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

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

May 21, 2015

Exemption No. 11653
Regulatory Docket No. FAA–2015–0661

Ms. LaSheita Sayer
ZoZo Group, LLC
700 East 24th Avenue, Suite 2
Denver, CO 80205

Dear Ms. Sayer:

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 March 13, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of ZoZo Group, Inc. (hereinafter petitioner or operator) for an exemption. The exemption would allow the petitioner to operate an unmanned aircraft system (UAS) to conduct aerial imagery documentation of highway construction projects.

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 FC40 P330.

The petitioner requested relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*. 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 the requested 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. 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, ZoZo Group, LLC 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, ZoZo Group, LLC is hereafter referred to as the operator.

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 FC40 P330 when weighing less than 55 pounds including payload. Proposed operations of any other aircraft will require a new petition or a petition to amend this exemption.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

21. Air Traffic Organization (ATO) Certificate of Waiver or Authorization (COA). All operations shall be conducted in accordance with an ATO-issued COA. The exemption holder may apply for a new or amended COA if it intends to conduct operations that cannot be conducted under the terms of the 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 May 31, 2017, unless sooner superseded or rescinded.

Sincerely,

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

March 13, 2015

U. S. Department of Transportation
Docket Management System
1200 New Jersey Ave., SE
Washington, DC 20590

FAA registration number: N5318Z

Re: Petition for Exemption under Section 333 of the FAA Modernization and Reform Act of 2012 and Part 11 of the Federal Aviation regulations from 14 C.F.R. Part 21; 14 C.F.R. 61.113(a)-(b); 91.7(a); 91.9(b)(2); 91.103(b); 91.109; 91.119; 91.121; 91.151(a); 91.203(a)-(b); 91.405(a); 91.407(a)(1); 91.409(a)(2); 91.417(a)-(b).

Dear Sir or Madam

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 and 14 C.F.R. 11, ZoZo Group, LLC herein referred to as "Applicant," a public relations firm specializing in public information and communication on state-owned construction projects, hereby applies for an exemption from the listed Federal Aviation Regulations ("FAR") to allow commercial operation of its small Unmanned Aircraft Systems ("UAS"), so long as such operations are conducted within the conditions and limitations outlined in the following petition or as may be established by the FAA as required by Section 333.

Approval of this exemption would thereby be consistent with the Secretary of Transportation's (the FAA Administrator's) responsibilities to "…establish requirements for the safe operation of such aircraft systems in the national airspace system." Section 333(c) of the Reform Act.

Regards,

LaSheita Sayer
ZoZo Group, LLC

Table of Contents

1. THE NAME AND ADDRESS OF THE APPLICANT IS:

ZoZo Group, LLC
Attn: LaSheita Sayer
Ph: 720-949-2020
Email: LaSheita@zozogroup.com
700 E. 24th Ave., Suite 2, Denver, CO 80205

2. REGULATIONS FROM WHICH THE EXEMPTION IS REQUESTED ARE:

14 C.F.R. 21

14 C.F.R. 45.23(b)

14 C.F.R. 61.113 (a)-(b)

14 C.F.R. 91.7 (a)

14 C.F.R. 91.9 (b) (2)

14 C.F.R. 91.103

14 C.F.R. 91.109

14 C.F.R. 91.119

14 C.F.R. 91.121

14 C.F.R. 91.151(a)

14 C.F.R. 91.203 (a)-(b)

14 C.F.R. 91.405 (a)

14 C.F.R. 91.407 (a) (1)

14 C.F.R. 91.409 (a) (2)

14 C.F.R. 91.417 (a)-(b)

3. STATUTORY AUTHORITY

The Federal Aviation Act grants the FAA authority to issue exemptions to any regulations made pursuant to this title under 49 U.S.C. §44701(f), should the exemption be deemed to be in the public interest.

Section 333(b) of the Reform Act gives guidance in determining whether a UAS may operate safely within the National Airspace System (NAS) without creating hazard to the user or the public. The factors to be considered under this subsection are:

- The size, weight, speed, and operational capability of the UAS;
- Whether the operation of the UAS will be in close proximity to airports and populated areas; and
- Whether the operation of the UAS will be within visual line of sight of the operator.

4. PUBLIC INTEREST CONSIDERATIONS

Applicant is a public relations firm specializing in the management of public information services on public works projects, primarily through the Colorado Department of Transportation (CDOT). Applicant's role on these projects is to provide accurate and timely information to the taxpaying public of Colorado regarding government funded construction projects. Applicant serves on public works projects throughout the State of Colorado and is typically involved in 25 to 35 public information projects each year, each requiring weekly or monthly progress imaging. Due to the limited ground-level accessibility of construction sites, one challenge Applicant has encountered is the inability to fully demonstrate the effective use of taxpayers' dollars through ground level imaging.

Applicant also proposes to use the UAS to enhance the safety of its team that document the progress of each construction project. The UAS will substantially improve safety conditions for Applicant's team by allowing members to remain a safe distance from traffic and construction equipment while documenting the progress of each construction project.

In order to more safely and effectively illustrate the progress on public works projects, Applicant requests exemptions from FAR provisions concerning the commercial use of civil aircraft in the national airspace (NAS). Granting this exemption will help provide improved public information regarding highway construction and improve safety conditions for Applicant's employees.

5. SAFETY CONSIDERATIONS

The following conditions and limitations, to which Applicant agrees to be bound, provide for at least an equivalent level of safety to operations under the current regulatory scheme. The conditions and limitations proposed for the commercial operation of the UAS owned and operated by Applicant are as follows:

1. The UAS will weigh less than fifteen pounds, including payload.
2. Flights will operate at speeds of less than 40 knots
3. Maximum total flight time for each operational flight will be 10 minutes or less.
4. Flight time, date, and location will be recording before and after each operation.

5. Flights will be operated at an altitude of no more than 400 feet AGL.
6. Operations will occur during normal Visual Flight Rule Meteorological Conditions
7. UAS Pilot will be Pilot in Command (PIC).
8. Minimum crew for each operation will consist of the PIC who will keep the UAS within his visual line of sight at all times. One or more Visual Observers may also be present for operations, if determined necessary by the PIC.
9. The PIC will be trained in flight operations and safety procedures as detailed in the submitted flight operations and procedures manual.
10. The PIC will hold at least a current third-class medical certificate.
11. Notification to stakeholders will be delivered prior to the scheduled flight operations. Stakeholders will be identified in accordance with the public information specifications set forth by the public entity for each project. Notification may be provided on the flyers distributed to notify such stakeholders of the project start.
12. The UAS will be programmed to return to a pre-determined location within the secure perimeter and land should the UAS lose communications or GPS signal.
13. The PIC will complete a customized UAS flight course, to be commissioned and designed by a professional instructor.
14. Operations will not take place over densely populated areas or within five miles of an airport. The UAS will not be operated by the PIC from a moving vehicle.
15. Prior to proposed operations, the PIC will have completed UAS training described above and will have logged at least one successful takeoff and landing in the proceeding 90 days with the UAS to be used in the proposed operations in order to ensure that the UAS is in good operating condition.
16. The PIC will land the UAS prior to battery levels dropping below the manufactures' recommended minimum level for safe operations.
17. An integrated Global Positioning System (GPS) on the UAS which allows the UAS to hover and land safely if communication with remote control pilot is lost will be initiated prior to all operations.

Because Applicant plans to use this small aircraft in low-speed, low-altitude operations only under normal weather conditions within the VLOS of the pilot, the operation of the aircraft by

Applicant in the National Airspace System will not pose a threat to public safety and should be exempted from the regulations listed above.

6. SPECIFIC REGULATIONS

14 C.F.R. Part 21, Subpart H: Airworthiness Certificates; 14 C.F.R. 91.203(a)(1)

ZoZo Group's UAS is a DJI Phantom FC40 P330 rotorcraft, weighing less than fifteen pounds, including payload. It carries no hazardous or flammable materials, is unmanned, and operates at speeds of no more than 40 knots. The aircraft can hover and move in a vertical and horizontal plane simultaneously and is equipped with remote link failsafe including a "return to home" feature. Flight operations will only take place in a predetermined and limited area during normal weather conditions and always within the visual line of sight (VLOS) of the Pilot in Command (PIC). All operations will fall within Class G airspace, under 400 feet AGL. Applicant therefore seeks complete relief from this Section.

14 C.F.R. 45.23(b) - Display of Markings

The size of the DJI Phantom UAS makes it impossible to mark the aircraft in accordance with Section 45.23(b). Labeling areas of the aircraft is unnecessary because the UAS will have no entrance, cabin, cockpit, or pilot station. Applicant therefore seeks complete relief from this Section.

14 C.F.R. 61.113 (a)-(b) - Private Pilot privileges and limitations; Pilot in Command (PIC)

14 C.F.R. 61.113 restricts a person with a private pilot's certificate from being the PIC in a commercial flight. Due to the size and weight of Applicant's UAS, the condition that no passengers or pilot will be carried on board, and the condition that no property will be transported, Applicant proposes an alternative requirement for the PIC of their UAS.

The limited size, weight, and operational capacity of the DJI Phantom in combination with the restrictions on use detailed above eliminates the need for a commercial pilot with the in-depth aeronautical knowledge required in commercial pilot licensure. The limited capacity of the battery in the DJI Phantom UAS restricts the overall flight time of the aircraft. The DJI

Manufacturer suggests that the maximum battery life is between 15-18 minutes. Applicant proposes a limitation on flight time to ensure that the UAS retains enough charge to safely land and make any emergency maneuvers. In light of the estimated battery life, no flights shall go longer than 10 minutes per battery charge or shall use more than 80% of battery life during each flight operation. Additionally, the DJI UAS is also equipped with failsafe modes to alert the operator when battery life is no longer able to support the continued flight of the UAS. Page 15 of the FOPM explains emergency battery procedures for this DJI Phantom UAS. An equivalent level of safety provided by the regulations in 14 C.F.R. 61.113 (a)-(b) can be achieved by pairing a basic aeronautical understanding along with a customized UAS-specific training program designed for Applicant's specific use of the UAS. Given the unique operational capabilities and safety features of Applicant's UAS, Applicant proposes that the PIC not be required to hold a commercial pilot certification. Instead, Applicant proposes its operators should be required to:

- Complete a customized UAS flight school course, to be commissioned and designed by a professional instructor.
- Be trained in flight operations and safety procedures as detailed in the submitted flight operations and procedures manual.
- Have logged at least one successful takeoff and landing in the proceeding 90 days with the UAS to be used in the proposed operations in order to ensure that the UAS is in good operating condition.
- Complete the checklist provided in the FOPM prior to operation.

14 C.F.R. 91.7(a): Civil aircraft airworthiness.

The regulation requires that no person may operate a civil aircraft unless it is in airworthy condition. In light of the size, features, and nature of proposed use, Applicant seeks complete relief from this section.

Applicant proposes a pre-flight inspection checklist to be completed prior to each flight operation in place of such airworthiness certificates which will include:

- Checking battery condition and levels in both the transmitter and UAS.
- Establishing communication between the transmitter and UAS.
- A visual check for power lines, antennas and other overhead objects.

- Evaluation of wind and weather conditions.

14 C.F.R. 91.9(b)(2): Civil Aircraft Flight Manual in the Aircraft.

The applicant proposes that all materials suggested in 14 C.F.R. § 91.9(b), § 91.203(a) and (b), § 47.3(b)(2), and 47.31(c) be available at the ground station within reach of the PIC during flight operations. Because the manufacturer of the DJI phantom does not have an FAA-approved Airplane or Rotorcraft Flight Manual, a supplementary customized Flight Operations and Procedures Manual (FOPM) will be created by Applicant. Applicant will thus satisfy the intent of the regulation.

14 C.F.R. 91.103- Preflight action

The pre-flight checklist proposed above, to be included in the FOPM, will provide an equivalent level of safety to that provided by the regulations in this section. Before each flight, the PIC will perform all pre-flight check items listed above including reviewing weather, checking battery levels, aircraft performance data, and estimates of landing and takeoff distances.

14 C.F.R. 91.109- Flight Instruction

This Section provides that no person may operate a civil aircraft (except a manned free balloon) that is being used for flight instruction unless that aircraft has fully functioning dual controls.

By its design, UAS do not include dual controls or any type of throw-over controls to aid in flight instruction. However, because the transmitter is hand-held, an instructor can take over control of the UAS easily by simply handing the controller to the instructor. This will provide an equivalent level of safety as the dual-control feature provides in commercial aircraft during training and instruction.

14 C.F. R. 91.119 - Minimum safe altitudes: General

Due to the size and speed of Applicant's UAS, the device may be operated at less than the minimums prescribed in paragraph (b) or (c) of this Section. The regulation states that over populated areas the aircraft cannot be operated closer than 500 feet to any person, vessel, vehicle,

or structure. Since the typical photo assignment would be photography of unopened intersections and/or roads, it may become necessary to operate at distances closer than 500 feet. Due to the small size and weight of the UAS and the type of locations it will be flying over, operating the device at a closer proximity would not adversely affect public safety or national security. Also the UAS will not carry a pilot or any passengers and will also not store any types of flammable or hazardous liquids on board therefore greatly reducing any potential harm.

An equivalent level of safety to that achieved by this provision will be achieved in Applicant's proposed operations given the size, weight, and speed of the UAS as well as the nature of the proposed use of the UAS. The majority of flight operations will take place over closed construction sites and other sparsely populated areas. No flight will be taken without notice to identifiable stakeholders.

14 C.F.R. 91.121- Altimeter settings

The DJI Phantom does not have a barometric altimeter. Instead, the device has a GPS altitude read out. Applicant seeks complete relief from this Section. An equivalent level of safety will be achieved by use of the GPS altitude indicator to confirm the altitude of the launch site shown before flight, pursuant to the FOPM Manual and Safety Check list.

14 C.F.R. § 91.151(a): Fuel Requirements for Flight in VFR Conditions

Section 91.151 (a) prohibits an individual from beginning "a flight in an airplane under VFR conditions unless (considering wind and forecast weather conditions) there is enough fuel to fly to the first point of intended landing, and, assuming normal cruising speed – (1) During the day, to fly after that for at least 30 minutes; or (2) At night, to fly after that for at least 45 minutes."

Due to the specifications of the DJI Phantom its battery does not allow for flights longer than 15 minutes. Given that flight operations will typically be completed in 7-10 minutes, requiring a reserve of 30 minutes of power would be impractical for Applicant's UAS. Further, the intention in the proposed operations of the UAS is to photograph/video record areas which typically under three miles in length in a very short period of time.

14 C.F.R. 91.203 (a)-(b) – Civil Aircraft; Certifications Required

The regulation provides in part:

(a) Except as provided in § 91.715, no person may operate a civil aircraft unless it has within it the following:

(1) An appropriate and current airworthiness certificate. . . .

(2) 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.

Because Applicant's UAS weighs less than fifteen pounds and lacks the capacity to carry any additional materials, aside from its battery and the attached camera; in order to achieve an equivalent level of safety the applicant proposes that the paperwork required by 91.203 to be located at the ground station, immediately accessible to the PIC.

14 C.F.R. 91.405, 14 C.F.R. 91.407, 14 C.F.R. 91.409, 14, C.F.R. 91.417 - Inspections, Maintenance required, Operation after maintenance, preventive maintenance, rebuilding or Alteration, Maintenance Records

Section 91.405(a) requires, in pertinent part, that an aircraft operator or owner shall have the aircraft inspected and shall, between required inspections, have any deficiencies repaired.

Section 91.407(a)(1) prohibits, in pertinent part, any person from operating an aircraft that has undergone maintenance, preventive maintenance, rebuilding, or alteration unless it has been approved for return to service by a person authorized under Section 43.7.

Section 91.409(a)(2) prescribes, in pertinent part, that no person may operate an aircraft unless, within the preceding year, it has had an inspection for the issuance of an airworthiness certificate.

Section 91.417(a) and (b) prescribes, in pertinent part, that records of maintenance must be kept.

An equivalent level of safety will be achieved because Applicant's small UAS is very limited in size and will carry a small payload consisting only of a camera, and operate only in restricted areas for limited periods of time. If mechanical issues arise, the UAS can land immediately and will never exceed an altitude of 400 feet AGL. Further, because there is no certified inspection facility for the DJI Phantom UAS, it is impossible for Applicant to comply with these regulations.

7. ZOZO GROUP'S SUMMARY OF REQUESTS FOR ITS UAS

Pursuant to 14 C.F.R. Part 11, the following summary is provided for publication in the Federal Register, should it be determined that publication is needed:

Applicant seeks an exemption from the following rules:
14 C.F.R. Parts 21- Subpart H; 14 C.F.R. 45.23(b); 14 C.F.R 61.113 (a)-(b); 14 C.F.R. 91.7 (a); 14 C.F.R. 91.9 (b) (2); 14 C.F.R. 91.103; 14 C.F.R. 91.109; 14 C.F. R. 91.119; 14 C.F.R. 91.121; 14 C.F.R. § 91.151(a); 14 C.F.R. 91.203 (a)-(b); 14 C.F.R. 91.405 (a); 14 C.F.R. 91. 407 (a) (1); 14 C.F.R. 91.409 (a) (2); 14 C.F.R. 91.417 (a) -(b) to operate commercially a small unmanned vehicle (55lbs or less) for aerial imagery documentation of highway construction projects.

Approved commercial flight operations would result in more comprehensive and effective public information provided to drivers and the tax-paying public of Colorado regarding construction projects in the state. Additionally, approval of this exemption would help increase public safety by making project documentation protocol safer. Current procedures endanger the safety of Applicant's team by requiring team members to enter potentially unsafe construction zones to document progress. Applicant's use of a UAS will allow to more accurately and safely capture high resolution images of project progress.

The size, weight, and limited operational capabilities of the DJI Phantom UAS owned by Applicant provide no substantial risks to the integrity or safety of the NAS and poses no threat to national security. The UAS will not carry any passengers or a pilot, will not contain any flammable or hazardous materials, and will always operate in Class G airspace at speeds lower than 40 knots. Along with the physical features of the UAS itself, the procedures imposed by this exemption create a level safety that is equivalent or greater than the safety provided by current regulations.

ZoZo

ZoZo Group, LLC

DJI Phantom
Flight Operations and Procedures Manual

Pre-flight Instruction & Takeoff sequence

Operations Check List

Aircraft and Transmitter Specifactions

PHANTOM Quick Start Manual v1.7

ZoZo Group, LLC

FAA Registration:

N 5318Z

Specifactions of the Aircraft

Parameters		Range
Operating Temperature		- 10℃ to 50℃
Power Consumption		3.12 W
Supported Battery		Only 3S LiPo
Take Off Weight		< 1200g
Hovering Accuracy		Vertical: .8m. Horizontal: 2.5m
Max. Yaw Angular Velocity		200 °/s
Max. Tilt Angle		35°
Max Ascent/ Descent speed		6 m/s (11.66 knots)
Max Flight Velocity		10 m/s (19.45 knots)
Diagonal Distance		350 mm
Weight		670 g
Weight(with Battery)		800 g

Transmitter Specfications

Parameters		Range
Working Frequency		2.4 GHz ISM
Control Channel Numbers of Transmitter		7
Communication Distance		1000 m
Receive Sensitivity (1% PER)		> - 100 dBm
Working Current/Voltage		52 mA@6V
4 AA Batteries required		

DJI Phantom

Flight Operations and Procedures

Part 1

Pre-flight Instruction

Before powering up the DJI Phantom

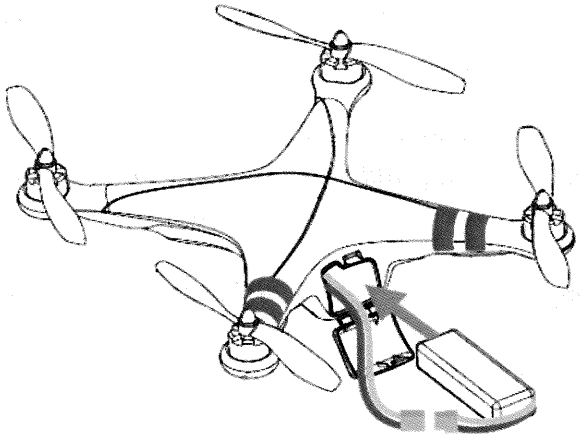
Make sure batteries in transmitter are good
Make sure DJI 3S LiPo battery is fully charged
Make sure Control Mode switch S1 is in GPS mode
Make sure IOC Switch S2 is in off postion
Before each flight in new area make sure that DJI copter has been properly calibrated
Make sure to first switch on the remote transmitter then power on the DJI Phantom before takeoff
Make sure to power off the multi rotor first then switch off the transmitter after landing
Aircraft camera shouldd face away from pilot before takeoff

1. Switch power switch to ON position on remote transmitter

2

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.



3. Wait about 1 to 2 minutes for LED indicator light to be flashing green only
(a rapidly blinking green light 4 times in a row means the home point has been set)

4. Make sure that Control Mode Switch S1 is switched all the way up to GPS mode
and LED indicator on Dji phantom air system is flashing only green

5. When Control mode switch S1 is in GPS mode on trasmitter and the LED indiator
on the DJI Phantom airsystem is flashing green only motor start up and take off phase may begin.

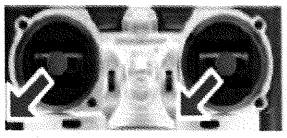
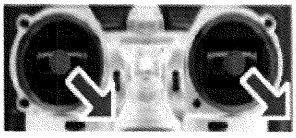
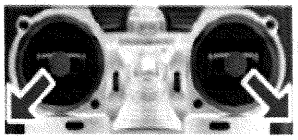
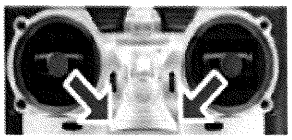
DJI Phantom

Flight Operations and Procedures

Part 2

Motor Start Up and Take off Phase

1. When Control mode switch S1 is in GPS mode on trasmitter and the LED indiator on the DJI Phantom airsystem pull both joysticks to the corners in one of the demonstrated ways.

2. This will power on the DJI Phantom engine, propellers should be spinning but DJI phantom airsystem should stil

3. To initiate take off push the left joystick (throttle) up past 70% so the DJi takes off quickly and smoothly from tl
(Don't Hesitate! Make sure you give the copter adequate throtle to get off the ground,
if you are too soft with the throttle on take off the Dji phantom will flip)

4. Once off the ground allow the DJI Phantom quadcopter to hover at about 10 ft AGL for around 25 seconds to 3(
(This allows IMU to warm up)

5. After the DJI Phantom is in the air make sure the Control mode switch S1 switch remains in GPS mode for the d
(If copter is driffting drastically or flying iradically land copter immidiately and begin to trouble shoot)
(If copter begins to flash red only slowly land the copter and begin trouble shooting)

6. Flights should last no longer than 8 minutes, When flight has been completed bring copter to a resonable landi

7. After copter is on the ground power off motor by using the same command as the start up, pull both joysticks i

8. Never power down transmitter before powering off the DJI Phantom air sytem

DJI Phantom Flight Operation Checklist

Aerial/ Ground

- ☐ Weather Forecast
- ☐ Airports/Airspace
- ☐ Flight Plan Hazards
- ☐ Emergency Plan
- ☐ Battery charge-100%
- ☐ Router charge -100%

Phantom Pre-Flight

- ☐ Router-ON
- ☐ Controller-On
- ☐ Toggle Switches-FULL UP
- ☐ Rotor Blades- INSTALLED
- ☐ sUAS Antenna- CHECK
- ☐ sUAS Visual Inspection-CHECK
- ☐ Gimbal Lock/ Lens Cap
- ☐ sUAS Battery- INSERTED
- ☐ sUAS power- ON
- ☐ Camera- ON & connected
- ☐ Satellite Connection
- ☐ Switch S1 toggle 5+ to intiate calibration (Yellow)
- ☐ Rotate Horizontally 360 degree (Green)
- ☐ Turn nose down, rotate 360 degrees (Flashing Green)
- ☐ Set on level surface
- ☐ Clear area
- ☐ Start rotor blades
- ☐ Initiate takeoff sequencing

Post Takeoff Checklist

- ☐ Hover ten feet AGL-CONFIRM CONTROL
- ☐ All sticks operate correctly in hover-Verified
- ☐ Camera-FULL UP
- ☐ Video recording-STOP
- ☐ Landing Zone - CLEAR
- ☐ Hover to Landing

Pre Land Checklist

- ☐ Landing area CLEAR
- ☐ Images COMPLETE

Post Land Checklist

- ☐ Power OFF
- ☐ Battery- Removed
- ☐ Transmitter- OFF
- ☐ Router-OFF
- ☐ Notify Tower/ CTAF - end of operation

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.

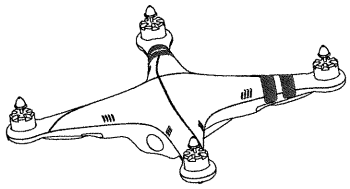
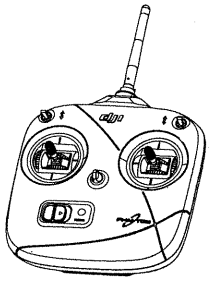
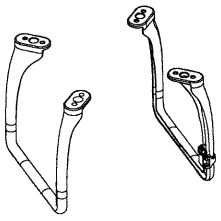
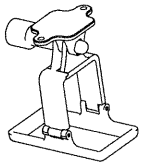
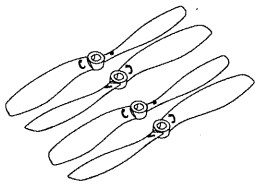
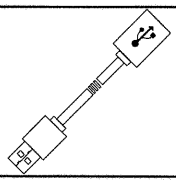
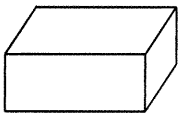
Trademarks

DJI and PHANTOM are registered trademarks of DJI Innovations. Names of product, brand, etc., appearing in this manual are trademarks or registered trademarks of their respective owner companies. This product and manual are copyrighted by DJI Innovations with all rights reserved. No part of this product or manual shall be reproduced in any form without the prior written consent or authorization of DJI Innovations. No patent liability is assumed with respect to the use of the product or information contained herein.

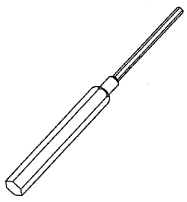
Battery Usage & Charging Cautions

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

In the Box

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

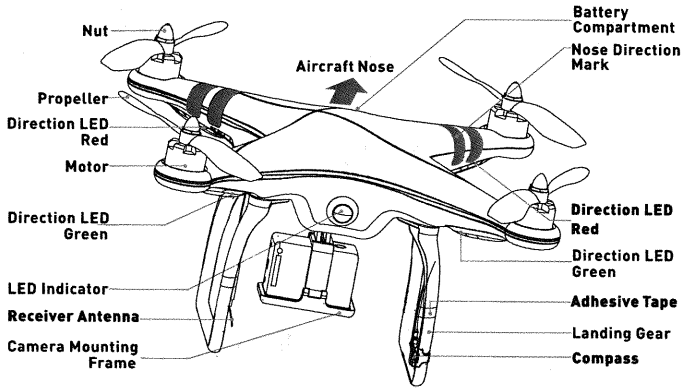
Required Items

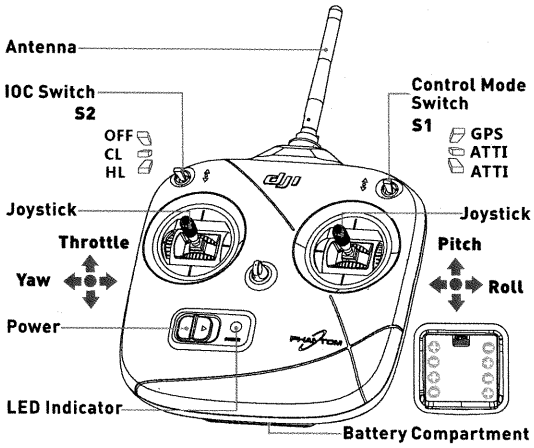
Phillips Screwdriver	5# AA Batteries
	

Introduction

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

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



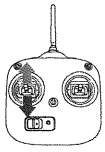
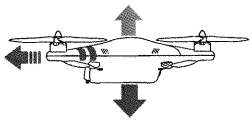
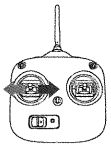
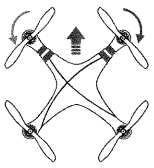
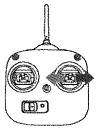
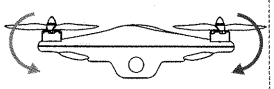
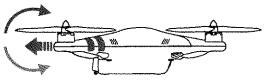
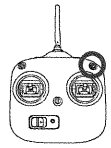
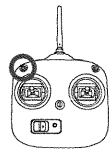
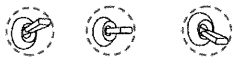


- ✓ Working Frequency: 2.4GHz ISM
- ✓ Control Channel Numbers of Transmitter: 7
- ✓ Communication Distance: 1000m
- ✓ Receiver Sensitivity(1%PER): > -100dBm
- ✓ Power Consumption of Transmitter: < 20dBm
- ✓ Working Current/Voltage: 52 mA@6V
- ✓ AA Battery (5#): 4 Required

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).
		
	 GPS ATTI. ATTI. ATTI. (Manual or Failsafe is selectable 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.
	 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.

- 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.

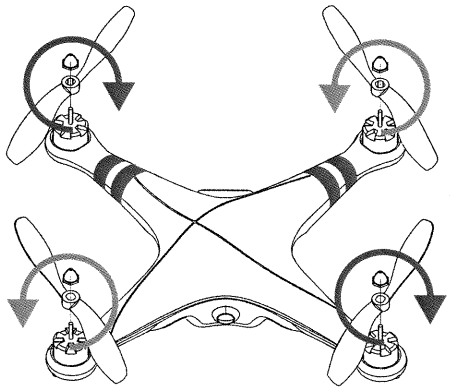
2. Battery Charging – LiPo Battery

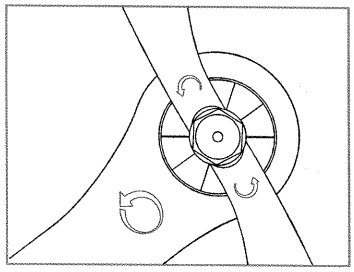
Please use the full charged battery of 3S LiPo.
(Recommended parameters: 733496 - 2200MAH-20C - 11.1V.)
The built-in ESCs of PHANTOM ONLY support 3S (11.1V) power supply. DO NOT use the battery of higher voltage.

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.

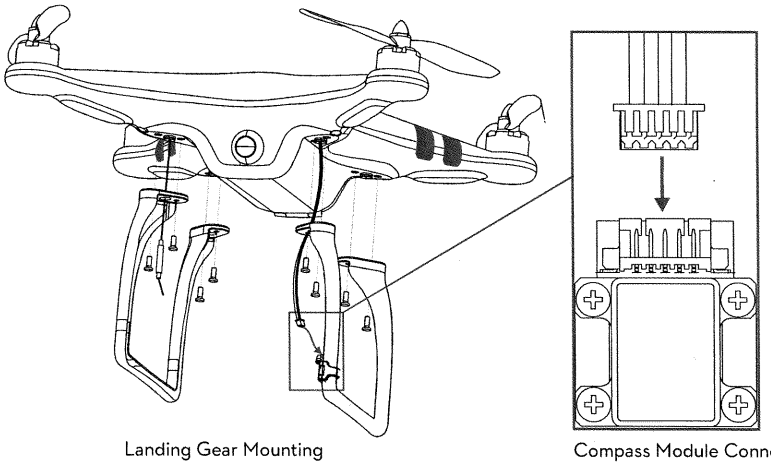




4. Mount the Landing Gear with the Compass Module if Required

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

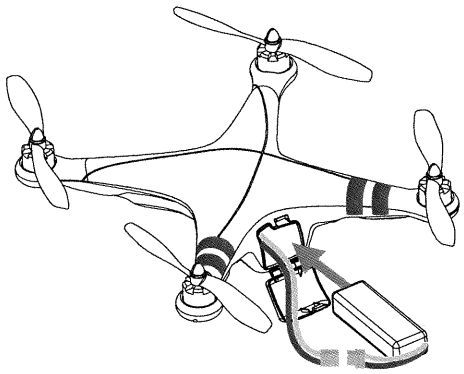
- When flying, please make sure the compass module is stationary and firm.
- If the Landing Gear with the compass module mount on has been deformed, please replace it with a new one and mount it as the procedures above.
- The compass module is not waterproof, and not anti-oil.
- DO NOT use the magnetic 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.

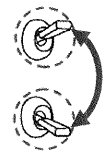
The GPS module has a built-in magnetic field sensor for measuring the geomagnetic field, which is not the same in different areas. The GPS module will not work unless the Compass Module has been connected. Make sure the Compass Module connections are correct.

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.

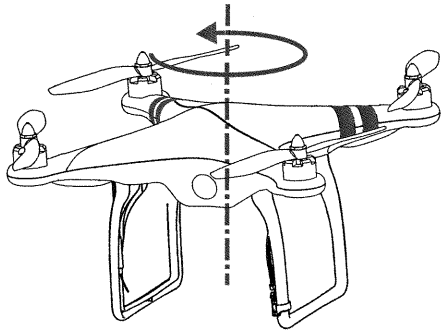
Calibrate the compass before the first flight or when flying in a different area. Make sure to keep away from ferromagnetic substance and other electronic equipment when calibrating or flying. If you keep having calibration failure, it might suggest that there is magnetic interference or other ferromagnetic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

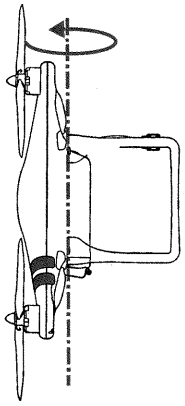
1. Quickly switch the control mode switch from ***ATTI. Mode*** to ***GPS ATTI. Mode*** and back to ***ATTI. Mode*** for 6 to 10 times, The LED indicator will turn to constantly yellow.
2. Rotate your aircraft around the horizontal axis (about 360°) until the LED changes to constant green, and then go 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.



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.

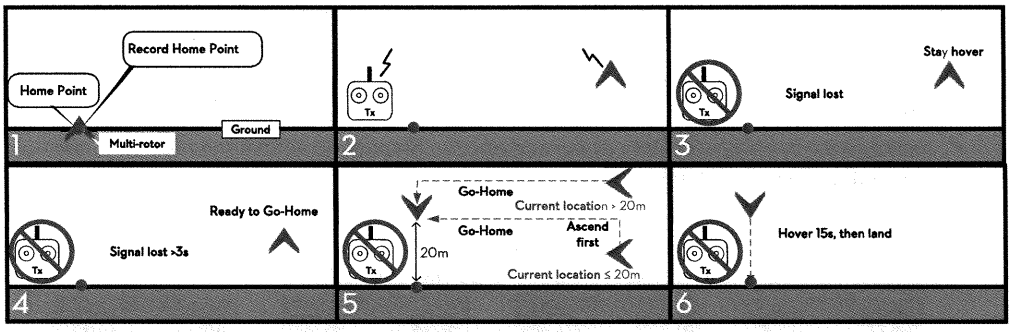
   - ✓ Release the yaw, roll and pitch sticks and keep them at the neutral position, at the same time raise the throttle stick from the bottom. The motors will stop if you do not push the throttle stick from the bottom within 3 sec and you will need to re-start the motors.
   - ✓ Keep raising the throttle 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.
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.

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.

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

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	
Tx signal lost	
Low Voltage Alert	
Record forward direction or home point	
Control Mode Indictor	Manual Mode: None ATTI. Mode:  (stick(s) not at center ) GPS Mode:  (stick(s) not at center ) IOC Mode:  (stick(s) not at center )
GPS Signal State Indicator (GPS/Compass Module is necessary)	GPS Signal is Best(GPS Satellite number > 6): None GPS Signal is Well(GPS Satellite number = 6):  GPS Signal is Bad (GPS Satellite number = 5) :  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.

CE 0700

FCC Statement

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

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

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

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

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

PHANTOM PILOT TRAINING GUIDE

Earning Your Stripes

Learn More: www.dji.com

⚠ CAUTION

AGES 18+

⚠ WARNING!
Rotating parts may cause injury

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.

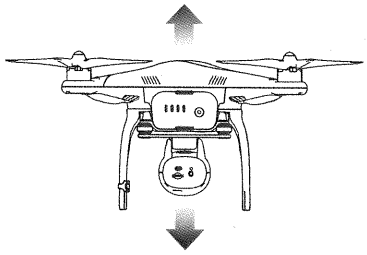
FORBIDDEN

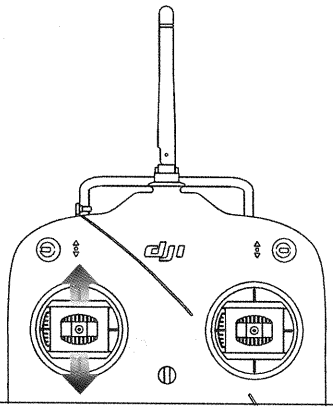
DO NOT touch the propellers after the Phantom has been started.

NO TOUCH

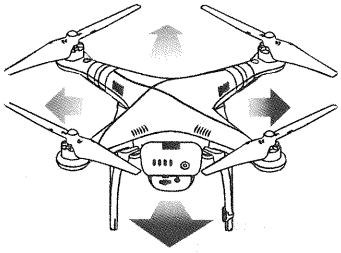
Basic Flight Maneuvers (★)

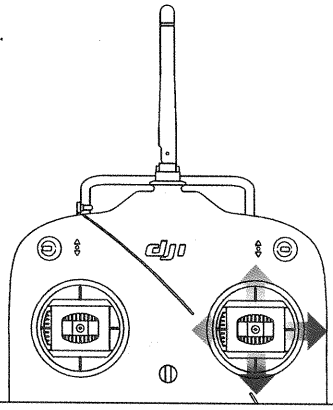
1 Take off and land with battery facing you.



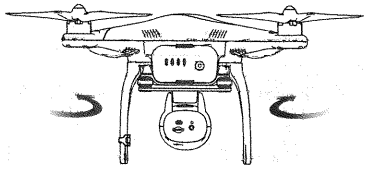


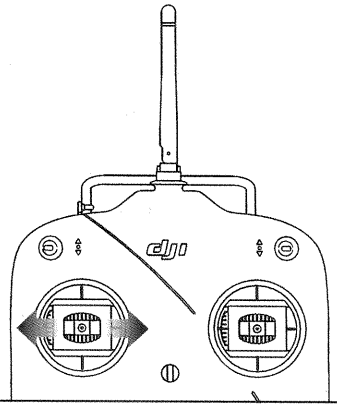
2 Hover in one spot keeping battery facing you, make sure to control Left/Right/Forward/Back movement.





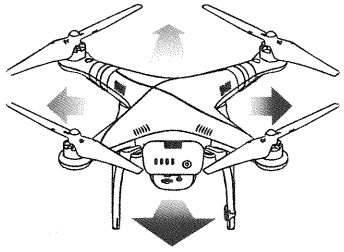
3 Rotate left, rotate right but try to keep the battery pointed at yourself.

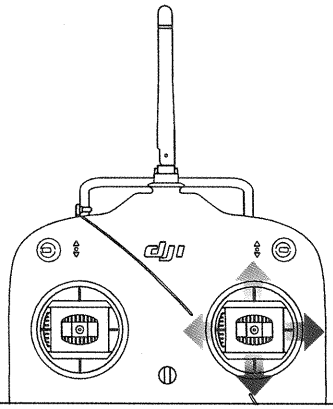




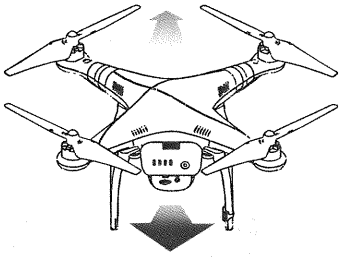
Basic Flight Maneuvers (★)

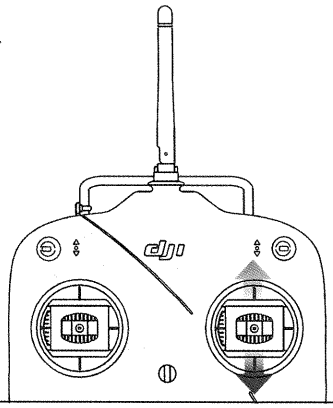
4 Slowly fly forward/back/left/right with back of Phantom pointed at yourself.



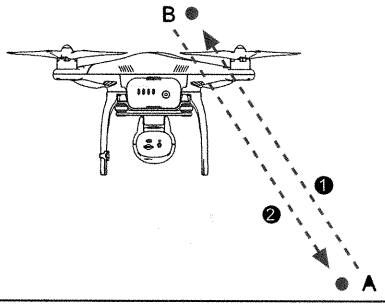


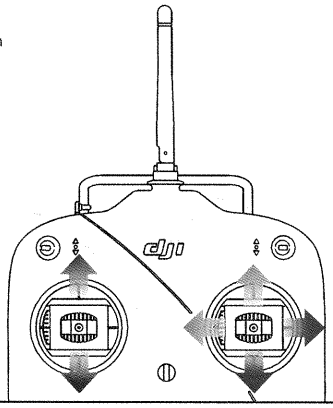
5 Fly forward to a spot 20~30 feet away.
Then fly back keeping the battery pointed at yourself.





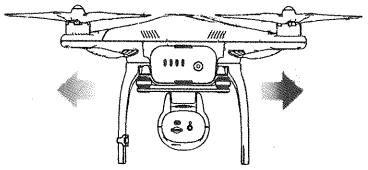
6 Mark a spot (B) on the ground 10ft away from the Phantom 's take off point. Hover and fly towards that spot and land at the spot (B). Then go back into a hover and bring the Phantom back to its original position (A) and land again.



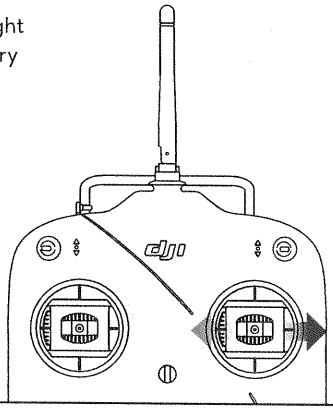


Basic Flight Maneuvers (★)

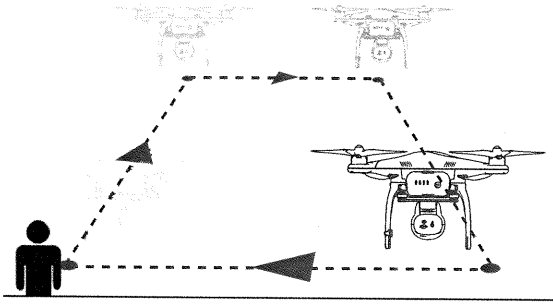
7 Fly left 10ft away from your take-off point, then fly right 10ft from your take-off point all while keeping battery pointed at yourself.

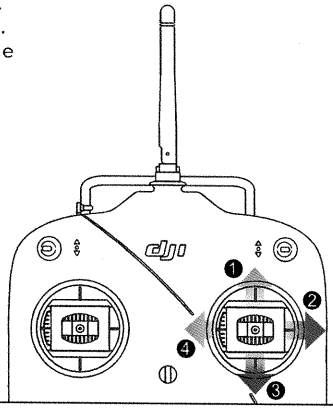


3 meters 3 meters

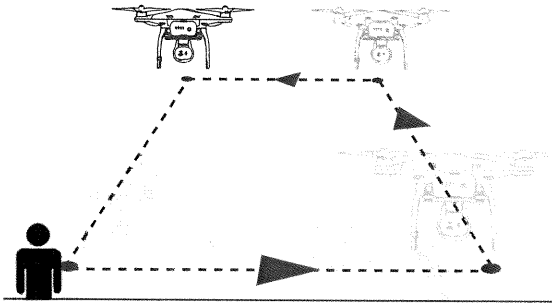


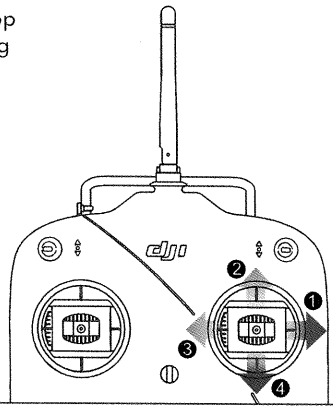
8 Then, while keeping the camera pointed forward, fly a 4 point square box formation going clockwise. Be sure to be in control and stop and hover in place at each point before proceeding to the next point.





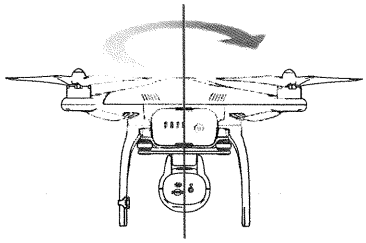
9 Do the same as above but fly the 4 point box formation counter-clockwise. Be sure to be in control and stop and hover in place at each point before proceeding to the next point.

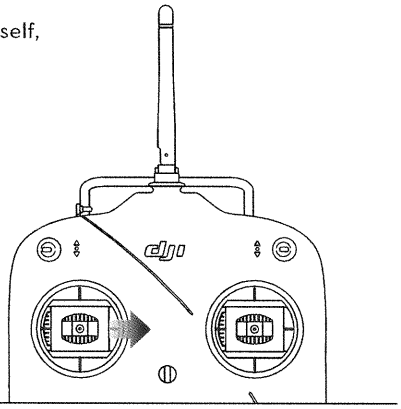




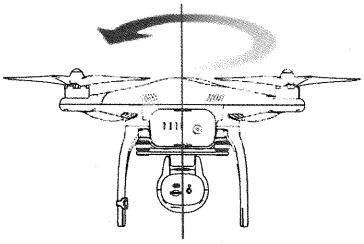
Skilled Flight Maneuvers (★ ★)

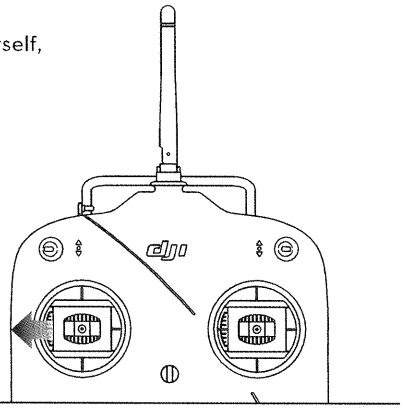
1 In a hover, starting with the battery pointed at yourself, rotate 360 degrees clockwise.



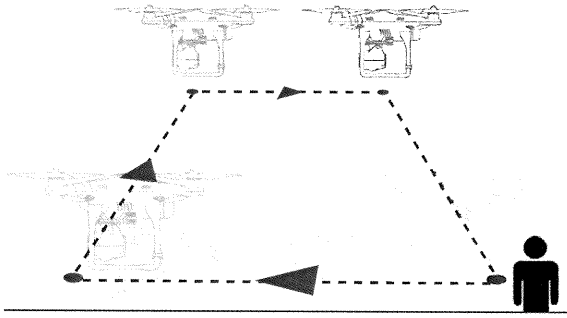


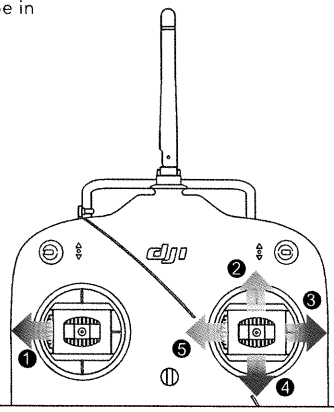
2 In a hover, starting with the battery pointed at yourself, rotate 360 degrees counter-clockwise.





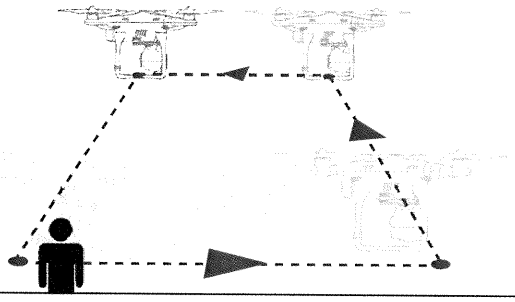
3 Starting with the battery pointed at yourself, go into a hover. Then rotate the Phantom 90 degrees facing left, and fly a 4 point square box formation going clockwise. Be sure to be in control and stop and hover in place at each point before proceeding to the next point.

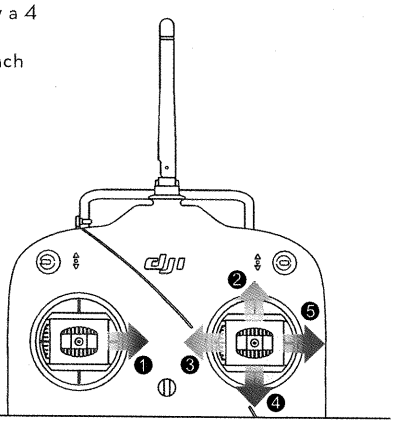




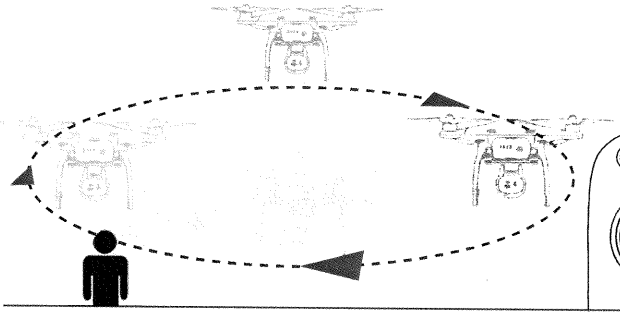
Skilled Flight Maneuvers (★ ★)

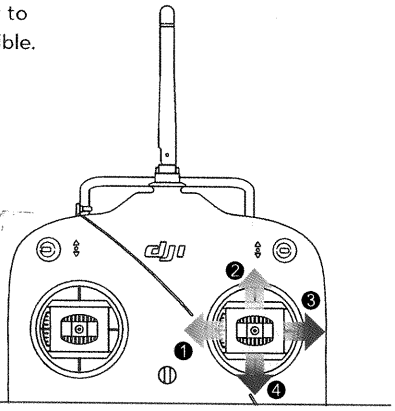
4 Starting with the battery pointed at yourself, go into a hover. Then rotate the Phantom 90 degrees facing right, and fly a 4 point square box formation going counter-clockwise. Be sure to be in control and stop and hover in place at each point before proceeding to the next point.



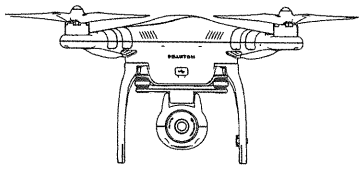


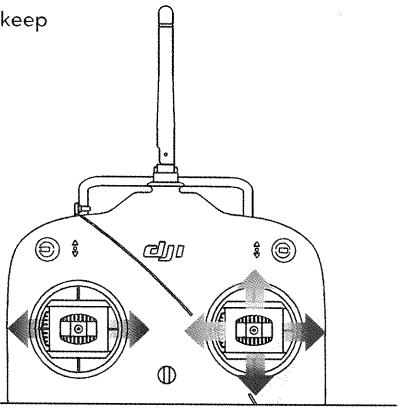
5 With the battery pointed at yourself, fly a circle. Try to keep the altitude and also the circle as uniform as possible.





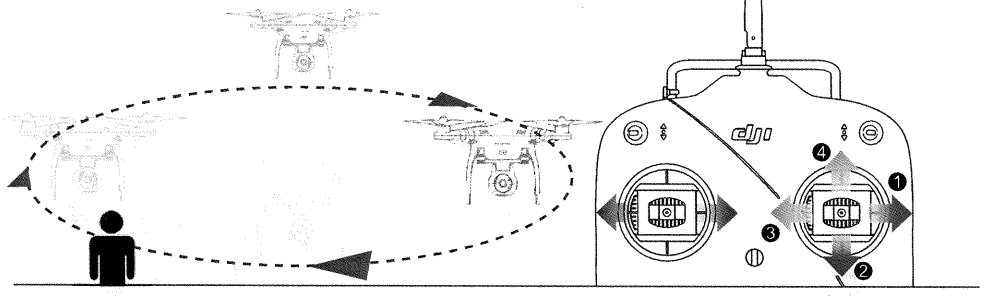
6 Hover with the camera pointed at yourself and try to keep the Phantom in one place.



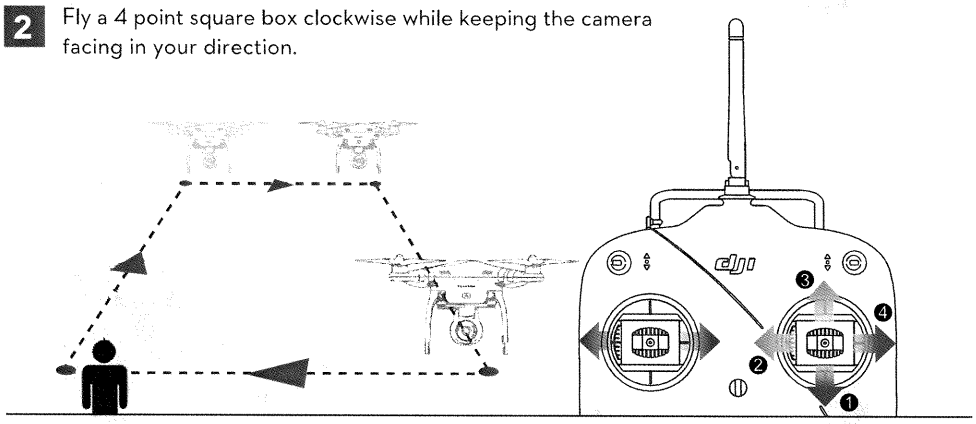


Advanced Flight Maneuvers (★★★)

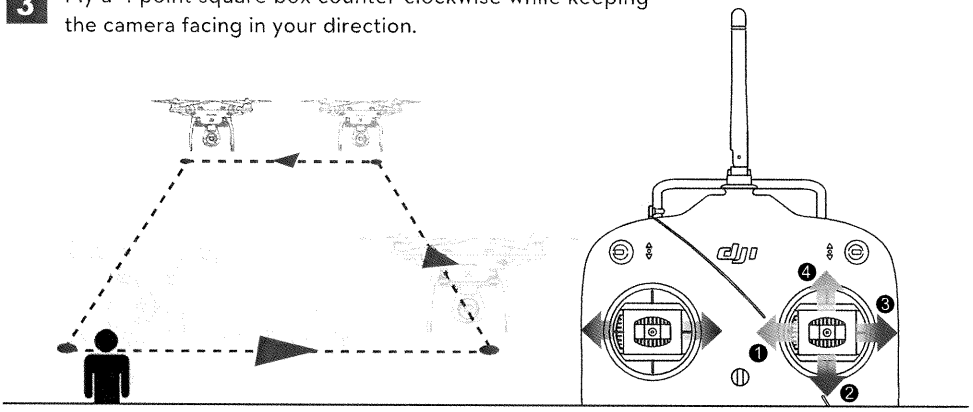
1 Fly a circle and keep the camera pointed towards you. Be sure to keep the altitude the same and the circle as uniform as possible.



2 Fly a 4 point square box clockwise while keeping the camera facing in your direction.

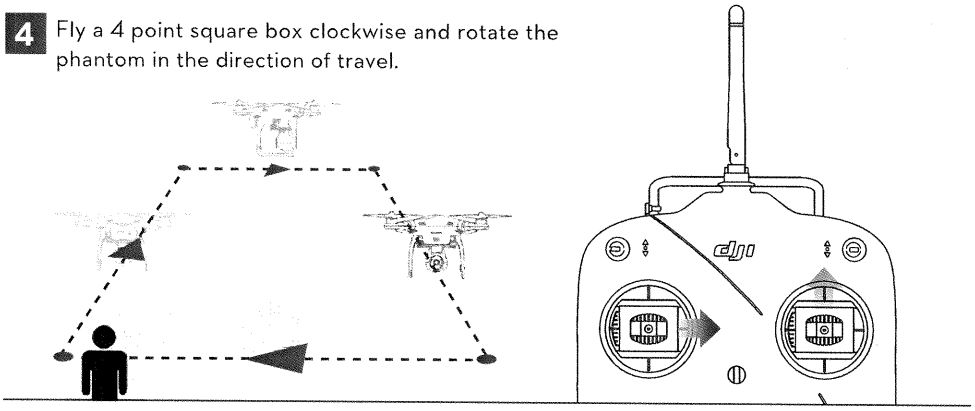


3 Fly a 4 point square box counter-clockwise while keeping the camera facing in your direction.

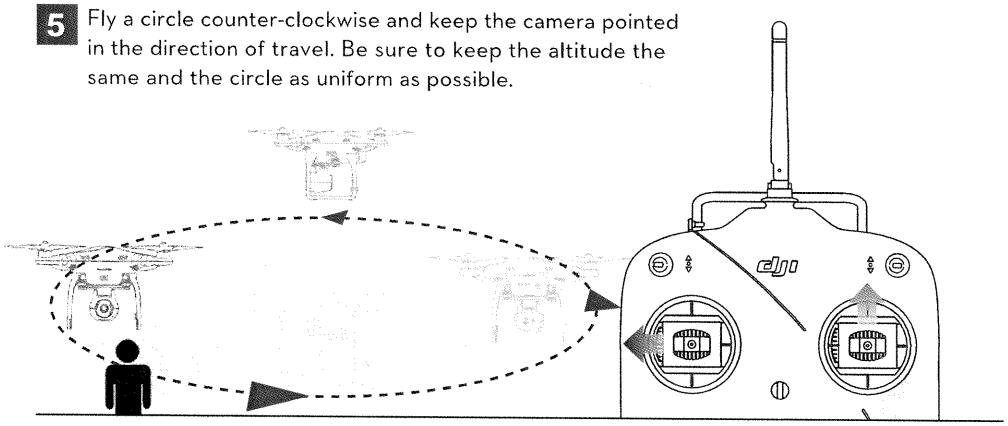


Advanced Flight Maneuvers (★★★)

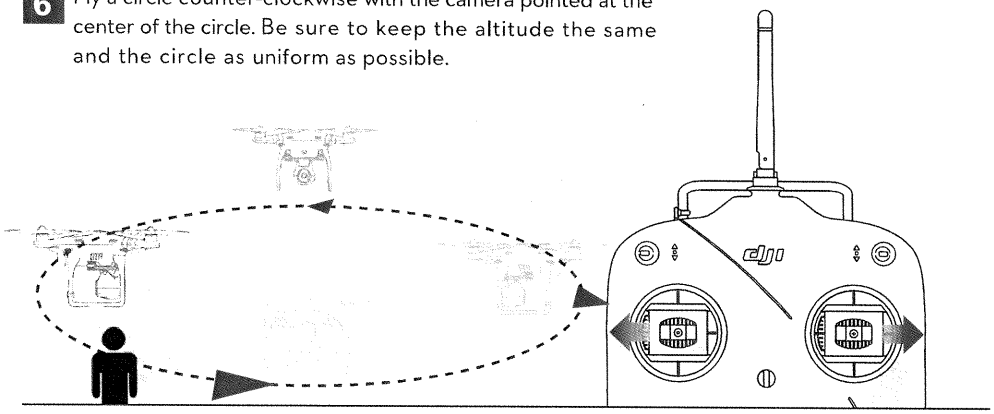
4 Fly a 4 point square box clockwise and rotate the phantom in the direction of travel.



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.

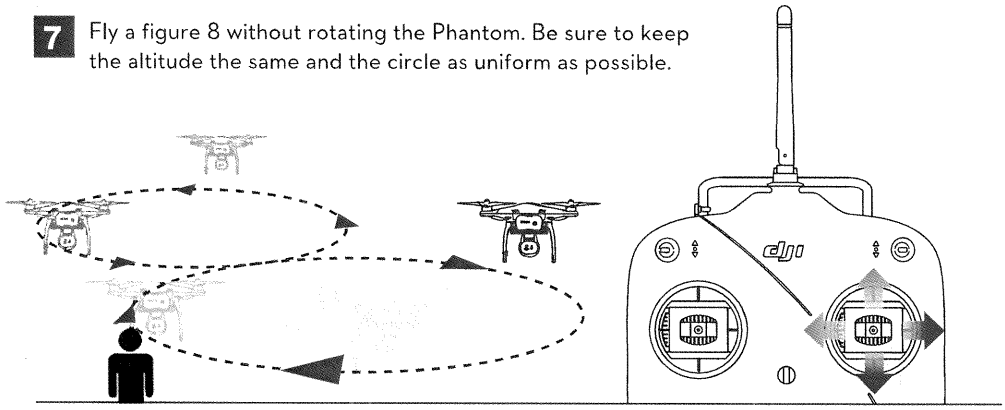


6 Fly a circle counter-clockwise with the camera pointed at the center of the circle. Be sure to keep the altitude the same and the circle as uniform as possible.

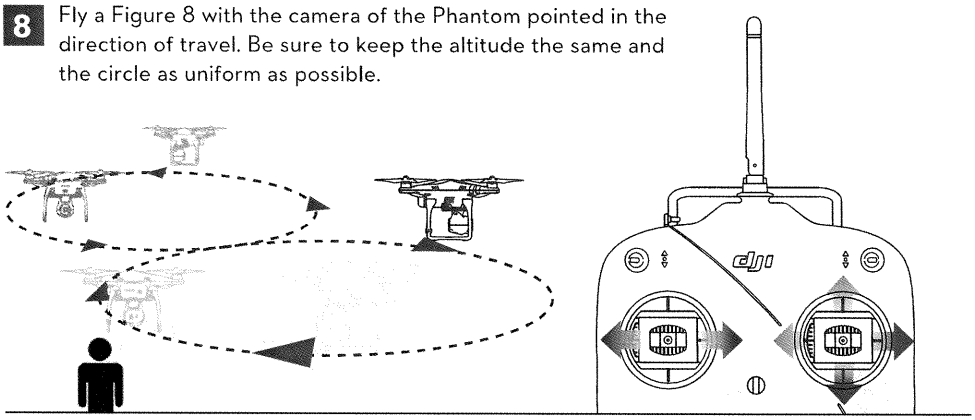


Advanced Flight Maneuvers (★★★)

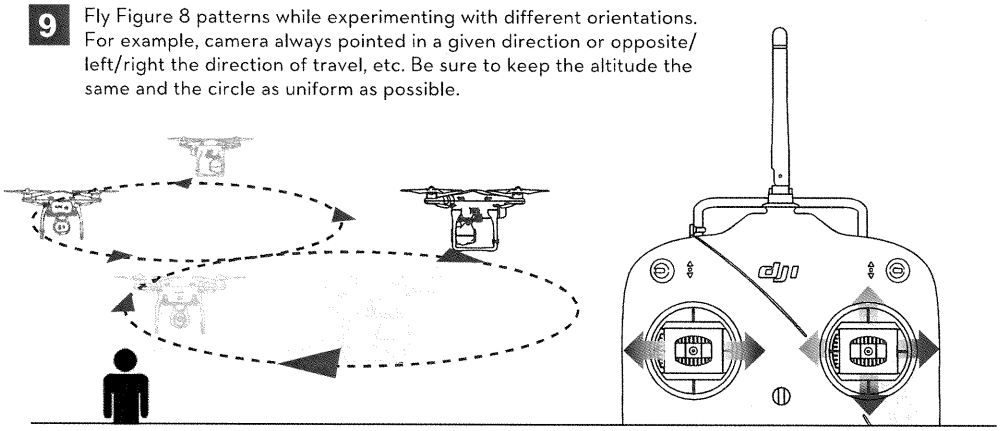
7 Fly a figure 8 without rotating the Phantom. Be sure to keep the altitude the same and the circle as uniform as possible.



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.



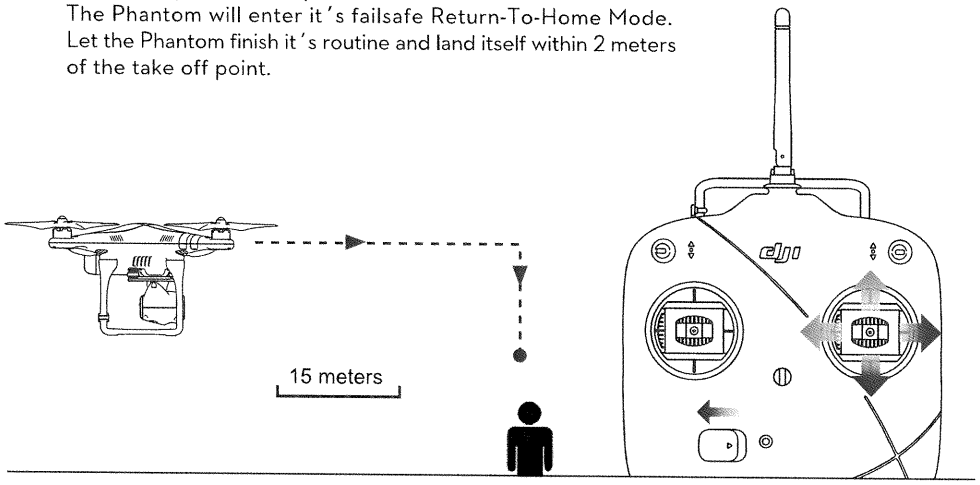
9 Fly Figure 8 patterns while experimenting with different orientations. For example, camera always pointed in a given direction or opposite/ left/right the direction of travel, etc. Be sure to keep the altitude the same and the circle as uniform as possible.



Emergency Situations

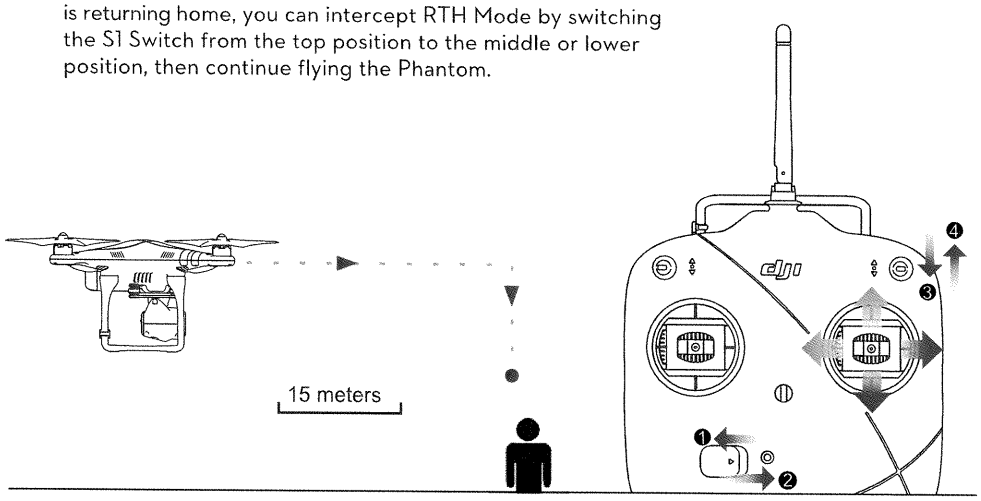
1 Return Home & Land Mode

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.



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.



www.dji.com