U.S. Department
of Transportation

**Federal Aviation
Administration**

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

September 25, 2015

Exemption No. 12998
Regulatory Docket No. FAA−2015−2771

Mr. Henry W. Bauer
President
Guardian Group, Inc.
2350 West 205th Street
Torrance, CA  90501

Dear Mr. Bauer:

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 dated June 8, 2015, you petitioned the Federal Aviation Administration (FAA) on
behalf of Guardian Group, Inc. (hereinafter petitioner or operator) for an exemption.  The
petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial
surveying and inspections.

See Appendix A 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 3 Professional.

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, Guardian Group, Inc. 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, Guardian Group, Inc. is hereafter referred to as the operator.

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[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 3 Professional 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 five 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 attached 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

Enclosures

**G** Guardian Group, Inc.

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June 8, 2015

**U.S. Department of Transportation, Docket Operations**
West Building Ground Floor, Room W12-140
1200 New Jersey Avenue, SE
Washington, DC 20590

Subject: Request for Issuance of Exemption under Title 14 CFR, Section 333

Dear Sir or Madam:

By the present letter, Guardian Group, Inc. ("GGI") requests an exemption from the requirements of Title 14 of the Code of Federal Regulations ("CFR") as allowed under Section 333 of the Federal Aviation Administration ("FAA") Modernization and Reform Act of 2012, with regard to the operation of an Unmanned Aircraft System ("UAS") for commercial use in the United States.

Please find enclosed GGI's petition demonstrating that the intended UAS operations will not adversely affect the safety of persons or property in the air or on the ground and meet the level of safety to the rules from which GGI seeks the exemptions.  GGI's petition also shows why granting the exemption is in the public interest.

Sincerely,

Guardian Group, Inc.

Henry W. Bauer
President
HWB/cd

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**Attachments**

DJI PHANTOM 3 Pro User Manual
DJI PHANTOM Advanced Manual
DJI PHANTOM Flying Flowchart
DJI PHANTOM Pilot Training Guide
DJI PHANTOM Quick Start Manual
GGI UAS Flight Operations Manual (V1.0)
GGI UAS Pre-Flight & Maintenance Operations Log (V1.0)

## I.      GLOSSARY OF ABBREVIATIONS

AGL          Above Ground Level

CFR          Code of Federal Regulations

COA          Certificate Of Authorization

DJI          DJI Phantom 3 Pro

FAA          Federal Aviation Administration

FCC          Federal Communications Commission

GCS          Ground Control Station

GGI          Guardian Group, Inc.

GPS          Global Positioning System

PIC          Pilot In Command

UAS          Unmanned Aircraft System

VFR          Visual Flight Rules

VLOS          Visual Line of Sight

VMC          Visual Meteorological Conditions

VO          Visual Observer

## II. INFORMATION SUPPORTING THIS PETITION AS SPECIFIED IN TITLE 14 CFR PART 11.81

### A. *Mailing Address and Contact Information*

**Guardian Group, Inc.**
2350 W. 205th Street
Torrance, CA 90501-1460
Phone: (310) 320-0320
Fax: (310) 320-0120

### B. *Sections of Title 14 CFR from which GGI Seeks an Exemption*

| Title 14 CFR Part | Summary of Regulation |
|---|---|
| Part 21 Airworthiness Certification | |
| 21 Subpart H | Certification procedures for products and parts, Airworthiness Certificates |
| Part 45 Identification and Registration Marking | |
| 45.23(b) | Display of marks; general |
| 45.27(a) | Location of marks on nonfixed-wing aircraft |
| Part 61 Certifications: Pilots, Light Instructors, and Ground Instructors | |
| 61.113(a) and (b) | Private pilot privileges and limitations: Pilot in command |
| Part 91 General Operating and Flight Rules | |
| 91.7(a) | Civil aircraft airworthiness |
| 91.9(b)(2) and (c) | Civil aircraft flight manual, marking, and placard requirements |
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| 91.119 | Minimum safe altitudes |
| 91.121 | Altimeter settings |
| 91.151(a)(1) | Fuel requirements for flights in VFR conditions |
| 91.203(a) and (b) | Carry civil aircraft certification and registration |
| 91.405(a) | Maintenance required |
| 91.407(a)(1) | Operation after maintenance |
| 91.409(a)(2) | Inspections |
| 91.417(a) and (b) | Maintenance records |

### C. *Extent of Relief GGI's Seeks*

GGI seeks exemption from several provisions of Title 14 CFR Parts 21, 45, 61, and 91 to the extent necessary to engage in commercial operations of a small UAS on sites where GGI conducts building inspections. If these exemptions are granted, GGI would operate the UAS with the permission of the property owner. GGI intends to use a UAS for the following:
- Surveying hard-to-reach areas of building,
- Rooftop inspection,
- Building exterior envelope inspection.

Sections III to VIII detail the measures GGI will be taking during the UAS operations to meet or exceed the level of safety authorized by the FAA, and demonstrate that GGI's operations will not adversely affect the safety of persons or property in the air or on the ground and do not pose a threat to national security.

### D. The Reasons why Granting GGI's Request Would Be in Public Interest

The proposed UAS operations in this petition significantly improve safety and reduce risk by alleviating the public's exposure to danger associated with traditional inspection methods.

GGI will use the UAS as an alternative to large and inherently dangerous high-reach equipment such as lifts or scaffolds.

Moreover, by using a UAS, GGI will reduce the risk of harm to employees by avoiding accident-prone, dangerous situations such as rooftop inspections or building envelope inspections above ground level. This would have a positive trickledown effect to families of GGI's employees which ultimately benefits the public.

The UAS that GGI intends to use is battery powered and does not release greenhouse gas emissions.

GGI's UAS will be capable of documenting conditions that may have been otherwise inaccessible using traditional inspection and survey methods.

### E. The Reasons why Granting GGI's Request Would Not Adversely Affect Safety

GGI's UAS operations will provide a level a safety that meet or exceed the level of safety authorized by the FAA. The operating procedures that will be implemented by GGI are detailed in sections III to VIII of the petition.

### F. Summary

GGI seeks exemption from the requirements of Title 14 CFR Parts: 21 Subpart H, 45.23, 45.27(a), 61.113(a) and (b), 91.7(a), 91.9(b)(2) and (c), 91.103, 91.119, 91.121, 91.151(a)(1), 91.203(a) and (b), 91.405(a), 91.407(a)(1), 91.409(a)(2), and 91.417(a) and (b) to the extent necessary to operate a UAS to perform aerial inspections of buildings within the United States.

### G. Additional Information Supporting GGI's Request

Sections III to VIII provide additional information supporting GGI's request.

## III. DESCRIPTION OF PETITIONER

For over twenty years, GGI has served the surety, insurance, construction, legal, and banking industries with distinction. Our demonstrated proficiency with surety claims consulting, property claims consulting, construction claims, and construction consulting includes many of the world's most challenging projects. GGI's construction management and construction defect service value is grounded in that same surety claims and surety consulting experience.

GGI provides clients a complete suite of construction defect services including, but not limited to:
- Field investigative inspection and testing,
- Defective construction analyses,
- Architectural and engineering failure analyses,
- Remedial repair scope and strategies.

GGI seeks to use UAS—assisted photography and video to survey hard-to-reach areas of building, inspect rooftops, and building exterior envelopes. The use of a UAS would allow GGI to better address its client's needs. It will provide a safer and more efficient mean to perform field investigative inspections.

## IV. UNMANNED AIRCRAFT SYSTEM

The UAS proposed by GGI is the DJI Phantom 3 Pro ("DJI"). The DJI Phantom 3 Pro is a battery-operated lightweight quadcopter with on-board equipment and controlled via radio transmission from a separate Ground Control Station ("GCS") used. *See Figure 1.*

The on-board flight computer is in constant communication with the GCS and transmits live data such as speed, compass direction of flight, and altitude levels.

The UAS contains a Global Positioning System ("GPS") tracking device and an on-board gimbal-mounted camera capable of capturing full color high definition photos and videos.

The UAS is also equipped with a set of LEDs and aircraft status indicators which not only provide an enhanced visual from the ground but also assist the Pilot In Command ("PIC") to confirm battery, GPS, and other functionalities of the UAS.



**Figure 1: DJI Phantom 3 Pro**

*A.* **UAS Performance**

Below are the DJI Phantom 3 Pro Aircraft specifications:

| | *Metric* | *Imperial* |
|---|---|---|
| **Weight (Including Battery and Propellers)** | 1280 g | 2.8 lb |
| **Diagonal Size (Including Propellers)** | 590 mm | 23.2 in |
| **Max Ascent Speed** | 5 m/s | 9.7 knots (11.2 mph) |
| **Max Descent Speed** | 3 m/s | 5.8 knots (6.7 mph) |
| **Hover Accuracy** | Vertical: +/- 0.1 m (when Vision Positioning is active) or +/- 0.5 m | Vertical: +/- 4 in (when Vision Positioning is active) or +/- 20 in |
| | Horizontal: +/- 1.5 m | Horizontal: +/- 59 in |
| **Max Speed** | 16 m/s (ATTI mode, no wind) | 31.1 knots (35.8 mph) (ATTI mode, no wind) |
| **Max Altitude Above Sea Level** | 6000 m | 3.73 mi |
| **Operating Temperature** | 0°C to 40°C | 32°F  to 104°F |
| **GPS Mode** | GPS/GLONASS | |

*Ref.:* *http://www.dji.com/product/phantom-3/spec*

DJI Phantom 3 Pro is equipped with the FAILSAFE feature: If the aircraft battery is running low, or if the DJI loses the connection with your remote controller for any reason, the aircraft will automatically return to the takeoff point and land safely.

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**Operation Conditions and Limitations – UAS Performance**

- The DJI Phantom 3 Pro will weigh less than 3 pounds including payload.

- The speed of the DJI Phantom 3 Pro will not exceed 87 knots (100 miles per hour). The DJI Phantom 3 Pro will be operated at airspeeds greater than the maximum Unmanned Aircraft operating airspeed recommended by the manufacturer.

- If the UAS loses communications or loses its GPS signal, the DJI Phantom 3 Pro will return to a pre-determined location within the private or controlled-access property.

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*B.* **Pre-Flight Inspections, Maintenance, and Repair**

GGI will implement all necessary procedures, such as pre-flight inspections, maintenance, and repair to ensure that the DJI Phantom 3 Pro is in a condition for safe flight.

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**Operation Conditions and Limitations – Pre-Flight Inspections, Maintenance, and Repair**
*[Continued on next page]*

- If the DJI Phantom 3 Pro is to undergo maintenance or alterations that affect the UAS operation or flight characteristics, e.g. replacement of a flight critical component, the UAS will undergo a functional test flight prior to conducting further operations. Functional test flights will only be conducted by a PIC with a Visual Observer ("VO") and must remain at least 500 feet from people. The functional test flight will be conducted in such a manner so as to not pose an undue hazard to persons and property.

| Operation Conditions and Limitations – Pre-Flight Inspections, Maintenance, and Repair |
| :--- |
| - GGI will be responsible for maintaining and inspecting the DJI Phantom 3 Pro to ensure that it is in a condition for safe operation. |
| - Prior to each flight, the PIC will 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 will not be operated until necessary maintenance has been performed and the UAS is found to be in a condition for a safe flight. |
| - GGI will follow the DJI Phantom 3 Pro manufacturer's maintenance, overhaul, replacement, inspection, and life limit requirements for the aircraft and aircraft components. |

Please find attached GGI UAS Flight Operations  Manual (V1.0) and  GGI UAS Pre-Flight & Maintenance Operations Log (V1.0).

### C.       Radio Frequency

The operating frequency of the Remote Controller (i.e. GCS) ranges from 2.400 GHz to 2.483 GHz.

The radio frequency used for control of the UAS associated equipment (camera, sensors, etc.) is 2.4 GHz ISM.

The DJI Phantom 3 Pro complies with the Federal Communications Commission ("FCC") regulations.

### V.       UNMANNED AIRCRAFT PILOT IN COMMAND

A designated pilot will be operating the DJI Phantom 3 Pro. GGI designated pilot will:
- Hold a private pilot's license,
- Hold a current third-class medical certificate,
- Have a deep knowledge and thorough understanding of the UAS and its operation,
- Have experience in operating the DJI Phantom 3 Pro.

The PIC will be assisted by a VO at all times during the DJI Phantom 3 operations.

| Operation Conditions and Limitations – PIC Qualifications and Training<br>*[Continued on next page]* |
| :--- |
| - The PIC will be designated before the flight and will not transfer his or her designation for the duration of the flight. |
| - The PIC will hold a private pilot certificate and a FAA airman medical certificate. |

**Operation Conditions and Limitations – PIC Qualifications and Training**

- GGI will not permit any PIC to operate unless the PIC demonstrates 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 will be logged in a manner consistent with Title 14 CFR Part 61.51(b). Training operations will be conducted during dedicated training sessions.

- All operations will utilize a visual observer (VO).

## VI. OPERATION OF THE UNMANNED AIRCRAFT

### A. *Intended UAS Operations*

GGI intends to use the DJI Phantom 3 Proto perform forensic evaluations and building condition assessments.

GGI's operations will provide a superior level of safety. Please refer to sections *VI.B: Limitations of UAS Operations*, and *VII: Discussion Of Requested Exemption*, and attached document: GGI UAS Flight Manual (V1.0).

### B. *Limitations Of UAS Operations*

**Operation Conditions and Limitations – UAS Operations** *[Continued on next page]*

- *The speed of the DJI Phantom 3 Pro will not exceed 87 knots (100 miles per hour). The DJI Phantom 3 Pro will be operated at airspeeds greater than the maximum Unmanned Aircraft operating airspeed recommended by the manufacturer. [Section IV.A]*

- *The DJI Phantom 3 Pro will not be operated at an altitude of no more than 400 feet Above the Ground Level ("AGL"). [Section IV.A]*

- The DJI Phantom 3 Pro will be operated at an altitude of no more than 400 feet AGL.

- The DJI Phantom 3 Pro will be operated within the visual line of sight ("VLOS") of the PIC and VO at all times. The VO and PIC will be able to communicate verbally at all times. The PIC will ensure that the VO can perform the duties required of the VO.

- UAS operations will not be conducted during night, as defined in 14 CFR § 1.1. All operations will be conducted under visual meteorological conditions ("VMC").

- The DJI Phantom 3 Pro will not operate within 5 nautical miles of an airport having an operational control tower unless a letter of agreement with that airport's management is obtained or otherwise permitted by a Certificate Of Waiver or Authorization ("COA") issued to GGI.

- The DJI Phantom 3 Pro will 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.

- The PIC will abort the flight in the event of unpredicted obstacles or emergencies.

> **Operation Conditions and Limitations – UAS Operations**
>
> - The PIC will be prohibited from flying unless (considering wind and forecast weather conditions) there is enough available power for the UAS to conduct the intended operation and to operate after that for at least five minutes or with the reserve power recommended by the manufacturer if greater.
>
> - The DJI Phantom 3 Pro will remain clear and give way to all manned aviation operations and activities at all times.
>
> - The UAS will not be operated by the PIC from any moving device or vehicle.
>
> - 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 UAS and/or debris in the event of an accident. GGI will 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 UAS, flight operations will 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.
>
> - All operations will 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.

## VII. DISCUSSION OF REQUESTED EXEMPTIONS

### A. Title 24 CFR Part 21, Subpart H: Certification Procedures for Products and Parts, Airworthiness Certificates

The FAA has stated that no exemption is needed from this section if a finding is made under the Reform Act that the UAS selected provides an equivalent level of safety when compared to aircraft normally used for the same application. *See granted exemption to Astraeus Aerial, Docket No. FAA-2014-0352 at 13-14, 22*. If, however, the FAA determines that there are some characteristics of the chosen UAS that fail to meet the requirements of the Reform Act, an exemption is requested.

The UAS operated will have a gross weight less than 55 pounds and will be flown at speeds less than 87 knots (100 miles per hour). It will not carry a pilot or passengers, or flammable fuels and will be operated in well-defined locations using a PIC and a VO. All operations will be conducted in compliance with the limitations and conditions stated in this petition for exemption.

The characteristics and conditions under which the UAS will be operated, as outlined in this petition, given the size, weight, speed, operation capability and proximity to airports and populated areas, achieve or exceed the equivalent level of safety over a manned aircraft with an airworthiness certificate used for the purposes outlined in this petition.

**B.    Title 14 CFR Parts 45.23(b) and 45.27(a): Aircraft Marking and Identification Requirements**

GGI seeks an exemption from the aircraft marking and identification requirements contained in Title 14 CFR Parts 45.23(b) and 45.27(a). In a previous grant of exemption, the FAA determined that exemption from these requirements was warranted, under the following conditions: the aircraft shall "*have identification (N-Number) markings in accordance with 14 C.F.R Part 45, Subpart C if the markings are as large as practicable.*" FAA Docket No. FAA-2014-0352.

**C.    Title 14 CFR Parts 61.113(a) and (b): Private Pilot Privileges and Limitations: Pilot in Command**

GGI seeks exemption from Title 14 CFR Parts 61.113(a) and (b) which restricts private pilot certificate holders from flying aircraft for compensation or hire and would also require a Class II medical certificate. The purpose of Part 61 is to ensure that the skill and competency of any PIC matches the airspace in which the PIC will be operating, as well as requiring certifications if the private pilot is carrying passengers or cargo for hire. In this case, while the UAS will be operated as part of a commercial operation, it carries neither passengers nor cargo.

In the Grant of Exemption to Astraeus Aerial, the FAA determined that the unique characteristics of UAS operation outside of controlled airspace did not warrant the addition cost and restrictions attendant with requiring a the PIC to have a Commercial Pilot Certificate and Class II medical certificate. The fulfillment of the additional requirements for a private pilot to become qualified as a commercial pilot would not lead to any additional safety benefits when UAS operations are involved. Furthermore, while helpful, a pilot license will not ensure remote control piloting skills. The risks associated with the operation of small UAS are far less than the risks associated with the commercial activities outlined in Title 14 CFR Parts 61.113 (a) and (b).

**D.    Title 14 CFR Part 91.7(a): Civil Aircraft Airworthiness**

GGI seeks an exemption from Title 14 CFR Part 91.7(a), which requires that a civil aircraft be in airworthy condition to be operated. The FAA has stated that no exemption is required for Title 14 CFR Part 91.7(a) to the extent that the requirements of Part 21 are waived or found inapplicable. *See Docket No. FAA-2014-0352 at 13-14, 22.*

**E.    Title 14 CFR Part 91.9(b)(2) and (c): Civil Aircraft Flight Manual in the Aircraft**

GGI seeks exemption from Title 14 CFR Part 91.9(b)(2) and (c). Given the small size and configuration of the UAS, it would be impossible to keep airworthiness documents and other aircraft manuals on board because there is simply no room, and the UAS has no cabin or cockpit.

The UAS flight manual, registration certificate, and other documentation will be kept at the control station with the operator during flight. This alternate method constitutes full compliance with the regulations.

### F.  Title 14 CFR Part 91.103: Preflight Action

GGI seeks an exemption from Title 14 CFR Part 91.103, which requires the PIC to become familiar with specific information before each flight, including information contained in the FAA-approved Flight Manual on board the aircraft.

The PIC will review information prior to flight to maintain the safety of the operation, including but not limited to, the weather, battery levels, landing and takeoff distances, and aircraft performance data. The PIC will refer to the manufacturer supplied UAS manual and GGI Flight Operations Manual for technical data and information as provided. The manual will be kept at the GCS during operations.

While the PIC will be familiar with all information necessary to safely conduct the flight, an exemption is requested to the extent that an FAA-approved Flight Manual is required.

### G.  Title 14 CFR Part 91.119: Minimum Safe Altitudes

GGI seeks an exemption from the minimum safe altitude requirements of Title 14 CFR Part 91.119. This section prescribes the minimum safe altitudes under which aircraft may not operate, including 500 feet above the surface and away from any person, vessel, vehicle, or structure in non-congested areas. *See Title 14 CFR Part 14 C.F.R. 91.119(c).*

Title 14 CFR Part 91.119(d) allows for a helicopter to operate at less than those minimum altitudes when it can be operated "*without hazard to persons or property on the surface*" provided that "*each person operating the helicopter complies with any routes or altitudes specifically prescribed for helicopters by the FAA.*" An exemption is required because the proposed UAS operations will occur below 400 feet AGL. Additionally, due the nature of the proposed operations, the PIC and/or VO may need to be less than 500 feet away from the UAS.

The UAS operated by GGI are far smaller than manned aircraft, such as rotorcraft and fixed winged aircraft. Additionally, the UAS do not carry a pilot or passengers, weigh less than 55 pounds, do not carry flammable fuel, will not exceed 87 knots (100 mph), and it will not be operated over non-participating persons. The UAS will be operated below 400 feet AGL with the use of a PIC and a VO to avoid risk to aircraft, persons and property. This provides an equivalent or greater level of safety than achieved with conventional aircraft currently performing similar operations.

### H.  Title 14 CFR Part 91.121: Altimeter Settings

GGI seeks an exemption from Title 14 CFR Part 91.121, which requires a person operating an aircraft to maintain cruising altitude or flight level by reference to an altimeter that is set to the elevation of the departure airport or barometric pressure. An exemption is required to the extent that the UASs do not have a barometric altimeter but rather GPS altitude display.

The operator will confirm the elevation of the launch site prior to launch. This will be compared to the GPS sensor or barometric sensor derived altitude as displayed on the UAS reading at the GCS. The operator will then determine the maximum permissible altitude to maintain flight below 400 feet AGL and will not exceed this altitude. The maximum permissible altitude will also be monitored and estimated by visual means through the use of the PIC and VO. This provides a level a safety equal to or exceeding the regulation.

### I. Title 14 CFR Part 91.151(a)(1): Fuel Requirements for Flight in Visual Flight Rules Conditions

GGI seeks an exemption from Title 14 CFR Part 91.151(a)(1): Fuel Requirements for Flight in Visual Flight Rules ("VFR") Conditions. The technological limitations on UAS battery power means that no meaningful flight operations can be conducted while still maintaining a 30-minute battery reserve. An exemption from the fuel requirements of Title 14 CFR Part 91.151(a) is therefore required.

The UAS flight will be terminated with at least 20% reserve power. This allows the UAS to return to its landing zone with adequate power remaining to conduct a safe and controlled landing. Given the UAS's size, weight, and speed, the UAS when operated with this limitation provides an equivalent or greater level of safety than manned aircraft represented by this regulation.

### J. Title 14 CFR Parts 91.203(a) and (b): Civil Aircraft: Certifications Required

Title 14 CFR Part 91.203(a) states that: "*No person may operate a civil aircraft unless it has [...] an appropriate and current airworthiness certificate.*" Furthermore, Title 14 CFR Parts 91.203(b) states that: "*No person may operate a civil aircraft unless the airworthiness certificate required by paragraph (a) of this section or a special flight authorization issued under §91.715 is displayed at the cabin or cockpit entrance so that it is legible to passengers or crew.*"

In regard to Title 14 CFR Part 91.203(a), an equivalent level of safety is achieved through the methods and characteristics as outlined in the request for exemption from Title 14 CFR Part 21, Subpart H.

In regard to Title 14 CFR Part 91.203 (b), the UAS does not carry a pilot or passengers, does not have a cabin or cockpit entrance, and does not have on-board storage in which to carry certification and registration documents. An equivalent level of safety will be achieved by maintaining the proper documentation at the GCS readily available. This alternate method constitutes full compliance with the regulations.

### K. Title 14 CFR Parts 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), 91.417(a) and (b): Maintenance and Inspections

GGI seeks an exemption from the maintenance inspection requirements contained in Title 14 CFR Parts 91.405(a), 91.407(a)(1) and (2), 91.417(a) and (b). These regulations specify maintenance and inspection standards in reference to Title 14 CFR Part 43. An exemption from these regulations is needed because Part 43 and these sections only apply to aircraft with an airworthiness certificate, which the UAS to be operated under this grant of exemption will not have.

The UAS will be maintained and inspected in accordance with the manufacturer-supplied manual and GGI UAS Pre-Flight & Maintenance Operations Log. This includes maintenance, overhaul, replacement and inspection requirements for the UAS. The PIC, prior to the first flight of the day and as deemed necessary otherwise, will undertake preflight inspection procedures in order to ensure the UAS is in a condition for safe operation. Discrepancies that may affect the safety of flight will be addressed and repaired if required. The PIC and GGI will maintain the UAS in a condition for safe operation.

Given the size, characteristics, and operating limitations of UAS as described herein, this provides a level of safety equivalent to or greater than manned aircraft performing similar operations.

## VIII.    PRIVACY

GGI's UAS operations will be conducted in accordance with applicable federal, state, or local laws regarding privacy. All operations shall be conducted over private or controlled-access property with permission from the land/building owner/controller or authorized representative. Permission from land owner/controller or authorized representative will be obtained for each flight to be conducted. Notification of inspection activities (including UAS operations) will be delivered via land/building owner/controller or authorized representative a minimum of 24 hours prior to inspection day/UAS operations.

# PHANTOM 3

## User Manual V1.2

2015.06

dji

# Using this manual

## Legends

⊘ Warning      ⚠ Important      ☼ Hints and Tips      📖 Reference

## Read Before the First Flight

Read the following documents before using the Phantom 3 Professional:
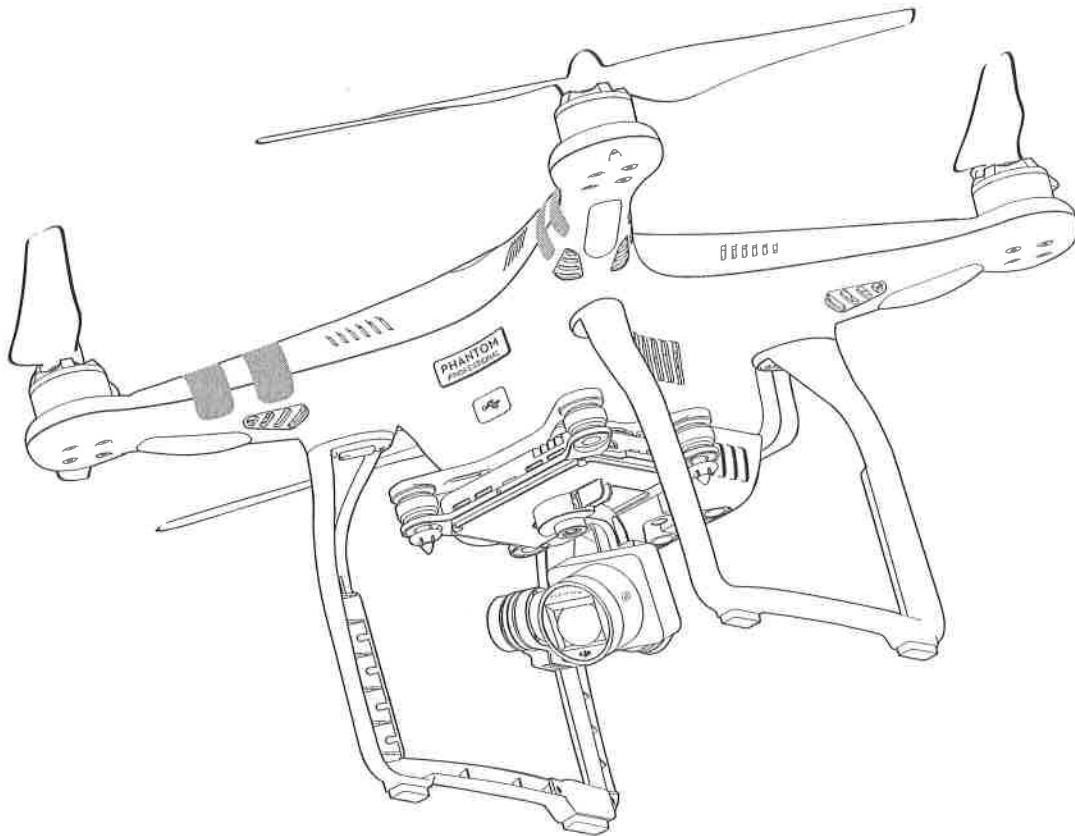
1. In the Box
2. Phantom 3 Professional User Manual
3. Phantom 3 Professional Quick Start Guide
4. Phantom 3 Professional / Advanced Safety Guidelines and Disclaimer
5. Phantom 3 Professional / Advanced Intelligent Flight Battery Safety Guidelines

We recommend that you watch all tutorial videos on the official DJI website and read the Disclaimer before you fly. Prepare for your first flight by reviewing the Phantom 3 Professional Quick Start Guide and refer to the User Manual for more detailed information.

## Video Tutorials

Please watch the tutorial videos at the link below, which demonstrates how to use Phantom 3 Professional safely:

http://www.dji.com/product/phantom-3/video

## Download the DJI Pilot app

Download and install the DJI Pilot app before using the aircraft. Scan the QR code to the right to download the latest version.

The Android version of the DJI Pilot app is compatible with Android 4.1.2 or later.
The iOS version of the DJI Pilot app is compatible with iOS 8.0 or later.

# Contents

## Camera and Gimbal

## DJI Pilot App

## Flight

## Troubleshooting (FAQ)

## Appendix

# Product Profile

This section introduces the Phantom 3 Professional and lists the components of the aircraft and remote controller.

# Product Profile

## Introduction

The Phantom 3 Professional represents the next generation of DJI quadcopters. It is capable of capturing 4K video and transmitting an HD video signal out of the box. The built-in camera has an integrated gimbal to maximize stability while minimizing both weight and size. Even when no GPS signal is available, the Vision Positioning System allows the aircraft to hover accurately in place.

## Feature Highlights

**Camera and Gimbal:** With the Phantom 3 Professional, you're shooting 4K video at up to 30 frames per second and capturing 12 megapixel photos that look crisper and cleaner than ever. An enhanced sensor gives you greater clarity, lower noise, and better pictures than any previous flying camera.

**HD Video Downlink:** The low-latency long range HD downlink is powered by an enhanced version of DJI Lightbridge.
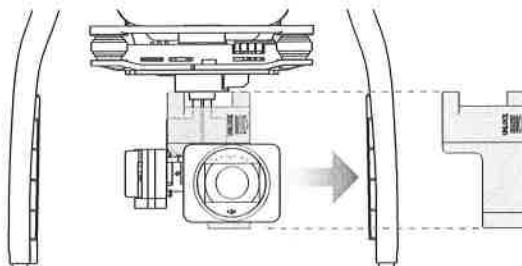
**DJI Intelligent Flight Battery:** The 4480 mAh DJI Intelligent Flight Battery features upgraded battery cells and an advanced power management system.

**Flight Controller:** The next-generation flight controller has been updated to provide a safer, more reliable flight experience. A newly implemented flight recorder stores critical data from each flight and the Vision Positioning System enhances hovering precision when flying indoors or in environments where GPS is unavailable.
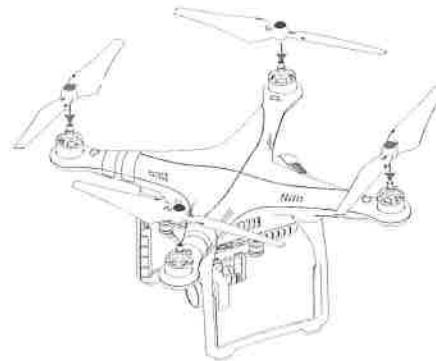
## Preparing the Aircraft

### Removing Gimbal Clamp

Remove the gimbal clamp by sliding it to the right (when facing the nose of the aircraft), as shown below.



### Attaching the Propellers:

Mount the propellers with black dots on to motors with black axes and spin counter-clockwise to secure. Mount the propellers with sliver dots on to motors with sliver axes and spin clockwise to secure. Be sure all propellers are securely in place.
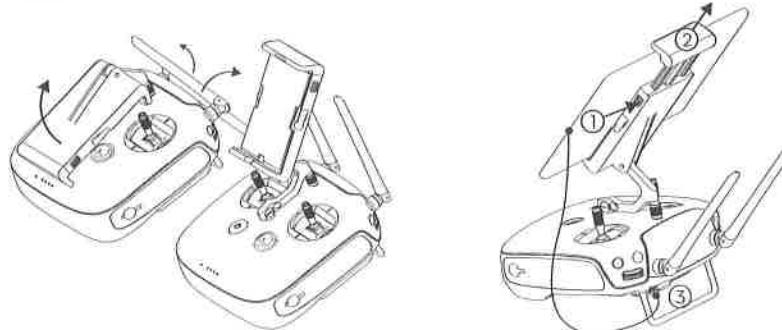


⚠ Place all propellers onto the correct motors and tighten by hand to lock them in position.
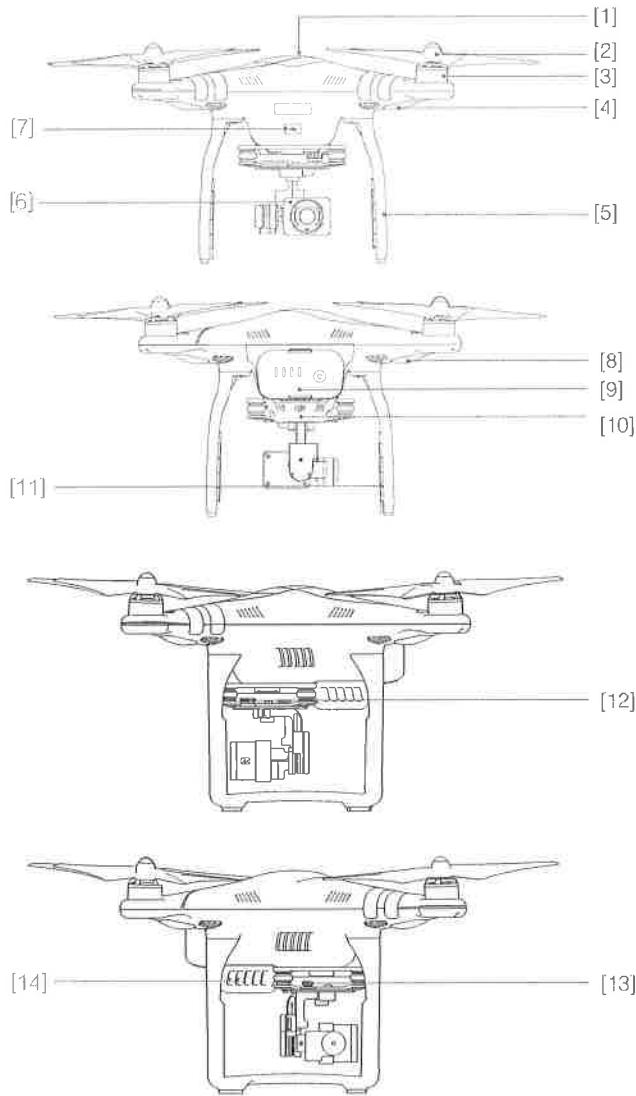
### Preparing the Remote Controller:

The mobile device holder is designed for securing tablet or mobile device. Tilt the mobile device holder to the desired position, then adjust the antennas so they are facing outward.

1. Press the button on the top right side of the mobile device holder to release the clamp, then adjust the clamp to fit the size of your mobile device.
2. Secure your mobile device in the clamp by pressing down, and connect your mobile device to the remote controller using a USB cable.
3. Plug one end of the cable into the mobile device, and the other end into the USB port on the back of the remote controller.
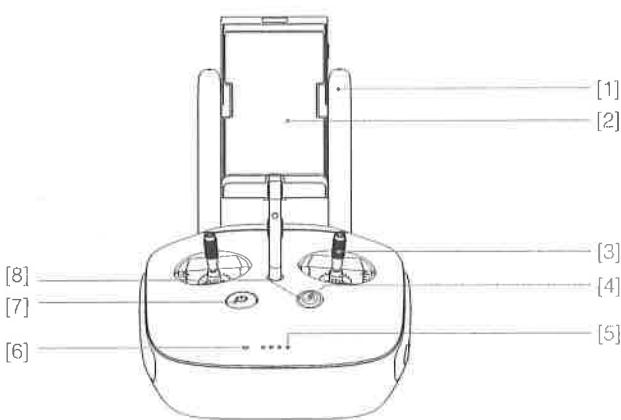
Product Profile

## Aircraft Diagram

[1] GPS

[2] Propeller

[3] Motor

[4] Front LED Indicator

[5] Landing gear

[6] Gimbal and Camera

[7] Aircraft Micro-USB Port

[8] Aircraft Status Indicator

[9] Intelligent Flight Battery

[10] Vision Positioning Sensors

[11] Antennas

[12] Camera Micro-SD Card Slot

[13] Camera Micro-USB Port

[14] Link Button

## Remote Controller Diagram

[1] **Antennas**

Relays aircraft control and video signal.

[2] **Mobile Device Holder**

Securely mounts your mobile device to the remote controller.

[3] **Control Stick**

Controls the orientation and movement of the aircraft.

[4] **Return Home (RTH) Button**

Press and hold the button to initiate Return to Home (RTH).

Product Profile

[5] Battery Level LEDs

Displays the battery level of the remote controller.

[6] Status LED

Displays the remote controller's system status.

[7] Power Button

Used to turn the remote controller on and off.

[8] RTH LED

Circular LED around the RTH button displays RTH status.

[9] Camera Settings Dial

Turn the dial to adjust camera settings. (Only functions when the remote controller is connected to a mobile device running the DJI Pilot app. )

[10] Playback Button

Playback the captured images or videos. (Only functions when the remote controller is connected to a mobile device running the DJI Pilot app.)

[11] Shutter Button

Press to take a photo. If burst mode is selected, the set number of photos will be taken with one press.

[12] Flight Mode Switch

Switch between P-mode, A-mode, and F-mode.

[13] Video Recording Button

Press to start recording video. Press again to stop recording.
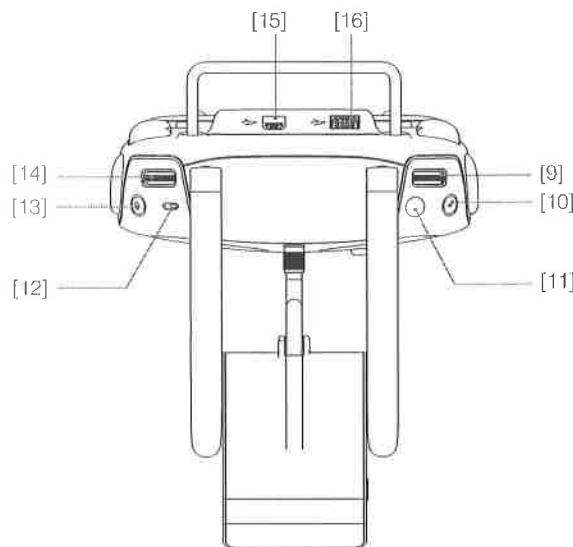
[17] C1 Button

Customizable through the DJI Pilot app.

[18] C2 Button

Customizable through the DJI Pilot app.

[19] Power Port

Connect to the DJI Phantom 3 Charger to charge the battery of the remote controller.
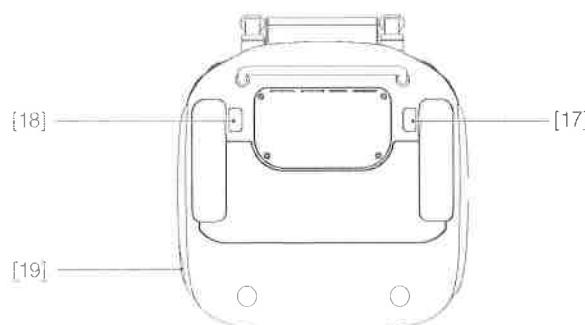
[14] Gimbal Dial

Use this dial to control the tilt of the gimbal.

[15] Mircro-USB Port

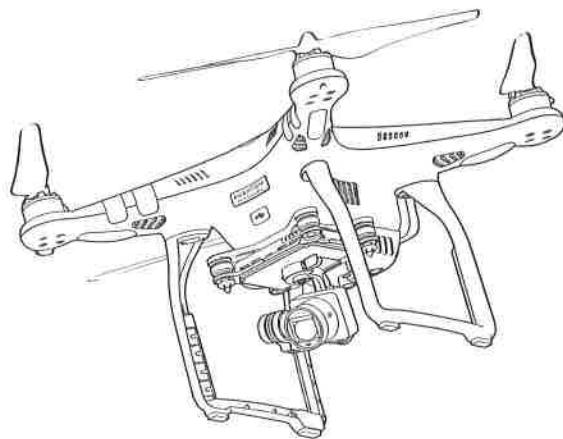Connect to a SD card reader to upgrade the firmware.

[16] USB Port

Connect to mobile device or to a USB port for firmware upgrade.

# Aircraft

This section introduces the features of the Flight Controller, Vision Positioning System, and the Intelligent Flight Battery

# Aircraft

## Flight Controller

The Phantom 3 Professional's flight controller features several important upgrades, including a new flight mode. Safety modes include Failsafe and Return-to-Home. These features ensure the safe return of your aircraft if the control signal is lost. The flight controller can also save critical flight data from each flight to the on-board storage device. The new flight controller also provides increased stability and a new air braking feature.

## Flight Mode

Three flight modes are available. The details of each flight mode are found below:

P-mode (Positioning) : P-mode works best when GPS signal is strong. There are three different states of P-mode, which will be automatically selected by the Phantom 3 Professional depending on signal strength of GPS and Vision Positioning sensors :

> P-GPS: GPS and Vision Positioning both are available. The aircraft is using GPS for positioning.
> P-OPTI: Vision Positioning is available but the GPS signal strength is not sufficient. The aircraft is using only the Vision Positioning System for positioning.
> P-ATTI: Neither GPS nor Vision Positioning is available. The aircraft is using only its barometer for positioning, so only altitude can be stabilized.

A-mode (Attitude): GPS and Vision Positioning System are not used for stabilization. The aircraft only uses its barometer. The aircraft can still automatically return to the home point if the control signal is lost and the Home Point was recorded successfully.

F-mode (Function): Intelligent Orientation Control (IOC) is activated in this mode. For more information about IOC, refer to the IOC section in the Appendix.

> ☀ Use the Flight Controller mode switch to change the flight mode of the aircraft, refer to the "Flight Mode Switch" on Page 26 for more information.

## Flight Status Indicator

The Phantom 3 Professional has Front LEDs and Aircraft Status Indicators. The positions of these LEDs are shown in the figure below:



Aircraft Status Indicator

Front LED

The Front LEDs show the orientation of the aircraft. The Front LEDs glow solid red when the aircraft is turned on to indicate the front (or nose) of the aircraft. The Aircraft Status Indicators communicate the system status of the flight controller. Refer to the table below for more information about the Aircraft Status Indicators:

## Aircraft Status Indicator Description

### Normal

| | |
|---|---|
| (R)(G)(Y) ······ Red, Green and Yellow Flash Alternatively | Turning On and Self Diagnostic Testing |
| (G)(Y) ······ Green and Yellow Flash Alternatively | Warming Up |
| (G) ······ Green Flashes Slowly | Safe to Fly (P-mode with GPS and Vision Positioning) |
| (G) X2 ······ Green Flashes Twice | Safe to Fly (P-mode with Vision Positioning but without GPS) |
| (Y) ······ Yellow Flashes Slowly | Safe to Fly (A-mode but No GPS and Vision Positioning) |

### Warning

| | |
|---|---|
| (Y) ······ Fast Yellow Flashing | Remote Controller's Signal Lost |
| (R) ······ Slow Red Flashing | Low Battery Warning |
| (R) ······ Fast Red Flashing | Critical Battery Warning |
| (R) ······ Red Flashing Alternatively | IMU Error |
| (R) —— Solid Red | Critical Error |
| (R)(Y) ······ Red and Yellow Flash Alternatively | Compass Calibration Required |

## Return-to-Home (RTH)

The Return-to-Home (RTH) function brings the aircraft back to the last recorded Home Point. There are three types of RTH procedures: Smart RTH, Low Battery RTH, and Failsafe RTH. This section describes these three scenarios in detail.

| 📖 | GPS | Description |
|---|---|---|
| Home Point | 📡ıll | If a strong GPS signal was acquired before takeoff, the Home Point is the location from which the aircraft was launched. The GPS signal strength is indicated by the GPS icon ( 📡ıll ). The aircraft status indicator will blink rapidly when the home point is recorded. |

## Smart RTH

Use the RTH button on the remote controller (refer to <u>"RTH button" on page 26</u> for more information) or tap the RTH button in the DJI Pilot app and follow the on-screen instructions when GPS is available to initiate Smart RTH. The aircraft will then automatically return to the last recorded Home Point. You may use the remote controller's control sticks to control the aircraft's position to avoid a collision during the Smart RTH process. Press and hold the Smart RTH button once to start the process, and press the Smart RTH button again to terminate the procedure and regain full control of the aircraft.
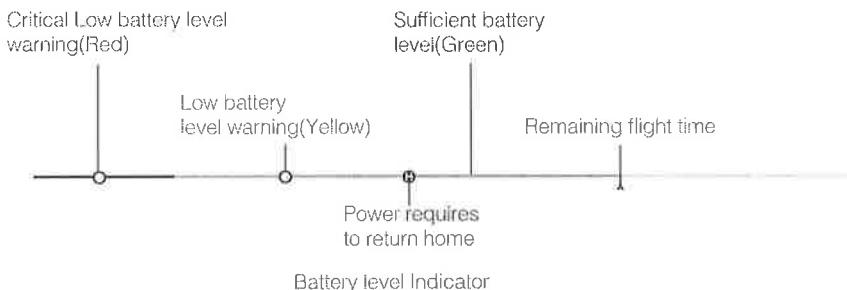
## Low Battery RTH

The low battery level failsafe is triggered when the DJI Intelligent Flight Battery is depleted to a point that may affect the safe return of the aircraft. Users are advised to return home or land the aircraft immediately when prompted. The DJI Pilot app will display a notice when a low battery warning is triggered. The aircraft will automatically return to the Home Point if no action is taken after a ten-second countdown. The user can cancel the RTH procedure by pressing the RTH button on the remote controller. The thresholds for these warnings are automatically determined based on the aircraft's current altitude and distance from the Home Point.

The aircraft will land automatically if the current battery level can only support the aircraft long enough to descend from its current altitude. The user can still use the remote controller to alter the aircraft's orientation during the landing process.

The Battery Level Indicator is displayed in the DJI Pilot app, and is described below:

Critical Low battery level warning(Red)

Sufficient battery level(Green)

Low battery level warning(Yellow)

Remaining flight time

Power requires to return home

Battery level Indicator

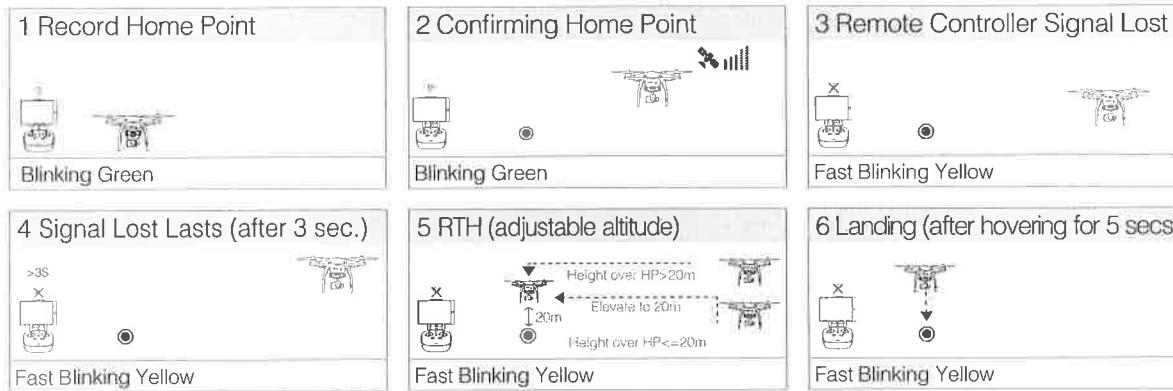| Battery Level Warning | Remark | Aircraft Status Indicator | DJI Pilot app | Flight Instructions |
|---|---|---|---|---|
| Low battery level warning | The battery power is low. Please land the aircraft. | Aircraft status indicator blinks RED slowly. | Tap "Go-home" to have the aircraft return to the 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. Remote controller will sound an alarm. | Fly the aircraft 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. | Aircraft status indicator blinks RED quickly. | The DJI Pilot app display will flash red and the aircraft will start to descend. The remote controller will sound an alarm. | Allow the aircraft to descend and land automatically. |
| Estimated remaining flight time | Estimated remaining flight based on current battery level. | N/A | N/A | N/A |

:⚪: • When Critical battery level warning is triggered and the aircraft begins to land automatically, you may push the throttle upward to make the aircraft hover at its current altitude, giving you an opportunity to navigate to a more appropriate landing location.
- The colored zones and markers on the battery level indicator bar reflect the estimated remaining flight time. They are automatically adjusted according to the aircraft's current location and status.

## Failsafe RTH

If the Home Point was successfully recorded and the compass is functioning normally, Failsafe RTH will be automatically activated if the remote controller signal is lost for more than three seconds. The Return-to-Home process may be interrupted and the operator may regain control of the aircraft if the remote controller signal connection is re-established.
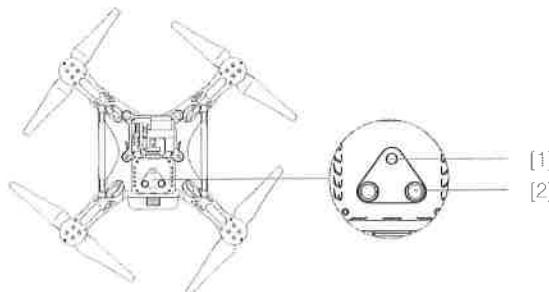
### Failsafe Illustration

| 1 Record Home Point | 2 Confirming Home Point | 3 Remote Controller Signal Lost |
|---|---|---|
| Blinking Green | Blinking Green | Fast Blinking Yellow |

| 4 Signal Lost Lasts (after 3 sec.) | 5 RTH (adjustable altitude) | 6 Landing (after hovering for 5 secs) |
|---|---|---|
| Fast Blinking Yellow | Fast Blinking Yellow | Fast Blinking Yellow |

⚠ • The aircraft cannot avoid obstruction during the Failsafe RTH, therefore, it is important to set an suitable Failsafe altitude before each flight. Launch the DJI Pilot app and enter "Camera" and select "MODE > Advanced Settings > Failsafe mode" to set the Failsafe altitude.
- The aircraft will stop its ascent and return to the Home Point immediately if the throttle stick is moved during the Failsafe RTH procedure.
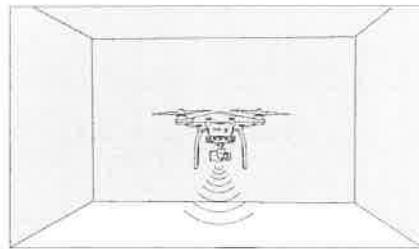
## Vision Positioning System

The DJI Vision Positioning System uses ultrasound and image data to help the aircraft maintain its current position. With the help of Vision Positioning, your Phantom 3 Professional can hover in place more precisely and fly indoors or in other environments where a GPS signal is not available. The main components of the Vision Positioning System are located on the bottom of your Phantom 3 Professional; they include [2] two ultrasonic sensors and [1] one monocular camera.
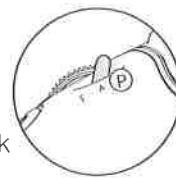
Using Vision Positioning

Vision Positioning is activated automatically when the Phantom 3 Professional is turned on. No further action is required. Vision Positioning is typically used in indoor environments, where GPS is unavailable. Using the sensors that are built into the Vision Positioning system, the Phantom 3 Professional can hover precisely even without GPS.



Follow the steps below to use Vision Positioning:

1. Toggle the flight mode switch to P-mode.
2. Place the aircraft on a flat surface. Note that the Vision Positioning system cannot work properly on surfaces without clear pattern variations.
3. Turn on the aircraft. The aircraft status indicator will flash green two times, which indicates the Vision Positioning system is ready. Gently push the throttle up to lift off and the aircraft will hover in place.

⚠ The performance of your Vision Positioning System is affected by the surface over which it is flying. The ultrasonic sensors may not be able to accurately measure distances when operating above sound-absorbing materials. In addition, the camera may not function correctly in suboptimal environments. The aircraft will switch from P-mode to A-mode automatically if neither GPS nor Vision Positioning System are available. Operate the aircraft with great caution in the following situations:
- Flying over monochrome surfaces (e.g. pure black, pure white, pure red, pure green).
- Flying over a highly reflective surfaces.
- Flying at high speeds(over 8 m/s at 2 meters or over 4 m/s at 1 meter).
- Flying over water or transparent surfaces.
- Flying over moving surfaces or objects.
- Flying in an area where the lighting changes frequently or drastically.
- Flying over extremely dark (lux < 10) or bright (lux > 100,000) surfaces.
- Flying over surfaces that can absorb sound waves (e.g. thick carpet).
- Flying over surfaces without clear patterns or texture.
- Flying over surfaces with identical repeating patterns or textures (e.g. tiles with the same design).
- Flying over inclined surfaces that will deflect sound waves away from the aircraft.

☀ • Keep the sensors clean at all times. Dirt or other debris may adversely affect the effectiveness of the sensors.
- Vision Positioning is only effective when the aircraft is at altitudes of 0.3 to 3 meters.
- The Vision Positioning System may not function properly when the aircraft is flying over water.
- The Vision Positioning System may not be able to recognize pattern on the ground in low light conditions (less than 100 lux).
- Do not use other ultrasonic devices with frequency of 40 KHz when Vision Positioning system is in operation.
- Vision Positioning System may not be able to stabilize the aircraft when flying close to the ground (below 0.5 meters) at fast speeds..

Aircraft

⊘ Keep the animals away from the aircraft when Vision Positioning system is activated. The sonar sensor emits high frequency sounds that are only audible to some animals.

## Flight Recorder

Flight data is automatically recorded to the internal storage of the aircraft. This includes flight telemetry, aircraft status information, and other parameters. To access these data, connect the aircraft to the PC through the Micro-USB port and launch the DJI Pilot app.
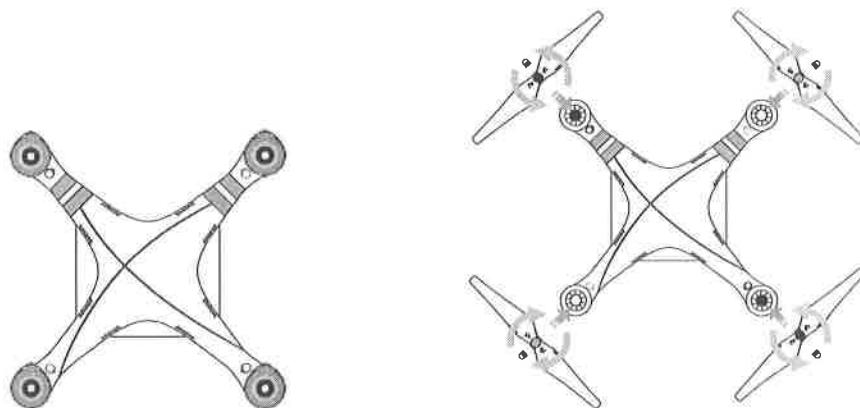
## Attaching and Detaching the Propellers

Use only DJI approved propellers with your Phantom 3 Professional. The grey and black nuts on the propeller indicate where they should be attached and in which direction whey should spin. To attach the propellers properly, match the nut color with the motor axis color.

| Propellers | Silver Dot | Black Dot |
|---|---|---|
| Figure | | |
| Attach On | Motors with a grey axes | Motors with a black axes |
| Legends | Lock : Turn the propellers in the indicated direction to mount and tighten. Unlock : Turn the propellers in the indicated direction to loosen and remove. | |

### Attaching the Propellers

1. Be sure to remove the warning stickers from the motors before attaching the propellers.
2. Attach the propellers with silver dots onto the motors with silver axes and spin the propellers clockwise to secure them in place. Attach the propellers with black dots onto the motors with black axes and spin the propellers counter-clockwise to secure them in place. Be sure to tighten each propeller by hand before flight.

⚠ • Ensure propellers are attached to its corresponding motors, otherwise the aircraft cannot take off.
   • Wear gloves when handling propellers.
   • Hand tighten each of the propellers on the corresponding motors to ensure it is attached firmly.
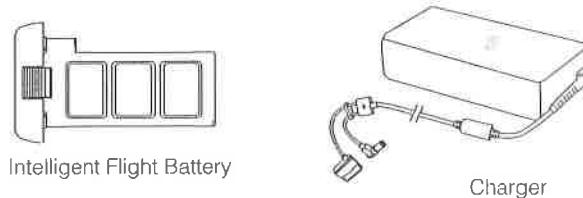
### Detaching the Propellers

Hold the motor in place with one hand, then spin the propeller in the indicated unlock direction.

⚠ • Check that the propellers and motors are installed correctly and firmly before every flight.
   • Ensure that all propellers are in good condition before each flight. DO NOT use aged, chipped, or broken propellers.
   • To avoid injury, STAND CLEAR of and DO NOT touch propellers or motors when they are spinning.
   • ONLY use original DJI propellers for a better and safer flight experience.

## DJI Intelligent Flight Battery

The DJI Intelligent Flight Battery has a capacity of 4480 mAh, a voltage of 15.2 V, and a smart charge/discharge functionality. It should only be charged using an appropriate charger that has been approved by DJI.



Intelligent Flight Battery                     Charger

⚠ The Intelligent Flight Battery must be fully charged before using it for the first time. Refer to "Charging the Intelligent Flight Battery" for more information.

☀ Be aware that the output power of the supplied Phantom 3 Professional charger is 100W.

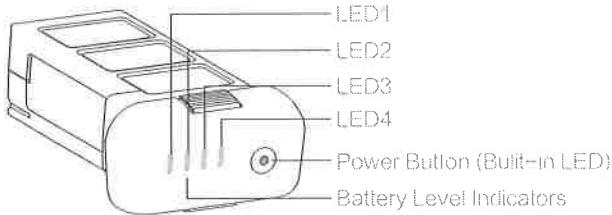### DJI Intelligent Flight Battery Functions

1. Battery Level Display: the LED indicators display the current battery level.
2. Battery Life Display: the LEDs display the current battery power cycle.
3. Auto-Discharging Function: To prevent swelling, the battery automatically discharges to below 65% of total power when it is idle for more than ten days. It takes around two days to discharge the battery to 65%. It is normal to feel moderate heat being emitted from the battery during the discharge process. Discharge thresholds can be set in the DJI Pilot app.
4. Balanced Charging: Automatically balances the voltage of each battery cell when charging.
5. Overcharge Protection: Charging automatically stops when the battery is fully charged.
6. Temperature Detection: The battery will only charge when the temperature is between 0°C (32°F) and 40°C (104°F).
7. Over Current Protection: The battery stops charging when high amperage (more than 8 A) is detected.
8. Over Discharge Protection: To prevent over-discharge damage, discharging automatically stops when the battery voltage reaches 12 V.
9. Short Circuit Protection: Automatically cuts the power supply when a short circuit is detected.

10. Battery Cell Damage Protection: The DJI Pilot app displays a warning message when a damaged battery cell is detected.
11. Battery Error History: Browse the battery error history in the DJI Pilot app.
12. Sleep Mode: To save power, the battery enters sleep mode after 20 minutes of inactivity.
13. Communication: Information pertaining to the battery's voltage, capacity, current, etc. is transmitted to the aircraft's main controller.

> ⚠ Refer to *Phantom 3 Professional / Advanced Intelligent Flight Battery Safety Guidelines* before use. Users take full responsibility for all operations and usage.

## Using the Battery



## Turning ON/OFF

**Turning On:** Press the Power Button once, then press again and hold for 2 seconds to turn on. The Power LED will turn red and the Battery Level Indicators will display the current battery level.

**Turning Off:** Press the Power Button once, then press again and hold for 2 seconds to turn off. The battery power LED will flash when powering off the Phantom to allow automatically stopping of a recording during the event recording wasn't stopped.

## Low Temperature Notice:

1. Battery capacity is significantly reduced when flying in low temperature (< 0°C) environments.
2. It is not recommended that the battery be used in extremely low temperature (< -10°C) environments. Battery voltage should reach the appropriate level when operating environment with temperatures between -10°C and 5°C.
3. End the flight as soon as the DJI Pilot app displays the "Low Battery Level Warning" in low temperature environments.
4. Keep the battery indoors to warm it before flying in low temperature environments.
5. To ensure optimal performance of the battery, keep the battery temperature above 20°C.
6. The charger will stop charging the battery if the battery cell's temperature is not within the operating range (0°C ~ 40°C ).

> ⚠ In cold environments, insert the battery into the battery compartment and allow the aircraft for approximately 1-2 minutes to warm up before taking off.

## Checking the Battery Level

The Battery Level Indicators display how much power remains. When the battery is turned off, press the Power Button once. The Battery Level Indicators will light up to display the current battery level. See below for details.

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

▯ : LED is on.      ▯ : LED is flashing.

▯ : LED is off.

| Battery Level | | | | |
|---|---|---|---|---|
| LED1 | LED2 | LED3 | LED4 | 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

Battery life refers to how many more times the battery can be discharged and recharged before it must be replaced. When the battery is turned off, press and hold the Power Button for 5 seconds to check the battery life. The Battery Level Indicators will light up and/or blink for two seconds, as shown below:

| Battery Life | | | | |
|---|---|---|---|---|
| LED1 | LED2 | LED3 | LED4 | Battery Life |
| ▯ | ▯ | ▯ | ▯ | 90%~100% |
| ▯ | ▯ | ▯ | ▯ | 80%~90% |
| ▯ | ▯ | ▯ | ▯ | 70%~80% |
| ▯ | ▯ | ▯ | ▯ | 60%~70% |
| ▯ | ▯ | ▯ | ▯ | 50%~60% |
| ▯ | ▯ | ▯ | ▯ | 40%~50% |
| ▯ | ▯ | ▯ | ▯ | 30%~40% |
| ▯ | ▯ | ▯ | ▯ | 20%~30% |
| ▯ | ▯ | ▯ | ▯ | below 20% |

⚠ When battery life reaches 0%, it can no longer be used.
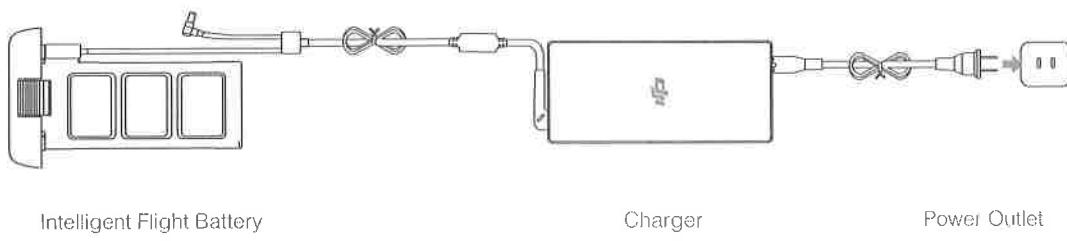
📖 For more information about the battery, launch the DJI Pilot app and check the information that is listed under the battery tab.

## Charging the Intelligent Flight Battery

1. Connect the Battery Charger to a power source (100-240 V 50/60 Hz).
2. Open the Protection Cap and connect the Intelligent Flight Battery to the Battery Charger. If the battery level is above 95%, turn on the battery before charging.
3. The Battery Level Indicator will display the current battery level as it is charging.
4. The Intelligent Flight Battery is fully charged when the Battery Level Indicators are all off.
5. Air-cool the Intelligent Flight Battery after each flight. Allow its temperature to drop to room temperature before storing it for an extended period.

⚠ • We do not recommend charging the Intelligent Flight Battery and remote controller with the standard charger at the same time, otherwise the charger may overheat.
   • Always turn off the battery before inserting it or removing it from the Phantom 3 Professional. Never insert or remove a battery when it is turned on.

Intelligent Flight Battery                    Charger                    Power Outlet

### Battery Level Indicators While Charging

| LED1 | LED2 | LED3 | LED4 | Battery Level |
|------|------|------|------|---------------|
| ☼ | ☐ | ☐ | ☐ | 0%~25% |
| ☼ | ☼ | ☐ | ☐ | 25%~50% |
| ☼ | ☼ | ☼ | ☐ | 50%~75% |
| ☼ | ☼ | ☼ | ☼ | 75%~100% |
| ☐ | ☐ | ☐ | ☐ | Fully Charged |

## Battery Protection LED Display

The table below shows battery protection mechanisms and corresponding LED patterns.

### Battery Level Indicators while Charging

| LED1 | LED2 | LED3 | LED4 | Blinking Pattern | Battery Protection Item |
|------|------|------|------|------------------|-------------------------|
| ☐ | ☼ | ☐ | ☐ | LED2 blinks twice per second | Over current detected |
| ☐ | ☼ | ☐ | ☐ | LED2 blinks three times per second | Short circuit detected |
| ☐ | ☐ | ☼ | ☐ | LED3 blinks twice per second | Over charge detected |
| ☐ | ☐ | ☼ | ☐ | LED3 blinks three times per second | Over-voltage charger detected |
| ☐ | ☐ | ☐ | ☼ | LED4 blinks twice per second | Charging temperature is too low |
| ☐ | ☐ | ☐ | ☼ | LED4 blinks three times per second | Charging temperature is too high |

After these issues are resolved, press the Power Button to turn off the Battery Level Indicator. Unplug the Intelligent Flight Battery from the charger and plug it back in to resume charging. Note that you do not need to unplug and plug in the charger in the event of a room temperature error; the charger will resume charging when the temperature is within the allowable range.

⚠  DJI does not take any responsibility for damage caused by third-party chargers.
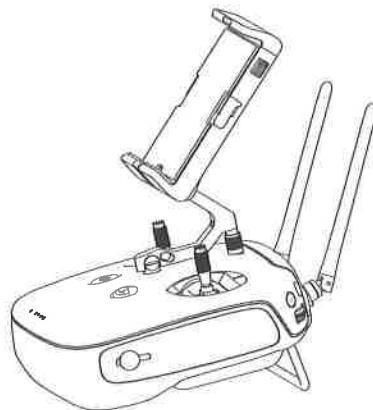
☀  How to discharge your Intelligent Flight Battery:
Slow : Place the Intelligent Flight Battery into the Phantom 3 Professional's Battery Compartment and turn it on. Leave it on until there is less than 8% of power left, or until the battery can no longer be turned on. Launch the DJI Pilot app to check battery levels.
Rapid : Fly the Phantom 3 Professional outdoors until there is less than 8% of power left, or until the battery can no longer be turned on.

Aircraft

# Remote Controller

This section describes the features of the remote controller and includes instructions for controlling the aircraft and the camera.

# Remote Controller

## Remote Controller Profile

The Phantom 3 Professional remote controller is a multi-function wireless communication device that integrates the video downlink system and aircraft remote control system. The video downlink and aircraft remote control system operate at 2.4 GHz. The remote controller features a number of camera control functions, such as taking and previewing photos and videos, as well as controlling gimbal motion. The remote controller is powered by a 2S rechargeable battery. The battery level is displayed via LED indicators on the front panel of the remote controller.

> • **Compliance Version:** The remote controller is compliant with both CE and FCC regulations.
> • **Operating Mode:** Control can be set to Mode 1 or Mode 2, or to a custom mode.
> • **Mode 1:** The right stick serves as the throttle.
> • **Mode 2:** The left stick serves as the throttle.
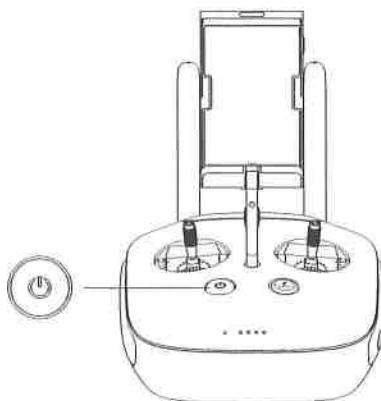
> ⚠ To prevent transmission interference, do not operate more than three aircrafts in the same area.

## Using the Remote Controller

### Turning the Remote Controller On and Off
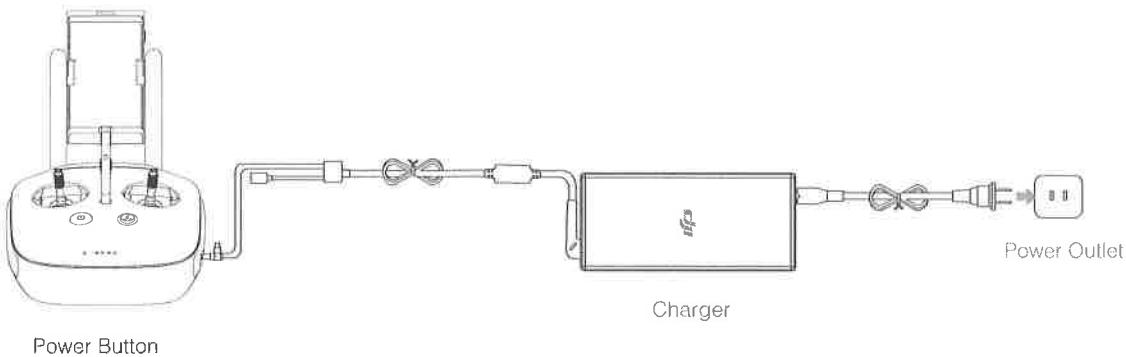
The Phantom 3 Professional remote controller is powered by a 2S rechargeable battery that has a capacity of 6000 mAh. The battery level is indicated via the Battery Level LEDs on the front panel. Follow the steps below to turn on your remote controller:

1. When the remote controller is turned off, press the Power Button once. The Battery Level LEDs will display the current battery level.
2. Press and hold the Power Button to turn on the remote controller.
3. The remote controller will beep when it is turned on. The Status LED will rapidly blink green, indicating that the remote controller is linking to the aircraft. The Status LEDs will glow solid green when linking is complete.
4. Repeat Step 2 to turn off the remote controller.
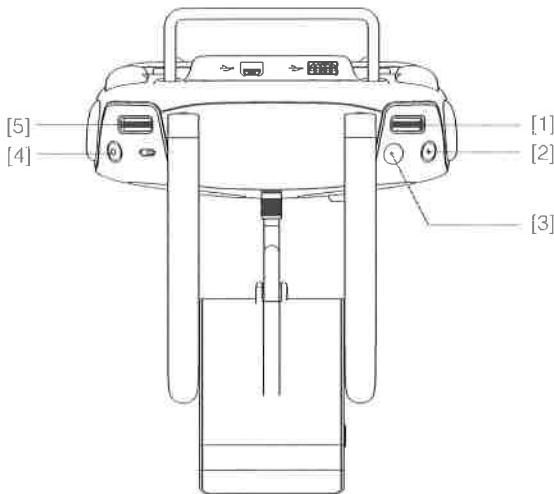


### Charging the Remote Controller

Charge the remote controller using the included charger. Refer to the figure on next page below for more details.

Power Outlet

Charger

Power Button

## Controlling the Camera

Shoot videos/pictures, view recorded images, and adjust camera settings via the Shutter Button, Camera Settings Dial, Playback Button, and Video Recording Button on the remote controller.



[1] Camera Settings Dial

Turn the dial to adjust camera settings such as ISO, shutter speed, and aperture without letting go of the remote controller. Move the dial to left or right to scroll through pictures and videos in playback mode. Press down on the dial to toggle between these settings.

[2] Playback Button

Press to view images and videos that have already been captured.

[3] Shutter Button

Press to take a photo. If burst mode is activated, multiple photos will be taken with a single press.

[4] Video Recoding Button

Press once to start recording video, then press again to stop recording.

[5] Gimbal Dial
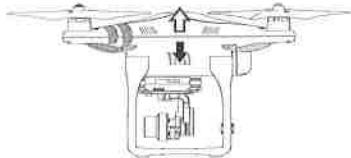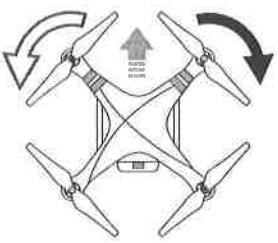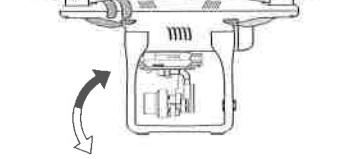
Use this dial to control the tilt of the gimbal.

## Controlling Aircraft

This section explains how to control the orientation of the aircraft through the remote controller. The Remote Control is set to Mode 2 by default.

Remote Controller

📖 Stick Neutral/Mid-Point: Control sticks are in the center position.
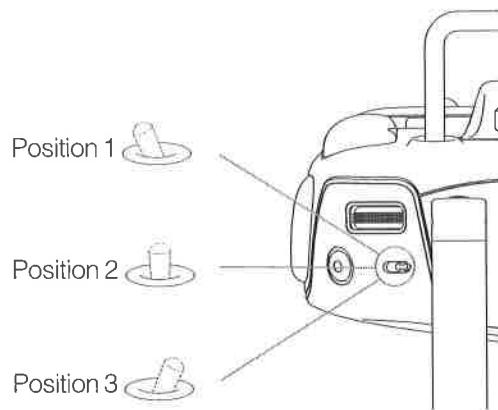Moving the Control Stick: The control stick is pushed away from the center position.

| Remote Controller (Mode 2) | Aircraft (● Indicates Nose Direction) | Remarks |
|---|---|---|
|  |  | Moving the left stick up and down changes the aircraft's elevation.<br>Push the stick up to ascend and down to descend. When both sticks are centered, the Phantom 3 Professional will hover in place.<br>The more the stick is pushed away from the center position, the faster the Phantom 3 Professional will change elevation. Always push the stick gently to prevent sudden and unexpected elevation changes. |
|  |  | Moving the left stick to the left or right controls the rudder and rotation of the aircraft.<br>Push the sick left to rotate the aircraft counter-clockwise, push the stick right to rotate the aircraft clockwise. If the stick is centered, the Phantom 3 Professional will maintain its current orientation.<br>The more the stick is pushed away from the center position, the faster the Phantom 3 Professional will rotate. |
|  |  | Moving the right stick up and down changes the aircraft's forward and backward pitch.<br>Push the stick up to fly forward and down to fly backward. Phantom 3 Professional will hover in place if the stick is centered.<br>Push the stick further away from the center position for a larger pitch angle (maximum 30°) and faster flight. |
|  |  | Moving the right stick control left and right changes the aircraft's left and right pitch.<br>Push left to fly left and right to fly right. The Phantom 3 Professional will hover in place if the stick is centered. |
|  |  | Gimbal 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 remain in its current position when dial is static. |

Remote Controller

Flight Mode Switch

Toggle the switch to select the desired flight mode. You may choose between; P-mode, F-mode and A-mode.

Position 1

| Position | Figure | Flight Mode |
|----------|--------|-------------|
| Position 1 | | F-mode |
| Position 2 | | A-mode |
| Position 3 | | P-mode |

Position 2

Position 3

P-mode (Positioning): P-mode works best when the GPS signal is strong. There are three different versions of P-mode, which will be automatically selected by the Phantom 3 Professional depending on GPS signal strength and the Vision Positioning sensors:

  P-GPS: GPS and Vision Positioning both are available; the aircraft is using GPS for positioning.

  P-OPTI: Vision Positioning is available but a sufficient GPS signal is not available. Aircraft is using only Vision Positioning for position holding.

  P-ATTI: Neither GPS nor Vision Positioning is available, the aircraft is using only its barometer for positioning, so only altitude is maintained.
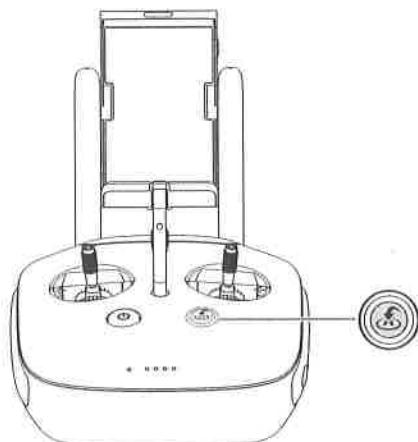
A-mode (Attitude): GPS and Vision Positioning System are not used for stabilization. The aircraft uses only its barometer to stabilize. The aircraft can automatically return to the Home Point if remote controller signal is lost and the Home Point was recorded successfully.

F-mode (Function): Intelligent Orientation Control (IOC) is activated in this mode. For more information about IOC, refer to the IOC section in the Appendix.

By default, the Flight Mode Switch is locked to P-mode. To unlock other flight modes, launch the DJI Pilot app, enter the "Camera" page, and tap "Mode", then activate "Multiple Flight Mode".
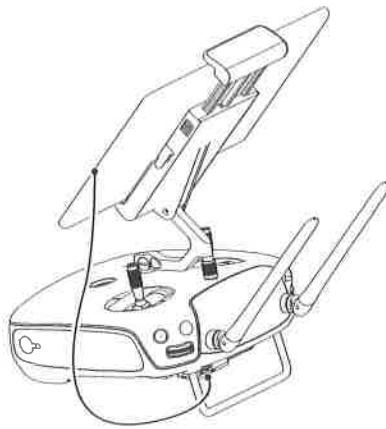
RTH Button

Press and hold the RTH button to start the Return-to-Home (RTH) procedure. The LED ring around the RTH Button will blink white to indicate that the aircraft is entering RTH mode. The aircraft will then return to the last recorded Home Point. Press this button again to cancel the RTH procedure and regain control of the aircraft.

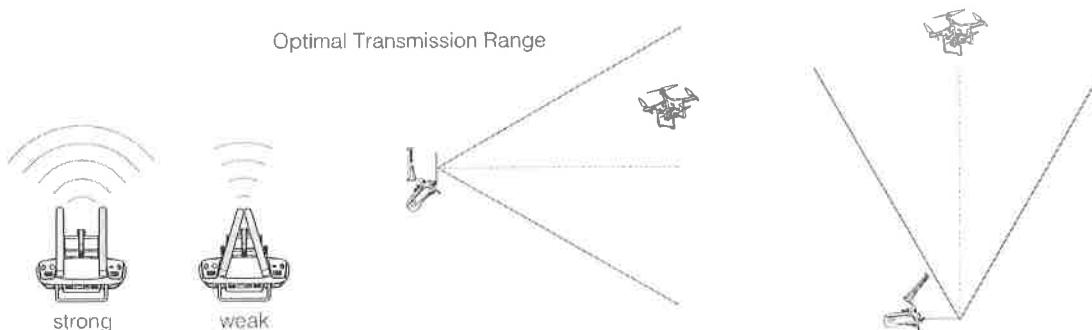## Connecting Your Mobile Device

Tilt the mobile device holder to the desired position. Press the button on the side of the mobile device holder to release the clamp, and then place your mobile device into the cradle. Adjust the clamp down to secure the mobile device. To connect your mobile device to the remote controller using a USB cable, plug one end of the cable into your mobile device and the other end into the USB port on the back of the remote controller.
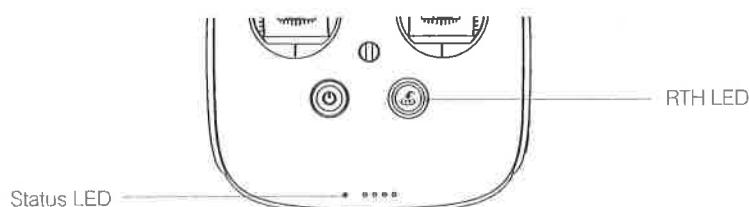


## Optimal Transmission Range

The transmission signal between the aircraft and the remote controller is most reliable within the area that is depicted in the image below:



Ensure that the aircraft is flying within the optimal transmission zone. To achieve the best transmission performance, maintain the appropriate relationship between the operator and the aircraft.

## Remote Controller Status LED

The Status LED reflects the strength of the connection between the remote controller and the aircraft. The RTH LED indicates the Return-to-Home status of the aircraft. The table below contains more information about these indicators.
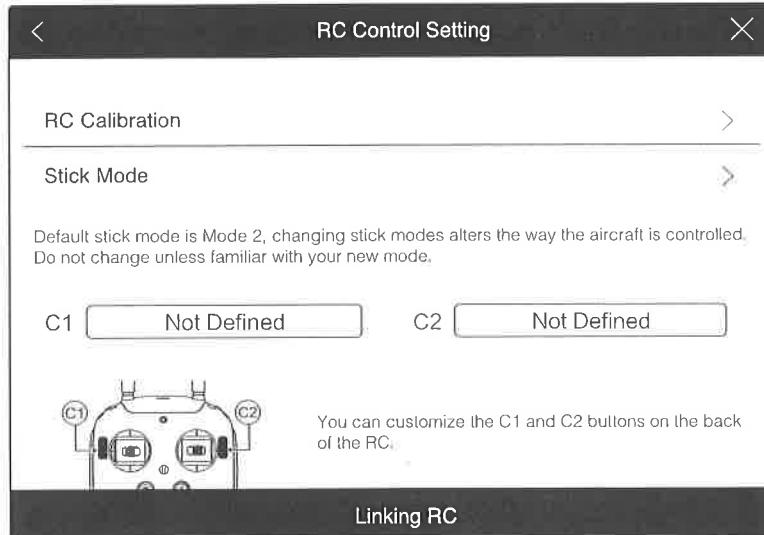
| Status LED | Alarm | Remote Controller Status |
|---|---|---|
| ⓡ — Solid Red | ♪ Chime | The remote controller is disconnected from the aircraft. |
| ⓖ — Solid Green | ♪ Chime | The remote controller is connected to the aircraft. |
| ⓡ······ Slow Blinking Red | D-D-D······ | Remote controller error. |
| ⓡ-ⓖ/ⓡ-ⓨ ······ Red and Green/ Red and Yellow Alternate Blinks | None | HD downlink is disrupted. |
| RTH LED | Sound | Remote Controller Status |
| ⓦ — Solid White | ♪ Chime | Aircraft is returning home. |
| ⓦ······ Blinking White | D · · · | Sending Return-to-Home command to the aircraft. |
| ⓦ······ Blinking White | DD ·· ·· ·· | Return-to-Home procedure in progress. |

⚠ The Remote Status Indicator will blink red and sound an alert, when the battery level is critically low.
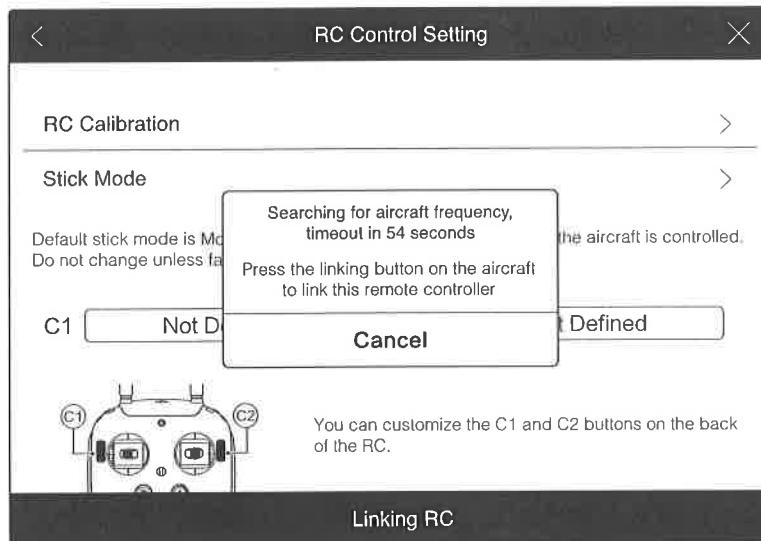
## Linking the Remote Controller

The remote controller is linked to your aircraft before delivery. Linking is only required when using a new remote controller for the first time. Follow these steps to link a new remote controller:

1. Turn on the remote controller and connect to the mobile device. Launch the DJI Pilot app.
2. Turn on the Intelligent Flight Battery.
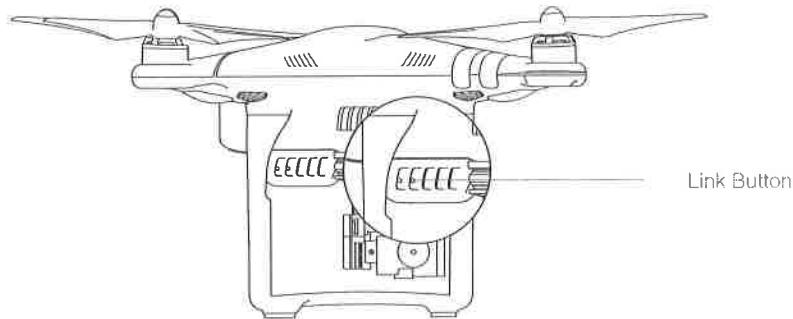3. Enter "Camera" and tap on 📡 ₁ₗₗ| and then tap "Linking RC" button as shown below.

4. The remote controller is ready to link. The Remote Controller Status Indicator blinks blue and a beep is emitted.



5. Locate the linking button on the side of the aircraft, as shown in the figure below. Press the link button to start linking. The Remote Controller Status Indicator LED will display a solid green once the remote controller is successfully linked to the aircraft.
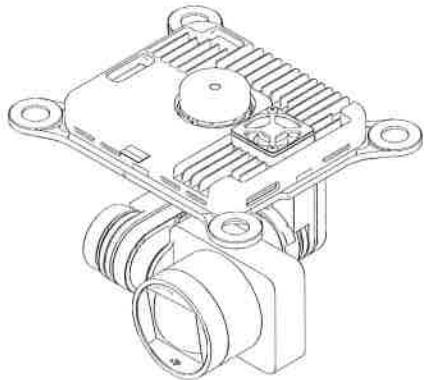


Link Button

⚠ • The remote controller will un-link itself from an aircraft if a new remote controller is linked to the same aircraft.

## Remote Controller Compliance Version

The remote controller is compliant with both CE and FCC requirements.

# Camera and Gimbal

This section provides the technical specifications of the camera and explains the gimbal's operation modes.
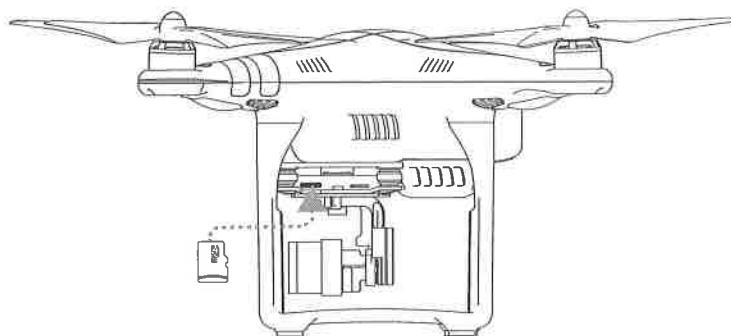
# Camera and Gimbal

The on-board camera uses the 1/2.3 inch CMOS sensor to capture video (up to 4096x2160p at 24fps or 4K at up to 30fps with the Phantom 3 Professional) and 12 megapixel stills. You may choose to record the video in either MOV or MP4 format. Available picture shooting modes include burst, continuous, and time-lapse mode. A live preview of what the camera sees can be monitored on the connected mobile device via the DJI Pilot app.

### Camera Micro-SD Card Slot

To store your photos and videos, insert the Micro-SD card into the slot, as shown below, before turning on the Phantom 3 Professional. The Phantom 3 Professional comes with a 16 GB Micro-SD card and supports Micro-SD cards up to 64 GB. A UHS-1 Micro-SD card is recommended due to their fast read and write speeds allowing you to save high-resolution video data.
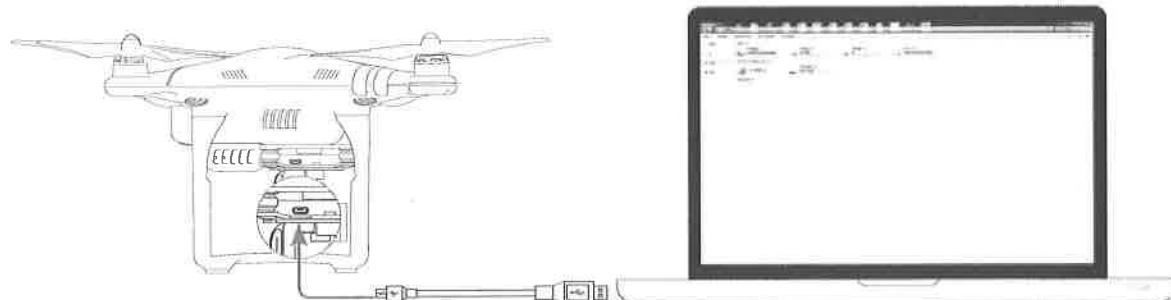


⊘    Do not remove the Micro-SD card from the Phantom 3 Professional when it is turned on.

### Camera Data Port

Turn on the Phantom 3 Professional and connect a USB cable to the Camera Data Port to download photos and videos to your computer.



⚠    The aircraft must be turned on before attempting to access the files on the Micro-SD card.

## Camera Operation

Use the Shutter and Video Recording buttons on the remote controller to shoot the images or videos through the DJI Pilot app. For more information about how to use these buttons, refer to "Controlling the Camera Page 24".

## 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.
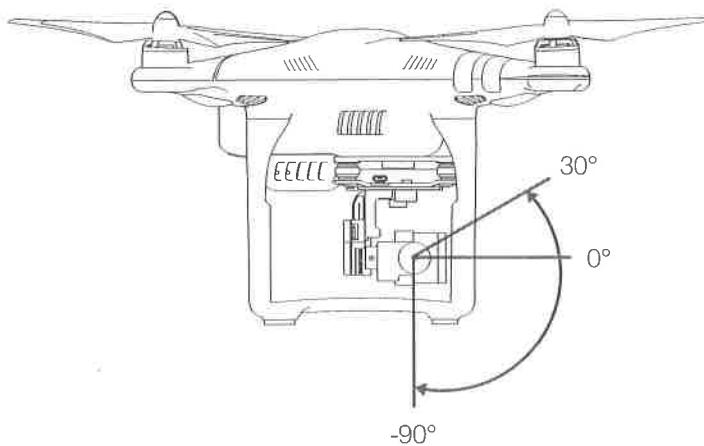
| Camera LED Indicator | Camera status |
|---|---|
| Ⓖ Green Fast Blink (0.2s off, 0.1s on ) | System is warming up. |
| Ⓖ Green Blink Once  (0.5s off, 0.4s on ) | Taking a single picture. |
| Ⓖ Green Blink 3 Times (0.3s off, 0.1s on ) | Taking 3 or 5 photos per shot. |
| Ⓡ Slow Red Blink (1.6s on, 0.8s off ) | Recording. |
| Ⓡ Fast Red Blink (0.5s off, 0.2s on ) | SD card error. |
| Ⓡ Ⓡ Double Red Blink (0.1s on, 0.1s off, 0.1s on, 0.1s off) | Overheated Camera |
| Ⓡ Solid Red | System error. |
| Ⓖ Ⓡ Green and Red Blink (0.8s green on, 0.8s red on) | Firmware Upgrading |

## Gimbal

### Gimbal Profile

The 3-axis gimbal provides a steady platform for the attached camera, allowing you to capture clear, stable images and video. The gimbal can tilt the camera within a 120° range.



Use the gimbal dial on the remote controller to control the tilt movement of the camera.

## Gimbal Operation Modes

Two gimbal operation modes are available. Switch between the different operation modes on the camera settings page of the DJI Pilot app. Note that your mobile device must be connected to the remote controller for changes to take effect. Refer to the table below for details:

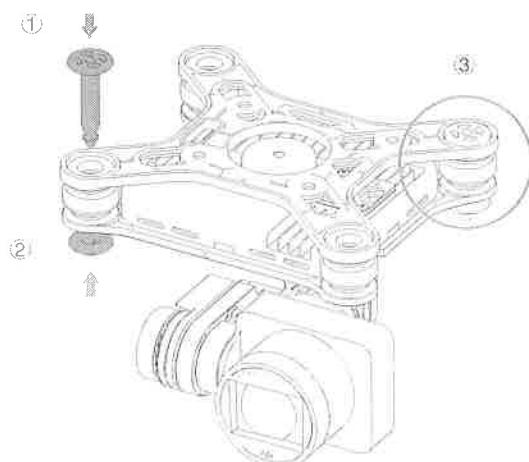| | | |
|---|---|---|
| | Follow Mode | The angle between gimbal's orientation and aircraft's nose remains constant at all times. |
| | FPV Mode | The gimbal will synchronize with the movement of the aircraft to provide a first-person perspective flying experience. |

⚠ • A gimbal motor error may occur in these situations: (1) the aircraft is placed on uneven ground or the gimbal's motion is obstructed (2) the gimbal has been subjected to an excessive external force, such as a collision. Please take off from flat, open ground and protect the gimbal at all times.
  • Flying in heavy fog or clouds may make the gimbal wet, leading to temporary failure. The gimbal will recover full functionality after it dries.

## Anti-Drop Kit

The anti-drop kit helps keep the gimbal and camera connected to the aircraft. Two pins have been mounted prior to shipping. If new or additional pins are required, see the diagram below. Press Part ① through the hole of the vibration absorber and into the center hole of Part ② , then lock them together as shown ③ . Mounting the anti-drop kit pins diagonally from each other is recommended.
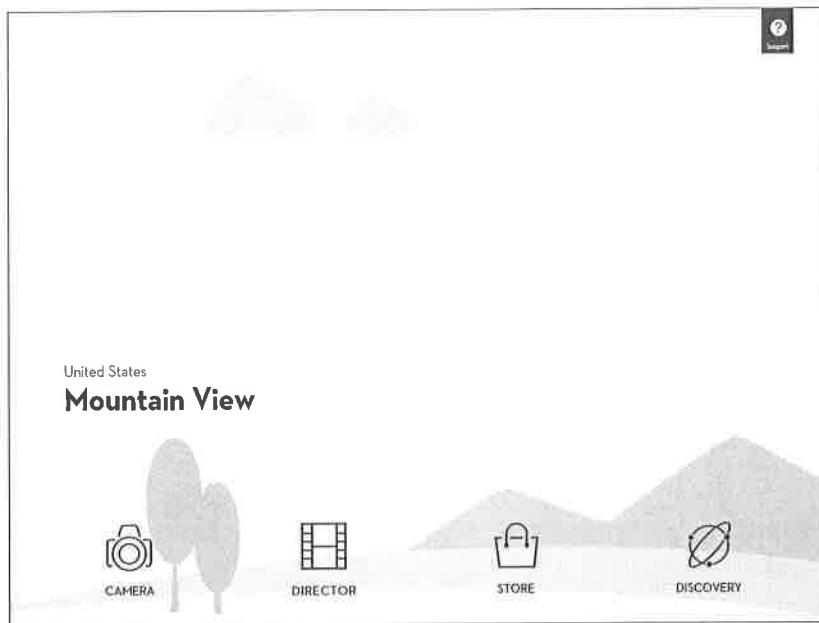
# DJI Pilot App

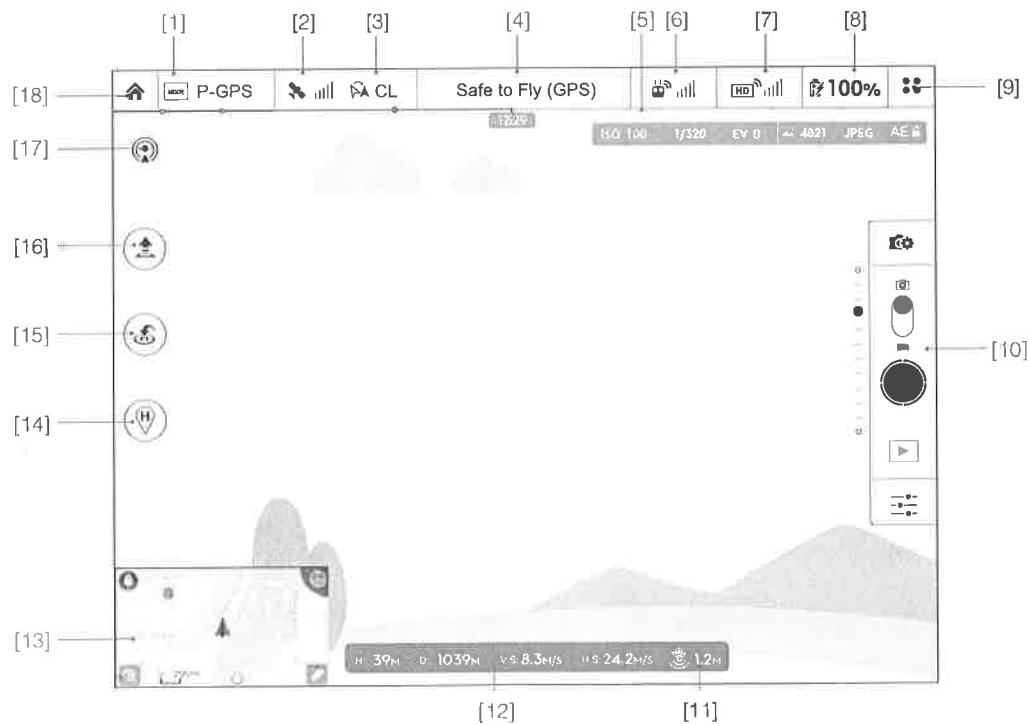This section introduces the four main functions of the DJI Pilot app.

# DJI Pilot App

The DJI Pilot app is a mobile application designed specifically for the Phantom 3 Professional. Use this app to control the gimbal, camera, and other aircraft functions. The app also features Map, Academy, and User Center, which are used for configuring your aircraft and sharing your photos and videos with others. It is recommended that you use a tablet for the best experience.



United States
**Mountain View**

CAMERA          DIRECTOR          STORE          DISCOVERY

## Camera

The Camera page contains a live HD video feed from the Phantom 3 Professional's camera. You can also configure various camera parameters from the Camera page.

[1] Flight Mode

MODE : The text next to this icon indicates the current flight mode.

Tap to configure the MC (Main Controller) Settings. These settings allow you to modify flight limits and set the gain values.

[2] GPS Signal Strength

⊷ılll: This icon shows the current strength of GPS signals. Green bars indicate adequate GPS strength.

[3] IOC Settings

⊱ CL : This icon displays the IOC setting when the aircraft has entered F-mode. Tap to view the IOC settings menu and select the desired IOC setting.

[4] System Status

Safe to Fly (GPS) : This icon indicates the current aircraft system status and GPS signal strength.

[5] Battery Level Indicator

—∘—∘—∘ : The battery level indicator provides a dynamic display of the battery level. The colored zones on the battery level indicator represent the power levels needed to carry out different functions.

[6] Remote Controller Signal

⛁ ılll : This icon shows the strength of remote controller's signal.

[7] HD Video Link Signal Strength

HD ılll : This icon shows the strength of the HD video downlink connection between the aircraft and the remote controller.

[8] Battery Level

🔋100%: This icon shows the current battery level.

Tap to view the battery information menu, set the various battery warning thresholds, and view the battery warning history.

[9] General Settings

⠿ : Tap this icon to view the General Settings page. From this page, you can set flight parameters, reset the camera, enable the quick view feature, adjust the gimbal roll value, and toggle the flight route display.

[10] Camera Operation Bar

Shutter and Recording Settings

📷 : Tap to enter various camera value settings, including color space for the recording, resolution of the videos, image size and so on.

Shutter

⏺ : Tap this button to take a single photo. Press and hold this button to select single shot, triple shot or time-lapsed shooting modes.

Record

⦿ : Tap once to start recording video, then tap again to stop recording. You can also press the Video Recording Button on the remote controller, which has the same functionality.

Playback

▶ : Tap to enter the playback page. You can preview photos and videos as soon as they are captured.

Camera Settings

⚏ : Tap to set ISO, shutter and auto exposure values of the camera.

[11] Vision Positioning

⚏ : This icon shows the distance between the surface and the Vision Positioning System's sensors.

[12] Flight Telemetry



The Vision Positioning Status icon is highlighted when the Vision Positioning is in operation.

Flight attitude is indicated by the flight attitude icon.
(1) The red arrow shows which direction the aircraft is facing.
(2) Light blue and dark blue areas indicate pitch.
(3) The angle of the boundary between the light blue and dark blue areas indicates the roll angle.

[13] Map

Display the flight path of the current flight. Tap to switch from the Camera GUI to the Map GUI.



[14] Dynamic Home Point

⦿ : Press this button to enable the dynamic home point feature, the home point then will be reset to position of the mobile device at specific time interval.

[15] Return to Home (RTH)

⦿ : Initiate RTH home procedure. Tap to have the aircraft return to the last recorded home point.

[16] Auto Takeoff/Landing

**⬆/⬇** : Tap to initiate auto takeoff or landing.

[17] Livestream

**⊙** : Livestream icon indicates the current video feed is broadcasting live on YouTube. Be sure the mobile data service is available on the mobile device.

[18] Back
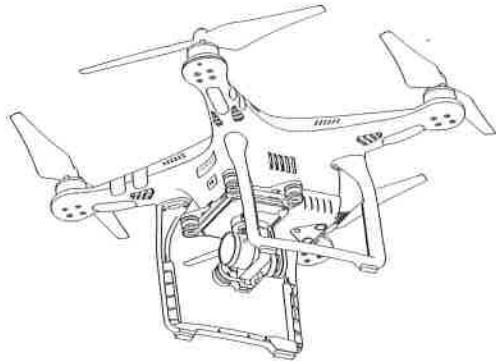
**⌂** : Tap to return to the main GUI.

## Director

Director is an automatic video editor built into the DJI Pilot app. After recording several video clips, simply tap "Director" from the app's home screen. You can then select a template and a specified number of clips, which are automatically combined to create a short film that can be shared immediately.

## Store

Tap "Store" to visit the official DJI Online Store to see the latest information about DJI products and easily buy new products.

## Discovery

Sync pictures and videos to your mobile device, view flight logs, and check your DJI account status in "Discovery". Use your registered DJI account to login to "Discovery".

DJI Pilot App

# Flight

This section describes safe flight practices and flight restrictions.

# Flight

Once pre-flight preparation is complete, it is recommended that you use the flight simulator in the DJI Pilot app to hone your flight skills and practice flying safely. Ensure that all flights are carried out in an open area.

## Flight Environment Requirements

1. Do not use the aircraft in severe weather conditions. These include wind speeds exceeding 10 m/s , snow, rain and fog.
2. Only fly in open areas. Tall structures and large metal structures may affect the accuracy of the on-board compass and GPS system.
3. Avoid obstacles, crowds, high voltage power lines, trees, and bodies of water.
4. Minimize interference by avoiding areas with high levels of electromagnetism, including base stations and radio transmission towers.
5. Aircraft and battery performance is subject to environmental factors such as air density and temperature.Be very careful when flying at altitudes greater than 19, 685 feet (6000 meters) above sea level, as the performance of the battery and aircraft may be affected.
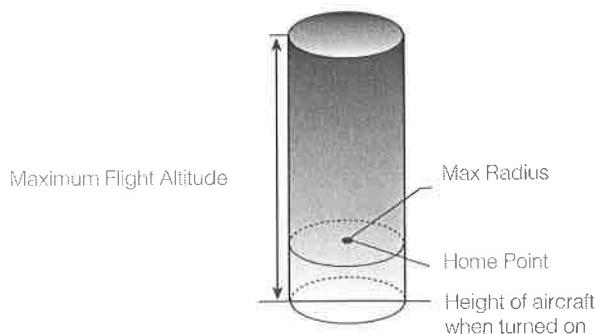6. The Phantom 3 Professional cannot operate within the polar areas.

## Flight Limits and No-Fly Zones

All unmanned aerial vehicle (UAV) operators should abide by all regulations set forth by government and regulatory agencies including the ICAO and the FAA. For safety reasons, flights are limited by default, which helps users operate this product safely and legally. Flight limitations include height limits, distance limits, and No-Fly Zones.

When operating in P-mode, height limits, distance limits, and No-Fly Zones function concurrently to manage flight safety. In A-mode, only height limits are in effect, which by default prevent the aircraft altitude from exceeding 1640 feet (500 m) .

### Maximum flight altitude & Radius Limits

Maximum flight altitude and radius limits may be changed in the DJI Pilot app. Be aware that the maximum flight altitude cannot exceed 1640 feet (500 meters). In accordance with these settings, your Phantom 3 Professional will fly in a restricted cylinder, as shown below:



Maximum Flight Altitude

Max Radius

Home Point

Height of aircraft when turned on

### GPS Signal Strong G ······ Blinking Green

|  | Flight Limits | DJI Pilot app | Aircraft Status Indicator |
|---|---|---|---|
| Maximum Flight Altitude | Aircraft's altitude cannot exceed the specified value. | Warning: Height limit reached. | None. |
| Max Radius | Flight distance must be within the max radius. | Warning: Distance limit reached. | Rapid red flashing ® ······ when close to the max radius limit. |

### GPS Signal Weak Y ······ Blinking Yellow

|  | Flight Limits | DJI Pilot app | Aircraft Status Indicator |
|---|---|---|---|
| Maximum Flight Altitude | Height is restricted to 400 feet. (120m) and under. | Warning: Height limit reached. | None. |
| Max Radius | No limits |  |  |

⚠
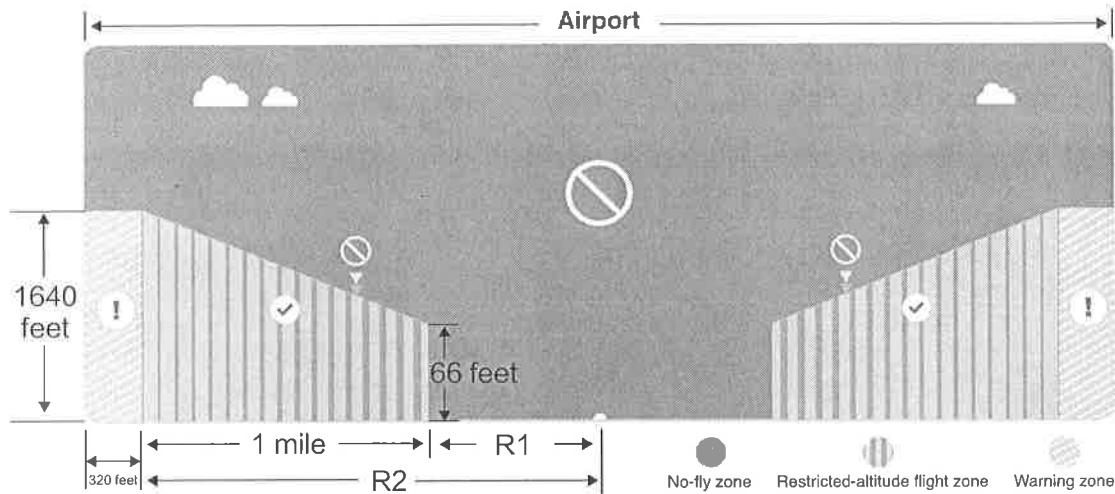- If you fly out of the limit, you can still control the Phantom 3, but cannot fly it any father. If the Phantom 3 flies out of the max radius in Ready to Fly (non-GPS) mode, it will fly back within range automatically.
- If the Phantom 3 flies out of the max radius in Ready to Fly (non-GPS) mode, it will fly back within range automatically.

## No-Fly Zones

All No-Fly Zones are listed on the DJI official website at http://flysafe.dji.com/no-fly. No-Fly Zones are divided into Airports and Restricted Areas. Airports include major airports and flying fields where manned aircraft operate at low altitudes. Restricted Areas include border lines between countries or sensitive institute. The details of the No-Fly Zones are explained as follow:
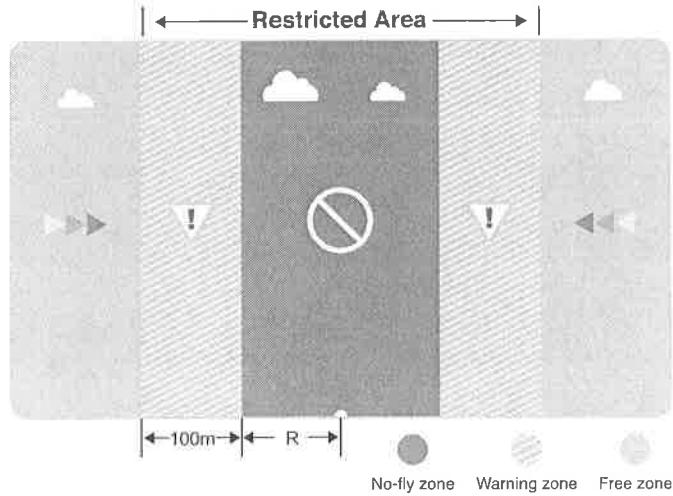
### Airport

(1) Airport No-Fly Zone are comprised of Take-off Restricted zones and Restricted Altitude Zones. Each zone features circles of various sizes.
(2) R1 miles (value of the R1 depends on the size and shape of the airport) around the airport is a Take-off restricted zone, inside of which take off is prevented.
(3) From R1 mile to R1 + 1 mile around the airport the flight altitude is limited to a 15 degree inclination. Starting at 65 feet (20 meters) from the edge of airport and radiating outward. The flight altitude is limited to 1640 feet (500 meters) at R1+1 mile
(4) When the aircraft enters within 320 feet (100 meters) of No-Fly Zones, a warning message will appear on the DJI Pilot app.

Airport

1640 feet

66 feet

320 feet

1 mile — R1 —

R2

No-fly zone    Restricted-altitude flight zone    Warning zone

Restricted Area

(1) Restricted Areas does not have flight altitude restrictions.
(2) R miles around the designated restriction area is a Take-off Restricted area. Aircraft cannot take off within this zone. The value of R varies based on the definition of the restricted areas.
(3) A "warning zone" has been set around the Restricted Area. When the aircraft approaches within 0.6 miles (1 km) of this zone, a warning message will appear on the DJI Pilot app.



Restricted Area

100m — R —

No-fly zone    Warning zone    Free zone

| GPS Signal Strong    G ······ Blinking Green | | | |
|---|---|---|---|
| Zone | Restriction | DJI Pilot App Prompt | Aircraft Status Indicator |
| No-fly Zone ● | Motors will not start. | Warning: You are in a No-fly zone. Take off prohibited. | ⓡ ······ Red flashing |
| | If the aircraft enters the restricted area in A-mode, but is switched to P-mode, the aircraft will automatically descend, land, and stop its motors. | Warning: You are in a no-fly zone. Automatic landing has begun. | |
| Restricted-altitude flight zone | If the aircraft enters the restricted area in A-mode, but is switched to P-mode, it will descend to an appropriate altitude and hover 15 feet below the altitude limit. | R1: Warning: You are in a restricted zone. Descending to safe altitude. R2: Warning: You are in a restricted zone. Maximum flight altitude is restricted to between 20m and 500m. Fly cautiously. | |
| Warning zone | No flight restriction applies, but there will be a warning . | 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.

⚠   • When flying in a safety zone, the aircraft's status indicator will blink red rapidly 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 blinking red.
   • For safety reasons, please do not fly close to airports, highways, railway stations, railway lines, city centers, or other sensitive areas. Fly the aircraft only within your line of sight.

Flight

## Preflight Checklist

1. Remote controller, Intelligent Flight Battery, and mobile device are fully charged.
2. Propellers are mounted correctly and firmly.
3. Micro-SD card has been inserted, if necessary.
4. Gimbal is functioning normally.
5. Motors can start and are functioning normally.
6. The DJI Pilot app is successfully connected to the aircraft.

## Calibrating the Compass

IMPORTANT: Always calibrate the compass in every new flight location. The compass is very sensitive to electromagnetic interference, which can produce abnormal compass data and lead to poor flight performance or flight failure. Regular calibration is required for optimal performance.
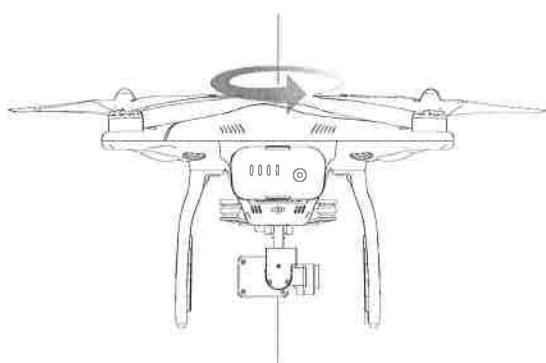
⊘
- Do not calibrate your compass where there is any possibility of strong magnetic interference. Sources of potential interference include magnetite, parking structures, and subterranean metal structures
- Do not carry ferromagnetic materials with you during calibration such as keys or cellular phones.
- Do not calibrate in direct proximity to large metal objects.
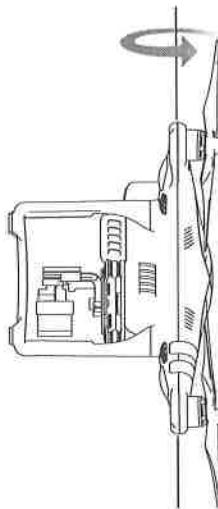- DO NOT calibrate indoors.

### Calibration Procedures

Choose an open area to carry out the following procedures.
1. Ensure that the compass is calibrated. If you did not calibrate the compass as part of your pre-flight preparations, or if you have moved to a new location since the last calibration, tap the Aircraft Status Bar in the app and select "Calibrate", then follow the on-screen instructions.
2. Hold the aircraft horizontally and rotate 360 degrees. The Aircraft Status Indicators will display a solid green light.

3. Hold the aircraft vertically, with nose pointing downward, and rotate it 360 degrees around the center axis. Recalibrate the compass if the Aircraft Status Indicator glows solid red.



Flight

⚠ If the Aircraft Status Indicator blinks red and yellow after the calibration procedure, move your aircraft to a different location and try again.

☼ Calibrate the compass before each flight. Launch the DJI Pilot app and follow the on-screen instructions to calibrate the compass. DO NOT calibrate the compass near metal objects such as a metal bridge, cars, scaffolding.

### When to Recalibrate

1.When compass data is abnormal and the Aircraft Status Indicator is blinking green and yellow.
2.When flying in a new location or in a location that is different from the most recent flight.
3.When the mechanical or physical structure of the Phantom 3 Professional has been changed.
4.When severe drifting occurs in flight, i.e. Phantom 3 Professional does not fly in straight line.

## Auto Takeoff and Auto Landing

Auto Takeoff
Use auto takeoff only if the Aircraft Status Indicators are blinking green. Follow the steps below to use the auto takeoff feature:
1. Launch the DJI Pilot app, and enter "Camera" page.
2. Ensure the aircraft is in P- mode.
3. Complete all steps on the pre-flight checklist.
4. Tap"▲", and confirm that conditions are safe for flight. Slide the icon to confirm and takeoff.
5. Aircraft takes off and hovers at (1.2 meters) above ground.

⚠ Aircraft Status Indicator blinks rapidly when it is using the Vision Position System for stabilization. The aircraft will automatically hover below 3 meters. It is recommended to wait until there is sufficient GPS lock before using the Auto Take-off feature.

Auto-Landing

Use auto-landing only if the Aircraft Status Indicators are blinking green. Follow the steps below to use the auto-landing feature:
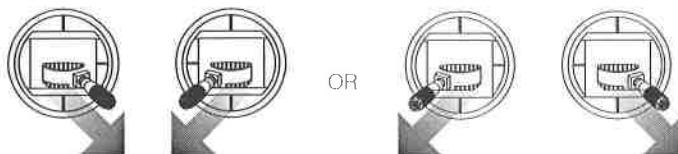
1. Ensure the aircraft is in P- mode.
2. Check the landing area condition before tapping "⬇", to begin landing. Then follow the on-screen instructions.

## Starting/Stopping the Motors

### Starting the Motors

A Combination Stick Command (CSC) is used to start the motors. Push both sticks to the bottom inner or outer corners to start the motors. Once the motors have started spinning, release both sticks simultaneously.
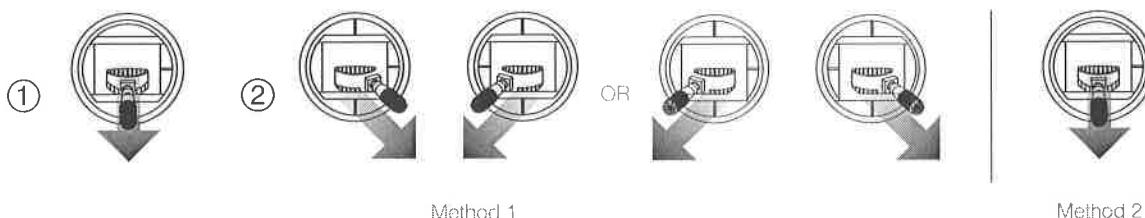


### Stopping the Motors

There are two methods to stop the motors.

Method 1: When Phantom 3 Professional has landed, push the throttle down①, then conduct the same CSC that was used to start the motors, as described above②. Motors will stop immediately. Release both sticks once motors stop.

Method 2: When the aircraft has landed, push and hold the throttle down. The motors will stop after three seconds.



Method 1                                             Method 2

⚠ Do not perform a CSC when the aircraft is in midair, otherwise the motors will suddenly stop.

## Flight Test

### Takeoff/Landing Procedures

1. Place the aircraft in an open, flat area with the battery level indicators facing towards you.
2. Turn on the remote controller and your mobile device, then turn on the Intelligent Flight Battery.
3. Launch the DJI Pilot app and enter the Camera page.
4. Wait until the Aircraft Indicators blink green. This means the Home Point is recorded and it is now safe to fly. If they flash yellow, the Home Point has not been recorded.
5. Push the throttle up slowly to take off or use Auto Takeoff.
6. Shoot photos and videos using the DJI Pilot app.
7. To land, hover over a level surface and gently pull down on the throttle to descend.
8. After landing, execute the CSC command or hold the throttle at its lowest position until the motors stop.
9. Turn off the Intelligent Flight Battery first, then the Remote Controller.

⚠ • When the Aircraft Status Indicators blink yellow rapidly during flight, the aircraft has entered Failsafe mode.
- A low battery level warning is indicated by the Aircraft Status Indicators blinking red slowly or rapidly during flight.
- Watch our video tutorials for more flight information.

## Video Suggestions and Tips

1. Go through the full pre-flight checklist before each flight.
2. Select the desired gimbal operation mode in the DJI Pilot app.
3. Only shoot video when flying in P-mode.
4. Always fly in good weather and avoid flying in rain or heavy wind.
5. Choose the camera settings that suit your needs. Settings include photo format and exposure compensation.
6. Perform flight tests to establish flight routes and preview scenes.
7. Push the control sticks gently to keep the aircraft's movement smooth and stable.

Flight

# FAQ

# Troubleshooting (FAQ)

**What is the difference between the Phantom 3 Professional and the Phantom 3 Advanced?**

The biggest difference between the Phantom 3 Professional and the Phantom 3 Advanced is in the camera. The Phantom 3 Professional is capable of shooting spectacular 4K video at up to 30 frames per second, and the Phantom 3 Advanced is capable of shooting at resolutions up to 1080p60. Both models shoot 12 megapixel photos.

The other main difference is the Intelligent Flight Battery charger. The Phantom 3 Advanced comes with a 57-watt charging unit and the Phantom 3 Professional comes with a 100-watt charger, the latter of which allows for shorter charging times.

**Can I remove the camera and attach my own?**

No. The cameras that come with both models are permanently attached. Attempting to remove, replace, or modify the camera may damage the product and will void your warranty.

**Can I charge my Remote Controller and Intelligent Flight Battery at the same time?**

While the Remote Controller charger and Intelligent Flight Battery charger have been integrated into one unit for your convenience, it is recommended that you only charge one item at a time. We recommend that you never charge both items using the same charger at the same time.

**What are the buttons on the back of my Remote Controller for?**

The two buttons on the back of the Remote Controller can be customized and assigned to function as you choose through the DJI Pilot app. Refer to the manual for more information.

**How far can I fly my Phantom 3?**

The signal transmission distance will vary depending on environmental conditions, but the Phantom 3 series can reach distances of up to 1.2 miles (2 kilometers) away from the pilot.

**What app should I use with my Phantom 3?**

The Phantom 3 is compatible with the DJI Pilot app for iOS and Android, which is already used with the DJI Inspire. The app will detect which aircraft is connected and automatically adjust accordingly.

**Which mobile devices are compatible with the app?**

The DJI Pilot app is only compatible with devices running iOS 8.0 or later or Android v4.1.2 or later.

The following devices are recommended:

iOS: iPhone 5s, iPhone 6, iPhone 6 Plus, iPad Air, iPad Air Wi-Fi + Cellular, iPad mini 2, iPad mini 2 Wi-Fi + Cellular, iPad Air 2, iPad Air 2 Wi-Fi + Cellular, iPad mini 3, and iPad mini 3 Wi-Fi + Cellular. This app is optimized for iPhone 5s, iPhone 6, and iPhone 6 Plus

Android: Samsung S5, Note 3, Sony Z3 EXPERIA, Google Nexus 7 II, Google Nexus 9, Mi 3, Nubia Z7 mini

Support for additional Android devices will become available as testing and development continues.

**How do I use the Director automatic video editor?**

Director is an automatic video editor built into the DJI Pilot app. After recording several video clips, simply tap "Director" from the app's home screen. You can then select a template and a specified number of clips, which are automatically combined to create a short film that can be shared immediately.

**How do I change the control mode of my Phantom 3?**

By default, the Remote Controller is set to Mode 2. This means that the right control stick controls the movement of the aircraft and the left control stick controls the throttle and orientation of the aircraft. These controls can be changed to Mode 1 or set to a customized configuration in the DJI Pilot app. This is only recommended for advanced users.

**Can I use a Phantom 2 Remote Controller with the Phantom 3?**

No. The Phantom 2 Remote Controller operates on a different frequency. The Phantom 2 Remote Controller operates at 5.8 GHz and the new Phantom 3 Remote Controller operates at 2.4 GHz.

**Can I use a Phantom 2 Intelligent Flight Battery with the Phantom 3?**

No. The Phantom 3 uses a newly designed Intelligent Flight Battery with greater power. The Phantom 3 has a 4 cell battery with a capacity of 4480 mAh and a voltage of 15.2 V.

**My Phantom 3 does not turn off right away, is something wrong?**

This is normal. After you attempt to power off the Intelligent Flight Battery, it may remain on for a few seconds as any video data is saved to the Micro SD card. This helps prevent your data from being lost or corrupted.

**Do I have to buy the Remote Controller separately?**

No, there is no need to buy a separate Remote Controller. Your Phantom 3 comes with a Remote Controller that is already linked to the aircraft.

**Does my Phantom 3 support dual Remote Controllers?**

No. The included Remote Controller can be used to control both the aircraft and the gimbal tilt at the same time.

**What does the "P, A, F" switch on the Remote Controller do?**

This switch, called the Flight Mode Switch, allows you to toggle different flight modes:

P-mode, or Positioning mode, indicates that both GPS and the Vision Positioning System are active and your Phantom 3 will attempt to stabilize using both.

In A-mode, or Attitude mode, the aircraft does not use GPS or the Vision Positioning System. Only the barometer is used for stabilization. The aircraft can still return to the Home Point as long as a sufficient GPS signal is available.

F-mode, or Function mode, activates Intelligent Orientation Control (IOC) functionality. Refer to the IOC section in the Appendix of the User Manual.

By default, only P-mode may be used. Refer to your user manual for instructions on unlocking the other modes.

**What is the Phantom 3 flight time?**

Flight times will vary depending on environmental conditions and usage patterns, but the Intelligent Flight Battery is designed to provide up to 23 minutes of uninterrupted flight time when fully charged.

**How can I restore a video file if the power is turned off during recording?**

Do not remove the Micro-SD card from the camera. If it has been removed, place it back in the camera. Turn the Phantom 3 on and wait approximately 30 seconds as the video file is restored.

**How can I ensure that my pictures and videos will be synchronized to my iOS album?**

You may need to adjust the settings of your mobile device. Open the Settings menu, select the Privacy tab, select the Photos tab, and then toggle the switch next to the DJI Pilot app icon. If the Pilot app has not been granted access to your albums, the photos and videos cannot be synchronized.

**What should I do to land my Phantom 3 smoothly as possible?**

Hover the aircraft over a flat, level surface. Slowly pull the throttle stick down until the aircraft touches the ground.

**Why is the discharge time of the battery not zero, even though I have never used it?**

Every battery is tested prior to being packaged and shipped. This affects the discharge time of a new battery and is the reason that the discharge time is not zero. The battery is safe to use.

**Can the mobile device holder be used on the Phantom 2 series Remote Controller?**

No, it cannot.

**How to safely operate the aircraft when encountering compass error?**

A compass error may occur when the aircraft is flying close to strong electric magnetic sources (e.g. power transmission lines). Aircraft Status Indicators blink red and yellow rapidly when a compass error occurs and the DJI Pilot app will display one of the following messages:

• Compass error, calibration required

  This warning message indicates the aircraft is receiving abnormal compass readings. It is recommended to power off the aircraft and re-calibrate the compass at a different location and then resume the flight.

• Compass error, exit P-GPS Mode

  This warning message indicates that the aircraft is drifting severely. Bring the aircraft to a higher altitude to gain enough GPS satellite locks when this warning message is prompted. The flight controller will automatically adjust the orientation of the aircraft in the midair to mitigate the drifts. The aircraft will switch back to P-GPS mode when the automatic adjustment is completed.

# Appendix

# Appendix

## Specifications

### Aircraft

| | |
|---|---|
| Weight (Battery & Propellers Included) | 1280 g |
| Max. Ascent Speed | 5 m/s |
| Max. Descent Speed | 3 m/s |
| Max. Speed | 16 m/s (ATTI mode, no wind) |
| Max. Flight Altitude | 6000 m |
| Max. Flight Time | Approximately 23 minutes |
| Operating Temperature | 0°C to 40°C |
| GPS Mode | GPS/GLONASS |

### Gimbal

| | |
|---|---|
| Controllable Range | Pitch: - 90° to + 30° |

### Vision Positioning

| | |
|---|---|
| Velocity Range | < 8 m/s (2 m above ground) |
| Altitude Range | 30 cm-300 cm |
| Operating Range | 30 cm-300 cm |
| Operating Environment | Brightly lit (lux > 15) patterned surfaces |

### Camera

| | |
|---|---|
| Sensor | Sony EXMOR 1/2.3"  Effective pixels:12.4 M (total pixels: 12.76 M) |
| Lens | FOV 94° 20mm(35mm format equivalent ) f/2.8 |
| ISO Range | 100-3200(video) 100-1600(photo) |
| Electronic Shutter Speed | 8s -1/8000s |
| Image Max. Size | 4000 x 3000 |
| Still Photography Modes | Single shot<br>Burst shooting: 3/5/7 frames<br>Auto Exposure Bracketing (AEB): 3/5<br>Bracketed frames at 0.7EV Bias<br>Time-lapse |
| Supported SD Card Types | Micro SD<br>Max. capacity: 64 GB. Class 10 or UHS-1 rating required |
| Video Recording Modes | UHD : 4096x2160p 24/25, 3840x2160p24/25/30<br>FHD:1920x1080p 24/25/30/48/50/60<br>HD:1280x720p 24/25/30/48/50/60 |
| Max. Bitrate Of Video Storage | 60 Mbps |
| Supported File Formats | FAT32/exFAT<br>Photo: JPEG, DNG<br>Video: MP4/MOV (MPEG-4 AVC/H.264) |
| Operating Temperature Range | 0°C to 40°C |

| Remote Controller | |
|---|---|
| Operating Frequency | 2.400 GHz-2.483 GHz |
| Transmitting Distance | 2000 m (Outdoor And Unobstructed) |
| Video Output Port | USB |
| Operating Temperature Range | 0°C- 40°C |
| Battery | 6000 mAh LiPo 2S |
| Mobile Device Holder | Tablets and smartphones |
| Transmitter Power(EIRP) | FCC: 20 dbm; CE:16 dbm |
| Working Voltage | 1.2 A @7.4 V |
| **Charger** | |
| Voltage | 17.4 V |
| Rated Power | 100 W |
| **Intelligent Flight Battery ( PH3-4480 mAh-15.2 V )** | |
| Capacity | 4480 mAh |
| Voltage | 15.2 V |
| Battery Type | LiPo 4S |
| Energy | 68 Wh |
| Net Weight | 365 g |
| Operating Temperature | -10°C- 40°C |
| Max. Charging Power | 100 W |

## Aircraft Status Indicator Description

| **Normal** | |
|---|---|
| ⊛R⊛G⊛Y ······ Red, Green and Yellow Flash Alternatively | Turning on and Self-Diagnostics |
| ⊛G⊛Y ····· Green and Yellow Flash Alternatively | Aircraft Warming Up |
| ⊛G ······ Green Flashes Slowly | Safe to Fly (P-mode with GPS and Vision Positioning) |
| ⊛G X2 ······ Green Flashes Twice | Safe to Fly (P-mode with Vision Positioning but without GPS) |
| ⊛Y ······ Yellow Flashes Slowly | Safe to Fly (A-mode but No GPS and Vision Positioning) |
| **Warning** | |
| ⊛Y ····· Fast Yellow Flashing | Remote Controller Signal Lost |
| ⊛R ······ Slow Red Flashing | Low Battery Warning |
| ⊛R ······ Fast Red Flashing | Critical Battery Warning |
| ⊛R ······ Red Flashing Alternatively | IMU Error |
| ⊛R —— Solid Red | Critical Error |
| ⊛R⊛Y ······ Red and Yellow Flash Alternatively | Compass Calibration Required |

## Intelligent Orientation Control (IOC)

IOC allows users to lock the control orientation of the aircraft in different modes. There are three working modes for IOC that can be selected in the DJI Pilot app. IOC only works when the aircraft is in F-mode, therefore the user must toggle the flight mode switch to activate IOC. Refer to the table below:

| | |
|---|---|
| Course Lock (CL) | The nose direction, at the time that CL is set, will remain the forward direction regardless of how the orientation and position of the aircraft changes. This will remain fixed until you reset it or exit CL mode. |
| Home Lock (HL)* | Record a Home Point (HP) and enter HL mode. The forward and backward controls will move the aircraft farther from and closer to the established Home Pont, regardless of how the orientation and position of the aircraft changes. |
| Point of Interest (POI)* | Point of Interest. Record a point of interest (POI). The aircraft can then circle around the POI and the nose will always points toward the POI. |

:Ö: *Home Lock and Point of Interest feature are coming soon.

### IOC Requirements

IOC is only available under the following conditions:

| Modes IOC | GPS enabled | GPS counts | Flight Distance Limits |
|---|---|---|---|
| Course Lock | No | None | None |
| Home Lock | Yes | ⚡ıl | Aircraft ←—≥10m—→ Home Point |
| POI | Yes | ⚡ıl | Aircraft ←5m~500m→ Point of Interest |

### Using IOC

Toggle the Flight Mode Switch F-mode and follow the instructions prompted on the DJI Pilot app to select the desired IOC mode.

## FCC Compliance

### FCC Compliance

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 the party responsible for compliance could void the user's authority to operate the equipment.

Compliance Information

### FCC Warning Message

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
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.

### FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator& your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

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.

### IC RSS warning

This device complies with Industry Canada licence-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 areil est conforme aux CNR d'Industrie Canada licables aux areils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes:
(1) l'areil ne doit pas produire de brouillage, et
(2) l'utilisateur de l'areil doit accepter tout brouillage radioélectrique subi, même si le brouillage est

Appendix

susceptible d'en compromettre le fonctionnement.

## IC Radiation Exposure Statement:

This equipment complies with IC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This equipment should be installed and operated with minimum distance 20cm between the radiator& your body.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

## KCC Warning Message

"해당무선설비는 운용 중 전파혼신 가능성이 있으므로 인명안전과 관련된 서비스는 할 수 없습니다 ."

"해당 무선설비는 운용 중 전파혼신 가능성이 있음"

## NCC Warning Message

低功率電波輻射性電機管理辦法
第十二條經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。
第十四條低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應改善至無干擾時方得繼續使用。前項合法通信，指依電信法規定作業之無線電通信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

Appendix

The content is subject to change.

**Download the latest version from**
**http://www.dji.com/product/phantom-3**

If you have any questions about this document, please contact DJI by
sending a message to **DocSupport@dji.com**.

# PHANTOM

## Advanced Manual

V 1.4

2013.03.22 Revision
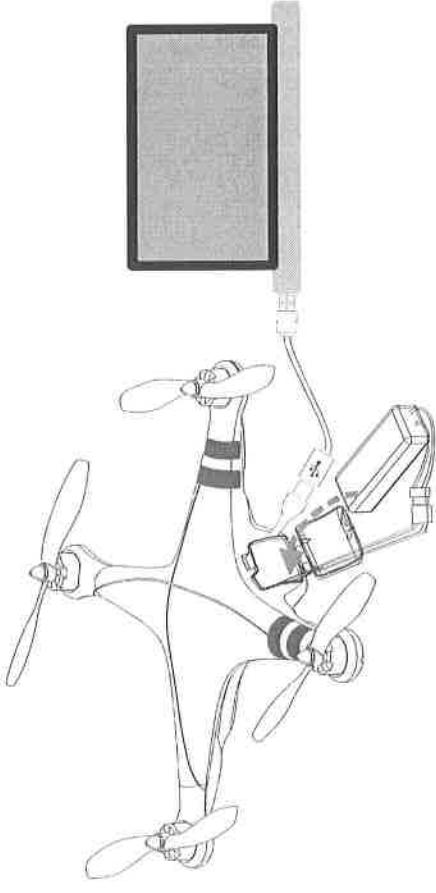
## Index

## A1 Software and Driver Installation

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.

1. Please download the driver DJI Driver Installer and NAZA-M assistant software from the PHANTOM page of DJI website (http://www.dji-innovations.com/products/phantom/downloads/).

2. Connect the PHANTOM and the PC via the USB cable, power on the PHANTOM system.

3. Run the DJI Driver Installer, and follow the instructions strictly to finish installation.

4. Run the assistant software installer, and follow the instructions strictly to finish installation.

## A2 Configuration and Firmware& Software Upgrade

1. Power on your computer. Make sure the computer is connected to the Internet for the first time you use.

2. Switch on the transmitter first, then power on the aircraft. Connect the aircraft to the PC with the USB cable. DO NOT break the connection until configuration or upgrade is finished.

3. Please refer to the "**Assembly &Configuration->Step3**" section of NAZA-M Quick Start Guide to get the detail of assistant software usage.

4. Refer to the "**Appendix->** Firmware & Assistant Software Upgrade" section of NAZA-M Quick Start Guide to get the detail of assistant software usage.

5. If Manual Mode is required, please select "Manual" from the drop down list of Basic->RC->Control Mode Switch in the assistant software. Refer to the "**Flying Test->** Step 1 Control Mode Knowledge" section of NAZA-M Quick Start Guide to get the detail about the Manual Mode.

## A3 Linking the Transmitter and Receiver

The linking of the transmitter to the receiver of the PHANTOM was carried out before they left the factory. If necessary you can link the transmitter to the receiver as follows, for example you replace the transmitter. The default receiver type is PPM.

DO NOT use the PHANTOM transmitter (receiver) with the third party remote control equipment.
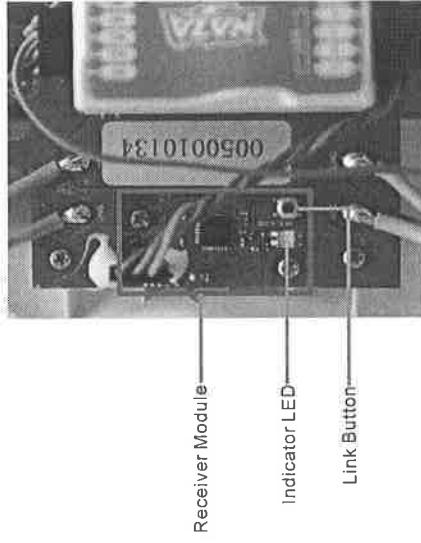
1. Please remove the housing by referring to the section of **A8 Maintenance -> Remove the Housing**.

2. Locate the receiver module according to the following figure.

3. After powering on the aircraft and the transmitter, if the LED indicator of the receiver on the control board is lit solid red, this means the receiver currently has no connection with any transmitter.

4. Press down the link button for more than two seconds until the LED indicator blinks, then release the button.

5. Push the throttle stick to the lowest position and turn on the transmitter. Then if the LED indicator of the receiver turns off, the link between the transmitter and the receiver has succeeded. (Linking operation can be done only when the LED indicator of the transmitter changes to blinking red.)

**Note:**

- If the transmitter can't enter the linking mode, please check that the throttle stick lies in the lowest position.

- You can use your R/C system normally only after the linking is done successfully.



Receiver Module

Indicator LED

Link Button

The following figure shows the successful change of transmitter mode to Mode 1.
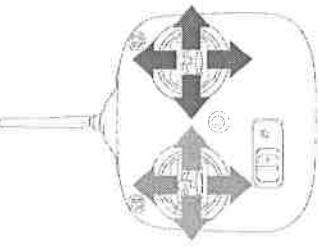
**Mode1**



# *A4* Changing the Control Mode of the Transmitter

You can change the operation mode of the transmitter according to the following procedures if necessary.( The operation mode of Mode1 and Mode2 are shown as below. )

Make sure to carry out the **A5 Transmitter Calibration**, if the Control Mode of the Transmitter is changed.

Mode1: ■ Throttle, it cannot hold the central position when released.
■ Roll, it can return to the central position when released.
■ Pitch, it can return to the central position when released.
■ Yaw, it can return to the central position when released.
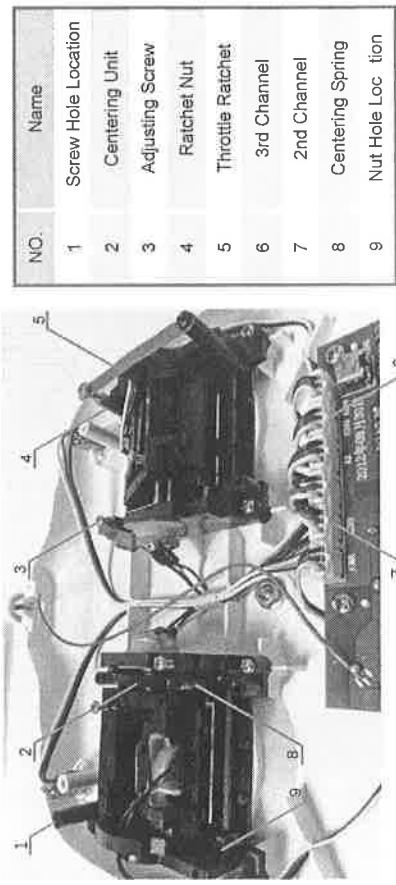
Mode2: ■ Throttle, it cannot hold the central position when released.
■ Roll, it can return to the central position when released.
■ Pitch, it can return to the central position when released.
■ Yaw, it can return to the central position when released.
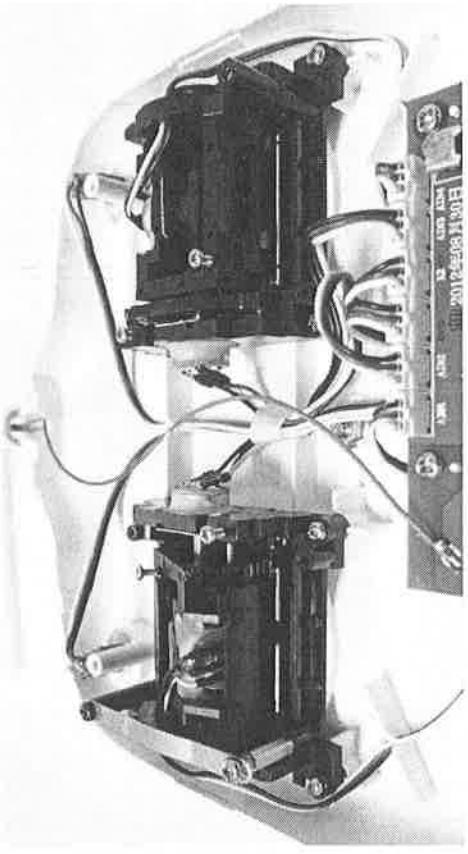
1. Remove the right Throttle Ratchet plate and the Ratchet Nut. Assemble the Ratchet Nut to the Nut Hole Location , and fix the Throttle Ratchet onto the Ratchet Nut and the Screw Hole Location. Adjust the screw height of the Throttle Support to change the tension, so as to give you the required operating feel.

2. Remove the left Centering Unit and the Centering Spring. Assemble them to the corresponding position of the Right part (Close to the middle location of the transmitter). Then adjust the height of the Adjusting Screw, so as to give you the required operating feel. (Note: Be careful not to excessively tension the spring when moving and fixing, to avoid damage.)

3. Exchange the connectors of Channel 2 ( AIN2 ) and Channel 3 (AIN3). (Note: Take care about the connector direction. )
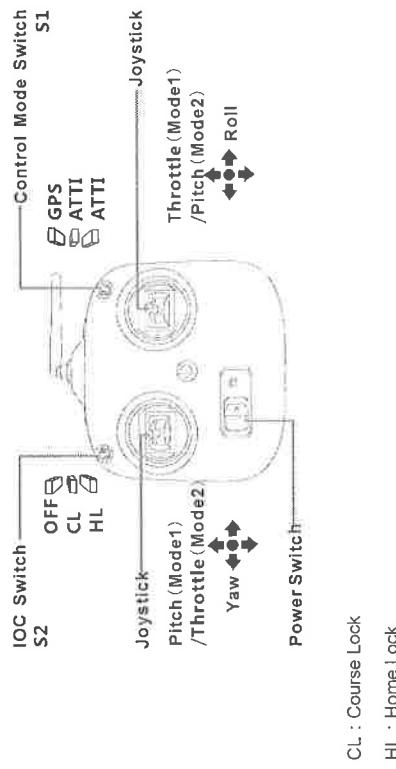
**Mode2**



| NO. | Name |
| --- | --- |
| 1 | Screw Hole Location |
| 2 | Centering Unit |
| 3 | Adjusting Screw |
| 4 | Ratchet Nut |
| 5 | Throttle Ratchet |
| 6 | 3rd Channel |
| 7 | 2nd Channel |
| 8 | Centering Spring |
| 9 | Nut Hole Loc tion |

# A5 Transmitter Calibration

If the control mode of the transmitter is changed or calibration has not been carried out for a long time, transmitter calibration is necessary.
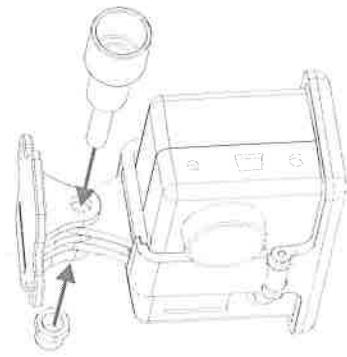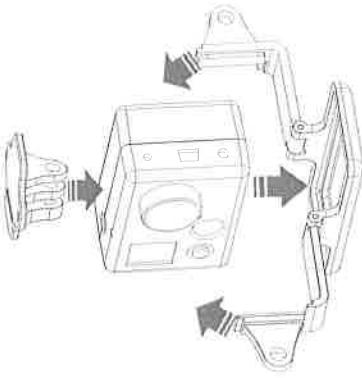


**IOC Switch S2**
OFF
CL
HL

**Joystick**
Pitch (Mode1)
/Throttle (Mode2)
Yaw
Roll

**Power Switch**

**Control Mode Switch S1**
GPS
ATTI
ATTI

**Joystick**
Throttle (Mode1)
/Pitch (Mode2)
Roll

CL : Course Lock

HL : Home Lock

1. Set the switch S2 at the OFF position, and the switch S1 at the GPS position

2. Push the Throttle stick to the top position, and push the Pitch stick to the top position. Keep the Pitch stick at the top position manually since it can return to the central position when released.

3. Turn on the Power Switch of the transmitter, you should hear the indicator sound of "Di—Di Di" from the transmitter repeatedly. Toggle the switch S2 to the CL position, you should hear an indicator sound of "Di" from the transmitter, in this case, the transmitter has entered the calibration mode. (During this period, the Throttle stick and the Pitch stick must be kept at the top position all the time.)

4. Release the Pitch stick and pull the Throttle stick to the central position. Toggle the switch S1 to the ATTI position; you should hear an indicator sound of "Di" from the transmitter. Then move all of the sticks throughout their complete range several times. After this, put the Throttle stick to the bottom position, and toggle the switch S2 to the HL position, you should hear an indicator sound of "Di" from the transmitter, in this case, the transmitter has been calibrated successfully.
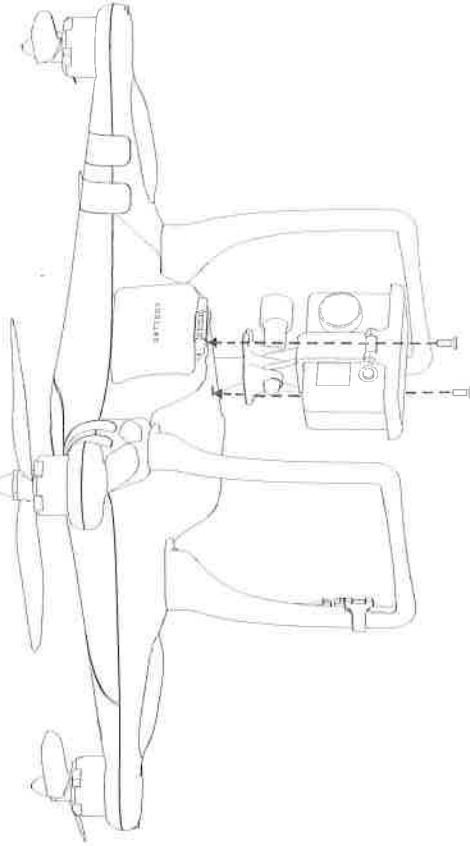
# A6 Mount Camera and Camera Frame

Please mount the Camera and Camera Frame if necessary.

( 1 ) Mount the Camera to the Camera Frame



( 2 ) Mount the Camera and Camera Frame to the aircraft

Make sure to use the dedicated cross screws of the type M3.0*6, since an over long screw will puncture the battery by passing through the battery compartment and could lead to explosion or fire.

## IOC Flying Test

Realize an IOC flight by the following procedures.

| During the same flight | | STEP1: Record | STEP2: ON | STEP3: OFF | STEP4: ON again |
|---|---|---|---|---|---|
| Course Lock | | | | | |
| | Switch Setting | Record forward direction | Set switch S1 to GPS or ATTI position, S2 to CL position | Set switch S2 to OFF position | Toggle switch S2 from OFF to CL position |
| Home Lock | | | | | |
| | Switch Setting | Record home point | Set switch S1 to GPS position and S2 to HL position | Set switch S2 to OFF position | Toggle switch S2 from OFF to HL position |

## IOC FLYING NOTES ! ! !

- LED will blink ● quickly if recording is successful. LED will blink between ○ and ● slowly to indicate the IOC mode only when MC is ready to fly in course lock or home lock modes.
- Home lock flying requires that 6 or more GPS satellites are found and the aircraft is further than 10m away from the home point.
- Before you do the home lock flight, you have to fly the aircraft out of the 10m range around home point, and then flip the switch S2 to HL position to fly in home lock when all the requirements are met. If you have already toggled the switch S2 to HL position when the aircraft is still in 10m range around home point, and this is the first time you are going to fly in home lock during the current flight, then if all the requirements are met, MC will change into home lock automatically when the aircraft flies out of the 10m range around home point.
- When flying in Home Lock mode, if any of the following situations happen, then the system will quit Home Lock flying and automatically enter Course Lock flying. The aircraft will fly in Course Lock using the earlier forward direction.
  1. The aircraft fly's within 10m range of the home point.
  2. You toggle the control mode switch to the ATTI. Mode.
  3. The GPS signal becomes bad (The GPS signal LED is blinking Red twice or three times).
- When the aircraft is flying in home lock mode far away from you and the home point, please do not toggle the IOC switch many times quickly so as to avoid the change of home point without you intentionally knowing.
- We suggest that you should know clearly which flight lock method you are going to fly, and you know the locked forward direction or home point, before you switch on IOC mode during the flight.
- Continuously spinning the aircraft in flight will cause a yaw error. In this case, you can stop or slow down the spinning, so as to have better flight performance.
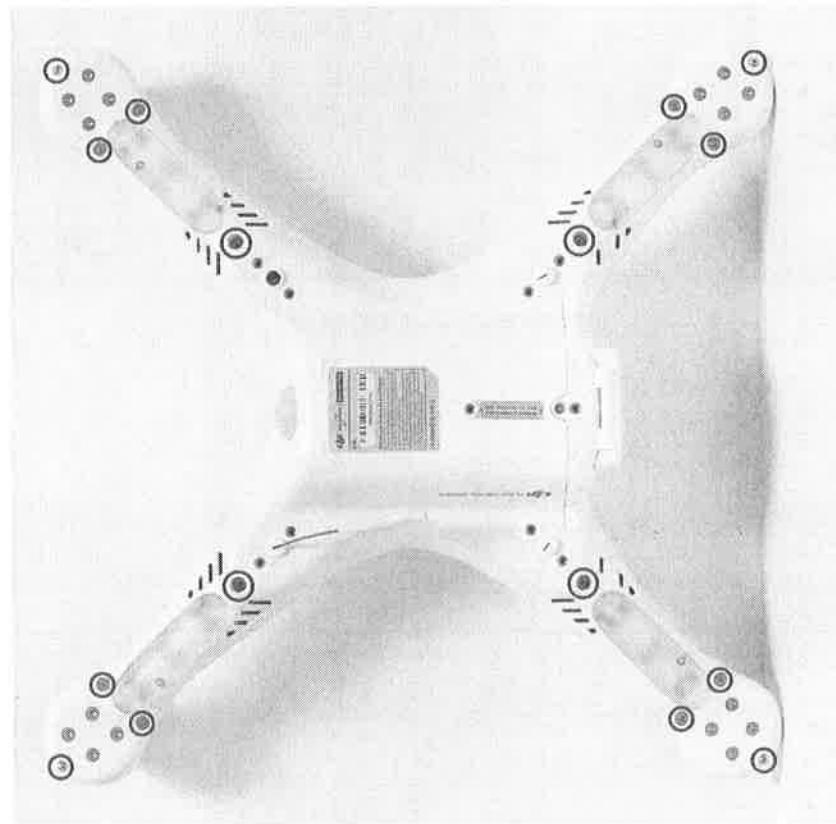
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# A7 Intelligent Orientation Control (IOC) Flight (with GPS & Compass module)

**Make sure to open the IOC function in the NAZA-M assistant software before using.**

**Definition of Forward Direction:** Quad -rotor will fly along this direction when you push the elevator stick.

### Graphic Description

🛩 Nose direction    → Forward direction    ● Home point    - - - - Over 10m from Home point

### Before You Start

Usually, the forward direction of a flying aircraft is the same as the nose direction. By using IOC, wherever the nose points, the forward direction has nothing to do with nose direction:
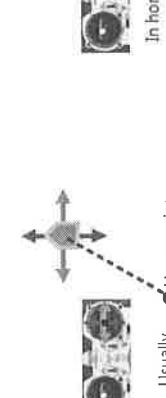
- In course lock flying, the forward direction is the same as a recorded nose direction. See the following figures (The red and blue arrows on the transmitter is corresponding to pitch and roll operations):



In course lock

- In home lock flying, the forward direction is the same as the direction from home point to aircraft. See the following figures (The red and blue arrows on the transmitter is corresponding to pitch and roll operations):



In home lock

### Method of Forward Direction & Home Point Recording

If you use the IOC function, please keep the Forward Direction of Course Lock Flying and the home point of Home Lock Flying in mind at any time. There are two ways to record the forward direction and the home point: Manually and Automatically. You may choose any one record method.

| | Course Lock Flight | Home Lock Flight |
|---|---|---|
| Automatically | 30 seconds after you power on the quad-rotor. | Before takeoff, the current position of the quad-rotor will be saved as home point when you push the throttle stick for the first time after 6 or more GPS satellites have been found. |
| Manually | Switch the S2 between **OFF** and **CL** position quickly 3 to 5 times to record current nose direction as new forward direction after you power on the quad-rotor for 30s. (**OFF ->CL-> OFF** is one time.) | When 6 or more GPS satellites are found, you can toggle the S2 switch between **CL** and **HL** position quickly 3 to 5 times to record the current position of the quad-rotor as the new home point. (**CL ->HL -> CL** is one time.) |

## A8 Maintenance

### 1. Remove the Housing

1. Remove all the nuts and propellers by using the assistant wrench.

2. Remove the screws marked in the figure below using a Phillips Screwdriver and a Hexagon Screwdriver, and then remove the housing.
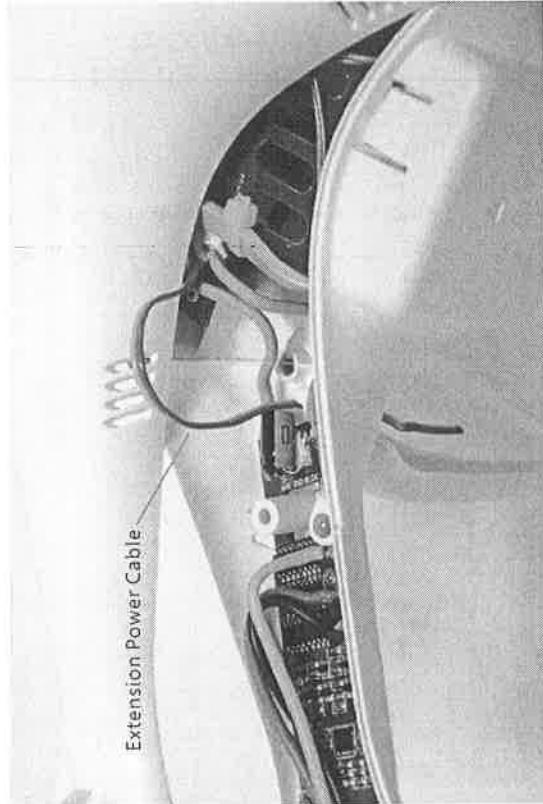
**Note:**

- Please take good care of the removed parts, for example, screws. Make sure to keep them safe and away from children.

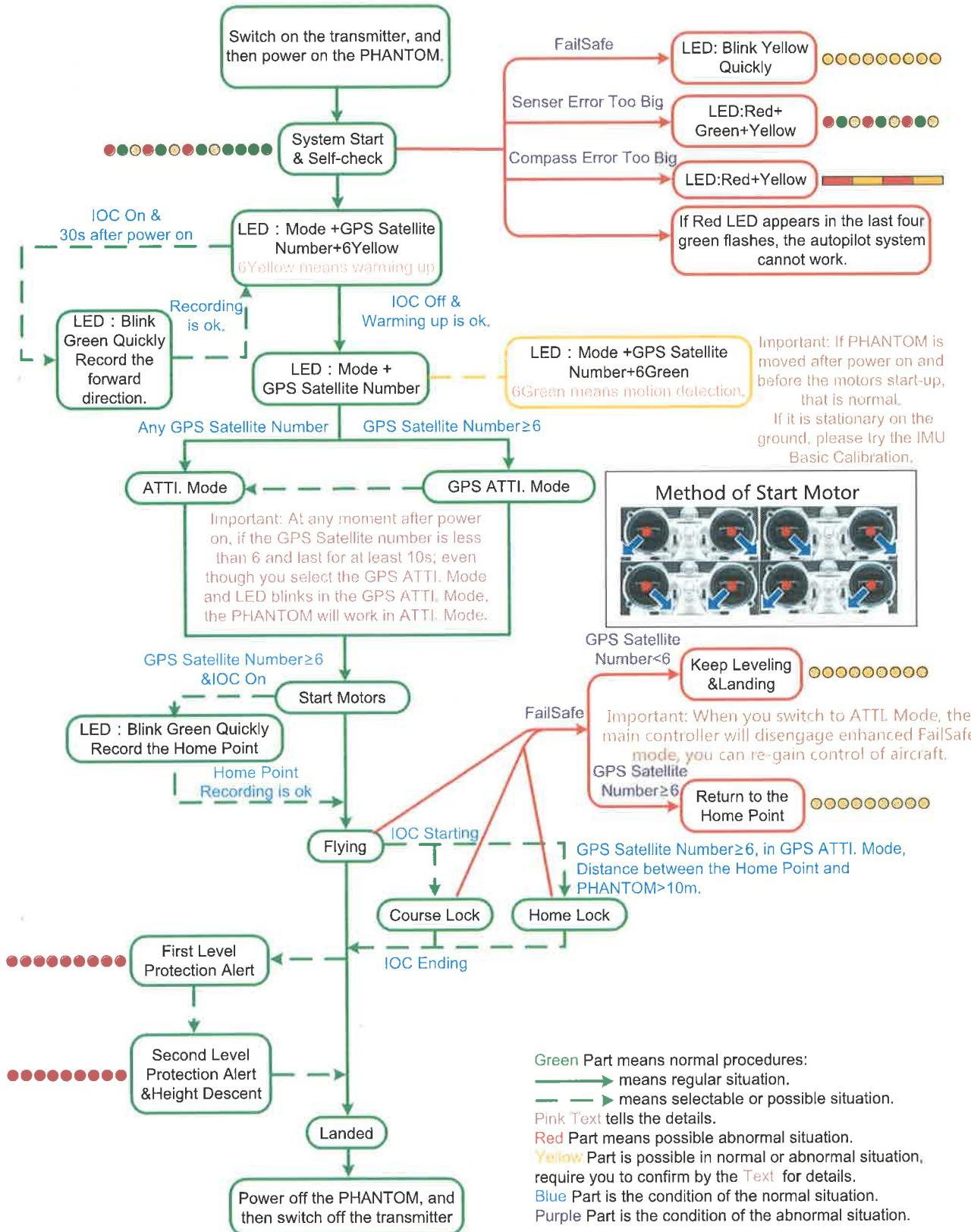- DO NOT use any thread locker, since the thread locker may corrode the shell of Phantom, may cause fractures.

## 2. Extension Power

There is an extension power cable in the Phantom for DIY use. The voltage from the Extension Power Cable is the same voltage as the power battery. The red cable is for positive and the grey cable is for negative. Make sure to keep the red cable and the grey cable separated, to avoid short circuit.



Extension Power Cable

# 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.

Switch on the transmitter, and then power on the PHANTOM.

System Start & Self-check

**FailSafe** → LED: Blink Yellow Quickly

**Senser Error Too Big** → LED:Red+ Green+Yellow

**Compass Error Too Big** → LED:Red+Yellow

If Red LED appears in the last four green flashes, the autopilot system cannot work.

**IOC On & 30s after power on**

LED : Mode +GPS Satellite Number+6Yellow
6Yellow means warming up

**Recording is ok.**

LED : Blink Green Quickly Record the forward direction.

**IOC Off & Warming up is ok.**

LED : Mode + GPS Satellite Number

LED : Mode +GPS Satellite Number+6Green
6Green means motion detection.

Important: If PHANTOM is moved after power on and before the motors start-up, that is normal. If it is stationary on the ground, please try the IMU Basic Calibration.

**Any GPS Satellite Number**          **GPS Satellite Number≥6**

ATTI. Mode  ←  GPS ATTI. Mode

Important: At any moment after power on, if the GPS Satellite number is less than 6 and last for at least 10s; even though you select the GPS ATTI. Mode and LED blinks in the GPS ATTI. Mode, the PHANTOM will work in ATTI. Mode.

## Method of Start Motor

**GPS Satellite Number≥6 &IOC On**

Start Motors

LED : Blink Green Quickly Record the Home Point

**Home Point Recording is ok**

**GPS Satellite Number<6** → Keep Leveling &Landing

**FailSafe**

Important: When you switch to ATTI. Mode, the main controller will disengage enhanced FailSafe mode, you can re-gain control of aircraft.

**GPS Satellite Number≥6** → Return to the Home Point

Flying

**IOC Starting**

GPS Satellite Number≥6, in GPS ATTI. Mode, Distance between the Home Point and PHANTOM>10m.

Course Lock          Home Lock

First Level Protection Alert

**IOC Ending**

Second Level Protection Alert &Height Descent

Landed

Power off the PHANTOM, and then switch off the transmitter

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.

# DJI

# PHANTOM PILOT TRAINING GUIDE

## Earning Your Stripes

# ⚠ CAUTION

This product is not suitable for people under the age of 18. Please carefully read the "Quick Start Guide", "User Guide", disclaimer, and fully watch the "Quick Start Videos" before using the PHANTOM. Users should make every effort to fly regularly in order to improve their flight skills as an advanced level pilot （★★★）. Please fly safely and responsibly.

## Please follow these guidelines prior to flying your Phantom:

❶ Always turn on the Remote Controller prior to turning on the Phantom.

❷ Toggle S1、 S2 to the top.

❸ Be sure there are no distractions when you're flying.

❹ When starting your training, be sure you are in a very large open area. Be aware of your surroundings. Always fly in areas void of obstacles and away from traffic and people.

❺ Before actually taking off, be sure you have calibrated the compass and you have full GPS satellite reception (Slow Continuous Green Flashing).

❻ Never fly over 400 feet.

❼ During training, stay behind your imaginary barrier and never fly behind yourself.

❽ When in doubt, gently pull down on the throttle stick and land.

❾ DO NOT PANIC.

---

The aircraft camera should face AWAY from the pilot before takeoff.

⚠
CAUTION

---

DO NOT fly the Phantom within a radius of 2 meters.

🚫
FORBIDDEN

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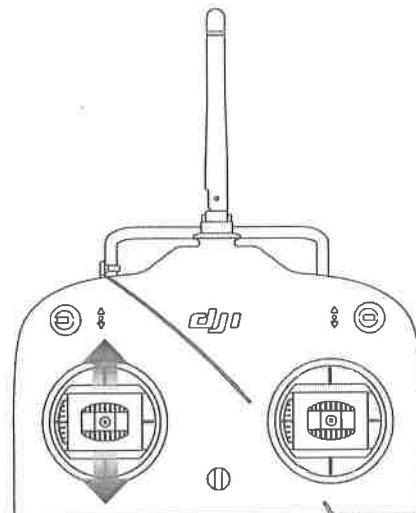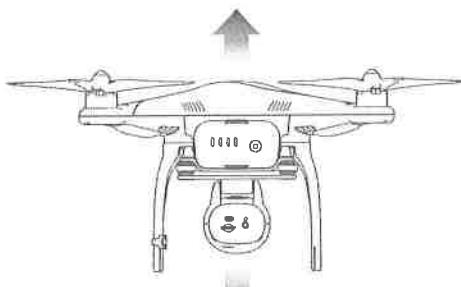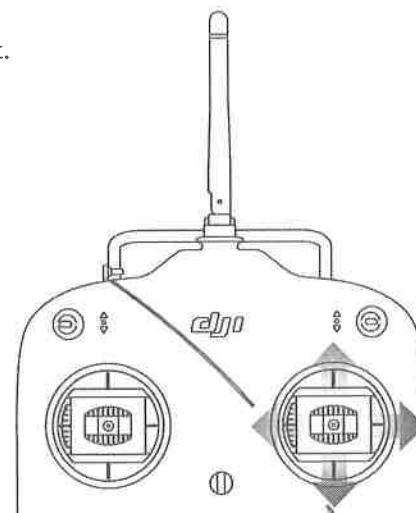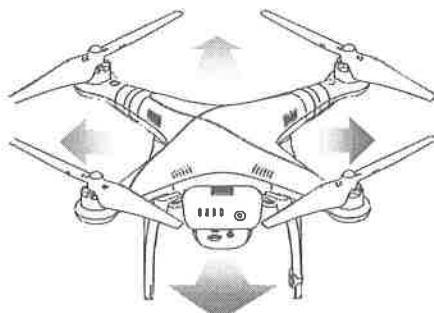
DO NOT touch the propellers after the Phantom has been started.

🚫✋
NO TOUCH

---

# Basic Flight Maneuvers ( ★ )
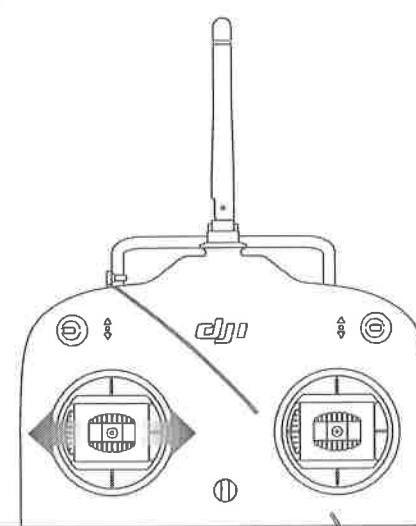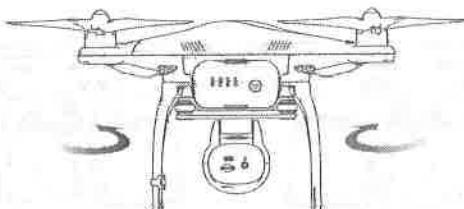
**1** Take off and land with battery facing you.

**2** Hover in one spot keeping battery facing you, make sure to control Left/Right/Forward/Back movement.
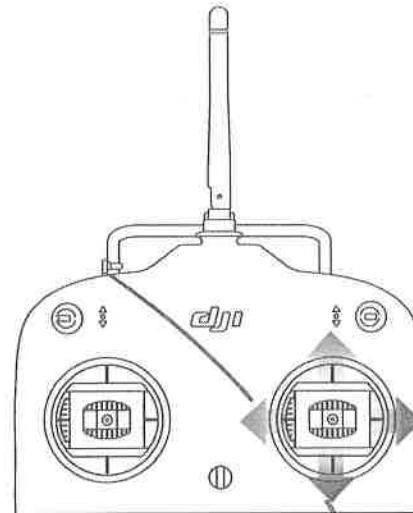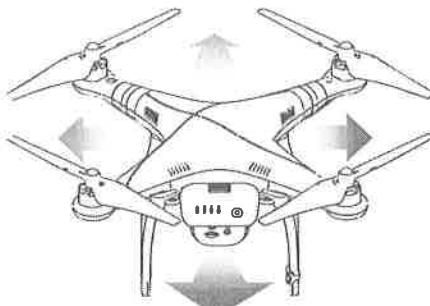
**3** Rotate left, rotate right but try to keep the battery pointed at yourself.
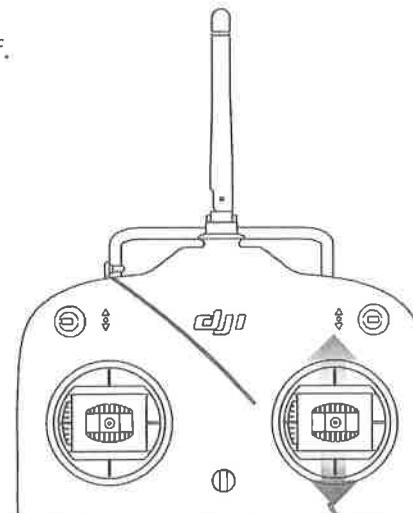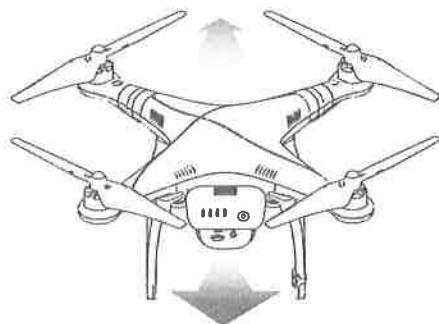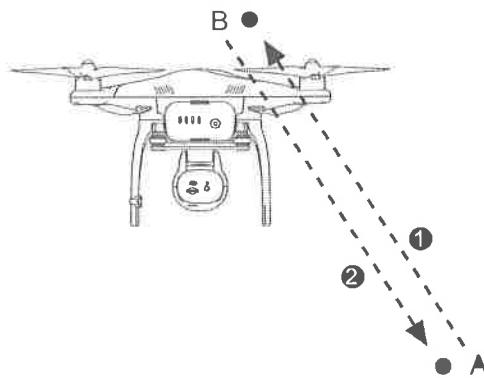
# Basic Flight Maneuvers ( ★ )
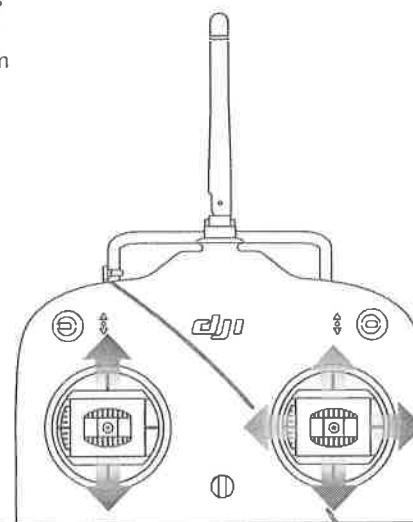
**4** Slowly fly forward/back/left/right with back of Phantom pointed at yourself.

**5** Fly forward to a spot 20~30 feet away.
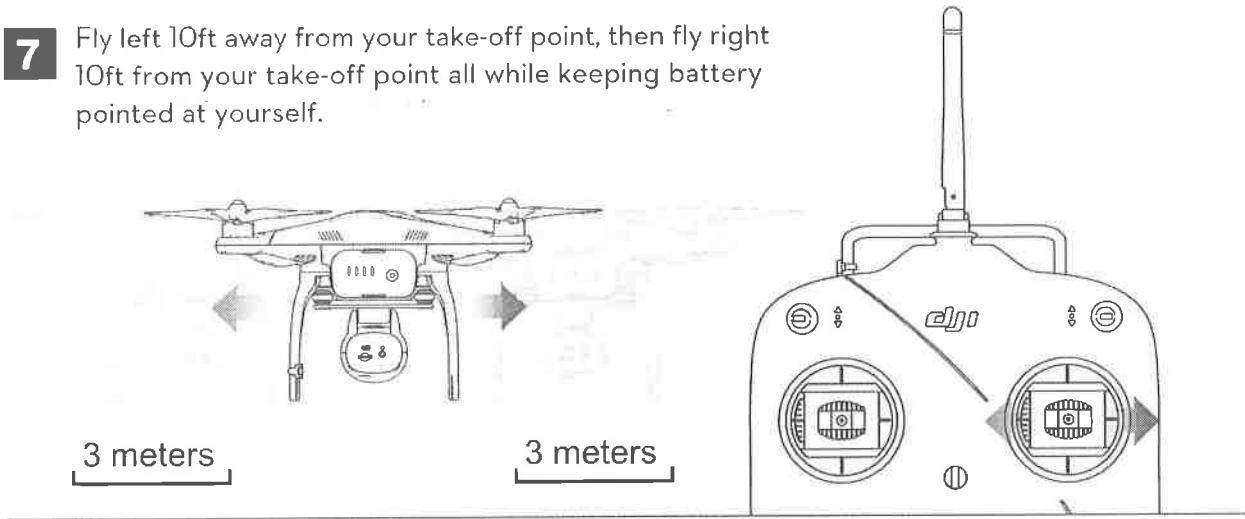Then fly back keeping the battery pointed at yourself.

**6** Mark a spot (B) on the ground 10ft away from the Phantom's take off point. Hover and fly towards that spot and land at the spot (B). Then go back into a hover and bring the Phantom back to its original position (A) and land again.

B ●

❶

❷

● A
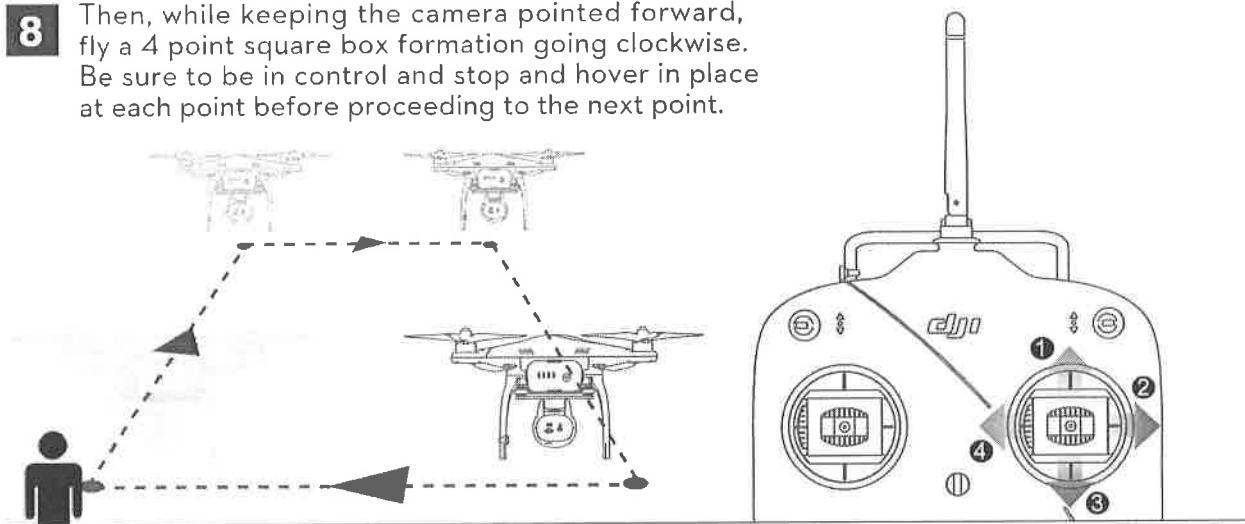
# Basic Flight Maneuvers ( ★ )
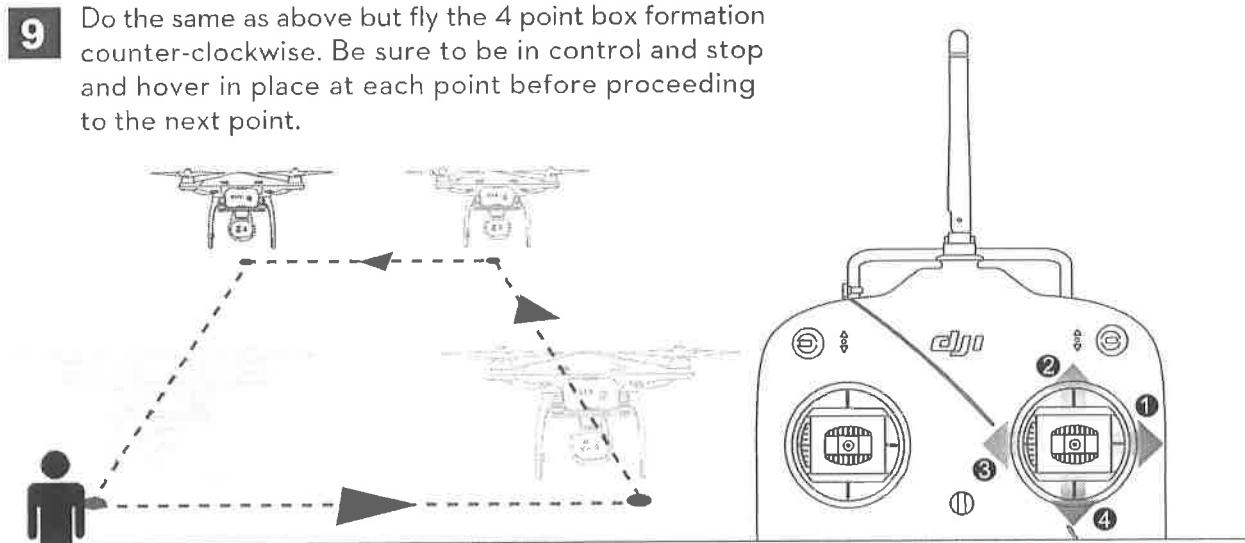
**7** Fly left 10ft away from your take-off point, then fly right 10ft from your take-off point all while keeping battery pointed at yourself.

3 meters   3 meters

**8** Then, while keeping the camera pointed forward, fly a 4 point square box formation going clockwise. Be sure to be in control and stop and hover in place at each point before proceeding to the next point.
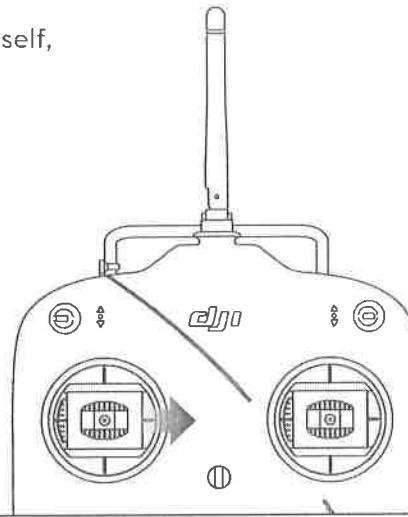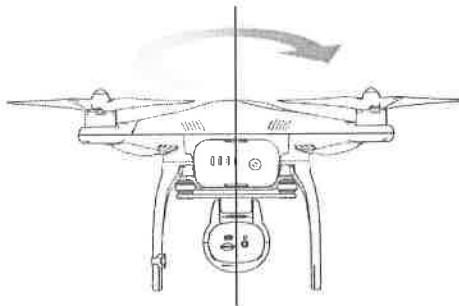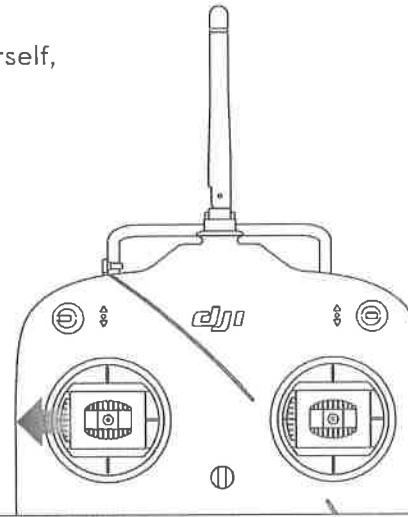
**9** Do the same as above but fly the 4 point box formation counter-clockwise. Be sure to be in control and stop and hover in place at each point before proceeding to the next point.
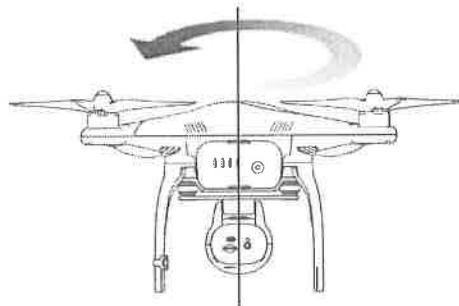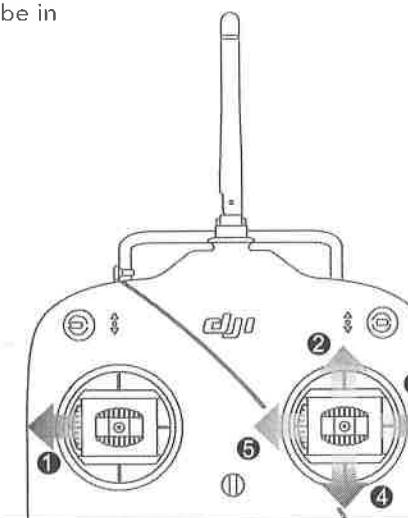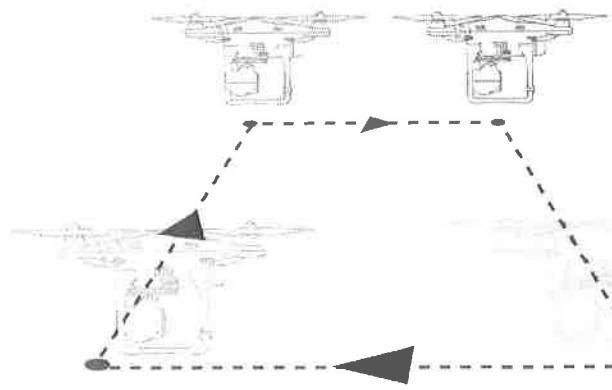
# Skilled Flight Maneuvers ( ★ ★ )

**1** In a hover, starting with the battery pointed at yourself, rotate 360 degrees clockwise.

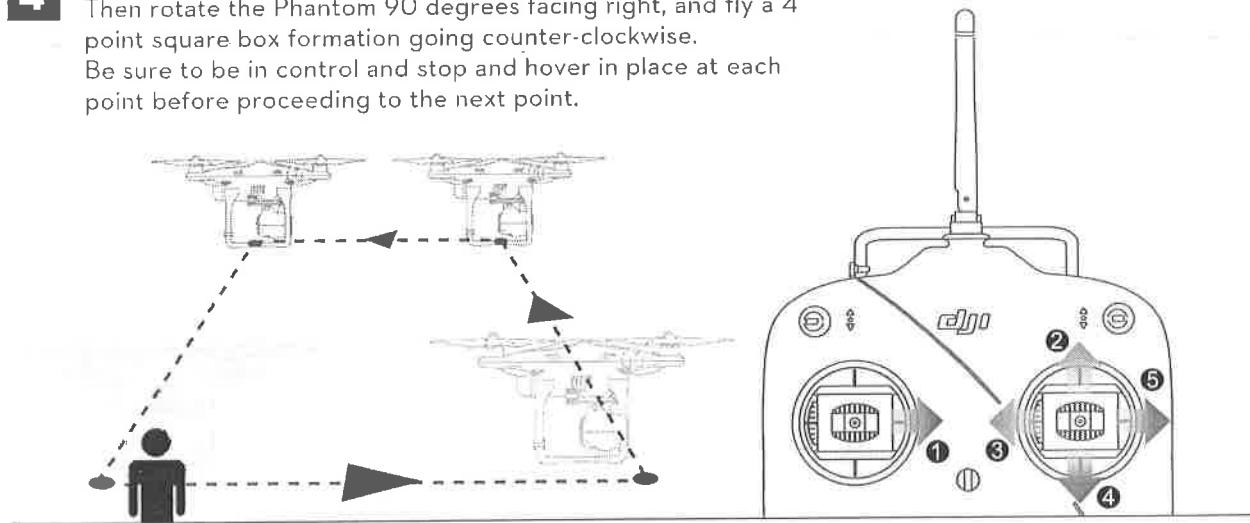**2** In a hover, starting with the battery pointed at yourself, rotate 360 degrees counter-clockwise.

**3** Starting with the battery pointed at yourself, go into a hover. Then rotate the Phantom 90 degrees facing left, and fly a 4 point square box formation going clockwise. Be sure to be in control and stop and hover in place at each point before proceeding to the next point.
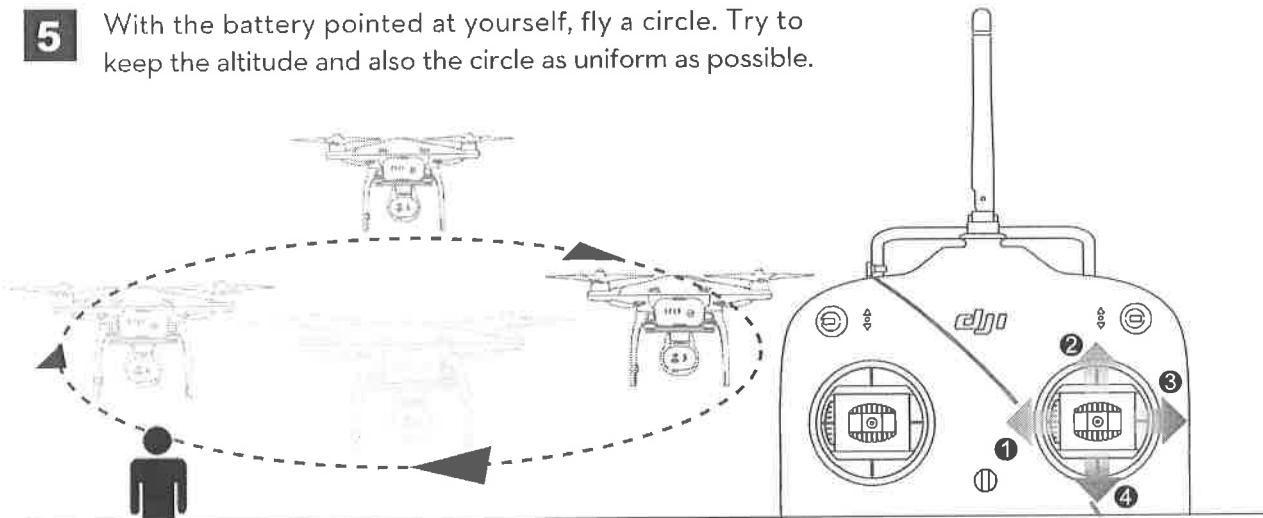
# Skilled Flight Maneuvers ( ★ ★ )

**4** Starting with the battery pointed at yourself, go into a hover. Then rotate the Phantom 90 degrees facing right, and fly a 4 point square box formation going counter-clockwise. Be sure to be in control and stop and hover in place at each point before proceeding to the next point.

**5** With the battery pointed at yourself, fly a circle. Try to keep the altitude and also the circle as uniform as possible.
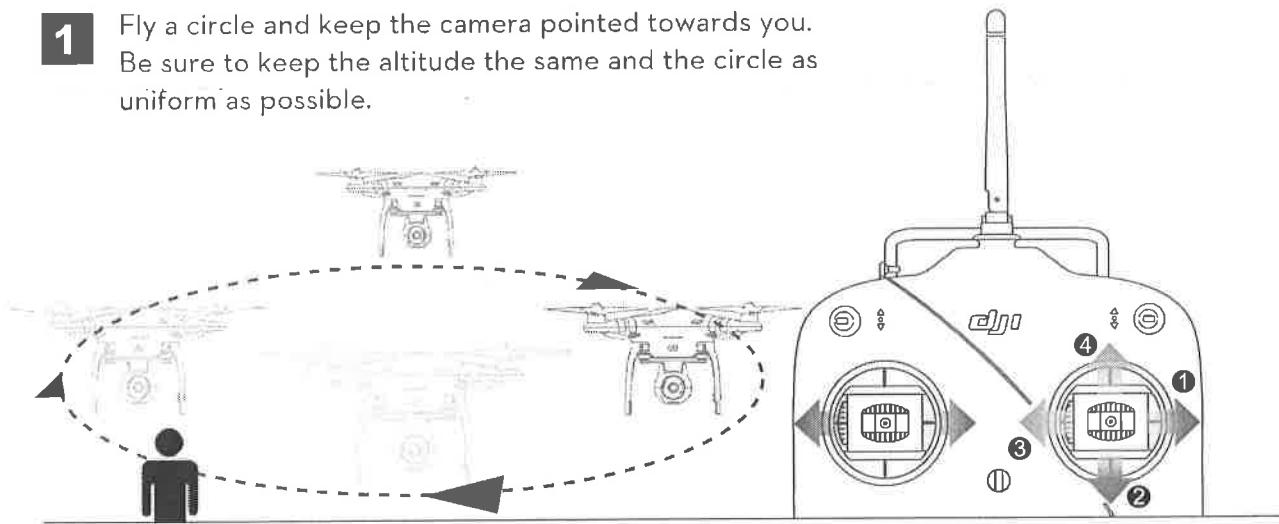
**6** Hover with the camera pointed at yourself and try to keep the Phantom in one place.
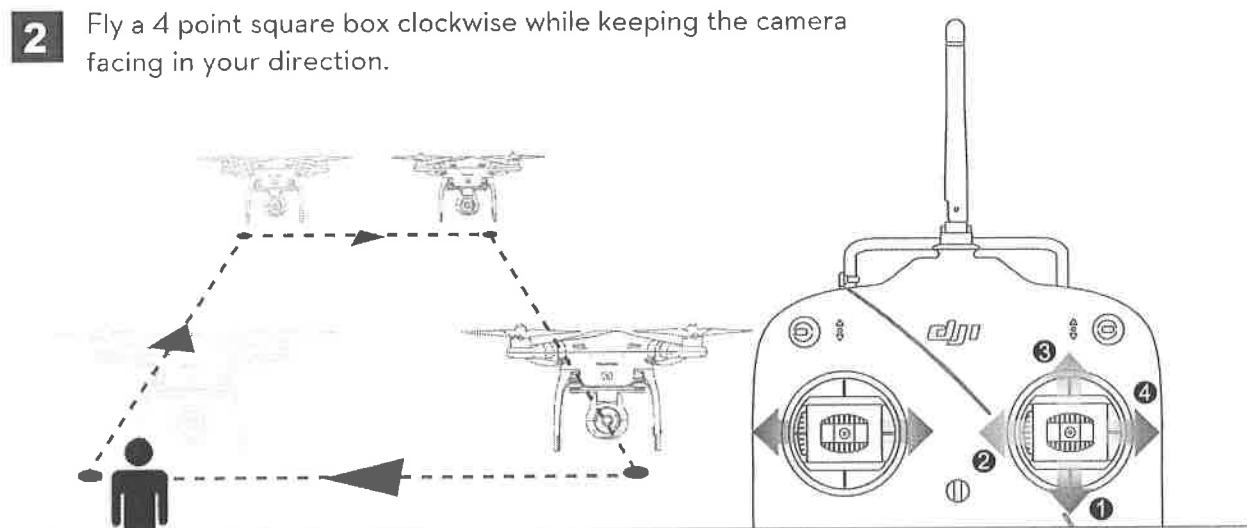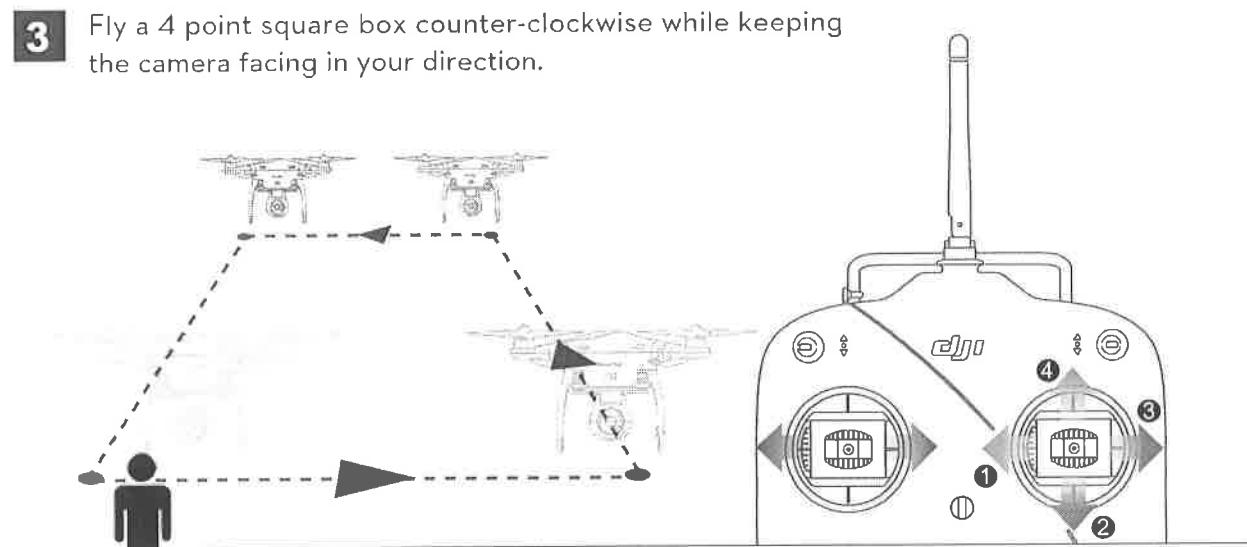
# Advanced Flight Maneuvers ( ★ ★ ★ )

**1** Fly a circle and keep the camera pointed towards you. Be sure to keep the altitude the same and the circle as uniform as possible.

**2** Fly a 4 point square box clockwise while keeping the camera facing in your direction.
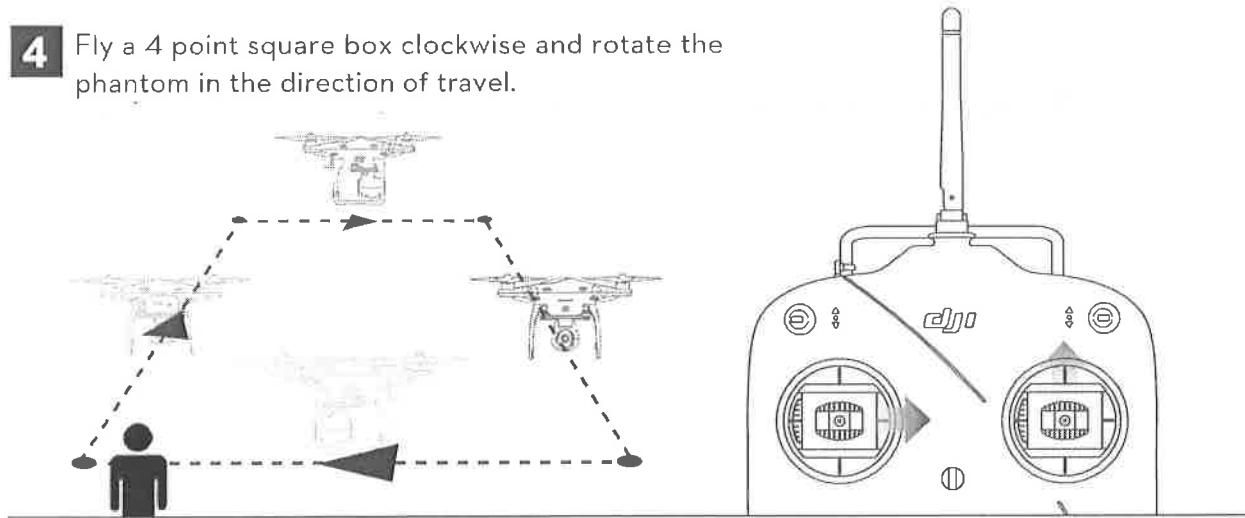
**3** Fly a 4 point square box counter-clockwise while keeping the camera facing in your direction.
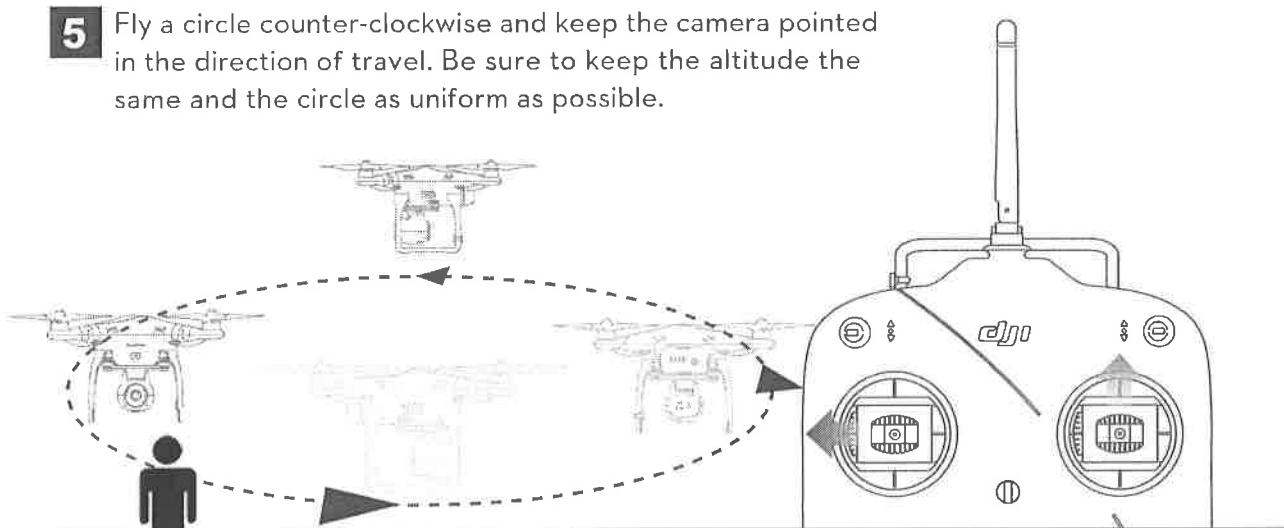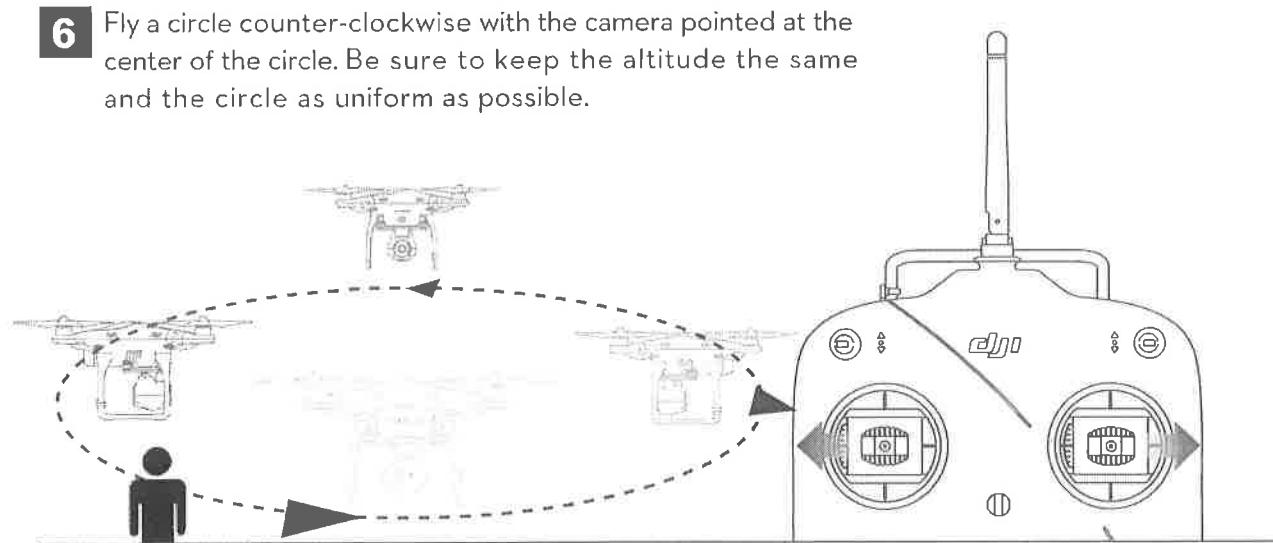
**4** Fly a 4 point square box clockwise and rotate the phantom in the direction of travel.

**5** Fly a circle counter-clockwise and keep the camera pointed in the direction of travel. Be sure to keep the altitude the same and the circle as uniform as possible.

**6** Fly a circle counter-clockwise with the camera pointed at the center of the circle. Be sure to keep the altitude the same and the circle as uniform as possible.
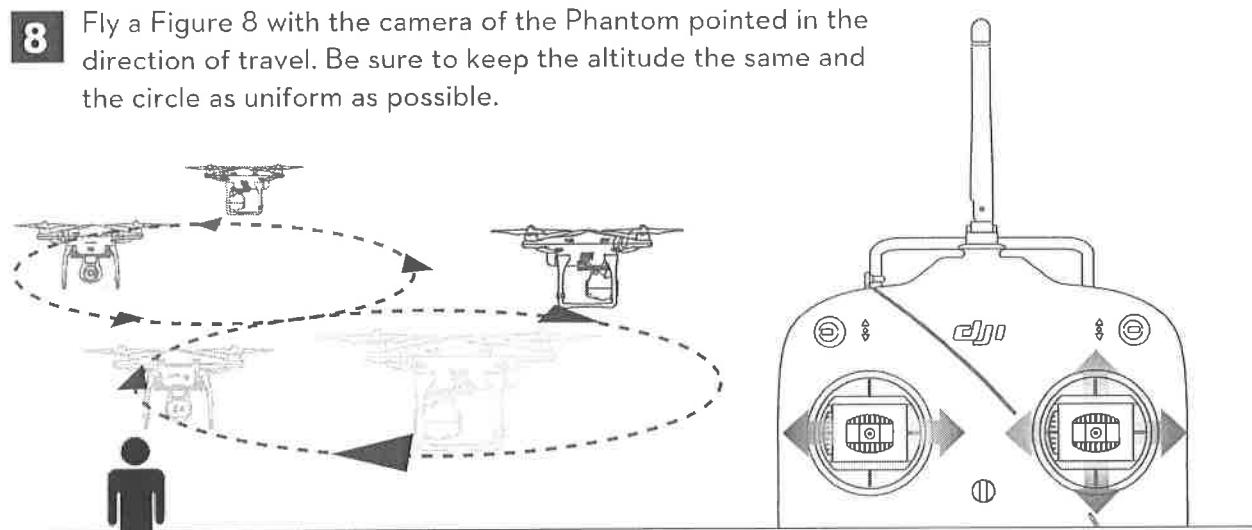
# Advanced Flight Maneuvers (★ ★ ★)
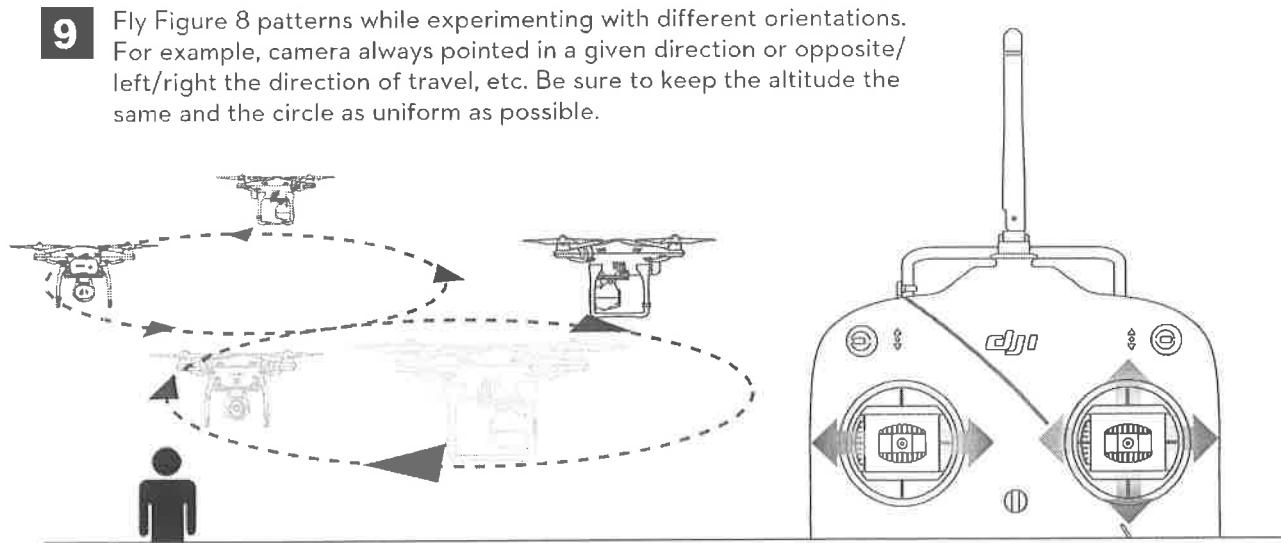
**7** Fly a figure 8 without rotating the Phantom. Be sure to keep the altitude the same and the circle as uniform as possible.

**8** Fly a Figure 8 with the camera of the Phantom pointed in the direction of travel. Be sure to keep the altitude the same and the circle as uniform as possible.
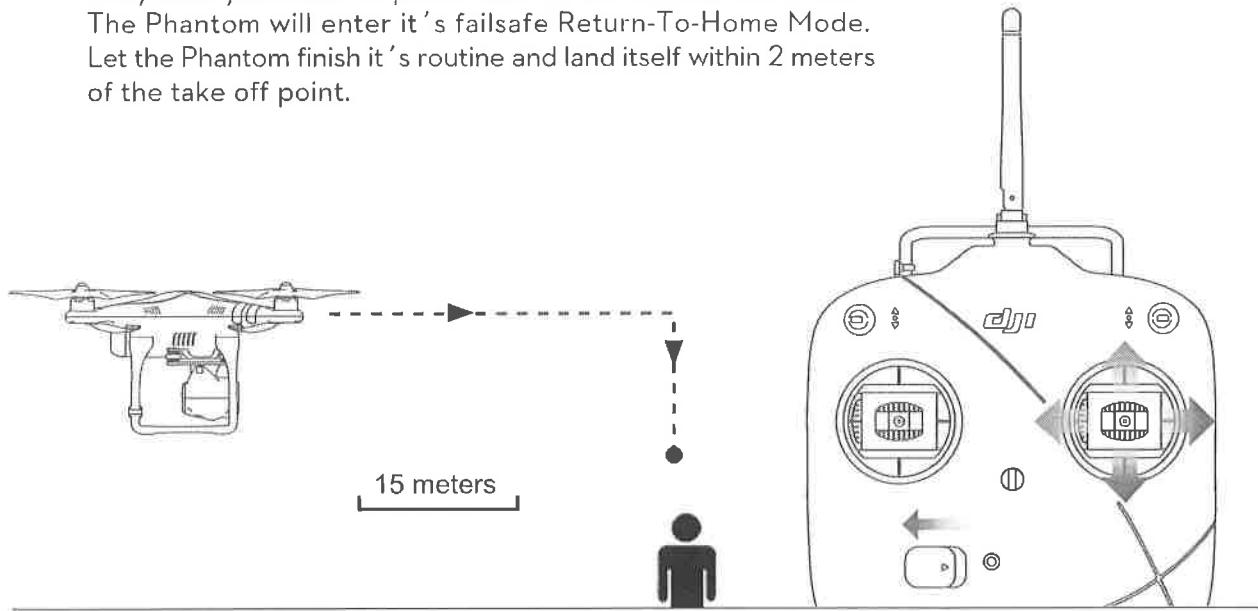
**9** Fly Figure 8 patterns while experimenting with different orientations. For example, camera always pointed in a given direction or opposite/left/right the direction of travel, etc. Be sure to keep the altitude the same and the circle as uniform as possible.

# Emergency Situations

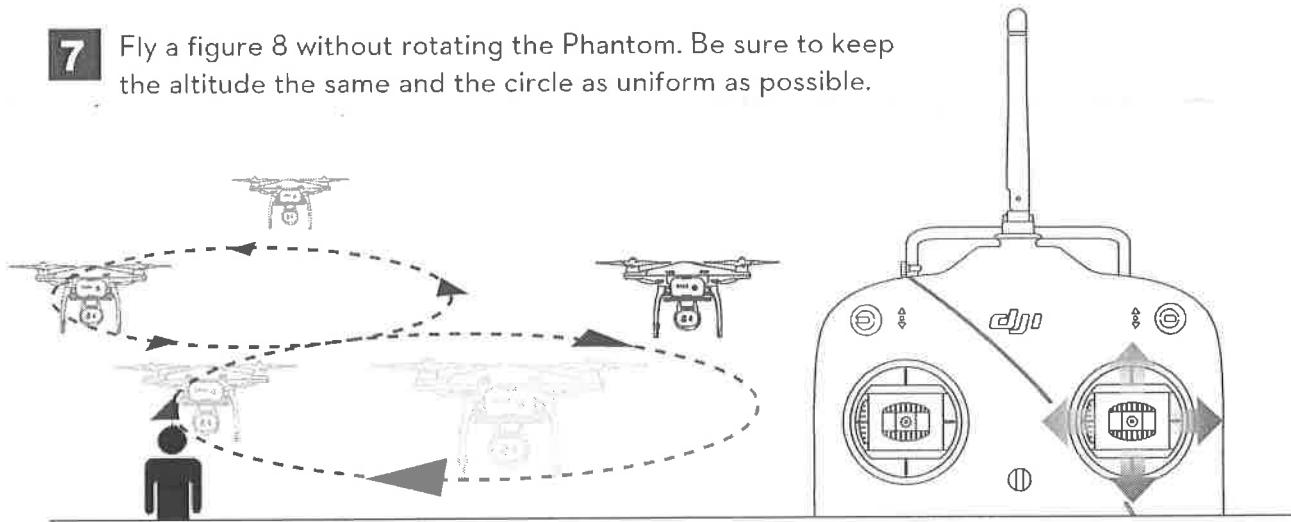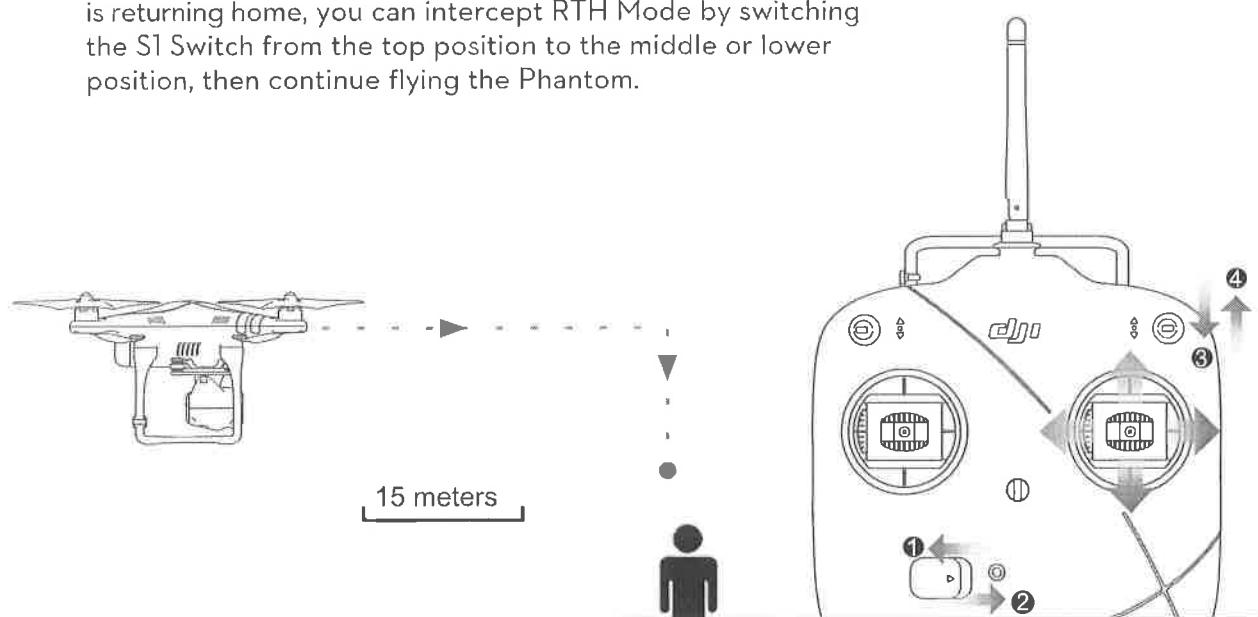## 1 Return Home & Land Mode

Be sure you are in a large open area. Before you take off, make sure you have a good GPS lock by ensuring your LED indicators are flashing Green. Fly the Phantom at least 50ft away from your take off point. Turn off the Remote Controller. The Phantom will enter it's failsafe Return-To-Home Mode. Let the Phantom finish it's routine and land itself within 2 meters of the take off point.

15 meters

## 2 Intercepting Return Home & Land Mode

Be sure you are in a large open area. Before you take off, make sure you have a good GPS lock by ensuring your LED indicators are flashing Green. Fly the Phantom 50ft away from your take off point. Turn off the Remote Controller. The Phantom will enter it's failsafe Return-To-Home Mode. When the Phantom is returning home, you can intercept RTH Mode by switching the S1 Switch from the top position to the middle or lower position, then continue flying the Phantom.

15 meters

www.dji.com

# 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**

# Content

# 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.**
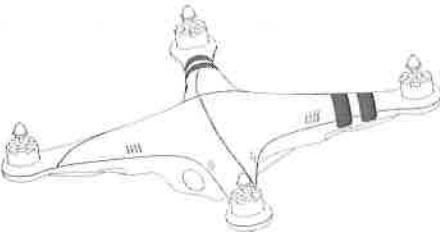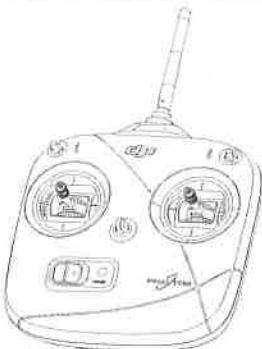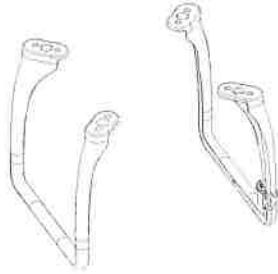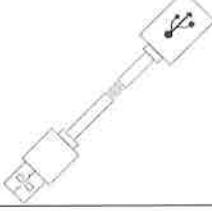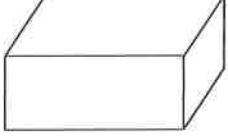
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# Battery Usage & Charging Cautions

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<br>(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
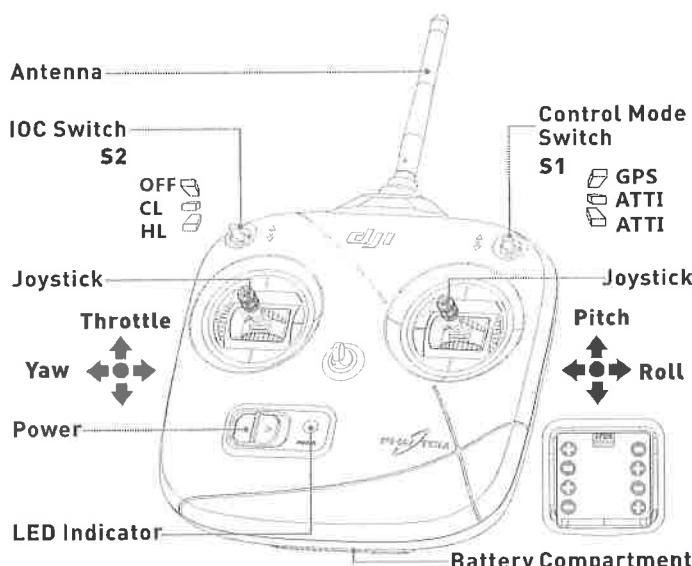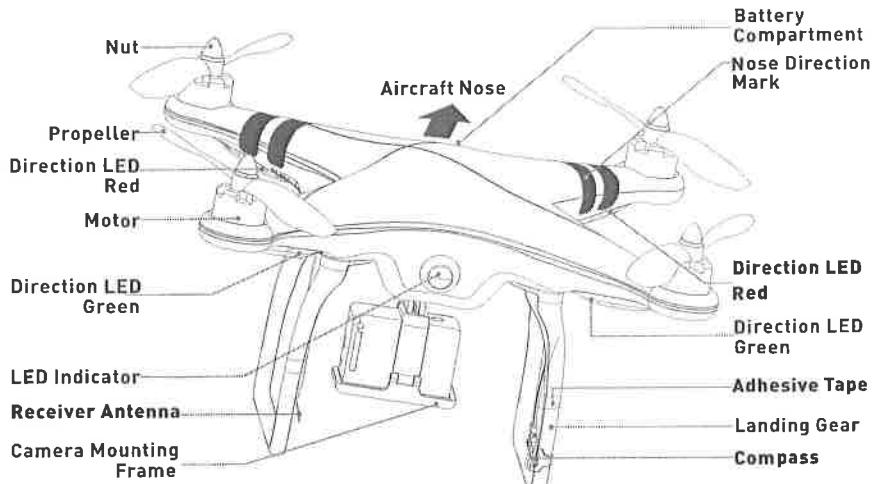
Nut
Aircraft Nose
Battery Compartment
Nose Direction Mark
Propeller
Direction LED Red
Motor
Direction LED Green
LED Indicator
Receiver Antenna
Camera Mounting Frame
Direction LED Red
Direction LED Green
Adhesive Tape
Landing Gear
Compass

Antenna
IOC Switch S2
OFF
CL
HL
Joystick
Throttle
Yaw
Power
LED Indicator
Battery Compartment
Control Mode Switch S1
GPS
ATTI
ATTI
Joystick
Pitch
Roll

- ✓ 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

# Aircraft & Transmitter Basic Operation

## Definitions

● **Stick neutral position and stick released** means the stick of Transmitter is pushed to the central position.

● **Command Stick** means the stick of Transmitter is pushed away from the central position.

| Transmitter | Aircraft (◄▥ is the nose direction ) | GPS ATTI. Mode/ATTI. Mode |
|---|---|---|
|  |  | Throttle stick is for aircraft up& down control. The aircraft will hold the height automatically if the stick is centered. You should Push the throttle stick to the neutral position to take-off the multi-rotor. Note that the stick returns to the central position when released for the transmitter V3.5. For the version below 3.5, the stick cannot hold the central position when released. |
|  |  | Yaw stick is for aircraft rudder control. Command stick controls the angular velocity of the aircraft, with the maximum rudder angular velocity of 200°/s. Left stick command gives counter clock-wise rotation of the aircraft, & vice versa. |
|  |  | Roll stick is for aircraft left/right control and Pitch stick is for front/back control. Command stick controls the angle of the aircraft. Stick neutral position is for 0°, its endpoint is 35°. The roll and pitch sticks return to the central position when released. ● In GPS Mode, the aircraft will hover (hold horizontal position) when sticks released. ● In ATTI. Mode, the aircraft will keep attitude stabilizing without horizontal position (different from hover in GPS Mode). |
|  | <br>GPS ATTI.   ATTI.   ATTI.<br>(Manual or<br>Failsafe is<br>selectable<br>in software.) | 3-position switch (S1) on the Transmitter for mode control. Only after Compass Module connection and Compass calibration, GPS ATTI. Mode is available. Otherwise, all switch positions are for ATTI. Mode. Pay attention because the GPS ATTI. Mode is dependent on the number of GPS satellites acquired by the main controller. Refer to the LED Indicator. When GPS signal has been lost for 3s, system enters ATTI. Mode automatically. You can enable the Manual Mode or FailSafe (also known as One-key Go-home) in the assistant software->Basic->R/C->Control Mode. |
|  | <br>OFF   Course Lock   Home Lock | 3-position switch (S2) on the Transmitter for Intelligent Orientation Control (IOC). Set the switch to OFF in basic flight. **This function is defaulted to off.** If you want to use this function refer to the advanced manual, and enable it in the assistant software. Use IOC when you are familiar with basic flight. |
| You can change the operation mode of the Transmitter according to the advanced manual if necessary. | | |

# Before Flying

## 1. Installing the Transmitter Batteries

1. Open the battery compartment cover of the Transmitter.

2. Install 4x AA battery (5#) in accordance with the + / - pole.

3. Close the battery compartment cover of the Transmitter.

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- DO NOT use the PHANTOM transmitter (receiver) with the other third party remote control equipment.

- Risk of explosion if replaced by an incorrect type.

- Dispose of used batteries according to the instructions.

- Remove the batteries after use.

- When the voltage is lower than 4V, the transmitter will alarm with sound of "BB............", please change the batteries.

## 2. Battery Charging – LiPo Battery

Please use the full charged battery of 3S LiPo.
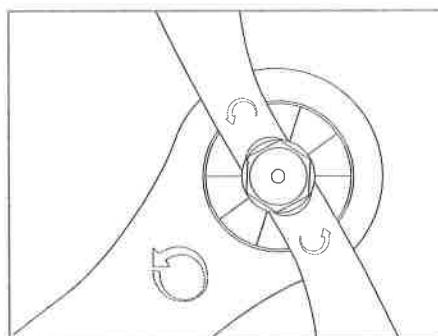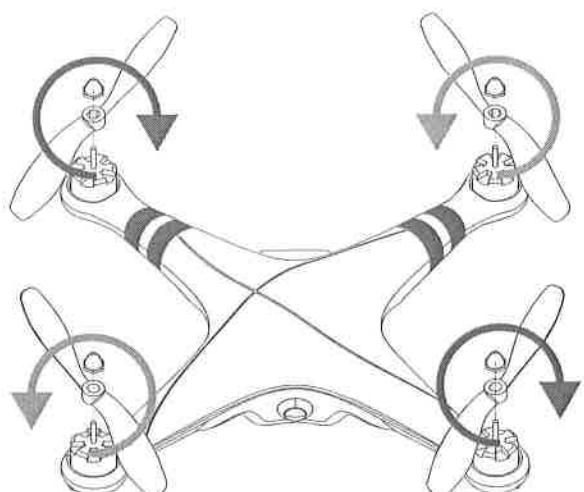
(Recommended parameters: 733496 - 2200MAH-20C - 11.1V.)

The built-in ESCs of PHANTOM ONLY support 3S (11.1V) power supply. DO NOT use the battery of higher voltage.

## 3. Fitting the Propeller

1. First prepare the aircraft and the propellers (original 8-inch).

2. Assemble the propellers (the side with rotary mark facing up) to the aircraft. Make sure the rotary mark on the propeller is the same as the mark on the frame arm. The arrow's direction stands for the rotating direction of the motors.

3. Finally fit the propeller nuts.

---
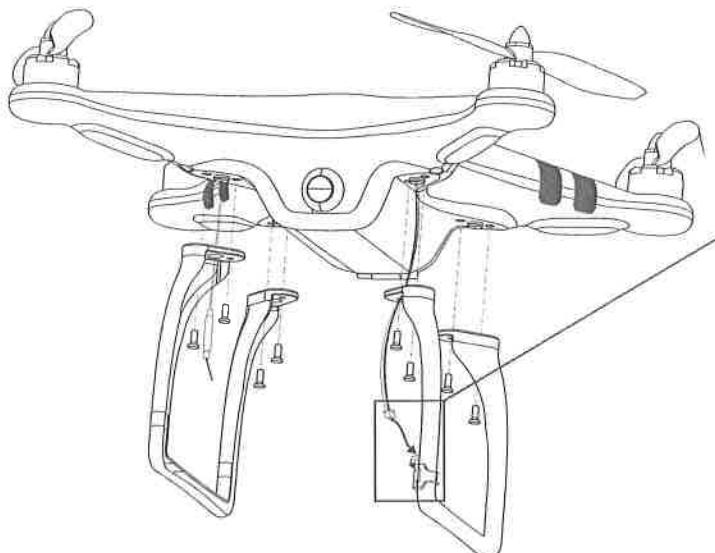
DO NOT use thread locker when mounting the propellers, just tighten the screws is enough.
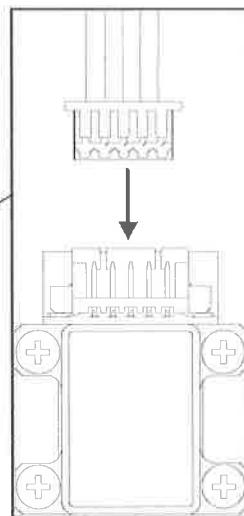
## 4. Mount the Landing Gear with the Compass Module if Required

If the GPS ATTI. Mode is desired, you must first mount the landing gear which contains the Compass Module.

1. Prepare the aircraft and the landing gear.

2. Mount the landing gear with the Compass Module to the right part (shown as the following chart); make sure the
   5-pin cable is through the hole of the landing gear. Fix the landing gear with screws (M3x6), and then connect the
   5-pin cable to the Compass Module.

3. Mount the other landing gear to the left part.

4. Fix the antenna and the 5-pin cable on both landing gear by using the white adhesive tape.

Landing Gear Mounting                                   Compass Module Connecting
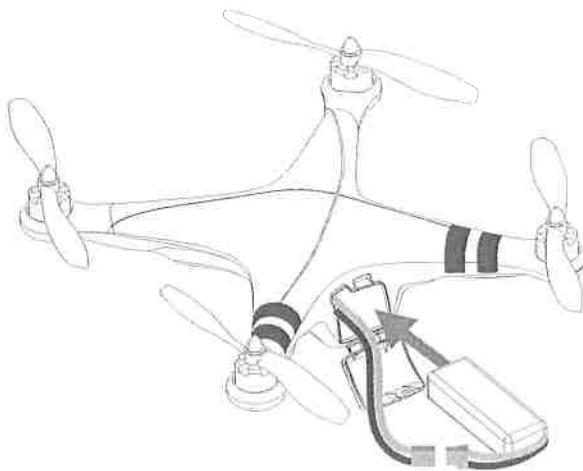
---

- When flying, please make sure the compass module is stationary and firm.

- If the Landing Gear with the compass module mount on has been deformed, please replace it with a new one and
  mount it as the procedures above.

- The compass module is not waterproof, and not anti-oil.

- DO NOT use the magnetic screwdriver. Otherwise, keep the screwdriver at least 10cm away from the compass
  module, to avoid magnetic interference.

---

## 5. Turn on the Transmitter

1. Set the IOC and Control Mode switch to the top position.

2. Turn on the power switch of the Transmitter

## 6. Power on the Aircraft

1. Place the aircraft on the ground

2. Open the battery compartment cover of the aircraft.

3. Put the battery into the compartment with the power cord facing outward.

4. Connect the battery and aircraft by the power lead and make sure the ESC′s work properly. (Correct sound)

5. Keep the sticks of the Transmitter and the Aircraft stationary until the system start and self-check has finished (●●◉●●◉●●◉●●●● ).

6. Put the power cable into the battery compartment.

7. Close the battery compartment cover.

8. The LED may blink Yellow 4 times quickly (◎◎◎◎ ). Start motor is disable during LED blinking Yellow 4 times quickly (◎◎◎◎ ), as the system is warming up.



## Notes

● Please contact your dealer if the "System start and self-check LED flashes" are not correct (Red LED appears in the last four green flashes) in the Step5.

● After the system start and self-checking has finished, if the LED blinks Red, Yellow and Green continually, that means the IMU data is abnormal. The PHANTOM will not work, please connect to the Assistant Software and follow the tips to do operation. If it blinks red and yellow lights alternately (███████░░░░), that means the compass error is too big, it can be caused by the following three cases. Please connect to the Assistant Software, select the "tools" tab and follow the tips of the "IMU Calibration" to do operation.

1. There are ferromagnetic substance around; first make sure that the compass has been calibrated correctly, you can lift the aircraft up (about 1m from the ground), and stay away from the surrounding possible ferromagnetic material object, if there is no red and yellow flashing after lifting it up about 1m from the ground, then it will not affect the flight.

2. The compass module had been put near a magnet; in this situation please timely replace the compass for a new one, otherwise it will lead to some abnormal action, or even loss of control.

3. The compass is not properly calibrated; in this situation please calibrate the compass correctly again, please see the GPS compass calibration for details.

# 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.
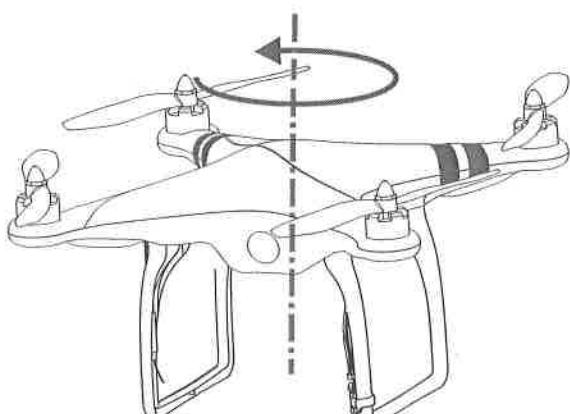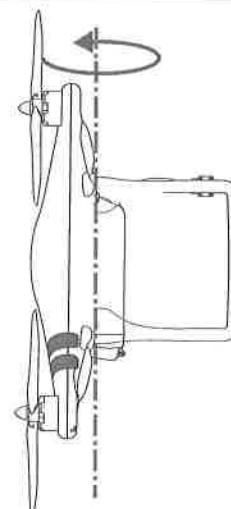
GPS ATTI. Mode

ATTI. Mode

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



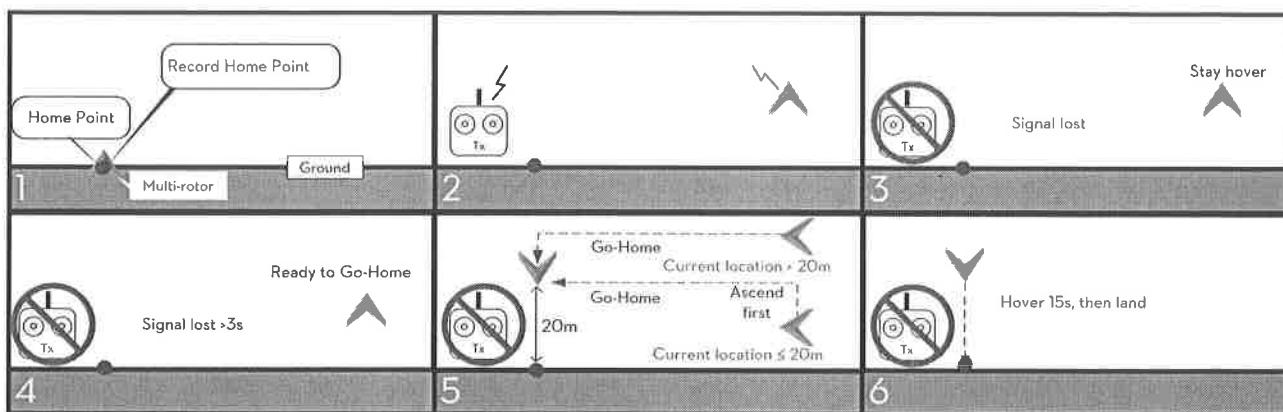Horizontal Rotation



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.

# The flowchart of failsafe and how to regain control

An introduction of Go-Home and Landing.



**Home-point:** Every time you power on, after first motors start, and if 6 or more GPS satellites are found (Red light blinks once or no blinking) for 10 seconds, the current position of multi-rotor will be saved as home-point by MC automatically.

| | |
|---|---|
| ⚠️ Note | 1. Please make sure to record the home-point during flight, and clearly know where it is. |
| | 2. During go-home the nose direction of the aircraft is facing toward the home-point, and the aircraft is flying directly from the current position to the home-point. |

## The flowchart of failsafe and how to regain control(the following content is for the firmware v3.12)

This section will demonstrate the working logic of failsafe and how to regain control.
The following description is effective only when:
1. The aircraft is in flight.
2. The GPS works normally and signal is GOOD (≥6 satellite, the LED blinks a single red light or no red light).

— What triggered failsafe
— The aircraft behavior after failsafe
— How to regain control
— Precautions

| (1) The aircraft flies far away, transmitter is on but the signal is weak. | Attitude Mode: (1) the aircraft will level its attitude immediately (2) 3 secs later, failsafe is triggered and aircraft will start to go home. (3) If signal is regained during (1) or (2), it will resume normal flight immediately. | Attitude Mode: In Attitude Mode as soon as you get signal you can regain control. |
|---|---|---|
| | GPS Mode: (1) the aircraft will slow down and hover. (2) if the signal is restored within 3 seconds (transmitter and receiver connected), the system will immediately return to normal operation; does not enter failsafe. (3) if not reconnected within 3sec, the system will enter failsafe, then even if the signal is restored, the system will not exit failsafe. | GPS Mode: switch the transmitter mode switch S1 to the middle position (ATTI. Mode), if the receiver is connected, then you will regain control. |
| (2) One position of switch S1 is set as "Failsafe" in the Assistant software, and you toggle the S1 to "Failsafe" position during flight. | The aircraft will slow down and hover. Then the system will enter failsafe mode after 3 seconds. | Switch the transmitter mode switch S1 to the middle position (ATTI. Mode), then you will regain control. |
| (3)Turn off the transmitter (we assume you want to trigger failsafe) | In this case, the behavior of the aircraft is the same as in the above condition.<br>If you want the aircraft to Return Home, please do not turn the transmitter back on within 3 seconds*, otherwise the aircraft will exit failsafe mode immediately. | If you choose to turn off the transmitter, you must be pretty sure that you know how to regain control. Here we offer a method, please read carefully. |

We strongly recommend you DO NOT try "Turn off the transmitter", because there are three types of risk:
(1) You must be pretty clear whether the Home-point is OK for landing or not. (You have to understand the definition of Home-point well and the working process of failsafe)
(2) If there are tall buildings around, the aircraft may be obstructed on the way.
(3) When GPS signal is bad or GPS is not working, failsafe will not work.

Note: if you start the motors, but do not push the throttle to take-off the aircraft, in this case it is very dangerous to turn off the transmitter, because the aircraft will take off automatically, so do not try this.

* If signal lost for more than 3 seconds failsafe will be triggered, if signal regained within 3 seconds it will exit failsafe immediately.

When you turn off the transmitter, use the following method to regain control:
(1) Switch the transmitter S1 switch to GPS. position.
(2) and then put the throttle stick to lowest position, you can now turn the transmitter back on (greater than 5secs after switching off, important), then put throttle stick to the center position immediately. If you hear the transmitter alarm, make sure the throttle stick is at the bottom position before moving to the center position.
(3) then you can switch the transmitter S1 switch to the middle position (ATTI. Mode) to regain control.

## Low-Voltage Alert

Low-Voltage Alert is to indicate that the battery cannot provide enough power for the aircraft, in order to warn you to land the aircraft ASAP. There are both first level and second level protections. It is not for fun, you should land your aircraft ASAP to prevent your aircraft from crashing or other harmful consequences!!!

In ATTI. Mode & GPS ATTI. Mode.

✓ The first level protection has LED warning.

✓ During second level protection the aircraft will land automatically with LED warning. Meanwhile the center point of throttle stick will move up slowly to 90% of endpoint, you should land ASAP to prevent your aircraft from crashing! When the center point is at 90% of endpoint, aircraft will still ascend slowly if you continue to pull the throttle stick, and the control of Pitch, Roll and Yaw are the same as before.

---

(1) Configure the FailSafe function in the **assistant software** -> **"Advanced"** -> **"F/S"** and read the instruction thoroughly and carefully.

(2) Configure the Low-Voltage Alert function in the **assistant software** -> **"Advanced"** -> **"Voltage"** and read the instruction thoroughly and carefully.

---

## LED Description

| System Status | LED Flashing |
|---|---|
| System start and self-check | ●◐◌●●◌●◌●●●● |
| IMU abnormal data | ●◐◌ |
| Warm up after power on | ◌◌◌◌ |
| Bias of Sensors too Big | ●●●●●● |
| Compass Error too Big | (bar indicator) |
| Tx signal lost | ◌◌◌◌◌◌◌◌◌◌◌◌◌◌◌◌◌◌◌◌◌◌◌ |
| Low Voltage Alert | ●●●●●●●●●●●●●●●●●●●●●● |
| Record forward direction or home point | ●●●●◌◌●●●●●●●●●●●◌◌●●● |
| Control Mode Indictor | Manual Mode: None<br>ATTI. Mode: ◌ ( stick(s) not at center ◌◌ )<br>GPS Mode: ● ( stick(s) not at center ●● )<br>IOC Mode: ◌● ( stick(s) not at center ◌●● ) |
| GPS Signal State Indicator<br>( GPS/Compass Module is necessary ) | GPS Signal is Best(GPS Satellite number > 6):   None<br>GPS Signal is Well(GPS Satellite number = 6):  ●<br>GPS Signal is Bad (GPS Satellite number = 5) :  ●●<br>GPS Signal is Worst (GPS Satellite number < 5):  ●●● |

| 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.
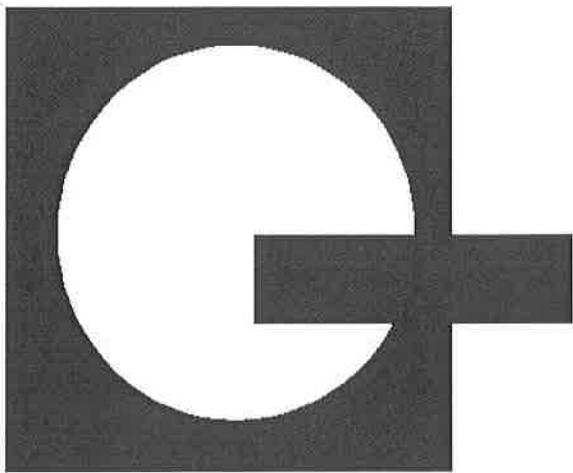
$C \in 0700$

## 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.

# UAS Flight Operations Manual

Version 1.0

**Guardian Group, Inc.**

## TABLE OF CONTENTS

## 1   GENERAL PROTOCOL

1.1   Review and consult the UAS manufacturer's manuals:

*1.1.1   DJI Phantom 3 Pro User Manual,*

*1.1.2   DJI Phantom Advanced Manual,*

*1.1.3   DJI Phantom Flying Flowchart,*

*1.1.4   DJI Phantom Pilot Training Guide,*

*1.1.5   DJI Phantom Quick Start Manual.*

1.2   Minimum crew for each operation shall consist of a pilot, who will be Pilot In Command ("PIC") of the UAS, and one or more Visual Observers ("VO") as necessary to safely conduct the mission.

1.3   The UAS shall be operated within Visual Line of Sight ("VLOS") of the PIC and VO at all times. The PIC will use human vision unaided by any device other than corrective lenses.

1.4   The UAS shall be operated during daylight only. Operations shall occur during daytime Visual Meteorological Conditions ("VMC"). UAS operations under Special Visual Flight Rules ("SVFR"), Instrument Flight Rules ("IFR"), at night, or beyond VLOS are prohibited.

1.5   The VO designated for any operation will be in constant voice contact with the PIC.

1.6   Prior to operation, PIC and VO are to prepare a flight plan setting forth the operational limitations and conditions for the flight operations and a description of any potential hazards on or in the vicinity of the survey site.

1.7   The PIC is prohibited from flying unless (considering wind and forecast weather conditions) there is enough power to fly at normal cruising speed to the intended

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landing point and land the UAV once the low battery warning is received (approximately 20% of the battery's maximum charge).

1.8   The UAV shall remain clear and yield the right of way to all other manned operations and activities at all times (including, but not limited to, ultralight vehicles, parachute activities, parasailing activities, hang gliders, etc.).

1.9   The UAS shall not be operated by the PIC from any moving device or vehicle.

1.10  Flights will be operated at an altitude of no more than 400 feet Above Ground Level ('AGL") and will never enter navigable controlled airspace.

1.11  Flights will be operated at a lateral distance of at least 200 feet from any nonparticipating persons unless that person is in a position where he or she is shielded from the UAS and any possible debris resulting from UAS failure.

1.12  Warning signage shall be placed within 150 feet of UAV operations. *See Section 2.3.*

1.13  At no time shall the UAS be operated so close to persons or objects to present an undue hazard to the PIC or the VO.

1.14  UAS operations shall occur at least 200 feet away from non-participating vehicles or structures unless the property owner/controller has granted permission, and the PIC has made a safety assessment of the risk of operating closer to those objects. At no time shall the UAS be operated so close to structures or vehicles as to present an undue hazard to the PIC or the VO.

1.15  Flights shall be limited to a speed of 30 knots, and vertical ascent/decent will be limited to 10 mph.

1.16  Contingency plan must be in place to safely terminate flight if there is a loss of communication between the PIC and the VO.

1.17  The PIC shall abort flight in the case of unpredicted obstacles or emergencies. *Refer to Section 4 below.*

## 2   PRE-FLIGHT PROTOCOL

2.1   Review local weather forecast.

2.2   Inspect surroundings.

2.2.1   *Visually review the flight location and surroundings.*

2.2.2   *Identify potential risks and challenges:*

2.2.2.1   Vicinity of public safety helipads/heliports,

2.2.2.2   Vicinity of medical helipads/heliports,

      2.2.2.3    Vicinity of airport(s),

      2.2.2.4    Vicinity of light poles,

      2.2.2.5    Vicinity of utility poles/towers/lines,

      2.2.2.6    Vicinity of trees,

      2.2.2.7    Vicinity of elevated obstructions,

      2.2.2.8    Vicinity of roadways with moderate to heavy traffic,

      2.2.2.9    Flocks of birds that may cause interference and potentially impact flight,

      2.2.2.10  Public gatherings that may attract viewer,

      2.2.2.11  Identify optimal point of control to maintain direct line of sight at all times,

      2.2.2.12  Identify optimal point of home position and launch/land location.

2.3    Place warning signage in appropriate locations.

    *2.3.1    Place sign(s) that warn potential observers or bystanders in public spaces.*

      2.3.1.1    Warning signs should state the following:

> **"ATTENTION! AERIAL PHOTOGRAPHY IN PROGRESS. FOR YOUR SAFETY, PLEASE REMAIN 150 FEET BACK."**

2.4    Inspect UAS.

    *2.4.1    Verify that all batteries are in proper working condition.*

      2.4.1.1    Visually inspect batteries for swelling, damage, or leakage.

      2.4.1.2    Verify that all batteries are fully charged.

    *2.4.2    Verify that the UAV is in proper working condition.*

      2.4.2.1    Visually inspect the propellers for warps, chips, and cracks.

      2.4.2.2    Visually inspect the UAV arms and body for damage/loose connections.

# 3   FLIGHT PROTOCOL

3.1    Install propellers and propeller locks (if applicable).

3.2    Install battery.

3.3    Power on radio then power on UAV.

3.4    Set geo-fence that limits UAV flight path to the inspection location only.

3.5    Visually inspect immediate and adjacent surroundings.

3.6    Lift UAV approximately 4 feet off of ground and allow to hover in place.

3.7    Verify that all system inputs are responding normally.

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3.8     Maneuver UAV in a slow controlled manner at all times.

3.9     Restrict flight altitude to a minimum elevation sufficient to acquire data.

3.10    Remain alert to surroundings including the following:

     *3.10.1    Approaching people and vehicles,*

         3.10.1.1    VO shall deflect all distraction from PIC.

     *3.10.2    Birds,*

     *3.10.3    Manned aircraft,*

     *3.10.4    Changes in wind speed and direction,*

     *3.10.5    Location of the sun,*

     *3.10.6    Changes in cloud coverage.*

3.11    Land UAV in same location as take off.

## 4    UNPREDICTED OBSTACLES OR EMERGENCIES

4.1     If at any time the PIC or VO observes or encounters an unpredicted obstacle, the PIC shall immediately land the UAV in a safe location.

4.2     The PIC may increase or decrease altitude based on the location of the unpredicted obstacle to avoid the obstacle.

4.3     If an unpredicted obstacle is identified during normal flight, the PIC shall return the UAV to its home position to further identify the challenge and create a new flight plan.

4.4     If the UAV begins to act in an unpredictable manner, then the PIC shall land the UAV immediately.
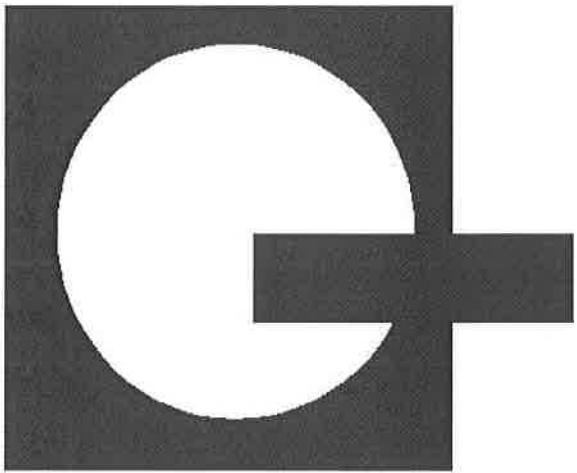
## 5    POST-FLIGHT PROTOCOL

5.1     Shut down UAS.

5.2     Remove propellers.

5.3     Allow all batteries and UAV to cool down.

5.4     Place batteries, transmitter(s), propellers, and accessories into carrying case.

5.5     Log flight time and any conditions that changed during flight.

5.6     Charge batteries pursuant to manufacturers recommendations.

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5.7 Ensure that all systems have the most current version of firmware/software installed.

# 6 FLIGHT LOGS

6.1 The PIC must maintain flight and maintenance logs using the <u>GGI USA Maintenance Operations Log</u>.

# UAS Pre-Flight & Maintenance Operations Log

Version 1.0

# ⊖ Guardian Group, Inc.

UAS: _____

Pilot In Command: _____

- Visual Observer: _____

Date: _____

Project Name: _____

Project Number: _____

Location: _____

Weather Conditions: _____

Flight Plan: _____
_____
_____
_____
_____
_____
_____
_____

Challenges: _____
_____
_____
_____
_____
_____

Flight Notes: _____
_____
_____
_____
_____
_____
_____
_____

Pre-Flight Checklist:
- ☐ Inspect surroundings
- ☐ Note flight plan
- ☐ Note challenges
- ☐ Place warning signage
- ☐ Inspect UAS
- ☐ Inspect batteries
- ☐ Tighten props / Install prop locks
- ☐ Inspect/tighten all connections
- ☐ Review flight plan
- ☐ Set geo-fence (if applicable)
- ☐ Test control inputs

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UAS: DJI Phantom 3 Pro
Maintenance Performed By: 
Date: 

Maintenance Checklist:

- ☐ Inspect UAS
- ☐ Inspect camera
- ☐ Inspect batteries
- ☐ Inspect cables
- ☐ Inspect charger
- ☐ Tighten all connections
- ☐ Inspect propellers

- ☐ Update software
- ☐ Update firmware
- ☐ Calibrate IMU
- ☐ Calibrate compass
- ☐ Test control inputs
- ☐ Charge batteries

Notes: