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

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

May 20, 2015

Exemption No. 11634
Regulatory Docket No. FAA–2015–0571

Mr. Chris Tonn
Owner
Pelican Drones, LLC
55 South A Street
Suite 110
Pensacola, FL 32502

Dear Mr. Tonn:

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

By letter posted to the docket March 9, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Pelican Drones, LLC (hereinafter petitioner or operator) for an exemption. The exemption would allow the petitioner to operate an unmanned aircraft system (UAS) to conduct aerial photography and video primarily of real property.

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 Phantom Vision 2 Plus.

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, Pelican Drones, 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, Pelican Drones, 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 Phantom Vision 2 Plus 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

Enclosures

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October 14, 2014 U.S.

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Washington, DC 20590 VIA FEDERAL DOCUMENT MANAGEMENT SYSTEM

Exemption Request under Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations

Dear Sir or Madam:

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 (the "Reform Act") and 14 C.F.R. Part 11, Pelican Drones, LLC (PD) seeks an exemption from Federal Aviation Regulations ("FARs") detailed below for the following described Unmanned Aerial System called in this application the PD System, which includes an Unmanned Aircraft (UA) and ground station-based equipment and crew:

THE UNMANNED AIRCRAFT (UA):

- A lightweight (2.7 lb gross weight with all on-board equipment), battery operated 4-motor rotorcraft in the form of a octocopter that takes off and lands vertically, manufactured by DJI, Model Phantom Vision Plus 2, to carry the following equipment in flight;
- An on-board flight computer with GPS navigation and location ability that receives signals for flight controls from a ground-based transmitter/controller;
- An on-board camera capable of capturing imagery in the form of full color, high definition still photos and video;
- An on-board telemetry system that delivers flight data from the on-board flight computer to the on-board radio transmitter including altitude AGL, horizontal and vertical speed, compass direction of flight and direction back to its launch site;
- A 600mW, 5.8GHz on-board radio transmitter that transmits live video from the on-board camera plus all the flight data from the telemetry system described above;

THE GROUND STATION-BASED PART OF THE SYSTEM:

- A Pilot in Command (PIC) in operational control of a flight operation from beginning to end and who controls the UA while in the air;
- A 100mW, 2.4GHz radio transmitter/controller operated by the PIC to control the UA while in flight;
- A radio receiver receiving live video and flight data from the on-board camera and computer projects it all together onto a screen for the PIC to view during flight;
- A Visual Observer (VO) is a person who provides a second pair of eyes to visually track the UA while in flight.

The requested exemption would support an application for a commercial Certificate of Authorization to use the above described CAV System to support aerial photography and video primarily of real property, specifically individual properties of at least two acres in size (equivalent to a square 295 feet/side).

The UA, powered by batteries, is smaller, lighter and more maneuverable than larger aircraft running on combustible fuel, it operates at lower altitudes with no people on board and will thereby reduce current risk levels and thereby enhance safety and diminish the likelihood of death or serious bodily injury. With a small payload and maximum flight time of only 20 minutes, this is offers little or no risk to national security.

Low level oblique photos and video from several angles are far more effective than ground-based imagery for displaying the characteristics of large, complex properties with several buildings and large trees. Helicopters can be used, but they are more expensive to and not able to fly as low. The benefits of reduced cost and improved quality of presentation from the UA will be valuable to and benefit many buyers and sellers of real property.

Additionally, we request that we be allowed to use our system to benefit first responders nearby who might require assistance, including fire fighters, the police, the sheriff, FEMA, et al., while remaining subject to all limitations cited in this application as we do so.

The PD System will be operated in the field with both a PIC and a VO in accordance with FAA Policy N 8900.227 Section 14 "Operational Requirements for UAS" and with the following Restrictions:

(a) No flight will be made with a UA Gross weight exceeding 55 pounds;
(b) All operations must occur in FAA Class G airspace at no more than 400 ft AGL, at an airspeed of no more than 25 knots and no further than 3/4 NM from the PIC;
(c) All operations must utilize a visual observer (VO). The VO and PIC must be able to communicate by voice at all times during a flight operation;
(d) Operations will be restricted to flights over private property with the permission of the property owner;

(e) The PIC must have accumulated and logged, in a manner consistent with 14 CFR § 61.51 (b), a minimum of 100 flight cycles and 25 hours of total time as a UA rotorcraft pilot and at least ten hours logged as a UA pilot with a similar UA type;
(f) All required permits will be obtained from state and local government prior to operation;
(g) The PD System will not be operated over densely populated areas;
(h) The PD System will not be operated at air shows;
(i) The PD System will not be operated over any open-air assembly of people;
(j) The PD System will not be operated over heavily trafficked roads;
(k) The PD System will not be operated within 5 NM of an airport or heliport;
(l) The PD System will not be operated over properties smaller than two acres in size;
(m) Operations will be restricted to day only and weather conditions equivalent to VFR;
(n) The PIC will brief the VO and property owner about the operation and risk before the first flight at each new location;
(o) No flight may be made without a Pre-Flight Inspection by the PIC before each operation to ascertain that the UA is in a condition safe for flight (see Appendix A).

The PIC and VO will meet the requirements outlined in FAA Policy N 8900.227 Section 16 personnel Qualifications. Additionally, the PIC and VO will perform maintenance on the system and will complete a course of maintenance instruction as part of their initial training.

We submit that the combination of the UA's light weight, flight performance and ability, fully qualified flight crew and strict operation under the guidelines established in 8900.227, and under all of the Restrictions (a) through (o) listed above, the FAA can have full confidence that the operation will have an equivalent or greater level of safety than manned aircraft performing the same mission.

The name and contact information of the applicant are:

Pelican Drones, LLC
Attn: Chris Tonn
Ph: 850-359-2602
Email: pelicandrones@gmail.com

The regulations from which the exemption is requested are listed below. Beside each regulation number is the page of the attached Addendum upon which each may be found together with our proposed equivalent level of safety for each regulation:

- 14 CFR 91.151……...Addendum Page 4
- 14 CFR Subpart E (91.401 - 91.417) ……Addendum Page 4
- FAA Policy 8900.227 Paragraph 16(c)(4) and Paragraph 16(e)(1) …Addendum Page 4

We are prepared to modify or amend any part of this request to satisfy the need for an equivalent level of safety. Please contact us at any time if you require additional information or clarification. We look forward to working with your office.

Sincerely,

Chris Tonn, Owner
Pelican Drones, LLC

Addendum containing Exemption Requests and Equivalent Level of Safety Appendix A – Flight Manual Appendix B – Owner's Manual for UA

Addendum

ADDENDUM EXEMPTION REQUESTS AND EQUIVALENT LEVEL OF SAFETY

Pelican Drones, LLC, requests an exemption from the following regulations as well as any additional regulations that may technically apply to the operation of the CAV System:

14 CFR Part 21, Subpart H: Airworthiness Certificates This part establishes the procedures for the issuance of an airworthiness certificate. While the FAA continues to work to develop airworthiness standards for Unmanned Aerial Systems, we request an experimental certificate be issued for the PD System under either or both of the following provisions:
21.191 Experimental certificates.
Experimental certificates are issued for the following purposes:
(a) Research and development. Testing new aircraft design concepts, new aircraft equipment, new aircraft installations, new aircraft operating techniques, or new uses for aircraft.
(b) Showing compliance with regulations. Conducting flight tests and other operations to show compliance with the airworthiness regulations including flights to show compliance for issuance of type and supplemental type certificates, flights to substantiate major design changes, and flights to show compliance with the function and reliability requirements of the regulations.

Since the experimental certificate can be used for commercial purposes such as market surveys, sales demonstrations, and customer crew training, we would expect that an experimental certificate would permit our commercial purpose as well.

The aircraft will not carry persons or property, will not carry fuel, and will only fly under strict operational requirements. Combined with the UA's light weight, being constructed primarily of carbon fiber and plastic, we propose that the UA will be at least as safe, if not safer, than a conventionally certificated aircraft performing the same mission.

If an experimental airworthiness certificate is not appropriate for this application, then we request an exemption of 14 CFR Part 21, Subpart H, and the requirement for an airworthiness certificate in general, citing the equivalent level of safety outlined in the previous paragraph.

14 CFR 91.203(a) & (b) Civil aircraft: Certifications required.
The regulation provides that an airworthiness certificate, with the registration number assigned to the aircraft and a registration certificate must be aboard the aircraft. Additionally, subparagraph (b) provides that the airworthiness certificate be "displayed at the cabin or cockpit entrance so that it is legible to passengers or crew."

At a maximum gross weight of 2.7 pounds, the UA is too small to carry documentation, does not have an entrance, and is not capable of carrying passengers or crew. To obtain an

equivalent level of safety and meet the intent of 91.203, we propose that documents deemed appropriate for this aircraft by the FAA will be co-located with the crew at the ground control station and available for inspection upon request. In order to identify the aircraft, we propose that the information found on airworthiness and registration certificates be permanently affixed to the aircraft via placard containing the following information plus the word “EXPERIMENTAL” to satisfy the requirement of 14 CFR 45.23, which follows immediately after the proposed placard description below:

EXPERIMENTAL
Manufacturer: DJI Innovations, Inc.
55 South A Street
Suite 110
Pensacola, FL 32502
Model: Phantom Vision 2 Plus, Serial Number: PH645322375

If found please contact: (850) 359-2602

14 CFR 45.23 Display of marks; general and 45.29 Size of marks.
These regulations provide that each aircraft must display "N" and the aircraft's registration number in letters at least 3 inches high. Additionally, the aircraft must display the word "EXPERIMENTAL" in letters at least 2 inches high near the entrance to the cabin, cockpit, or pilot station. The UA does not have an entrance in which the word "EXPERIMENTAL" can be placed, and may not have a registration number assigned to it by the FAA.

We propose to achieve an equivalent level of safety by including the word "EXPERIMENTAL" in the placard on the top of the aircraft, as shown above, where the PIC, VO and others in the vicinity of the aircraft while it is preparing for launch will be able to see the designation. Additionally, we feel that the permanent placard discussed in the previous paragraph will provide the aircraft's registration information at the ground station. Finally, we will display at the ground station a high contrast flag or banner that contains the words "Unmanned Aircraft Ground Station" in letters 3 inches high or greater. Since the aircraft will operate within 3/4 NM of the ground station, the banner should be visible to anyone that observes the aircraft and chooses to investigate its point of origin.

14 CFR 91.9 Civil aircraft flight manual, marking, and placard requirements.
This regulation provides that no person may operate an aircraft unless a current, approved flight manual is in the aircraft. We assume that the intent of this requirement is to ensure that flight manual information is available to the aircrew while operating the aircraft. We request an exemption to this requirement since the aircraft is not only too small to carry documentation, the documentation would not be available to the crew during flight operations.

To obtain an equivalent level of safety and meet the intent of 91.9, we propose that a current, approved UA Flight Manual (Appendix A) must be available to the crew at the ground station

anytime the aircraft is in, or preparing for, flight.

14 CFR 61.113 Private pilot privileges and limitations: Pilot in Command and 61.133 Commercial pilot privileges and limitations.
The regulation provides that no person that holds a private pilot certificate may act as pilot in command of an aircraft for compensation or hire. Subparagraph (b) allows a private pilot to act as pilot in command of an aircraft in connection with any business or employment if: (1) The flight is only incidental to that business or employment; and (2) The aircraft does not carry passengers or property for compensation or hire.

Our proposed operations require that the PIC must either
1. Hold a Commercial Pilot Certificate issued by the FAA, and have logged 25 hours of flight experience in this type of UA, or
2. Meet the requirements of 8900.227 para 16(c)(2)(c) "Operations without a pilot certificate" in which the PIC is required to complete "FAA private pilot ground instruction" and pass "the FAA Private Pilot written examination." Since there are currently no means available for the pilot of a UAS to gain the experience in an equivalent category and class in order to apply for a commercial pilot's license, we propose to generate an equivalent level of safety by requiring our pilots to complete, at a minimum, FAA commercial pilot ground instruction and pass the FAA Commercial Pilot written examination in addition to completing the private pilot requirements. Since the aircraft cannot carry passengers or property, we feel we meet the intent of 61.113 Subparagraph (b) even though the intent of this application is to conduct a business.

14 CFR 91.109 Flight Instruction; Simulated instrument flight and certain flight tests
The regulation states that "No person may operate a civil aircraft that is being used for flight instruction unless that aircraft has fully functioning dual controls."

The PD System ground-based control station consists of a small hand-held radio transmitter and while it does not offer a second set of "controls", both the student and instructor can, and will, operate the single set of controls simultaneously. With both student and instructor having "hands-on" the controls during flight, we feel that this technique meets the intent 91.109 and provides an equivalent level of safety.

14 CFR 91.119 Minimum safe altitudes: General.
The regulation states that over sparsely populated areas the aircraft cannot be operated closer than 500 feet to any person, vessel, vehicle, or structure. Since the aircraft will be operating at a maximum of 400 feet AGL, we cannot comply with this requirement.

In order to provide an equivalent level of safety we will only fly over private property with a size of at least two acres with the permission of the owner of the property flown over. The aircraft will not be operated over congested areas or over any open air assembly of persons. The property owner will be briefed on the expected route of flight and the associated risks to

persons and property on the ground. The aircraft will be operated at a low altitude allowing, if a power unit fails, an emergency landing without undue hazard to persons or property on the surface. Therefore we maintain that due to the small size of the UA, the hazard to persons, vehicles and structures is minimal compared to manned aircraft, which should be considered in granting the exemption.

14 CFR 91.121 Altimeter settings.
The regulation requires that aircraft shall maintain cruising altitudes by reference to an altimeter setting available within 100 NM of the aircraft.

The UA will always fly below 400 feet AGL and will not need to maintain cruising altitudes in order to prevent conflict with other aircraft. An Above Ground Level altimeter measurement above the takeoff point is transmitted via radio from the UA on-board computer to the display screen held by the PIC, providing a constantly updated AGL readout.

14 CFR 91.151 Fuel requirements for flight in VFR conditions.
The regulation provides that no person may begin a flight in an airplane under day-VFR conditions unless there is enough fuel to fly to the first point of intended landing and to fly after that for at least 30 minutes.

We feel the intention of this paragraph is to provide an energy reserve as a safety buffer for delays to landing. The UA is battery operated and the maximum duration of flight from a single battery charge is 18 minutes with a 20% reserve. Since the aircraft will never fly more than ¾ NM from the point of intended landing, a full battery charge at launch will ensure that we meet the reserve energy requirement of this paragraph. We request an exemption to the word "fuel" and ask for an equivalent interpretation with the word "energy".

14 CFR Subpart E (91.401 - 91.417) - Maintenance, Preventive Maintenance, Alterations
The regulation provides that the operator is primarily responsible for maintaining the aircraft in an airworthy condition, including compliance with part 39 and 43. Paragraphs 91.407 and 91.409 require that the aircraft be "approved for return to service by a person authorized under 43.7" after maintenance and inspection.

It is our intention that the PIC perform maintenance and inspection of the aircraft and "be authorized to approve the aircraft for return to service." As provided in the Pre-Flight Checklist in Appendix A, the PIC will ensure that the aircraft is in an airworthy condition prior to every flight and in addition conduct detailed inspections after every two hours of flight. Maintenance performed by the PIC is limited to repairing small cracks, replacing a propeller, checking electrical connections and updating software and firmware for the on-board computer. All other maintenance will be performed by the manufacturer or their designated repair facility. The PIC will document work performed in accordance with 91.417. We feel that due to the size, construction, and simplicity of the aircraft, the PIC can ensure an equivalent level of safety.

8900.227 Paragraph 16(c)(4) PIC Medical. and Paragraph 16(e)(1) Observer Medical. This policy provides that both the PIC and VO must have a valid FAA second-class medical certificate issued under part 67 in order to perform as a pilot or observer.

The UA maximum gross weight is 2.7 pounds, it is constructed of carbon fiber and plastic and the PIC is not on board. Both the PIC and the VO are required to be in VLOS. Given the unlikely event that both the PIC and VO become medically incapacitated while the aircraft is in flight, the UA will return autonomously to the site of launching and land without crew intervention. Therefore, requiring the PIC and VO to meet the same medical requirements as a commercial pilot carrying passengers in a large aircraft is an unnecessary burden.

We propose that the minimum medical requirements for the PIC and VO be vision corrected to 20/20 and a valid, state issued driver's license. The 20/20 vision requirement will ensure that the PIC and VO can see and avoid air traffic; a licensed driver is medically qualified to operate a much larger vehicle.

APPENDIX A – FLIGHT MANUAL

FLIGHT RESTRICTIONS

(a) No flight will be made with a UA Gross weight exceeding 55 pounds;
(b) All operations must occur in FAA Class G airspace at no more than 400' AGL, at an airspeed of no more than 25 knots and no further than 3/4 NM from the PIC;
(c) All operations must utilize a visual observer (VO). The VO and PIC must be able to communicate verbally at all times during a flight operation;
(d) Operations will be restricted to flights over private property with the permission of the property owner;
(e) The PIC must have accumulated and logged, in a manner consistent with 14 CFR § 61.51 (b), a minimum of 100 flight cycles and 25 hours of total time as a UA rotorcraft pilot and at least ten hours logged as a UA pilot with a similar UA type;
(f) All required permits will be obtained from state and local government prior to operation;
(g) The PD System will not be operated over densely populated areas;
(h) The PD System will not be operated at air shows;
(i) The PD System will not be operated over any open-air assembly of people;
(j) The PD System will not be operated over heavily trafficked roads;
(k) The PD System will not be operated within 5 NM of an airport or heliport;
(l) The PD System will not be operated over properties smaller than two acres in size;
(m) Operations will be restricted to day only and weather conditions equivalent to VFR;
(n) The PIC will brief the VO and property owner about the operation and risk before the first flight at each new location;
(o) No flight may be made without a successful Pre-Flight Inspection by the PIC before each operation to ascertain that the UA is in a condition safe for flight.

PRE-FLIGHT CHECKLIST

(1) Use voltmeter to determine that UA battery is fully charged in order to prevent unexpected premature descent;
(2) Check all wiring connections are tight;
(3) Check all propellers are undamaged and no cracks exist in any structural members of the UA;
(5) Turn on radio controller, check for adequate voltage, set it to connect to the UA, move all control switches to forward or down position and throttle control stick full back position;
(6) Connect UA main battery, check for radio contact with UA's radio receiver;
(7) At a location different from previous flight, re-set GPS and compass to current location;
(8) Turn on transmitter, gimbal and camera.

TO REGAIN CONTROL AFTER LOST RADIO CONTACT

1. Failsafe = ON
2. Throttle = 50%
3. Mode = ATTI
4. Failsafe = OFF
5. Mode = GPS

If radio contact is not restored, the UA will automatically continue at 60 ft above its last elevation before losing contact toward its takeoff point, then descend and land there autonomously

DSLRPros Futaba 8FG Black Edition Super 14-Channel Ultimate Kit Replacement Transmitter

Pre-programmed Control Guide

(1) SE Toggle Switch: This is your flight mode (i.e. GPS Atti, Failsafe)

(2) SA Toggle Switch: This is your Intelligent Orientation Control, IOC, mode *which is NOT enabled by default.*

(3) SC Toggle Switch: This is your timer reset. The Futaba comes with a timer at 4 minutes and at 7 minutes. *(This can be reprogrammed in the Futaba controller to allow for a two-battery setup).*

(4) RD Knob: This sets the gimbal's stopping point for the tilt. The tilt is controlled by the trim knob on the rear right side of the Futaba.

(5) SD Toggle Switch: This enablee the "Fluid Slow Pan" mode *(Off, 30%, 60%)*

(6) Throttle & Pan control stick

(7) Forward, backward, left, right control stick

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PHANTOM 2 User Manual V1.4
For PHANTOM 2 Flight Controller Firmware version V3.10
& PHANTOM 2 Assistant version V3.8
& PHANTOM RC Assistant version V1.1
2015.01
Congratulations on purchasing your new DJI product. Please thoroughly read the entire contents of this manual to
fully use and understand the product.
It is advised that you regularly check the PHANTOM 2's product page at www.dji.com which is updated on a
regular basis. This will provide services such as product information, technical updates and manual corrections. Due
to any unforeseen changes or product upgrades, the information contained within this manual is subject to change
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If you have any questions or concerns regarding your product, please contact your dealer or DJI Customer Service.
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1.1 Built-in Flight Control System Instructions

The built-in flight control system is used to control the entire aircraft's functions in flight such as Pitch (forwards
and backwards), Roll (left and right), Elevator (up and down) and Yaw (turn left or right). The flight controller
contains the MC (Main Controller), IMU, GPS, compass, receiver.
The IMU (Inertial Measurement Unit) has a built-in inertial sensor and a barometric altimeter that measures both
attitude and altitude. The compass reads geomagnetic information which assists the GPS (Global Position System)
to accurately calculate the aircrafts position and height in order to lock the aircraft in a stable hover. The receiver is
used to communicate with the remote controller and the MC acts as the brains of the complete flight control
system connecting and controlling all the modules together.
The PHANTOM 2 can be configured in the Assistant, by choosing Naza-M mode or Phantom 2 mode.
This manual is for Phantom 2 mode. Please refer to the Naza-M V2 Quick Start Manual for more
information.

1.2 Connections with Other DJI Products

PHANTOM 2 is compatible with other DJI products, including ZENMUSE H3-2D and H3-3D gimbal, iOSD mini,
iOSD Mark II. Below are connections for these products and wireless video transmission module.
Compass
Gimbal Mounting Position
Mount the H3-2D/H3-3D
gimbal using 4 screws.
CAN-Bus Connector
Video Cable
To the iOSD module or wireless
video transmission module.
8-Pin Cable
To the G8 port on

the H3-2D/H3-3D
gimbal.
5-Pin Cable
To the compass.
Figure 1-3
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Important Notes of Using with Other DJI Products

（1） The video cable can provide power for the wireless video transmission module with a battery voltage
(11.1V~12.6V) and a maximum current 2A.

（2） Make sure the working current of the wireless video transmission module you connect can work with an
operational voltage between 11.1V~12.6V and the total working current of the iOSD and wireless video
transmission module is under 2A, as an overcurrent will damage the central board’s components. If the
total current exceeds 2A, please be sure to provide power supplied from a separate power source for the
wireless video transmission module.

（3） PHANTOM 2 uses a 2.4GHz RC system. To avoid communication interference, it’s not recommended to
use other 2.4GHz devices (including 2.4G Wi-Fi or 2.4G wireless video transmission module) except the
2.4G Bluetooth and 2.4G Datalink.

（4） Be sure to keep the wireless video transmission module and other communicating devices away from the
compass during installation and connection to avoid interference.

（5） To improve the compatibility with ZENMUSE gimbals, the latest factory deliveries of PHANTOM 2 has
updated to the Version 2 shown below. H3-2D/H3-3D gimbal can be directly installed for the Version 2
while for Version 1, a H3-3D adapter kit (coming soon) is required to install the H3-3D gimbal.
Version 1
Gimbal Mounting
Position
Version 2
Gimbal Mounting
Position
Figure 1-4

（6） When using the H3-3D gimbal, please connect the 8-Pin cable of PHANTOM 2 to the G8 port of H3-3D
shown below.
Figure 1-5

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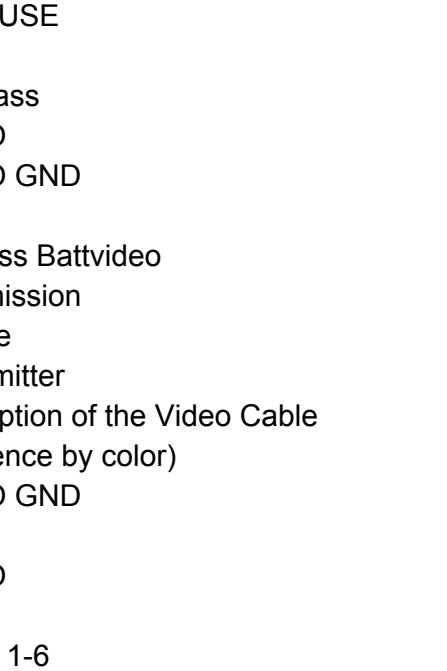
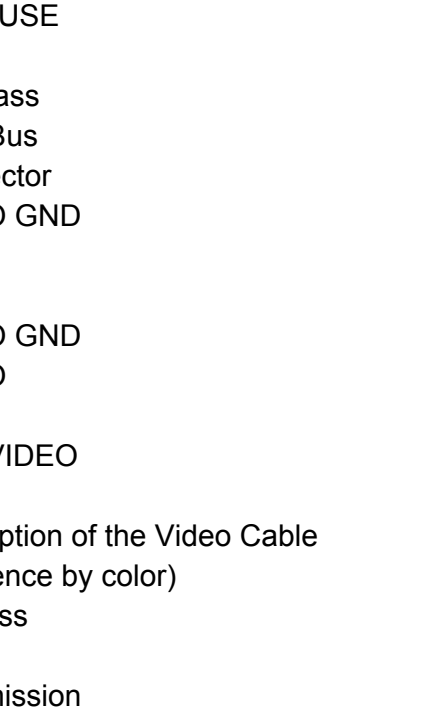
Connections with Other DJI Products
（1） Connecting the H3-2D and H3-3D gimbal and wireless video transmission module, the figure below uses
H3-2D as an example.


Figure 1-6
（2） Connecting the H3-2D and H3-3D gimbal, iOSD mini and wireless video transmission module, the figure
below uses H3-2D as an example.


module
Transmitter
Figure 1-7
©2013-2015 DJI. All Rights Reserved.8 |
（3） Connecting the H3-2D and H3-3D gimbal, iOSD mini and DJI specified wireless video transmission module
AVL58, the figure below uses H3-2D as an example.
ZENMUSE
H3-2D
Compass
DJI
DJI specified
wireless
video
transmission
module
AVL58
Transmitter
CAN-Bus
connector
VIDEO GND
VBat+
GND
VIDEO
Description of the Video Cable
(sequence by color)
Figure 1-8
We recommend connecting the VBat+ port of the video cable to the two BATT+ ports of the AVL58
simultaneously. The same is true of the GND port of the video cable and two BATT- ports.
（4） Connecting the H3-2D and H3-3D gimbal, iOSD Mark II and wireless video transmission module, the figure
below uses H3-2D as an example.
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ZENMUSE
H3-2D
VBat+
GND
VIDEO
DJI
VIDEO GND
Wireless video transmission
module Transmitter specified by

DJI(AVL58)
OR
Other wireless video transmission
module Transmitter
CAN-Bus
Connector
Compass
Description of the Video Cable
(sequence by color)
Figure 1-9
The diagram below illustrates the conneciton between the iOSD Mark II and the wireless video transmission module.
iOSD Mark II
Other wireless video
transmission module
Transmitter
VIDEO GND
VIDEO
BATT- Batt-
BATTBATT+
BATT+
UART
UART
AV-OUT
AV-GND
Batt-
Batt+
Batt+
Wireless video
transmission
module
AVL58 Transmitter
specified by DJI
iOSD Mark II
AV-OUT
AV-GND
BATTBATTBATT+
BATT+
UART
UART
Use the 8-Pin cable in the iOSD Mark II package when connecting to the DJI specified wireless video
transmission module AVL58.

（5） Using the iPad Ground Station
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iPad Ground
Station
+ -
3S-6S
Battery
Air End
Ground End
Figure 1-10
Connect the Air End of 2.4G Bluetooth Datalink to a spared CAN-Bus port of iOSD if an iOSD is used.
（6） Using the PC Ground Station
Air End
Ground End
PC Ground
Station
Figure 1-11
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1.3 LED Flight Indicators Description
1. LED flight indicators are used to show the aircraft’s current status. Once powered on, the indicators will light
up.
LED flight
indicators
Aircraft in Normal status Descriptions
Power On Self-Test
Warming Up & Aircraft cannot take off during warming up
Ready to Fly
Ready to Fly (non-GPS)
Aircraft in abnormal status Warnings and errors
Remote Controller Signal Lost
1st Level Low Battery Capacity Warning
2nd Level Low Battery Capacity Warning
Not Stationary or Sensor Bias is too big
Errors & Aircraft cannot fly.
Compass data abnormal because of ferro-magnetic interference or
the compass needs calibration.
（1） The LED indicators diagram above are for Phantom 2 mode. In Naza-M mode, LED indicators
will work according to the Naza-M flight control system.
（2） Connect to the PHANTOM 2 Assistant for detailed information about warnings and errors.

2. The front LEDs are for indicating where the nose of the aircraft is. They light up solid red only after the motors
have spooled up.
The front
LEDs
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1.4 Notes for PHANTOM 2 using with other DJI products
Before using PHANTOM 2 with other DJI products, users should connecting the products correctly and upgrade
the firmware as requirements below .
Items to upgrade Firmware versions required Assistant for upgrading Assistant version
P330CB (built-in
central board)
V1.0.1.19 or above PHANTOM 2 V1.08 or above
Zenmuse H3-2D CMU V1.0，IMU V1.6 or above PHANTOM 2 V1.08 or above
iOSD Mark II V3.01 or above iOSD V4.0 or above
iOSD mini V1.06 or above iOSD V4.0 or above
*The iOSD Assistant is applied to both iOSD Mark II and iOSD mini.
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2 Propellers
PHANTOM 2 uses the original 9-inch propellers which are classified by the color of each central nut. Damaged
propellers should be replaced by purchasing new ones if necessary.
Propellers Grey Nut (9450) Black Nut (9450 R)
Diagram
Assembly Location
Attach to the motor thread that does
not have a black dot.
Attach to the motor thread that has a
black dot.
Fastening/Un-fastening
Instructions
Lock: Tighten the propeller in this direction.
Unlock: Remove the propeller in this direction.
2.1 Assembly
1. （Figure 2-1）Remove the four warning cards from the motors after you’ve read them.
2. （Figure 2-2）Prepare the two grey nut propellers and two black nut propellers. Make sure to match the
black nut propellers with the correctly marked black dot motors. Tighten the propellers according to the
fastening instructions.
Figure 2-1 Figure 2-2 Figure2-3
2.2 Disassembly

（Figure 2-3）Keep the motor deadlocked in place with the assistant wrench (or one hand) and remove the
propeller according to the un-fastening instructions.

2.3 Notes

1. Propellers are self tightening during flight. DO NOT use any thread locker on the threads.
2. Make sure to match the propeller nut colors with the corresponding motors.
3. It is advised to wear protective gloves during propeller assembly and removal.
4. Check that the propellers and motors are installed correctly and firmly before every flight.
5. Check that all propellers are in good condition before flight. DO NOT use any ageing, chipped, or broken
propellers.
6. To avoid injury, STAND CLEAR of and DO NOT touch the propellers or motors when they are spinning.
7. ONLY use original DJI propellers for a better and safer flight experience.

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3 Remote Controller

The PHANTOM 2 remote controller can be configured in the PHANTOM RC Assistant. The sticks mode is Mode 2
on delivery.

For upgraded remote controller (models: NDJ6 or NRC900), select “Upgrade Version” in Phantom Assistant.

For basic remote controller (models: DJ6 or RC900), select “Basic Version” in Phantom Assistant.

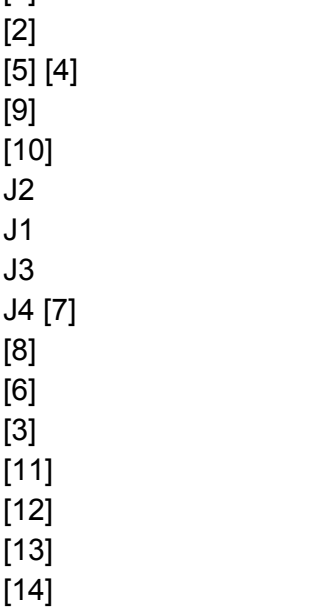

Figure 3-1 Figure 3-2

[1]Antenna [2]Carrying Handle [3]Left Dial [4]3-Position Switch S1 [5]3-Position Switch S2 [6]Joystick1(J1;J2)
[7]Joystick2(J3;J4) [8]Neck Strap Attachment [9]Power Switch [10]Power Indicator

[11]Battery Level Indicators LED1/LED2/LED3/LED4 (from left to right) [12]Trainer Port
[13]Battery Charge & RC Assistant Port (micro-USB port) [14] Potentiometer

3.1 Power on the Remote Controller

1. Set the S1 and S2 switches to the upper most position and ensure both joysticks are at the mid-point position. Then toggle on the power switch.
2. Push the power switch to the right to power on the remote controller. If the power LED indicator is solid on, the remote controller is functioning normally. The battery level indicators display the current battery level.

1. Please make sure the battery level of remote controller is enough. If the low voltage warning alert
sounds (refer to <Remote Controller Power LED Indicator Status>), please recharge the battery as soon
as possible.
2. Charge the remote controller's battery by using the included micro-USB cable. Using the incorrect
type of charging cable may cause damage.
3. Turn off the remote controller before charging. The power LED indicator will display solid red when
charging is in progress. The LED indicators will display solid green when the battery is fully charged.

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3.2 Remote Controller LED Indicator Status

3.2.1 Remote Controller Power LED Indicator Status

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

The remote controller will power off automatically when battery voltage drops below 3.45V. Land and
recharge the battery as soon as possible when the low voltage alert occurs to avoid loss of control
during flight.

3.2.2 Remote Controller Battery Level Indicator Status

The battery level indicators will show the current battery level during both the discharging process. The following is
a description of the indicators.

: The LED is solid on : The LED will blink regularly
: The LED is light off
Discharging process
LED1 LED2 LED3 LED4 Current battery level
75%~100%
50%~75%
25%~50%
12.5%~25%
0%~12.5%
<0%
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3.3 Antenna Orientation
The remote controller's antenna should point skywards without obstructions for maximum communication range
during flight.
Figure 3-3
3.4 Remote Controller Operation
The operations of remote controller are based on mode 2 stick configuration.
Definitions
The 'stick neutral' positions and 'stick released' mean the control sticks of the remote controller are placed at
the central position.
To 'move the stick' means that the stick of remote controller is pushed away from the central position.
Slide Lever is used for the pitch control of the H3-2D and H3-3D gimbal.
Remote
Controller
(Mode 2)
Aircraft
（nose direction）
Operation details
The throttle stick controls aircraft altitude/elevation.
Push the stick up and the aircraft will rise.
Pull the stick down and the aircraft will descend.
The aircraft will automatically hover and hold its
altitude if the sticks are centered.
Push the throttle stick above the centered (mid-point)
position to make the aircraft take off. When flying, we
suggest that you push the throttle stick slowly to
prevent the aircraft from sudden and unexpected
elevation changes.
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The yaw stick controls the aircraft rudder.

Push the stick left and the aircraft will rotate counter clock-wise.
Push the stick right and the aircraft will rotate clock-wise. If the stick is centered, the aircraft will remain facing the same direction.
The yaw stick controls the rotating angular velocity of the aircraft. Pushing the stick further away from center results in a faster aircraft rotation velocity.
The pitch stick controls the aircraft's front & back tilt. Push the stick up and the aircraft will tilt and fly forward.
Pull the stick down and the aircraft will tilt and fly backward. The aircraft will keep level and straight if the stick is centered.
Pushing or pulling the stick further away from center will result in a larger tilt angle (maximum of is 35˚) and faster flight velocity.
The roll stick controls the aircraft's left & right tilt.
Push the stick left and the aircraft will tilt and fly left.
Push the stick right and the aircraft will tilt and fly right.
The aircraft will keep level and straight if the stick is centered.
Pushing the stick further away from center will result in a larger tilt angle (maximum of 35˚) and faster flight velocity.
Position-1 Position-2 Position-3
S1 is for compass calibration. Toggle the S1 switch from position-1 to position-3 and back to position-1 at least 5 times, which will force the aircraft to enter into compass calibration mode.
Users can configure position 3(bottom position) of the S1 switch to trigger the Failsafe in the Assistant.
OFF Course Lock Home
point Lock
S2 is the IOC mode switch. IOC (Intelligent Orientation Control) function can be enabled in the Assistant when in Naza-M mode. Only use the IOC function after you are familiar with flying.
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The left dial controls the pitch of the H3-2D and H3-3D gimbal. The position of left dial determines the pitch angle relative to the horizontal level.
Turn the left dial to the right to make the gimbal pitch

up.
Turn the left dial to the left to make the gimbal pitch
down.
The gimbal will keep its current position if the dial is
static.
（1） For ‘Ready to Fly’ the aircraft will hover when all sticks are released.
（2） For ‘Ready to Fly (non-GPS)’ the aircraft will only keep the altitude when all sticks are released.
3.5 Linking the Remote Controller & Built-in Receiver
PHANTOM 2 has a built-in receiver, the link button and indicator located on the bottom of the aircraft as illustrated
in the Figure 3-4.
The link between the remote controller and aircraft is already established for you so you can initially skip this
procedure. If you ever replace the remote controller, re-establishing the link is required.
Link button &
Link indicator
Figure 3-4
Linking procedures
1. Power on the PHANTOM 2.
2. Turn on the remote controller and place it 0.5m~1m away from the aircraft.
3. Push the link button with a thin object and hold it until the Link indicator blinks red, then release it.
4. When the Link indicator turns solid green, the link between the remote controller and the built-in receiver
has been successfully established.
Link Indicator Status
The remote controller is turned off and there is no 2.4GHz signal around, please turn
on the remote controller.
The receiver is ready for linking.
There is 2.4GHz signal around but the remote controller is not linked with the receiver,
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please carry out the linking procedures.
The remote controller is linked with the receiver successfully.
4 Intelligent Battery
The intelligent battery is specially designed for the PHANTOM 2, with a battery capacity of 5200mAh, voltage of
11.1V and charge-discharge management functionality. The battery should only be charged with the DJI charger.
Intelligent Battery Charger
DJI Intelligent Battery Functions
（1） Balance Charging Automatically balance the voltage of each battery cell during charging.

（2） Capacity Display Display the current battery level.
（3） Communicating
The main controller communicates with the battery via communication ports for battery voltage, capacity, current and other information.
（4） Overcharging Protection
Charging stops automatically when the battery voltage reaches 12.8V to prevent overcharging damage.
（5） Over Discharging Protection
Discharging stops automatically when the battery voltage reaches 8.4V to prevent over discharging damage.
（6） Short Circuit Protection Automatically cuts off the power supply when a short circuit is detected.
（7） Sleep Protection
The battery will enter sleep mode after 10 minutes of inactivity to save power. The static current is 10nA in sleep mode when the battery is powered on without connecting to other devices.
（8） Charging Temperature Detection
The battery will charge only when its temperature is within 0℃~55℃. If the battery temperature is out of this range, the battery will stop charging.
（1） Before use, please read and follow the user manual, disclaimer, and the warnings on the battery.
Users take full responsibility for all operations and usage.
（2） The battery should only be charged with the charger provided by DJI. DJI does not take any responsibility for operation of any charger from a third party.
4.1 Charging Procedures
1. Connect the charger to a wall socket (Use the plug set if necessary).
2. Connect the battery to the charger. If the current capacity of the battery is over 75%, you should power on the battery to begin charging.
3. The Battery Level indicators display current capacity level as the battery charges. Please refer to battery
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level indicator description for details.
4. The battery is fully charged when the Battery Level indicator lights are off. Please disconnect the charger and battery when the charging is completed.
Wall Socket
4.2 Install the Battery
Push the battery into the battery compartment correctly as the following diagram shows. Make sure to push the

battery into the compartment until you hear a ‘click’ sound.
Figure 4-1
An incorrectly inserted battery may cause one of the following to occur: (1) Bad contact. (2) Unavailable
battery information. (3) Unsafe for flight. (4) Unable to take off.
4.3 Battery Usage
Figure 4-2
(1) Checking the battery level: When the battery is powered off; pressing the battery power button once will
indicate the current battery level. Refer to < Battery Level Indicator Description> for details.
(2) Powering on: When the battery is powered off; press the battery power button once and then press and hold for
2 seconds to turn on the intelligent battery.
(3) Powering off: When the battery is powered on; press the battery power button once and then press and hold for
2 seconds to turn off the intelligent battery.
LED3
LED4
Battery Power Button
(Built-in Battery Power Indicator)
LED2
LED1
Battery Level Indicator
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(4) Checking the battery life: When the battery is powered off; press and hold the battery power button for 5
seconds to check the battery life. The battery level indicators will show the life and the battery power indicator
will blink for 10 seconds, then all LEDs will light out and the intelligent battery will turn off. Refer to < Battery
Level Indicator Description> for details.
More battery information is available in the battery tab of the PHANTOM 2 Assistant.
4.4 Description of the Battery Level Indicator
The battery level indicators will show the current battery level during both the charging and discharging process as
well as battery life. The following is a description of the indicators.
: The LED is solid on : The LED will blink regularly
: The LED is light off
Charging process
LED1 LED2 LED3 LED4 Current battery level
0%~25%
25%~50%
50%~75%

75%~100%
Full charged
Discharging process
LED1 LED2 LED3 LED4 Current battery level
87.5%~100%
75%~87.5%
62.5%~75%
50%~62.5%
37.5%~50%
25%~37.5%
12.5%~25%
0%~12.5%
<0%
Battery life
LED1 LED2 LED3 LED4 Current battery life
90%~100%
©2013-2015 DJI. All Rights Reserved.
80%~90%
70%~80%
60%~70%
50%~60%
40%~50%
30%~40%
20%~30%
Less than 20%
4.5 Correct Battery Usage Notes
1. Never plug or unplug the battery into the aircraft when it is powered on.
2. The battery should be charged in an environment that is between 0℃ to 40℃, and be discharged in an
environment that is between -20℃ to 50℃. Both charging and discharging should be in an environment
where the relative humidity is lower than 80%.
3. It’s recommended to charge and discharge the battery thoroughly once every 20 charge/discharge cycles.
Users should discharge the battery until there is less than 8% power left or until the battery can no longer
be turned on. Users should then fully recharge the battery to maximum capacity. This power cycling
procedure will ensure the battery is working at its optimal level.
4. For long term storage please place the battery with only a 40~50% capacity in a strong battery box
securely. We recommend discharging and charging the battery completely once every 3 months to keep it

in good condition. The capacity should be varied in such a cycle
(40%~50%)—0%—100%—(40%~50%).
5. It’s suggested you purchase a new battery after you have discharged your current battery over 300 times.
Please completely discharge a battery prior to disposal.
6. It’s suggested that you purchase a new battery if the current battery is swollen or damaged in any way.
7. Never try to recharge or fly with a battery that is swollen or damaged in any way.
8. Never charge the battery unattended. Always charge the battery on a non-flammable surface such as
concrete and never near any flammable materials.
9. Safety is extremely important and users can get more information in the DISCLAIMER.
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5 Calibrating the Compass
IMPORTANT: Make sure to perform the Compass Calibration procedures prior to the first flight.
The compass is very sensitive to electromagnetic interference which causes abnormal compass data and leads to
poor flight performance or even flight failure. Regular calibration of the compass enables the compass to perform at
its optimal level.
5.1 Calibration Warnings
（1） DO NOT calibrate your compass where there is a possibility for the existence of strong magnetic interference such as magnetite, parking structures, and steel reinforcement underground.
（2） DO NOT carry ferromagnetic materials with you during calibration such as keys or cellular
phones.
（3） Compass Calibration is very important; otherwise the flight control system will work abnormally.
5.2 Calibration Procedures
Please carry out the calibrating procedures in the flight field before flight. Please watch the quick start video of the
PHANTOM 2 for more compass calibration details.
Normal LED
Quickly flip the switch S1
360o Rotate the aircraft
horizontally
360oRotate the aircraft
vertically (Nose downward)
Position-1
Start horizontal calibration Start vertical calibration Succeed Fail
Position-1->Position-3->Position-1

Flip no less than 5 times
Start
cali
LED Flight Indicator
Position-1->Position-3->Position-1
Flip once
Position-3
LED Flight Indicator
LED Flight
Indicator
Re-calibrate
Position-1
Position-3
5.3 When Recalibration is required
（1） When Compass Data is abnormal, the LED flight indicator will blink alternating between red and yellow.
（2） Last compass calibration was performed at a completely different flying field/location.
（3） The mechanical structure of the aircraft has changed, i.e. changed mounting position of the compass.
（4） Evident drifting occurs in flight, i.e. the aircraft doesn’t fly in straight lines.
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6 Flight
6.1 Flying Environment Requirements
（1） Before your first flight, please allow yourself some flight training (Using a flight simulator to
practice flying, getting instruction from an experienced person, etc.).
（2） DO NOT fly in bad weather, such as rain or wind (more than moderate breeze) or fog.
（3） The flying field should be open and void of tall buildings or other obstacles; the steel structure
within buildings may interfere with the compass.
（4） Keep the aircraft away from obstacles, crowds, power lines, trees, lakes and rivers etc.
（5） Try to avoid interference between the remote controller and other wireless equipment (No base
stations or cell towers around).
（6） The flight control system will not work properly at the South Pole or North Pole.
（7） Never use the aircraft in a manner that infringes upon or contravenes international or domestic
lays and regulations.
6.2 Starting the Motors
A Combination Stick Command (CSC) is used to start the motors. Push the sticks according to one of the options
below to start motors. Once the motors have started, release both sticks simultaneously. The same CSC is used to

stop the motors.
A B C D
Figure 6-1
6.3 Takeoff/Landing Procedures
1. Start by placing the PHANTOM 2 on the ground with the battery level indicators facing you.
2. Turn on the remote controller.
3. Power on the aircraft by turning on the intelligent battery.
4. When LED flight indicator blinks green/yellow, the PHANTOM 2 is entering Ready to Fly/Ready to Fly
(non-GPS) mode. Start the motors with the CSC command.
5. Push the throttle stick up slowly to lift the aircraft off the ground. Refer to <Remote Controller Operation>
for more details.
6. Be sure you are hovering over a level surface. Pull down the throttle stick to descend. The stick will lock into
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place and the aircraft will descend steadily.
7. After landing, leave the throttle stick down for 3 to 5 seconds to stop the motors. Return throttle stick to
middle position after the motors have stopped.
You SHOULD NOT execute the CSC during normal flight! This will stop the motors and cause the
aircraft to descend rapidly and drop without any type of control.
（1） When the LED flight indicator blinks yellow rapidly during flight, the aircraft has entered into
Failsafe mode, refer to <Failsafe Function> for details.
（2） A low battery capacity warning is indicated by the LED flight indicator blinking red slowly or
rapidly during flight. Refer to the <Low Battery Capacity Warning Function> for details.
（3） Watch the quick start video about flight for more flight information.
（4） Aircraft and battery performance is subject to environmental factors such as air density and
temperature. Be very careful when flying 3000 meters (9800 feet) or more above sea level, as battery and aircraft performance may be reduced.
（5） When used with a H3-3D gimbal, a GoPro camera, and the iOSD mini, your Phantom 2 will be very
close to its maximum takeoff weight. It is not recommended that you attach the Phantom 2 propeller guards at this weight. Otherwise, the aircraft will be unable to fly normally.
6.4 Failsafe Function
The aircraft will enter Failsafe mode when the connection from the remote controller is lost. The flight control
system will automatically control the aircraft to return to home and land to reduce injuries or damage. The following

situations would make the aircraft fail to receive a signal from the remote controller and enter Failsafe mode:

（1） The remote controller is powered off.

（2） The remote controller is powered on but the S1 is toggled in the position triggering the Failsafe (this must
have been configured in the PHANTOM 2 Assistant).

（3） The aircraft has flown out of the effective communication range of the remote controller.

（4） There is an obstacle obstructing the signal between the remote controller and the aircraft, essentially
reducing the distance the signal can travel.

（5） There is interference causing a signal problem with the remote controller.

Failsafe works differently depending on the mode the aircraft is in when Failsafe mode is initiated whether it is in
the Ready to Fly or Ready to Fly (non-GPS) mode.

Ready to Fly (non-GPS) ---- Automatic landing

The flight control system will try to keep the aircraft level during descent and landing. Note that the aircraft may
be drifting during the descent and landing process.

Ready to Fly ---- Automatic go home and land

The flight control system will automatically control the aircraft to fly back to the home point and land.

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Home Point

When the aircraft is initializing the Ready to Fly status, the aircraft will record the current GPS coordinates as
the home point. It is recommended to lift off only after Ready to Fly status is confirmed for the safety of being
able to fly back to home point successfully in case the Failsafe mode is initiated.

Go Home Procedures

1 Record Home Point. 2 Flying. 3 Remote controller signal lost.

5 Fly 4 Signal lost lasts 3s, begin to go home. back to home point. 6 Landing after hovering 15s.

LED Flight Indicator LED Flight Indicator LED Flight Indicator

LED Flight Indicator LED Flight Indicator LED Flight Indicator

Height over home point<=20m

Height over home point>20m

20m

Elevate to 20m

Figure 6-2

（1） In a Failsafe situation, if less than 6 GPS satellites are found for more than 20 seconds, the aircraft
will descend automatically.

（2） When the aircraft is landing automatically, users can control the aircraft's position and altitude if
the remote controller signal is recovered.
In Phantom 2 mode, users can set a new home point manually when the aircraft is in "Ready to fly" status
as long as a home point has been recorded automatically. Quickly flipping the S2 switch of the remote
controller from upper most to lower most positions 5 times or more will reset the current aircraft position
as a new home point of PHANTOM 2. When successfully reset, you will see a series of rapid green blinks
on the LED Flight Indicator. The definition of "home point" is:
（1） The home point is the place PHANTOM 2 returns to when the control signal is lost, which is
recorded last time.
（2） The home point is used to calculate the horizontal distance between you and the aircraft, the
distance will be displayed as
D
if using iOSD module.
Regaining Control during Failsafe Procedure
Position of
Switch S1
Position-1 Position-2
Position-3
(No triggering the Failsafe)
How to regain
control
When the S1 switch is switched to Position-1,
toggle the S1 switch to any other position once to
regain control. If remote controller's signal is
recovered, control is returned back to the pilot.
Regain control as soon as signal is
recovered.
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6.5 Low Battery Capacity Warning Function
The low battery capacity warning alerts users when the battery is close to depletion during flight. When it appears,
users should promptly fly back and land to avoid accidental damage. The PHANTOM 2 has two levels of low battery
capacity warning. The first appears when the battery has less than 30% power and the second appears when it has
less than 15% power.

（1） When battery power drops below 30% and LED indicator will blink red slowly.
（2） At lower than 15% the LED indicator will blink red rapidly, the PHANTOM 2 will also begin to descend and
land automatically. After it has landed, keep the throttle stick at its lowest point or execute CSC.
（3） There is a hidden third low battery threshold in addition to the 1st and 2nd level warnings. This uses 10.65V
as its threshold. Both this voltage threshold and the 2nd Level Low Battery Warning will trigger auto-landing.
Altitude can be maintained if necessary by pushing up on the throttle stick.
（1） Remember to fly your PHANTOM 2 back as soon as you see a low battery capacity warning.
（2） Keeping the battery contact needles and pads clean is very important. Any dirt and dust may
cause a communication failure.
6.6 Flight Limits Function
All UAV (unmanned aerial vehicle) operators should abide by all regulations from such organizations at ICAO
(International Civil Aviation Organization) and per country airspace regulations. For safety reasons, the flight limits
function is enabled by default to help users use this product safely and legally. The flight limits function includes
height, distance limits.
In Ready to Fly status, height, distance limits works together to restrict the flight. In Ready to Fly (non-GPS) status,
only height limit works and the flying height restricted to be not over 120m.
(1) The default parameters in the Assistant is compliant within the definitions of class G ruled by
ICAO. (Refer to Airspace Classification to get more details). As each country has its own rules,
make sure to configure the parameters to comply with these rules too, before using the PHANTOM 2.
(2) Users in Mainland China can refer to 民用航空空域使用办法.
Max Height & Radius Limits
The Max Height & Radius restricts the flying height and distance. Configuration can be done in the PHANTOM 2
Assistant. Once complete, your aircraft will fly in a restricted cylinder.
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Max
Height
Max
Radius
Home Point

The height of
aircraft when it
is powered on
Figure 6-3 Figure 6-4
Ready to Fly
Limits Ground Station Rear LED flight indicator
Max Height
The flight height is restricted to fly
under the max height.
Warning: Height limit
reached.
None.
Max Radius
The flight distance is restricted to fly
within the max radius.
Warning: Distance limit
reached.
Rapid red flashings
when close to the Max radius limit.
Ready to Fly(non-GPS)
Flight Limits Ground Station Rear LED flight indicator
Max Height
The flight height is restricted to fly
under the minor height between the
Max height and 120m.
Warning: Height limit reached.
None.
Max Radius Not limited, no warnings or LED indicators.
(1) If the aircraft flies out of the limits, you can still control your aircraft except to fly it further away.
(2) If the aircraft is flying out of the max radius in Ready to Fly (non-GPS) status, it will fly back
within the limits range automatically if 6 or more GPS satellites have been found.
6.7 Flight Limits of Special Areas
Special areas include airports worldwide. All special areas are listed on the DJI official website. Please refer to
http://www.dji.com/fly-safe/category-mc for details. These areas have been divided into category A and category B.
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Category A Category B
Ready to Fly
Airspace Limits
Rear LED

Flight Indicator
A
Orange
Motors will not start.
If the Phantom flies into a special area in Ready to Fly (non-GPS) mode and Ready to Fly mode activates, it will automatically descend and land then stop its motors.
B
Yellow
If the Phantom flies into a special area in Ready to Fly (non-GPS) mode and Ready to Fly mode activates, it will descend to airspace C and hover 5 meters below edge d.
C
Green
No restrictions of flight, but the Phantom will not enter Category A, the aircraft can fly free, but it will not enter Airspace B through Boundary b & d.
Around Category B sites, the phantom can fly freely, but it will not enter into Airspace A through Boundary a.
D
Blue
No restrictions. None.
10.5m
2400m
Center of
Special
Area
8000m
120m
A B C
8100m
D
b
d
c b a a c
d
a
b
c
Airspace: A,B,C,D
Boundary: a, b, c, d
1000m
A C D

c a a c
a
2000m c
Center of
Special
Area
Airspace: A,C,D
Boundary: a, c,
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Semi-automatic descent: All stick commands are available except the throttle stick command during
the descent and landing process. Motors will stop automatically after landing. Users will regain control
once the motors have stopped. There is no need to toggle the S1 switch.
(1) When flying in the airspace (A/B/C) of restricted special area, LED flight indicators will blink red
quickly and continue for 3 seconds, then switch to indicate current flying
status and continue for 5 seconds at which point it will switch back to red blinking.
(2) For safety reasons, please do not fly close to airports, highways, railway stations, railway lines,
city centers and other special areas. Try to ensure the aircraft is visible.
6.8 Conditions of Flight Limits
In different working modes and flight modes, flight limits will differ according to number of GPS satellites found.
The following table demonstrates all the cases(√: available; ×:unavailable).
All flights are restricted by height, distance and special areas simultaneously.
Phantom mode
Flight Status Limits of Special Area Max Height Max Radius
Ready to Fly √ √ √
Ready to Fly (non-GPS) × √ ×
Naza-M mode
Control Mode number of GPS found Limits of Special Area Max Height Max Radius
GPS
≥6 √ √ √
＜6 × √ ×
ATTI.
≥6 √ √ ×
＜6 × √ ×
Manual
≥6 × × ×
＜6 × × ×
Disclaimer

Please ensure that you are kept up to date with International and Domestic airspace rules and regulations before
using this product. By using this product, you hereby agree to this disclaimer and signify that you have read this fully.
You agree that you are responsible for your own conduct and content while using this product, and for any direct or
indirect consequences caused by not following this manual, violate or disregard any other applicable local laws,
administrative rules and social habits thereof.
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7 Assistant Installation and Configuration
7.1 Installing Driver and PHANTOM 2 Assistant
Installing and running on Windows
1. Download driver installer and Assistant installer in EXE format from the download page of PHANTOM 2
on the DJI website.
2. Connect the PHANTOM 2 to a PC via a Micro-USB cable.
3. Run the driver installer and follow the prompts to finish installation.
4. Next, run the Assistant installer and follow the prompts to finish installation.
5. Double click the PHANTOM 2 icon on your Windows desktop to launch the software.
The installer in EXE format only supports Windows operating systems (Win XP, Win7, Win8 (32 or 64
bit)).
Installing and running on Mac OS X
1. Download the Assistant installer in DMG format from the download page of PHANTOM 2 on the DJI
website.
2. Run the installer and follow the prompts to finish installation.
3. When launching for the first time if use Launchpad to run the PHANTOM 2 Assistant, Launchpad won’t
allow access because the software has not been reviewed by Mac App Store.
4. Locate the PHANTOM 2 icon in the Finder, press the Control key and then click the PHANTOM 2 icon
(or right-click the PHANTOM 2 icon using a mouse). Choose Open from the shortcut menu, click open in
the prompt dialog box and then software will launch.
5. After the first successful launch, directly launching of the software can be achieved by double-clicking
the PHANTOM 2 icon in the Finder or using Launchpad.
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Installer in DMG format supports only Mac OS X 10.6 or above.
Usage of PHANTOM 2 Assistant on Mac OS X and Windows are exactly the same. The Assistant pages

appear in other places of this manual are on the Windows for example.
7.2 Using the PHANTOM 2 Assistant on a PC
1. Start up the PC, power on the PHANTOM 2, then connect the PHANTOM 2 to the PC with a Micro-USB
cable. DO NOT disconnect until configuration is finished.
2. Run the PHANTOM 2 Assistant and wait for the PHANTOM 2 to connect to the Assistant. Observe the
indicators on the bottom of the screen. When connected successfully, the connection indicator is
and communication indicator is blinking .
3. Choose [Basic] or [Advanced] configuration pages.
4. View and check the current configuration in the [View] page.
Language swap
View configurations
Connection indicator
Communication
indicator
RC, Gain
Gimbal, Battery IMU calibration
Firmware upgrade
Account, software
version
*This image is for reference
only. Please refer to the
actual user interface.
Function switch of Phantom 2
and Naza-M mode
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（1） Users should not enable the Naza-M function before finishing Advanced Flight Maneuvers
procedure in the " PHANTOM Pilot Training Guide”. If the Naza-M mode is enabled, users can switch the control mode between ATTI. Mode, GPS Mode or Manual Mode, and access the advanced settings (e.g. IOC). In addition, the LED located on the rear frame arms will display Naza-M flight status indications instead of the PHANTOM 2's indicators. Do not enable the Naza-M mode unless you are an experienced user or guided by a professional.
（2） You can change to the Phantom 2 mode by clicking the same button used to turn on the Naza-M
mode. This operation will disable the Naza-M mode and enable Phantom 2 mode. All parameters
will be returned to factory settings.
7.3 Firmware upgrade of PHANTOM 2
Please refer to the PHANTOM 2 Assistant to install driver and PHANTOM RC Assistant, and then follow the

procedures below to upgrade the software and firmware; otherwise the PHANTOM 2 might not work properly.
1. An internet connection is required to upgrade PHANTOM 2's firmware.
2. Click the [Upgrade] icon to check the current firmware version and whether the installed firmware is the
latest version. If not, click the relative links to upgrade.
3. Be sure to wait until the Assistant shows "finished". Click OK and power cycle the PHANTOM 2 after 5
seconds. Once completed, the firmware is up to date.
Firmware upgradable items
Current firmware version
Upgrade link
*This image is for reference
only. Please refer to the
actual user interface.
（1） DO NOT power off until the upgrade is finished.
（2） If the firmware upgrade failed, the main controller will enter a waiting for firmware upgrade
status automatically. If this happens, repeat the above procedures.
Firmware upgradable items:（1）Main Controller（2）P330CB(Main Board)（3）Receiver（4）Gimbal
CMU（5）Gimbal IMU（6）Battery
7.4 PHANTOM RC Assistant Description
Please follow the procedures to finish the configuration of the remote controller.
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1. Turn off the remote controller and find the Micro-USB port on the bottom of it.
2. Start up the PC, power on the remote controller, and then connect the remote controller to the PC with a
Micro-USB cable. DO NOT disconnect until the configuration is finished.
3. Run the PHANTOM RC Assistant and wait for the remote controller to connect to the Assistant. Observe
the indicators on the bottom left of the screen. When connected successfully, the connection indicator is and communication indicator is blinking .
4. Finish configuration in the [Main] page.
5. Finish upgrade in the [Info] page if necessary.
DT7调参软件
Main Page of the 2.4GHz Remote Controller
Language swap
Main page
Connection indicator
Communication indicator
Firmware upgrade
Account, software

version
*This image is for
reference only. Please
refer to the actual
user interface.
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8 Appendix
8.1 Specifications
Aircraft
Operating environment temperature -10℃ to 50℃
Power consumption 5.6W
Supported Battery DJI Intelligent battery
Weight (including the battery) 1000g
Take-off Weight ≤1300g
Hovering Accuracy (Ready to Fly) Vertical: 0.8m; Horizontal: 2.5m
Max Yaw Angular Velocity 200°/s
Max Tilt Angle 35°
Max Ascent / Descent Speed Ascent: 6m/s; Descent: 2m/s
Max Flight Speed 15m/s (Not Recommended)
Wheelbase 350mm
2.4GHz Remote Controller
Operating Frequency 2.4GHz ISM
Communication Distance (open area) 1000m
Receiver Sensitivity (1%PER) -97dBm
Working Current/Voltage 120 mA@3.7V
Built-in LiPo Battery Working Current/Capacity 3.7V, 2000mAh
DJI Intelligent Battery
Type 3S LiPo Battery
Capacity 5200mAh, 11.1V
Charging Environment Range 0℃ to 40℃
Discharging Environment Range -20℃ to 50℃
8.2 LED Flight Indicators Description
Aircraft in Normal status Descriptions
Power On Self-Test
Warming Up & Aircraft cannot take off during warming up
Ready to Fly
Ready to Fly (non-GPS)
Aircraft in abnormal status Warnings and errors
Remote Controller Signal Lost
1st Level Low Battery Capacity Warning
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2nd Level Low Battery Capacity Warning
Not Stationary or Sensor Bias is too big

Errors & Aircraft cannot fly.*
Compass data abnormal because of ferro-magnetic interference or
the compass needs calibration.
* Users can connect to the PHANTOM 2 Assistant to get detailed information about warnings and errors.