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

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

September 8, 2015

Exemption No. 12781
Regulatory Docket No. FAA−2015−1450

Mr. Kyle Falwell
Central Virginia Aerial Solutions, LLC
4132 Richmond Highway
Lynchburg, VA 24501

Dear Mr. Falwell:

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 letters dated April 27, 2015, and August 6, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Central Virginia Aerial Solutions, LLC (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial mapping and surveys.

See Appendix A for the petition submitted to the FAA describing the proposed operations and the regulations that the petitioner seeks an exemption.

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

Airworthiness Certification

The UAS proposed by the petitioner are the DJI Phantom 2, DJI Phantom 2 Vision+, and DJI Inspire.

The petitioner requested relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*. In accordance with the statutory criteria provided in Section 333 of Public Law 112−95 in reference to 49 U.S.C. § 44704, and in

consideration of the size, weight, speed, and limited operating area associated with the aircraft and its operation, the Secretary of Transportation has determined that this aircraft meets the conditions of Section 333. Therefore, the FAA finds that the requested relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*, and any associated noise certification and testing requirements of part 36, is not necessary.

The Basis for Our Decision

You have requested to use a UAS for aerial data collection[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, Central Virginia Aerial Solutions, LLC is granted an exemption from 14 CFR §§ 61.23(a) and (c), 61.101(e)(4) and (5), 61.113(a), 61.315(a), 91.7(a), 91.119(c), 91.121, 91.151(a)(1), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b), to the extent necessary to allow the petitioner to operate a UAS to perform aerial data collection. This exemption is subject to the conditions and limitations listed below.

[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.

Conditions and Limitations

In this grant of exemption, Central Virginia Aerial Solutions, LLC is hereafter referred to as the operator.

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

1. Operations authorized by this grant of exemption are limited to the DJI Phantom 2, DJI Phantom 2 Vision+, and 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 five minutes or with the reserve power recommended by the manufacturer if greater.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

This exemption terminates on September 30, 2017, unless sooner superseded or rescinded.

Sincerely,

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

Enclosures

April 27, 2015

U.S. Department of Transportation
Docket Management System
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Washington, D.C. 20590

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Lynchburg, VA 24501
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Exemption Request for Central Virginia Aerial Solutions, LLC under Section 333 of the FAA Modernization and Reform Act of 2012 (FMRA)

Dear Sir or Madam:

Central Virginia Aerial Solutions, LLC (CVAS) requests exemptions from several provisions of the Federal Aviation Regulations (FAR) in accordance with Section 333 of the FAA Modernization and Reform Act of 2012. CVAS seeks these exemptions in order to safely operate small lightweight DJI unmanned aircraft systems (UASs) (detailed below) commercially (private property mapping and surveys) in airspace regulated by the Federal Aviation Administration (FAA). The exemptions CVAS is requesting are Part 21; §§ 45.23(b); 61.113(a) and (b); 61.133(a); 91.7(a); 91.9(b)(2); 91.109(a); 91.119; 91.151(a); 91.203(a) and (b); 91.319(a)(1); 91.405(a); 91.407(a)(1); 91.409(a)(2); and 91.417(a) of Title 14, Code of Federal Regulations (14 CFR part 11). The exemption would allow operation of unmanned aircraft systems (UAS) for the purpose of precision aerial surveys.

The requested exemption would support an application for a commercial Certificate of Authorization to use the system to support private property mapping and surveys:

- Marketing / Advertising
- Land Development
- Insurance Claims
- Forestry / Agriculture
- Golf Course Planning
- Construction
- Real Estate
- Inspections
- Land Appraisal

- Wildlife Management
- Resort / Recreation
- Vineyard and Winery

The DJI UASs systems consist of lightweight battery operated aircrafts, an integrated state of the art ground station system and communications equipment. The aircrafts carry an onboard high resolution camera (with first person view) that allows us to conduct precision aerial photography and video. This technology will assist the Pilot in Commands (PIC) in providing the upmost safety procedures and the public will benefit from these services. CVAS services will help the commercial industry and not bring harm to any person in the air or on the ground.

Kyle Falwell, The co-owner of CVAS is an ATP pilot with Type ratings in the CE 500 and CE525 aircraft. Kyle will personally oversea all operations of safety. His extensive aviation background will on aid in the safety of all CVAS operations.

The aircrafts of CVAS will be operated in the field of view with both a PIC and a ground-based Visual Observer (VO) in accordance with FAA Policy N 8900.227 Section 14 "Operational Requirements for UAS" with the following additional restrictions:

- All operations will occur in Class G airspace (below 400' AGL)
- Operations will be operated over private property, commercial property, or property (not federal or state) with permission of the land owner
- The aircraft will not operate within 5NM of any airport or heliport (unless well-coordinated with the FAA and airport/heliport (detailed flight plans))
- Operations will be limited to day, visual meteorological conditions
- Aircraft will remain within Visual Line of Sign at no greater that ½ NM of the PIC at all times
- While the aircraft is airborne, the VO will be positioned within voice distance to the PIC

The PIC and VO will meet the requirements outlined in FAA Policy N 8900.227 Section 16 Personnel Qualifications. Additionally, the PIC and VO will perform maintenance on the system and will complete all necessary maintenance set forth by the FAA or manufacturer.

We submit that the combination of the aircrafts light weight, historically demonstrated flight performance, fully qualified flight crew and strict operation under the guidelines established in 8900.227, the FAA can have confidence that the operation will have an equivalent or greater level of safety of manned aircraft performing similar operations. CVAS is dedicated to safety and believes the company will not bring any harm to the public (air or ground).

Unmanned Aircraft Systems (UASs): *User Manuals are attached*

CVAS proposes to operate the DJI UASs Phantom 2, Phantom 2+, and the Inspire 1. The petitioner states that given the size, weight, speed and limited operating area associated with the aircraft to be utilized by the applicant, an exemption from 14 CFR Part 21, Subpart H

(Airworthiness Certificates), subject to certain conditions and limitations, is warranted and meets the requirements for an equivalent level of safety under 14 CFR Part 11 and Section 333 of P.L. 112-95 (Section 333). The petitioner further states that UAS operated without an airworthiness certificate in the limited environment and under the conditions and limitations proposed by the petitioner will be at least as safe, or safer, than a conventional aircraft (fixed wing or rotorcraft) operating with an airworthiness certificated issued under 14 CFR Part 21, Subpart H and not subject to the proposed conditions and limitations.

The petitioner states that the unmanned aircraft (UA) to be operated under this request is a rotary-wing aircraft, with the smallest aircraft weighing 2.5 lbs (largest weighing 7.6 lbs) fully loaded, flies at a maximum speed of 29 knots (not recommended), carries neither a pilot nor passengers, carries no flammable fuels, and operates exclusively within a pre-disclosed area. Operations under this exemption will be tightly controlled and monitored by both the operator, spotter, and local public safety requirements.

DJI Aircraft Specs: ***CVAS has a total of three aircraft listed in this exemption***

Phantom 2(1): Serial Number: PH645195943

Weight: 2.5 pounds

Max Speed: 29 knots

Flight Time: 25 minutes

Battery: 3S LiPo, 5200mAh, 11.1V

Operating Frequency: 2.4GHz ISM (range 1000 meters) *Note: We only operate with 100% line of sight to the Aircraft (we do not lose visual of the aircraft)*

First Person View: Yes

Phantom 2 Vision + (2): Serial Number: PH645199878 **Serial Number:** PH645240161

Weight: 2.7 pounds

Max Speed: 29 knots

Flight Time: 25 minutes

Battery: 3S LiPo, 5200mAh, 11.1V

Operating Frequency: 5.728-5.85 GHz

First Person View: Yes

Inspire (1): Serial Number: 0370010491

Weight: 7.6 pounds

Max Speed: 31 knots

Flight Time: 18 minutes

Battery: LiPo(6S, 10000mAh~15000mAh, 15C(Min))

Operating Frequency: 2.4GHz ISM (range 1000 meters) *Note: We only operate with 100% line of sight to the Aircraft (we do not lose visual of the aircraft)*

First Person View: Yes

UAS Pilot In Command

The petitioner asserts that operations of the DJI should not be required to hold a commercial or private pilot certificate. However I Chief Safety Officer does. The petitioner notes that unlike a conventional aircraft that carries a pilot, passengers, and cargo, the DJI UASs are remotely controlled with no passengers or property of others on board. The petitioner proposes that operator requirements should take into account the characteristics of the particular UAS. The petitioner states that the DJI UASs have high degree of pre-programmed control and various built-in technical capabilities that strictly limit the potential for operation outside of the operating conditions set forth in its petition for exemption.

CVAS will not allow the PIC to fly any aircraft without at least 40 hours of training flight time with the exact aircraft used for the business. The company has several private testing areas that are in a remote location with no vertical obstructions. This allows the PICs for CVAS to test all the systems and understand fail safe features to the fullest extent before conducting business with the UAS.

PICs and VOs for Central Virginia Aerial Solutions, LLC

Kyle Falwell, Managing Member: (434) 851-1992
Connor Burke, Member: (434)258-5361

CVAS's PICs are well versed in all the safety features on the DJI aircrafts. They have spent countless hours perfecting the pre-flight, flight, and post flight procedures. CVAS's PICs can perform all necessary maintenance on the DJI aircrafts and if for some reason they are not able to fix aircraft to safety specifications, they will seek assistance with the strict parameters of the FAA and the DJI Flight Operational Manuals (Attached to the request).

The name and contact information of the applicants are:

Central Virginia Aerial Solutions, LLC
4132 Richmond Hwy
Lynchburg, VA 24501
Kyle Falwell: (434) 851-1992
Connor Burke: (434)258-5361
Kyle@bonairbrokerage.com

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

Sincerely,

Kyle Falwell, Management Member

Connor Burke, Member

Aircraft DJI Inspire 1

Model
T600
Weight (Battery Included)
2935 g
Hovering Accuracy (Gps 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 8s - 1/8000s 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 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 require Operating Temperature Range 0° to 40° C
Remote Controller	Name C1 Operating Frequency 922.7~927.7 MHz (Japan Only) 5.725~5.825 GHz 2.400~2.483 GHz Transmitting Distance (Outdoor And Unobstructed) 2 km 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 Phone Max Mobile Device Width 170mm 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 8.0 or later Android 4.1.2 or later Supported Mobile Devices * Compatible with iPhone 5s, iPhone 6, iPhone 6 Plus, i mini 3, and iPad mini 3 Wi-Fi + Cellular. This app is op * Samsung S5, Note 3, Sony Xperia Z3, Google Nexus *Support for additional Android devices available as tes

Aircraft	Supported Battery DJI 5200mAh LiPo Battery Weight (Battery & Propellers Included) 1242g Hover Accuracy (Ready To Fly) Vertical: 0.8m; Horizontal: 2.5m Max Yaw Angular Velocity 200°/s Max Tiltable Angle 35° Max Ascent / Descent Speed Ascent: 6m/s; Descent: 2m/s Max Flight Speed 15m/s (Not Recommended) Diagonal Motor-Motor Distance 350mm
Gimbal	Working Current Static : 750mA; Dynamic : 900mA Control Accuracy ±0.03° Controllable Range Pitch : -90° - 0° Maximum Angular Speed Pitch : 90°/s
Camera	Operating Environment Temperature 0°C-40°C Sensor Size 1/2.3" Effective Pixels 14 Megapixels Resolution 4384×3288 Hd Recording 1080p30 & 720p Recording Fov 110° / 85°
Remote Control	Operating Frequency 5.728 GHz - 5.85 GHz Communication Distance (Open Area) CE Compliance: 400m; FCC Compliance: 800m Receiver Sensitivity (1%Per) -93dBm

	Transmitter Power CE Compliance: 25mW; FCC Compliance: 100mW Working Voltage 120 mA@3.7V Built-In Lipo Battery Working Current/Capacity 3.7V, 2000mAh
Range Extender	Operating Frequency 2412-2462MHz Communication Distance (Open Area) 500-700m Transmitter Power 20dBm Power Consumption 2W
DJI VISION App	System Requirement Of Mobile Device iOS version 6.1 or above/ Android system version 4.0 o Mobile Device Support • iOS recommended: iPhone 4s, iPhone 5, iPhone 5s, iF • Android recommended: Samsung Galaxy S3, S4, Not

GENERAL FEATURES

- Lightweight, multi-functional integrated aircraft and camera
- Camera remote-control by DJI VISION App
- Range Extender increases Wi-Fi distance to 300m
- Anti-vibration camera platform with single axis stabilisation
- Low-voltage protection
- Virtual Radar aircraft locator on mobile device
- Range of camera tilt options
- Multiple, continuous and timed capture options
- HD Video Recording (1080/p30 or 1080/60i)
- RAW and JPEG picture formats

TRANSMITTER

- Operating Frequency:5.728 GHz – 5.85 GHz
- Communication Distance (open area) : CE: 300m; FCC: 500m
- Receiver Sensitivity (1%PER) :-93dBm</td></tr>
- Transmitter Power:CE: 25mw; FCC: 125mw
- Working Voltage:80 mA@6V
- Battery:4 AA Batteries

CAMERA

- Resolution:14 Megapixels
- FOV:140 °/ 120° / 90 °
- Sensor size:1/2.3
- Functionality:Support of multi-capture, continuous capture and timed capture;Support of HD Recording (1080/p30 or 1080/60i);Supports of both RAW and JPEG picture format

RANGE EXTENDER

- Operating Frequency:2412-2462MHz
- Communication Distance (open area) :300m
- Transmitter Power:<=17dBm
- Power Consumption:1.5W

DJI VISION APP

INSPIRE 1

Maintenance Manual

V1.0 2015.2

To ensure that your aircraft continues to offer optimal performance and to ensure flight safety, it is recommended that comprehensive maintenance be performed after every 200 flights or 50 flight hours. This manual is intend to help users maintain their aircraft and maximize its continued reliability.

I. Checking the Battery

1. Check the battery for damage and deformities. If there are any signs of damage to the battery, stop using it and discharge the battery to 10% or below for disposal. Do not disassemble the battery for any reason.

2. Check the battery pins and rub them clean with an eraser if any residue is observed. This will help to ensure a more reliable connection.

3. Check the metal battery power connectors for damage. If the connectors appear burnt, try to clear them. This can be done by inserting a piece of sandpaper (1mm thick) into the connectors to polish the metal.

4. Check the contact pins in the battery compartment to ensure that the pins are clear. They should be able to establish easy contact with the battery connectors and should not be bent.

5. Check the electrodes on the battery. If they appear burnt, polish them with sandpaper. If there is serious erosion, send the battery in for repairs.

6. Check the plastic components of the battery bracket to see it is in good condition and that all screws are secure. This prevents the battery from becoming loose during flight.

7. Check the power cables between the arms and the center plate, if the cables are worn, contact DJI to arrange repairs.

8. For long term storage, please refer to the "Intelligent Flight Battery Safety Guidelines" and check the battery once a month to prevent the battery cell from being damaged.

9. Run the DJI Pilot App to confirm that all battery cells are at similar voltage levels and stay at the same level when the battery is fully charged. If all cells maintain voltage levels above 3.7V but any cell is 0.2V higher or lower than the others, contact DJI for analysis. You can also check the battery cell warning history. If any warning are reported, contact DJI.

II. Checking the Transformation System

1. Check the servomotor cables for wear. Also confirm that the connection points are still in good condition.

2. Check the lead screws and contact DJI Support to arrange repairs if any bending or damage is discovered. Clean the lead screws with WD-40 spray if they show signs of rust.

3. Listen to the servomotors during the transformation, if there is abnormal noise, it may indicate that the servomotors worn.

4. After the landing gear rises, check the lead screws and bearings. If any dirt or dust is found, clean and grease the

bearings.

5. Check the lead screws. If there is any scratches, dents, or plastic particles underneath them, contact DJI Support to arrange repairs.

III. Checking the Aircraft

1. Confirm that all the screws are still adequately tightened.
2. Check the aircraft for breaks or damage. If there is any reason to believe that detectable damage might affect flight safety, consult with DJI Support.
3. Check the carbon tubes of the arms for damage.
4. Check the dampers on the landing gears. If they are loose, secure them with 502 glue.
5. Ensure that there are no obstacles on or around the GPS module or around the antennas on the landing gear. Remove any obstacles (such as tapes with conductive material) that might affect or block the signal.
6. Check that the right and left landing gear rest at the same tilt angle.

IV. Checking the Motors

1. Check the rotors to confirm that they have not become loose.
2. Detach the propellers and start the motors. Listen carefully. If there is any abnormal noise, please replace the motors. This may be a sign that the bearings have been worn out.
3. Detach the propellers and start the motors. Carefully examine the edge of the rotor and confirm that the shaft is perfectly centered on the motor. Check for any abnormal or excessive vibration. If any problems are detected, contact DJI Support to order replacement motors.
4. Check for deformities by confirming that the gap between the motor and motor base is even. If not contact DJI Support to order replacement motors.
5. Ensure that the screws used to secure the motor base are tight and the plastic components around the motors are in good condition. If not please tighten the screws and contact DJI to repair any broken plastic components.

V. Checking the Propellers

1. Check the propellers. If there is any bending, breakage or cracking on a propeller, do not use it.
2. Attach the propeller to the motor, turn on the aircraft, and place it on the ground. Stand 1 meter away from the aircraft and observe the rotating propellers. If you can see two distinct propeller outline layers, when looking at a spinning propeller from the side, this propeller is damaged and should not be used.

VI. Checking the IMU

1. Open DJI Pilot app to check the condition of the IMU and perform an advanced IMU calibration. Please place the aircraft in a cool environment and on a flat, stable surface (if the landing gear is damaged, support the aircraft with four objects of equal height). Do not touch the craft during the calibration.
2. Turn on the aircraft and listen for any abnormal noise or vibration from the fan located on the front of the aircraft. If any irregularity is detected, replace the fan.

VII. Checking the Control and Video Transmission System

1. Check the 4 antennas on the landing gear to ensure that they are secure. Also check for any bending or damage.

2. Check the antennas of the remote controller for damage

3. Check the neck strap for damage or wear, replace if necessary.

VIII. Checking the Gimbal and Camera

1. The quick-mount connector for the camera is a particularly vulnerable component. If the gimbal fails to initialize when turned on, fails to work after initialization, or fails to transmit video to the app (while OSD data is displayed), the quick-mount connector may be worn. In this case, replace the rubber mat, circuit board, and/or connector on the gimbal quick-mount.

2. Check the metal contacts on the quick mount connector board, if any contact is bent, replace the quick-mount connector.

3. Check the contact pins on the quick-mount connector board, if there is any dirt, rub it clean with an eraser. If any contact pins are worn out it should be replaced.

4. Confirm that the gimbal is able to properly stabilize itself. If its stabilizing performance deteriorates, contact DJI to arrange repairs.

5. Listen for any abnormal noise from the fan when the gimbal is turned on. This may indicate unusual vibration and the fan should be replaced.

IX. Checking the Vision Positioning System

1. Check the lens of the camera. If any dirt or residue is detected, gently clean the lens.

2. Check for and remove objects that might block the sensors.

3. Ensure that the Vision Positioning System is securely installed on the aircraft.

4. Detach the propellers and turn on the aircraft. Hold the aircraft 1-2 meters above a surface with rich patterns, under good lighting conditions. Change the Flight Mode switch to P Mode on the controller and check the DJI Pilot app. If the app displays an altitude value and indicates that P-OPTI mode is active, the Vision Positioning System should function normally.

Support Center Contact Info:

http://www.dji.com/support

The content is subject to change.

Download the latest version from http://www.dji.com/product/inspire-1/download

DJI Inspire 1

Flight Check list:

---Fully charge remote and battery
---close ALL apps in Ipad AND put it in airplane mode

----make sure the DJI pilot app is closed.
----Make sure prop locks are secure
----Turn Inspire on and Remote on
----Turn ios app on
----Press Camera button
----Make sure all firmwares are uptodate and the app confirms it

---Caliberate Compass
---Press Mode button
----Press "advanced settings"
----Press "sensor"
----Caliberate IMU advanced----Press button "HD" always use "CUSTOM" channel
---Watch channels in my case the cleanest channel in 2.4 mhz is "32"
---Pick channel "32" The blue Bar should be in your chosen channel in my case "32
---Choose "midline image tranmission quality" it gives about 1 mile range
---Close menu
----Take both RX TX outside get a good sat llock on GPS
----Press both sticks inwards and down ..mark your home..lady should confirm in app
---FLY
---The reason the RC connection may break is as folows
---there is ipad in the way between Sky and the two antennas that should be pointing to the sky always! AND a
---You have left the ipad in regular mode and not "airplane" mode
---You have not selected "off" under "set RC status" but have selected "master" or slave---You have selected a
from 2.4 ghz devices in your neighboorhood (go Back and pick the cleanest channel)

PHANTOM 2

Maintenance Manual

V1.0 2015.2

To ensure that your aircraft continues to offer optimal performance and to ensure flight safety, it is recommended that comprehensive maintenance be performed after every 200 flights or 50 flight hours. This manual is intend to help users maintain their aircraft and maximize its continued reliability.

I. Checking the Battery

1. Check the battery for damage and deformities. If there are any signs of damage to the battery, stop using it and discharge the battery to 10% or below for disposal. Do not disassemble the battery for any reason.

2. Check the battery pins and rub them clean with an eraser if any residue is observed. This will help to ensure a more reliable connection.

3. Check the metal battery power connectors for damage. If the connectors appear burnt, try to clear them. This can be done by inserting a piece of sandpaper (1mm thick) into the connectors to polish the metal.

4. Check the contact pins in the battery compartment to ensure that the pins are clear. They should be able to establish easy contact with the battery connectors and should not be bent.

5. Check the electrodes on the battery. If they appear burnt, polish them with sandpaper. If there is serious erosion, send the battery in for repairs.

6. Check the plastic components of the battery bracket to see it is in good condition and that all screws are secure. This prevents the battery from becoming loose during flight.

7. Check the power cables between the arms and the center plate, if the cables are worn, contact DJI to arrange repairs.

8. For long term storage, please refer to the "Intelligent Flight Battery Safety Guidelines" and check the battery once a month to prevent the battery cell from being damaged.

9. Run the DJI Pilot App to confirm that all battery cells are at similar voltage levels and stay at the same level when the battery is fully charged. If all cells maintain voltage levels above 3.7V but any cell is 0.2V higher or lower than the others, contact DJI for analysis. You can also check the battery cell warning history. If any warning are reported, contact DJI.

II. Checking the Transformation System

1. Check the servomotor cables for wear. Also confirm that the connection points are still in good condition.

2. Check the lead screws and contact DJI Support to arrange repairs if any bending or damage is discovered. Clean the lead screws with WD-40 spray if they show signs of rust.

3. Listen to the servomotors during the transformation, if there is abnormal noise, it may indicate that the servomotors worn.

4. After the landing gear rises, check the lead screws and bearings. If any dirt or dust is found, clean and grease the

bearings.

5. Check the lead screws. If there is any scratches, dents, or plastic particles underneath them, contact DJI Support to arrange repairs.

III. Checking the Aircraft

1. Confirm that all the screws are still adequately tightened.
2. Check the aircraft for breaks or damage. If there is any reason to believe that detectable damage might affect flight safety, consult with DJI Support.
3. Check the carbon tubes of the arms for damage.
4. Check the dampers on the landing gears. If they are loose, secure them with 502 glue.
5. Ensure that there are no obstacles on or around the GPS module or around the antennas on the landing gear. Remove any obstacles (such as tapes with conductive material) that might affect or block the signal.
6. Check that the right and left landing gear rest at the same tilt angle.

IV. Checking the Motors

1. Check the rotors to confirm that they have not become loose.
2. Detach the propellers and start the motors. Listen carefully. If there is any abnormal noise, please replace the motors. This may be a sign that the bearings have been worn out.
3. Detach the propellers and start the motors. Carefully examine the edge of the rotor and confirm that the shaft is perfectly centered on the motor. Check for any abnormal or excessive vibration. If any problems are detected, contact DJI Support to order replacement motors.
4. Check for deformities by confirming that the gap between the motor and motor base is even. If not contact DJI Support to order replacement motors.
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1. Open DJI Pilot app to check the condition of the IMU and perform an advanced IMU calibration. Please place the aircraft in a cool environment and on a flat, stable surface (if the landing gear is damaged, support the aircraft with four objects of equal height). Do not touch the craft during the calibration.
2. Turn on the aircraft and listen for any abnormal noise or vibration from the fan located on the front of the aircraft. If any irregularity is detected, replace the fan.

VII. Checking the Control and Video Transmission System

1. Check the 4 antennas on the landing gear to ensure that they are secure. Also check for any bending or damage.

2. Check the antennas of the remote controller for damage

3. Check the neck strap for damage or wear, replace if necessary.

VIII. Checking the Gimbal and Camera

1. The quick-mount connector for the camera is a particularly vulnerable component. If the gimbal fails to initialize when turned on, fails to work after initialization, or fails to transmit video to the app (while OSD data is displayed), the quick-mount connector may be worn. In this case, replace the rubber mat, circuit board, and/or connector on the gimbal quick-mount.

2. Check the metal contacts on the quick mount connector board, if any contact is bent, replace the quick-mount connector.

3. Check the contact pins on the quick-mount connector board, if there is any dirt, rub it clean with an eraser. If any contact pins are worn out it should be replaced.

4. Confirm that the gimbal is able to properly stabilize itself. If its stabilizing performance deteriorates, contact DJI to arrange repairs.

5. Listen for any abnormal noise from the fan when the gimbal is turned on. This may indicate unusual vibration and the fan should be replaced.

IX. Checking the Vision Positioning System

1. Check the lens of the camera. If any dirt or residue is detected, gently clean the lens.

2. Check for and remove objects that might block the sensors.

3. Ensure that the Vision Positioning System is securely installed on the aircraft.

4. Detach the propellers and turn on the aircraft. Hold the aircraft 1-2 meters above a surface with rich patterns, under good lighting conditions. Change the Flight Mode switch to P Mode on the controller and check the DJI Pilot app. If the app displays an altitude value and indicates that P-OPTI mode is active, the Vision Positioning System should function normally.

Support Center Contact Info:

http://www.dji.com/support

The content is subject to change.

Download the latest version from http://www.dji.com/product/inspire-1/download

Phantom 2 Vision + Mission Checklists!

psFlight.org!

1. Hover approximately ten feet above the ground to confirm UAS is under control.!
2. All sticks operate correctly while in hover - Verified!

1. Camera - Full Up! 2. Video Recorder - Stop! 3. Landing Zone - Clear / Safe! !

1. Battery - Remove & Replace! 2. Wifi Connection to Monitor - Verified! 3. DJI application - Connect to Camera! 4. Takeoff! !

End of Ops Checklist!

1. Battery - Off!
2. Transmitter - Off!
3. Router - Off!
4. Notify Tower/CTAF - End of Ops

!

Arrival Checklist!

1. If day and operating out of back of vehicle, point vehicle into

sun.!

2. Remove case and place on level surface.!

3. Check distance to nearest airport and/or controlled airspace using smartphone or tablet app.!

4. If required, use VHF aviation transceiver, to contact tower of field if closer than 5 NM.!

5. Inform tower / CTAF of UAS ops, location, and max height of flight.!

1. Remove transmitter.!

2. Router - On!

3. Transmitter - On!

4. Toggle Switches - Full Up!

5. Video Monitor - On!

6. Remove UAS from case.!

7. Gimbal Lock & Lens Cap - Removed!

8. Micro-SD card - Inserted.!

9. UAS Battery - Inserted!

10. Place UAS in clear and safe launch and recovery position if it returns to home.!

11. UAS Battery - On!

12. Wifi Connection to Monitor - Verified!
13. DJI Application - Load!
14. DJI application - Connect to Camera!
15. SD Card - Format!
16. Camera - Full Up!
17. Satellite Connections - Verified!
18. Charge Levels - Safe for Flight!
19. Video Recording - Start!
20. Takeoff!