo app compatibility:	iOS 8.0 or later / Android 4.3 or later
Operating temperature:	32° F - 113° F (0° C - 45° C)
Operating relative humidity:	0-85% RH

*Flight time varies with payload, wind conditions, elevation, temperature, humidity, flying style, and pilot skill. Listed flight time applies to elevations less than 2,000 ft above sea level.

**Range varies with location, antenna orientation, background noise and multi-path.

10.2 Warranty

3D Robotics warrants to the original retail purchaser of Solo (the "Product") that at the time of purchase that this product is free from material defect in materials and workmanship. Should this Product fail during normal consumer usage and conditions due to defective material or workmanship within one year from the date of purchase, or such longer period as is required by applicable law ("Warranty Period"), such defect(s) will be repaired or replaced at 3D Robotics' option, without charge for parts or labor directly related to the defect(s). The complete terms of the limited warranty applicable to Solo can be found at 3dr.com/terms.

This Warranty extends only to consumers who purchase the product from a 3D Robotics authorized reseller and is not transferable or assignable. This Warranty does not apply to: (1) Product subjected to abnormal use or conditions, accident (including without limitation, collision, crash or fire), alteration, or improper repair; (2) damage from exposure to moisture or extreme environmental conditions; (3) damage from use with any accessory, software or other product not expressly authorized by 3D Robotics; (4) damage from external causes such as dirt, sand, battery leakage, blown fuse, or improper usage of any electrical source; (5) commercial use; or (6) use in violation of law or ordinances in effect in the jurisdiction in which the Product is used.

3D Robotics assumes no liability for any accident, injury, death, loss, or other claim related to or resulting from the use of this product. 3D Robotics makes no other warranties for Solo, and makes no warranties whatsoever for service, software, maintenance or support for non-3D Robotics branded products. Such products, service, software, maintenance or support is provided by 3D Robotics "As Is" and any third-party warranties, products, software, services, maintenance or support are provided by the original manufacturer or supplier, not by 3D Robotics.

Software is subject to the separate software license agreement accompanying or made available to you in connection with the software. A portion of the software contains or consists of open-source software, which you may use under the terms and conditions of the specific license under which the open-source software is distributed. You agree that you will be bound by any and all such license agreements, and that your usage of this product indicates your acceptance of those agreements. Title to software remains with the applicable licensor(s). In no event will 3D Robotics be liable to you for damages, including any general, special, incidental or consequential damages arising out of the use or inability to use the software.

THE EXTENT OF 3D ROBOTICS' LIABILITY UNDER THIS WARRANTY IS LIMITED TO THE REPAIR OR REPLACEMENT PROVIDED ABOVE AND, IN NO EVENT, SHALL ITS LIABILITY EXCEED THE PURCHASE PRICE PAID BY PURCHASER FOR THE PRODUCT.

10.3 Regulatory Compliance

10.3.1 U.S. - FCC (Federal Communication Commission)

3DR Solo FCC:	2ADYD-S111A
3DR Solo Controller FCC:	2ADYD-AT11A

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by 3D Robotics could void the user's authority to operate the equipment.

Radiation Exposure Statement:
The Solo system has been tested to ensure compliance with FCC-mandated limits for general population radio frequency (RF) exposure for an uncontrolled environment. These limits ensure that no harmful effects will result from operating Solo according to the standard operating procedures described in this manual.

The body's Specific Absorption Rate (SAR) for the Solo controller is 1.33 watts per kilogram (W/kg) in compliance with the FCC limit of 1.6 W/kg. To reduce exposure to RF energy, hold Solo at least 20 cm away from your body at all times during operation. Do not operate the Solo controller co-located or in conjunction with any other antenna or transmitter.

This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

10.3.2 Canada - Industry Canada

3DR Solo IC:	12768A-S114A
Model number:	S110A
3DR Solo Controller IC:	12768A-AT14A
Model number:	AT10A

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

IC Radiation Exposure Statement:
The Solo system has been tested to ensure compliance with IC-mandated limits for general population radio frequency (RF) exposure for an uncontrolled environment. These limits ensure that no harmful effects will result from operating Solo according to the standard operating procedures described in this manual. To reduce exposure to RF energy, hold Solo at least 20 cm away from your body at all times during operation. Do not operate the Solo controller co-located or in conjunction with any other antenna or transmitter. Changes or modifications not expressly approved by 3D Robotics could void the user's authority to operate the equipment.

Solo (http://3drobotics.com/kb/solo/)

Best Practices

Fly in wide-open areas (very important!)

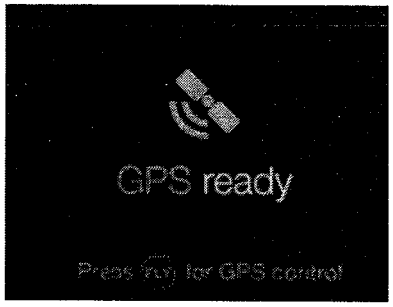
Solo's GPS depends on a clear view of the sky for accurate location tracking. These GPS signals can be blocked by tall structures like trees and buildings, causing unexpected flight behavior, so it is extremely important to fly in wide-open areas away from people.

Use the Preflight Checklist in the manual

The Preflight Checklist (http://3drobotics.com/kb/preflight-checklist-solo/) will walk you through all the necessary pre checks for a prepared flight. It's hard to remember everything, so keep this guide handy.

Wait for GPS before taking off

Solo's GPS system is your safety net. Without GPS, Solo is unable to use location tracking and rely on features like Return to Home and Smart Shots.

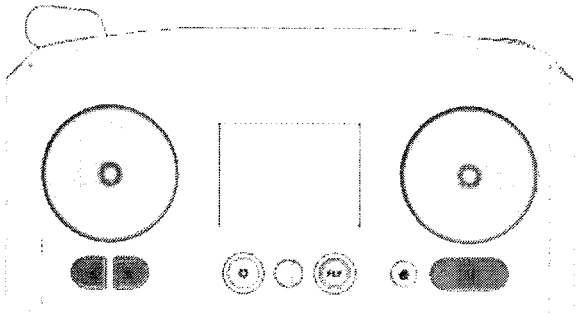


For take off, place Solo 10-15 ft. away from you

This will ensure Solo has a safe amount of room to get into the air.

If Solo is grounded and you need to shut off the motors, hold A + B + Pause to stop the propellers before approaching

Spinning propellers can cause serious injury. Never touch moving propellers or place any objects in the way of the propeller while Solo's motors are powered. To power down the motors, hold A + B + Pause.



Use the Pause button if you get into trouble

At any point if you find yourself in over your head, simply press the Pause button and Solo will stop and hover in place.

Solo (http://3drobotics.com/kb/solo/)

Preflight Checklist

Use this checklist as a guide to prepare Solo for flight. Since it is easier to troubleshoot issues at home as opposed to out in the field, we recommend performing a handful of checks at home first.

If you have an equipment concern and can't find the solution you are looking for in the Solo Knowledge Base (http://3drobotics.com/kb/solo/), contact support here (http://3drobotics.com/kb/solo/) before flying.

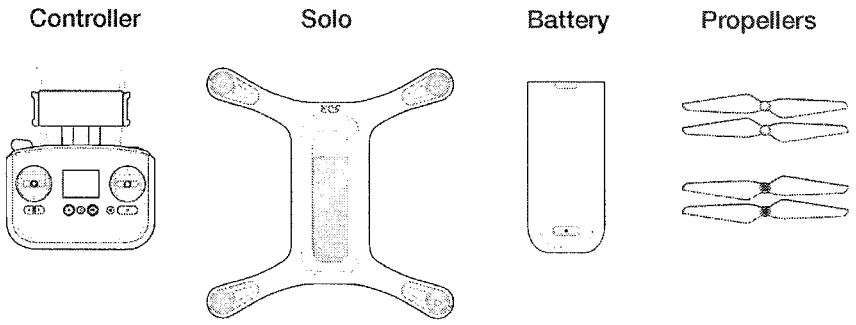
Before leaving home, check...

1 Battery charges

Check that the flight battery (http://3drobotics.com/kb/solo-charging-battery/), controller battery (http://3drobotics.com/kb/solo-charging-controller/), and your mobile device are charged up and ready to go. If you plan on using your GoPro®, make sure its battery is fully charged as well.

2 Flight equipment

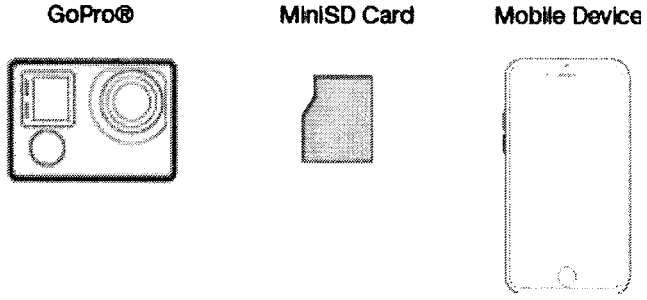
Check for damaged or loose components.



Carefully inspect each propeller for damage. Propellers should be discarded and replaced if bent or chipped.

3 Filming and streaming equipment

If you plan on using your GoPro® with Solo, attach your GoPro® (http://3drobotics.com/kb/attach-camera-solo/) and establish a live feed (http://3drobotics.com/kb/viewing-solo-video/) through the Solo App to make sure everything is communicating properly. Now is a good time to also make sure your MiniSD card is cleared of old footage so you have enough memory to record your upcoming flight.



GoPro® and MicroSD Card — Optional for flight

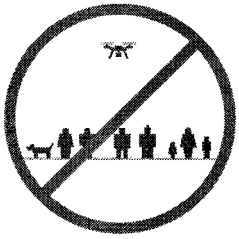
4 Packing up

Now that you have made sure everything is in good-working order, very carefully pack all your items in your Solo carrying case. Make sure each item is snug and secure... it would be a shame to make it to the field to find something has broken during transportation.

In the field, check your flying location for...

1 People

Whether you are a veteran pilot or new to flying, never fly around people! Unforeseen flight hazards can occur at any time and you are ultimately responsible for the safety of yourself and others.



2 Inclement weather

Solo is not designed for harsh weather conditions. If it is windy, snowing, raining etc. pack up and wait for calmer skies.

3 Surrounding airports

Stay at least 5 miles away from surrounding airports.

4 Interfering Wi-Fi networks

Stay clear of crowded Wi-Fi environments. If you are in an area with many different Wi-Fi networks your connection to Solo will not be as reliable. Also, things like telephone poles and cell towers will cause Wi-Fi interference, so make sure that you are clear of these as well.

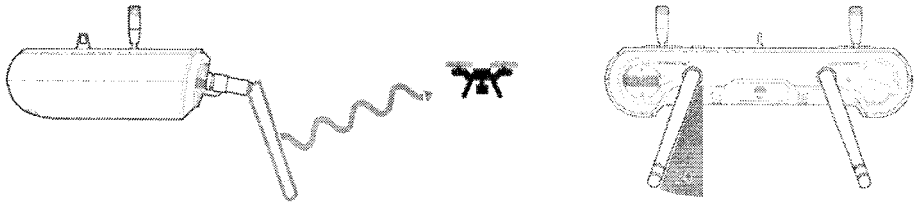
Setting up to fly, final checks...

1 Propellers

Check that the propellers are correctly attached (http://3drobotics.com/kb/solo-attaching-propellers/) and spin smoothly without obstruction when turned. Once again, check the propellers to be sure they are not bent or chipped as damage can occur during travel.

2 Antenna configuraton

Antennas are down and away from the controller so they are approximately perpendicular with Solo in flight. Tilt each antenna out and away from one another at a 20° angle.



3 GoPro® configuration (optional)

Before attaching your GoPro® (http://3drobotics.com/kb/attach-camera-solo/)to Solo, make sure to insert your MiniSD card and check that you've set the recommended GoPro® settings. Once you've attached the camera, establish a live feed (http://3drobotics.com/kb/viewing-solo-video/) make sure the Solo App is registering the GoPro® feed.

Double-check your GoPro®'s Wi-Fi is disabled before taking flight. Failure to do so may lead to unexpected behavior.

4 Level takeoff surface

For a smooth takeoff Solo requires a flat and solid surface to

launch from.

5 Safe takeoff/landing area

Make sure Solo has 20 ft of space in each direction to takeoff and land from. Depending on the GPS strength of your location, Solo's Return Home feature may require a little extra room.

6 Return Home accuracy

Since GPS strength can vary from location to location, the exact landing point of a Return Home call can differ slightly from the original launch point. Just so you know where exactly where Solo will land in the future, take off with Solo, fly out a small distance, and test the Return Home feature to see where Solo has pinpointed to land.

Give your surroundings one last check!

A good amount of time has probably gone by since beginning your preflight checks, leaving time for people to have wandered into your flying area while you were busy making your way down the list. Give your surroundings one more good look for any potential flying hazards and just remember to use common sense for safe flying.

Fly on!

PHANTOM Quick Start Manual V1.7

2013.09.25 Revision

For NAZA-M Firmware V3.12

& Assistant Software V2.12

Thank you for purchasing our product. Please visit the DJI website, PHANTOM section to confirm if the printed manual is the latest one according to the manual version. If not, please download and refer to the latest manual.

Please read the entire manual strictly and follow these steps to use you product. The manual will get you ready to fly by doing simple operations. You can get an advanced manual from DJI website to learn more about PHANTOM, for example, configuring parameters by connecting to assistant software, changing the transmitter to Model, matching frequency between the transmitter and the receiver, etc.

Make sure to use the NAZA-M assistant software of 2.0 version (or above 2.0) to carry out firmware upgrade and parameter configuration. DO NOT use the NAZA-M assistant software bellow 2.0 version.

Note: The built-in autopilot system is NAZA-M; you can obtain the current NAZA-M Firmware Version according to the Assistant Software. If you ever upgrade your NAZA-M Firmware, please carefully read the corresponding NAZA-M release note and NAZA-M quick start guide.

www.dji.com

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Disclaimer & Warning

Please read this disclaimer carefully before using the PHANTOM. By using this product, you hereby agree to this disclaimer and signify that you have read them fully. **THIS PRODUCT IS NOT SUITABLE FOR PEOPLE UNDER THE AGE OF 18.**

PHANTOM is an excellent flight platform offering an excellent flight experience, only if it is powered normally and in a good working condition. Despite the PHANTOM having a built-in autopilot system and our efforts in making the operation of the controller as safe as possible when the main power battery is connected, we strongly recommend users to remove all propellers when calibrating and setting parameters. Make sure all connections are good, and keep children and animals away during firmware upgrade, system calibration and parameter setup. DJI Innovations accepts no liability for damage(s) or injuries incurred directly or indirectly from the use of this product in the following conditions:

1. Damage(s) or injuries incurred when users are drunk, taking drugs, drug anesthesia, dizziness, fatigue, nausea and any other conditions no matter physically or mentally that could impair your ability.
2. Damage(s) or injuries caused by subjective intentional operations.
3. Any mental damage compensation caused by accident.
4. Failure to follow the guidance of the manual to assemble or operate.
5. Malfunctions caused by refit or replacement with non-DJI accessories and parts.
6. Damage(s) or injuries caused by using third party products or fake DJI products.
7. Damage(s) or injuries caused by mis-operation or subjective mis-judgment.
8. Damage(s) or injuries caused by mechanical failures due to erosion, aging.
9. Damage(s) or injuries caused by continued flying after low- voltage protection alert is triggered.
10. Damage(s) or injuries caused by knowingly flying the aircraft in abnormal condition (such as water, oil, soil, sand and other unknown material ingress into the aircraft or the assembly is not completed, the main components have obvious faults, obvious defect or missing accessories).
11. Damage(s) or injuries caused by flying in the following situations such as the aircraft in magnetic interference area, radio interference area, government regulated no-fly zones or the pilot is in backlight, blocked, fuzzy sight, and poor eyesight is not suitable for operating and other conditions not suitable for operating.
12. Damage(s) or injuries caused by using in bad weather, such as a rainy day or windy (more than moderate breeze), snow, hail, lightning, tornadoes, hurricanes etc.
13. Damage(s) or injuries caused when the aircraft is in the following situations: collision, fire, explosion, floods, tsunamis, subsidence, ice trapped, avalanche, debris flow, landslide, earthquake, etc.
14. Damage(s) or injuries caused by infringement such as any data, audio or video material recorded by the use of aircraft.
15. Damage(s) or injuries caused by the misuse of the battery, protection circuit, RC model and battery chargers.
16. Other losses that are not covered by the scope of DJI Innovations liability.

Cautions for Product Use

Please check the following steps carefully every time before flight.

1. Before use of the product, please accept some flight training (Using a simulator to practice flying, getting instruction from a professional person, etc.).
2. Check that all parts of the multi-rotor are in good condition before flight. Do not fly with aging or broken parts.
3. Check that the propellers and the motors are installed correctly and firmly before flight. Make sure the rotation direction of each propeller is correct. Do not get close to or even touch the working motors and propellers to avoid serious injury.
4. Do not over load the multi-rotor (should be less than 1200g).
5. Make sure that the transmitter battery and flight battery are fully charged.
6. Try to avoid interference between the remote control transmitter and other wireless equipment.
7. Make sure to switch on the transmitter first, then power on the multi-rotor before takeoff! Power off the multi-rotor first, then switch off the transmitter after landing!
8. The fast rotating propellers of PHANTOM will cause serious damage and injury. Always fly the multi-rotor 3m or above away from you and unsafe conditions, such as obstacles, crowds, high-voltage lines, etc. FLY RESPONSIBLY.
9. All parts must be kept out of the reach of children to avoid CHOKE HAZARD; if a child accidentally swallows any part you should immediately seek medical assistance.
10. Please always keep the compass module away from the magnet. Otherwise it may damage the compass module and lead the aircraft to work abnormally or even be out of control.
11. DO NOT use the PHANTOM transmitter (receiver) with the other third party remote control equipment.
12. Make sure to use the NAZA-M assistant software of 2.0 version (or above 2.0) to carry out firmware upgrade and parameter configuration. DO NOT use the NAZA-M assistant software bellow 2.0 version.
13. The built-in ESCs of PHANTOM ONLY support 3S (11.1V) power supply.
14. ONLY use the DJI original motor and 8-inch propeller.
15. If you want to put the PHANTOM in a car, please keep it away from the speaker, since the compass module may be magnetized.
16. DO NOT use the magnetic screwdriver. Otherwise, keep the screwdriver at least 10cm away from the compass module, to avoid magnetic interference.
17. If you use your own equipment(for example: GoPro3), please make sure the WiFi function is disabled, to avoid the interference on the transmitter, which may cause the PHANTOM to FailSafe, crack and or even to fly away.
18. For Mac user, please install Windows Parallel to run assistant software.

If you have any problem you cannot solve during installation, please contact a DJI Authorized Dealer.

Trademarks

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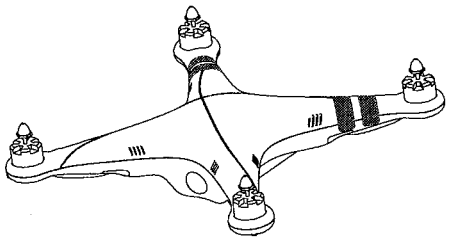
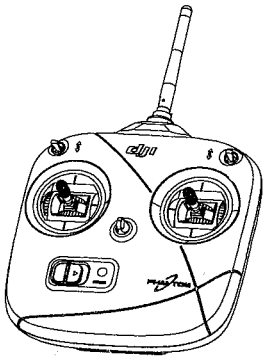
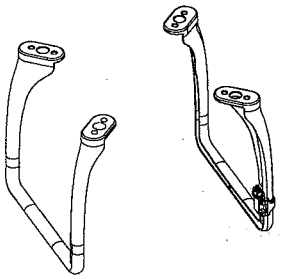
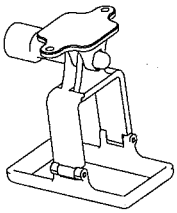
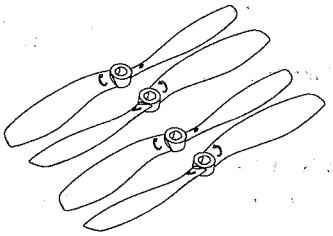
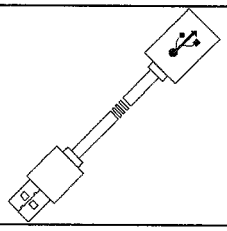
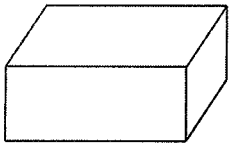
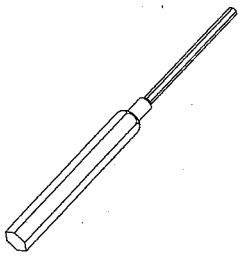
Battery Usage & Charging Cautions

1. Do not put the battery into water; store the battery in a cool and dry environment.
2. Only use the correctly specified batteries
3. Batteries must be kept out of the reach of children; if a child accidentally swallows the battery you should immediately seek medical assistance.
4. Do not use or store the battery near fire.
5. Battery should be charged with proper standard charger.
6. Do not connect the battery reversed in positive and negative terminals in the charger or equipment.
7. Do not connect the battery directly to the wall plugs or vehicle-mounted socket.
8. Do not put the battery into a fire or heat the battery.
9. Do not let the battery terminals (+and-) touch together to cause short-circuit.
10. Do not transport or store the battery together with metal objects.
11. Do not hit or throw the battery.
12. Do not weld the battery terminals together.
13. Do not drive a nail in, hit with a hammer, or stomp on the battery.
14. Do not disassemble or alter the battery.
15. Do not use or store the battery in extreme heat environments, such as direct sunlight or in the car in hot weather. Otherwise, the battery will overheat, may cause fire (or self-ignite), this will affect the performance of the battery, shorten the service life of the battery.
16. Do not use the battery in strong electrostatic areas, otherwise the electronic protection may be damaged which may cause a hazard.
17. If you get the battery electrolyte leakage into your eyes, don't rub, first wash your eyes with clean water then seek medical assistance immediately. If not handled in a timely manner, eyes could be damaged.
18. Do not use the battery when it emits an odour, high temperature, deformation, change in colour or other abnormal phenomena; if the battery is in use or charging, you should stop charging or using immediately.
19. If the battery terminal gets dirty, please clean it with a dry cloth before using. Otherwise it will cause a poor contact, thus causing energy loss or inability to charge.
20. Discarded battery could lead to a fire; you should completely discharge the battery and wrap the output terminal with insulating tape before discarding.
21. DO NOT drain the battery of phantom or leave the battery plugged into the PHANTOM when unused. When there is low voltage alert please landing timely to avoid damages to the battery or others.

In the Box

Aircraft	Transmitter	Landing Gear (with Compass Module)
		
Frame for Camera	Propellers	Assistant Wrench
		
USB Cable	Screw Package (M3x6)	Accessory
		

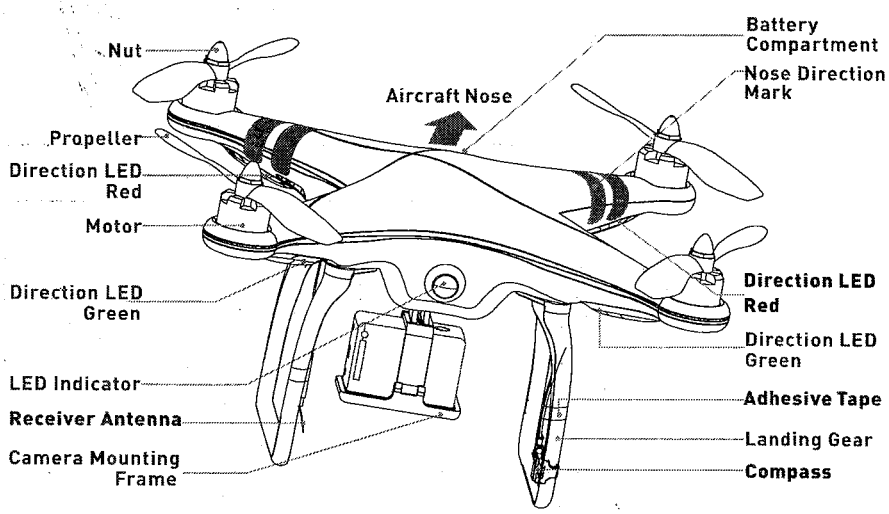
Required Items

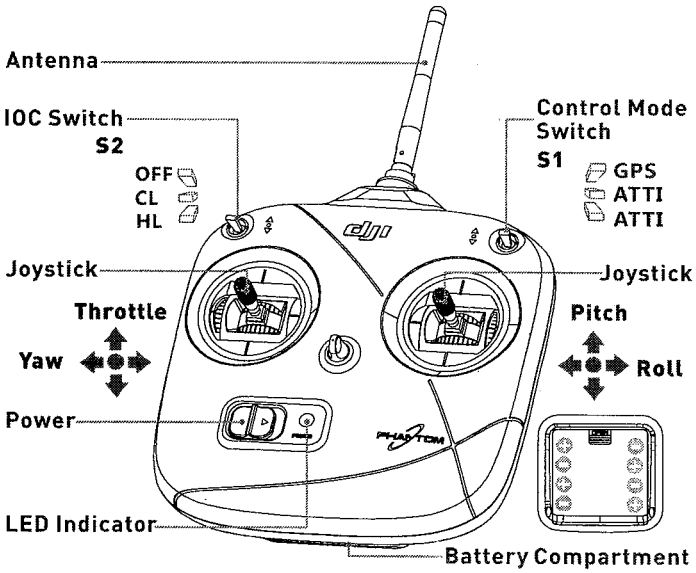
Phillips Screwdriver	5# AA Batteries
	

Introduction

The PHANTOM is an all-in-one small Quad Copter designed for multi-rotor enthusiasts. Before shipping from the factory, it has been configured and fully tested, which means you have no configuration to do.

- Built-in
  - ✓ NAZA-M Autopilot System
    (Refer to NAZA-M manual for details)
  - ✓ GPS & Compass Module
  - ✓ R/C Receiver
  - ✓ Power System for Flight
  - ✓ LED Indicator
  - ✓ USB Interface
    (in the Battery Compartment)
- Function
  - ✓ ATTI./GPS ATTI. Mode
  - ✓ Intelligent Orientation Control
  - ✓ Enhanced Fail-Safe
  - ✓ Low-Voltage Alert
- Camera Frame (For GoPro)
- Takeoff Weight:<1200g





- ✓ Working Frequency: 2.4GHz ISM
- ✓ Control Channel Numbers of Transmitter: 7
- ✓ Communication Distance: 1000m
- ✓ Receiver Sensitivity(1%PER): > -100dBm
- ✓ Power Consumption of Transmitter: < 20dBm
- ✓ Working Current/Voltage: 52 mA@6V
- ✓ AA Battery (5#): 4 Required

7. GPS & Compass Calibration

If the Compass Module is not used, you can skip this step.

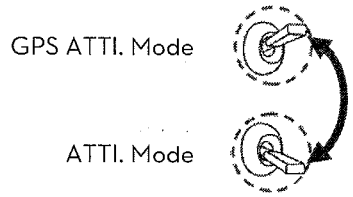
The GPS module has a built-in magnetic field sensor for measuring the geomagnetic field, which is not the same in different areas. The GPS module will not work unless the Compass Module has been connected. Make sure the Compass Module connections are correct.

Please always keep the compass module away from the magnet. If this situation occurs please change the compass module before flying. Otherwise it may damage the compass module and lead the aircraft to work abnormally or even be out of control.

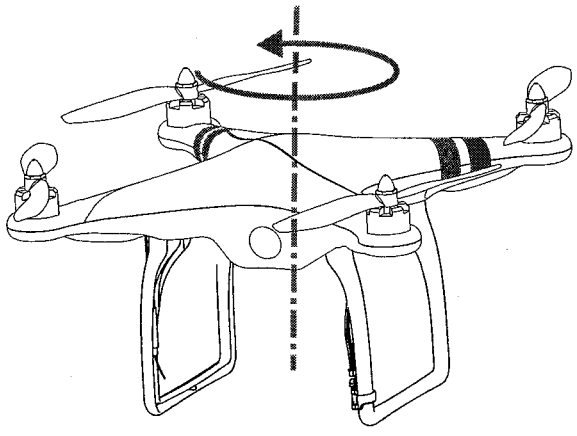
Calibrate the compass before the first flight or when flying in a different area. Make sure to keep away from ferromagnetic substance and other electronic equipment when calibrating or flying. If you keep having calibration failure, it might suggest that there is magnetic interference or other ferromagnetic substance, please avoid flying in this area.

If you have calibration failure or the LED blinks red and yellow lights alternately ( ), please connect to the Assistant Software, select the "Tools" tab and follow the tips of the "IMU Calibration" to do operation.

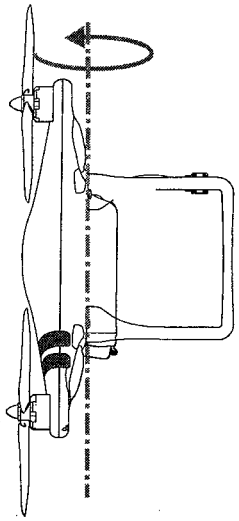
1. Quickly switch the control mode switch from ***ATTI. Mode*** to ***GPS ATTI. Mode*** and back to ***ATTI. Mode*** for 6 to 10 times, The LED indicator will turn to constantly yellow.
2. Rotate your aircraft around the horizontal axis (about 360°) until the LED changes to constant green, and then go to the next step.
3. Hold your aircraft vertically and rotate it (its nose is downward) around the vertical axis (about 360°) until the LED turns off, meaning the calibration is finished.
4. If the calibration was successful, calibration mode will exit automatically. If the calibration has failed, the LED keeps flashing quickly Red. Switch the control mode switch one time to cancel the calibration, and then re-start from step 1.



ATTI. Mode->GPS ATTI. Mode -> ATTI. Mode is one time , quickly switch 6 to 10 times



Horizontal Rotation



Vertical Rotation

Flight Test

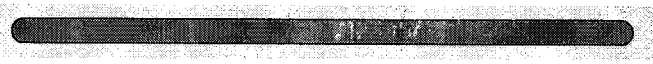
1. If in GPS ATTI. Mode, place the aircraft in an open space without buildings or trees. Take off the aircraft after 6 or more GPS satellites are found (Red LED blinks once or no blinking). If in ATTI. Mode, you can skip this step.
2. Place the aircraft 3 meters away from you and others, to avoid accidental injury.
3. Start-up
   - ✓ Switch on the transmitter first, then power on multi-rotor! Keep the aircraft stationary until the system start and self-check has finished.
   - ✓ Please wait for the system to warm up gradually with the LED blinks Yellow 4 times quickly (●●●●). You should not start the motors until the blinking disappears.
   - ✓ Keep the aircraft stationary, and execute the CSC to start the motors.

   - ✓ Release the yaw, roll and pitch sticks and keep them at the neutral position, at the same time raise the throttle stick from the bottom. The motors will stop if you do not push the throttle stick from the bottom within 3 sec and you will need to re-start the motors.
   - ✓ Keep raising the throttle stick until all the rotors are working, push the throttle stick to the mid position and then take-off your multi-rotor gently, pay attention not to push the stick excessively.
   - ✓ Pay attention to the aircraft movement at any time, and use the sticks to adjust the aircraft's position. Keep the yaw, roll, pitch and throttle sticks at the mid position to hover the aircraft at desired height.
4. Lower the aircraft slowly until touch down is achieved. The motors will stop automatically after 3 seconds, or you can repeat the start-up stick command to stop the motors sooner.
5. Please always power off the aircraft first, and then switch off the transmitter after landing.

FLYING NOTES !!!

- ✓ At the first motors start, the system will check the sensors Bias and you are asked to keep the aircraft stationary (no need of horizontal level). If you cannot start the motors and the LED blinks Green 6 times quickly (●●●●●●), it means that the sensor error is too big. Please connect the assistant software, enter the "Tools" - > IMU calibration, carry out basic calibration.

  Note: after the first successful motors start, this checking will be disabled and it is no need any more to keep the aircraft stationary during starting motors.
- ✓ If in GPS ATTI. Mode, keep the aircraft flying in the open space without obstruction. Pay attention to the GPS satellite status indicator LED. When GPS signal has been lost for 3s (red LED blink twice or three times), system enters ATTI. Mode automatically.
- ✓ If the battery voltage is too low for flying, the aircraft enters the first level protection with LED flashing quickly Red, please land ASAP. Once the aircraft enters the second level protection, the aircraft will drop height automatically.
- ✓ If you want to put the PHANTOM in a car, please keep it away from the speaker, since the compass module may be magnetized.
- ✓ DO NOT fly near to ferromagnetic substances, to avoid strong magnetic interference with the GPS.
- ✓ It is recommended to land the aircraft slowly, to prevent the aircraft from damage when landing.
- ✓ If the Transmitter indicates low-battery alert, please land ASAP. In this condition the Transmitter may cause the aircraft to go out of control or even crash.

Compass Calibration	LED Flashing
Begin horizontal calibration	
Begin vertical calibration	
Calibration or others error	

ESC Sound Introduction

ESC State	Sound
Ready	♪1234567
Throttle stick is not at bottom	BBBBBB...
Input signal abnormal	B--------B--------B...
Input voltage abnormal	BB---BB---BB---BB...

Transmitter State Introduction

Transmitter State	Introduction
The throttle stick isn't at the lowest position after turning on may alarm.	B--------BB
Linking between the Transmitter and the Receiver	
Normal Operation	
Low-battery Alert (Need to change the battery)	BB.....

Specifications of the Aircraft

Parameters	Range
Operating Temperature	-10°C ~ 50°C
Power Consumption	3.12W
Supported Battery	ONLY 3S LiPo
Take-off Weight	<1200g
Hovering Accuracy (GPS Mode)	Vertical: 0.8m. Horizontal: 2.5m
Max Yaw Angular Velocity	200°/s
Max Tilt Angle	35°
Max Ascent / Descent Speed	6m/s
Max Flight Velocity	10m/s
Diagonal distance (motor center to motor center)	350mm
Weight	670g
Weight(with Battery)	800g

CE Statement

Due to the used enclosure material, the device shall only be connected to a USB Interface of version 2.0 or higher. The connection to so called power USB is prohibited.

CAUTION RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.

Hereby, DJI Innovations Corporation declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

CE 0700

FCC Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment.

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

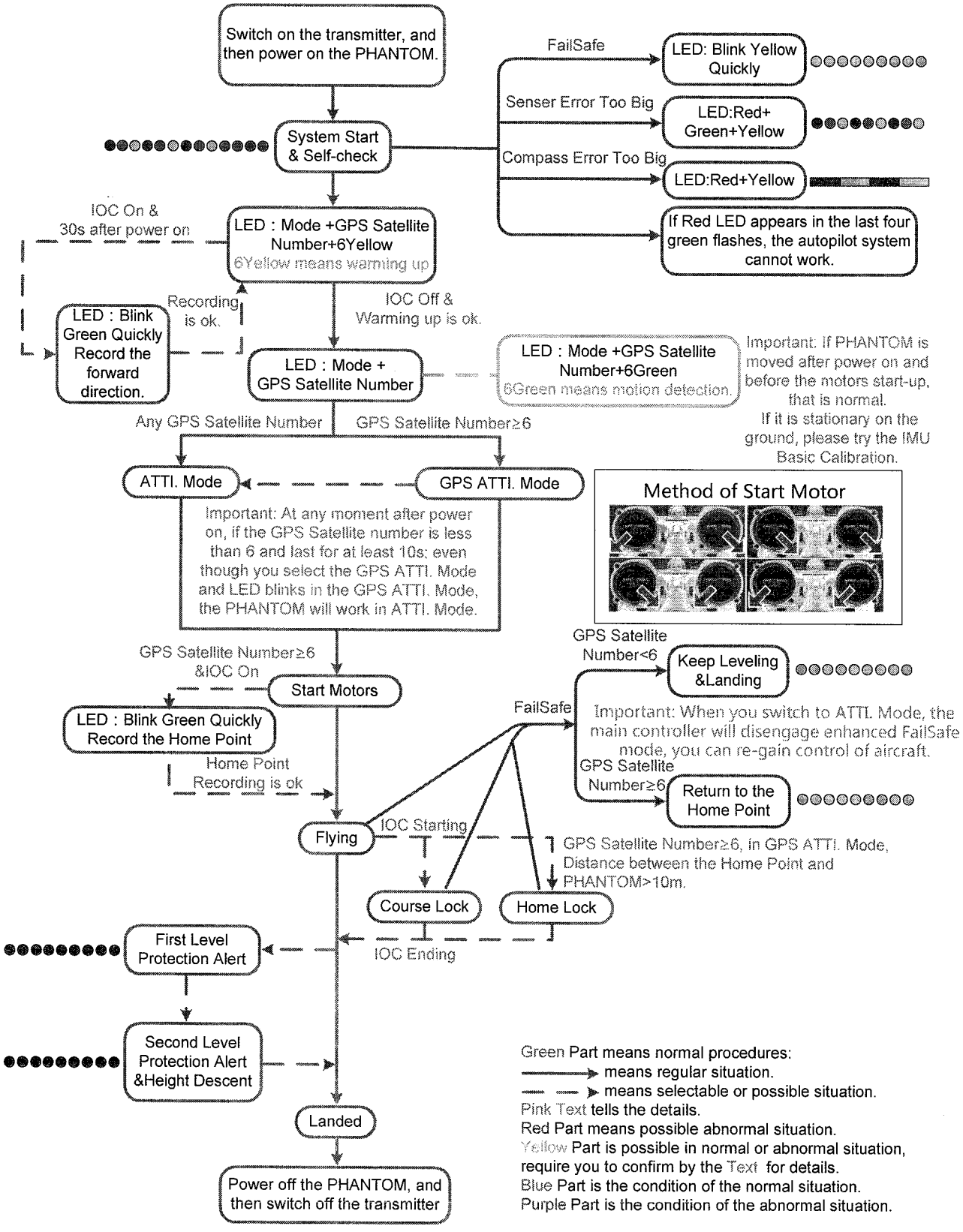
NOTE: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications or changes to this equipment. Such modifications or changes could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.

PHANTOM Flying Flowchart V1.0 (Simplified Version)

This flowchart is aiming at help you to get familiar with the flying procedures of PHANTOM, please read the Manual carefully to get the operation details. Its corresponding Firmware Version is V3.0.



Green Part means normal procedures:
——▶ means regular situation.
– – – ▶ means selectable or possible situation.
Pink Text tells the details.
Red Part means possible abnormal situation.
Yellow Part is possible in normal or abnormal situation, require you to confirm by the Text for details.
Blue Part is the condition of the normal situation.
Purple Part is the condition of the abnormal situation.

PHANTOM 2 VISION+

User Manual V1.8

2015.01

Phantom 2 Vision + User Manual

V1.2 2015.01

Please read this manual carefully before using the product.

Important Safety Notice

Use your Phantom carefully. It contains sensitive electronic components and may be damaged when dropped, crashed or exposed to water. Never fly a damaged Phantom.

Maintenance
Do not open or attempt to repair Phantom by yourself as doing so may cause damage to the Phantom or cause injury. If the Phantom is not operating normally or has come into contact with liquid, contact a DJI authorized dealer or DJI customer service. Learn more at www.dji.com/support

Battery
Never disassemble, pinch, crush, burn, drop or tread on the DJI smart flight battery. Never short or allow the metal contacts on the battery terminal to touch. Do not expose batteries to extreme temperatures. Always use the DJI approved charger to charge the battery. Keep the DJI battery away from children and store it in a cool, dry place.

Please read the Disclaimer before using your Phantom 2 Vision+.

Using This Manual

Key

⊘ Warning ⚠ Important Hints and Tips References or Definitions

Important

Except when specifically stated, all descriptions in this manual are for Phantom mode, not Naza-M mode.

Before Flight

The following tutorials and manuals have been produced to ensure you to make full use of your Phantom 2 Vision+.
(1) Disclaimer
(2) Phantom 2 Vision+ Quick Start Guide
(3) Phantom 2 Vision+ User Manual
(4) Phantom Pilot Training Guide
Watching all the tutorial videos and reading the Disclaimer before flight is recommended. Afterwards, prepare your first flight using the Phantom 2 Vision+ Quick Start Guide. Improve your flying skills in subsequent flights using the Phantom Pilot Training Guide. Refer to this manual for more comprehensive information. Experienced users, particularly those with DJI Phantom 2 Vision experience should skip to the Phantom 2 Vision+ Quick Start Guide to begin preparing for flight.

Watch the Tutorial Videos

Please watch the tutorial videos below to learn how to use Phantom 2 Vision+ correctly and safely.
http://www.dji.com/phantom2visionplus/training/
Phantom 2 Vision+ official tutorial videos

Download DJI VISION App

Download and install the DJI VISION App. Choose one of the download methods below.

Search "DJI VISION" on the App Store then follow instructions for iOS version.
Search "DJI VISION" on Google Play then follow instructions for Android version.

App Store iOS6.1 or above

Google play Android 4.0 or above

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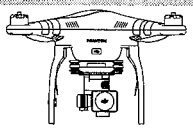
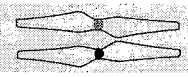
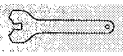
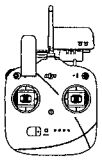
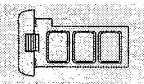
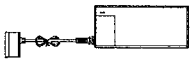
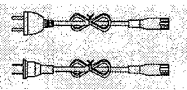
Overview

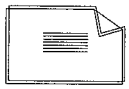
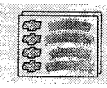
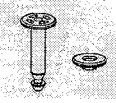
The Phantom 2 Vision+ is the next evolution of the Phantom 2 Vision. It features the same App enabled First Person View (FPV), high performance camera, remote camera control and in-flight content sharing, but adds to it a high performance 3- axial camera stabilization system. It is ideal for aerial creativity whether photo or video. In addition, it provides ground station function which allows users to plan the flight mission and enables aircraft to flight automatically.

FPV: First Person View, see the world from the perspective of the craft and feel a true flying experience.

1 In the Box

Check that all of the following items have been included in your package before use. If anything is missing, please contact your local dealer.

NO.	Name	Picture	Qty.	Remarks
1	Aircraft		1	Integrated gimbal and camera
2	Propeller Pairs		4	4 with black nut, 4 with grey
3	Micro-SD Card		1	Inserted in aircraft Micro-SD slot
4	Lens Cap		1	Fixed to camera lens
5	Gimbal Clamp		1	Attached to the gimbal
6	Prop Wrench		1	In maintenance packet
7	Remote Controller		1	Includes attached Phone Holder and Range Extender
8	DJI Smart Flight Battery		1	Inside aircraft
9	Charger		1	110-240V Adaptive
10	Power Cables		2	GB & CE
11	Plug Adaptors		2	SAA & BS
12	Micro-USB Cable		1	For range extender charging and firmware upgrade

13	Manuals		4	Including: Disclaimer, Phantom Pilot Training Guide, Phantom 2 Vision+ Quick Start Guide, User Manual
14	Stickers		2	Colors: Pink, Blue
15	Vibration Absorber		4	In maintenance packet
16	Anti-drop Kit		2	In maintenance packet
17	Spare Screws		11	In maintenance packet M3X5(6pcs); M3X8(5pcs)
18	Landing Pad		4	In maintenance packet

2 Introduction

The Phantom 2 Vision+ package includes: Phantom, Camera, Gimbal, Propulsion System, Flight Control System, Remote Controller and Wi-Fi Communication System. 5.8 GHz Remote Controller Receiver, Flight Control System and 2.4 GHz Wi-Fi Module are inside the Phantom.

Remote Controller	Outside	Working Modes	Inside
5.8GHz 2 sticks, 7 channels	3-axial Stabilized Gimbal Camera Motors and Props	Phantom-Ready to Fly and Ready to Fly(non-GPS) NAZA-M-GPS, ATTI, Manual and Failsafe	Flight Control System 2.4GHz Wi-Fi Module 5.8GHz Receiver Electronic Speed Controls(ESCs)

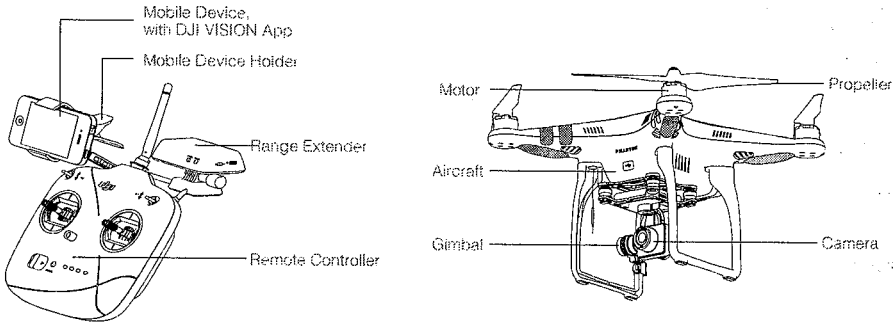


Figure 1

Choose between Phantom and Naza-M working modes using Phantom 2 Vision+ Assistant. If using Naza-M mode, please refer to the NAZA-M V2 Quick Start Manual for related instructions.

- Phantom: Flight settings will be selected automatically depending on whether 6 or more satellites have been found. This mode allows users to configure the Remote Controller and gain values, and use Failsafe and battery level warnings.
- Naza-M: Flight settings will be identical to the Naza-M V2. Users can choose between GPS, Attitude, or Manual mode. They can also access advanced settings including Intelligent Orientation Control (IOC). Rear LED Flight Indicators will display the flight status according to the Naza-M indicator.
- Ready to Fly: When 6 or more GPS satellites have been found, the Flight Control System will lock its home point and Rear LED Flight Indicators will blink a slow green (G ·····). This mode is ideal for beginners.
- Ready to Fly (non-GPS): When less than 6 GPS satellites have been found, the Flight Control System will stabilize itself less than in full Ready to Fly mode and will require more skilled flying. Rear LED Flight Indicators will blink a slow yellow (Y ·····).

Assembly and Use

Follow the below instructions to prepare for flight.

1 Removing Gimbal Clamp

Pull gimbal clamp in the direction indicated to remove.

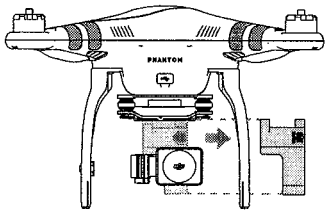


Figure 2

To avoid damage to the gimbal, remove Gimbal Clamp before powering up the Phantom.

Attach the Gimbal Clamp during transportation or long term storage to avoid damage.

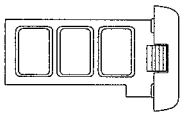
2 Preparing the Battery

Ensure all related devices are fully charged before flying the Phantom 2 Vision+.

Device	Power supply
Remote Controller	2000mAh rechargeable LiPo battery
Range Extender	Charge fully through Micro-USB slot. See Charging the Range Extender (Page 20) for details.
Aircraft (including gimbal and camera)	DJI Smart Flight Battery.
Mobile Device	Fully charge before using the DJI VISION App.

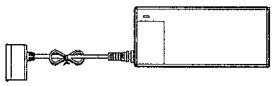
2.1 DJI Smart Flight Battery

This battery has been specially designed for the Phantom 2 series. It has a battery capacity of 5200mAh, voltage of 11.1V and charge-discharge management functionality. It can only be charged with a DJI charger or Phantom 2 Car Charger.



Smart Flight Battery

Figure 3



DJI Charger

Figure 4

DJI Smart Flight Battery Functions

(1) Balance Charging	Automatically balances the voltage of each battery cell during charging.
(2) Capacity Display	Displays current battery levels.
(3) Communication	Communicates with Flight Controller about battery voltage, capacity, current and other relevant information.
(4) Overcharge Protection	Charging stops automatically when battery voltage reaches 12.8V to prevent overcharge damage.
(5) Over Discharge Protection	Discharging stops automatically when battery voltage reaches 8.4V to prevent over discharge damage.
(6) Short Circuit Protection	Automatically cuts power supply when a short circuit is detected.
(7) Sleep Protection	Sleep mode is entered after 10 minutes of inactivity to save power.
(8) Charging Temperature Detection	The battery will charge only when the temperature is between 0°C (32°F) and 40°C (104°F).

Battery Specifications

Type	LiPo
Capacity	11.1V, 5200mAh
Charging Environment Temperature	0°C~40°C
Discharging Environment Temperature	-20°C~50°C
Charging/Discharging Environment Relative Humidity	<80%

⚠ Please read the user manual, disclaimer, and battery warnings before use. Users take full responsibility for all operations and usage.

2.2 Usages

Powering on/off

Powering on: Press Circular Power Button once, then press again and hold for 2 seconds to power on. Power Light will go red and Battery Level Indicators will show the current battery level.

Powering off: Press Circular Power Button once, then press again and hold for 2 seconds to turn off. Battery Level Indicators will all go out.

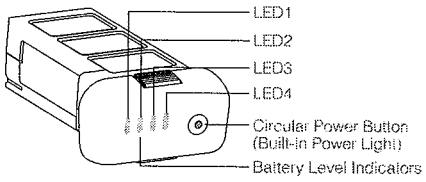


Figure 5

Checking the battery level

When the battery is powered off, press the Circular Power Button once. Battery Level Indicators will light up to show battery level. See below for details.

Battery Level Indicators will show the current battery level during charging and discharging. The indicators are defined below.

LED is on LED blinks
LED is off

Discharging process				
LED1	LED2	LED3	LED4	Current battery level
▯	▯	▯	▯	87.5%~100%
▯	▯	▯	▯	75%~87.5%
▯	▯	▯	▯	62.5%~75%
▯	▯	▯	▯	50%~62.5%
▯	▯	▯	▯	37.5%~50%
▯	▯	▯	▯	25%~37.5%
▯	▯	▯	▯	12.5%~25%
▯	▯	▯	▯	0%~12.5%
▯	▯	▯	▯	<0%

Battery life

When the battery is powered off, press and hold the Circular Power Button for 5 seconds to check battery life. Battery Level Indicators will show light up and the Battery Power Indicators will blink for 10 seconds. All lights will then turn off. For details, please see below.

Battery life				
LED1	LED2	LED3	LED4	Current battery life
▯	▯	▯	▯	90%~100%
▯	▯	▯	▯	80%~90%
▯	▯	▯	▯	70%~80%
▯	▯	▯	▯	60%~70%
▯	▯	▯	▯	50%~60%
▯	▯	▯	▯	40%~50%
▯	▯	▯	▯	30%~40%
▯	▯	▯	▯	20%~30%
▯	▯	▯	▯	Less than 20%

⚠ When batter life reaches 0, it is no longer operational.

📖 More battery information is available in the battery tab of the Phantom 2 Vision+ Assistant.

Charging the Flight Battery

(1) Connect charger to wall socket (100-240V, 50/60Hz, using the Plug Adaptors if necessary).
(2) Connect battery to charger. If the current capacity of the battery is over 75%, you should turn it on before beginning to charge.
(3) Battery Level Indicators will display current capacity level as the battery charges.
(4) Battery is fully charged when Battery Level indicator lights are off. Disconnect the charger and battery when charging is complete.

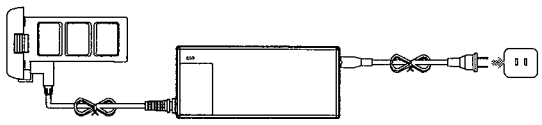


Figure 6

Charging process				
LED1	LED2	LED3	LED4	Current battery level
▯	▯	▯	▯	0%~25%
▯	▯	▯	▯	25%~50%
▯	▯	▯	▯	50%~75%
▯	▯	▯	▯	75%~100%
▯	▯	▯	▯	Fully charged

The Smart Flight Battery can be charged using an optional Phantom 2 Car Charger. This can charge the battery in-car or through 3S-6S Li-Po batteries. Contact your authorized dealer or DJI customer service for details.

⚠ • Battery should only be charged with the charger provided by DJI. DJI does not take any responsibility for damage caused by third party chargers.
• If current battery level is over 75%, the battery should be turned on before charging.

2.4 Battery Installation

Push battery into battery compartment according to the below diagram. When you hear a click, the battery has been properly installed.

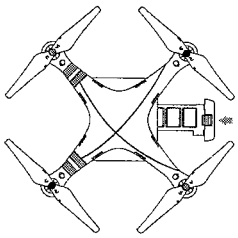


Figure 7

⚠ An incorrectly installed battery may cause
• Bad contact,
• Unavailable battery information,
• Unsafe flight,
• Inability to take off.

2.5 Correct Battery Usage Notes

(1) When the battery is turned on, do not connect it to or disconnect it from the Phantom.
(2) Charge and discharge the battery completely once every 20 charge/discharge cycles. Discharge the battery until there is less than 8% power or until it can no longer be turned on, then recharge it to maximum capacity. This power cycling procedure will optimize the battery.
(3) For long term storage, place the battery with only a 40~50% charge in a strong battery box. Discharge and charge the battery once every 3 months to keep it in good condition. Charge amount should be varied in these maintenance charges - (40%~50%)—0%—100%—(40%~50%).
(4) Purchase a new battery after your current battery has been discharged over 300 times. Completely discharge a battery prior to disposal. Please dispose of batteries properly.
(5) Purchase a new battery if your current battery swells up or is damaged in any way.
(6) Never recharge or fly with a battery that is swollen or damaged in any way.
(7) Never charge batteries unattended. Always charge batteries on a non-flammable surface such as concrete and never near any flammable materials.
(8) Safety is extremely important. For more information, please see the Disclaimer.

Discharging methods:
Slow: Place battery in Phantom and turn on. Leave on until there is less than 8% of power left or until the battery can no longer be turned on. See DJI VISION App for battery levels. Motors do not need to be turned on, reducing wear.
Fast: Fly the Phantom outdoors until there is less than 8% of power left or until the battery can no longer be turned on.

3 Preparing the Phantom 2 Vision+

The Phantom 2 Vision+ is a quadrotor with a built-in Flight Control System with integrated gimbal and camera. It features an FC Assistant Port, Camera Data Port and a specialized battery compartment for its flight battery. All these features make the Phantom 2 Vision+ easy to assemble and configure.

3.1 Introduction

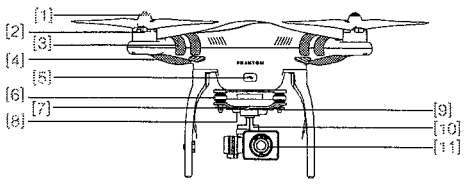


Figure 8

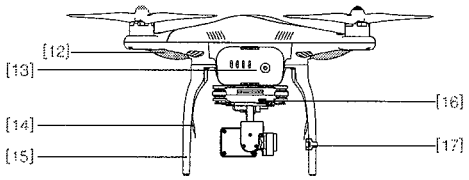


Figure 9

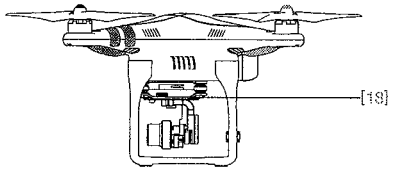


Figure 10

[1] Propeller (P15)

[2] Motor

[3] Front Sticker

[4] Front LED (P12)

[5] FC Assistant Port (Micro-USB slot) (P46)

[6] Vibration Absorber

[7] Camera LED Indicator (P15)

[8] Camera Function Button (P14)

[9] Anti-drop Kit (P13)

[10] 3-axial Stabilized Gimbal (P12)

[11] Camera Lens (P14)

[12] Rear LED Flight Indicator (P12)

[13] DJI Smart Flight Battery (P7)

[14] Receiver Antenna (P17)

[15] Landing Gear

[16] Camera Data Port (Micro-USB slot) (P14)

[17] Compass (P25)

[18] Micro-SD Slot (P13)

3.2 Built-in Flight Control System

The Phantom 2 Vision+ is equipped with a DJI Naza-M V2 Flight Control System. This provides incredible ease of use and stability. Pilots can control the Phantom's movements in many directions, including pitch (forwards and backwards), roll (left and right), elevator (up and down) and yaw (turn left or right). The flight control system also can provide IOC, Failsafe and battery level warnings.

Modules	Functions
Flight Controller	Acts as the brains of the complete flight control system, responsible for connecting and controlling all the modules together.
IMU	Has a built-in inertial sensor and a barometric altimeter that measures both attitude and altitude.
GPS & Compass	The compass reads geomagnetic information and assists the GPS (Global Position System) to accurately calculate the position and height of the aircraft.
LED Flight Indicators	Indicates the status of flight control system.

FC Assistant Port

The flight control system communicates with the PC Assistant through a Micro-USB cable between the Phantom FC Assistant Port and the PC. Users can use Assistant to configure the aircraft and upgrade the Phantom firmware. Please refer to Using the Phantom 2 Vision+ Assistant (Page 46) for details.

3.3 LED Flight Indicator Descriptions

LED flight indicators are found at the front and the rear of the Phantom. Front LEDs are for indicating where the nose of the aircraft is. They light up solid red after motors have started spinning. Rear LED Flight Indicators light up to show the aircraft's current flight status once the flight battery is powered on. For details, please see the below table.

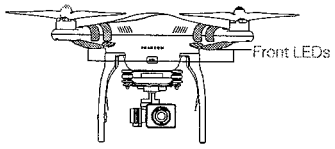


Figure 11

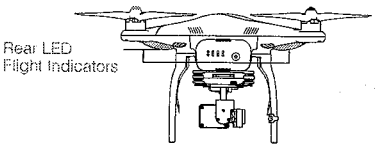


Figure 12

Rear LED Flight Indicators	Normal	Notes
R G Y ····· Red, Green, Yellow flashing in turn	Power On Self-Test	
Y G ····· Yellow,Green flashing in turn	Warming Up	Aircraft cannot take off.
G ····· Slow Green flashing	Ready to Fly	More than 6 GPS satellites are found.
Y ····· Slow Yellow flashing	Ready to Fly (non-GPS)	Less than 6 GPS satellites are found.

Rear LED Flight Indicators	Abnormal	Notes
Y ····· Quick Yellow flashing	Remote Controller Signal Lost	Refer to Failsafe Function (Page27) for details.
R ····· Slow Red flashing	Low Battery Level Warning	DJI VISION App will also show warning message.
R ····· Quick Red flashing	Critical Low Battery Level Warning	DJI VISION App will show warning message.
R ····· Three Red flashing off and on	Not Stationary or Sensor Bias is too big	Keep aircraft stationary or perform IMU calibration.
R —— Solid red	Error	Cannot fly.
R Y ····· Red, Yellow flashing in turn	Compass Needs Calibration	Refer to Calibrating the Compass (Page25) to get details.

⚠ If a solid red R LED indicator appears, connect to the Phantom 2 Vision+ Assistant for details and resolution. This may be caused by:

- IMU calibration required: Recalibrate IMU using Assistant.
- IMU is abnormal: Repair required.
- Compass is abnormal: Repair required.
- Remote Controller mid-point is set abnormally: Refer to How to solve large margin(s) mid-point error? (Page 49)

3.4 3-axial Stabilized Gimbal

The 3-axial stabilized gimbal of the Phantom 2 Vision+ will power on and self-check each time the flight battery is installed and powered on. Its pitch can be controlled using the DJI VISION App. This gimbal has two working modes, Non-FPV mode and FPV mode, with the Non-FPV mode set as default. This can be configured in Phantom 2 Vision+ Assistant or the DJI VISION App.

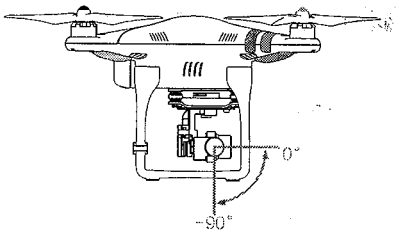


Figure 13

Gimbal specifications	
Control accuracy	±0.03°
Controllable range	Pitch : -90°~0°
Maximum angular velocity	Pitch : 90°/s

• **Non-FPV Mode:** the gimbal will stabilize across 3-axial for smooth aerial creativity.
• **FPV Mode (First Person View Mode):** Gimbal will lock to the movements of the Phantom for a FPV experience.

Anti-drop Kit

The Anti-drop Kit helps keep the gimbal and camera connected to the aircraft. Two have been mounted on delivery. If new ones are required, take the gimbal and press part [1] through the center hole of the Vibration Absorber the center hole of part [2]. Lock them together as shown in [3]. Mounting the Anti-drop Kit diagonally is recommended.

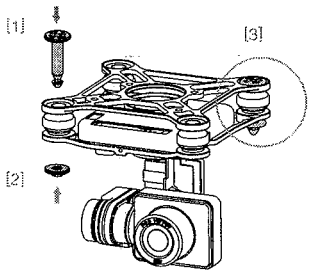


Figure 14

⚠ Once part [1] and part [2] are connected, the Anti-drop Kit cannot be disconnected and reused.

Micro-SD Slot

With flight battery powered off, make sure the Micro-SD card is inserted correctly into the Micro-SD Slot before taking any photos or recording any video.

The Phantom 2 Vision+ comes with a 4GB Micro-SD card and can support cards up to 32GB. The DJI VISION App may not be able to read some Micro-SD cards. Using the DJI VISION App to reformat new Micro-SD cards is recommended.
Refer to Format Micro-SD Card (Page 37) for details.

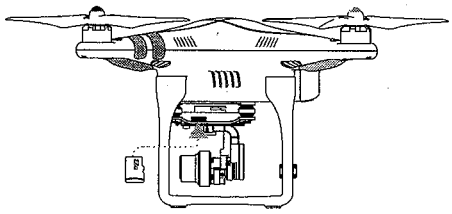


Figure 15

⊘ Do not insert or remove Micro-SD card when flight battery is powered on.

Gimbal Error Warnings

Before the aircraft takes off, if a gimbal motor error is detected or the gimbal clamp is not removed, there will be a warning prompt on the camera page of the DJI VISION App. This will disappear after the problem is resolved.

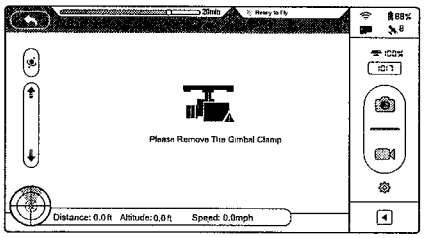


Figure 16

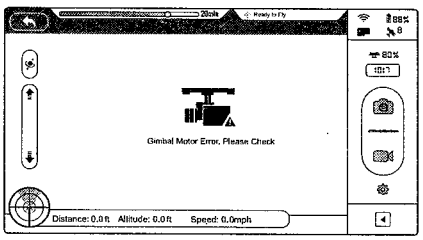


Figure 17

⚠
- Remove gimbal clamp before powering on flight battery.
- Gimbal motor error may occur in these situations: (1) Gimbal is placed on uneven ground. (2) Gimbal has received an excessive external force, e.g. a collision. Please take off from flat, open ground and protect the gimbal after powering up.
- Flying in heavy fog or cloud may make the gimbal wet, leading to a temporary failure. The gimbal will recover when it dries out.

3.5 Camera

The Phantom 2 Vision+ camera powers up when the flight battery has been installed and switched on. Photos and videos can be shot by pressing either the onboard button or the DJI VISION App. For aerial photography it supports burst shots, continuous capture and timed capture, and exports to both Adobe DNG Raw and JPEG. For aerial video, it shoots in full HD at (1080p30/1080i60) and can even shoot 720p60 for internet ready slow motion.

Camera specifications	
Sensor Size	1/2.3"
Pixels	14 Megapixels
Resolution	4384x3288
HD Recording	1080p30 /1080i60/720p60
Recording FOV	110° / 85°

Lens cap removal

Remove lens cap before use and replace it when shooting is complete to protect the camera lens.

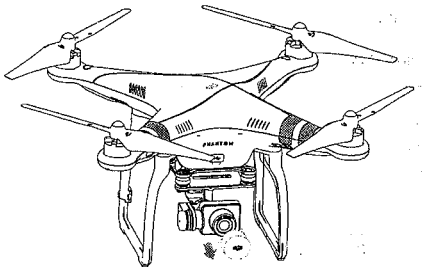


Figure 18

Camera Function Buttons

Capture: Press (hold less than 2 seconds) to take a single capture.

Record: Press (hold more than 2 seconds) to begin recording. Press again to stop.

Camera Data Port

Connect the Camera Data Port to a PC using a Micro-USB cable to copy files to a PC.

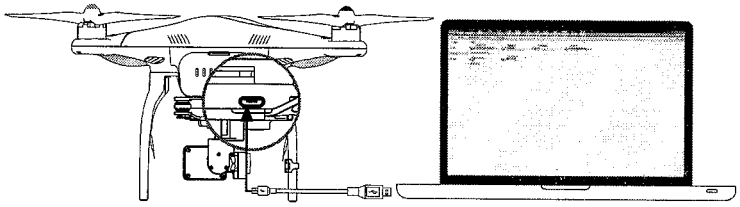


Figure 19

⚠ Photos and videos can only be copied when the flight battery is powered on.

Camera LED Indicator

Camera LED Indicator lights up after the flight battery is powered on. It provides information on the working status of the camera.

Camera LED Indicator	Wi-Fi status	Camera status
Green Solid	OFF	Power On; Idle
Slow Green Blink (0.2s on, 1.8s off)	ON	Idle
Green Blink(0.1s on, 0.3s off, 0.1s on, 1.8s off)	ON	Micro-SD card connected to PC
Fast Green Blink (0.1s on, 0.3s off)	ON	Synchronizing
Orange Solid	OFF	Recording
Orange Blink Once (0.2s on, 0.3s off)	ON / OFF	Taking a single picture.
Orange Blink 3 Times(0.1s on, 0.1s off)	ON / OFF	Taking 3 or 5 photos per shot
Orange Fast Blink (0.1s on, 0.3s off)	ON / OFF	Firmware Upgrading
Green, Orange (0.2s green, 1.8s orange)	ON	Recording
Red Solid	ON / OFF	Critical error
Slow Red Blink (0.2s on, 1.8s off)	ON / OFF	CMOS sensor error
Red Blink Once (0.2s on, 0.3s off)	ON / OFF	Operation failed
Red Blink 3 Times(0.1s on, 0.1s off)	ON / OFF	Micro-SD card error
Fast Red Blinks (0.1s on, 0.3s off)	ON / OFF	Upgrade error
Fast Green, Orange and Red Blink (0.1s on, 0.3s off)	ON / OFF	Overheated Camera

4 Attaching the Propellers

Always use original 9-inch propellers, classified by the color of each central nut.

4.1 Introduction

Propellers	Grey Nut (9450)	Black Nut (9450 R)
Diagram		
Assembly Location	Attach to motor without black dot.	Attach to motor with black dot.
astening/ n-fastening Instructions	Lock: Tighten propeller in this direction. Unlock: Loosen propeller in this direction.	

4.2 Assembly

(1) (Figure 20) Remove warning cards from motors after you have read them.

(2) (Figure 21) Spin grey marked propellers clockwise onto unmarked motors and black marked propellers anti-clockwise for black marked motors.

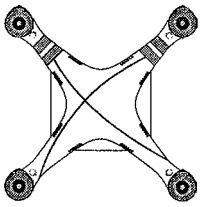


Figure 20

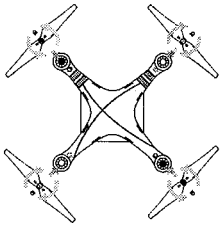


Figure 21

⊘ Propellers self tighten during flight. DO NOT use thread locker.

⚠ • Always match marked props with the corresponding motor.
• Protective gloves are recommended during propeller assembly and removal.

4.3 Removing the Propellers

(Figure 22) Prevent motor rotation using the included wrench or a hand, then remove propeller according to the un-fastening instructions.

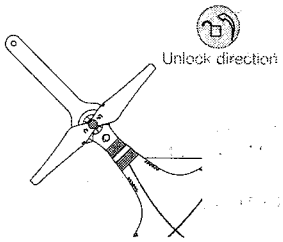


Figure 22

4.4 Notes

(1) Check that propellers and motors are installed correctly and firmly before every flight.
(2) Ensure that all propellers are in good condition before each flight. DO NOT use any ageing, chipped, or broken propellers.
(3) To avoid injury, STAND CLEAR of and DO NOT touch propellers or motors when they are spinning.
(4) ONLY use original DJI propellers for a better and safer flight experience.

⚠ For beginner flyers, Phantom 2 Prop Guards are recommended. Contact your authorized dealer or DJI customer service to purchase if necessary.

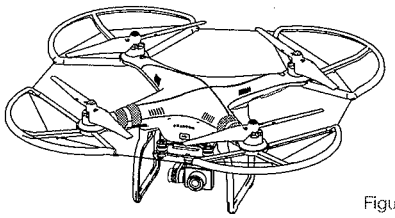


Figure 23

5 Preparing the Remote Controller

The Phantom 2 Vision+ Remote Controller is a wireless communication device using the 5.8GHz frequency band. Remote Controller and Phantom are paired before delivery.
For upgraded remote controller (models: NPVT581, NDJ6 or NRC900), select "Upgrade Version" in Phantom Assistant. For basic remote controller (models: PVT581, DJ6 or RC900), select "Basic Version" in Phantom Assistant.
The Remote Controller is set to Mode 2 by default. This can be adjusted in the PHANTOM RC Assistant. See Using the PHANTOM RC Assistant (Page 47) for details. You can also adjust the power of your Remote Controller according to national regulations. Please refer to Compliance Version Configuration (Page 19).

📖 • **Compliance Version:** The Phantom 2 Vision+ Remote Controller is compliant with CE and FCC (see the FCC ID) regulations.
• **Operating Mode:** Mode 1 and Mode 2 refer to different channel mappings.
• **Mode 1:** The right stick controls throttle.
• **Mode 2:** The left stick controls throttle.

The Range Extender and Phone Holder are already mounted on the Remote Controller. Twist the Mobile Device Holder to face outwards and fix it in position for mobile device installation.

⊘ Large smartphones and tablets are not recommended for the Phone Holder as they do not fit.

5.1 The Remote Controller

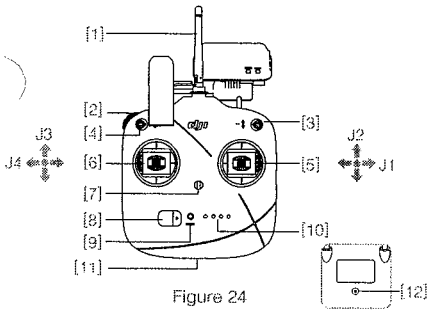
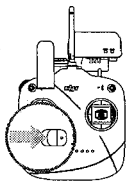


Figure 24

[1] Antenna
[2] Left Dial
[3] Switch S1
[4] Switch S2 (Reserved)
[5] Right Stick: J1, Roll [left & right], J2, Pitch [front & back]
[6] Left Stick: J3, Throttle [up & down], J4, Yaw [rotation]
[7] Neck Strap Attachment
[8] Power Switch
[9] Power Indicator
[10] Battery Level Indicator
[11] Battery Charge & RC Assistant Port (use the supplied micro-USB cable to charge or upgrade the remote controller)
[12] Training Port (on back)

5.2 Power on the Remote Controller

(1) Set S1 and S2 switches to the upper most position and place all sticks in the mid-point.
(2) Toggle power switch to the right to switch on.
(3) There will be a power on indicator beep. If the remote controller is set to be CE compliant, then there will be one beep, while the FCC compliant version will emit two beeps. The battery level indicator displays the current battery level. The indicator will blink green quickly, indicating the remote controller and receiver are linking. Once fully linked, the power indicator will change to a solid green.



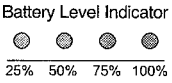
⚠ • If the low voltage warning alert sounds (refer to Remote Controller Power LED Status Information (Page 17) for details), please recharge the battery as soon as possible.
• Using the incorrect type of charging cable may cause damage.
• Following long term storage, recharge the battery before use.

5.3 Remote Controller Power LED Status Information

Power LED Indicator	Sound	Remote Controller Status
G — Solid Green	None	Functioning normally.
R — Solid Red	None	Charging(remote controller is powered off)
Y — Solid Yellow	None	Remote controller joysticks calibration error, need to be re-calibrate.
R — Solid Red	BB—BB—BB	Low voltage (from 3.5V-3.53V), recharge the remote controller.
····· Quick Red flashing	B-B-B.....	Critical low voltage (from 3.45V-3.5V). Recharge the remote controller immediately.
G ····· Slow Green flashing	B–B–B.....	Alert will sound after 15 minutes of inactivity. It will stop once you start using the remote controller.

5.4 Battery Level Indicator

Built-in LiPo Battery: The remote controller includes a rechargeable LiPo battery with a capacity of 2000mAh. You can monitor the current battery level using the LED indicators on the front panel of the remote controller as the figure shown:



⚠ The remote controller will show a blinking LED and sound an alert when the voltage drops below 3.45V, then automatically power off after 3 seconds. This process will repeat even if you power cycle the remote controller. If this low voltage warning occurs during flight, the remote controller will automatically power off, causing the aircraft to enter Failsafe mode, which cannot be interrupted (refer to Failsafe Function (Page27) for details). It is strongly recommended that you recharge the battery immediately when the 3.45V-3.5V low voltage warning occurs.

5.5 Antenna Orientation

Keep the antennas pointing skyward, perpendicular to the ground for maximum remote controller range during flight.

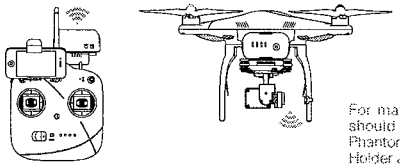


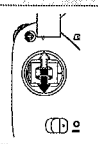
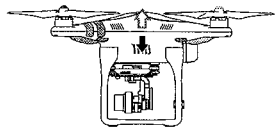
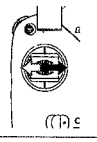
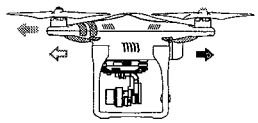
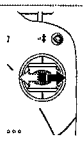
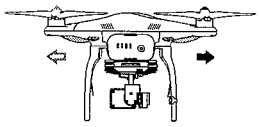
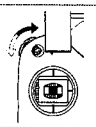
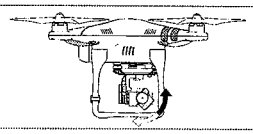
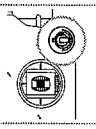
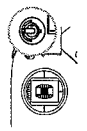
Figure 25

For maximum range and reliability, Remote Controller antenna should point skywards with no obstructions between it and the Phantom. Obstacles may cause Return to Home to trigger. Phone Holder and Range Extender should not block the antenna.

5.6 Remote Controller Operation

The Remote Controller is set to Mode 2 by default.

- Stick Neutral/ mid point: Control sticks of the Remote Controller are placed at the central position.
- Move the Stick: The control stick is pushed away from the central position.

Remote Controller (Mode 2)	Aircraft (indicates nose direction)	Operation details
		Vertical movements on the left stick control elevation. Push the stick up to ascend and down to descend. When both sticks are centered the Phantom will hover in place. Push the throttle stick upward beyond the centered (neutral) position to take off. Push the throttle gently to prevent sudden and unexpected elevation.
		Horizontal movements on the left stick control the rudder. Push left to rotate counter clock-wise and right for clockwise. If the stick is centered, the Phantom will fly straight. The more the stick is moved, the faster the Phantom will rotate.
		Vertical movements on the right stick control forward and backward pitch. Push up to fly forward and down to fly backward. The Phantom will hover in place if the stick is centered. Push the stick further for a larger pitch angle (maximum 35°) and faster flight.
		Horizontal movements on the right stick control left and right pitch. Push left to fly left and right to fly right. The Phantom will hover in place if the stick is centered. Push the stick further for a larger pitch angle (maximum 35°) and faster flight.
		Left Dial: Turn the dial to the right, and the camera will shift to point upwards.Turn the dial to the left, and the camera will shift to point downwards. The camera will keep its current position if the dial is static.
	 Position 1 Position 2 Position 3	The S1 switch is used for compass calibration. Toggle the S1 from position 1 to position 3 and back approximately 5 times to enter into compass calibration mode. In Naza-M mode, the S1 switch is used to switch between control modes and enter compass calibration.
	 Position 1 Position 2 Position 3	S2 is used to record a Home point manually. After a Home point has been recorded automatically, flipping S2 from position 1 to position 3 and back 5 times (or more) rapidly will move the Home point to the Phantom's current location. In addition, you can enable Dynamic Home Point feature in DJI VISION App. In Naza-M working mode, S2 is be used for IOC.

⚠ • In 'Ready to Fly' mode, the Phantom will hover when all sticks are released.
• In 'Ready to Fly (non-GPS)' the Phantom will lock its altitude but will not have horizontal positioning.

5.7 Linking the Remote Controller and Receiver

2.8G receiver is built in to the Phantom 2 Vision+. Its link button and indicator are located on the underside of the phantom, as shown in Figure 26.
The Remote Controller and the receiver are paired before delivery. Only use this button if you have replaced your Remote Controller or receiver.

Linking Procedures

(1) Power off the Remote Controller, power on the aircraft. You will see the link indicator blinking red.
(2) Press the link button with a thin object and hold until the link indicator blinks yellow. Release the link button.
(3) Power on the Remote Controller. Link indicator will switch off, showing that a link has been successfully established.

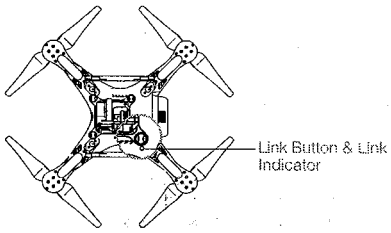


Figure 26

Link Indicator

Link Indicator	Description	Next Operation
R ····· Red flashing	No signal received.	Switch on the Remote Controller or perform a link procedure.
Y ····· Yellow flashing	Ready to link.	Switch on the Remote Controller.

5.8 Compliance Version Configuration

As power levels vary between regulators, the Phantom Remote Controller's power output can be adjusted by twisting the CE/FCC Control Knob (Figure 27) on the back of the Remote Controller using a flathead screwdriver. For CE compliance, set the Remote Controller to CE with a full counterclockwise turn. For FCC compliance, set the Remote Controller to FCC with a full clockwise turn. Be sure to follow relevant local regulations.
Compliance can be configured using the PHANTOM RC Assistant. Select CE compliance version in Assistant to set it, or do the same with FCC compliance version.

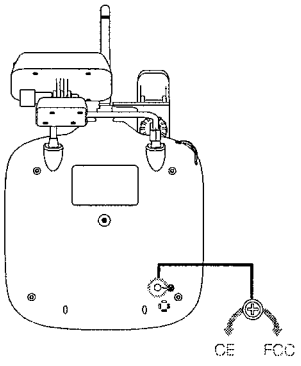


Figure 27

⚠ • Turn the CE/FCC Control Knob gently to avoid damage.
• CE compliant devices have an effective remote controller range of 400 meters in open spaces due to power limitations.
• FCC compliant devices have an effective range of 800 meters in open spaces.
• Watch your flight distance as the Phantom 2 Vision+ will enter Failsafe mode (auto-landing or go home and land) if it flies beyond the relevant range limits.
• Always follow local laws and regulations.

• It is recommended to use a Φ2.4mm flathead screwdriver for adjustments.
• There is another potentiometer for reserved use.

6 Preparing the Range Extender

The Phantom 2 Vision+ Range Extender is a wireless communication device that operates within the 2.4 GHz frequency band. It is used to extending the effective range of communication between a Smartphone and the Phantom 2 Vision+. In an open, unobstructed area, the transmission distance can reach up to 700 meters. This can be reduced by trees, buildings and other sources of the same frequency. Before every flight, it is suggested that you ensure the Range Extender is functioning properly; otherwise communication issues between the mobile device and the Phantom 2 Vision+ may occur.

Each Range Extender has a unique MAC address and network name (SSID), details of which are printed on the label as 'Phantom_XXXXXX'. The 'XXXXXX' represents the last 6 letters or numbers of the MAC address for the Range Extender. This can be renamed in the DJI VISION App.

6.1 Introduction

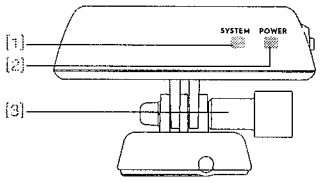


Figure 28

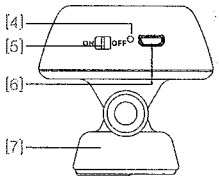


Figure 29

[1] SYSTEM Indicator
[2] POWER Indicator
[3] Locking Screw
[4] Binding Reset Button
[5] Power Switch
[6] Charging Port(Micro-USB slot)
[7] Mounting Bracket

SYSTEM Indicator

Shows Wi-Fi status of the Range Extender.

SYSTEM Indicator	Description
G ····· Green flashing	The Wi-Fi network is functioning normally.
Off	The Wi-Fi network is functioning abnormally.

POWER Indicator

Shows power levels of the Range Extender.

POWER Indicator	Description
G Solid green	Fully charged.
R Solid red	Low voltage alert, re-charge required.
Y Solid Yellow	Charging.

⚠ If the power indicator is a solid red light, the Ranger Extender may stop working at any moment. Land and recharge as soon as possible.

Binding Reset Button

When the Binding Reset Button is pressed, it will reset and restart the Range Extender. You will need to bind it with the Phantom 2 Vision+ again to recreate its Wi-Fi network. Failure to do so will cause the DJI VISION App to fail to connect with the camera.

6.2 Using Range Extender

Charging the Range Extender

Charge the Range Extender by connecting the charging port to a power supply device such as a PC or a USB charger using a Micro-USB cable. Make sure to charge the Range Extender completely before using it for the first time. This takes 3~4 hours depending on USB power output.

⚠ Make sure the Range Extender has enough power before each use.

Powering on the Range Extender

(1) Flick the power switch to the ON position.
(2) Wait for approximately 30 seconds. The Wi-Fi signal indicator will blink green indicating the Range Extender is communicating properly.
Keep the Range Extender facing the aircraft during flight for the best communication link.

⚠ Power off the Range Extender after every flight to avoid discharging the battery.

Checking the Battery Level

The battery level of the Range Extender can be checked in the camera page of the DJI VISION App as shown below. When the battery level drops to 20% or lower, the battery level icon will go red as a charging reminder.

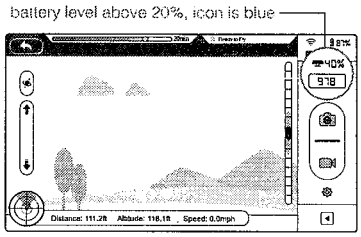


Figure 30

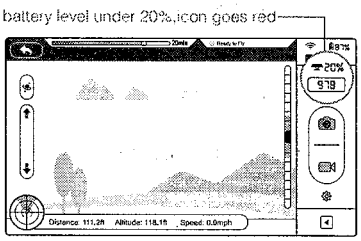


Figure 31

6.3 Rename Range Extender SSID

Make your Range Extender SSID easier to remember by changing its name.

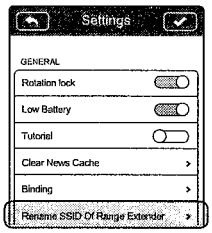


Figure 32

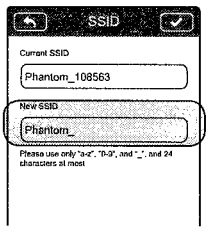


Figure 33

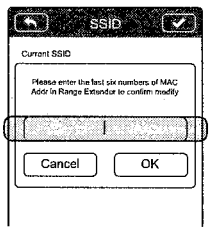


Figure 34

(1) Tap "Rename SSID of Range Extender" in the Settings page. Enter a new SSID name (e.g. Phantom_Tom) in the textbox.
(2) Tap ✔ and you will be asked to enter the last six characters of your MAC address on the Range Extender to confirm the change. The MAC address can be found on the sticker on your Range Extender. If your MAC address is 60:60:1F:60:41:E7, then enter 6041E7.
(3) Tap "OK" to confirm the change. The Range Extender will automatically restart and the App will return to the settings page. Approximately 30 seconds later, the new network name can be found in the Wi-Fi list of your mobile device. Select and connect the renamed network to use the DJI VISION App.

6.4 Binding the Phantom 2 Vision+ and Range Extender

If the connection between the Phantom 2 Vision+ and the Range Extender fails, or one of them needs to be repaired or replaced, a camera and Range Extender binding will need to be performed through the DJI VISION App.

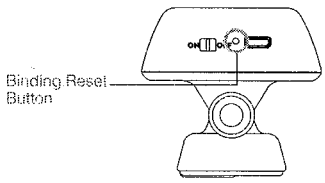


Figure 35

(1) Power on the camera and Range Extender.
(2) Approximately 30 seconds later, press the Binding Reset Button on the Range Extender with a pin until the SYSTEM Indicator turns off. The Range Extender will then restart automatically.
(3) Approximately 30 seconds later, the SYSTEM Indicator will start to blink green, indicating that the Range Extender is ready for binding.
(4) Enable Wi-Fi on your mobile device then select "Phantom_XXXXXX" the (SSIDof your Range Extender) from theWi-Fi network list.
(5) Run the DJI VISION App then tap -> Settings -> General -> Binding (Figure 36). Select 'Scan QR Code' to scan the camera QR code on the bottom of aircraft (Figure 37). Get the camera SSID (E.g. FC200_xxxxxx) and the MAC address (Figure 38). You can also skip the scan and enter the camera MAC address directly (Figure 39). The MAC address can be found on the camera label.
(6) Tap the tick ✔ in the top right corner. The Range Extender should automatically restart. Binding is now complete.

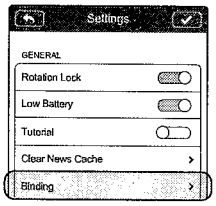


Figure 36

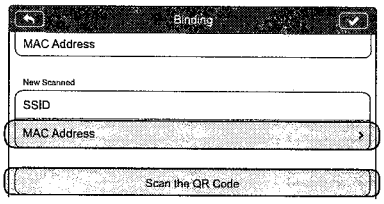
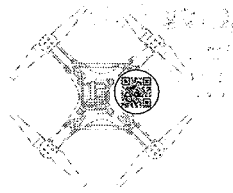


Figure 37



Scan the camera QR code on the bottom of aircraft

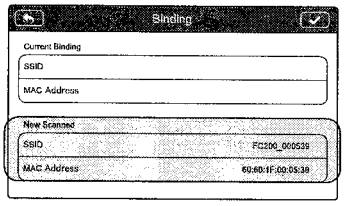


Figure 38

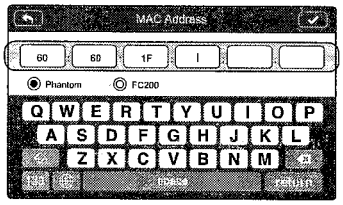


Figure 39

⊘ DO NOT push the Binding Reset Button of the Range Extender unless you are ready to rebind the Range Extender and the camera. This will unbind your camera so you must follow the steps above for rebinding.

⚠ If both the Phantom 2 Vision+ and the Range Extender are powered on and working normally, you will be able to find the SSID on the Wi-Fi list of your mobile device.

- The QR code is located on the bottom cover of the Phantom 2 Vision+. If you cannot find the QR code, please contact DJI customer service and provide your camera serial number (printed on the label of the camera) so they can generate a new QR code for you.
- Photographing and saving the QR code is recommended to prevent loss.

7 Downloading and Installing the DJI VISION App

7.1 Download and Install

Download DJI VISION App
Download and install the DJI VISION App. Choose one of the download methods below.

Search "DJI VISION" on the App Store then follow instructions for iOS version.
Search "DJI VISION" on Google Play then follow instructions for Android version.

App Store iOS6.1 or above

Google play Android 4.0 or above

Supported mobile devices

iOS (iOS6.1 or above) Recommended: iPhone4S, iPhone5, iPhone5S, iPhone5C,iPhone6, iPhone6 Plus, iPod Touch4, iPod Touch5; Available but not recommended: iPad3, iPad4, iPad mini, iPad Air.

Android (4.0 or above): Samsung Galaxy S3, S4, Note2, Note3 or mobile devices of similar configuration.

DJI continues to support many mobile devices and any information from users are welcome. Please send any questions or queries to the following mailbox: phantom2vision@dji.com.

⚠ The DJI website is regularly updated. Check back often for latest App updates.

7.2 Register and Login

Access the Internet to register and login.

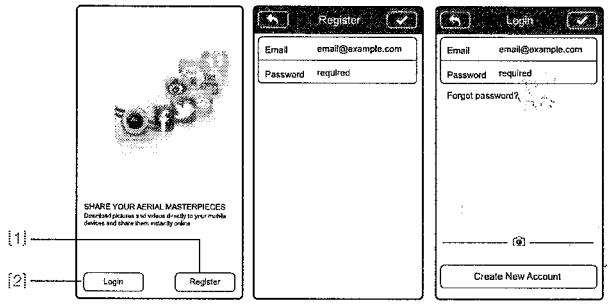


Figure 40 Figure 41 Figure 42

[1] Register

Tap 'Register' to enter the registration page. Fill in your Email and Password information and then tap ✔ to create a new account.

The DJI account works with all DJI Assistant and Apps.

[2] Login

Tap 'Login' to enter the login page. Fill in your registered Email and Password and then tap ✔ to login.

⚠ Log in to your account the first time you use the DJI VISION App.

Tap "Forgot Password" if you have forgotten your login details.

[3] Usage tips

Useful tips will display when you enter the welcome page. Tap the screen to display the next tip.

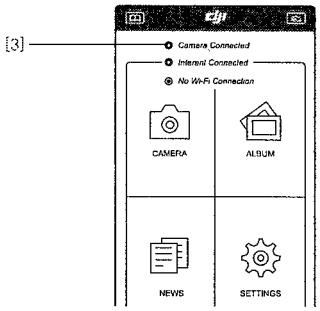


Figure 43

Enable the "Tutorial" switch in the Settings page to get hints and tips the first time you use the DJI VISION App.

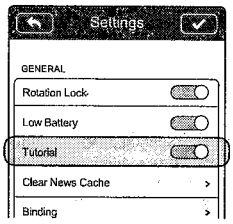


Figure 44

8 Connecting the Camera

Before flight, always connect your smartphone to the Phantom's Wi-Fi network. This is required for the camera control and FPV.

8.1 Connecting Procedures

Follow these instructions to connect a mobile device to the Phantom 2 Vision+ camera.

(1) Power on the Remote Controller and the Range Extender.
(2) Power on the Phantom 2 Vision+.
(3) Enable the Wi-Fi on your mobile device; wait for about 30 seconds, and then select "Phantom_XXXXXX" from theWi-Fi network list (Figure45).
(4) Run the DJI VISION App on your mobile device. When the Wi-Fi Computer Connection status on the App main menu goes green, the connection is good (Figure46).
(5) Tap the "CAMERA" icon and the DJI VISION App will begin a live camera preview (Figure47). This means everything is functioning normally.

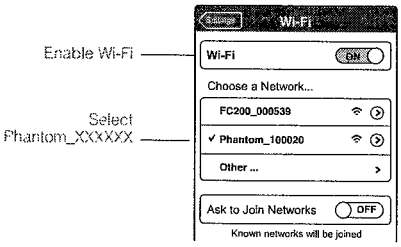


Figure 45

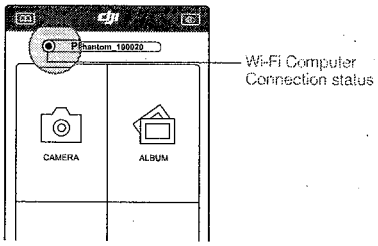


Figure 46

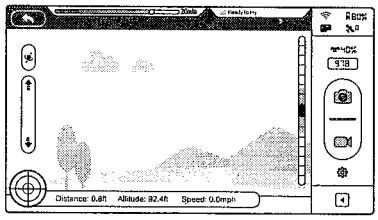


Figure 47

Wi-Fi Computer Connection Status Description

Icon		Description
G	Solid green	Wi-Fi is connected to the Phantom 2 Vision+.
B	Solid blue	Wi-Fi is connected to another Wi-Fi network, not to the Phantom 2 Vision+.
	Off	No Wi-Fi connection.

- The SSID is unique for each Phantom 2 Vision+ It will appear as Phantom_XXXXXX in your Wi-Fi list.
- Android users can tap the SSID button on the main page to mobile device Wi-Fi settings directly.

Flight

Once pre-flight preparation is complete, it is recommended to carry out the tasks in the Phantom Pilot Training Guide to prepare for more complex flight maneuvers and learn to fly safely. Ensure that all flights are carried out in a suitable location.

ght Environment Requirements

(1) Do not use the aircraft in severe weather conditions. These include wind speed exceeding category 4, snow, rain and smog.
(2) Fly in open fields as high buildings or steel structures may affect the accuracy of the onboard compass.
(3) Keep the Phantom away from obstacles, crowds, high voltage power lines, trees or bodies of water when in flight.
(4) Reduce the chance of electromagnetic interference by not flying in areas with high levels of electromagnetism, including base stations or radio transmission towers.
(5) The Phantom cannot operate within the polar areas.
(6) Do not fly the aircraft within no-fly zones specified by local laws and regulations.

Preflight Checklist

(1) Remote Controller, smart battery, Range Extender and smartphone are fully charged.
(2) Propellers are mounted correctly.
(3) Gimbal clamp has been removed.
(4) Damping absorbers are in good condition, not broken or worn.
(5) Anti-drop kits have been mounted correctly.
(6) Camera lens cap has been removed.
(7) Micro-SD card has been inserted if necessary.
(8) Gimbal is functioning as normal.
(9) Motors can start and are functioning as normal.
(10) DJI VISION App can connect to the camera.

1 Calibrating the Compass

IMPORTANT: Make sure to calibrate the compass in every new flight location. The compass is very sensitive to electromagnetic interference, which can cause abnormal compass data leading to poor flight performance or even flight failure. Regular calibration is required for optimum performance.

- DO NOT calibrate your compass where there is a chance of strong magnetic interference, such as magnetite, parking structures, and steel reinforcements underground.
- DO NOT carry ferromagnetic materials with you during calibration such as keys or cellular phones.
- DO NOT calibrate beside massive metal objects.

1.1 Calibration Procedures

Choose an open space to carry out the following procedures. Watch the Phantom 2 Vision+ quick start video for more ails.

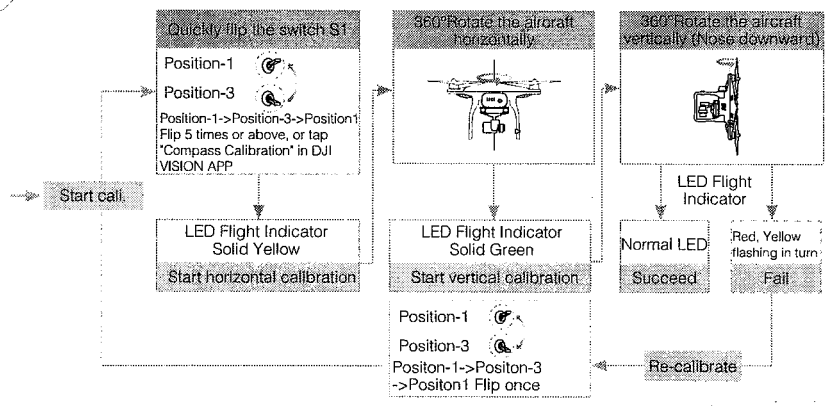


Figure 48

If compass calibration is needed before flight, a prompt will appear on the DJI VISON App's camera page. It will disappear after successful calibration.

1.2 When to Recalibrate

(1) When compass data is abnormal, the rear LED flight indicator will blink red and yellow.
(2) Flying in different location to last flight.
(3) Mechanical structure of the Phantom has changed, i.e. changed mounting position of the compass.
(4) Severe drifting occurs in flight, i.e. Phantom does not fly in straight lines.

2 Starting/Stopping the Motors

2.1 Starting Motors

A Combination Stick Command (CSC) is used to start the motors instead of simply pushing the stick up. Push both sticks to their bottom corners to start the motors. Once the motors have spun up, release both sticks simultaneously.

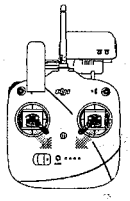


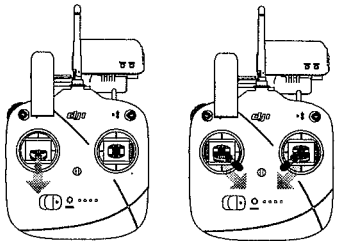
Figure 49

2.2 Stopping Motors

There are two methods to stop the motors.

Method 1: When the Phantom has landed, push the throttle down, then conduct CSC. Motors will stop immediately. Release both sticks once motors stop.

Method 2: When the aircraft has landed, push the throttle down and hold. Motors will stop after 3 seconds.



[1] [2]

Figure 50

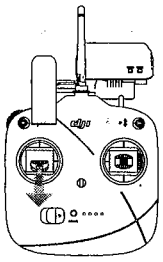


Figure 51

Do not execute CSC during normal flight. This will stop the motors and cause the aircraft to drop without control.

- Conduct the CSC as neatly as you can. Release the sticks once motors start/stop.
- Pull down the throttle stick to descend. The stick will lock into place and the aircraft will descend steadily. Push the throttle stick upward to release throttle lock.

3 Flight Test

3.1Take off/Landing Procedures

(1) Place the Phantom 2 Vision+ on open flat ground with battery indicators facing towards you.
(2) Power on the Remote Controller and Range Extender, then the Smart Flight Battery.
(3) Launch the DJI VISION App and start bind it with your smartphone then enter the camera preview page.
(4) Wait until the Rear LED Flight Indicator blinks green. This means it has initialized and is Ready to Fly. If it flashes yellow, it is in Ready to Fly (non-GPS) mode and will require more careful flight. Execute the CSC command to start motors.
(5) Push the throttle up slowly to take off. Refer to Remote Controller Operation (Page 18) for more details.
(6) Shoot photos and videos using the DJI VISION App. Refer to DJI VISION App Usage (Page 32) for more details.
(7) To land, hover over a level surface and gently pull down on the throttle gently to descend.
(8) After landing, execute the CSC command or hold the throttle at its lowest position for 3 seconds or more until the motors stop.
(9) Turn off the smart battery, Range Extender and Remote Controller.

⚠ • When the Rear LED Flight Indicator blinks yellow rapidly during flight, the aircraft has entered Failsafe mode. Refer to Failsafe Function(Page 27) for details.
• A low battery level warning is indicated by the Rear LED Flight Indicator blinking red slowly or rapidly during flight. Refer to the Low Battery Level Warning Function(Page 28) for details.
• View tutorials about flight for more flight information:www.dji.com/phantom2visionplus/training.
• Aircraft and battery performance is subject to environmental factors such as air density and temperature. Be very careful when flying 3000 meters (9800 feet) or more above sea level, as battery and aircraft performance may be reduced.

3.2 Video Suggestions and Tips

(1) Work through the check list before each flight.
(2) Set the gimbal working mode to Stabilized.
(3) Aim to shoot when flying in Ready to Fly only.
(4) Always fly in good weather, such as sunny or windless days.
(5) Change camera settings to suit you. These include FOV, photo format and exposure compensation.
(6) Take flight tests to establish flight routes and scenes.
(7) Push the sticks gently to make aircraft movements stable and smooth.

4 Failsafe Function

The Phantom will enter Failsafe mode when its connection to the Remote Controller is lost. The Flight Control System will automatically control the aircraft to return to home and land to prevent injury or damage.

Home Point: When the Phantom enters 'Ready to Fly' from the 'Ready to Fly status (non-GPS)', the GPS coordinates will be recorded and set as the home point.
• When Remote Controller signal is lost, the aircraft will return to the recorded home point coordinates and land.
• Home point coordinates are used to calculate the horizontal distance of the aircraft (shown as "Distance" on the GUI of the DJI VISION App).
• After successfully record the home point, rear LED flight indicators blink fast green.
Dynamic Home Point: The Home point will be reset to position of the mobile device at specific time intervals.
• Enable dynamic home point in DJI Vision app or Phantom 2 Assistant.
• Dynamic home point is only available to the GPS-enabled mobile device. Turn on GPS and data service to obtain higher accuracy of the mobile device position.
• Dynamic home point is useful in situations when you are in motion and require a Home point that is different from the takeoff point.

4.1 When Will Failsafe Activate?

(1) The Remote Controller is powered off.
(2) The Phantom has flown out of effective remote controller range.
(3) The signal between the Remote Controller and the Phantom has been blocked.
(4) There is interference causing a signal problem with the Remote Controller.

4.2 Failsafe Procedure

ating the Failsafe mode from different flying statuses will results in different landing processes.
eady to Fly(non-GPS)— Automatic landing
The Flight Control System will keep the aircraft level during descent and landing. It may be drift during the descent and landing process.
Ready to Fly— Automatic go home and land
The Flight Control System will automatically control the aircraft to fly back to the home point and land.

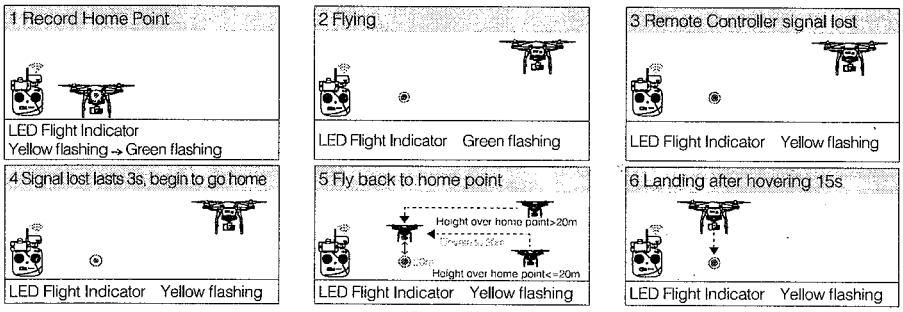


Figure 52

- To ensure the aircraft successful return to home after Failsafe activation, aim to only fly in Ready to Fly mode.
- The Phantom will automatically descend during the Failsafe process if there are less than 6 GPS satellites detected for more than 20 seconds.
- When the aircraft is landing automatically, users can control the aircraft's position and altitude if the remote controller signal is recovered.
- Aircraft cannot navigate around vertical obstacles on its return home course during Failsafe. However, you can set return home altitude value in Phantom Assistant to avoid hitting vertical obstacles through DJI Phantom Assistant.

Quickly flipping the S2 switch of the Remote Controller from top to bottom 5 times or more will reset the current aircraft position as a new home point. Rear LED flight indicators will blink green rapidly when successful.

Failsafe on the DJI VISION App

The DJI VISION App will provide information during Failsafe.

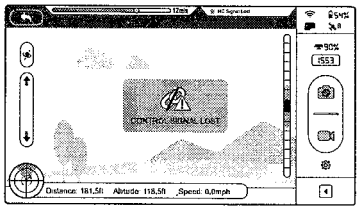


Figure 53

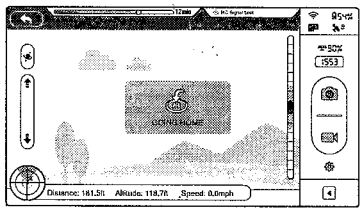


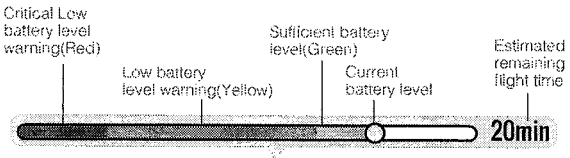
Figure 54

4.3 Regaining Control During Failsafe Procedures

Position of Switch S1	Position-1	Position-2	Position-3
How to regain control	When the S1 switch is switched to Position-1, toggle the S1 switch to any other position once to regain control. If the Remote Controller signal is recovered, control is returned to the pilot.	Regain control as soon as signal is recovered.	

5 Low Battery Level Warning Function

If the DJI smart battery is depleted to a point that may affect the safe return of the aircraft, the low battery level warning notifies users to take action. Users are advised to land the aircraft immediately when they observe these warnings. The thresholds for these warnings are automatically determined based on the current aircraft altitude and its distance from the Home point. Details of the battery level warning are listed below:



Battery level indicator

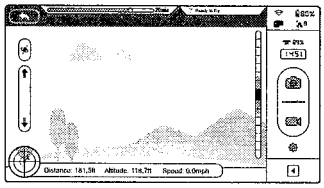
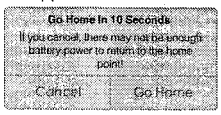


Figure 55

Battery Level Warning	Remark	Rear LED Flight Indicator	DJI VISION App	Flight Instructions
Sufficient battery level	Sufficient battery level	Green LED blinks slowly	No message prompts	Operating normally, no specific action needed
Low battery level warning	The battery power is low. Please land the aircraft.	Red LED blinks slowly.	When "Go-Home" is selected in the Phantom Assistant, this message will appear:  Tap "Go-home" to have the aircraft return to the Home point and land automatically, or "Cancel" to resume normal flight. If no action is taken, the aircraft will automatically go home and land after 10 seconds.	Fly the Phantom 2 Vision+ back and land it as soon as possible, then stop the motors and replace the battery.
Critical Low battery level warning	The aircraft must land immediately.	Red LED blinks quickly.	The DJI Vision App screen will flash red and aircraft starts to descend.	The Phantom 2 Vision+ will begin to descend and land automatically.
Estimated remaining flight time	Estimated remaining flight based on current battery level.	N/A	N/A	N/A

Color zones on the battery level indicator  reflect estimated remaining flight time and are adjusted automatically, according to the aircraft's current status.
When the critical battery level warning activates and the aircraft is descending to land automatically, you may push the throttle upward to hover the aircraft and navigate it to a more appropriate location for landing.

When these warnings are triggered, please bring the aircraft back to the Home point or land to avoid losing power during flight.

Low Battery Level Warning on the DJI VISION App

Battery level warnings will show on the camera page of the DJI VISION App when the battery level is low.
(1) A red light will flash along the edges of the app screen.
(2) Audible alarm. Make sure sound is turned on and volume is turned up on your mobile device.
(3) The aircraft battery icon will turn red.

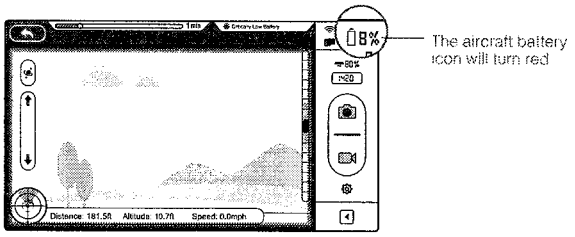


Figure 56

6 Flight Limits

All unmanned aerial vehicle (UAV) operators should abide by all regulations from such organizations as the ICAO (International Civil Aviation Organization) and their own national airspace regulations. For safety reasons, the flight limits function is enabled by default to help users use this product safely and legally. The flight limits function includes height, distance limits and No Fly Zones.

In Ready to Fly mode, height, distance limits and No Fly Zones work together to manage flight. In Ready to Fly (non-GPS) status, only height limits work and flights cannot go higher than 120m.

Default parameters in Assistant are compliant within the definitions of class G ruled by ICAO. (Refer to Airspace Definition to get more details). As each country has its own rules, make sure to configure these parameters to comply with these rules before flying.

6.1 Max Height & Radius Limits

Max Height & Radius limits flying height and distance. Configuration can be done in the Phantom 2 Vision+ Assistant (Figure 57). Once complete, your Phantom will fly in a restricted cylinder (Figure 58).

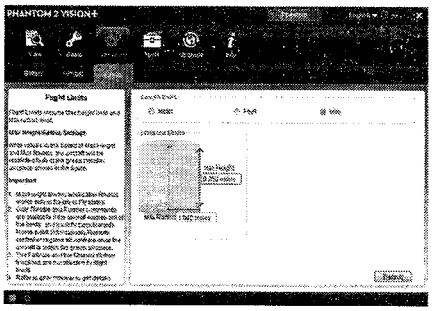


Figure 57

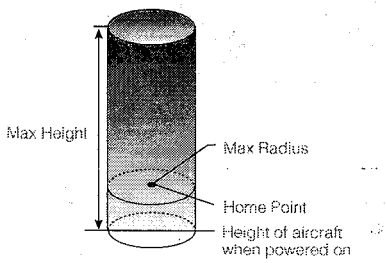


Figure 58

Ready to Fly G ····· Green flashing			
	Limits	DJI VISION App	Rear LED flight indicator
Max Height	Flight height must be under the set height.	Warning: Height limit reached.	None.
Max Radius	Flight distance must be within the max radius.	Warning: Distance limit reached.	Rapid red flashing (R) ····· when close to the max radius limit.

Ready to Fly(non-GPS) Y ····· Yellow flashing			
	Flight Limits	DJI VISION App	Rear LED flight indicator
Max Height	Flight height restricted to 120m and under.	Warning: Height limit reached.	None.
Max Radius	No limits		

- If you fly out of the limit, you can still control the Phantom, but cannot fly it further.
- If the Phantom flies out of the max radius in Ready to Fly (non-GPS) mode, it will fly back within range automatically.

6.2 Flight Restriction of Restricted Areas

Restricted areas include airports worldwide. All restricted areas are listed on the DJI official website at http://www.dji.com/fly-safe/category-mc. Restricted areas are divided into category A and category B. Category A areas cover major international airport such as LAX and Heathrow, while category B areas includes smaller airports.

Category A Safety Zone

(1) The category A "safety zone" is comprised of a small "no-fly zone" and a range of "restricted-altitude zones". Flight is prevented in the "no-fly zone" but can continue with height restrictions in the restricted-altitude zone.
(2) 1.5 miles (2.4 km) around a designated safety zone is a no-fly zone, inside which takeoff is prevented.
(3) 1.5 miles (2.4 km) to 5 miles (8 km) around restricted areas are altitude restricted, with maximum altitude going from 35 feet (10.5 m) at 1.5 miles (2.4 km) to 400 feet (120 m) at 5 miles (8 km).
(4) A "warning zone" has been set around the safety zone. When you fly within 320 feet (100m) of the safety zone, a warning message will appear on the DJI Vision app.

Category B Safety Zone

(1) Category B "safety zone" is comprised of a "no-fly zone" and a "warning zone".
(2) 0.6 miles (1 km) around the safety zone is a designated "no-fly zone".
(3) A "warning zone" has been set around the safety zone. When you fly within 0.6 miles (1Km) of this zone, a warning will appear on the DJI Vision app.

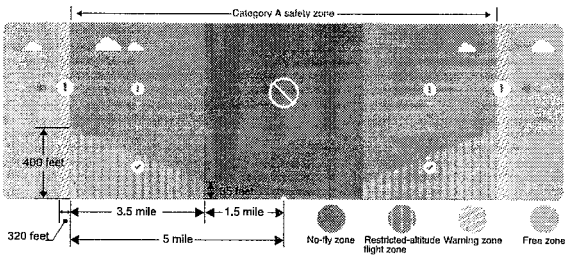


Figure 59:Category A

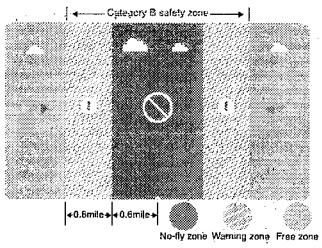


Figure 60: Category B

Ready to Fly :G ····· Green flashing			
Zone	Restriction	DJI VISION App Notification	Rear LED Flight Indicator
No-fly Zone	Motors will not start.	Warning: You are in a No-fly zone. Take off prohibited.	:R ····· Red flashing
	If the Phantom enters the restricted area in Ready to Fly (non-GPS) mode but Ready to Fly mode activates, the Phantom will automatically descend to land then stop its motors after landing.	Warning: You are in a No-fly zone, automatic landing has begun. (If you are within 1.5 mile radius)	
Restricted-altitude flight zone	If the Phantom enters a restricted area in Ready to Fly (non-GPS) mode and Ready to Fly mode activates, it will descend to a safe altitude and hover 15 feet below the safe altitude.	Warning: You are in a restricted zone. Descending to safe altitude. (If you are between the range of 1.5 mile and 5 mile radius) Warning: You are in a restricted zone. Max flight height restricted to between 10.5m and 120m. Fly Cautiously.	
Warning zone	No flight restriction applies, but there will be warning message.	Warning: You are approaching a restricted zone, Fly Cautiously.	
Free zone	No restrictions.	None.	None.

Semi-automatic descent: All stick commands are available except the throttle stick command during the descent and landing process. Motors will stop automatically after landing. Users will regain control once the motors have stopped. There is no need to toggle the S1 switch.

- When flying in the safety zone, LED flight indicators will blink red :R ·····quickly and continue for 3 seconds, then switch to indicate current flying status and continue for 5 seconds at which point it will switch back to red blinking.
- For safety reasons, please do not fly close to airports, highways, railway stations, railway lines, city centers and other special areas. Try to ensure the aircraft is visible.

6.3 Conditions of Flight Limits

In different working modes and flight modes, flight limits will differ according to number of GPS satellites found. The following table demonstrates all the cases(√: available; ×:unavailable).

All flights are restricted by height, distance and special areas simultaneously.

Phantom mode			
Flight Status	Limits of Special Area	Max Height	Max Radius
Ready to Fly	√	√	√
Ready to Fly (non-GPS)	×	√	×

Naza-M mode				
Control Mode	number of GPS found	Limits of Special Area	Max Height	Max Radius
GPS	≥6	√	√	√
	<6	×	√	×
ATTI.	≥6	√	√	×
	<6	×	√	×
Manual	≥6	×	×	×
	<6	×	×	×

6.4 Disclaimer

Please ensure that you are up to date with international and domestic airspace rules and regulations before using this product. By using this product, you hereby agree to this disclaimer and signify that you have read this fully. You agree that you are responsible for your own conduct and content while using this product, and for any direct or indirect consequences caused by not following this manual, violating or disregarding other applicable local laws, administrative rules and social habits thereof.

DJI VISION App Usage

The DJI VISION App controls the Phantom 2 Vision+ camera including capture, recording, settings and pitch angle. It also displays essential flight information including flight parameters and battery level.

1 DJI VISION App Main Menu

After logging in you will see the VISION App home screen. This shows current Wi-Fi connection status and the four main features of the App.

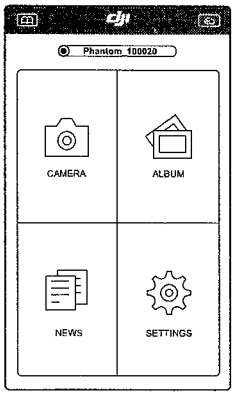


Figure 61

Icons		Description
	Camera	Tap to enter the Camera view screen
	Album	Tap to enter your Album of photos and videos
	News	Tap to read the latest DJI News
	Settings	Tap to change and view app Settings
	Manuals	Tap to view and download manuals
	Checklist	Tap to enter the preflight checklist

⚠ • When using the camera and the SD card album (Page 37), connect your mobile device to the Phantom 2 Vision+ Wi-Fi network.
• Internet access is required for sharing photos, videos and reading DJI news.
• If you receive a phone call during a flight, the live camera preview screen may be interrupted. It's recommended to ignore the call and pay attention to your flight.

2 Camera Page

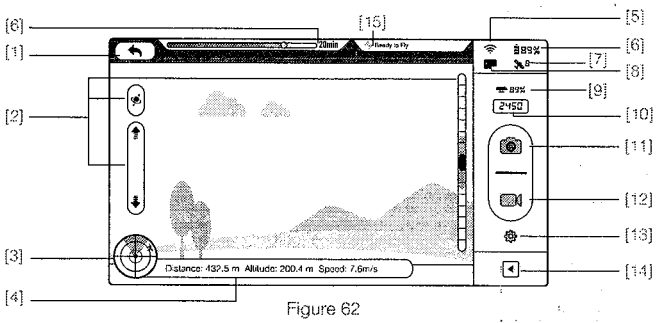


Figure 62

[1] Return [2] Camera Pitch Control [3] Flight Attitude and Radar Function [4] Flight Parameters [5] Wi-Fi Signal Strength [6] Flight Battery Level [7] Aircraft GPS Status [8] Micro-SD Card Status [9] Range Extender Battery Level [10] Remaining Shots [11] Shutter Button [12] Video Recording Button [13] Camera Settings [14] Hide or Show Flight Parameters [15] Rear LED Flight Indicator Status

[1] Return

-Return to the preview page

[2] Camera Pitch Control

-Pitch Control switch is white tap once to highlight it and enter Accelerometer Sensor Mode. Tap again to return to normal.

Normal Mode

Tap up arrow to pitch camera upwards and down arrow to pitch downwards. Green slider indicates current camera pitch.

Gimbal pitch control (Normal Mode)

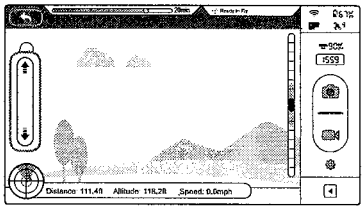


Figure 63

Gimbal pitch movement

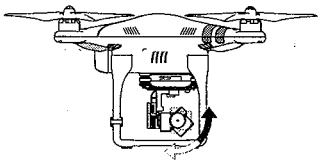


Figure 64

Accelerometer Sensor Mode

The gimbal pitch movement is controlled by moving your mobile device. Pitch forward to pitch camera down and backward to pitch camera up.

Gimbal pitch control (Accelerometer Sensor Mode)

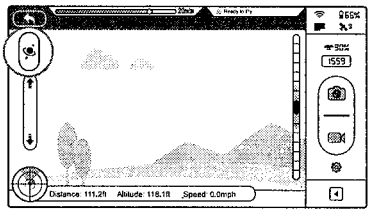


Figure 65

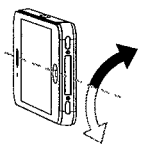


Figure 66

Gimbal pitch movement

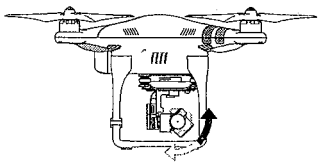


Figure 67

⚠ In Accelerometer Sensor Mode, the pitch angle indicator will show a grey area. When the green pitch indicator is inside the grey area, the camera will move according to pitch gestures. When the indicator reaches the boundary of the grey area, pitch gestures will control the camera's pitch speed at a constant rate.

[3] Flight Attitude and Radar Function

Figure 68

Flight attitude is indicated by the flight attitude icon.
(1) The red arrow shows which direction the Phantom 2 Vision+ is facing.
(2) Light blue and dark blue areas indicate pitch.
(3) Pitching of the boundary between light blue and dark blue area shows roll angle.
(4) An orange circle around the radar indicates that the dynamic home point is not available. A green circle around the radar indicates that the dynamic home point is available and a new home point has been set.

Tap flight attitude icon to turn on the radar function. Home in the center of the radar and the red icon indicates the Phantom 2 Vision+'s current heading, direction, and approximate distance from home. Tap flight attitude icon again to disable the radar.The current longitude and latitude of the aircraft is displayed on the bottom of the radar.

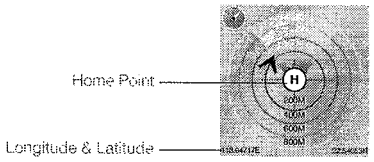


Figure 69

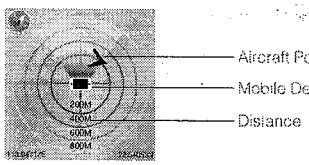
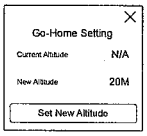


Figure 70

⚠
- By default, the center of the radar indicates the home point recorded by the Phantom 2 Vision+. Tap the center of the radar to switch the center to your mobile device's current location.
- If your mobile device contains a compass, the top portion of the Radar is the direction you are pointing. If not, the radar will be oriented due north.
- Distance units are metric in Figure 69 and Figure 70. Users can switch the unit to imperial in the settings page.

[4] Flight Parameters

Tap to set return home (RTH) altitude.
Distance: Horizontal distance from home point.
Altitude: Vertical distance from home point.
Speed: Horizontal flying speed.



Distance value will show as N/A if the Phantom 2 Vision+ is not in "Ready to Fly" mode.

[5] Wi-Fi Signal Strength

Indicates camera is connected to your mobile device and Wi-Fi is working normally.
The connection between the camera and mobile device may fail if Wi-Fi signal strength is low. Refer to Phantom 2 Vision+ CONNECTION BROKEN for more information.

[6] Flight Battery Level

Show current flight battery level. When battery level is low and the battery icon turns red it is recommended to fly the aircraft back and land it as soon as possible. Please refer to Low Battery Level Warning Function (Page 28) to get more details.

[7] Aircraft GPS Status

GPS status icon display the number of satellites found by the aircraft. The icon is highlighted when more than 6 satellites are found, allow the Phantom to fly in "Ready to Fly" mode.

[8] Micro-SD Card Status

Displays Micro-SD Card Status. Icon is highlighted when a valid Micro-SD card is inserted. If there is no Micro-SD card present, it is grayed out.

[9] Range Extender Battery Level

Shows current battery level of the Range Extender. Refer to Checking the Battery Level (Page 21) for more details.

[10] Remaining Shots

Displays estimated shots remaining, based on the current photo size setting and storage capacity of the Micro-SD card. This shows '0' if:
(1) Micro-SD card is not inserted.
(2) Micro-SD card is full.

(3) Micro-SD card is damaged.
(4) Connection between the DJI VISION App and camera is broken.

[11] Shutter Button

Tap to take photos.
Single capture: press once for a single capture.
Continuous capture: press once for 3 or 5 captures.
Timed capture: press once to begin a timed capture, press again to stop.

- Shutter button is disabled during video recording.
- Capture modes can be reconfigured in camera settings; refer to the Camera Settings (Page35).

[12] Video Recording Button

Start and stop video recording. Tap once to start recording. A red dot will blink to indicate recording is in progress and a time code will appear in the top right corner of the preview screen. Press again to stop recording.

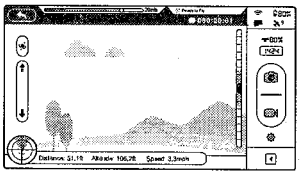


Figure 71

[13] Camera Settings

Tap to open the camera settings menu, refer to Camera Settings (Page 35).

[14] Hide or Show Flight Parameters

Tap to hide flight parameters. Tap again to show.

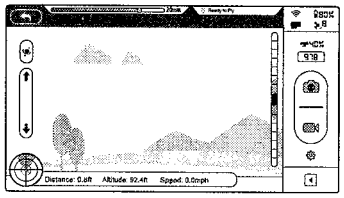


Figure 72

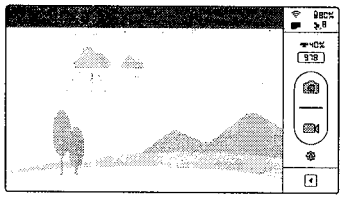


Figure 73

[15] Rear LED Flight Indicator Status

Displays the aircraft's current flight status. Tap for details.

3 Camera Settings

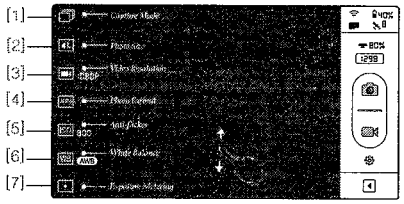


Figure 74

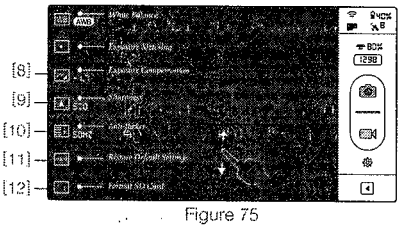


Figure 75

[1] Capture Mode [2] Photo Size [3] Video Resolution [4] Photo Format [5]ISO [6] White Balance [7] Exposure Metering [8] Exposure Compensation [9] Sharpness [10] Anti-flicker [11] Restore Defaults [12] Format Micro-SD Card

[1] Capture Mode

	Single capture.
	3 captures.
	5 captures.
	Configurable timed capture: a) Interval between shots (3~60 s) b) Number of shots (2~254, or number of picture is subject to the capacity of the memory card.)

[1] Toolbar Auto Hide

Slide the switch from left to right to enable this function. Toolbar will auto hide on the camera page.

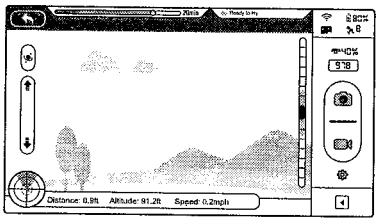


Figure 91: Toolbar Auto Hide Disabled

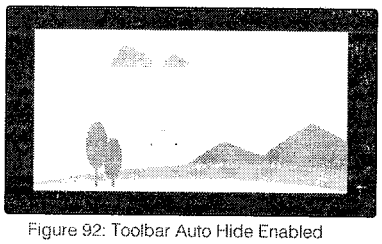


Figure 92: Toolbar Auto Hide Enabled

[2] When Connection Breaks

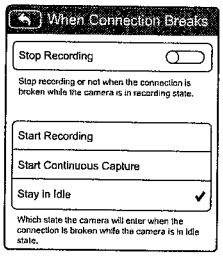


Figure 93

Stop Recording:
Enabled: Stop recording if the Wi-Fi connection between the mobile device and the camera breaks while the camera is recording.
Disabled: Keeps recording if the Wi-Fi connection between the mobile device and the camera breaks while the camera is recording.

Select the state the camera will enter in the event of a Wi-Fi Connection break between the mobile device and the camera. Use this function to ensure your recording is uninterrupted during the flight.

[3] Camera Settings Display

iOS users will see an enabled item display in the camera settings toolbar and disabled items will be hidden. This feature is not available on Android.

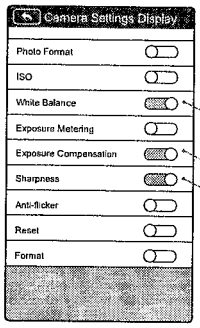


Figure 94

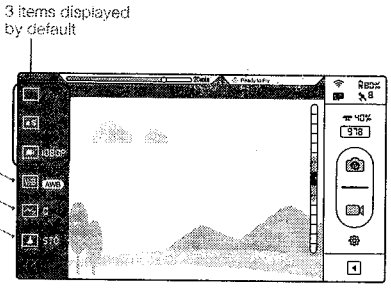


Figure 95

[4] Preview Quality

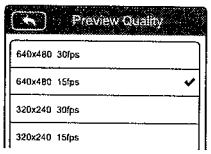


Figure 96

High: 640 x 480@30fps
Medium: 640 x 480@15fps
Medium: 320 x 240@30fps
Low: 320 x 240@15fps (Recommended when there is a lot of interference.)

[5] Parameter Unit

Select imperial or metric units of measurement.

[6] Ground Station

Slide to the right to enable ground station feature.

[7] Compass Calibration

Tap to calibrate the compass. Do not calibrate the compass during flight.

[8] Low Battery Auto Go Home

Enable or disable auto go home feature when battery is low.

[9] Dynamic Home Point

When activated, the Home point will be reset to your current position at specific time intervals. The aircraft will return to the latest Home point as required.

[10] Current RTH Altitude

Default RTH altitude set to 20m. Raising the RTH altitude above 120m is not recommended.

[11] Battery History Info

Show the battery history warning records.

[12] GPS Signal Notice

If enabled, the DJI VISION App will display a pop-up tip when attempting to takeoff without a sufficient GPS signal.

[13] FPV Mode

Switched on, the gimbal will work in FPV mode. Switched off, the gimbal will work in Stabilize mode.

[14] Rotation Lock

The user interface of the DJI VISION App will rotate if rotation lock is enabled (for iOS device only).

[15] Low Battery Warning

If enabled, an alarm will sound when the battery level is too low.

> ⚠ We recommended adjusting the mobile device volume to the highest level.

[16] Tutorial

Hints and Tips

[17] Clear News Cache

Tap to flush news cache.

[18] Binding

In the event that camera and Range Extender binding is lost or an item has been repaired or replaced, binding must be performed using the DJI VISION App. Refer to Binding the Phantom 2 Vision+ and Range Extender (Page 21) for details.

[19] Rename Range Extender SSID

Tap to rename the SSID of the Range Extender. Refer to Rename Range Extender SSID (Page 21) for details.

[20] Upgrade Range Extender

When upgraded, it is possible to use a mobile device's data network to access internet functions while connected to the Phantom.
This feature is not available on Android.

[21] Find My PHANTOM 2 VISION

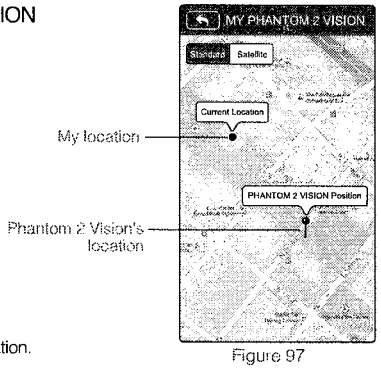


Figure 97

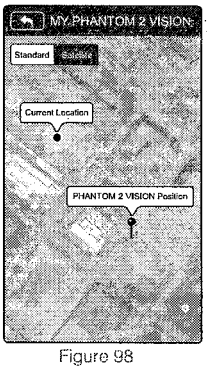


Figure 98

[22] Account

Tap to see user account information.

[23] Rate

Tap to rate the DJI VISION App. Internet access required.

> Android App does not include rating.

[24] About

Tap to see the current version of the DJI VISION App and contact information.

7 Ground Station

The DJI Vision app features an integrated ground station function. Using it you can create flight missions by placing waypoints and setting waypoint altitude and overall speed. When flight plan has been created, simply tap "GO" and your aircraft will execute the flight mission automatically. You may also abort the flight mission and bring aircraft home by activating "GoHome" feature.

⚠ Upgrade Phantom firmware to the latest version to enable ground station feature. Refer to "Firmware Upgrade of the Phantom 2 Vision+" (P46) for more information about how to upgrade the firmware.

7.1 Ground Station GUI

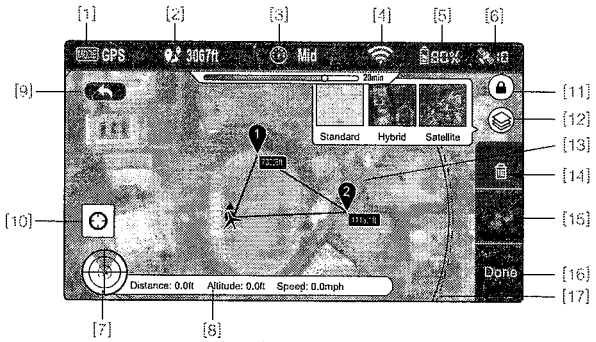


Figure 99

[1] MODE

Modes include
Hover: Hovering
Waypoint: Mission in progress
GoHome: Returning to home point
Take off: Taking off
Landing: Landing
GPS: GPS flight
Atti.: Atti. flight
Manual: Manual flight

[2] Approximated Flight Mission Distance

Planned mission distance. To achieve optimum battery performance, max mission distance is 5km(3miles).

[3] Speed

For flight safety concern, only three gears of flight speed are available. Choose from Fast (8m/s), Mid(4m/s) and Slow (2m/s) for flight speeds. Estimated 10 minutes flight is achievable when the aircraft travels in "Fast" gear.

[4] Wi-Fi Signal Strength

Wi-Fi signal strength display. Refer to [5] in "Using the DJI Vision App" for details.

[5] Battery Level

Battery level display. Refer to [6] in "Using the DJI Vision app" for details.

[6] GPS

Number of satellites connected. Refer to [7] in "Using the DJI Vision app" for details.

[7] Flight Attitude and Radar

Attitude and Radar display. Refer to [3] in "Using the DJI Vision app" for details.

[8] Flight Parameters

Flight information display. Refer to [4] in "Using the DJI Vision app" for details.

[9] Back

Return to camera GUI.

[10] Home Point Locator

Locate your Home point.

[11] Orientation Lock

Unlock to sync map orientation with aircraft movement.

[12] Map View

Select map view from standard, hybrid or satellite.

[13] Waypoint

Tap each waypoint to set altitude.

[14] Delete

Delete current waypoint.

[15] Go Home

Abort mission, return home and land.

[16] Done

Hit "Done" then tap "GO" to begin mission.

[17] Flight Area

The aircraft can fly in this area and return to the home point with the current battery level. This area is dependent on the current state of the aircraft and will be refreshed at specific time intervals.

7.2 Using Ground Station

Step 1 Launching Ground Station:

Enable ground station in the Settings section of the DJI Vision app. A disclaimer for Ground Station will appear. Read this thoroughly before using Ground Station.

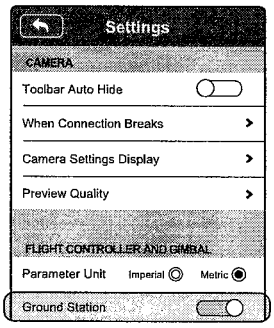


Figure 100

Ensure your mobile device has access to the Internet. Due to the map data required, Wi-Fi connection is recommended. Internet access is required to cache the ground station map, if Wi-Fi is unavailable, mobile data service is required. Open the DJI Vision app camera GUI and swipe left to launch ground station(see Figure 101). DJI Vision app cannot connect to your aircraft while it is accessing the Internet. Hence, you may prompt with the warning message such as "Connection to Phantom Failed". This message will not appear when your aircraft is re-connected to DJI Vision app. Map data of your current location will load. You can then drag the map to cache nearby areas for future use(see Figure 102).

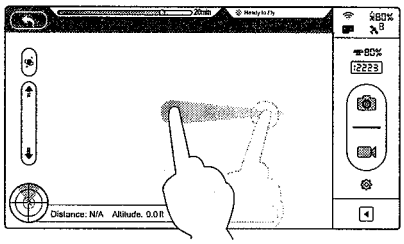


Figure 101

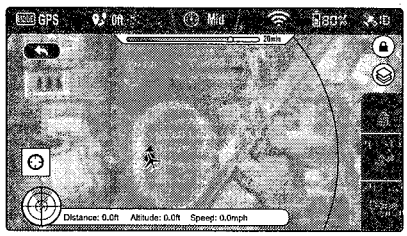


Figure 102

Step 2 Setting a Waypoint:

Disconnect from the Internet and connect the DJI Vision app to your aircraft. Check that remote controller S1 switch is in position (position-1) and the upper left corner in ground station display and wait for the aircraft to enter "Ready-to-Fly" mode (LED indicator blinking green) before swiping left into ground station. Tap on the map to place a waypoint. You can place up to 16 waypoints including the Home point. Waypoints cannot be placed beyond 500m from the Home point or inside No Waypoint Areas.

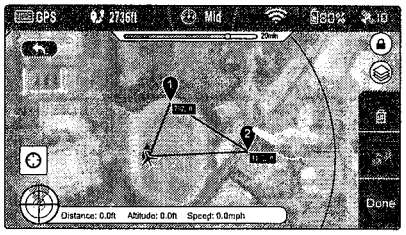


Figure 103

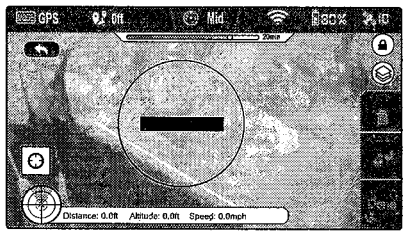


Figure 104

⚠
- A circle on the map, as shown in Figure 104, indicates a restricted, No Waypoint area. Waypoints cannot be placed in this area. For more information, refer to "6.2 Flight Restriction of Restricted Areas (P30)".
- To achieve the optimal video transmission quality, the aircraft is set to operate within a 500m-radius area from Home point.

Tap on a waypoint to open a waypoint properties window. Slide the white dot right to adjust waypoint altitude. The default altitude is set to 98 feet (30 m) and can be adjusted from 0 to 650 feet (200 m). Tap "OK" to save waypoint settings. To delete current waypoint, tap 🗑. Modify longitude and latitude value using the input box.

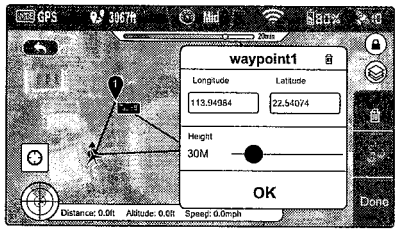


Figure 105

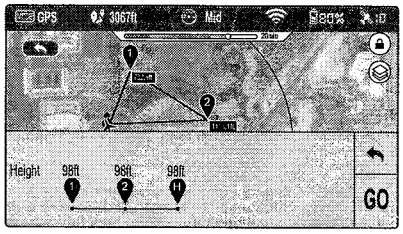


Figure 106

Step 3 Preview a Mission:
Tap "Done" to preview the mission when all waypoints are set. A prompt similar to the one below will appear.
This prompt lists all waypoints and their altitudes. The aircraft will fly to each waypoint listed. If there is a difference in altitude between waypoints, the aircraft will adjust its altitude as it flies between points. When ready, tap "GO" to begin mission.

⚠ Aircraft reacts differently to the "GO" command:
- If aircraft is on the ground, the aircraft takes off automatically and ascend 16 feet (5m) then fly to the first waypoint.
- If aircraft is in the air, the aircraft flies to the first waypoint.

Step 4 Executing Flight Mission
The aircraft flies to each waypoint in numerical order. As it flies, swipe back into the DJI Vision app camera GUI to control camera tilt and capture photos or video. Tap ⏸ to pause the mission during the flight, and aircraft will then start hovering. Tap ▶ to resume mission. If you wish to regain control of the aircraft, toggle the S1 switch on remote controller from (Position-1) to either (Position-2) or (Position-3) to discontinue the current mission.

Step 5 Landing
When all waypoints have been visited, the aircraft will return to its Home point and hover. Regain control of the aircraft and land it manually. You may also tap button to initiate "Go Home" procedure. Aircraft will abort current mission, return to Home point and auto land. When the aircraft is landing automatically, users can control the aircraft's position and altitude. Users can start the motors to take off immediately after the motors have stopped following auto landing.

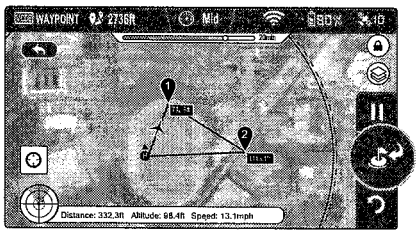


Figure 107

PC / MAC Assistant

For better use of the Phantom 2 Vision+, Phantom 2 Vision+ Assistant and Phantom RC Assistant are required. Both run on Windows or Mac OS X operating systems.

1 Installing Driver and Phantom 2 Vision+ Assistant

1.1 Installing and Running on Windows

(1) Download the driver installer and Assistant installer (.EXE) from the Phantom 2 Vision+ download page.
(2) Connect the Phantom 2 Vision+ to a PC using a Micro-USB cable.
(3) Run the driver installer and follow the prompts to finish installation.
(4) Run the Assistant installer and follow the prompts to finish installation.
(5) Double click the Phantom 2 Vision+ icon on your desktop to launch Assistant.

⚠ Supports Windows XP, Windows 7 and Windows 8 (32 or 64 bit).

1.2 Installing and Running on Mac OS X

(1) Download the Assistant installer (.DMG) format from the Phantom 2 Vision+ download page.
(2) Run the installer and follow the prompts to finish installation.

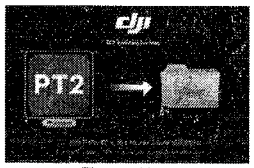


Figure 108

(3) When launching for the first time, if using Launchpad to run the Phantom 2 Vision+ Assistant, Launchpad will not allow access because Assistant has not been reviewed by the Mac App Store.

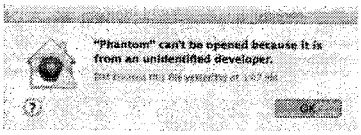


Figure 109

(4) Locate the Phantom 2 Vision+ icon in Finder, press Control then click the icon (or right-click the icon using a mouse). Choose Open from the shortcut menu, then click Open in the prompt dialog box to launch.
(5) After the first successful launch, double click the Phantom 2 Vision+ icon as normal to launch using Finder or Launchpad.

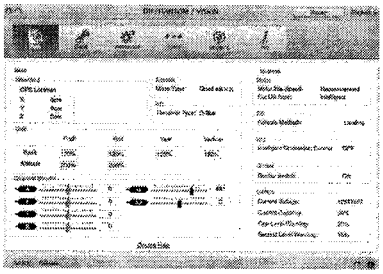


Figure 110

Appendix

1 Rear LED Flight Indicator Status

Rear LED Flight Indicators	Normal status
R G Y ····· (Red, Green, Yellow flashes in turn)	Power On Self-Test
Y G ····· (Green, Yellow flashes in turn)	Warming Up
G ····· (Slow Green flashes)	Ready to Fly
Y ····· (Slow Yellow flashes)	Ready to Fly (non-GPS)
Rear LED Flight Indicators	**Abnormal status**
Y ····· (Quick Yellow flashes)	Remote Controller Signal Lost
R ····· (Slow Red flashes)	Low Battery Level Warning
R ····· (Quick Red flashes)	Critical Low Battery Level Warning
R ····· (Three Red flashes off and on)	Not Stationary or Sensor Bias is too big
R —— (Solid red)	Error*
R Y ····· (Red, Yellow flashes in turn)	Compass Needs Calibration

*You can learn more about error by connecting the Phantom 2 Vision+ to the Assistant.

2 Specifications

Aircraft	
Supported Battery	DJI 5200mAh Li-Po Battery
Weight (Battery & Propellers included)	1242g
Recommend payload	≤1300g
Maximum payload	1350g
Hovering Accuracy (Ready to Fly)	Vertical: 0.8m; Horizontal: 2.5m
Max Yaw Angular Velocity	200°/s
Max Tiltable Angle	35°
Max Ascent / Descent Speed	Ascent: 6m/s; Descent: 2m/s
Max Flight Speed	15m/s (Not Recommended)
Motor Diagonal Length	350mm
3-axial stabilized Gimbal	
Working Current	Static : 750mA; Dynamic : 900mA
Control Accuracy	±0.03°
Controllable Range	Pitch : -90° - 0°
Maximum Angular Speed	Pitch : 90°/s
Camera	
Operating Environment Temperature	0°C - 40°C
Sensor Size	1/2.3"
Effective Pixels	14 Megapixels
Resolution	4384×3288
HD Recording	1080p30 /1080i60
Recording FOV	110° / 85°

Remote Controller	
Operating Frequency	5.728 GHz - 5.85 GHz
Communication Distance (open area)	CE Compliance: 400m; FCC Compliance: 800m
Receiver Sensitivity (1%PER)	-93dBm
Transmitting Power (EIRP)	CE Compliance: 25mW; FCC Compliance: 100mW
Working Current/Voltage	120mA@3.7V
Battery	2000mAh rechargeable LiPo battery
Range Extender	
Operating Frequency	2412MHz - 2462MHz
Communication Distance (open area)	500m - 700m
Transmitting Power	20dBm
Power Consumption	2W

3 Troubleshooting (FAQ)

3.1 How to solve large margin(s) mid-point error?

If the Remote Controller stick(s) mid-point margin of error is too big, the motors will fail to start when you execute the CSC and the Phantom will not take off. The below are some possible fixes for this.

(1) One of the Remote Controller's stick positions (except the throttle stick) is not centered when powering on the Phantom 2 Vision+.
Solution: Place all Remote Controller sticks at their mid-point positions and then power cycle the Phantom 2 Vision+ to re-record the mid-point.

(2) The Remote Controller sticks have been trimmed, leading to a deviation in the mid-point position.
Solution: Use Assistant to perform a Remote Controller calibration.
a) Connect to Assistant, tap Basic -> RC -> Command Sticks Calibration and push all Remote Controller sticks through their complete travel range to see if any stick cannot reach its outermost position.
b) Power cycle the Phantom 2 Vision+. Power cycling is required.
c) Re-attempt Remote Controller calibration in Assistant.

If the above solutions do not solve your issue, please send your Remote Controller to DJI Customer service for repair.

3.2 How to restore a video file if power is turned off during a recording session?

Solution: Keep or place the Micro-SD card back into the camera. Power cycle the camera and wait about 30 seconds for the video file to be restored.

3.3 Failure to acquire the SSID.

Solution: Double check whether both the camera and Range Extender are powered on and the power switch of the camera is switched to "Wi-Fi ON."

3.4 What to do if Phantom 2 Vision+ is out of sight and the Wi-Fi connections is lost?

Solution: Turn off the Remote Controller to trigger the Failsafe mode and the aircraft will start to fly back, descend, and land at the Home point. Please make sure there are no obstacles between the Phantom and the home point and that you are familiar with the procedure for regaining control.

3.5 Wi-Fi connection fails all the time.

Solution: Double check the current Wi-Fi connection status of the mobile device. The mobile device may be connecting to other Wi-Fi networks after a connection breaks with the Phantom 2 Vision+.

3.6 Files fail to synchronize.

Solution: Video files that are too large (file sizes close to 4GB) cannot be synchronized to the mobile device. Some mobile devices do not support the synchronization of the 1080i60 video files.

3.7 iOS Albums fail to synchronize.

Solution: Reset the settings of your mobile device as illustrated below. Enable the Settings -> Private -> Photos -> DJI VISION. Otherwise Albums will fail to synchronize with your mobile device.

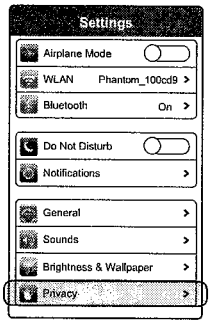


Figure 116

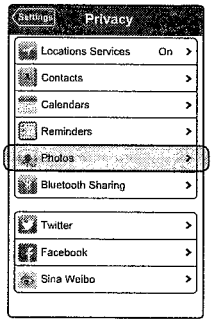


Figure 117

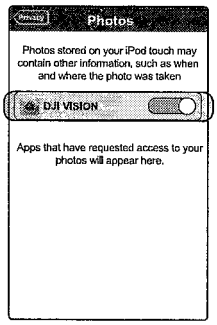


Figure 118

3.8 Failure to share.

Solution: Make sure your mobile device has access to the Internet.

3.9 Some Android devices have a problem connecting to the Phantom 2 Vision+ Wi-Fi Extender.

Solution: Some Android devices do not allow for both a Wi-Fi connection and a mobile data connection at the same time. When trying to connect to the Phantom 2 Vision+ Wi-Fi network, most devices will check whether an Internet connection has a certain Wi-Fi setting enabled, e.g. Auto network switch or Test for Internet connection. If no Internet connection is found because the Phantom 2 Vision+ creates a non-routable connection it will drop the Phantom 2 Vision+ Wi-Fi network connection and scan for the next available connection. Example: For the Samsung Note 3, carry out the following procedures to solve this issue. Tap Settings -> Wi-Fi, and then tap the "Menu" button. Select "Advanced" then uncheck the "Auto network switch". You might see a warning that indicates the Internet connection is unstable this message can be ignored.

3.10 App tips for mobile devices.

Solution: If using the App on multiple mobile devices turn off the App on the first mobile device then turn it on the second one to ensure normal functions on the second mobile device.

3.11 How to land the aircraft more smoothly?

Solution: First pull the throttle stick position down to lower than 5%, then execute the CSC command to stop the motors.

3.12 Why is the discharge time of a battery not zero when unused?

Solution: A battery aging test is performed prior to delivery which affects the discharge time of the new battery. This is why the discharge time of a new battery is not zero. The battery is okay to use.

3.13 Do I need extra hardware to utilize ground station?

Solution: No extra hardware is required.

3.14 Does ground station support caching map data offline?

Solution: Yes, user can cache map data in ground station for future use.

3.15 What if I accidently exit DJI Vision App in ground station mode?

If DJI Vision App is closed when aircraft is executing flight mission, aircraft continues with the remaining flight mission.
If DJI Vision App is closed and failed to re-connect with aircraft within 1 minute, aircraft returns home point automatically.

The content is subject to change.

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