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

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

May 11, 2015

Exemption No. 11528
Regulatory Docket No. FAA–2015–0342

Mr. Andrew M. Cross
dba AC Aerial Photography
3500 Abbotts Mill Drive
Willoughby, OH 44094

Dear Mr. Cross:

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 February 9, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of AC Aerial Photography (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial videography and cinematography.

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 and Tarot 810

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, AC Aerial Photography 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, AC Aerial Photography 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 and Tarot 810 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 May 31, 2017, unless sooner superseded or rescinded.

Sincerely,

/s/

John S. Duncan
Director, Flight Standards Service

Enclosures

Feb 9, 2015

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

Exemption Request Section 333 of the FAA Reform Act of the Federal Aviation Regulations from Part 21; 14 C.F.R. 45.23(b); 14 C.F.R. Part 21; 14 C.F.R. 61.113(a)&(b); 91.7(a); 91.9(b) (2); 91.121; 91.151(a); 91.203(a)&(b); 91.405(a); 91.407(a) (1); 91.409(a) (2); 91.417(a)&(b) ; 91.119c

Dear Sir or Madam,

I, Andrew M Cross (dba AC Aerial Photography), am writing pursuant to the FAA Modernization and Reform Act of 2012 and the procedures contained within 14 C.F.R. 11, to request that I, Andrew M Cross (dba AC Aerial Photography), a private pilot, aircraft owner, Aircraft Owners Pilots Assoc. member, AMA Member, Experimental Aircraft Association, Remote Control Aerial Platform Association and owner and operator of small unmanned aircraft, be exempted from the Federal Aviation Regulations ("FARs") listed below so that I, Andrew M Cross (dba AC Aerial Photography), may operate my small hobby level light weight unmanned aircraft systems ("UAS") commercially in airspace regulated by the Federal Aviation Administration ("FAA"). The Multicopters are as follow…

- DJI Phantom 2 Quadcopter using a DJI Naza V2 flight controller and zenmuse gimbal with go pro. 5lbs max take off weight
- Tarot 810 Hexocopter using a DJI Naza V2 flight controller and gimbal with camera. 14 lbs max take off weight

Flight operations and control for both are identical since both use the same DJI Naza M V2 flight controller and prescribed flight envelope exemptions will be the same. Line of site operation only, 400ft height restriction, 30kt speed, and 1500ft max lateral distance, GPS guided with return to home capability. 100+ hours of flight time experience have been logged by me for each multicopter and I will be the sole operator of the multicopters.

As described herein I, Andrew M Cross (dba AC Aerial Photography), am a certificated Private Pilot with a Class III Medical Certificate; experienced in flying hobby RC Aircraft and Multicopters for recreational purposes as well as personal manned aircraft. My intent for aerial videography/cinematography to enhance community awareness for those individuals and companies unfamiliar with the geographical layout of North East Ohio area, community awareness, aerial media for business and real estate photography and videos at less cost and lower threat (accident impact and lower emissions) than manned aircraft, thereby increasing

safety and ecological impact to the public and promote economic growth for the North East Ohio area.

My, Andrew M Cross (dba AC Aerial Photography)'s, exemption request would permit operation of ultra light weight, unmanned (piloted by remote control) and comparatively inexpensive UAS(s) in tightly controlled and limited airspace predetermined in areas away from general public, airports, heliports and vehicular traffic for community videos, and within property boundaries for small business and individual real estate listing videos/photos with the permission of the property owners or designee. Currently, similar lightweight, remote controlled UAS's are legally operated by unmonitored amateur hobbyists with no safety plan or controls. I, Andrew M Cross (dba AC Aerial Photography), have personally instilled safety within AMA guidelines, AC 91.57 circular, and Certificated Manned Aircraft Knowledge.

Operation of UAS will be per attached user guides and modified RCAPA checklists, AC 91-57 (400 ft max height, Line of site, not within Class C or B airspace, and only in Class D with prior permission and Transceiver contact with Control tower, Class G and E airports at least 3 miles from airports or with proper Airspace procedures Authorization or Contact, and under VFR rules.

Granting my, Andrew M Cross (dba AC Aerial Photography)'s, request comports with the Secretary of Transportation's (FAA Administrator's) responsibilities and authority to not only integrate UAS's into the national airspace system, but to "...establish requirements for the safe operation of such aircraft systems [UAS's] in the national airspace system" under Section 333(c) of the Reform Act specific to the use of UAS's for aerial media and real estate purposes. Further I, Andrew M Cross (dba AC Aerial Photography), will conduct my operations in compliance with the protocols described herein or as otherwise established by the FAA.

For the reasons stated below I, Andrew M Cross (dba AC Aerial Photography), respectfully request the grant of an exemption allowing me to operate ultra light weight, remote controlled UAS's for academic community awareness to benefit/ stimulate attraction to the North East Ohio area and to enhance aerial media for small business and real estate listing videos for homeowners who cannot afford expensive manned aircraft for the same purpose. Both of which will promote local economic growth through increased employment and increased tax base. Both with public safety in mind by keeping heavier manned aircraft containing combustible fuels and emissions that that poses potential public hazard.

This exception is similar and has precedence as exemption 11153 (Burnzeye View, INC.) and exemption 11138 (Douglas Trudeau).

I have attached…

- Operator Manuals for the DJI Phantom II (Quick Start and Full)
- Personal (RCAPA modified) Operational/preflight checklist guidelines
- Physical description of the Tarot 810, which use DJI Naza v2 control systems and thus will also use the aforementioned Phantom II checklist/guidelines

I. Contact Information:

Andrew M Cross (dba AC Aerial Photography)
3500 Abbotts Mill Dr., Willoughby, OH 44094

Phone: (440) 391-8634

Email: across420@gmail.com

II. The Specific Sections of Title 14 of the Code of Federal Regulations From Which Andrew M Cross (dba AC Aerial Photography) Requests Exemption are:

14 C.F.R. Part 21

14 C.F.R. 45.23(b);

14 C.F.R. Part 21;

14 C.F.R. 61.113(a)&(b);

91.7(a);

91.9(b) (2);

91.121;

91.151(a);

91.203(a)&(b);

91.405(a);

91.407(a) (1);

91.409(a) (2);

91.417(a)&(b) ;

91.119c

4III. The Extent of relief Andrew M Cross (dba AC Aerial Photography) seeks and the Reason He Seeks Such Relief:

I, Andrew M Cross (dba AC Aerial Photography), submit this application in accordance with the Reform Act, 112 P.L. 95 §§ 331-334, seeking relief from any currently applicable FARs operating to prevent me, Andrew M Cross (dba AC Aerial Photography), contemplated commercial cinematic, academic and other flight operations within the national airspace system. The Reform Act in Section 332 provides for such integration of civil unmanned aircraft systems into our national airspace system as it is in the public's interest to do so. My, Andrew M Cross (dba AC Aerial Photography)'s, ultra light weight RC multicopters meets the definition of "small unmanned aircraft" as defined in Section 331 and therefore the integration omg small UAS's are expressly contemplated by the Reform Act. I would like to operate my multicopters commercially prior to the time period by which the Reform Act requires the FAA to promulgate rules governing such craft. The Reform Act guides the Secretary in determining the types of UAS's that may operate safely in our national airspace system. Considerations include: The weight, size, speed and overall capabilities of the UAS's; Whether the UAS will be operated near airports or heavily populated areas; and, Whether the UAS will be operated by line of sight. 112 P.L. 95 § 333 (a). Each of these items reflect in favor of an exemption for me, Andrew M Cross (dba AC Aerial Photography). My multicopters use four (4) or six (6) counter-rotating propellers for balance, control and stability. My UAS's are equipped with GPS and auto return safety technology. Weighing less than five (5) pounds and (14 lbs) (far below the maximum 55 pound limit); including cameras and gimbals.

I, Andrew M Cross (dba AC Aerial Photography), considers safety as foremost with each flight. I am an Experienced certificated manned Private Pilot and have knowledge of Airspace and manned flight operations. I have 100+ hours of experience inn each multi rotor and will operate each flight per per attached user guides and modified RCAPA checklists, AC 91-57 (400 ft max height, Line of site, not within Class C or B airspace, only in Class D with prior permission and Transceiver contact with Control tower, Class G and E airports at least 3 miles from airports or with proper Airspace procedures Authorization or Contact, and under VFR rules.

The multicopters and there control systems operate with GPS and accelerometers which keep the systems in place with no control input and allow return to home if the radio control signal is loss.

I never take off without fully charged batteries and I land with at least 20% battery life, have a real time feed of battery power on the Tarot 810 and visual indication for the Phantom 2. Both have autoland capability if battery life is low.

Typical flight time is 7 to 15 minutes and operation is Line of site only, 400ft height restriction, 30kt speed, and 1500ft max lateral distance

I, Andrew M Cross (dba AC Aerial Photography)'s, am extremely cautious when operating of my UAS/ultra light weight unmanned aircraft and will not "create a hazard to users of the national airspace system or the public." 112 P.L. 95 § 333 (b). Given the small size and weight of my UAS it falls well within Congress's contemplated safety zone when it promulgated the Reform Act and the corresponding directive to integrate UAS's into the national airspace system. Andrew M Cross (dba AC Aerial Photography)'s UAS, used in hobby flight, has a demonstrable safety record and does not pose any threat to the general public or national security.

IV. How Andrew M Cross (dba AC Aerial Photography)'s Request Will Benefit the Public As A Whole:

Aerial videography for business use, geographical awareness and for real estate marketing has been traditionally completed with manned fixed wing aircraft and helicopters. Aerial videography is cost prohibitive. Only large businesses and high end Realtors or luxury homeowners can afford such expense. This deprives small businesses, non-luxury homeowners, and small budget Realtors from a valuable marketing tool. Manned aircraft pose more of a threat to both the pilots and the general public due to the size and the combustable fuel held on board. than do small UAS which are low mass and contain no fuel.

Congress has already proclaimed that it is in the public's interest to integrate commercially flown UAS's into the national airspace system. The multicopters proposed for exemption are battery powered and creates no emissions that can harm the environment. The consequence of a small UAS crashing is far less than a full size helicopter or fixed wing aircraft.

Permitting me, Andrew M Cross (dba AC Aerial Photography), to immediately fly within national air space furthers economic growth. Granting my exemption request substantially furthers the economic impact for the North East Ohio community for companies looking to relocate or build in North East Ohio as well as individuals looking to relocate for career advancement through academic and geographical awareness. Both of which serve as a stimulus to the community.

V. Reasons Why Andrew M Cross (dba AC Aerial Photography)'s Exemption Will Not Adversely Affect Safety Or How The Exemption Will Provide a Level of Safety At Least Equal To Existing Rule:

My, Andrew M Cross (dba AC Aerial Photography)'s, exemption will not adversely affect safety.

I will be flying UAS's with tighter restrictions than the general hobbyist who may or may not be operating to AC 91-57.

As a Certificated Private Pilot, local to the area, I have knowledge of airspace and aircraft operations as well as basic sectional knowledge.

My operations will typically occur in non navigable airspace or airspace that manned aircraft should not be flying in. <400 feet AGL.

As a commercial interest, I will have a vested interest in safety to build business and community integrity and respect.

The UAS's I will be flying are 5 and 14 lbs takeoff weight and contain no flammable aviation fuel compared to a equivalent manned aircraft. Much less Mass,energy, flammability compared to a full size aircraft.

The aircraft will only operate 7-15 minutes per flight minimizing risk compared to full size aircraft.

Multicopters are direct controlled, line of site, with return to home capability.

As the sole operator, have 100+ hours on each multicopter.

Prescribe to RCAPA checklists, AC 91-57, user manuals attached for each flight.

My, Andrew M Cross (dba AC Aerial Photography)'s, safety protocols provide a level of safety equal to or exceeding existing rules. It is important to note that absent the integration of commercial UAS into our national airspace system, helicopters are the primary means of aerial video and photography for community awareness and real estate. While the safety record of such helicopters is remarkably astounding, there have been several incidents across the nation involving loss of life as well as extensive property damage; it is far safer to operate a battery powered ultra light weight UAS.

UAS's do not need to operate as high as manned aircraft and pose less potential energy and a less volatility in a crash.

VI. A Summary The FAA May Publish in the Federal Register:

A. 14 C.F.R. 21 and 14 C.F.R. 91: Airworthiness Certificates, Manuals and The Like.

14 C.F.R. 21, Subpart H, entitled Airworthiness Certificates, sets forth requirements for procurement of necessary airworthiness certificates in relation to FAR § 91.203(a)(1). The size, weight of my, Andrew M Cross (dba AC Aerial Photography)'s, UAS's permits exemption from Part 21 because my UAS meets (and exceeds) an equivalent level of safety pursuant to Section 333 of the Reform Act. The FAA is authorized to exempt aircraft from the airworthiness certificate requirement under both the Act (49 U.S.C. § 44701 (f)) and Section 333 of the Reform Act. Both pieces of legislation permit the FAA to exempt UAS's from the airworthiness certificate requirement in consideration of the weight, size, speed, maneuverability and proximity to areas such as airports and dense populations. My, Andrew M Cross (dba AC Aerial Photography)'s, current and projected UAS's meet or exceed each of the elements. Precedence of exemption 11138

14 C.F.R. 91.7(a) prohibits the operation of an aircraft without an airworthiness certificate. As no such certificate will be applicable in the form contemplated by the FARs, this Regulation is inapplicable. Aircraft will be inspected and preflighted per operators manual and attached preflight guidelines.

14 C.F.R. § 91.9 (b) (2) requires an aircraft flight manual in the aircraft. As there are no on board pilots or passengers, and given the size of the UAS(s), this Regulation is inapplicable. An equivalent level of safety will be achieved by maintaining a safety/flight manual delineating areas of where safety can be

defined. The FAA has previously issued exemptions to this regulation in Exemption Nos. 8607, 8737, 8738, 9299, 9299A, 9565, 9565B, 10167, 10167A, 10602, 10700 and 32827.

14 C.F.R. § 91.121 regarding altimeter settings is inapplicable insofar as the UAS(s) utilizes electronic global positioning systems with a barometric sensor which "zeros" at field elevation. Since flight times are limited to 15 minutes AGL indications will be accurate.

14 C.F.R. § 91.151 Fuel requirements for flight in VFR conditions prescribed minimums below entire duration of flight time of sUAS. SUAS will land with at least 30% of battery life. Visual LED warnings from sUAS as well as telemetry data will show battery level and auto land will begin at 30% battery life.

14 C.F.R. § 91.203 (a) and (b) provides for the carrying of civil aircraft certifications and registrations. They are inapplicable for the same reasons described above. The equivalent level of safety will be achieved by maintaining

any such required certifications and registrations by me, Andrew M Cross (dba AC Aerial Photography).

14 C.F.R. § 45.23: Marking of The Aircraft.

Applicable Codes of Federal Regulation require aircraft to be marked according to certain specifications. My UAS are, by definition, unmanned. They therefore do not have a cabin, cockpit or pilot station on which to mark certain words or phrases. Further, two-inch lettering is difficult to place. Per exemption 11138 which highlights previous exemptions, no marking is required or applicable.

14 C.F.R. §§ 61.113 (a) & (b), private pilots are limited to non-commercial operations.

I, Andrew M Cross (dba AC Aerial Photography), can achieve an equivalent level of safety as achieved by current Regulations because my UAS does not carry any pilots or passengers. Further, I possess a private pilot license and a class III medical certificate and have a knowledge of Airspace and aircraft operations and have a personal interest that UAS and manned aircraft do not intersect. The risks attended to the operation of my UAS is far less than the risk levels inherent in the commercial activities outlined in 14 C.F.R. § 61, et seq. Thus, allowing me, Andrew M Cross (dba AC Aerial Photography), to operate my UAS meet and exceed current safety levels in relation to 14 C.F.R. §61.113 (a) & (b).

14 C.F.R. § 91.119c prescribes safe altitudes for the operation of civil aircraft. It allows helicopters to be operated at lower altitudes in certain conditions. My UAS will never operate at an altitude greater than 400 AGL. I, Andrew M Cross (dba AC Aerial Photography), will however operate my UAS in safe areas away from public and traffic, only with permission of said property and structure owners or designee, providing a level of safety at least equivalent to or below those in relation to minimum safe altitudes. In addition the DJI flight controllers on each multicopter allow me to restrict the multicopters max height to 400ft and 1500ft horizontal. Given the size, weight, maneuverability and speed of my UAS, an equivalent or higher level of safety will be achieved.

Per exemption 11138 … “If barriers or structures are present that can sufficiently protect nonparticipating persons from the UA or debris in the event of an accident, then the UA may operate closer than 500 feet to persons afforded such protection. The operator must also 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. When considering how to immediately cease operations, the primary concern is the safety of those nonparticipating persons. In addition, the FAA finds that operations may be conducted closer than 500 feet to vessels,

vehicles and structures when the owner/controller of any such vessels, vehicles or structures grants permission for the operation and the PIC makes a safety assessment of the risk of operating closer to those objects and determines that it does not present an undue hazard."

14 C.F.R. 91.405 (a); 407 (a) (1); 409 (a) (2); 417(a) & (b): Maintenance Inspections.

The above-cited Regulations require, amongst other things, aircraft owners and operators to "have [the] aircraft inspected as prescribed in subpart E of this part and shall between required inspections, except as provided in paragraph (c) of this section, have discrepancies repaired as prescribed in part 43 of this chapter. . . ."

These Regulations only apply to aircraft with an airworthiness certificate. They will not, therefore, apply to my, Andrew M Cross (dba AC Aerial Photography)'s, UAS. However, as a safety precaution I inspect my UAS before and after each flight.

A Summary The FAA May Publish in the Federal Register: A. 14 C.F.R. 21 and 14 C.F.R. 91: Airworthiness Certificates, Manuals and The Like. 14 C.F.R. 21, Subpart H, entitled Airworthiness Certificates, sets forth requirements for procurement of necessary airworthiness certificates in relation to FAR § 91.203(a)(1). The size, weight and enclosed operational area of my UAS permits exemption from Part 21 because my, Andrew M Cross (dba AC Aerial Photography)'s, UAS meets an equivalent level of safety pursuant to Section 333 of the Reform Act. The FAA is authorized to exempt aircraft from the airworthiness certificate requirement under both the Act (49 U.S.C. § 44701 (f)) and Section 333 of the Reform Act. Both pieces of legislation permit the FAA to exempt UAS's from the airworthiness certificate requirement in consideration of the weight, size, speed, maneuverability and proximity to areas such as airports and dense populations. My UAS meets or exceeds each of the elements. 14 C.F.R. 91.7(a) prohibits the operation of an aircraft without an airworthiness certificate. As no such certificate will be applicable in the form contemplated by the FARs, this Regulation is inapplicable. 14 C.F.R. § 91.9 (b) (2) requires an aircraft flight manual in the aircraft. As there are no pilots or passengers, and given the size of the UAS's, this Regulation is inapplicable. An equivalent level of safety will be achieved by maintaining a manual. The FAA has previously issued exemptions to this regulation in Exemption Nos. 8607, 8737, 8738, 9299, 9299A, 9565, 9565B, 10167, maintenance program that involves regular software updates and curative measures for any damaged hardware. Therefore, an equivalent level of safety will be achieved.

Request precedence of 11138 exemption…

“7) Prior to each flight, the PIC must inspect the UAS to ensure it is in a condition for safe flight. If the inspection reveals a condition that affects the safe operation of the UAS, the UAS is prohibited from operating until the necessary maintenance has been performed and the UAS is found to be in a condition for safe flight. The Ground Control Station must be included in the preflight inspection. All maintenance and alterations must be properly documented in the aircraft records.

8) Any UAS 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. The PIC who conducts the functional test flight must make an entry in the aircraft records.

9) The pre-flight inspection section in the operating documents must account for all discrepancies, i.e. inoperable components, items, or equipment, not already covered in the relevant sections of the operating documents.

10) The operator must follow the UAS manufacturer’s aircraft/component, maintenance, overhaul, replacement, inspection, and life limit requirements.

11) The operator must carry out its maintenance, inspections, and record keeping requirements, in accordance with the operating documents. Maintenance, inspection, and alterations must be noted in the aircraft records, including total flight hours, description of work accomplished, and the signature of the authorized person returning the UAS to service.

12) Each UAS operated under this exemption must comply with all manufacturer Safety Bulletins.

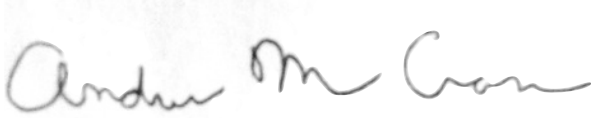
13) The authorized person must make an entry in the aircraft record of the corrective action taken against discrepancies discovered between inspections.”

In summary, Andrew M Cross (dba AC Aerial Photography) seeks an exemption from the following Regulations:

Part 21; 14 C.F.R. 45.23(b); 14 C.F.R. Part 21; 14 C.F.R. 61.113(a)&(b); 91.7(a); 91.9(b) (2); 91.121; 91.151(a); 91.203(a)&(b); 91.405(a); 91.407(a) (1); 91.409(a) (2); 91.417(a)&(b) ; 91.119c) to commercially operate my, Andrew M Cross (dba AC Aerial Photography)'s, small unmanned vehicle/lightweight unmanned aircraft vehicle in community awareness, small business, and real estate operations, and to develop economic platforms for real estate to enhance the experience of those seeking to relocate to the NE Ohio. Currently, aerial media for small business,area awareness, and real estate aerial videography/photography relies primarily on the use of larger aircraft running on combustible fuel. Posing

potential risk to the public. Granting my, Andrew M Cross (dba AC Aerial Photography)'s, request for exemption will reduce current risk levels and thereby enhance safety. My UAS craft do not contain potentially explosive fuel, is smaller, lighter and more maneuverable than conventional real estate video and photographic aircraft with much less flight time. Further, I operate at lower altitudes in primarily non navigable airspace eliminating potential public risk flying to and from established air fields.Formal collection of information shared with the FAA will enhance the FAA's internal efforts to establish protocols for complying with the FAA Modernization and Reform Act of 2012. There are no personnel on board my, Andrew M Cross (dba AC Aerial Photography)'s, UAS and therefore the likelihood of death or serious bodily injury is significantly diminished. My, Andrew M Cross (dba AC Aerial Photography)'s, operation of my UAS, weighing less than 5 pounds and 15 pounds and traveling at lower speeds within limited areas will provide an equivalent level of safety as that achieved under current FARs. Accordingly I, Andrew M Cross (dba AC Aerial Photography), respectfully request that the FAA grant my exemption request and am willing to cooperate in sharing information to benefit the FAA, safety of manned aircraft, and the general public at large.

Respectfully submitted,



Andrew M Cross (dba AC Aerial Photography)