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

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

October 1, 2015

Exemption No. 13049
Regulatory Docket No. FAA−2015−2785

Mr. Lane Swainston
President
Swainston Digital Imaging
1542 Little Dove Court
Henderson, NV 89014

Dear Mr. Swainston:

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

By letter dated June 29, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Swainston Digital Imaging (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial imaging, safety surveys, forensic inspections, and law enforcement support.

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

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

Airworthiness Certification

The UAS proposed by the petitioner is a DJI Inspire.

In accordance with the statutory criteria provided in Section 333 of Public Law 112−95 in reference to 49 U.S.C. § 44704, and in consideration of the size, weight, speed, and limited operating area associated with the aircraft and its operation, the Secretary of Transportation

has determined that this aircraft meets the conditions of Section 333. Therefore, the FAA finds that relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*, and any associated noise certification and testing requirements of part 36, is not necessary.

The Basis for Our Decision

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

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

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

Our Decision

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. 106(f), 40113, and 44701, delegated to me by the Administrator, Swainston Digital Imaging 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, Swainston Digital Imaging is hereafter referred to as the operator.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

14. The operator may not permit any PIC to operate unless the PIC demonstrates the ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption, including evasive and emergency maneuvers and maintaining appropriate distances from persons, vessels, vehicles and structures. PIC qualification flight hours and currency must be logged in a manner consistent with

14 CFR § 61.51(b). Flights for the purposes of training the operator's PICs and VOs (training, proficiency, and experience-building) and determining the PIC's ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption are permitted under the terms of this exemption. However, training operations may only be conducted during dedicated training sessions. During training, proficiency, and experience-building flights, all persons not essential for flight operations are considered nonparticipants, and the PIC must operate the UA with appropriate distance from nonparticipants in accordance with 14 CFR § 91.119.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Sincerely,

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

Enclosure

SWAINSTON DIGITAL IMAGING

29 June 2015

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

Dear Sir or Madam:

Attached please find Swainston Digital Imaging's (SDI) request for an exemption from the listed Federal Aviation Regulations to allow commercial operation of Small Unmanned Aircraft Systems ("sUAS") for aerial imaging, safety surveys, forensic inspections, and law enforcement support. This exemption request is initially for the use of the "Inspire" sUAS manufactured by DJI, an established sUAS company.

Also attached to this letter is the equipment SDI Flight Manual, which outlines the operating requirements, limitations, and technical specifications for the DJI Inspire sUAS System as used by SDI. SDI has reviewed this Manual and has found it to be acceptable for sUAS operations. Applicant submits this manual as a Confidential document under 14 CFR 11.35 (b) as the entire manual contains proprietary information that the applicant has not and will not share with others. The Manual contains operating conditions and procedures that are not available to the public and are protected from release under the Freedom of Information Act 5 USC 552 et. seq.

Thank you for your time and consideration, and please let me know if you have any questions.

Sincerely,

Lane Swainston
Swainston Digital Imaging
President

Cc File
Enclosures

29 June 2015

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

Re: Exemption Request Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations from 14 CFR 61.113 (a) & (b); 91.103(b); 91.119;91.121; 9.151(a); 91.405 (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 (the Reform Act) and 14 C.F.R. Part 11, Swainston Digital Imaging (SDI), an aerial photography and digital imaging company, on behalf of itself and its related affiliates under common ownership and control, hereby applies for an exemption from the listed Federal Aviation Regulations ("FARs") to allow commercial operation of its Small Unmanned Aircraft Systems ("sUAS") for aerial imaging for video, still photography, forensic inspections, safety surveys, and law enforcement support, so long as such operations are conducted within and under the conditions outlined herein or as may be established by the FAA as required by Section 333.

As detailed in this document and the attached Flight Manual, the requested exemption would permit the operation of sUAS under controlled conditions in airspace that is 1) limited 2) predetermined 3) controlled and 4) would provide safety enhancements to the already best practices safety protocols followed by SDI during aerial photography and inspection operations. SDI is a member of the "Professional Aerial Photographers Association, International" (PAPA) and has a longstanding demonstrated record of safe operations in the National Airspace System (NAS). Principal employees have received Private Pilot ground school training and each have logged well over 25 hours of sUAS flight operations. Approval of this exemption would thereby enhance safety and fulfill 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.

The name and address of the applicant is:

Swainston Digital Imaging
1542 Little Dove Court
Henderson, Nevada 89014
Lane Swainston
PH: 702-501-7555
Email: lane@swainston.com

Regulations from which the exemption is requested:

14 C.F.R. Part 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. 109
14 C.F.R. 119
14 C.F.R. 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. 407 (a) (1)
14 C.F.R. 409 (a) (2)
14 C.F.R. 417 (a) & (b)

I. STATUTORY AUTHORITY FOR EXEMPTIONS

The Federal Aviation Act expressly grants the FAA authority to issue exemptions. This statutory authority includes exempting civil aircraft, as the term is defined under §40101 of the Act, including sUASs, from the requirement that all civil aircraft must have a current airworthiness certificate.

The Administrator may grant an exemption from a requirement of a regulation prescribed under subsection (a) or (b) of this section or any sections 44702-44716 of this title if the Administrator finds the exemption in the public interest. 49 U.S.C. §44701(f) See also 49 USC §44711(a); 49 USC §44704; 14 CFR §91.203(a) (1).

Section 333(b) of the Reform Act assists the Secretary in determining whether sUAS may operate in the National Airspace System (NAS) without creating a hazard to the user, the public, or a threat to national security. In making this determination, the Secretary must consider:

- The sUAS's size, weight, speed, and operational capability;
- Whether the sUAS operates within the visual line of sight of the operator

- Whether the sUAS operates outside of highly populated areas and away from close proximity to airports

Reform Act §333(a). If the Secretary determines that a sUAS "may operate safely in the national airspace system, the Secretary shall establish requirements for the safe operation of such aircraft in the national airspace system." *Id.* §333(c)

SDI's sUAS are multirotor vehicles, weighing 20 or fewer lbs. including payload. They operate under normal conditions at a speed of no more than 70 knots and have the capability to hover, and move in the vertical and horizontal plane simultaneously. The sUAS will operate only in the PIC and Visual Observers visual line of sight at all times and will operate only within the designated area described in the Confidential SDI Flight Manual, attached as Exhibit 1 (hereinafter "the Manual"). Such operations will insure that the sUAS will "not create a hazard to users of the national airspace system or the public." Reform Act Section 333 (b).

Given the small size of the sUAS involved and the restricted and controlled environment within which they will operate, our application falls squarely within the zone of safety (an equivalent level of safety) in which Congress envisioned that the FAA must, by exemption, allow commercial operations of sUAS to commence immediately. Also, due to the small size of the sUAS, altitudes, and restricted areas in which the sUAS will operate, approval of the application presents no national security issue.

Given the clear direction in Section 333 of the Reform Act, the authority contained in the Federal Aviation Act, as amended; the strong equivalent level of safety surrounding the proposed operations, and the significant public benefit, including enhanced safety, the grant of the requested exemptions is in the public interest. Accordingly, SDI respectfully requests that the FAA grant the requested exemption without delay.

II. PUBLIC INTEREST

This exemption application is expressly submitted to fulfill Congress' goal in passing Section 333(a) through (c) of the Reform Act. This law directs the Secretary of Transportation to consider whether certain unmanned aircraft systems may operate safely in the NAS before completion of the rulemaking required under Section 332 of the Reform Act. By granting an exemption the FAA will fulfill Congress's intent of allowing UAS to operate with significant safety precautions in low risk environments.

The use of sUAS on aerial photography operations can significantly reduce the risk to photographers and participants. Also, sUAS can inspect, photograph, and collect data on hard to get to areas that otherwise would require direct access or manned aircraft.

Additionally, sUAS could replace the use of helicopters and small aircraft to produce imagery for various purposes. The sUAS we propose to fly in this application are less than 20 pounds, and carry no combustible material on board, as opposed to the much larger conventionally powered small aircraft. Shifting to sUAS from helicopters and other manned aircraft presents a marked safety increase for our workers and the public.

Lastly, sUAS reduce the environmental impact by dramatically decreasing the energy used for aerial imaging and data collection. The sUAS used by SDI use rechargeable lithium ion batteries, as opposed to fossil fuels burned in operation of small aircraft that are many hundreds of times heavier.

III. EQUIVALENT LEVEL OF SAFETY

SDI proposes that the exemption requested herein apply to sUAS that have the characteristics and that operate with the limitations listed herein. These limitations provide for at least an equivalent or even higher level of safety to operations under the current regulatory structure because the proposed operations represent a safety enhancement to the already safe protocols followed on imaging, photography, safety surveys, forensic inspection, and law enforcement support operations conducted with helicopters and other conventional aircraft.

SDI will be bound by the following limitations when conducting its sUAS operations under an FAA issued exemption:

1. The sUAS will be less than 20 pounds.
2. Flights will be operated within visual line of sight of a Pilot in Command.
3. Maximum total flight time for each operational flight will be 20 minutes. The Pilot in Command calculates battery reserve, and will return the sUAS to the "Designated Safety Zone" with at least 20% battery power reserve should that occur prior to the 20 minute limit.
4. Flights will normally be operated at an altitude of not more than 400 feet AGL, never exceeding 1200 feet AGL.
5. Crew for each operation will consist of the sUAS Pilot in Command (PIC) who will keep the sUAS within his visual line of sight at all times and will be supported by a qualified Visual Observer (VO).
6. The sUAS operator will be trained in flight operations, and safety procedures as detailed in the Flight Manual.
7. The sUAS will only operate within a confined "Area of Operations" (AO) as defined in the Manual. The Manual also requires the establishment of a "Designated Safety Zone" (Safety Zone) for the preparation, takeoff, and landing flight operations area.
8. A briefing will be conducted regarding the planned sUAS operations prior to each day's production activities. It will be mandatory that all personnel who will be performing duties within the boundaries of the Safety Zone be present for this briefing.
9. All onsite personnel will consent to the UAS flyover on site by waiver, and the operator will obtain additional verbal or written consent of all persons who will be allowed within 100 feet of the flight AO.
10. Pilot in Command will have been trained in operation of UAS generally and will have received up-to-date information on the particular sUAS to be operated as required by the SDI Manual.
11. Necessary written and/or oral permission from the relevant property holders will be obtained.

12. All necessary permissions and permits will be obtained from territorial, state, county, or city jurisdictions, including local law enforcement, fire, or other appropriate government agencies as may be required.
13. If the sUAS loses communications or loses its GPS signal, it will have the capability to enter "loiter mode" and hover, reestablish satellite connection, and return to a predetermined location within the "Designated Safety Zone" and land.

IV. DESCRIPTION OF SPECIFIC REGULATIONS

14 CFR 61.113 (a) & (b): Private pilot privileges and limitations: Pilot in command

Sections 61.113 (a) & (b) limit private pilots to non-commercial operations. Because the sUAS will not carry a pilot or passengers, the proposed operations can achieve the equivalent level of safety of current operations by requiring the Pilot in Command operating the aircraft to have completed a sUAS flight training course of 25 hours before flying a sUAS (See the SDI Manual for details). Unlike a conventional aircraft that carries the pilot and passengers, the sUAS is remotely controlled with no living thing or cargo on board. The area of operation is controlled and restricted per prior planning and necessary coordination with the local FSDO if applicable, and all flights are planned and coordinated in advance as required and as set forth in the SDI Flight Manual.

The sUAS to be operated hereunder is less than 20 lbs. fully loaded, carries neither a pilot nor passenger, carries no explosive materials or flammable liquid fuels, and operates exclusively within a controlled Area of Operation as set out in the SDI Flight Manual. Like other civil aircraft, operations under this exemption will be tightly controlled and monitored by the Pilot in Command, pursuant to the SDI Flight Manual requirements, and under the requirements and in compliance with local public safety requirements, to provide security for the Area of Operation as is currently done by SDI on normal aerial photography operations. The FAA will have advance notice of all operations as may be required.

The risks associated with the operation of the sUAS are therefore diminished from the level of risk associated with commercial operations contemplated by Part 61 when drafted, and allowing operations of the sUAS as requested with an operator who has met the minimum requirements stated in the SDI Manual achieves the level of safety contemplated by 14 C.F.R. §61.113 (a) & (b).

14 C.F.R. 91.103: Preflight Action

This regulation requires each Pilot in Command take certain actions before flight to ensure the safety of flight. An exemption is needed from this requirement as the PIC will take separate preflight actions, including checking for weather conditions, checking flight battery requirements, checking takeoff and landing distances, and all other actions in the Preflight Checklist in the SDI Manual. These actions will provide an equivalent level of safety.

14 C.F. R. 91.119: Minimum Safe Altitudes

Section 91.119 establishes safe altitudes for operation of civil aircraft. Section 91.119 (d) allows helicopters to be operated at less than the minimums prescribed, provided the person operating the helicopter complies with any route or altitudes prescribed for helicopters by the FAA. This exemption is for a multirotor craft that flies similarly to a helicopter, with vertical takeoff and vertical landing, which will typically operate at altitudes of less than 400 AGL, so an exemption may be needed to allow such operations. The sUAS will never operate at altitude higher than 1200 AGL and will be in a controlled area with a "Designated Safety Zone", where buildings and people will not be exposed to operations without the specified pre-obtained consent. (See SDI Manual for detailed procedures.)

The equivalent level of safety will be achieved given the size, weight, speed of the sUAS as well as the location where it is operated. No flight will be taken without the required permission of the property owner or local officials. Because of the advance notice to the property owner and any onsite personnel as outlined in the SDI Flight Manual, all affected individuals will be aware of the planned flight operations. Unlike flight operations with aircraft or rotorcraft weighing far more than the maximum 20 lbs. proposed herein, our sUAS will not carry flammable fuel. In addition, the coordinated operations of the sUAS will ensure separation between sUAS operations and the operations of conventional aircraft that must comply with Section 91.119.

14 C.F.R. 91.121: Altimeter Settings

This regulation requires each person operating an aircraft to maintain cruising altitude by reference to an altimeter that is set "...to the elevation of the departure airport or an appropriate altimeter setting available before departure." As the sUAS may not have a barometric altimeter, but instead a GPS altitude read out, an exemption may be needed. An equivalent level of safety will be achieved by the operator, pursuant to the SDI Flight Manual and Safety Check list, confirming the altitude of the launch site shown on the GPS altitude indicator before flight.

14 CFR 91.151 (a): Fuel requirements for flight in VFR conditions

Section 91.151 (a) outlines fuel requirements for beginning a flight in VFR conditions. Our sUAS is limited to operations in controlled environments as outlined in the SDI Flight Manual, and has a limited range and flight time which require an exemption from 14 CFR 91.151 (a)

The battery powering the sUAS provides over 20 minutes of powered flight. To meet the 30 minute reserve requirement in 14 CFR §91.151, sUAS flights would necessarily be limited to a few minutes in length. Given the limitations on the sUAS's proposed flight area and the location of its proposed operations within a predetermined area, a longer time frame for flight in daylight or night VFR conditions is reasonable.

SDI believes that an exemption from 14 CFR §91.151(a) falls within the scope of prior exemptions. See Exemption 10673 (allowing Lockheed Martin Corporation to operate without compliance with FAR 91.151(a)). Operating the small sUAS, in a controlled area where only people and property owners or official representatives who have signed waivers will be allowed,

with less than 30 minutes of reserve fuel, does not engender the type of risks that Section 91.151(a) was intended to alleviate given the size and speed of the small UAS. Additionally, limiting sUAS flights to a few minutes would greatly reduce the utility for which the exemption will be granted.

An equivalent level of safety can be achieved by limiting flights to approximately 20 minutes, or enough battery reserve to ensure that the sUAS lands at the ground station with at least 20% of battery power (as determined by the onboard monitoring system and the PIC), whichever happens first. This restriction would be more than adequate to return the sUAS to its planned landing zone from anywhere in its limited operating area.

Similar exemptions have been granted to other operations, including Exemptions 2689F, 5745, 10673, and 10808.

14 CFR 91.405 (a); 407 (a)(1); 409 (a)(2); 417 (a) & (b): Maintenance inspections

These regulations require that an aircraft operator or owner "shall have that aircraft inspected as prescribed in the subpart E of this part and shall between required inspections, except as provided in paragraph (c) of this section, have discrepancies repaired as prescribed in part 43 of this chapter...," and others shall inspect or maintain the aircraft in compliance with Part 43.

Given that these sections and Part 43 apply only to aircraft with an airworthiness certificate, these sections will not apply to SDI. Maintenance will be accomplished by the Operator and pursuant to the flight manual and operating handbook as referenced in the SDI Flight Manual. An equivalent level of safety will be achieved because these small sUAS are very limited in size and will carry a small payload and operate only in controlled areas for limited periods of time. If mechanical issues arise, the sUAS can land immediately and will be typically operating from 400 AGL or less and no higher than 1200 feet AGL. As provided in the SDI Flight Manual, the PIC will ensure that the sUAS is in working order prior to initiating flight, perform required maintenance, and keep a log of any maintenance performed. Moreover, the PIC is the person most familiar with the aircraft and best suited to maintain the aircraft in an airworthy condition to provide the equivalent level of safety.

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Pursuant to 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. § 21, subpart H; 14 C.F.R. 45.23(b); 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) and (b); 91.405 (a); 91.407 (a) (1); 91.409 (a) (2) and 91.417 (a) & (b) to operate commercially a small unmanned vehicle (55lbs or less) in aerial photography operations.

Approval of exemptions allowing commercial operations of sUAS in the aerial photography, safety surveys, forensic inspection, law enforcement support, and video industries enhances safety while reducing risk. Manned aircraft still photography, forensic inspection, law enforcement support and video creates a greater risk because the aircraft are much larger, have combustible fuel, and carry an onboard human crew. In contrast, a sUAS weighing fewer than 20 lbs. and powered by batteries eliminates virtually all of that risk, given the reduced mass and lack of combustible fuel carried on board. The sUAS will carry no passengers or crew and, therefore, will not expose them to the risks associated with manned aircraft flights.

The operation of small sUAS, weighing less than 20 lbs., conducted in the strict conditions outlined above, will provide an equivalent level of safety supporting the grant of the exemptions requested herein, including exempting the applicant from the requirements of Part 21 and allowing commercial operations. These lightweight aircraft operate at slow speeds, close to the ground, and in a controlled environment and, as a result, are far safer than conventional operations conducted with turbine or reciprocating helicopters or full scale manned aircraft operating in close proximity to the ground and people.

Privacy

All flights will occur over private or public property with the necessary private property owner's prior consent and knowledge. Images taken will be of individuals who have also consented to being filmed or otherwise having agreed to be in the area where aerial photography, safety surveys, or forensic inspections will take place.

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Satisfaction of the criteria provided in Section 333 of the Reform Act of 2012--size, weight, speed, operating capabilities, proximity to airports and populated areas and operation within visual line of sight and national security – provide more than adequate justification for the grant of the requested exemptions allowing commercial operation of applicant's sUAS in construction industry pursuant to the SDI Manual appended hereto.

Sincerely,

Lane Swainston
Swainston Digital Imaging
President

Cc File

UAS Flight Manual

Swainston Digital Imaging

29 June 2015

This manual contains standard operating procedures and guidelines for UAS operations.

Swainston Digital Imaging

UAS Operations Manual

Table of Contents

PURPOSE, SCOPE, AND MISSION STATEMENT

Swainston Digital Imaging (SDI), a member of the Professional Aerial Photographers Association, International (PAPA) intends as the Operator to promote safe operation of sUAS in the National Airspace System (NAS) in a manner that is consistent with a long history of safe and professional flight operations in close cooperation with the Federal Aviation Administration (FAA). The Operators are experienced professional aerial photographers and have completed private pilot ground school for rotary wing aircraft as well as approximately 40 hours of instructor supervised flight time. The sUAS Pilots in Command (PIC) that will operate systems according to the approach outlined in this Flight Manual of procedures (Manual) are trained in accordance with this Manual and have received at least 25 hours of UAS training combined with experience on conventional Aerial Photographic flight missions.

The intent of the Manual is to provide the outline of a system to conduct safe and successful sUAS operations in accordance with the applicable FAA regulations and consistent with the section 333 waiver that this Manual is based upon. It is expected that the Operator will continue to apply the skills and experience they have employed in manned aircraft operations under FAA regulations. This combination of prior successful flight experience and sound sUAS flight operational procedures is intended to promote the highest levels of professionalism in safe aerial photographic flight missions.

DEFINITIONS

The following definitions of words and terms apply to the information contained in this Manual and are specific to procedures and operations that are outlined herein. In the case of a conflict with an official FAA definition, the FAA definition will be the rule.

Anemometer - An instrument to measure the velocity of the wind in the Area of Operations.

Area of Operations - Defined as the area where sUAS operations will be carried out for a specific flight or series of flights on a given mission.

Checklists - Procedural checklists used by the PIC to verify proper and safe procedures during all phases of sUAS operations.

Designated Safety Zone - Defined and marked area of ground operations used for safe take offs and landings of the sUAS at a given Area of Operations.

Flight Control Systems - The combination of telemetry, PIC operated controls, and onboard control mechanisms that are employed to control the flight of the sUAS.

Frequency Analyzer - A device used to scan the Area of Operations for possible interference from radio waves.

GPS - Global Positioning System.

Handheld Radio - A radio transceiver capable of communication with other Pilots or FAA personnel in the Area of Operations.

Loiter Mode - A default recovery mode the sUAS goes into when communications are lost from the PIC.

Maintenance Recommendations - Periodic maintenance recommendations for each of the sUAS components that have a usable life.

Manual - This flight manual that combines the Operator specific procedures with the sUAS manufacturers' manual.

Manufacturers Recommendations - Written recommendations provided by the manufacturers of the various components of the sUAS.

NAS - National Airspace System.

Non Participants - Persons who have not agreed to participate in sUAS operations.

Operator - The entity submitting as the applicant on this waiver request to the FAA who will be responsible for all sUAS operations and procedures.

PAPA - Professional Aerial Photographers Association, International.

Participants - Persons who have agreed to participate in sUAS operations.

Pilot In Command - Person who will fly the UA during sUAS operations and who is responsible for all safety related or operational decisions under the direction of the Operator in accordance with this Manual and FAA requirements.

SOP - Standard operating procedures.

sUAS - Small Unmanned Aerial Systems as contemplated under the FAA guidelines, not to exceed 55 pounds in weight or 100 miles per hour in speed.

Telemetry - Electronically transmitted data that provides control and information transmissions to and from the PIC and the sUAS.

UA – Unmanned Aircraft.

Visual Observer - An individual who is designated to observe flight operations and to maintain visual contact with the UA during flight operations while maintaining communications and coordination with the PIC.

PERSONNEL RESPONSIBILITIES

VISUAL OBSERVER

All operations will utilize a Visual Observer. The main responsibilities of the Visual Observer will be to ensure that the UA is operated within the visual line of sight of both the PIC and Visual Observer at all times. The Visual Observer will maintain verbal communication with the PIC at all times. Prior to flight, the PIC will ensure that the Visual Observer understands and can perform all the duties required of the Visual Observer.

PIC

Pilot in Command is responsible for the safe operation of the sUAS at all times in accordance with this Manual and the applicable FAA regulations.

Pilot in Command will be responsible for:

- All support personnel.
- Performing all pre-flight, flight phase, and post flight inspections, air worthiness, diagnostics, and testing.
- Manufacturer recommended maintenance operations.
- Weather condition assessments and forecast reviews.

FLIGHT TEAM COMPOSITION

The onsite flight team is composed of a Pilot in Command (PIC) and a Visual Observer (VO). The PIC is responsible for all flight operations and decisions to proceed. The VO is responsible to maintain visual contact with the UA and to provide constant communication with the PIC regarding aircraft status and surrounding conditions within the Area of Operations.

QUALIFICATION REQUIREMENTS

The PIC must be a licensed Commercial Pilot and must have completed the PAPA sponsored ground school with at least 25 hours of sUAS flight time. The VO must have completed sUAS ground school training and must demonstrate experience with FAA procedures and the standard procedures of this Manual.

OPERATING LIMITATIONS AND CONDITIONS

Operational Ceiling - Maximum 1,200 ft AGL, typical 400 ft AGL.

Operational Endurance - approximately 20 minutes.

Maximum Speed - 100 MPH

Maximum Operating Temperature - 110 degrees F

Minimum Operating Temperature - 0 degrees F

Maximum Operational Wind Speed - 15 MPH (gusts to 20 MPH)

MAINTENANCE PROCEDURES

Only SDI personnel or an appointed service technician may carry out maintenance on the sUAS aircraft systems described in this operations manual. In all cases a Maintenance Logbook (see Appendix B) is completed to reflect any work undertaken and a flight test, testing all functions (including the return-to-home failsafe facility), is subsequently carried out by the PIC.

ROUTINE MAINTENANCE

The Pre-Flight and Post-Flight checklists shown in Appendix A are completed by the PIC every time a SDI sUAS aircraft is operated. Every six months (or fifty hours of flight time – whichever comes first) the following inspection is carried out by the PIC. The inspection is recorded in the Maintenance Logbook along with any findings. Any issues identified are remedied and the aircraft undergoes a full flight-test before the aircraft is returned to Operational Status:

- Inspection of the airframe for any damage, unusual marks and tightness of fixings;
- Inspection of the motor mountings for correct tension;
- Inspection of the propellers for condition, unusual marks, chips, cracks and tightness of fasteners;
- Inspection of electrical wiring for condition, unusual marks or discoloration;
- Inspection of electrical terminal fittings and plugs for secure attachment and general condition;
- Inspection of the attachment of all fittings such as flight controller, GPS antennas etc. for secure attachment;
- Inspection of payload attachment points for condition and security of payload;
- Inspection of the condition and function of all ancillary equipment such as transmitter etc.
- Testing of all system battery packs for charge status and general condition.

If any issues or problems are identified then the aircraft is not allowed to fly until the issue has been remedied. If minor problems (such as damaged propellers, faulty battery packs etc.) are identified and remedied, and the PIC believes the aircraft is suitable to return to Operational Status then the work completed is noted in the Maintenance Logbook. If major issues are identified (such as an unserviceable motor, damaged airframe etc.), then the aircraft undergoes a full

flight test regime (as described below), once the identified fault has been remedied.

FULL FLIGHT TEST

The system has all functions tested with a minimum of five minutes flight time by a qualified PIC recording any abnormalities in the Flight Record Logbook (Appendix D). If the PIC deems the aircraft to be safe then he must sign the Flight Record Logbook as fit for Operational use. Systems with identified issues relating to firmware or software (see below) are grounded by SDI until any problems are rectified.

SOFTWARE AND FIRMWARE UPDATE POLICY

All new software and firmware are thoroughly assessed before installation. Particular attention is focused on relevance to operations, reason for release and any known issues. Multi-rotor and UAS forums are consulted regularly for any reported issues with the release and only when the validity of the upgrade has been confirmed is the upgrade considered.

In all circumstances the upgrade is performed by qualified SDI personnel or appointed service providers. All upgrade information such as version numbers and new functions are recorded in the Maintenance Logbook. All SDI PIC are made aware that the firmware or software has been upgraded before any flight operations are undertaken.

Any upgraded system has all functions thoroughly tested with a minimum of five minutes flight time by a qualified SDI PIC who records any abnormalities in the Flight Record Logbook. If the PIC deems the aircraft to be safe then the PIC signs the Flight Record Logbook as fit for Operational use. If any doubts exist as to the new upgrade the aircraft is downgraded to the previous firmware and the flight test procedure is repeated. Systems with identified issues relating to firmware or software are grounded until the problem can be rectified.

LOGS AND RECORDS

PILOT AND AIRCRAFT HOURS

SDI PIC are required to keep a log of pilot and aircraft hours.
To meet this requirement SDI holds and updates a spreadsheet-based Personal Flying Log Book for Aircraft Operating Crew. This log book is a separate document which can be viewed on request (see sample page at Appendix D).

BATTERY LOGBOOK

SDI Personal Flying Log Book (Appendix D) additionally records information about battery condition (charge) before and after each flight. The Battery Logbook is accompanied by – and supported with – SDI Incident Logbook (Appendix C) and Maintenance Logbook (Appendix B).

FLIGHT PLANNING

WEATHER

Operator will require PIC to obtain all necessary weather information in order to plan and conduct safe flight operations according to and as referenced by any applicable UA Operator Manuals. If operating near an operating Automatic Terminal Information Service (ATIS), the ATIS broadcast system will be consulted. If ATIS is not available, PIC will consult-alternative sources for a current weather forecast.

The operating envelope for the Inspire has been referred to earlier. It is emphasized that the PIC is to ensure the operating envelope environment meets or exceeds all safe and legal visibility, precipitation, humidity, and wind limitations for safe operation.

SITE PERMISSIONS

- Secure permissions from property owner if required.
- Secure permissions from participants.
- Coordinate with local law enforcement if required.
- Prior to operations, Operator receives permission for take-off and landing from the relevant land-owner. In most cases permission attainment is unproblematic as the landowner and the client are the same individual (or entity). In the case of local authority owned land, the relevant authority is contacted in advance to secure permission for take-off and landing, and to find out about any operating restrictions or specific insurance requirements that might apply.

PRE-FLIGHT INSPECTIONS AND CHECKS

Prior to each flight, the PIC will conduct a pre-flight inspection and determine if the UAS is in a condition for safe flight, and to account for all possible discrepancies or inoperable equipment. If the inspection reveals any condition that will affect the safe operation of the UAS, the aircraft will be prohibited from operating until the necessary maintenance can be performed and the UAS can be returned to safe flight. The preflight inspections will include the following components according to the recommended checklists in the DJI Inspire operator manual, and in the SDI checklist:

- ☐ Airframe
- ☐ Battery
- ☐ Transmitters
- ☐ Camera and Gimbal
- ☐ Propulsion system including propellers

In addition, with the battery attached and turned on in the UAS, the PIC will oversee and monitor the series of diagnostic tests to determine and verify proper voltage levels, control function, communication, and GPS satellite connectivity acquisition. PIC will utilize the DJI Inspire LED indicators as well as telemetry data to determine if the proper preflight diagnostics have been completed. The PIC will also perform and log a pre-flight compass calibration each time the UAS is flown from a new location.

DOCUMENTATION

PIC will ensure that all documents used by SDI to ensure safe flight operations and any document required under 14 CFR 91.9 and 91.203 must be available at the Ground Control Station on site at any time the UAV is operating, and ready to be made available to any law enforcement official upon request. If possible, these documents will be on the PIC's person at all times during flight operations, and accessible to law enforcement without interrupting the PIC while conducting flight operations (possibly in a pouch on the back of the vest).

PRE-FLIGHT AREA AND PERSONNEL CHECKS

- Survey flight operations area for safety concerns and to verify conditions.
- Examine all components of the UAS to verify proper function in accordance with the applicable manuals and manufacturer's instructions.
- Verify notification to all personnel on site.
- Establish Designated Safety Zone and verify safe clearances.
- PIC should wear the specified safety vest.
- The ultimate responsibility for aircraft airworthiness and operational safety rests with the UAV pilot-in-command. For this, the PIC – as an aid – uses a Pre-Flight Checklist (see Appendix A). In summary, the Pre-Flight Checklist prompts examination of the following:
    - ☐ The airframe (for condition and lack of damage);
    - ☐ The battery (for level-of-charge and security of attachment);
    - ☐ The transmitter (for level-of-charge and to check that switches

are in the 'home' position);
- ☐ The camera (secured, on and operating).
- ☐ Propulsion system

- In addition, when the flight battery is connected to the UAV, the flight controller undertakes a series of diagnostic tests (while simultaneously locating the position of GPS satellites).

CLOSED SET OPERATIONS

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:

- The operator must have a Motion Picture and Television Operations Manual (MPTOM) as documented in this grant of exemption.
- 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:
    - Dates and times for all flights;
    - Name and phone number of the operator for the UAS aerial filming conducted under this grant of exemption;
    - Name and phone number of the person responsible for the on-scene operation of the UAS;
    - Make, model, and serial or N-Number of UAS to be used;
    - Name and certificate number of UAS PICs involved in the aerial filming;
    - 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;
    - Signature of exemption holder or representative; and
    - 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.
- 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.

ON-SITE PROCEDURES

The on-site procedures undertaken by SDI are conducted in accordance with and controlled through an extensive use of checklists. For this reason, the following sections repeatedly refer to various checklists found in Appendix A of this Manual.

- **Site Survey** - In advance of operations, a survey is undertaken to review the site, its terrain, structures and surroundings – to check any assumptions made about the location prior to arrival and to adjust the operations plan accordingly. For this, an On-Site Survey Checklist is used (see Appendix A, page 25). The primary purpose of the site survey is to make a visual check of the operating area with the objective of identifying any potential hazards.

- **Selection of Operating Areas and Alternatives** - In advance of the pre-flight On-Site Survey, Google maps will be consulted and – if possible – the local site will be visited beforehand. The site will be specifically checked in terms of:
    - Proximity to Airport Reference Points (ARP) as denoted in the Airport Facility Directory (AFD). Must operate outside 5 miles of ARP, unless otherwise agreed upon by virtue of written letter of agreement with the airport's management, or otherwise permitted by the COA issued to Photographic Solutions
    - Ability of PIC and VO to operate the UAS clear of, and give way to, all manned aviation operations and activities at all times.
    - 500 ft. clearance of all non-participating persons, vessels, vehicles, and structures unless; **A.** sufficiently protected in the event of an accident, and the nonparticipating persons remain protected at all times during operations of the UAS, and **B.** The owners and controllers of any vessels, vehicles, or structures has granted permission for the 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.

- Ability of SDI to conduct operations over private or controlled access property with permission from the owner/controller or representative of such, and said permissions are granted.
- Proximity to radio interferences
- Prevailing weather conditions have been adequately assessed, including; high winds, convection, visibility, minimum cloud clearance (500 ft below, and 2,000 ft horizontal clearance), or when visibility is less than 3 miles from the PIC.

The primary site for take-off and landing will be assessed (size, shape, surface, slope and surroundings) and an alternative site will be identified should the primary site become unavailable or unsuitable.

- **Boundaries** - SDI requires that proper identifiers and signage will be in place in the operating area to alert people to the fact that aerial work is being conducted. The PIC will be responsible for cordoning to ensure safe distances from operations are observed. Cordoning procedures to be practiced include:
    - Take-off and Landing safety Area: PIC will determine the safe distances of all people from the take-off and landing operation of the UAS. The PIC will also establish a cordoned area with clearly marked delineation the take-off and landing operations.
    - Signage and Identifying Clothing: The PIC will place signage at each entry point within the operations area alerting people to the following:
        A. Low altitude aerial work is being conducted
        B. Use of any actual sensing equipment being used
        C. A request asking people to not enter the area without first notifying the PIC or SDI designated on-site flight operations personnel
        D. PIC and VO will put on outerwear that will identify them in their respective roles. Signage will be attached on their person that will instruct law-enforcement, observers, or any other people present that they are not to be interrupted un-necessarily while conducting flight operations.

- **Anemometer Weather Check** - Beyond pre-site planning weather forecast checks, SDI requires that the PIC conduct specific on-site weather checks. The PIC will utilize a hand-held or portable Anemometer to determine wind speed, direction, temperature, and humidity. Aerial operations will only be conducted within the specific recommended wind and humidity limitations of the UAS manufacturer's operating manuals, or if not identified therein, only in conditions where wind speed is less than 15mph, gusting up to 20mph.

- **Crew Briefing** - SDI flight operations personnel will typically include the PIC, VO, and other possible ground crew. The operations personnel, in addition to any other parties that may be present, will be briefed prior to the start of operations. The briefing will include:
    - Introduction to the equipment being used including the UAS and the ground station functions, with particular emphasis on moving parts including weight of the UAS, and the harm or damage that could possibly be inflicted by coming into contact with those components (particularly the propellers, and hot surfaces)
    - Familiarization with the failsafe return-to-home systems and instruction on how to activate those systems if the PIC is unable to activate those systems
    - Expected flight plan, holding positions, flight duration, and overall flight boundaries.
    - Expected responsibilities and authority of each flight operations personnel
    - Identification and familiarization with the take-off and landing designated areas, and the requirements for remaining clear of those areas at all times.
    - The need for all present to alert the PIC of any encroachments of people or objects into the airspace and ground boundaries
    - Importance of mitigating any possible distractions or un-necessary communication with the PIC during operations
    - Careful review of Lost Link and emergency procedures
- **Communications** - SDI uses channel-hopping technology on 2.4GHz to maintain communications with the UAV for the purposes of platform control. There is no communication ('downlink') from the UAV to the

ground station. In the event of loss of or interference with the control frequency, the UAV is programmed to return to its take-off position and land autonomously ('return-to-home'). This failsafe procedure is described further under Emergency Procedures.

- **Frequency Scans** - SDI will perform frequency scans to help identify possible conflict with radio communications. This will be performed via a hand-held or portable radio spectrum scanner by the PIC. These scans will include a full spectrum scan of the applicable frequency range of the UAS. Possible sources of radio interference or conflict will be identified and evaluated to determine if flight operations can be safely continued.

- **Recharging and Battery Use (Fuel Management)** - The DJI Inspire utilizes a 4,500mAh 22.8 V LiPo "intelligent" battery. Batteries are charged at base prior to flight operations. The number of batteries that will be transported to the flight operations area will be based on the specific needs of the flight operations or mission. The battery capacity will be tested utilizing the internal proprietary tester on the battery, and will also be checked utilizing the proprietary DJI software, as well as any internally sensed telemetry software and hardware attached to the UAS. A battery charge log will be kept via the proprietary DJI Inspire software and will be completed prior to every flight. Any battery found to be less than fully-charged, damaged, displays insufficient voltage, or otherwise defective will not be used.

- **Load-outs and Equipment** - The Inpire is a simple quad-copter UAS with limited capability for loads and equipment. Removable equipment includes the battery, gimbal, camera, telemetry hardware, antenna, and imaging transmitter. The battery is held in place via proprietary fittings. The gimbal is attached via screws into the airframe. The camera is attached to the gimbal using screws and a proprietary harness. All other equipment is attached using nylon fittings, Velcro, or adhesives. Total takeoff weight with these components will not exceed the maximum recommended take-off weight identified in the Inspire Users/operators Manual of 2935 grams. Payload security is tested prior to any operations both visually and by vigorous tactile testing. All attachment points will be inspected and tested weekly.

FLIGHT PROCEDURES

SDI will utilize checklists to direct the flight operations personnel in flight procedures. The following section will continually refer to the several checklists presented in the Appendix.

- **Motor Start** - All of the various preflight checks will have been performed prior to motor start and will include:
  - PIC and VO will put on identifying outerwear.
  - Pre-flight compass calibration, GPS verification, and voltage diagnostics completed.
  - Take-off position and location is checked to ensure it is clear of obstacles, debris, potential hazards, and people.
  - Transmitter switches are placed in the proper configuration, including the home switch and GPS mode switch.
  - Transmitter is on and properly charged with voltage confirmed.
  - Battery is secured, on, and properly seated.
  - Camera and gimbal is armed, responding to commands, and stabilized.
  - UAS is placed in the proper takeoff position.
  - LED flight mode indicator, and telemetry read-out shows adequate GPS connectivity according to the DJI Inspire User/operators Manual.
  - LED flight mode indicators and telemetry read-outs show the proper flight mode is selected DJI Inspire User/operators Manual.
  - Camera is switched on.
  - All flight operations personnel are in their proper position and at the ready.
  - Start motors, and establish functional pre-take-off power setting.

- **Take-Off** - Once motors have been started, the PIC will verify that the pre-take-off checklist has been completed. Once this has been verified, the PIC will follow the following take-off procedure:
  1. Apply power for a controlled ascent to a safe low-level test altitude over the take-off area, and then hold.
  2. After in hold, PIC performs check of all control stick response including rudder, aileron, elevator, and throttle to ensure proper response to commands.

3. PIC confirms with VO that the flight operations area is free of obstructions or other manned or unmanned air traffic.
4. PIC confirms with all flight operations personnel that they are ready to proceed with flight operations as planned.

- **In-Flight** - SDI requires that the PIC is free to concentrate on positioning, scanning, and monitoring systems and the flight operations area without un-necessary distraction, and to ensure the flight is compliant with remaining 500ft clear of all non-participating persons, vessels, vehicles, or structures unless proper permissions have been obtained as described in the previous section addressing the selection of sites. Throughout the flight, PIC will take particular care to remain within the established operating permissions and envelope by executing the following practices:
    - Verify through verbal communication with the VO that they are alerted to any manned or unmanned aircraft within the flight area.
    - Verify through verbal communication with the VO that obstacles are being identified and avoided.
    - Interval monitoring of voltage and communication with UAV to ensure adequate voltage according to the DJI Phantom 2 User/operating Manual for safe return and landing.
    - Monitor time since motors were started to ensure a minimum of 3 minutes of battery fuel is available for return and landing of UAV.
    - A safety margin of a minimum of 3 minutes of battery life is maintained at all times.
    - Maintain visual contact with flight systems/mode and battery LED light indicators at all times.
    - Maintain situational awareness of changes in weather, visibility, or cloud avoidance at all times.
    - Maintain operation speeds less than 100mph.
    - Maintain visual contact with UAV at all times.
    - Ensure VO has visual contact with the UAV in flight at all times. Establish a position hold until VO re-establishes visual contact with the UAV if contact is lost.

- **Let-Down/Landing** - To execute a safe recovery and landing of the UAV, the PIC will ensure that the following practices are followed:

- Establish and guide the UAV through a safe route to directly above the cordoned take-off and landing area.
- Maintain a safe descent rate and follows all procedures and techniques to avoid vortex state or settling with power.
- Verify that a minimum of 3 minutes of battery life is available, as mentioned above, to ensure a holding position if the landing area is not cleared.
- Verify that the landing area is clear of debris, obstacles, people, or hazards that would preclude a safe landing.

- **Shutdown** - Upon landing, the throttle is returned to the home position causing the rotors to stop spinning. Operations then proceed as follows:
  - The UAV battery is switched off or disconnected.
  - The camera is stopped and is then switched off.
  - The UAV is removed from the landing area and is checked for any abnormalities or damage.
  - The transmitter is switched off.
  - The UAV battery is removed, tested, and then the battery is safely secured and stored.

EMERGENCY PROCEDURES

The emergency procedures described below address the following, safety-critical question: *In the event of a malfunction, failure or other in-flight emergency, how is the UAS going to safely land without creating a hazard to other airspace users or persons or property on the ground?*

MOTOR THRUST LOSS

As a quad copter, The Phantom 2 has no 'rotor redundancy'. Loss of power to a motor on a quad copter will result in a crash. For this reason, SDI takes specific preventative steps to ensure that loss of power to a motor will not occur:

- Wiring integrity is checked visually prior to any flight operations.
- A pre-flight battery check is undertaken to test the charge of the cells.
- Upon take-off, the UAS is lifted into a temporary, low-altitude holding position and the throttle/ rudder and aileron/elevator control sticks are moved to check that UAV is responding as expected.

If there is a loss of thrust to a motor, any residual control left available to the PIC will be used to guide the UAV away from people and objects to avoid injury or damage to property and people. Every effort will be made to restrict the crash site to the safest possible position.

UAV BATTERY FAILURE

As has been addressed in above previous sections, SDI has procedures and practices in place designed to prevent UAV batter failure or malfunction, and they include:

- The batteries are physically inspected and tested through all phases of pre-flight and post flight for damage or swelling
- The Battery performance and condition is tested prior to each flight to ensure they are fully charged, and the proprietary DJI Inspire software charge track/log is checked to ensure the battery meets the minimum safe requirements as specified by DJI in operating manual and firmware specs.
- Throughout all phases of flight, the battery voltage, percentage of charge remaining, and time in operation is constantly monitored via the telemetry transmission to the ground station to ensure there is the proper minimum voltage and time to return and land is achieved and maintained.
- The PIC will immediately land the UAV in the nearest possible landing area

if telemetry indicates the minimum voltage, time in operation, or percentage of charge are not met.

BATTERY FAILURE FAILSAFE

As a preventative measure to keep the UAV from a forced landing or crash due to battery failure, the DJI Inspire flight controller has several levels of low voltage protections incorporated as specified in the attached User/Operator's Manual, triggering an automated Failsafe Return to Home and Landing command as follows:

- 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 Inspire 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. The following list details the battery power warnings:
    - When battery power drops below 30% the LED indicator will blink red slowly.
    - 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.
    - 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.

● ● ●● ●	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.

TRANSMITTER/CONTROLLER BATTERY FAILURE

As has been mentioned previously, through the extensive use of checklist procedures, SDI requires that the PIC ensure the DJI Inspire controller (ground station) will be fully charged prior to any aerial operation. Any monitors being used to display telemetry will also be fully charged.

CONTROLLER BATTERY FAILSAFE

SDI will use The DJI Inspire flight control system that incorporates an automated failsafe system which commands the UAV to return to home and land if there is a loss of frequency due to battery failure. The PIC will reference the below LED lighting system to monitor the controller charge;

Remote Controller Power LED Indicator Status

Power LED	Sound	Remote Controller Status
▬▬▬	None	Normal
●●●●●●	B-B-B.....	Low voltage (at 4V-4.3V). Replace the batteries 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 4V. Land and change batteries as soon as possible when the low voltage alert occurs to avoid loss of control during flight.

LOSS OF CONTROL FREQUENCY (and/or Ground Station Failure)

To help prevent a loss of control frequency, SDI requires that the PIC ensure flight operations only occur within un-aided visual line of site VLOS at all times. Doing so will keep the UAV well within the required minimum range of the DJI Inspire controller/transmitter.

LOSS OF CONTROL FREQUENCY FAILSAFE

If the control frequency signal is lost for more than 3 seconds (UAS out of range, ground station failure etc.) the DJI Inspire Flight Controller has been programmed to switch the UAS into failsafe mode and it will 'return to home' (RTH) and also land:

- If the failsafe occurs while in GPS mode according to the parameters of the DJI Inspire User/Operator Manual, the UAV will return to the take-off

and landing area and auto-land.

- If the fail location occurs while in ATTI mode according to the parameters of the DJI Inspire User/Operator Manual, the UAV will auto-land.
- The RTH failsafe mechanism works by the UAS Flight Controller saving the home (take-off) point automatically when the throttle stick is moved for the first time (after 6 or more GPS satellites have been acquired – denoted by a single red pulse from the LED or a series of continuous green pulses).

The RTH failsafe function on the UAS is tested on a weekly basis by SDI by switching the transmitter off during a test flight session.

MALICIOUS OR ACCIDENTAL INTERFERENCE WITH CONTROL FREQUENCY

As was mentioned in previous sections, through the extensive use of checklists, SDI requires that the PIC utilize a Spectrum Scanner to ensure there is no accidental or malicious radio interference. In the unlikely event that this should occur, the PIC will initiate the failsafe procedure mentioned in the previous section

- **Pilot Incapacitation** - If the pilot-in-command becomes incapacitated to the extent that control of the UAV becomes unviable, the UAV will hover in a stationery position until the battery's second level low-voltage protection is triggered. At this point, the UAV will descend and land in a steady, controlled manner. If an observer is present, they will have been briefed on the UAS's failsafe (return-to-home) mode and its activation (see Section on "Crew Briefing").

- **Aircraft Incursion -** If another aircraft should enter or appears to be entering the Visual Line of Sight Operating Envelope VLOS, PIC will operate the UAV to immediately maintain safe visual separation, and give way to any manned flight operation.

FLY AWAY PROCEDURE

A "fly away" is defined as the loss of control transmission link where the PIC no longer has control or the ability to command the UAV to remain within the bounds of the intended operation area. In the unlikely event that this should occur, the PIC will observe and record the direction of flight heading, speed, and altitude of the UAV, and then follow the Incident Response Procedure as outlined below:

- **Crash & Incident Response** While SDI takes extreme caution in its flight procedures to prevent a loss of control or crash, any incident, accident, or operation that transgresses the lateral or vertical boundaries as defined by the applicable COA issued must be reported to the FAA UAS Integration Office (AFS 80 within 24 hours. The following procedures will also be ensured by the PIC:
    - PIC will have on their person a copy of the local emergency response contact information, including fire, law enforcement, medical response, and the UAS Integration Office contact information

Appendix A

Checklists

PRE-FLIGHT START-UP CHECKLIST:

- ☐ Verify all transmitter, on-board aircraft and camera batteries are fully charged (confirm voltages).
- ☐ Ensure no frequency conflicts with video and transmitter / receiver.
- ☐ Check all control surfaces for signs of damage, loose hinges, and overall condition. Inspect the wings / rotors to ensure they are in good structural condition and properly secured.
- ☐ Check motor / engine and mounting attachments to the airframe.
- ☐ Inspect propellers / mounting hardware (tight) / rotor blades for chips and deformation.
- ☐ Check the landing gear for damage and function.
- ☐ Test electrical connections (plugged in and secure).
- ☐ Ensure photo / video equipment mounting system is secure and operational.
- ☐ Check location of GPS equipment controlling the autopilot.
- ☐ Check the IMU movements in the ground control software.
- ☐ UAV in stabilization mode, ensure control response move toward the correct positions.
- ☐ UAV / Drone is in a level location safe for takeoff.
- ☐ FPV / Power up ground station.
- ☐ FPV / Power up Video receiver.
- ☐ If using Video recorder, turn on camera system.
- ☐ Camera settings are correct (still images, video, frame rate).
- ☐ SD camera memory clear and inserted into the camera.
- ☐ Action / Start filming.
- ☐ All transmitter controls move freely in all directions.
- ☐ All transmitter trims in neutral position.
- ☐ All transmitter switches in correct position (typically away).
- ☐ Transmitter throttle to zero.
- ☐ Radio transmitter on.
- ☐ Connect / power on battery to airframe.
- ☐ Ensure led indicators and audible tones are correct.
- ☐ Timer on (if applicable).
- ☐ FPV, confirm video is in monitor / goggles.
- ☐ Scan for nearby cars / people / animals.
- ☐ Say "CLEAR!".
- ☐ Arm flight controller.

- ☐ Increase throttle slightly listening for any abnormalities.
- ☐ Short 20-30 second hover at 3-5 feet (listen for vibrations / loose items).
- ☐ Confirm Voltage levels are correct.

PRE-FLIGHT INSPECTION CHECKLIST:

- ☐ Perform initial walk-around.
- ☐ Inspect UAV for cracks in joints and structural members.
- ☐ Inspect UAV for loose or damaged screws, ties, fasteners, straps.
- ☐ Inspect UAV for loose or damaged wiring.
- ☐ Inspect UAV for loose or damaged connections (solder, plugs, etc.).
- ☐ Inspect prop mounts and screws and apply slight counter pressure on arms to check for loosened components.
- ☐ Ensure antennas and masts are secure.
- ☐ Inspect / clean FPV Camera and Lens and insure it is secured and connections are firmly attached.
- ☐ Ensure camera settings are correct (still images, video, frame rate).
- ☐ Ensure FPV Transmitters are secure and operational.
- ☐ Ensure batteries are fully charged, properly seated and secured.
- ☐ Ensure the following fail-safe equipment is functioning:
    - ☐ RTH (return to home).
    - ☐ Recovery Command Response (toggle test).
    - ☐ Firmware Airport Proximity Detection.
- ☐ Ensure props are smooth and free of damage / defect (check blade, surface and hub).
- ☐ Ensure prop adapters are tight / secure.
- ☐ Ensure voltage alarm is connected.
- ☐ Ensure arming / idle timeout is properly configured.
- ☐ Ensure correct model is selected in transmitter (if applicable).
- ☐ Check RC transmitter for the correct range and centering for all sticks.
- ☐ Perform range test.

IN-FLIGHT CHECKLIST:

- ☐ Basics: If flying manually, always keep your fingers on the controller/transmitter.
- ☐ Never let the UAV out of your sight even for a second.
- ☐ Climb to a safe altitude away from potential hazards and to reduce noise pollution.
- ☐ Keep aircraft at a safe operating distance from people, electric utility lines and buildings.
- ☐ If the UAV must be flown over buildings or people, use a lightweight UAV and maintain a safe altitude for recovery and make every effort to minimize exposure.
- ☐ Spotter: Use a spotter whenever possible and appropriate, especially when flying by First Person View (FPV).
- ☐ Do not fly UAVs within distance defined by local laws of any private/commercial airport/helipad.
- ☐ Do not fly around a pre-existing UAV flying site without a frequency-management agreement.
- ☐ Do not interfere with operations and traffic patterns at any airport.

LANDING CHECKLIST:

- ☐ Regardless of whether of a manual or automated UAV landing, scan landing area for potential obstruction hazards.
- ☐ Announce out loud "Preparing to Land".
- ☐ Use a safe descent rate and follow correct procedures to avoid a vortex state or settling.
- ☐ Carefully land the aircraft away from obstructions and people.
- ☐ Turn the power off to the aircraft and/or disconnect the batteries.
- ☐ Turn off the transmitter.
- ☐ Turn the power off to the photo equipment.
- ☐ Visually check aircraft for signs of damage and/or excessive wear.
- ☐ Remove the unused fuel if applicable. Secure the aircraft.
- ☐ Check pictures: Verify that the UAV camera actually took the pictures.
- ☐ LOG FLIGHT.

Appendix B

Maintenance Logbook

Swainston Digital Imaging
MAINTENANCE LOGBOOK

Date	Component	Maintenance Activity	Maintenance Time	Comments

Appendix C

Incident/Accident Logbook

Swainston Digital Imaging
INCIDENT/ACCIDENT LOGBOOK

Date of Incident/ Accident	Time of Incident/ Accident	Name of Injured	Incident/Accident Details	Action Taken	Notes

Appendix D

Flight Record Log Book

Swainston Digital Imaging
FLIGHT RECORD LOGBOOK (Sample Page)

Date	Location	Activity	Flying Time	Battery Before	Battery After	Comments

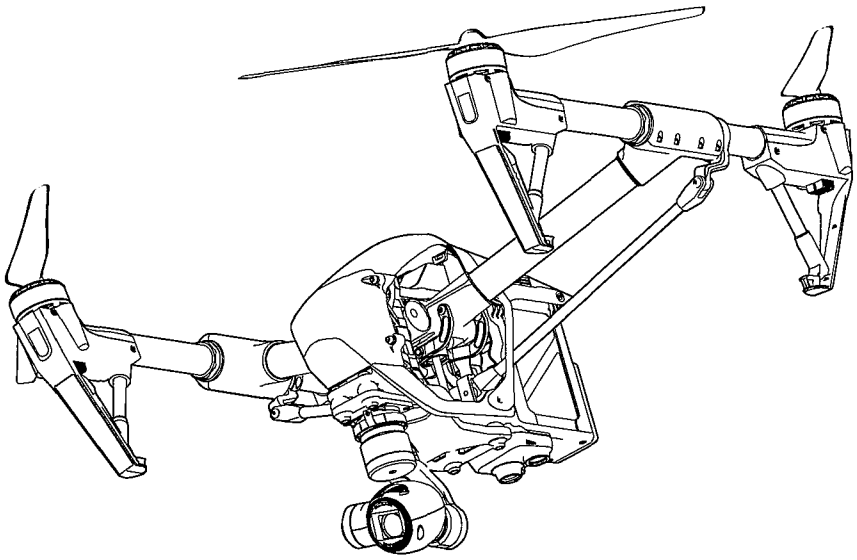
Appendix E

DJI Inspire User Manual

INSPIRE 1

User Manual V1.0

2015.3



Using this manual

Legends

⊘ Warning ⚠ Important Hints and Tips Reference

Before Flight

The following tutorials and manuals have been produced to ensure you to make full use of your Inspire 1.

1.Disclaimer
2.In the Box
3.Inspire 1 Quick Start Guide
4.Safety Guidelines
5.Inspire 1 User Manual
6.Intelligent Flight Battery Safety Guidelines

Watching all the tutorial videos and reading the Disclaimer before flight is recommended. Afterwards, prepare for your first flight by using the Inspire 1 Quick Start Guide. Refer to this manual for more comprehensive information.

Watch the video tutorials

Please watch the tutorial video below to learn how to use Inspire 1 correctly and safely:

www.dji.com/product/inspire-1/video

Download the DJI Pilot app

Download and install the DJI Pilot app before use. Scan the QR code or visit "http://m.dji.net/djipilot" to download the app.

For the best experience, use mobile device with Andriod V 4.1.2 or above. Requires iOS 8.0 or later.

Contents

Product Profile

This chapter describes the features of Inspire 1, instructs you to assemble the aircraft and explains the components on the aircraft and remote controllers.

Product Profile

Introduction

The Inspire 1 is brand new quadcopter capable of capturing 4K video and transmitting an HD video signal (up to 2km) to multiple devices straight out of the box. Equipped with retractable landing gear, it can capture an unobstructed 360 degree view from its camera. The built-in camera has an integrated gimbal to maximize stability and weight efficiency while minimizing space. When no GPS signal is available, Vision Positioning technology provides hovering precision.

Feature Highlights

Camera and Gimbal: Up to 4K video recording and 12 megapixel photo capture. Reserved mounting space for ND filters for better exposure control. New quick-release mount allows you to remove the camera with ease.

HD Video Downlink: Low latency, HD downlink powered by an enhanced version of the DJI Lightbridge system. It also provides dual controllers mode.

Landing gear: Retractable landing gear that enables an unobstructed panoramic view from the camera.
DJI Intelligent Flight Battery: 4500 mAh DJI Intelligent Flight Battery employs new battery cells and a battery management system.

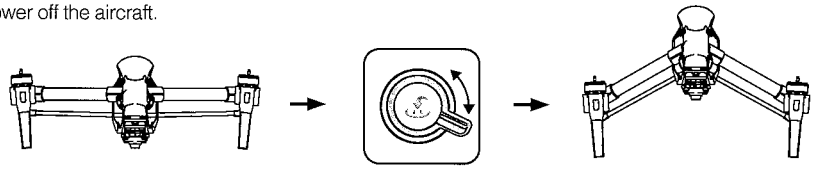
Flight Controller: The next generation flight controller system provides a more reliable flight experience. A new flight recorder stores the flight data from each flight, and Vision Positioning enhances hovering precision when no GPS is available.

Assemble the Aircraft

Unlocking Travel Mode

The aircraft is in Travel Mode during delivery. Follow these steps to change it to Landing Mode before your first flight:

1. Insert the Intelligent Flight Battery into the battery compartment.
2. Power on the Remote Controller and the Intelligent Flight Battery.
3. Toggle the Transformation Switch up and down at least four times.
4. Power off the aircraft.

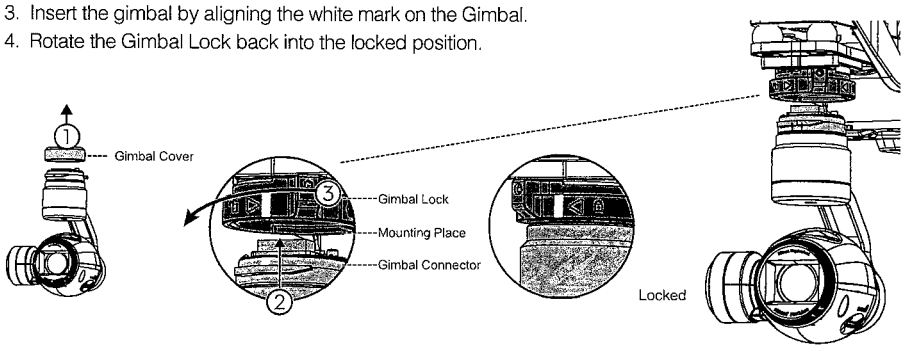


Travel Mode　　Toggle×4　　Landing Mode

⚠
- Battery must be fully charged before using it for the first time. Refer to "Charging the Intelligent Flight Battery" (P21) for more information .
- If you have purchased the dual remote controller version, you must use the Master remote controller to deactivate Travel Mode. Refer to "Setting Up Dual Remote Controllers Mode" (P30) section for more infromation about Master remote controller.
- Be sure to remove the gimbal from the aircraft before switch from Landing Mode to Travel Mode.
- Place the aircraft on the smooth and reflective surface (e.g. table or tile) before switching between the travel modes to the landing mode. Do not place the aircraft on the rough and sound-absorbing surface (e.g. carpet) before switching between the travel modes and landing mode.

Installing Gimbal and Camera

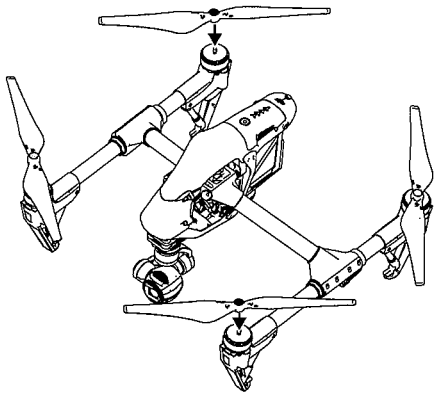
1. Remove Gimbal Cover.
2. Rotate the Gimbal Lock to the unlocked position (to the right when facing the nose of the aircraft).
3. Insert the gimbal by aligning the white mark on the Gimbal.
4. Rotate the Gimbal Lock back into the locked position.



⚠ Ensure the Micro-SD card is correctly inserted into the camera.

Attaching Propellers

Attach propellers with the black nut onto motors with the black dot and spin counter-clockwise to secure. Attach propellers with gray nut onto motors without a black dot and spin clockwise to secure.

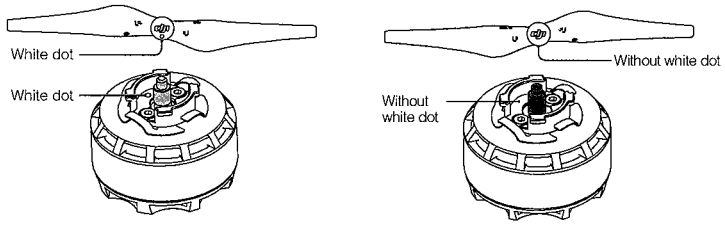


⚠ Place all propellers onto the correct motor and tighten by hand to ensure security before flight.

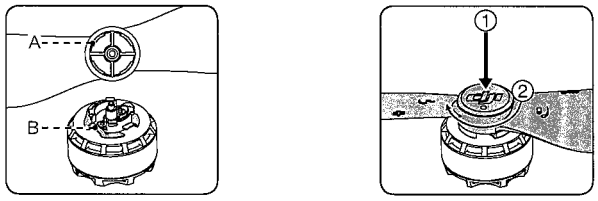
Attaching 1345s Quick-Release Propellers

The 1345s Quick-Release propeller is the upgrade version of the propellers that greatly enhance the reliability of the propeller during the flight. Following the steps below to attach the 1345s Quick-Release propellers.

1. Install the propellers with a white dot onto the mounting plates that have a white dot, and install the propellers without a white dot onto the mounting plates that do not have a white dot.



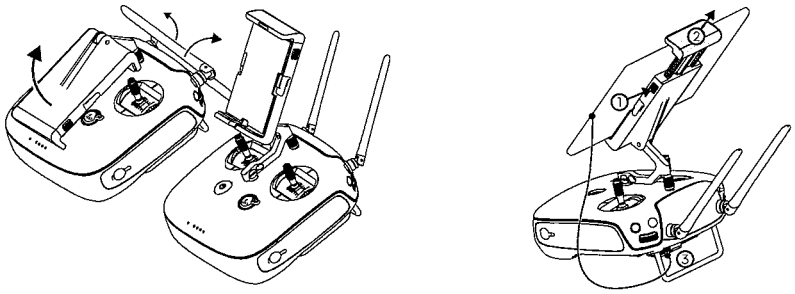
2. Align the hook (A) on the propellers with the securing spring (B), then press down the propeller onto the mounting plate then rotate the propellers according to the lock direction until it is secured.



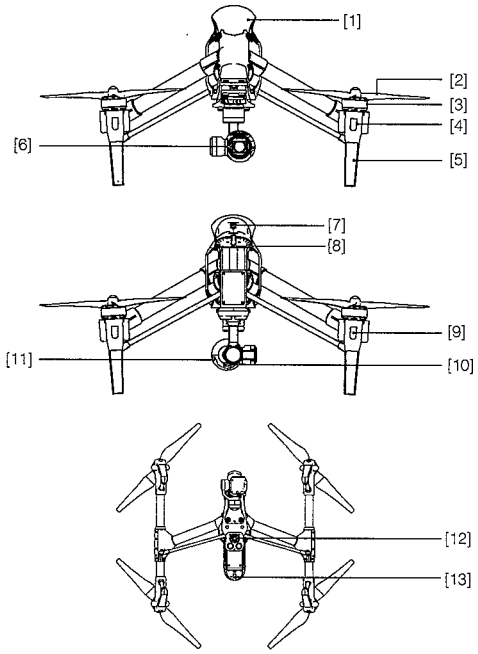
Preparing Remote Controller

Tilt the Mobile Device Holder to the desired position then adjust the antenna as shown.

1. Press the button on the side of the Mobile Device Holder to release the clamp, adjust it to fit then attach your mobile device.
2. Connect your mobile device to the remote controller with a USB cable.
3. Plug one end of the cable into your mobile device, and the other end into the USB port on the back of the remote controller.



Aircraft Diagram



[1] GPS

[2] Propeller (P17)

[3] Motor

[4] Front LED (P12)

[5] Landing gear

[6] Gimbal and Camera (P35)

[7] Intelligent Flight Battery (P18)

[8] Aircraft Micro-USB Port

[9] Rear LED (P12)

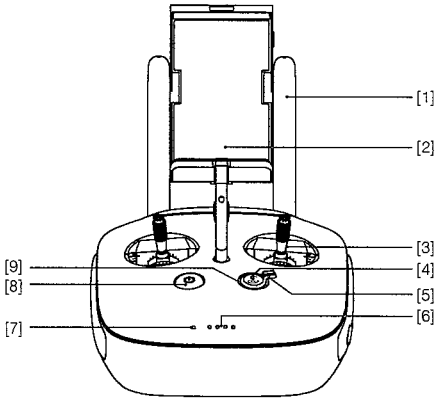
[10] Camera Micro-USB Port

[11] Camera Micro-SD Card Slot (P35)

[12] Vision Positioning Sensors (P16)

[13] Aircraft Status Indicator (P13)

Remote Controller Diagram



[1] Antennas (P29)

Relays aircraft control and video signal.

[2] Mobile Device Holder

Mounting place for your mobile device.

[3] Control Stick

Controls aircraft orientation.

[4] Return Home (RTH) Button (P13)

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

[5] Transformation Switch (P27)

Toggle the switch up or down to raise or lower the landing gear.

[6] Battery Level LEDs

Displays the current battery level.

[7] Status LED

Displays the power status.

[8] Power Button

Used to power on or power off the remote controller.

[9] RTH LED

Circular LED around the RTH button displays RTH status.

[10] Camera Settings Dial

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

[11] Playback Button

Playback the captured images or videos.

[12] Shutter Button

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

[13] Flight Mode Switch

Used to switch between P, A and F mode.

[14] Video Recording Button

Press to start recording video. Press again to stop recording.

[15] Gimbal Dial

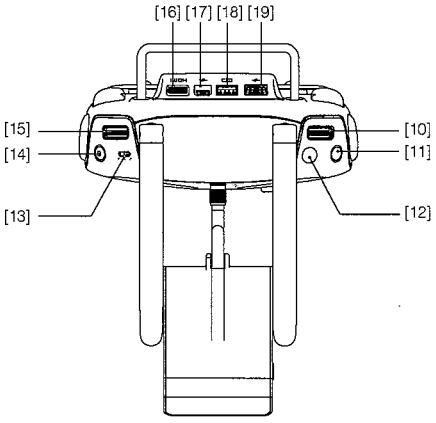
Use this dial to control the tilt of the gimbal.

[16] Mini-HDMI Port

Connect an HD compatible monitor to this port to get a live HD video preview of what the camera sees.

[17] Micro-USB Port

For connecting the remote controller to your computer.

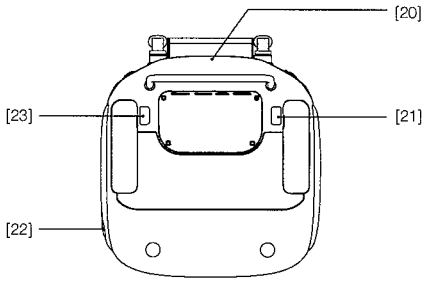


[18] CAN Bus Port

Reserved for future use.

[19] USB Port

Connect to mobile device to access all of the DJI Pilot app controls and features.



[20] GPS Module

Used to pinpoint the location of the remote controller.

[21] Back Left Button

Customizable button in DJI Pilot app.

[22] Power Port

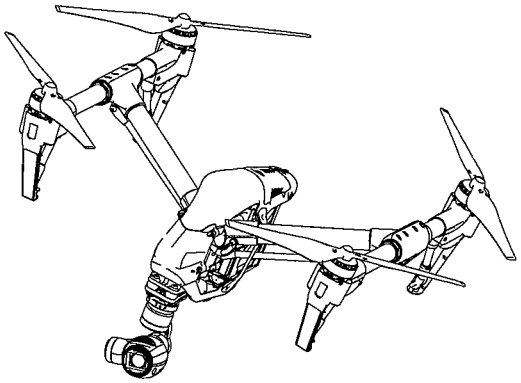
Connect to a power source to charge the remote controller's internal battery.

[23] Back Right Button

Customizable button in DJI Pilot app.

Aircraft

This chapter describes the features of the Flight Controller, Vision Positioning System and the Intelligent Flight Battery.



Aircraft

Flight Controller

The Inspire 1's flight controller is based on DJI flight controller with several enhancements such as new flight mode and new safe mode. Three safe modes are available: Failsafe, Return Home and Dynamic Home Point. These features ensure the safe return of your aircraft if the control signal is lost. A flight recorder stores crucial flight data for each flight.

Flight Mode

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

P mode (Positioning) : P mode works best when GPS signal is strong. There are three different states of P mode, which will be automatically selected by the Inspire 1 depending on GPS signal strength and Vision Positioning sensors:

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

P-OPTI: Vision Positioning is available but the GPS signal is not. Aircraft is using only Vision Positioning for hovering

P-ATTI: Neither GPS or Vision Positioning available, aircraft is using only its barometer for positioning, so only altitude is controlled.

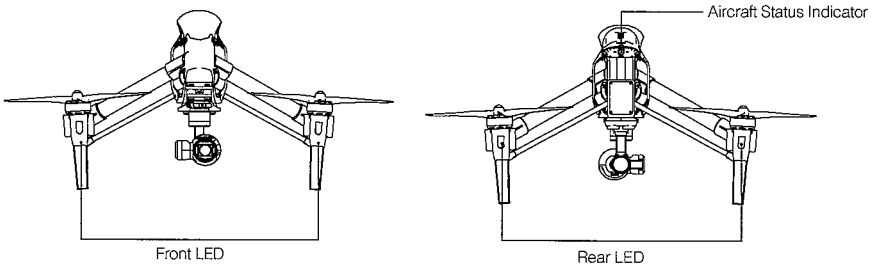
A mode (Attitude): The GPS and Vision Positioning System is not used for holding position. The aircraft only uses its barometer to maintain altitude. If it is still receiving a GPS signal, the aircraft can automatically return home if the Remote Controller signal is lost and if the Home Point has been recorded successfully.

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

Use the Flight Controller mode switch to change the flight mode of the aircraft, refer to the "Flight Mode Switch" on P27 for more information.

Flight Status Indicator

The INSPIRE 1 comes with the Front LED, Rear LED and Aircraft Status Indicator. The positions of these LEDs are shown in the figure below:



The Front and Rear LED show the orientation of the aircraft. The Front LED displays solid red and the Rear LED displays solid green.

Aircraft Status Indicator shows the system status of the flight controller. Refer to the table below for more information about the Aircraft Status Indicator:

Aircraft Status Indicator Description

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

Return to Home (RTH)

The Return to Home (RTH) brings the aircraft back to the last recorded Home Point. There are three cases that will trigger RTH procedure; they are Smart RTH, Low Battery RTH and Failsafe RTH.

FF	GPS	Description
Home Point	🛰 ıllll	The Home Point is the location at which your aircraft takes off when the GPS signal is strong. You can view the GPS signal strength through the GPS icon (🛰 ıllll). If you are using the Dynamic Home Point setting, the Home Point will be updated to your current position as you move around and when the Aircraft Status Indicator blinks green.

Smart RTH

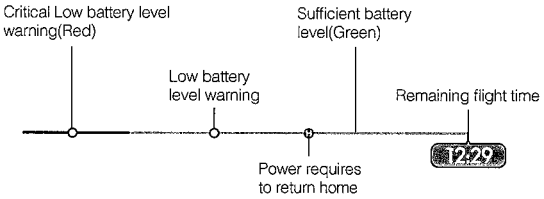
Using the RTH button on the remote controller (refer to "RTH button" on P28 for more information) or the RTH button in the DJI Pilot app when GPS is available to enables smart RTH. The aircraft return to the latest recorded Home Point, you may control the aircraft's orientation to avoid collision during the Smart RTH. Press the Smart RTH button once to start the process, press the Smart RTH button again to exit Smart RTH and regain the control.

Low Battery RTH

The low battery level failsafe is triggered when the DJI Intelligent Flight Battery is depleted to a point that may affect the safe return of the aircraft. Users are advised to return home or land the aircraft immediately when these warnings are shown. DJI Pilot app will advise user to return the aircraft to the Home Point when low battery warning is triggered. Aircraft will automatically return to the Home Point if no action is taken after 10 seconds countdown. User can cancel the RTH by pressing once on the RTH button. The thresholds for these warnings are automatically determined based on the current aircraft altitude and its distance from the Home Point.

Aircraft will land automatically if the current battery level can only support the aircraft to land to the ground from the current altitude. User can use the remote controller to control the aircraft's orientation during the landing process.

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



Battery level indicator

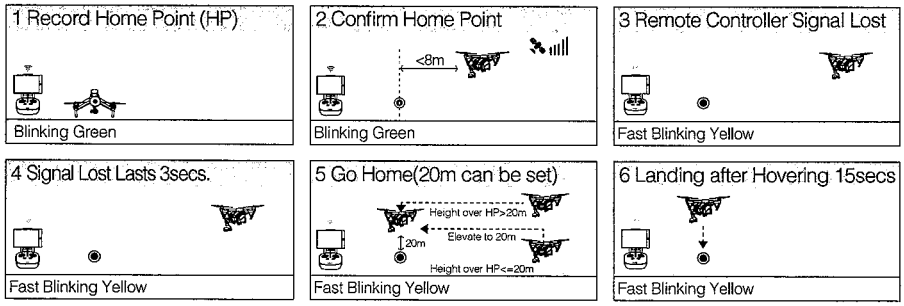
Battery Level Warning	Remark	Aircraft Status Indicator	DJI Pilot app	Flight Instructions
Low battery level warning	The battery power is low. Please land the aircraft.	Aircraft status indicator blinks RED slowly.	Tap "Go-home" to have the aircraft return to the Home point and land automatically, or "Cancel" to resume normal flight. If no action is taken, the aircraft will automatically go home and land after 10 seconds. Remote controller will sound an alarm.	Fly the aircraft back and land it as soon as possible, then stop the motors and replace the battery.
Critical Low battery level warning	The aircraft must land immediately.	Aircraft status indicator blinks RED quickly.	The DJI Pilot app screen will flash red and aircraft starts to descend. Remote controller will sound an alarm.	The aircraft will begin to descend and land automatically.
Estimated remaining flight time	Estimated remaining flight based on current battery level.	N/A	N/A	N/A

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

Failsafe RTH

Failsafe RTH is activated automatically if remote controller signal (including video relay signal) is lost for more than 3 seconds provided that Home Point has been successfully recorded and compass is working normally. Return home process may be interrupted and the operator can regain control over the aircraft if a remote controller signal is resumed.

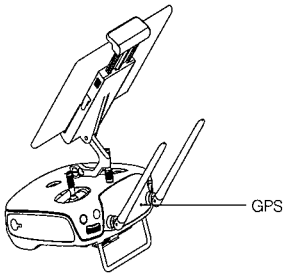
Failsafe Illustration



- Aircraft cannot avoid obstruction during the Failsafe RTH, therefore it is important to set an reasonable Failsafe altitude before each flight. Launch the DJI Pilot app and enter "Camera" view and select "MODE" to set the Failsafe altitude.
- Aircraft will stop ascending and immediately return to the Home Point if you move the throttle stick during the Failsafe.

Dynamic Home Point

Dynamic home point is useful in situations when you are in motion and require a Home Point that is different from the takeoff point. GPS module is located at the position shown in the figure below:



Ensure the space above the GPS module is not obstructed when using Dynamic Home Point.

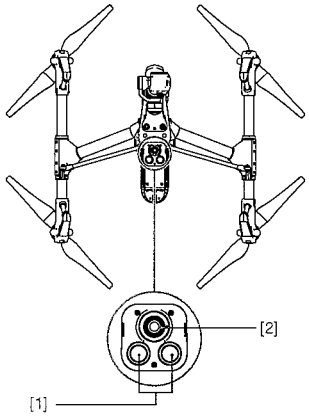
There are two options for Dynamic Home Point.
1. Set the aircraft current coordinate as the new Home Point.
2. Set the remote controller's coordinate as the new Home Point.

Setting Up Dynamic Home Point

Follow the steps below to setup Dynamic Home Point:
1. Connect to the mobile device and launch the DJI Pilot app and go to the "Camera" page.
2. Tap"📍"and select"🎮", to reset the remote controller's coordinates as the new Home Point.
3. Tap"📍"and select"✈", to reset the aircraft's coordinates as the new Home Point.
4. The aircraft status indicator blinks green to show Home Point is set successfully.

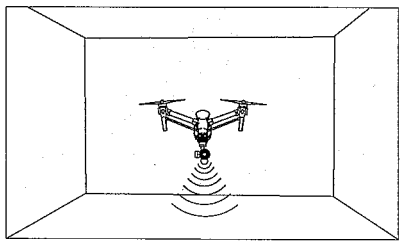
Vision Positioning System

DJI Vision Positioning is a positioning system that uses ultrasonic and image data to help the aircraft identify its current position. With the help of Vision Positioning, your Inspire 1 can hover in place more precisely and fly indoors or in other environments where there is no GPS signal available. The main components of DJI Vision Positioning are located on the bottom of your Inspire 1, including [1]two sonar sensors and[2]one monocular camera.



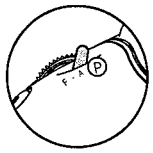
Using Vision Positioning

Vision Positioning is activated automatically when the Inspire 1 is powered on. No manual action is required. Vision Positioning is typically used in the indoor environment where no GPS is available. By using the sensors on the Vision Positioning system, Inspire 1 can perform precision hovering even when no GPS is available.



Follow the steps below to use Vision Positioning:

1. Toggle the switch to "P" as shown the figure to the right:
2. Place the Inspire 1 on a flat surface. Notice that the Vision Positioning system cannot work properly on surfaces without pattern variations.
3. Power on the Inspire 1. The aircraft status indicator will flash twice in green light, which indicates the Vision Positioning system is ready. Gently push the throttle up to lift off, and the Inspire 1 will hover in place.



⚠ The performance of your Inspire 1's Vision Positioning System is subject to the surface you are flying over. The ultrasonic waves may not be able to accurately measure the distance over sound absorbing materials, and the camera may not function correctly in suboptimal environments. The aircraft will switch from "P" mode to "A" mode automatically if both GPS and Vision Positioning System are not available. So operate the aircraft cautiously when in any of the following situations:

- Flying over monochrome surfaces (e.g. pure black, pure white, pure red, pure green).
- Flying over a highly reflective surfaces.
- Flying at high speeds(over 8m/s at 2 meters or over 4m/s at 1 meter).
- Flying over water or transparent surfaces.
- Flying over moving surfaces or objects.
- Flying in an area where the lighting changes frequently or drastically.
- Flying over extremely dark (lux < 10) or bright (lux > 10,000) surfaces.
- Flying over surfaces that can absorb sound waves (e.g. thick carpet).
- Flying over surfaces without clear patterns or texture.
- Flying over surfaces with identical repeating patterns or textures (e.g. tiles with same design).
- Flying over inclined surfaces that will deflect sound waves away from the aircraft.
- In the event of loss of remote controller's signal, the aircraft will hover for 8 seconds and then auto-land if it is in "P" mode.

- Keep the sensors clean at all times. Dirt or other debris may adversely affect the effectiveness of the sensors.
- The effective hovering altitudes of the aircraft is from 0 to 2.5 meters.
- Vision Positioning system may not function properly when the aircraft is flying over water.
- Vision Positioning system may not be able to recognize pattern on the ground in low light conditions (less than 100lux).
- Do not use other ultrasonic devices with frequency of 40 KHz when Vision Positioning system is in operation.
- Vision Positioning system may not be able to stabilize the aircraft when flying close to the ground (below 0.5 meters) in fast speed.

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

Flight Recorder

Flight data is automatically stored in the internal storage device of the aircraft. User can gain access to these data through the DJI Pilot app. This includes flight duration, orientation, distance, aircraft status information, speed, and other parameters.

Attaching and Detaching the Propellers

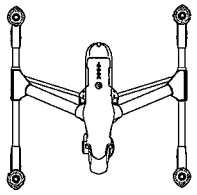
Use only DJI approved propellers with your Inspire 1. The grey or black nut on the propeller indicates the rotation direction of the propeller and where it should be attached. To attach the propellers properly,

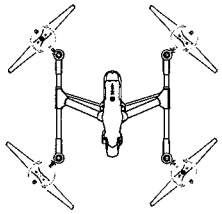
match the nut with the dots on the motors of your Inspire 1:

Propellers	Grey cap(1345)	Black cap(1345R)
Figure		
Attach On	Motors without a black dot	Motors with a black dot
Legends	Lock : Turn the propellers in the indicated direction to mount and tighten Unlock : Turn the propellers in the indicated direction to loosen and remove	

Attaching the Propellers

1. Attach the propellers with a grey nut onto a motor without a black dot and spin the propellers clockwise to secure them in place. Attach the propellers with a black nut onto a motor with a black dot and spin the propellers counter clockwise to secure its position. Be sure to completely tighten each propeller by hand before flight.





⚠
- Ensure propellers are attached to its corresponding motors, otherwise the aircraft cannot take off.
- Handling the propellers with care.
- Manually tighten each of the propellers on the corresponding motors to ensure it is attached firmly.

Detaching the Propellers

Hold the motor still. Then spin the propeller in the unlock direction indicated on the propeller itself.

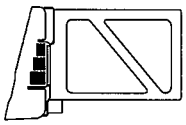
Detaching 1345s Quick-Release Propellers

Press the 1345s Quick-Release propellers downward firmly then rotate the propeller in the unlock direction to unlock the propellers.

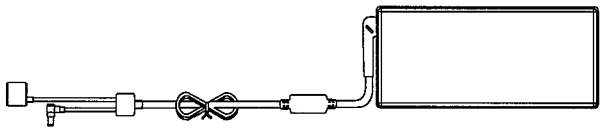
⚠
- Check that the propellers and motors are installed correctly and firmly before every flight.
- Ensure that all propellers are in good condition before each flight. DO NOT use old, chipped, or broken propellers.
- To avoid injury, STAND CLEAR of and DO NOT touch propellers or motors when they are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

DJI Intelligent Flight Battery

The DJI Intelligent Flight Battery has a capacity of 4500mAh, voltage of 22.2V, and smart charge-discharge functionality. It can only be charged with an appropriate DJI approved charger.



Intelligent Flight Battery



Charger

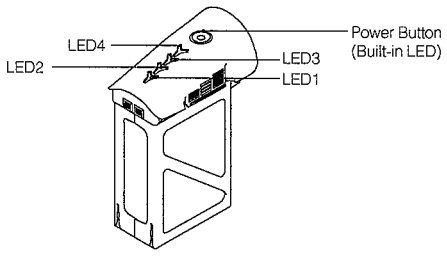
⚠ Battery must be fully charged before using it for the first time. Refer to "Charging the Intelligent Flight Battery" P21 for more information .

DJI Intelligent Flight Battery Functions

1. Battery Level Display: LEDs display the current battery level.
2. Battery Life Display: LEDs display the current battery power cycle.
3. Auto-discharging Function: The battery automatically discharges to below 65% of total power when it is idle (press the power button to check battery level will cause battery to exit idle state) for more than 10 days to prevent swelling. It takes around 2 days to discharge the battery to 65%.It is normal to feel moderate heat emitting from the battery during the discharge process. Discharge thresholds can be set in the DJI Pilot app.
4. Balanced Charging: Automatically balances the voltage of each battery cell when charging.
5. Over charge Protection: Charging automatically stops when the battery is fully charged.
6. Temperature Detection: The battery will only charge when the temperature is between 0 °C(32°F) and 40°C (104°F).
7. Over Current Protection: Battery stops charging when high amperage (more than 10A) is detected.
8. Over Discharge Protection: Discharging automatically stops when the battery voltage reaches 18V to prevent over-discharge damage
9. Short Circuit Protection: Automatically cuts the power supply when a short circuit is detected.
10. Battery Cell Damages Protection: DJI Pilot app shows warning message when damaged battery cell is detected.
11. Battery Information History: Show the last 32 entries of battery information records that include warning messages and so on.
12. Sleep Mode: Sleep mode is entered after 10 minutes of inactivity to save power.
13. Communication: Battery voltage, capacity, current, and other relevant information is provided to the aircraft's to the main controller.

⚠ Refer to *Disclaimer* and *Intelligent Flight Battery Safety Guidelins* before use. Users take full responsibility for all operations and usage.

Using the Battery



Powering ON/OFF

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

Powering Off: Press the Power Button once, then press again and hold for 2 seconds to power off.

Low Temperature Notice:

1. The performance of the intelligent Flight Battery is significantly reduced when flying in a low temperature environments (those with air temperatures below 5°C). Ensure that the battery is fully charged and the cell voltage is at 4.43 V before each flight.
2. Using the Intelligent Flight Battery in extremely low temperature environments (those with air temperatures below -10°C) is not recommended. When flying in environments with temperatures between 5°C and -10°C, the Intelligent Flight Battery should be able to achieve the appropriate voltage levels (above 4.2 V), but it is recommended that you apply the included insulation sticker to the battery in order to prevent a rapid drop in temperatures.
3. If the DJI Pilot app displays the "Critical Low Battery Level Warning" when flying in low temperature environments, stop flying and land the aircraft immediately. You will still be able to control the aircraft's movement when this warning is triggered.
4. Store the Intelligent Flight Battery in a room temperature environment and ensure that its temperature exceeds 5°C before using it in the low temperature environment.
5. When using the Inspire 1 in a low temperature environment, begin by allowing the aircraft to hover at a low altitude, for approximately one minute, to heat the battery.
6. To ensure optimum performance, keep the Intelligent Flight Battery's core temperature above 20°C when in use.

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

Checking the battery level

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

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

: LED is on. : LED is flashing.
: LED is off.

Battery Level				
LED1	LED2	LED3	LED4	Battery Level
●	●	●	●	87.5%~100%
●	●	●	✳	75%~87.5%
●	●	●	●	62.5%~75%
●	●	✳	●	50%~62.5%
●	●	●	●	37.5%~50%
●	✳	●	●	25%~37.5%
●	●	●	●	12.5%~25%
✳	●	●	●	0%~12.5%
●	●	●	●	=0%

Battery life

The battery life indicates how many more times the battery can be discharged and recharged before it must be replaced. When the battery is powered off, press and hold the Power Button for 5 seconds to check the battery life. The Battery Level Indicators will light up and/or blink as described below for 2 seconds:

Battery Life				
LED1	LED2	LED3	LED4	Battery Life
✦	✦	✦	✦	90%~100%
✦	✦	✦	✧	80%~90%
✦	✦	✦	✦	70%~80%
✦	✦	✧	✦	60%~70%
✦	✦	✦	✦	50%~60%
✦	✧	✦	✦	40%~50%
✦	✦	✦	✦	30%~40%
✧	✦	✦	✦	20%~30%
✦	✦	✦	✦	below 20%

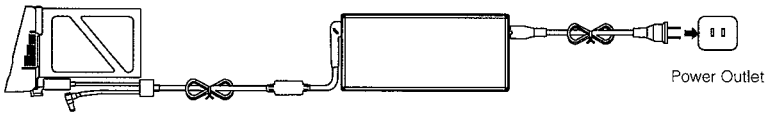
⚠ When battery life reaches 0%, it can no longer be used.

For more information about the battery, launch DJI Pilot app and check the information under the battery tab.

Charging the Intelligent Flight Battery

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

⚠
- Do not charge the Intelligent Flight Battery and remote controller with standard charger (model: A14-100P1A) at the same time, otherwise the charger may overheat.
- Always turn off the battery before inserting it or removing it from the Inspire 1. Never insert or remove a battery when it is powered on.



Battery Level Indicators while Charging				
LED1	LED2	LED3	LED4	Battery Level
				0%~25%
				25%~50%
				50%~75%
				75%~100%
				Fully Charged

Charging Protection LED Display

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

Battery Level Indicators while Charging					
LED1	LED2	LED3	LED4	Blinking Pattern	Battery Protection Item
				LED2 blinks twice per second	Over current detected
				LED2 blinks three times per second	Short circuit detected
				LED3 blinks twice per second	Over charge detected
				LED3 blinks three times per second	Over-voltage charger detected
				LED4 blinks twice per second	Charging temperature is too low (<0°C)
				LED4 blinks three times per second	Charging temperature is too high (>40°C)

After any of the above mentioned protection issues are resolved, press the button to turn off the Battery Level Indicator. Unplug the Intelligent Flight Battery from the charger and plug it back in to resume charging. Note that you do not need to unplug and plug the charger in the event of a room temperature error, the charger will resume charging when the temperature falls within the normal range.

⚠ DJI does not take any responsibility for damage caused by third-party chargers.

How to discharge your Intelligent Flight Battery:

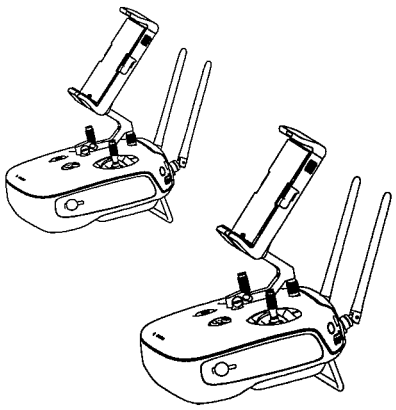
To effectively calibrate the battery capacity, it is recommended to charge and discharge the battery thoroughly for every 10 charge-and-discharge cycle. User should install the battery onto the aircraft and then power on the aircraft to initiate the discharge process, discharge the battery until the aircraft is powered off automatically. User should then fully charge the battery to ensure the battery is working at its optimal.

Slow: Place the Intelligent Flight Battery into the Inspire 1's Battery Compartment and power it on. Leave it on until there is less than 5% of power left, or until the battery can no longer be turned on. Launch the DJI Pilot app to check battery level.

Rapid: Fly the Inspire 1 outdoors until there is less than 5% of power left, or until the battery can no longer be turned on.

Remote Controllers

This chapter describes the features of the remote controller that includes aircraft and remote controller operations and dual remote controller mode.



Remote Controller

Remote Controller Profile

The Inspire 1 Remote Controller is a multi-function wireless communication device that integrates the video downlink ground system and aircraft Remote Controller system. The video downlink and aircraft Remote Controller system operate at 2.4 GHz with maximum transmission distance of 2km. The remote controller features a number of camera functions, such as taking and previewing photos and video, and controlling gimbal motions. The remote controller is powered by a 2S rechargeable battery. The current battery level is displayed by LEDs on the front panel of the remote control.

- **Compliance Version:** The Remote Controller is compliant with both CE and FCC regulations.
- **Operating Mode:** Control can be set to Mode 1 , Mode 2.
- **Mode 1:** The right stick serves as the throttle.
- **Mode 2:** The left stick serves as the throttle.

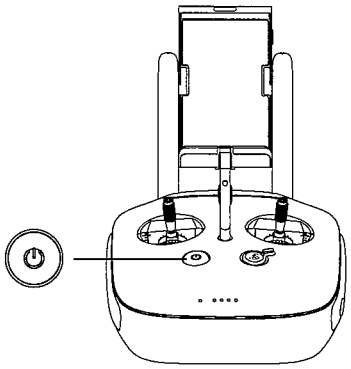
⚠ Do not operate more than 3 aircrafts within in the same area (size equivalent to a soccer field) to prevent transmission interference.

Remote Controller Operations

Powering On And Off The Remote Controller

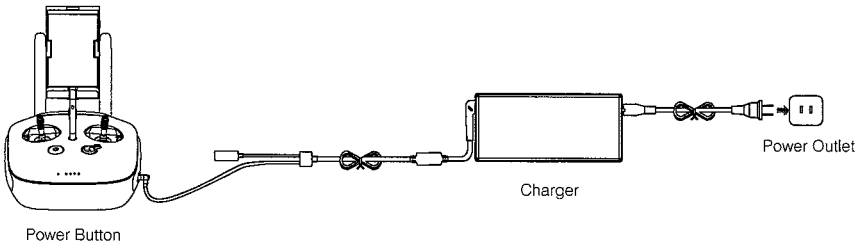
The Inspire 1 remote controller is powered by a 2S rechargeable battery with a capacity of 6000mAh. The battery level is indicated by the Battery Level LEDs on the front panel. Follow the steps below to power on your remote controller:

1. When powered off, press the Power Button once and the Battery Level LEDs will display the current battery level.
2. Then, press and hold the Power Button to power on the remote controller.
3. The Remote Controller will beep when it powers on. The Status LED will blink green (slave remote controller blinks solid purple) rapidly, indicating that the remote controller is linking to the aircraft. The Status LED will show a solid green light when linking is completed.
4. Repeat step 2 to power off the remote controller after finish using it.



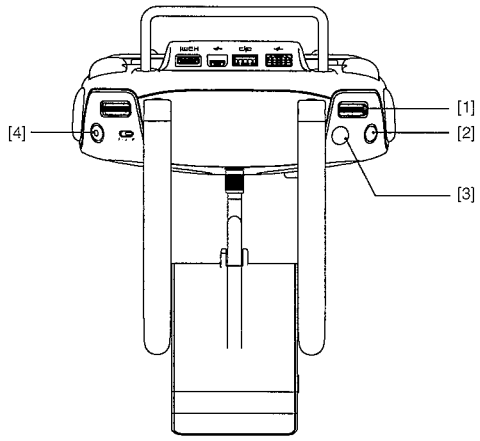
Charging Remote Controller

Charge the remote controller via supplied charger.



Controlling Camera

Shoot videos or images and adjust camera settings via the Shutter Button, Camera Settings Dial, Playback Button and Video Recording Button on the remote control.



[1] Camera Settings Dial

Turn the dial to quickly adjust camera settings such as ISO and shutter speed without letting go of the remote controller. Move the dial button to left or right to view the pictures or videos in playback mode.

[2] Playback Button

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

[3] Shutter Button

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

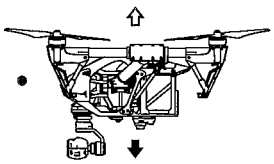
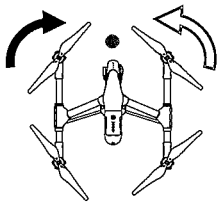
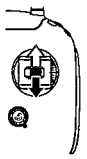
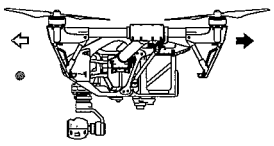
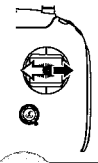
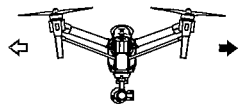
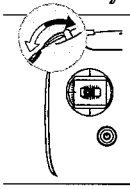
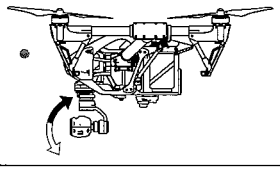
[4] Recoding Button

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

Controlling Aircraft

This section explains how to use the various features of the remote controller. The Remote Controller is set to Mode 2 by default.

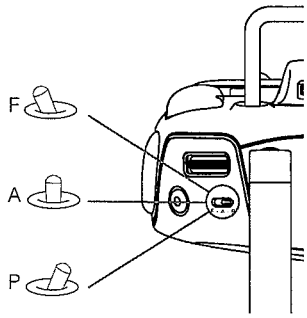
Stick Neutral/ mid point: Control sticks of the Remote Controller are placed at the central position.
Move the Stick: The control stick is pushed away from the central position.

Remote Controller (Mode 2)	Aircraft (● indicates nose direction)	Remarks
		Moving the left stick up and down changes the aircraft's elevation. Push the stick up to ascend and down to descend. Push the throttle stick up to takeoff. When both sticks are centered, the Inspire 1 will hover in place. The more the stick is pushed away from the center position, the faster the Inspire 1 will change elevation. Always push the stick gently to prevent sudden and unexpected elevation changes.
		Moving the left stick to the left or right controls the rudder and rotation of the aircraft. Push the sick left to rotate the aircraft counter clock-wise, and push the stick right to rotate the aircraft clockwise. If the stick is centered, the Inspire 1 will stay facing its current direction. The more the stick is pushed away from the center position, the faster the Inspire 1 will rotate.
		Moving the right stick up and down changes the aircraft's forward and backward pitch. Push the stick up to fly forward and down to fly backward. The Inspire 1 will hover in place if the stick is centered. Push the stick further away from the center position for a larger pitch angle (maximum 35°) and faster flight.
		Moving the right stick control left and right changes the aircraft's left and right pitch. Push left to fly left and right to fly right. The Inspire 1 will hover in place if the stick is centered. Push the stick further away from the center position for a larger pitch angle (maximum 35°) and faster flight.
		Gimbal Dial: Turn the dial to the right, and the camera will shift to point upwards. Turn the dial to the left, and the camera will shift to point downwards. The camera will remain in its current position when dial is static.

Flight Mode Switch

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

Figure	Flight Mode
F	F mode
A	A mode
P	P mode



P mode (Positioning) : P mode works best when GPS signal is strong. There are three different states of P mode, which will be automatically selected by the Inspire 1 depending on GPS signal strength and Vision Positioning sensors:

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

P-OPTI: Vision Positioning is available but the GPS signal is not. Aircraft is using only Vision Positioning for hovering

P-ATTI: Neither GPS or Vision Positioning available, aircraft is using only its barometer for positioning, so only altitude is controlled.

A mode (Attitude): The GPS and Vision Positioning System is not used for holding position. The aircraft only uses its barometer to maintain altitude. If it is still receiving a GPS signal, the aircraft can automatically return home if the Remote Controller signal is lost and if the Home Point has been recorded successfully.

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

The Flight Mode Switch is locked in P mode by default. To unlock the switch, launch the DJI Pilot app, enter the "Camera" page, tap "MODE", and then activate "Multiple Flight Mode" .

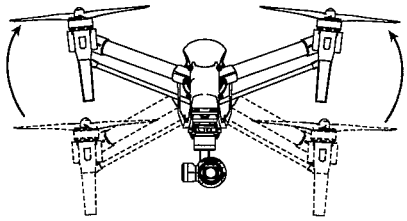
Transformation Switch / RTH Button

The Transformation Switch / RTH Button combination serves two functions. Toggle the switch up or down to raise or lower the landing gear. Or, press the button to activate the Return to Home (RTH) procedure.

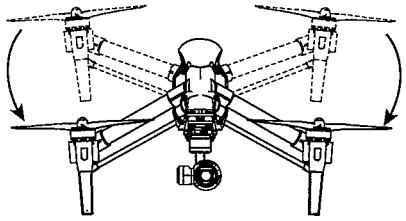
Transformation Switch

This switch has two positions. The effect of toggling the switch to any of these positions is defined below:

1. **Raise:** Raise the landing gear to its upper most position.



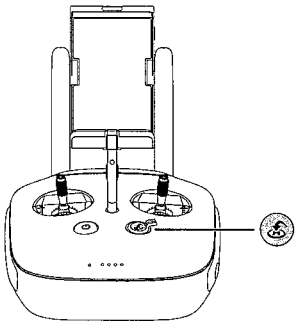
2. **Lower:** The landing gear will lower to its lowest position for landing.



⚠ Do not raise the landing gear when the aircraft is on the ground. Ensure the landing gear is lowered before landing.

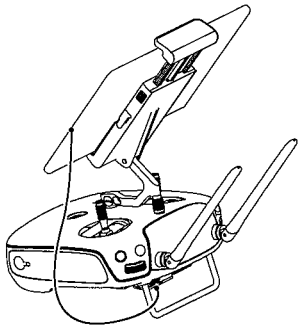
RTH button

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



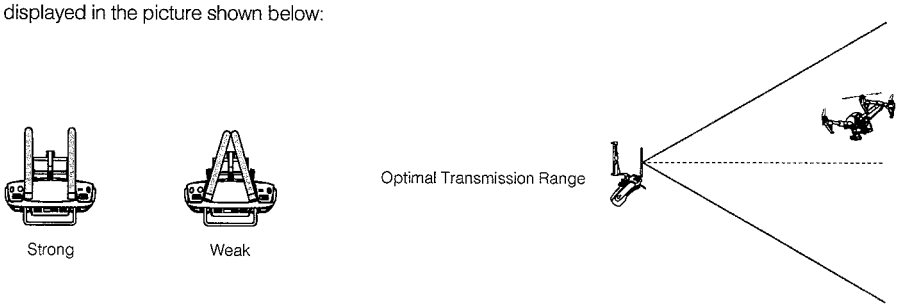
Connecting Mobile Device

Tilt the Mobile Device Holder to the desired position. Press the button on the side of the Mobile Device Holder to release the clamp, and then place your mobile device into the clamp. Adjust the clamp to secure your mobile device. Then connect your mobile device to the remote controller with a USB cable. Plug one end of the cable into your mobile device, and the other end into the USB port on the back of the remote controller.



Optimal Transmission Range

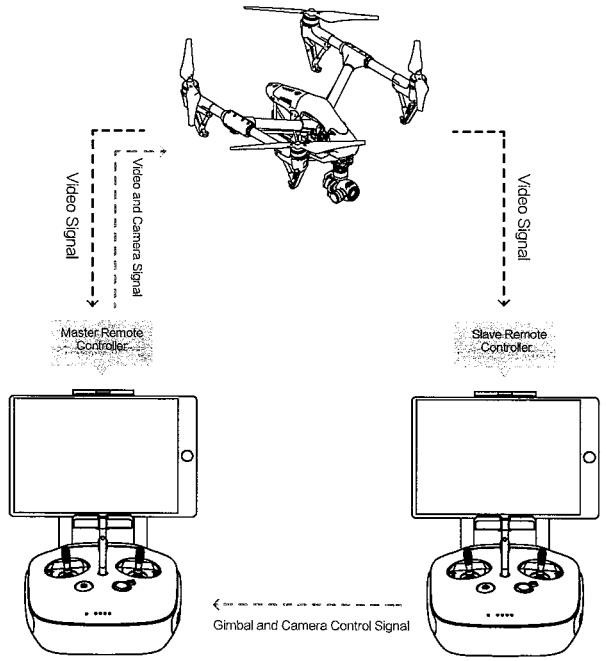
The signal transmission between aircraft and remote controller perform best within the range that displayed in the picture shown below:



Ensure the aircraft is flying within the optimal transmission range. Adjust the distance and position between the operator and the aircraft to achieve optimal transmission performance.

Dual Remote Controllers Mode

More than one remote controller can connect to the same aircraft in Dual Remote Controller mode. In Dual Controllers mode, the "Master" remote controller operator controls the orientation of the aircraft, while the "Slave" remote controller controls the movement of the gimbal and camera operation. When multiple "slave" remote controllers (max of 6) are connect to the aircraft, only the first connected "slave" remote controller is able to control the gimbal, the remaining "slave" remote controller can view the live feed video from the aircraft and set the camera parameters, but they cannot control the gimbal.



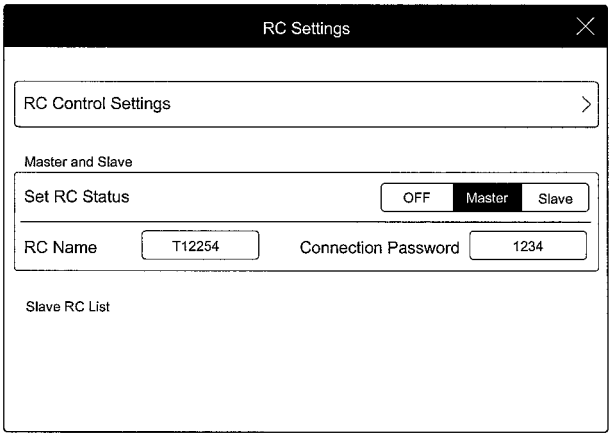
⚠ Use the gimbal dial on the remote controller to control the pitch movement of the camera in the single remote controller mode, however, you cannot control the pan movement of the camera.

Setting Up Dual Remote Controllers Mode

Dual Remote Controllers mode is disabled by default. Users must enable this feature on the "Master" remote controller by through the DJI Pilot app. Follow the steps below for setup:

"Master" Remote Controller:

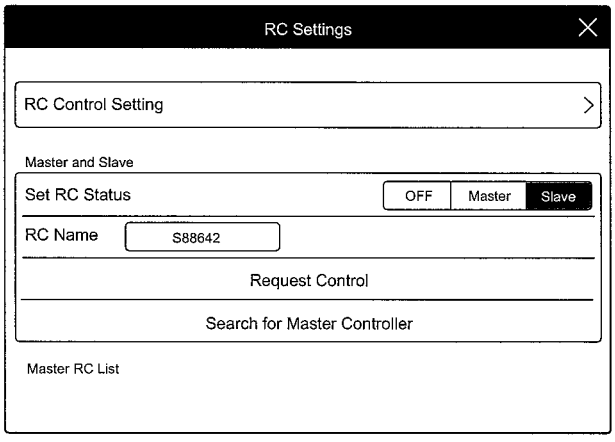
1. Connect the remote controller to your mobile device and launch the DJI Pilot app.
2. Go to the Camera page, and tap to enter the remote controller settings window.
3. Tap "Set RC Status" to enable Master-and-Slave mode.
4. Select "Master" in the "Set RC Status" section to set the remote controller as "Master" remote controller.



5. Enter the connection password for the "Slave" remote controller.

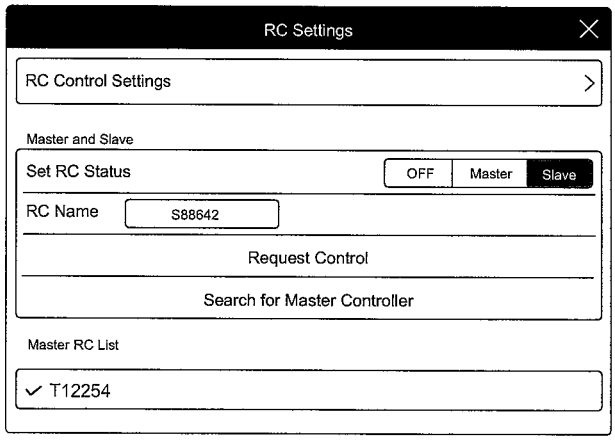
"Slave" Remote Controller:

1. Tap "Search for Master Controller" to search the "Master" remote controller.

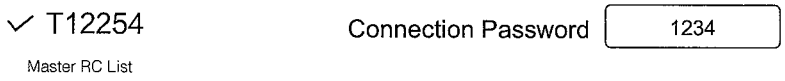


⚠ Remote controller cannot link to the aircraft if the remote controller is set as "Slave". Meanwhile, the "Slave" remote controller cannot control the orientation of the aircraft. Reset the remote controller to "Master" in DJI Pilot app if you wish to link the remote controller to the aircraft.

2. Search the "Master" remote controller in the surrounding area in the "Request Control" section.

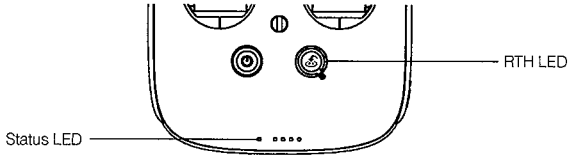


3. Select the "Master" remote controller from the "Master RC List" and input the connection password to connect to the desired "Master" remote controller.



Remote Controller Status LED

The Status LED reflects connection status between Remote Controller and aircraft. The RTH LED shows the Return to Home status of the aircraft. The table below contains details on these indicators.



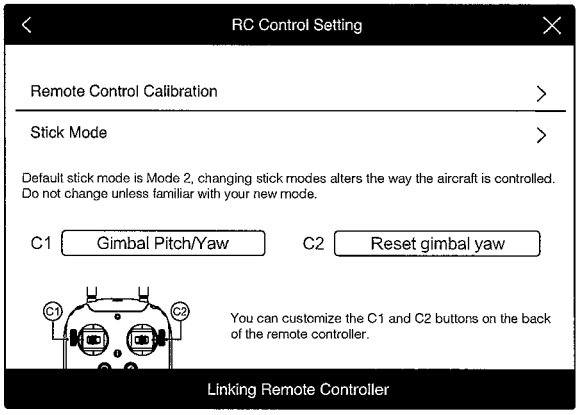
Status LED	Alarm	Remote Controller Status
Ⓡ —— Solid Red	♪ chime	The remote controller set as "Master" but it is not connected with the aircraft.
Ⓖ —— Solid Green	♪ chime	The remote controller set as "Master" and it is connected with the aircraft.
Ⓟ —— Solid Purple	D-D-	The remote controller set as "Slave" but it is not connected with the aircraft.
Ⓑ —— Solid Blue	D-D- ♪ chime	The remote controller set as "Slave" and it is connected with the aircraft.
Ⓡ ····· Slow Blinking Red	D-D-D·····	Remote controller error.
Ⓡ-Ⓖ/Ⓡ-Ⓨ ····· Red and Green/ Red and Yellow Alternate Blinks	None	HD Downlink is disrupted.
RTH LED	**Sound**	**Remote Controller Status**
Ⓦ —— Solid White	♪ chime	Aircraft is returning home.
Ⓦ ····· Blinking White	D · · ·	Sending Return to Home command to the aircraft.
Ⓦ ····· Blinking White	DD ·· ·· ··	Aircraft Return to Home in progress.

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

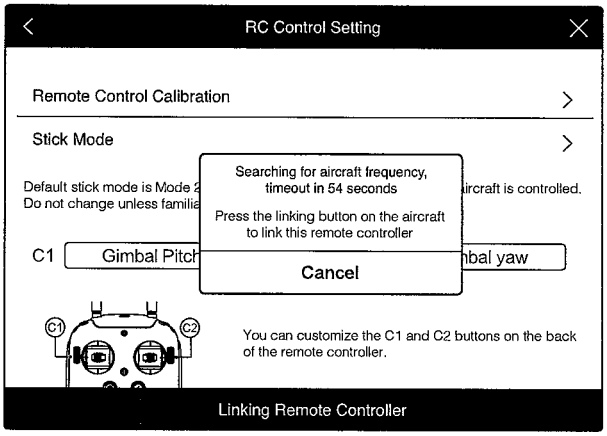
Linking the Remote Controller

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

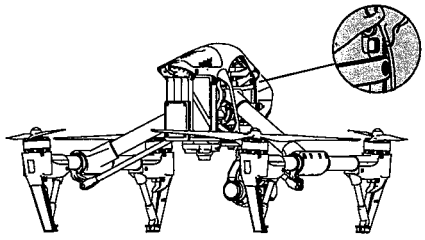
1. Power on the remote controller and connect to the mobile device. Launch DJI Pilot app.
2. Power on the Intelligent Flight Battery.
3. Enter "Camera" view and tap on and then tap "Linking Remote Controller" button as shown below.



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



5. Locate the Linking button on the front of the aircraft, as shown in the figure shown below. Press the Linking button to start linking. The Remote Controller Status Indicator will display solid green if Link is succeed.



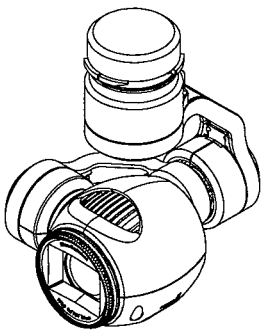
- Remote controller cannot link to the aircraft if the remote controller is set as "Slave". Meanwhile, the "Slave" remote controller cannot control the orientation of the aircraft. Reset the remote controller to "Master" in DJI Pilot app if you wish to link the remote controller to the aircraft.
- Remote controller will disconnect from the linked aircraft if a new remote controller is linked to the same aircraft.

Remote Controller Compliance Version

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

Gimbal and Camera

This chapter provides the technical specifications of the camera and explains the working mode of the gimbal.



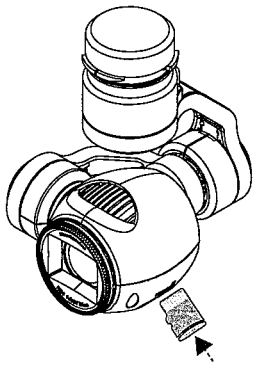
Camera and Gimbal

Camera Profile

The on-board camera supports 4K video capture up to 4096x2160p24 and 12M pixel photos capture by using the 1/2.3 inch CMOS sensor. You may export the video in either MOV or MP4 format for editing. Available picture shooting modes include burst, continuous, and timer mode. A live preview of what the camera is seeing before you shoot videos and pictures is supported through the DJI Pilot App.

Camera Micro-SD Card Slot

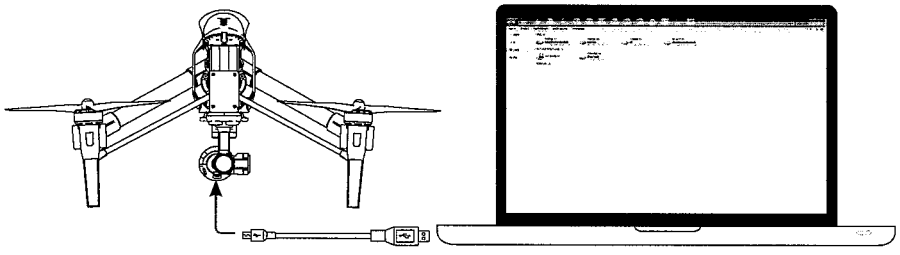
To store your photos and videos, plug in the micro-SD card into the slot shown below before powering on the Inspire 1. The Inspire 1 comes with a 16GB micro-SD card and supports up to a 64GB micro-SD card. A UHS-1 type micro-SD card is recommended, because the fast read and write capability of these cards enables you to store high-resolution video data.



⊘ Do not remove micro-SD card from the Inspire 1 when it is powered on.

Camera Data Port

Power on the Inspire 1 and then connect a USB cable to the Camera Data Port to download photos or videos from the camera to your computer.



⚠ Power on the aircraft before attempting to download the files.

Camera Operation

Use the Shutter and Record button on the remote controller to shoot the images or the videos through the DJI Pilot app. For more information about how to use these buttons, refer to "Controlling Camera" P25.

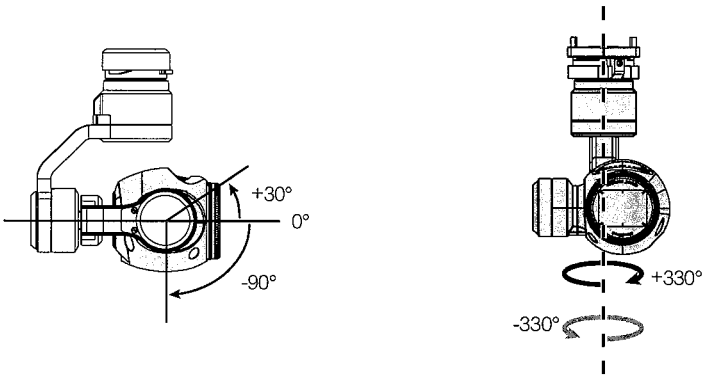
ND Filter

Attach an ND filter to the front of the camera to reduce over-exposure and "jello" effect.

Gimbal

Gimbal Profile

The 3-axis Gimbal provides a steady platform for the attached camera, allowing you to capture stabilized images and video. The Gimbal can tilt the camera up to 120 degrees and rotate 360 degrees.



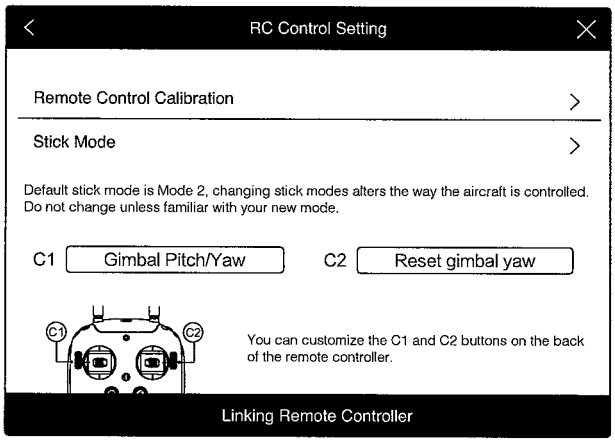
Use the gimbal dial on the remote controller to control pitch movement of the camera by default. Note that you cannot control the pan motion of the camera by default. Enable the "Master-and-Slave" mode and set the remote controller to "Slave" state if you wish to control both the pan and pitch movement of the camera.

⚠ Use the gimbal dial on the remote controller to control the pitch movement of the camera in the single remote controller mode, however, you cannot control the pan movement of the camera.

Pan Control

Follow the instructions below to use the gimbal dial to control the pan movement of the gimbal:

1. Power on the aircraft and remote control, launch DJI Pilot app and enter "Camera" page.
2. Tap "RC Control Settings" icon and select either C1 or C2 customizable button as the gimbal pitch/yaw switching button.
3. Select "Gimbal Pitch/Yaw" from the dropdown list.

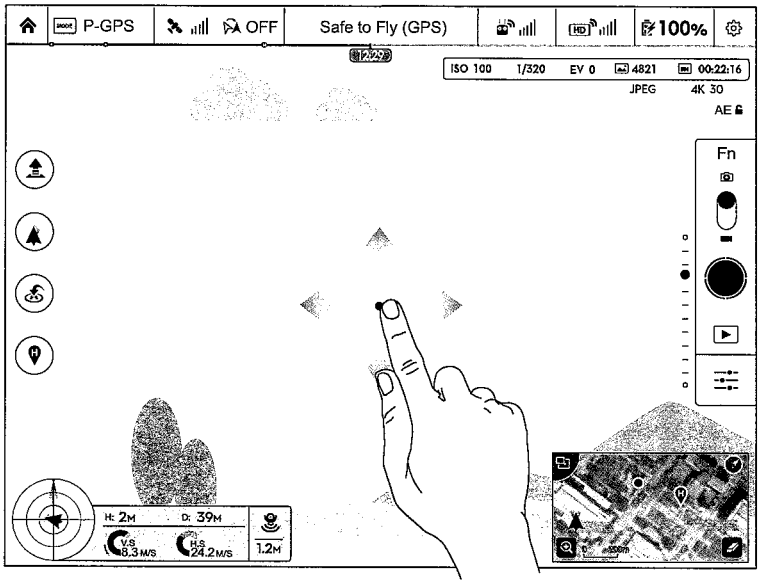


Press C1 or C2 button to switch from pitch mode to yaw mode. You may use the gimbal dial to pan the gimbal under yaw mode. Press C1 or C2 again to exit yaw mode.

Using DJI Pilot App to Control Gimbal

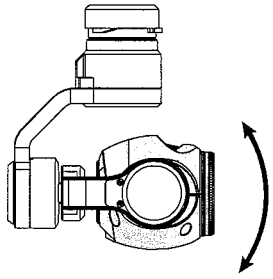
Follow the steps below to use DJI Pilot app to control the gimbal orientation:

1. Launch DJI Pilot app, enter "Camera" page.
2. Tap and press on the screen until a blue circle is shown.
3. Slide to control the gimbal orientation within the "Camera" page as shown below.

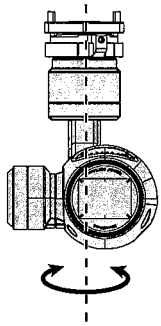


Gimbal Operation Modes

Three Gimbal operation modes are available. Switch between the different operation modes on the Camera page of the DJI Pilot App. Note that your mobile device must be connected to the remote controller for changes to take effect. Refer to the table below for details:



Pitch



Pan

Follow Mode	The angle between Gimbal's orientation and aircraft's nose remains constant at all times. One user alone can control the pitch motion of the Gimbal, but a second user is required to control the pan motion using a second remote controller.
FPV Mode	The Gimbal will lock to the movements of the aircraft to provide a First-Person-View flying experience.
Free Mode	The Gimbal's motion is independent of the aircraft's orientation. One user alone can control the pitch motion of the Gimbal, but a second user is required to control the pan motion using a second remote controller.
Re-alignment	Tap to force the Gimbal orientation to re-align with aircraft's orientation by panning from gimbal's current orientation. Pitch angle will remain unchanged during the re-alignment.

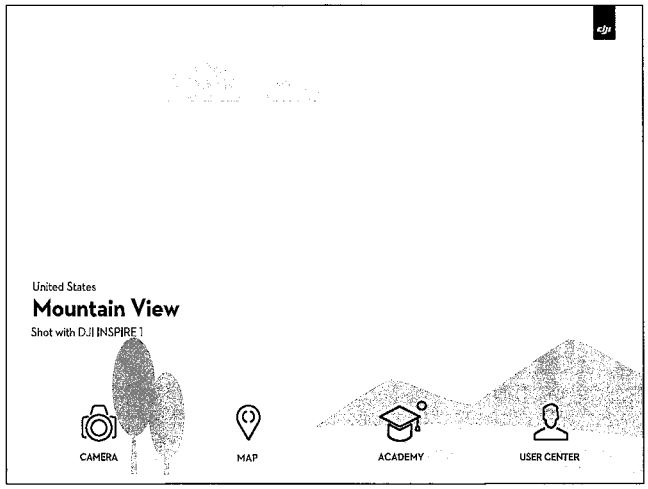
- Gimbal motor error may occur in these situations: (1) Gimbal is placed on uneven ground. (2) Gimbal has received an excessive external force, e.g. a collision. Please take off from flat, open ground and protect the gimbal after powering up.
- Flying in heavy fog or cloud may make the gimbal wet, leading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

DJI Pilot App

This chapter describes the four main GUI of the DJI Pilot app.

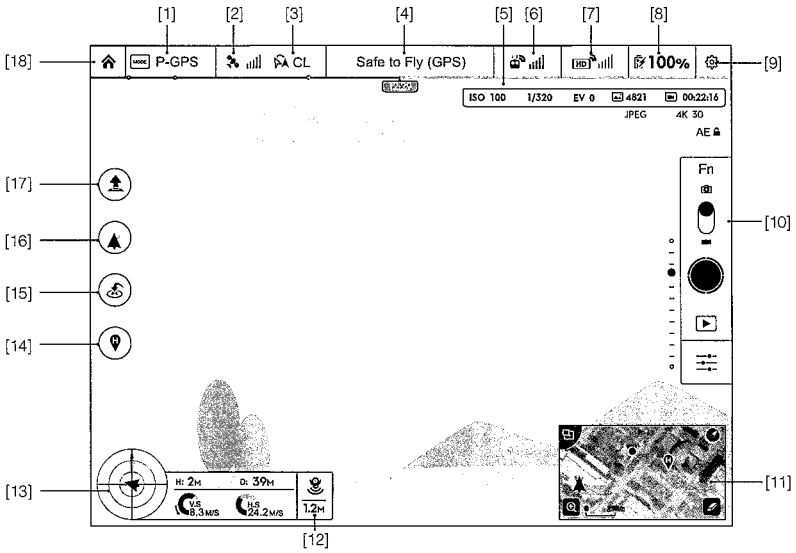
DJI Pilot App

The DJI Pilot app is a new mobile app designed specifically for the Inspire 1. Use this app to control the gimbal, camera and other features of your flight system. The app also comes with Map, Store a User Center, for configuring your aircraft and sharing your content with friends. It is recommended that you use a tablet for the best experience.



Camera

The Camera page contains a live HD video feed from the Inspire 1's camera. You can also configure various camera parameters from the Camera page.



[1] Flight Mode

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

Tap to enter MC (Main Controller) settings. Modify flight limits, perform compass calibration, and set the gain values on this screen.

[2] GPS Signal Strength

: This icon shows the current strength of GPS signals. Green bars indicates adequate GPS strength.

[3] IOC Settings

CL : This icon shows which IOC setting that the aircraft has entered when in F Mode.

Tap to enter IOC setting menu and select Course Lock, Home Lock or Point of Interest Lock.

[4] System Status

Safe to Fly (GPS) : This icon shows current aircraft system status, such as GPS signal health.

[5] Battery Level Indicator

: The battery level indicator dynamically displays the battery level. The color zones on the battery level indicator represent different battery levels.

[6] Remote Controller Signal

: This icon shows the strength of remote controller signal.

[7] HD Video Link Signal Strength

HD : This icon shows the HD video downlink signal strength between the aircraft and the remote controller.

[8] Battery Level

100%: This icon shows the current Intelligent Flight Battery level.

Tap to enter battery information menu, set the various battery warning thresholds and view the battery warning history in this page.

[9] General Settings

: Tap this icon to enter General Settings page. Select parameter units, reset the camera, enable the quick view feature, adjust the gimbal roll value and toggle flight route display on this page.

[10] Camera Operation Bar

Exposure Lock

AE : Tap to enable or disable the camera exposure lock.

Function

Fn : Tap to adjust camera settings, such as video format and digital filters.

Shutter

: Tap this button to take a single photo.

Record

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

Playback

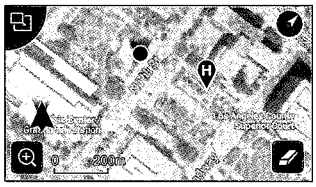
▶ : Tap to enter playback page. You can preview photos and videos as soon as they are captured.

Camera Settings and Shooting Mode

⚙ : Tap to enter the Camera Settings page and switch from camera shooting mode from manual to auto.

[11] Map

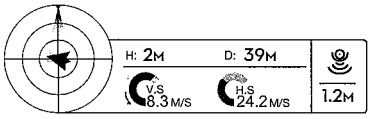
Display the flight path of the current mission. Tap to switch from the Camera GUI to the Map GUI.



[12] Vision Positioning

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

[13] Flight Telemetry



Vision Positioning Status

Icon is highlighted when Vision Positioning is in operation.

Flight attitude is indicated by the flight attitude icon.

(1) The red arrow shows which direction the aircraft is facing.
(2) Light blue and dark blue areas indicate pitch.
(3) Pitching of the boundary between light blue and dark blue area shows roll angle.

[14] Home Point Settings

: Tap this button to reset the current home point. You may choose to set the aircraft take-off location, the remote controller's current position, or the aircraft's current position as the Home Point.

[15] Return to Home (RTH)

: Initiate RTH home procedure. Tap to have the aircraft return to the latest home point.

[16] Gimbal Operation Mode

Refer to "Gimbal Operation Mode" P38 for more information.

[17] Auto Takeoff/Landing

: Tap to initiate auto takeoff or landing.

[18] Back

: Tap to return to the main GUI.

Map

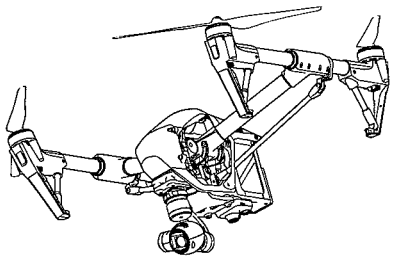
User can view the current flight route in a larger map view in this page. You can also perform Auto take-off and Landing in the page. Ensure your mobile device has access to the Internet. Due to the map data required, Wi-Fi connection is recommended. Internet access is required to cache the map, if Wi-Fi is unavailable, mobile data service is required.

Academy

Download user manual, view online videos. Also you can use the flight simulator to practice your flight skills.

User Center

You can sync the picture and videos to the mobile device, view the flight records and check your DJI account status in the User Center. Use the DJI registered account to login to the User Center.



Flight

This chapter describes the flight safety and flight restrictions.

Flight

Once pre-flight preparation is complete, it is recommended to use the flight simulator to learn how to fly safely. Ensure that all flights are carried out in a suitable location.

Flight Environment Requirements

1. Do not use the aircraft in severe weather conditions. These include wind speed exceeding 10m/s , snow, rain and smog.
2. Only fly in open areas. Tall buildings and steel structures may affect the accuracy of the on-board compass and GPS signal.
3. Avoid from obstacles, crowds, high voltage power lines, trees or bodies of water.
4. Minimize electromagnetic interference by not flying in area with high levels of electromagnetism, including mobile phone base stations or radio transmission towers.
5. Aircraft and battery performance is subject to environment factor such as air density and temperature. Be very careful when flying 14700 feet (4500 meters) or more above sea level as battery and aircraft performance may be reduced.
6. The Inspire 1 cannot operate within the polar areas in "P" mode.

Flight Limits and Flight Restriction Area

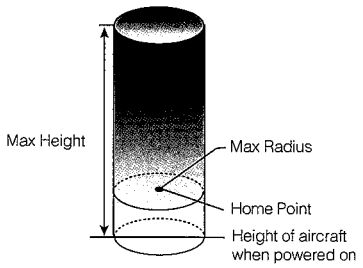
Flight limits on height and distance can be set. The details of these flight limits are described in the following section.

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

When operating in P Mode, height, distance limits and No Fly Zones work together to manage flight. In A mode only height limits work and flights cannot go higher than 120 meters.

Max Height & Radius Limits

Max Height & Radius limit flying height and distance, and the user may change these settings in the DJI Pilot App. Once complete, your Inspire 1 will fly in a restricted cylinder that is determined by these settings. The tables below show the details of these limits.



GPS Signal Strong ····· Blinking Green			
	Flight Limits	DJI Pilot App	Aircraft Status Indicator
Max Height	Flight altitude must be under the set height.	Warning: Height limit reached.	None.
Max Radius	Flight distance must be within the max radius.	Warning: Distance limit reached.	Rapid red flashing ····· when close to the max radius limit.

GPS Signal Weak ····· Blinking Yellow			
	Flight Limits	DJI Pilot App	Aircraft Status Indicator
Max Height	Flight height restricted to 120m and under.	Warning: Height limit reached.	None.
Max Radius	No limits		

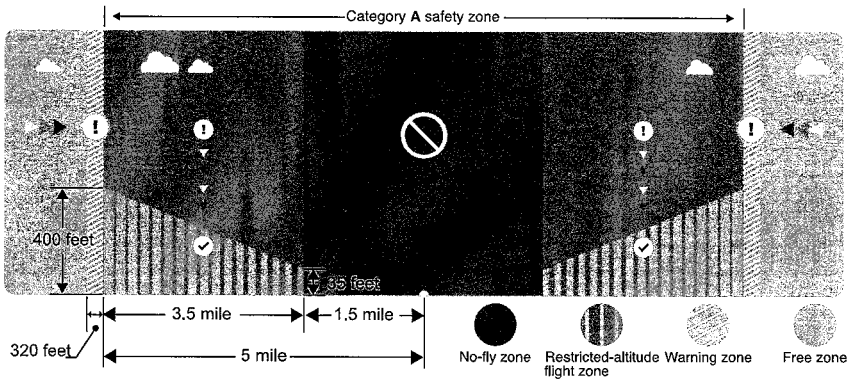
⚠ • If you fly out of the limit, you can still control the Inspire 1, but cannot fly it further.
• If the Inspire 1 flies out of the max radius in Ready to Fly (non-GPS) mode, it will fly back within range automatically.

Flight Restriction of Restricted Areas

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

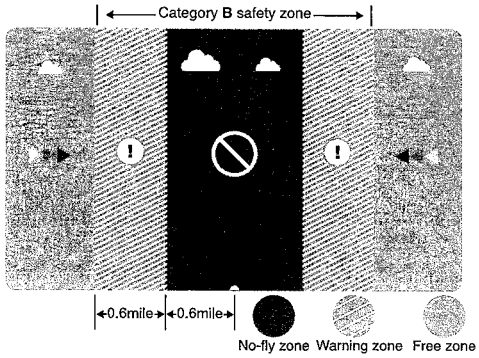
Category A Safety Zone

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



Category B Safety Zone

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



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

Semi-automatic descent: All stick commands are available except the throttle stick command during the descent and landing process. Motors will stop automatically after landing.

- When flying in the safety zone, aircraft status indicator 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.
- 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.

Preflight Checklist

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

Calibrating the Compass

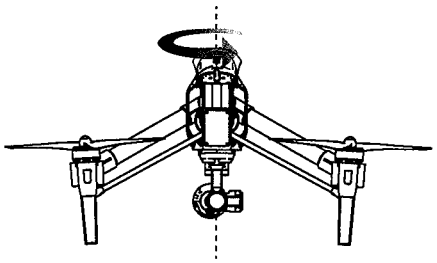
IMPORTANT: Make sure to calibrate the compass in every new flight location. The compass is very sensitive to electromagnetic interference, which can cause abnormal compass data leading to poor flight performance or even failure. Regular calibration is required for optimum performance.

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

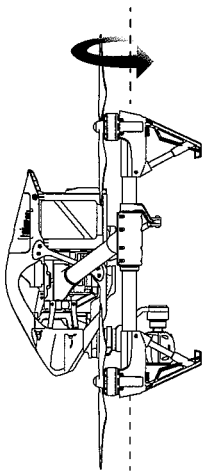
Calibration Procedures

Choose an open space to carry out the following procedures.

1. Ensure the compass is calibrated. If you did not calibrate the compass in the Checklist, or if you have changed your position since last calibrating it, tap "MODE" in the app and select "Compass Calibration" to calibrate the compass. Then follow the on-screen instructions.
2. Hold and rotate the aircraft horizontally 360 degrees, and the Aircraft Status Indicator will display a solid green light.



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



⚠ If the Aircraft Status Indicator blinks red and yellow after the calibration, move your aircraft to a different location to carry out compass calibration.

Calibrate the compass before each flight. Launch DJI Pilot App, follow the on-screen instruction to calibrate the compass.

When to Recalibrate

1. When compass data is abnormal, and the Aircraft Status Indicator is blinking red and yellow.
2. When flying in a new location, or a location that is different from your last flight.
3. When the mechanical structure of the Inspire 1 has changed, i.e. changed mounting position of the compass.
4. When severe drifting occurs in flight, i.e. the Inspire 1 does not fly in straight lines.

Auto Take-off and Auto Landing

Auto Take-off

Use auto take-off to take off your aircraft automatically if the Aircraft Status Indicator displays blinking green. Follow the steps below to use auto take-off:

1. Launch DJI Pilot app, enter "Camera" page.
2. Ensure the aircraft is in "P" mode.
3. Go through the pre-flight checklist.
4. Tap"⏫", and confirm flight condition. Slide to confirm and take-off.
5. Aircraft takes off and hovers at 1.5 meters above ground.

Auto-Landing

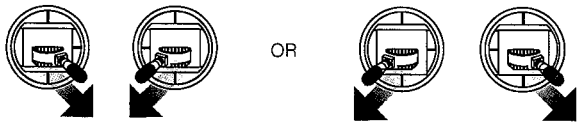
Use auto-landing to land your aircraft automatically if the Aircraft Status Indicator displays blinking green. Follow the steps below to use auto-landing:

1. Ensure the aircraft is in "P" mode.
2. Check the landing area condition before tapping "⏬", to perform landing.
3. Aircraft lowers the landing gear and proceed to land automatically.

Starting/Stopping the Motors

Starting Motors

The Combination Stick Command (CSC) listed below are used to start the motors instead of simply pushing the stick up. Ensure that you perform the CSC in one motion.

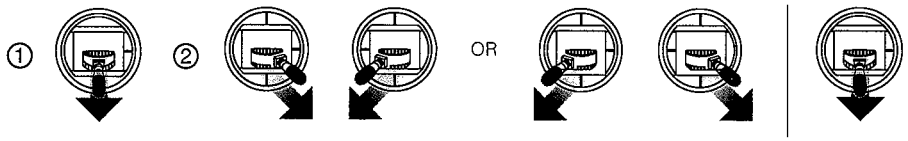


Stopping Motors

There are two methods to stop the motors.

Method 1: When the Inspire 1 has landed, push the throttle down ①, then conduct CSC ②. Motors will stop immediately. Release both sticks once motors stop.

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



⚠ Do not perform CSC when aircraft is in midair, otherwise the motors will be stopped.

Flight Test

Take off/Landing Procedures

1. Place the aircraft on open, flat ground with battery indicators facing towards you.
2. Power on the remote controller and your mobile device, then the Intelligent Flight Battery.
3. Launch the DJI Pilot App and enter the Camera page.
4. Wait until the Aircraft Indicator blinks green. This means the Home Point is recorded and it is safe to fly now. If it flashes yellow, it means Home Point is not recorded, and you should not take off.
5. Push the throttle up slowly to take off or using Auto Take-off to take off.
6. Shoot photos and videos using the DJI Pilot app.
7. To land, hover over a level surface and gently pull down on the throttle slowly to descend.
8. After landing, execute the CSC command or hold the throttle at its lowest position for 3 seconds or more until the motors stop.
9. Turn off the Intelligent Flight Battery first, followed by the Remote Controller.

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

Video Suggestions and Tips

1. Work through the checklist before each flight.
2. Select desired gimbal working mode in the DJI Pilot app.
3. Aim to shoot when flying in P mode only.
4. Always fly in good weather, such as sunny or windless days.
5. Change camera settings to suit you. These include photo format and exposure compensation.
6. Perform flight tests to establish flight routes and scenes.
7. Push the sticks gently to make aircraft movements stable and smooth.

FAQ

Troubleshooting (FAQ)

1. How can I put a GoPro camera on the Inspire 1?
   The Inspire 1 does not currently support GoPro attachments. The gimbal is designed to hold DJI cameras only.

2. When will ground station functionality be available?
   The Inspire 1 does not currently support ground station. Ground station will be available with future firmware updates.

3. Is the camera's exposure automatic?
   The exposure can be set to Auto, for automatic changes, or Manual, if you wish to use a specific setting.

4. Can I see the size of images through the app?
   Yes, you can preview image or video sizes through the DJI Pilot app.

5. How much weight can the Inspire 1 carry without its included camera?
   We do not recommend flying with any payload other than the included DJI gimbal and camera.

6. Do you have an LCD monitor available for the Inspire 1?
   No, DJI does not sell LCD or HD monitors for the Inspire 1. However, you can output the live streaming video to a compatible monitor or mobile device of your own.

7. How long does it take to charge the battery? Does it comes with a charger?
   Yes, all Inspire 1 units come with standard TB47 charger.
   With the standard TB47 100W charger, it takes 85min to fully charge a 4500mAh battery.

8. Are the two remote controllers the same? Should I setup the remote controllers in the app or somewhere else to control the camera and aircraft separately?
   The two remote controllers are physically identical. You can set the remote controllers to either "Master" or "Slave" through the DJI Pilot app if you wish to use dual controller mode.

9. Where can I find info on the simulation application that plugs into the trainer port? Can you suggest a simulation program?
   There is no trainer port on the remote controller for the Inspire 1.

10. Can the mobile device holder be used on the Phantom 2 series remote controller?
    No, it cannot. The mobile device holder can only be used with the Inspire 1 remote.

11. Does the Inspire 1 have a SD card included?
    The Inspire 1 comes with a 16GB micro-SD card. It supports SD cards up to 64GB.

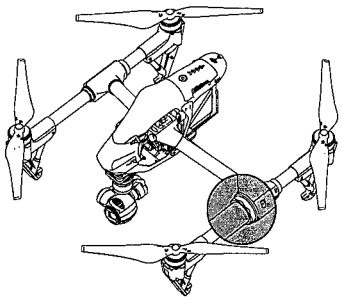
12. Can I upgrade and buy a second remote controller if I only buy a single remote controller now?
    Yes.

13. How big is the Inspire 1?
    Its length x height x width dimensions without the propellers attached are 44 x 30 x 45cm (17.3 x 11.8 x 17.7in).

14. What flight controller does the Inspire 1 use?
    The Inspire 1 uses its own new flight controller.

15. Which motors and propellers does the Inspire 1 come with?
    The Inspire 1 uses 3510 motors and 1345 propellers.

16. Aircraft frame arm joints appear loosen, is that normal?
    The space of the joins shown in the below figure is normal and it will not affect the performance of aircraft, do not adjust the position of the screws on your own.



17. Failed to complete self-check?
    Place the aircraft on the flat surface before powering on. Do not move the aircraft during the self-check.

Appendix

Appendix

Specifications

Aircraft	
Model	T600
Weight (Battery Included)	2935 g
Hovering Accuracy (P Mode)	Vertical: 0.5 m Horizontal: 2.5 m
Max Angular Velocity	Pitch: 300°/s Yaw: 150°/s
Max Tilt Angle	35°
Max Ascent Speed	5 m/s
Max Descent Speed	4 m/s
Max Speed	22 m/s (ATTI mode, no wind)
Max Flight Altitude	4500 m
Max Wind Speed Resistance	10 m/s
Max Flight Time	Approximately 18 minutes
Motor Model	DJI 3510
Propeller Model	DJI 1345
Indoor Hovering	Enabled by default
Operating Temperature Range	-10° to 40° C
Diagonal Distance	559 to 581 mm
Dimensions	438x451x301 mm
Gimbal	
Model	ZENMUSE X3
Output Power (With Camera)	Static: 9 W; In Motion: 11 W
Operating Current	Station: 750 mA; Motion: 900 mA
Angular Vibration Range	±0.03°
Mounting	Detachable
Controllable Range	Pitch: -90° to +30° Pan: ±320°
Mechanical Range	Pitch: -125° to +45° Pan: ±330°
Max Controllable Speed	Pitch: 120°/s Pan: 180°/s

Camera	
Name	X3
Model	FC350
Total Pixels	12.76M
Effective Pixels	12.4M
Image Max Size	4000x3000
ISO Range	100-3200 (video) 100-1600 (photo)
Electronic Shutter Speed	8 s to 1/8000 s
FOV (Field Of View)	94°
CMOS	Sony EXMOR 1/2.3"
Lens	20mm (35mm format equivalent) f/2.8 focus at ∞) 9 Elements in 9 groups Anti-distortion
Still Photography Modes	Single shoot Burst shooting: 3/5/7 frames Auto Exposure Bracketing (AEB): 3/5 bracketed frames at 0.7EV Bias Time-lapse
Video Recording Modes	UHD (4K): 4096x2160p24/25, 3840x2160p24/25/30 FHD: 1920x1080p24/25/30/48/50/60 HD: 1280x720p24/25/30/48/50/60
Max Bitrate Of Video Storage	60 Mbps
Supported File Formats	FAT32/exFAT Photo: JPEG, DNG Video: MP4/MOV (MPEG-4 AVC/H.264)
Supported SD Card Types	Micro SD Max capacity: 64 GB. Class 10 or UHS-1 rating required.
Operating Temperature Range	0° to 40° C
Remote Controller	
Name	C1
Operating Frequency	922.7MHz~927.7 MHz (Japan Only) 5.725~5.825 GHz;2.400~2.483 GHz
Transmitting Distance	2 km (Outdoor And Unobstructed)
EIRP	10dBm@900m, 13dBm@5.8G, 20dBm@2.4G
Video Output Port	USB, Mini-HDMI
Power Supply	Built-in battery
Charging	DJI charger
Dual User Capability	Host-and-Slave connection

Mobile Device Holder	Tablet or Smart Phone
Output Power	9 W
Operating Temperature Range	-10° to 40° C
Storage Temperature Range	Less than 3 months: -20° to 45° C More than 3 months: 22° to 28° C
Charging Temperature Range	0-40° C
Battery	6000 mAh LiPo 2S
Charger	
Model	A14-100P1A
Voltage	26.3 V
Rated Power	100 W
Battery (Standard)	
Name	Intelligent Flight Battery
Model	TB47
Capacity	4500 mAh
Voltage	22.2 V
Battery Type	LiPo 6S High voltage battery
Energy	99.9 Wh
Net Weight	570 g
Operating Temperature Range	-10° to 40° C
Storage Temperature Range	Less than 3 months: -20° to 45° C More than 3 months: 22° C to 28° C
Charging Temperature Range	0° to 40° C
Max Charging Power	180 W
Battery (Optional)	
Name	Intelligent Flight Battery
Model	TB48
Capacity	5700 mAh
Voltage	22.8 V
Battery Type	LiPo 6S
Energy	129.96 Wh
Net Weight	670 g
Operating Temperature Range	-10 to 40° C
Storage Temperature Range	Less than 3 months: -20 to 45° C More than 3 months: 22° to 28° C
Charging Temperature Range	0° to 40° C

Max Charging Power	180 W
Vision Positioning	
Velocity Range	Below 8 m/s (2 m above ground)
Altitude Range	5-500 cm
Operating Environment	Brightly lit (lux > 15) patterned surfaces
Operating Range	0-250 cm
DJI Pilot App	
Mobile Device System Requirements	iOS version 7.1 or later; Android version 4.1.2 or later
Supported Mobile Devices	* iPhone 6 Plus, iPhone 6, iPhone 5S, iPad Air 2, iPad Mini 3, iPad Air, iPad Mini 2, iPad 4;* Samsung Note 3, Samsung S5, Sony Z3 EXPERIA;* Note: It is recommended that you use a tablet for the best experience

Intelligent Orientation Control (IOC)

IOC allows users to lock the orientation of aircraft in different fashions. There are three working modes for IOC and you may select the desired IOC modes from the DJI Pilot app. IOC only works under F mode, and user must toggle the flight mode switch to "F" mode to activate IOC. Refer to the table below:

Course Lock (CL)	Its forward direction is pointing to the nose direction when recording, which is fixed until you re-record it or exit from CL.
Home Lock (HL)*	Record a Home Point (HP), and push Pitch stick to control the aircraft far from or near to the HP.
Point of Interest (POI)*	Point of Interest. Record a point of interest (POI), the aircraft can circle around the POI, and the nose always points to the POI.

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

Prerequisites of IOC

Use the IOC feature under the following condition:

Modes IOC	GPS enabled	GPS	Flight Distance Limits
Course Lock	No	None	None
Home Lock	Yes		Aircraft ≥10m Home Point
POI	Yes		Aircraft 5m~500m Point of Interest

Using IOC

Enable the IOC feature by tapping "Enable IOC" in the setting page of the DJI Pilot app. Toggle the Flight Mode Switch to "F" mode and follow the on-screen instruction to use IOC feature.

How to Update Firmware

Follow the process described below to upgrade the aircraft, remote controller and battery.

Updating the Aircraft Firmware

Step 1- Check Battery and SD Card Capacity

Ensure the Intelligent Flight Battery has at least 50% power and there is at least 100MB of free space on the SD card.

Step 2- Prepare the Firmware Update Package

1. Download the firmware update package from the official DJI website (http://www.dji.com/product/inspire-1).
2. Insert the SD into your PC. Extract the all downloaded files into the root directory of the SD card. Remove the SD card from your PC. Ensure the Inspire 1 is powered off then insert the SD card into the SD card slot on the Inspire 1 camera.

Step 3- Update the Aircraft

1. Ensure the remote controller is powered off and then power on the aircraft. Upgrade will begin automatically after aircraft is powered on.
2. It will take approximately 25 minutes to complete the firmware update. The camera will sound a short pulse of "D-D-D-D" beeping sound to indicate the upgrade is in progress and sound a "D---DD" beeping sound to indicate the update is complete with success.
3. Check the upgrade status by opening the ".txt" file that is automatically generated after the update. The update is successful if the text "result: successful" is in the document. Try upgrading the firmware again if the text "result: failed" is found or the gimbal sound a long beep sound.

Updating the Remote Controller Firmware

Step 1- Check Battery and SD Card Capacity

Remote controller firmware is included in the aircraft firmware update package. Use the same update package file that is downloaded from the DJI official website. Ensure the remote controller battery level is above 50%.

Step 2- Prepare the Firmware Update Package

1. Extract all downloaded files into the root directory of an SD card or USB thumb drive.
2. Insert the SD card into a SD card reader or the USB disk onto the remote controller USB port when remote controller powered off. If you do not have a SD card reader, you may insert the SD card into the gimbal and connect the gimbal with remote controller to upgrade the remote controller.

Step 3- Update the Remote Controller

1. Power on the remote controller and wait 60 seconds until the upgrade begins. Do not power off the remote controller during the update.
2. It will take approximately 10 minutes to complete the firmware update. The camera will sound a beeping sound and the Status LED on the remote controller shows solid blue to indicate the update is in progress. The Status LED on remote controller shows solid green and beeping sound will stop if the upgrade is completed with success. The Status LED on remote controller shows solid red if upgrade is failed. Try upgrade again.

Updating Intelligent Flight Battery Firmware

The Intelligent Flight Battery is upgraded during the aircraft firmware upgrade process. It is recommended to keep the upgrade package files in your SD card. The upgrade will start automatically after power cycling the aircraft.

⚠
- Do not perform firmware update while the aircraft is still flying in the air. Only carry out firmware update when the aircraft is landed.
- Be sure to update the remote controller's firmware to the latest version after you upgrade the aircraft's firmware.
- The remote controller may become unlinked from the aircraft after updating. Re-link the remote controller and aircraft.
- Confirm the update results according to the gimbal sounds. It is normal for the aircraft to sound or the LED to blink during the update process.
- Ensure there is only one firmware package file stored on your SD card.
- Only storage devices that are formatted for FAT32 and exFAT file systems are supported for aircraft and remote controller firmware updates.
- Delete any automatically generated txt files (xxx_GS.TXT) in the SD card when updating multiple remote controllers.

FCC Compliance

FCC Compliance

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.
Changes or modifications not expressly roved by the party responsible for compliance could void the user's authority to operate the equipment.

Compliance Information

FCC Warning Message

Any Changes or modifications not expressly roved by the party responsible for compliance could void the user's authority to operate the equipment.
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Radiation Exposure Statement:

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

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio

frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
—Reorient or relocate the receiving antenna.
—Increase the separation between the equipment and receiver.
—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
—Consult the dealer or an experienced radio/TV technician for help.

IC RSS warning

This device complies with Industry Canada licence-exempt RSS standard (s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference,including interference that may cause undesired operation of the device.
Le présent areil est conforme aux CNR d'Industrie Canada licables aux areils radio exempts de licence.

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

IC Radiation Exposure Statement:

This equipment complies with IC RF radiation exposure limits set forth for an uncontrolled environment.
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
This equipment should be installed and operated with minimum distance 20cm between the radiator& your body.
Any Changes or modifications not expressly roved by the party responsible for compliance could void the user's authority to operate the equipment.

KCC Warning Message

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

NCC Warning Message

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

The content is subject to change.

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