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

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

August 26, 2015

Exemption No. 12624
Regulatory Docket No. FAA−2015−2478

Mr. Jonathan J. Ammon
OffTheGround
301 McLellan Boulevard
Phoenix, AZ 85013

Dear Mr. Ammon:

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 1, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of OffTheGround (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct site documentation and videography of developed and undeveloped commercial property for developers, brokers, architects and construction professionals.

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

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

Airworthiness Certification

The UAS proposed by the petitioner is a DJI Phantom 2 Vision+.

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, OffTheGround 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, OffTheGround 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 Vision+ 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 August 31, 2017, unless sooner superseded or rescinded.

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

Enclosures

OffTheGround
Phoenix, Arizona 85013
Phone: 602-689-9552
Email: jammon@offtheground.build

Date: June 1, 2015

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

Dear Sir or Madam:
Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 (the Reform Act), OffTheGround herby applies for an exemption from the Federal Aviation Regulations identified herein to allow for the commercial operation of a small unmanned aerial vehicle (*i.e.*, UAV) for the purposes of site documentation and videography of developed and undeveloped commercial property for developers, brokers, architects and construction professionals in airspace regulated by the Federal Aviation Administration (FAA) in Maricopa County, Arizona.

OffTheGround's operation under this exemption will be subject to strict operating requirements and conditions to ensure an equivalent level of safety to currently authorized operations using manned aircraft and under conditions as may be modified by the FAA as required by Section 333. Furthermore, OffTheGround will be operated under controlled conditions at low altitudes that are permitted in accordance with OffTheGround's Certificate of Authorization (COA).

This exemption would permit the commercial operation of the UAV DJI Phantom 2 Vision +. Additional specifications, checklists and training guides are included as appendices in this submittal.

The applicant contact information is:

- **OffTheGround**
- Attn: Jonathan J Ammon
- Telephone: 602-689-9552
- Email: Jammon@offtheground.build
- Address: 301 McLellan Blvd, Phoenix, Arizona 85013

OffTheGround contends that this application satisfies the conditions and criteria set forth in Section 333 of the Reform Act, that the operations described herein benefit the public interest as a whole and that the use of UAVs for commercial site documentation for developers, brokers, architects and construction professionals meets or exceeds the level of safety currently experienced by traditional manned aircraft utilized for these purposes. 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" in Section 333(c) of the

Reform Act. OffTheGround is thankful for the Federal Aviation Administration's time and consideration.

Respectfully,

Jonathan Ammon, Registered Architect
Founder, OffTheGround

For your convenience, OffTheGround has organized this exemption request in the following format:

I. Regulations for which the Exemption is Required
II. Statutory Authority for Requested Exemptions
III. OffTheGround Background Information
IV. Proposed Operations
    a. Operation Locations and Environments
    b. Operating Conditions and Limitations
    c. Operator Certification and Requirements
    d. UAV Registration, Markings and Requirements
V. Public Benefit and Public Interest
VI. Discussion of Requested FAR Exemptions

I. Regulations for which the Exemption is Required

OffTheGround requests exemption from the following regulations:

- 14 C.F.R. Part 21, Subpart H – Airworthiness Certificates
- 14 C.F.R §45.23(b)–Display of Marks
- 14 C.F.R §45.27(a)–Location of Marks Non Fixed-Wing Aircraft
- 14 C.F.R § 61.113 (a) & (b) - Private Pilot Privileges and Limitations; Pilot in Command
- 14 C.F.R § 91.7 (a) – Civil Aircraft Airworthiness
- 14 C.F.R §91.9(b)(2)&(c)–Civil Aircraft Flight Manual
- 14 C.F.R §91.103–Preflight Action
- 14 C.F.R § 91.109 (a) – Flight Instruction
- 14 C.F.R §91.119–Minimum Safe Altitudes
- 14 C.F.R § 91.121 – Altimeter Settings
- 14 C.F.R §91.151(a)(1) - Fuel Requirements for Flight in VFR (Visual Flight Rule) Conditions
- 14 C.F.R §91.203(a)&(b)–Carrying Civil Aircraft Certification and Registration
- 14 C.F.R §§ 91.405 (a), 91.407 (a)(l), 91.409 (a)(2), 91.417 (a) & (b) – Maintenance Inspections

II. Statutory Authority for Requested Exemptions

This petition for exemption is submitted in accordance with Section 333 of the Reform Act. Congress has directed the FAA "to safely accelerate the integration of civil unmanned aircraft systems into the national airspace system." Pursuant to Section 333 of the Reform Act, the FAA Administrator is to permit operation of an unmanned aircraft system where it does not create a hazard to users of the National Airspace System ("NAS") or the public or pose a threat to national security based on the following considerations:

- The size, weight, speed and operational capability
- Operation in proximity to airports and populated areas
- Operation within visual line of sight of the operator

Furthermore, the Federal Aviation Act grants the FAA Administrator general authority to grant exemptions from the agency's safety regulations and minimum standards when the Administrator decides a requested exemption is in the public interest. A party requesting an exemption must explain the reasons why the exemption: (1) would benefit the public as a whole, and (2) would not adversely affect safety or how it would provide a level of safety at least equal to the existing rules.

The Federal Aviation Act expressly grants the FAA the authority to issue exemptions. This statutory authority, by its terms, includes exempting civil aircraft, as the term is defined under 40101 of the Act, from the requirement that all civil aircraft must have a current airworthiness certificate and those regulations requiring commercial pilots to operate aircraft in commercial service:

- The Administrator may grant an exemption from a requirement of a regulation prescribed under subsection (a) or (b) of this section or any of sections.

III. OffTheGround Background Information

OffTheGround will provide safe, efficient and outstanding aerial imaging and videography services to clients in the following industries: commercial property development, brokerage, architecture and construction.

The founder, Jonathan J Ammon, is a license architect and budding commercial developer in Phoenix, Arizona. He has worked in the construction management industry as a Virtual Design and Construction (VDC) Engineer and Manager for 4 years. He has also led the virtual coordination and construction of architecture, structural and mechanical, electrical and plumbing systems on 13 commercial projects throughout the United Stated. VDC is a market niche focused on developing and utilizing 3-Dimensional visualization software and technology to enable collaboration among designers, architects, engineers and builders. Jonathan obtained his construction OSHA 30 accreditation for safety operations (Occupational Safety & Health Administration) in 2014, his architectural license in 2015 and has given numerous construction tours of buildings throughout the United States.

Similar to the primary goals and intentions of construction firms, OffTheGround takes a 'Safety First' approach to all of its endeavors in the UAV operations industry.

IV. Proposed Operations

OffTheGround is requesting exemptions from the Federal Aviation Regulations (the "FARs") stated herein pursuant to Section 333 of the Reform Act in order to document both developed and undeveloped commercial property throughout Maricopa County for developers, brokers, architects and construction professionals utilizing the UAV DJI Phantom 2 Vision +.

Site documentation of predetermined, developed, undeveloped and desert areas are currently performed by three main methods: (1) manned-aircraft (2) on foot or (3) 3rd party software such as Google Earth or Maricopa.gov's Plat Maps. In many cases, each of the aforementioned methods can be replaced or augmented by using a UAV to perform site studies and documentation opportunities. The UAV can provide all or a combination of (1) better results (2) improved, more specified and greater visualization coverage (3) increased worker and public safety and (4) decreased costs over the current visualization and documentation methods. Please see *Section V Public Benefit and Public Interest* for additional information.

OffTheGround will operate their UAVs with a gimbal mounted high-resolution camera. The camera will acquire still photographs and/or video of existing structures, vacant land in both urban and desert environments and current construction sites. The documentation work and UAV operator will be completed by owner and founder Jonathan Ammon using a live feed from the UAV's attached camera. The images and videos will then be categorized and cataloged for OffTheGround's clients. All documented sites will be predetermined, controlled as to access and provide a safer option to aircraft or on-foot activity.

A. Operation Locations and Environments

OffTheGround will operate a lightweight 2.75 pound battery operated 4-motor DJI Phantom 2 Vision + to document commercial properties throughout Maricopa County for developers, brokers, architects and construction professionals. The locations and environments that OffTheGround will document include the following:

- Existing structures
- Empty urban lots
- Construction Projects
- Open desert

B. Operating Conditions and Limitations

OffTheGround operators will abide by the following conditions and requirements:

(a) The safe operation of the UAV (the DJI Phantom 2 Vision+) will be the first priority before, during and after every operation

(b) As a majority of Maricopa County airspace is classified as Type B, the UAV will not exceed an altitude of over 400 feet with a constant Visual Lines of Site (VLAS) maintained by the Pilot in Command (PIC) and a Visual Observer (VO)

(c) The UAV will not exceed an air speed of 25mph

(d) All required permits will be obtained from state and local governments and agencies prior to operation if necessary

(e) Flight operations will be conducted only between the period of official sunrise and sunset

(f) All flights will include both a PIC and a VO. For the foreseeable future, the only PIC will be Jonathan Ammon (founder and owner)

(g) Any additional/future UAV operators employed by OffTheGround will have been granted a UAV Commercial Operating License through the Federal Aviation Administration (FAA)

(h) Any PIC will be trained in flight, operations and safety procedures as detailed in Appendix A, titled *Phantom 2 Vision Plus Pilot Training Guide* and the *Phantom 2 Vision Plus User Manual*. No operations by a PIC will be allowed until Jonathan J Ammon has confirmed that the documents in Appendices A and D are read and fully comprehended

(i) The PIC will not operate a UAV should he or she know (or has any reason to know) of any physical or mental condition that would interfere with the safe operation of the UAV

(j) The PIC and VO will at ALL times have their vision unaided by any device with the exception of corrective lenses

(k) The PIC and VO will operate and/or observe only one UAV at a time

(l) The PIC and VO will at all times be able to communicate by voice

(m) The PIC will brief the VO and property owner about the operation and risk before the first flight at each new location

(n) Prior to every flight, the PIC and VO will assess weather conditions using FAA approved weather sources and direct weather observation, will check airspace restrictions and will assess the location of people and property to minimize any risks if he or she loses control of the UAV.

(o) Prior to every flight, the PIC and VO will complete a Pre-Flight Inspection checklist to ascertain that the UAV is in a condition safe for flight. The PIC and/or VO will document the time, date and location of every flight. Please see Appendix B titled *Pre-Flight Checklist*

(p) Prior to every flight, predetermined potential landing zones will be identified and briefed by the operator, observers and participating persons prior to flight

(q) At the end of each flight, the PIC and VO will document the time, date and location of the UAV flight. Please see Appendix C titled *Post-Flight Checklist*

(r) A UAV post-flight inspection will also be completed as an added level of safety. Please see Appendix C titled *Post-Flight Checklist*

(s) At no time shall the UAV be operated with missing or manufacturer unapproved parts, or in any condition that could pose a hazard to any other aircraft or structure or person on the ground.

(t) OffTheGround will utilize GPS location based technology, an auto return home function and will never operate below a 20% battery capacity or a 25 minute flight time (whichever comes first)

(u) OffTheGround will control the UAV with a Ground Station based 2.4

(u) OffTheGround will control the UAV with a Ground Station based 2.4 GHZ radio transmitter while in flight. The radio receiver will receive live video and flight data from the on-board camera and computer. This will be projected onto an iPad screen for the PIC and VO to view during flight

(v) OffTheGround will restrict its operations to flights over property with the permission of the property owner and/or representative. All onsite personnel will consent to the UAV flyover on site by waiver, and the operator will obtain additional verbal or written consent of all persons who will be within 100 feet of flight operation

(w) OffTheGround will confer with the participating parties regarding any known hazards or abnormal operating conditions that OffTheGround may consider pertinent to UAV operations. Should any hazards and/or conditions be identified, they will be documented in Appendix B titled *Pre-Flight Checklist*

(x) OffTheGround will operate at a lateral distance of no more than 100 feet from any inhabited structure, building, vehicle, vessel or people not associated with the operation or who have not signed a waiver in advance of the operation.

(y) OffTheGround will not operate over non-participating persons and properties.

(z) OffTheGround will not operate over densely populated areas

(aa) OffTheGround will not operate at air shows

(bb) OffTheGround will not operate at during construction hours. So as to minimize the risk injury, any and all UAV operations will be limited to end of day operations when construction operations are not taking place.

(cc) OffTheGround will not operate over heavily trafficked roads

(dd) OffTheGround will not operate within 5NM of an airport (please see the included graphic that shows a 5NM radius from the center of Phoenix Sky Harbor International airport). Should the opportunity to operate the UAV within a 5NM radius of the airport, OffTheGround will request and acquire the necessary permitting and documentation from any and all involved agencies (ex – Police/Fire Departments)

(ee) OffTheGround will not operate in restricted airspace, or areas under current Temporary Flight Restrictions (TFRs).

(ff) The UAV utilized will weigh less than 10 lbs (the current UAV in use has a maximum takeoff weight of approximately 2.9 pounds). For the foreseeable future, any UAV drone investments will be similar to the DJI Phantom 2 Vision+ product

(gg) The UAV will yield the right-of-way to other aircraft, manned or unmanned. If there is a risk of a collision, the operator will immediately maneuver away. Furthermore, the PIC will discontinue the flight when continuing would pose a hazard to other aircraft, people or property

C. Operator Certification and Requirements

OffTheGround operators will abide by the following conditions and requirements:

(a) Operators will hold an exemption from the Federal Aviation Regulations pursuant to Section 333 of the Reform Act.

(b) Operators will be 18 years of age or older

(c) Operators will make available to the FAA, upon request, the UAV for inspection or testing.

(d) Operators will maintain a log of flights as practicable for future currency or flight logging requirements

(e) Operators will report an accident to the FAA within 10 business days of any operation that results in damage to property, other than the UAV, estimated to exceed $20,000 (including materials and labor).

(f) OffTheGround will abide by any regulations passed that require additional permits, variances, licenses, insurance, bonding &/or other requirements of that nature. As local municipality laws will vary within greater Maricopa County, OffTheGround will follow letter of the law of the respective areas per the location of each flight.

D. UAV Registration, Markings and Requirements

All OffTheGround UAVs will be registered and marked according to the following conditions and requirements:

(a) All UAVs to be operated by OffTheGround will be maintained in condition for safe operation

(b) All UAVs will be inspected prior to flight by the PIC to ensure that it is in a condition for safe operation. Any damages will be document in Appendix B titled *Pre-Flight Checklist*

(c) All UAVs to be operated by OffTheGround for commercial operations will be registered with the FAA

(d) All UAVs to be operated by OffTheGround for commercial operations will be marked with an aircraft registration number according to 14 C.F.R Part 45.

V. Public Benefit and Public Interest

The process currently used to photograph and document developed and undeveloped property in urban and desert areas in Maricopa County is performed via helicopter, by foot and by 3rd party software providers such as Google Earth and Maricopa.gov's Plat Maps application. The use of a UAV in place of current practices for such applications will further the public interest in several areas including, but not limited to the following:

- The UAV carries no passengers, pilot or crew, thereby increasing pilot, passenger and worker safety
- The UAV carries no flammable fuel thereby increasing safety to the general public
- The UAV has a lower noise signature than a typical helicopter thereby improving public welfare
- The UAV has zero emissions thereby reducing the environmental impact over traditional manned aircraft

- The UAV is less expensive to operate than a traditional manned aircraft, thereby decreasing the cost, while increasing the frequency of site documentation and inspection
- The UAV can often eliminate the need for a worker to 'walk an active construction site' to inspect, photograph and collect data on hard to get areas. This is turn significantly reduces the risk to workers of falls while inspecting, surveying, or monitoring site progress. Falls are a leading source of workplace fatalities and injuries on construction sites.
- The UAV replace the need for people to traverse un-built desert property, minimizing the risk of hazardous accidents by native wildlife (cacti, snakes, spiders, coyotes).
- The UAV has numerous safety features such as Failsafe mode, automatic landing, GPS based altitude locks, Flight-Limits function (ex – air traffic control height restrictions) and low battery warnings.

VI. Discussion of Requested FAR Exemptions

A. 14.C.F.R. Part 21, Subpart H – Airworthiness Certificates

Section 91.203(a)(1) requires civil aircraft to have "an appropriate and current airworthiness certificate." Part 21, Subpart H ("Airworthiness Certificates") establishes the procedural requirements and applicability for the issuance of air worthiness certificates as directed by 14 C.F.R. § 91.203(a)(1).

Equivalent level of safety: The UAVs operated will have a gross weight less than 10 lbs. and will be flown at speeds less than 25 mph (the approximate weight the UAV in use by OffTheGround is approximately 2.9 pounds). UAVs do not carry a pilot or passengers, do not carry flammable fuels and will be operated in well-defined locations using an operator (PIC) and a visual observer (VO). All operations will be conducted in compliance with the limitations and conditions stated in this petition for exemption. The Federal Aviation Act and Section 333 of the Reform Act both authorizes the FAA to exempt aircraft from the requirement of an airworthiness certificate upon consideration of the UAV's size, weight, speed, operational capability and proximity to airports and populated areas.

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

B. 14C.F.R§45.23(b)–Display of Marks

Regulation 14 C.F.R. § 45.32 (b) states: "...the operator must also display on that aircraft near each entrance to the cabin, cockpit, or pilot station, in letters not less than 2 inches nor more than 6 inches high, the words 'limited,' 'restricted,' 'light-sport,' 'experimental,' or 'provisional,' as applicable."

Equivalent level of safety: The UAV in use does not have a "cabin, cockpit or pilot

station entrance" therefore the required marks cannot be displayed "near each entrance." Additionally, letters not less than 2 inches nor more than 6 inches may not be practical given the small size of the UAV. If the UAV is too small to display markings in the size described in regulation § 45.23 (b), then markings will be displayed in the largest manner possible.

C. 14C.F.R.§45.27(a)–Location of Marks Non Fixed-Wing Aircraft

Regulation 14 C.F.R. 45.27 (a) states: "Each operator of a rotorcraft must display on that rotorcraft horizontally on both surfaces of the cabin, fuselage, boom, or tail the marks required by §45.23."

Equivalent level of safety: A UAV does not carry a pilot or passengers, does not have a cabin and may have a design that is significantly different than traditional manned aircraft. As such, the markings requirements of 14 C.F.R. § 45.25 may not be feasible given the design and layout of the aircraft. To provide an equivalent level of safety, the UAV will display required markings on conspicuous locations of the aircraft.

D. 14 C.F.R § 61.113 (a) & (b) - Private Pilot Privileges and Limitations; Pilot in Command

Regulation 14 C.F.R. § 61.113 limits pilots to non-commercial operations.

Equivalent level of safety: OffTheGround will be operated as part of a commercial operation, but neither passengers nor cargo will be involved. The area of operation is controlled and restricted, and all flights are planned and coordinated in advance as set forth in this document. The risks associated with the operation of the UAV are so diminished from the level of risk associated with commercial operations, that allowing operations of the UAS as requested with a pilot who has met the minimum requirements of this document exceeds the present level of safety achieved by 14 C.F.R. §61.113 (a) & (b).

E. 14 C.F.R. § 91.7 (a) – Civil Aircraft Airworthiness

The regulations states: "No person may operate a civil aircraft unless it is in airworthy condition."

Equivalent level of safety: As there will be no airworthiness certificate issued for the aircraft, should this exemption be granted, no FAA regulatory standard will exist for determining airworthiness. Given the size of the aircraft and the requirements contained in the DJI Manual for maintenance and use of safety checklists prior to each flight, as set forth in this document, an equivalent level of safety will be provided.

F. 14C.F.R.§91.9(b)(2)&(c)–Civil Aircraft Flight Manual

Regulation 14 C.F.R. § 91.9 (b)(2) states: "No person may operate a U.S.-registered civil aircraft ... For which an Airplane or Rotorcraft Flight Manual is not required by §21.5 of this chapter, unless there is available in the aircraft a current approved Airplane or Rotorcraft Flight Manual, approved manual material, markings, and

placards, or any combination thereof."

Equivalent level of safety: The equivalent level of safety will be enabled by maintaining proper documentation of the flight manual at the ground control point where the pilot flying the UAV will have immediate access to it. This includes the UAV operation manual as provided by the manufacturer or equivalent documents as created by OffTheGround.

G. 14C.F.R.§91.103–Preflight Action

14 C.F.R. § 91.103 requires the PIC to become familiar with specific information before each flight, including information contained in the FAA-approved Flight Manual on board the aircraft.

Equivalent level of safety: An exemption is needed from this requirement as the pilot 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 this document and the DJI Manual. These actions will provide an equivalent level of safety. The manual will be kept at the ground station during operations.

H. 14 C.F.R. § 91.109 (a) – Flight instruction

14 C.F.R. § 91.109 (a) states that, "No person may operate a civil aircraft (except a manned free balloon) that is being used for flight instruction unless that aircraft has fully functioning dual controls." By design, UAVs do not have functioning dual controls. They are piloted using a Flight Control System / Ground Control Station that communicates with the aircraft via signals.

Equivalent level of safety: During flight instruction, there are no pilots or passengers on the aircraft and the Ground Control Station will be a safe distance from the aircraft. The aircraft will remain a safe distance from non-participating individuals causing no safety hazard (approximately 100 feet. See Section IV, Part B, item (v).

Given the size and speed of the UAV, an equivalent level of safe training can be performed without dual controls because no pilot or passengers are aboard the aircraft and it is a safe distance from the public and structures.

I. 14C.F.R.§91.119–Minimum Safe Altitudes

14 C.F.R. § 91.119 states that an aircraft may not be operated closer than 500 feet to any person, vessel, vehicle or structure. The nature of the operations described herein may require operation in relatively close proximity to items such as washes, building roofs, trees, etc. However, operations will not be conducted over non-participating individuals.

Equivalent level of safety: The UAVs operated by OffTheGround are far smaller than manned aircraft, such as rotorcraft and fixed winged aircraft, which are used for similar operations. Furthermore, the UAVs do not carry a pilot or passengers, weigh less than 10 lbs., do not carry flammable fuel, will not exceed 25 mph and will not be

operated over non-participating persons. The UAVs will be operated below 400 feet above ground level with the use of an operator and a visual observer to avoid collision risk to aircraft, persons and property. This provides an equivalent or greater level of safety than achieved with conventional aircraft currently performing similar operations.

J. 14 C.F.R. § 91.121 – Altimeter Settings

14 C.F.R. § 91.121 requires an aircraft to be operated by reference to an altimeter that is set to the elevation of the departure airport or barometric pressure when operating below 18,000 feel MSL. Although some UAVs contain a barometric pressure sensor, the UAVs used by OffTheGround utilize GPS sensors to determine altitude.

Equivalent level of safety: The operator will confirm the elevation of the take-off/landing site prior to launch. This will be compared to the GPS sensor as displayed on the UAV telemetry reading at the Ground Control Station. The operator will then determine the maximum permissible altitude to maintain a flight below 400 feet Above Ground Level (ABV). The maximum permissible altitude will also be monitored and estimated by visual means through the use of the VO.

K. 14C.F.R.§91.151(a)(1) - Fuel requirements for flight in VFR (Visual Flight Rule) conditions

Section 91.151 (a) outlines fuel requirements for beginning a flight in VFR conditions. It states that "No person may begin a flight in an airplane under VFR conditions unless (considering wind and forecast weather conditions) there is enough fuel to fly to the first point of intended landing and, assuming normal cruising speed – (1) During the day, to fly after that for at least 30 minutes..."

Equivalent level of safety: The UAV will be operated only during daylight hours in VFR conditions. The technical limitations of most UAVs limit total flight time to approximately 30 minutes before the battery is depleted. This means that no meaningful flight time would be possible given the limitations of § 91.151 (a) (1). Therefore, the UAV flight will be terminated with at least 20% reserve power (or a max flight time of 25 minutes). This allows the UAV to return to its landing zone with adequate power remaining to conduct a safe and controlled landing. Given the UAV's size, weight and speed, the UAV when operated with this limitation provides an equivalent or greater level of safety than manned aircraft represented by this regulation.

L. 14C.F.R.§91.203(a)&(b)–Carrying Civil Aircraft Certification and Registration

The regulation states: (a) "...no person may operate a civil aircraft unless it has ... an appropriate and current airworthiness certificate." (b) "No person may operate a civil aircraft unless the airworthiness certificate required by paragraph (a) of this section or a special flight authorization issued under §91.715 is displayed at the cabin or cockpit entrance so that it is legible to passengers or crew."

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

In regard to 14 C.F.R. § 91.203 Part (b), the UAV does not carry a pilot or passengers, does not have a "cabin or cockpit entrance" and does not have onboard storage in which to carry certification and registration documents. An equivalent level of safety will be achieved by maintaining the proper documentation at the Ground Control Station readily available to the operator.

M. 14 C.F.R. §§ 91.405 (a), 91.407 (a)(l), 91.409 (a)(2), 91.417 (a) & (b) – Maintenance Inspections

The regulations 14 C.F.R. §§ 91.405 (a), 91.407 (a)(1), 91.409 (a)(2) and 91.417 (a) & (b) specify maintenance and inspection standards in reference to 14 C.F.R. Part 43. Specifically, 14 C.F.R. § 91.405 (a) requires that each owner or operator of an aircraft, "shall have the aircraft inspected as prescribed in subpart E of this part and shall between required inspection ... have discrepancies repaired as prescribed in part 43 of this chapter."

An exemption is required from these regulations because Part 43 and these sections apply only to aircraft with an airworthiness certificate, which the UAV will not have.

Equivalent level of safety: The UAVs will be maintained and inspected in accordance with the manufacturer-supplied manual. This includes maintenance, overhaul, replacement and inspection requirements for the UAVs. The operator, prior to every flight of the day will undertake preflight inspection procedures in order to ensure the UAV is in a condition for safe operation. Discrepancies that may affect the safety of flight will be documented, addressed and repaired. The operator will maintain the UAVs in a condition for safe operation. Given the size, characteristics and operating limitations of UAVs as described herein, this provides a level of safety equivalent to or greater than manned aircraft performing similar operations.