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

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

August 24, 2015

Exemption No. 12578
Regulatory Docket No. FAA−2015−2379

Mr. Drew Mateya
Steel City NDT LLC
BlackHawk Aerial Systems
322 Mall Boulevard Suite 270
Monroeville, PA 15146

Dear Mr. Mateya:

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 May 28, 2015, you petitioned the Federal Aviation Administration (FAA) for an exemption. You requested to operate an unmanned aircraft system (UAS) to conduct aerial photography, cinematography, videography, mapping, crop surveying, and inspection.

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 Vision+, DJI Phantom 3, DJI Inspire 1, Avyon MD4-200, and Avyon MD4-1000.

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, Mr. Drew Mateya 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, Mr. Drew Mateya 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+, DJI Phantom 3, DJI Inspire 1, Avyon MD4-200, and Avyon MD4-1000 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

05/28/15

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U.S. Department of Transportation
Docket Management System
1200 New Jersey Ave., SE
Washington, DC 2059

RE: Exemption Request Section 333 of the FAA Reform Act of 2012

Attachments: 1) Phantom 2 Vision+ Technical Data
2) Phantom 3 Technical Data
3) Phantom Inspire 1 Technical Data
4) Avyon MD4-200 Technical Data
5) Avyon MD4-1000 Technical Data

References: 1) Exemption No. 11409 Regulatory Docket No. FAA-2015-0187 in the matter of the petition of WADE BELL.
2) SkyLynx, LLC petition for exemption letter.

Dear Sir or Madam,

In accordance with the FAA's Guidelines for Submitting a Petition for Exemption under section 333 of the FAA Modernization and Reform Act of 2012, I Drew Mateya, referred to hereafter as the petitioner, request exemption from the following sections of Title 14, Code of Federal Regulations §§

14 CFR 21 subpart H; 14 CFR 45.23(b); 14 CFR 61.113(a); 14 CFR 61.113(b); 14 CFR 91.7(a); 14 CFR 91.9(b) (2); 14 CFR 91.103; 14 CFR 91.109; 14 CFR 91.119(c); 14 CFR 91.121; 14 CFR 91.151(a); 14 CFR 91.203(a); 14 CFR 91.203(b); 14 CFR 91.405(a); 14 CFR 91.407(a) (1); 14 CFR 91.409(a) (2); 14 CFR 91.409(a)(2); 14 CFR 91.417(a); 14 CFR 91.417(b);

In order to operate small Unmanned Aircraft Systems (UAS) commercially in airspace regulated by the Federal Aviation Administration (FAA) for the purposes of aerial photography, cinematography, videography, mapping, crop surveying, inspection and other flight operations that could be performed safely and more cost effectively with the use of small

UAS at low altitude within the United States national airspace system as compared to a manned aircraft. Operations will be performed only at the request of and with the commerce and raise awareness of the beneficial uses of small unmanned air systems. So long as such operations are conducted within and under the conditions outlined herein or as may be established by the FAA as required by Section 333. The conditions identified and proposed by the petitioner are drawn from *Attachments 1-5*.

The Federal Aviation Regulations (FARs)

14 CFR Part 21 subpart H
14 CFR 45.23 (b)
14 CFR 61.113 (a) & (b)
14 CFR 91.7 (a)
14 CFR 91.9 (b) (2)
14 CFR 91.103
14 CFR 91.109
14 CFR 91.119 (c)
14 CFR 91.121
14 CFR 91.151 (a)
14 CFR 91.203 (a) & (b)
14 CFR 91.405 (a)
14 CFR 91.407 (a) (1)
14 CFR 91.409 (a) (1)
14 CFR 91.409 (a) (2)
14 CFR 91.417 (a) & (b)

The petitioner seeks exemption from the above mentioned FARs for the following reasons;

14 CFR Part 21, Subpart H: Airworthiness Certificates 14 CFR §91.203(a) (1)
Subpart H, entitled Airworthiness Certificates, establishes the procedural requirements for the issuance of airworthiness certificates as required by FAR **§91.203 (a) (1)**. Given the size and limited operating area associated with the aircraft to be utilized by the Applicant, an exemption from Part 21 Subpart H meets the requirements of an equivalent level of safety under Part 11 and Section 333 of the Reform Act. The Federal Aviation Act (**49 U.S.C.§44701 (f)**) and Section 333 of the Reform Act both authorize the FAA to exempt aircraft from the requirement for an airworthiness certificate, upon consideration of the size, weight, speed, operational capability, and proximity to airports and populated areas of the particular UAS. In all cases, an analysis of these criteria demonstrates that the UAS operated without an airworthiness certificate, in the restricted environment and under the conditions proposed will be at least as safe, or safer, than a conventional aircraft (fixed wing or rotorcraft) operating with an airworthiness certificate without the restrictions and conditions proposed.

The UAS to be operated hereunder is less than 55 lbs. fully loaded, carries neither a pilot nor passenger, carries no explosive materials or flammable liquid fuels, and operates

exclusively within a secured and designated area. Unlike other civil aircraft, operations under this exemption will be tightly controlled and monitored by both the operator and under the requirements and in compliance with local public safety requirements. The FAA will have advance notice of all operations. These safety enhancements provide a greater degree of safety to the public and property owners than conventional operations conducted with airworthiness certificates issued under 14 C.F.R. Part 21, Subpart H. Lastly, application of these same criteria demonstrates that there is no credible threat to national security posed by the UAS, due to its size, speed of operation, location of operation, lack of explosive materials or flammable liquid fuels, and inability to carry a substantial external load.

14 CFR §45.23(b): Marking of the Aircraft
When marks include only the Roman capital letter "N" and the registration number is displayed on limited, restricted or light-sport category aircraft or experimental or provisionally certificated aircraft, 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.

Even though the UAS will have no airworthiness certificate, an exemption may be needed as the UAS will have no entrance to the cabin, cockpit or pilot station on which the word "Experimental" can be placed. Given the size of the UAS, two-inch lettering will be impossible. The word "Experimental" will be placed on the fuselage in compliance with **§45.29 (f)**.

The equivalent level of safety will be provided by having the UAS marked on its fuselage as required by **§45.29 (f)** where the pilot, observer and others working with the UAS will see the identification of the UAS as "Experimental."

14 CFR §61.113(a) and (b): Private Pilot Privileges and Limitations – Pilot in Command
The petitioner requests relief in order to facilitate the utilization of pilots, who hold a Private Pilot (or greater) certificate. Any pilots operating under this exemption would be required to comply with any conditions as set forth and in a similar fashion to the previously granted exemptions.

14 CFR §91.7(a): Civil Aircraft Airworthiness
No person may operate a civil aircraft unless it is in airworthy condition. 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 for maintenance and use of safety check lists prior to each flight an equivalent level of safety will be provided.

14 CFR §91.9(b) (2): Civil Aircraft Flight Manual in the Aircraft
Section **§91.9 (b) (2)** provides: No person may operate a U.S.-registered civil aircraft (2) 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. The UAS, given its size and configuration has no ability or place to carry such a flight manual on the aircraft, not only because there is no pilot on board, but because there is no room or capacity to carry such an item on the aircraft. The equivalent level of safety will be maintained by keeping the flight manual at the ground control point where the pilot flying the UAS will have immediate access to it.

14 CFR §91.103: Preflight Action
This regulation requires each pilot in command to take certain actions before flight to insure the safety of flight. As FAA approved rotorcraft flight manuals will not be provided for the aircraft an exemption will be needed. The PIC will take all actions as stated in the FOM in Section 4 under Normal Procedures including but not limited to reviewing weather, flight battery requirements, landing and takeoff distances and aircraft performance data before initiation of flight.

14 CFR §91.109: Flight Instruction
Section **§91.103** provides that no person may operate a civil aircraft (except a manned free balloon) that is being used for flight instruction unless that aircraft has fully functioning dual controls. UAS and remotely piloted aircraft, by their design do not have fully functional dual controls. Flight control is accomplished through the use of a control box that communicates with the aircraft via radio communications. The FAA has approved exemptions for flight training without fully functional dual controls for a number of aircraft and for flight instruction in experimental aircraft. The equivalent level of safety provided by the fact that neither a pilot nor passengers will be carried in the aircraft and by the size and speed of the aircraft.

14 CFR §91.119(c): Minimum Safe Altitudes
As discussed in *Exemption 11138 (DOUGLAS TRUDEAU)*, operations conducted closer than 500 feet to the ground may require that the UAS be operated closer than 500 feet to essential persons, or objects that would not be possible without additional relief. The petitioner requests modification, waiver or exemption and clarification concerning the terms "congested areas" and "densely populated". The petitioner requests waiver for this condition to allow reasonable and responsible operations in areas of subdivisions and neighborhoods if required.

14 CFR §91.121: Altimeter Settings
As discussed in *Exemption 11138 (DOUGLAS TRUDEAU)* is inapplicable since the UAS does not have an altimeter and instead utilizes electronic GPS with a barometric sensor for altitude information.

14 CFR §91.151(a): Fuel Requirements for Flight in VFR Conditions
As discussed in *Exemption 11136 (ADVANCED AVIATION SOLUTIONS LLC)* prior relief has been granted for manned aircraft to operate at less than the prescribed minimums, including Exemption *Nos. 2689, 5745*, and *10650*. In addition, similar UAS-specific relief has been granted within *Exemption Nos. 8811, 10808,* and *10673* for daytime, VFR conditions. The UAS provides battery power remaining in percent to the PIC. The UAS batteries provide

approximately an average of 25 minutes of powered flight. Information provided in the operating documents discusses procedures regarding remaining battery power management. Those documents contain a condition in which the PIC will initiate a landing procedure when battery remaining reaches a specified level. Given the limitations on proposed operations and the location of those proposed operations, The FAA found that a reduced minimum power reserve for flight in daytime VFR conditions was reasonable.

14 CFR §91.203(a) and (b): Carrying Civil Aircraft Certification and Registration
The regulation provides in pertinent part:
(a) Except as provided in **§91.715**, no person may operate a civil aircraft unless it has within it the following:
(1) An appropriate and current airworthiness certificate
(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.

The UAS fully loaded weighs no more than 55 lbs. and is operated without an onboard pilot. As such, there is no ability or place to carry certification and registration documents or to display them on the UAS.

An equivalent level of safety will be achieved by keeping these documents at the ground control point where the pilot flying the UAS will have immediate access to them, to the extent they are applicable to the UAS.

91.405(a); 91.407(a) (1); 91.409 (a)(1) & (2); 91.417(a) & (b): Maintenance Inspections
As discussed in *Exemption 11138 (DOUGLAS TRUDEAU)*, The petitioner proposes to inspect and ensure that the UAS is in a condition for safe flight in accordance with the operating documents. The FAA found that adherence to the petitioner's operating documents and the conditions and limitations specified, describing the requirements for maintenance, inspection, and recordkeeping, were sufficient to ensure that safety would not be adversely affected.

THE UAS(s)

DJI Phantom 2 Vision+
The DJI Phantom 2 Vision+ is a highly successful consumer grade small rotorcraft in the quadcopter configuration with an advertised weight of less than 44 Ounces (1242g) designed primarily to carry aloft a high definition camera. It has an advertised maximum speed of less than 30 knots (15m/s) and a maximum climb rate of less than 1200 feet per minute (6 m/s). It is powered by four electric motors with a distance between motors of less than 14 inches (350mm). It utilizes an internal inertial measuring unit (IMU) with integrated barometric sensor augmented with global positioning system (GPS) to maintain its geospatial orientation and position. It is controlled primarily through an FCC certified radio control (RC) unit. Real time video and telemetry information is transmitted back to a ground control station allowing the operator and/or PIC to monitor battery level, GPS signal strength, altitude (AGL), distance from PIC, camera imagery, and control camera angle. It has failsafe modes of operation for

either loss of RC or GPS signal. Altitude can be limited by the onboard flight controller and maximum altitude can be preprogrammed by the PIC. Battery life limits flight times to approximately 25 minutes. The onboard flight controller will warn the pilot via telemetry and external lighting cues before reaching a low battery state. An automatic termination of flight and landing will be initiated when the battery reaches a predetermined low state. It is anticipated that flights will usually last less than 10 minutes. More information is available in *Attachment 1* or http://www.dji.com/product/phantom-2-vision-plus/spec

DJI Phantom 3

The DJI Phantom 3 is a new highly successful consumer grade small rotocraft in the quadcopter configuration with an advertised weight of 45 Ounces (1280g) designed primarily to carry aloft a high definition camera. It has an advertised maximum speed of 31 knots (16 m/s) and a maximum climb rate of 984 feet per minute (5 m/s). The DJI Phantom 3 is powered by four electric motors with a distance between motors of 23.22 inches (590 mm). The DJI Phantom 3 utilizes and internal inertial measuring unit (IMU) with integrated barometric sensor augmented with global positioning system (GPS) to maintain its geospatial orientation and position. It is controlled primarily through an FCC certified radio control (RC) unit. Real time video and telemetry information is transmitted back to a ground control station allowing the operator and/or PIC to monitor battery level, GPS signal strength, altitude (AGL), distance from PIC, camera imagery, and control camera angle. It has failsafe modes of operation for either loss of RC or GPS signal. Altitude can be limited by the onboard flight controller and maximum altitude can be preprogrammed by the PIC. Battery life limits flight times to approximately 23 minutes. The onboard flight controller will warn the pilot via telemetry and external lighting cues before reaching a low battery state. An automatic termination of flight and landing will be initiated when the battery reaches a predetermined low state. It is anticipated that flights will usually last less than 10 minutes. More information is available in *Attachment 2* or http://www.dji.com/product/phantom-3/spec.

DJI Inspire 1

The DJI Inspire 1 is DJIs newest and most advanced consumer grade small rotocraft in the quadcopter configuration with an advertised weight of less than 103.5 Ounces (2935g) designed primarily to carry aloft a high definition camera. It has an advertised maximum speed of less than 42.8 knots (22 m/s) and a maximum climb rate of less than 990 feet per minute (5 m/s). The DJI Inspire 1 is powered by four electric motors with a distance between motors of 22 to 22.87 inches (559 to 581mm). The DJI Inspire 1 utilizes an internal inertial measuring unit (IMU) with integrated barometric sensor augmented with global positioning system (GPS) to maintain its geospatial orientation and position. It is controlled primarily through an FCC certified radio control (RC) unit. Real time video and telemetry information is transmitted back to a ground control station allowing the operator and/or PIC to monitor battery level, GPS signal strength, altitude (AGL), distance from PIC, camera imagery, and control camera angle. It has failsafe modes of operation for either loss of RC or GPS signal. Altitude can be limited by the onboard flight controller and maximum altitude can be preprogrammed by the PIC. Battery life limits flight times to approximately 18 minutes. The onboard flight controller will warn the pilot via telemetry and external lighting cues before reaching a low battery state. An automatic termination of flight and landing will be initiated when the battery reaches a predetermined low state. It is anticipated that flights will usually

last less than 10 minutes. More information is available in *Attachment 3* or http://www.dji.com/product/inspire-1/spec

Avyon MD4-200

The MD4-200 is Avyon's (Microdrones) smallest consumer grade small rotocraft in the quadcopter configuration with an advertised weight of 28.2 ounces (800g) designed primarily to carry aloft a high definition camera. The MD4-200 has an advertised maximum speed of 9.7 knots (5m/s) and a maximum climb rate of 984.25 feet per minute (5m/s). The MD4-200 is powered by four electric motors with a distance between motors of 21.26 inches (540mm). The MD4-200 utilizes an internal inertial measuring unit (IMU), magnetometer (Mag), barometric sensor augmented with global positioning system (GPS) to maintain its geospatial orientation and position. Control and telemetry is provided through an FCC certified radio control (RC) unit. Real time video and telemetry information is also transmitted back to a ground control station allowing the operator and/or PIC to monitor battery level, GPS signal strength, altitude (AGL), distance from PIC, camera imagery, and control camera angle. It has failsafe modes of operation for either loss of RC, GPS signal or low battery level. Altitude can be limited by the onboard flight controller and maximum altitude can be preprogrammed by the PIC. Battery life limits flight times to approximately 30 minutes. The onboard flight controller will warn the pilot via telemetry and external lighting cues before reaching a low battery state. An automatic termination of flight and landing will be initiated when the battery reaches a predetermined low state. It is anticipated that flights will typically last less than 15 minutes. More information is available in *Attachment 4* or http://www.microdrones.com/en/products/md4-200/technical-data/

Avyon MD4-1000

The MD4-1000 is Avyon's (Microdrones) consumer grade small rotocraft in the quadcopter configuration with an advertised weight of 93.47 ounces (2,650g) designed primarily to carry aloft a high definition camera. The MD4-1000 has an advertised maximum speed of 23.33 knots (12.0m/s) and a maximum climb rate of 22.97 feet per minute (7m/s). The MD4-1000 is powered by four electric motors with a distance between motors of 40.55 inches (1,030mm). The MD4-1000 utilizes an internal inertial measuring unit (IMU), magnetometer (Mag), barometric sensor augmented with global positioning system (GPS) to maintain its geospatial orientation and position. Control and telemetry is provided through an FCC certified radio control (RC) unit. Real time video and telemetry information is also transmitted back to a ground control station allowing the operator and/or PIC to monitor battery level, GPS signal strength, altitude (AGL), distance from PIC, camera imagery, and control camera angle. It has failsafe modes of operation for either loss of RC, GPS signal or low battery level. Altitude can be limited by the onboard flight controller and maximum altitude can be preprogrammed by the PIC. Battery life limits flight times to approximately 88 minutes. The onboard flight controller will warn the pilot via telemetry and external lighting cues before reaching a low battery state. An automatic termination of flight and landing will be initiated when the battery reaches a predetermined low state. It is anticipated that flights will typically last less than 30 minutes. More information is available in *Attachment 5* or http://www.microdrones.com/en/products/md4-1000/technical-data/.

RISK MITIGATION & SAFETY

The petitioner has reviewed FAA exemption reference's 1-3 *Conditions and Limitations* section and the procedures set forth will be utilized in order to manage and mitigate risk and ensure public safety. A preflight checklist will be developed and implemented to ensure that the UA airworthiness will be verified and documented before flight. Airworthiness will be maintained by performance of routine inspections before each flight, maintaining flight and maintenance logs to record time on failure-prone components. In addition a full safety program will be implemented and followed to ensure that further safety precautions are followed during operational flights. Full maintenance procedures (SOPs) as well as maintenance frequencies shall be developed and documented to reduce and/or eliminate failures.

The petitioner requests that in a manner similar to reference 3, that the petitioner be allowed to operate within 5 miles of an airport provided that;

> "*The UA may not operate in Class B, C, or D airspace without written approval from the FAA. The UA may not operate within 5 nautical miles of the geographic center of a nontowered airport as denoted on a current FAA-published aeronautical chart unless a letter of agreement with that airport's management is obtained, and the operation is conducted in accordance with a NOTAM as required by the operator's COA. The letter of agreement with the airport management must be made available to the Administrator upon request.*"

Operations within 5 miles of an airport are not anticipated to be routine but the petitioner is requesting a mechanism to facilitate such activities without requesting a new and separate exemption(s) should the need arise. Operations within class B airspace are not requested due to the lack of mode C transponder.

PUBLIC INTEREST

Use of specified UAS(s) in lieu of a manned aircraft would enhance safety and reduce the environmental impact as compared to similar operations conducted with manned aircraft of greater proportions, carrying a crew and flammable fuel. Additionally, use of specified UAS(s) in order to facilitate commerce could lead to economic growth. Operations for this petition will enable service for property owners or their designees seeking an enhanced perspective for characteristics, amenities, and benefits of their desired photographic subjects that cannot be displayed through ground level videography/photography. Aerial photography is a valuable marketing tool that can lead to increased commerce and enhance personal photography. Crop surveying applications could lead to decreased use of pesticides and fertilizer and conservation of water as well as increased crop yields and decreased costs. Aerial surveying and inspections can increase work site efficiency, improve volumetric estimations and reduce risks. The petitioner will provide clients with photographic data for these purposes on a 'for hire' basis acting as an independent contractor. A visual observer will be utilized. Liability insurance will be obtained commensurate with the granting of this request for exemption. Flight data including UA flight time, control unit operation time, incident, accident, and details concerning any deviations from normal operations will be available to

FAA for use in collecting data regarding the use of UAS as part of this application. This data may be submitted to FAA via traditional means, e.g. COA Monthly Reports, or other means as required.

CONCLUSION

The petitioner is requesting this exemption for the purposes of "aerial photography, cinematography, videography, mapping, crop surveying, inspections and other flight operations". The reason for such a general and broad based request is that the petitioner wishes to utilize a business strategy of horizontal integration and maximize economies of scope in order to capitalize on opportunities as they may arise in the future without the long turnaround time associated with additional exemptions. The petitioner's business model is based on the idea of offering ad hoc small UAS services to individuals or companies who wish to employ these services as a safe, effective, and legal option to enhance their business or hobby. The petitioner's own market research shows pent up demand for these services currently exists in the real estate market and other markets are just beginning to emerge. Although videography and photography are included in the request, the primary objective will be aerial survey of farm crops for precision agriculture. The petitioner has identified universities and other agencies that could benefit from the operation requested in this application.

Internet research shows that many are currently operating similar UAS in exactly this fashion without, it is assumed, FAA authorization. The petitioner has refrained from engaging in commercial use of the UAS. The primary purpose of seeking this exemption is to obtain the capability to offer those services while remaining in compliance.

Respectfully Submitted

Drew Mateya