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

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

July 28, 2015

Exemption No. 12200
Regulatory Docket No. FAA–2015–1861

Mr. Damon Darnall
President
Aerial Real Estate Photography
17460 I−35 North, Suite 430
Schertz, TX 78154

Dear Mr. Darnall:

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 8, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Aerial Real Estate 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 is a DJI Phantom 2.

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, Aerial Real Estate 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, Aerial Real Estate 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 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 July 31, 2017, unless sooner superseded or rescinded.

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

Enclosures

May 8, 2015

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

Re: Exemption Request Section 333 of the FAA Reform Act of the Federal Aviation Regulations from 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); 91.103(b); 91.109;119.121; 91.151(a); 91.203(a)&(b); 91.405(a); 91.407(a) (1); 91.409(a) (2); 91.417(a)&(b)

To Whom It May Concern:

I, Damon Darnall, President of Aerial Real Estate Photography ("AREP") 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 AREP, an owner and operator of small unmanned aircraft, be exempted from the Federal Aviation Regulations ("FARs") listed below so that AREP may operate our small ultra lightweight unmanned aircraft system ("UAS") commercially in airspace regulated by the Federal Aviation Administration ("FAA").

I am a Contest Director with the AMA (American Modelers Association). I am also a Flight Instructor with AMA Leader Club #1218. I'm experienced in flying Hobby Class Remote Control Aircraft for recreational purposes. I have added hobby grade quad-copters[1] UAS to my inventory equipped with a GoPro4 Black cameras with intent for aerial videography/cinematography to enhance academic community awareness for those individuals and companies unfamiliar with the geographical layout of the metro San Antonio area, and augment real estate listing videos; following exemption and approval by the FAA.

I have built, flown and maintained RC aircraft for over twenty five (25) years without incident. I've graduated from the RC 1st Flight School, completing intermediate and advanced flight and safety training. I am also certified by RCFA (RC Flight Academy) in Multi-Rotor Flight and Safety Training. My exemption request would permit operation of ultra lightweight, unmanned (piloted by remote control) and comparatively inexpensive UAS(s) in tightly controlled and limited airspace.[2]

Flights will be in areas away from the general public, airports, heliports and heavy vehicular traffic areas for community videos, and within property boundaries for individual homeowner real estate listing videos/photos. Currently, similar lightweight, remote controlled UAS's are legally operated by unmonitored amateur hobbyists with no safety plan or controls in place to prevent catastrophe. AREP has instituted extensive safety protocols and controls[3] to avoid

1 Appendix A - DJI Phantom 2 Quad-copter Operator Manual

2 Appendix B - San Antonio metro area 5 mile airport radius maps

3 Appendix C - Flight Check/Flight Safety Protocols

and prevent public hazard, as well as manned aircraft hazards/catastrophe. This will act to further safety protocols exclusive to lightweight UAS's specific to real estate video and photography usage as AREP record flight data and other information gained through permitted flight operations to share with the FAA through any required FAA reports to assist with future protocol and safety regulation.

Granting AREP'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 real estate/Realtor purposes. Further, AREP will conduct operations in compliance with the protocols described herein or as otherwise established by the FAA.

For the reasons stated below, AREP respectfully requests the grant of an exemption allowing operation of ultra lightweight, remote controlled UAS's for academic community awareness to benefit/stimulate attraction to the metro San Antonio area and to enhance 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 as well as enhance public safety by minimizing the use of heavier manned aircraft containing combustible fuel that pose potential public hazard.

I. Contact Information:

Damon Darnall, President
AREP
17460 I-35N Ste.430
Schertz, TX. 78154
Office: (210) 660-7591
Mobile: (713) 259-0449
Email: Damon@ProwessMarketingConsultants.com

II. The Specific Sections of Title 14 of the Code of Federal Regulations From Which AREP Requests Exemption are:

14 CFR 21;
14 C.F.R. 45.23(b);
14 CFR 61.113 (a) & (b);
14 C.F.R. 91, et seq.;
14 CFR 407 (a) (1);
14 CFR 409 (a) (2); and,
14 CFR 417 (a) & (b)

III. The Extent of relief AREP seeks and the Reason Seeking Such Relief:

AREP, submits this application in accordance with the Reform Act, 112 P.L.95 §§ 331-334, seeking relief from any currently applicable FARs operating to prevent AREP, 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.

AREP's, ultra lightweight UAS meets the definition of "small unmanned aircraft" as defined in Section 331 and therefore the integration of the ultra lightweight UAS is expressly contemplated by the Reform Act. We would like to operate our ultra lightweight UAS prior to the time period by which the Reform Act requires the FAA to promulgate rules governing such craft. This can provide direct experience and valuable information for formal regulation that can be administered uniformly to all real estate related UAS aerial video and photography. 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 AREP. AREP UAS utilizes four (4) counter-rotating propellers for balance, control and stability. Our UAS's are equipped with GPS and auto return safety technology. The UAS's weigh less than four (4) pounds (far below the maximum 55 pound limit); including camera with gimbal.

AREP considers safety foremost with each flight. Our small unmanned aircraft are designed to hover in place via GPS and operate in less than a 23 knot (25 mph) wind. Because of safety concerns, stability and fear of financial loss, AREP will not fly in winds exceeding 13 kph (15 mph). Built in safety systems include a GPS mode that allows our UAS's to hover in place when radio controls are released. With three modes to choose from, we utilize the *GPS*[4] for aerial videography/photography. This is the safest, most reliable and stable mode to prevent accident and hazard. When pilot communication is lost, the UAS is designed to slowly descend to point of take off. We do not operate our UAS's near airports, hospitals or police heliports, nor do we operate near areas where the general public is within fifty to one hundred (50-100) yards depending on location, conditions and weather. Our UAS software is continuously updated with the most up-to-date airport airspace no fly zones (http://www.dji.com/fly-safe/category-mc).
We are constantly on alert for any manned aircraft (Police/Medical helicopters, etc.) and prepared to land/abort immediately to the nearest and safest ground point should a manned aircraft approach our location or we suspect manned aircraft may approach near our location. Our UAS's are capable of vertical and horizontal operations, and are flown only within the line of sight of of the remote control pilot. Utilizing battery power rather than combustible fuels, flights generally last between three (3) to seven (7) minutes, with an altitude under two hundred (300) feet. We, utilize a fresh fully charged battery with each flight as a safety precaution; full flight time limit for each battery is nine (9) to twelve (12) minutes as tested. I do not operate my UAS at or below manufacturer recommend minimum charge levels for operation; preferring to remain well within a safe operating range to insure adequate communication between radio control and UAS to eliminate potential for crash, loss of control or hazard. Reserve batteries are at hand with each exercise to insure replacement for sufficient safe level of operation. We do everything we can to minimize any risk that may cause a crash and create hazard to the public/property/manned aircraft. AREP strictly follows RCFA's Flight Training Protocols that are outlined in the Flight Check / Flight Safety Protocals[3]. These include, but are not limited to, link loss recovery, GPS loss recovery, disorientation recovery, line-of-sight loss recovery, emergency landing procedures, and motor failure emergency landing.

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3 Appendix C - Flight Check/Flight Safety Protocols

4 GPS modes includes, position hold, self-leveling, altitude command, GPS, return home feature, and safety control to return home or land in the event of communication interruption between RC transmitter and UAS. See Appendix A - Operator Manual.

It also outlines advanced flying and recovery practices on a simulator and requires participants to safely navigate specific courses within a certain timeframe. AREP also keeps logs of all flights, replacement parts and flight batteries. We also require a minimum of 4 flights a month including takeoff and landings.

AREP is extremely cautious when operating our 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 our UAS's, they fall 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. Our UAS's, used in hobby flight, have a demonstrable safety record and do not pose any threat to the general public or national security.

IV. How AREP's Request Will Benefit the Public As A Whole:

Aerial videography for geographical awareness and for real estate marketing has been around for a long time through manned fixed wing aircraft and helicopters. For small budget real estate companies and average homeowners, the expense of such aerial videography is cost prohibitive. Only large companies, high-end realtors or luxury homeowners can afford to absorb such expense. This deprives most homeowners and realtors from a valuable marketing tool. Manned aircraft can pose a threat to the public through potential catastrophic crashes. Our UAS's pose no such threat, since size and lack of combustible fuel alleviates any potential threat to the public.

Congress has already proclaimed that it is in the public's interest to integrate commercially flown UAS's into the national airspace system, hence the passing of the Reform Act. Granting our exemption request furthers the public interest through academic/visual awareness of the geographical benefits in and around the metro San Antonio area. Our ultra light-weight UAS's are battery powered and create no emissions that can harm the environment. The consequence of our ultra light-weight UAS's crashing is far less than a full size helicopter or fixed wing aircraft; which are heavy, contain combustible fuel and can cause catastrophic devastation to the public.

The public's interest is furthered by minimizing ecological and crash threat by permitting aerial video/photo capture through my battery operated ultra light-weight UAS's. Allowing our UAS's to immediately fly within national air space furthers economic growth. If our exemption is granted, it substantially furthers the economic impact for the metro San Antonio community by making it more accessible for companies looking to relocate or build in the San Antonio metro area as well as individuals looking to relocate for career advancement through academic and geographical awareness. Both of these serve as a stimulus to the community.

V. Reasons Why AREP's Exemption Will Not Adversely Affect Safety Or How The Exemption Will Provide a Level of Safety At Least Equal To Existing Rule:

Our exemption will not adversely affect safety. Quite the contrary, by allowing us to log more flight time in FAA controlled airspace, we can communicate with the FAA, and contribute to the innovation and implementation of new and, as of yet, undiscovered safety protocols for realtors. In addition, we submit the following safety protocols and enhancements to the current practices for real estate aerial videography and photography:

- AREP UAS - weighs less than 4 pounds complete with a small ultra light weight high quality Gopro4 Black Camera;

- AREP only operates our UAS's below 300 ft (well within the 400 ft permissible ceiling set by the FAA Modernization and Reform Act of 2012);
- AREP UAS only operate for 3-7 minutes per flight;
- AREP lands UAS's prior to manufacturer recommended minimum level of battery power;
- AREP pilot UAS through remote control only by line of sight; and will not operate more than 1000 feet[1] from us;
- AREP UAS's have GPS a flight safety feature meaning it hovers and then slowly lands if communication with the remote control pilot is lost;
- AREP UAS's have additional safety features such as altitude limitations, distance limitations and built in geo-fencing;
- AREP UAS's low power safety features will automatically land upon the battery voltage getting low, in the case of a defective or failing battery.
- AREP actively analyzes flight data and other sources of information to constantly update and enhance safety protocols;
- AREP only operates in reasonably safe environments that are strictly controlled, are away from power lines, elevated lights, airports and actively populated areas;
- AREP conducts extensive pre-flight inspections and protocol, during which safety carries primary importance;
- AREP always obtains all necessary permissions prior to operation;
- AREP has individual identifying numbers clearly displayed on each aircraft that is logged and always available for inspection.
- AREP has procedures in place to abort flights in the event of safety breaches or potential danger;
- AREP always displays a "Caution Flight in Progress 150 ft distance required" sign when flying[5];
- AREP uses a VO flight assistant;
- Flight testing of all new aircraft is done at licenced AMA flying fields. At the same time, geo-fencing calibration of 300 ft AGL and 1000 ft distance are verified. UAS's with programmable flight systems like the Phantom 2, firmware programmed for maximum 300 ft AGL and 1000 ft distance, are the appropriate distance for easily maintaining VSOL without assistance of binoculars or other aids.
- Most intended operation will only require a range of 20-100 ft AGL and less than 300 ft lateral distance from PIC. Limited stated distance for VSOL will be rare, if ever needed.
- AREP checks monthly for Firmware and safety updates on all multirotor equipment including:
    - Main Controller
    - GPS
    - Receiver
    - Battery
    - Zen IMU

In addition, we request request consideration for 120 day §63.13 Temporary Airman Certificate to allow FAA time to review our petition and allow AREP time to coordinate and attain formal specialized training. AREP is seeking a reasonable exemption with restriction solely to UAS operation at AGL below 300 feet with distance of flight no greater than 1000 feet. Currently there are no provisions within the FAA for governing UAS's such as the DJI Phantom 2

1 Appendix A - DJI Phantom 2 Quad-copter Operator Manual

5 Appendix D - AREP Caution Sign

for hobby or commercial use. Phantom 2 sales have been exponentially higher than the 7,500 in 5 years estimate that the FAA put forward three years ago. With over 1 millions units sold in 2014 alone, the need for experienced, trained, and responsible operators is more important than ever. UAS's being flown without guidelines by unfamiliar and untrained individuals who do not belong to a professional organizations like the AMA, may pose a threat to NAS, the public, and responsible hobbyists.

Recently Transport Canada relaxed UAS regulations to place less restriction on UAS's under 2 kg (4.4 lbs).

AREP requests review of Transport Canada's latest exemption[6,7] for UAS operation for portions that can be adopted and adapted to apply in United States NAS. The includes providing guideline and penalties for infractions, violations, and failure to comply.

Attachments A & B are from Transport Canada's Exemption for sUAS under 2 kg (4.4 pounds)

AREP's safety protocols greatly exceed existing rules. It is important to note that until the integration of commercial UAS into our national airspace system, full size 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 incidents involving loss of life as well as extensive property damage. It is far safer to operate a battery powered ultra light-weight UAS.

- First, the potential loss of life is diminished because UAS's carry no people on board and AREP only operates our UAS's in specific areas away from mass populations.
- Second, there is no fuel on board a UAS and thus the potential for fire or explosions is greatly diminished.
- Third, the small size and extreme maneuverability of our UAS's allow us to remotely pilot away from and avoid hazards quickly and safely.
- Lastly, given its small size and weight, even when close enough to capture images, AREP's UAS's need not be so close to the objects because of the technology and use of post editing software that mimics panning and zooming.

Accordingly, AREP's UAS's have been experimentally operated for familiarization/competency and will continue to operate at and above current safety levels.

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).

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6 Appendix E - Transport Canada's Info Chart UAS

7 Appendix F - Transport Canada's Exemption for UAS's under 4.4lbs.

The size, weight and enclosed operational area of AREP's UAS's permit exemption from Part 21 because our UAS's meet (and exceed) 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. AREP's current and projected UAS's meet or exceed 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 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.[3] 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 our UAS's utilize electronic global positioning systems with a barometric sensor.

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 AREP.

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

Applicable Codes of Federal Regulation require aircraft to be marked according to certain specifications. Our UAS's 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 on such small aircraft with dimensions smaller that minimal lettering requirement. Regardless, we will mark our UAS's in the largest possible lettering by placing the word "EXPERIMENTAL" on their fuselages as required by 14 C.F.R. §45.29 (f) so that the pilot, or anyone assisting the pilot as a spotter with the UAV will see the markings. The FAA has previously issued exemptions to this regulation through Exemptions Nos. 8738, 10167, 10167A and 10700.

C. 14 C.F.R. § 61.113: Private Pilot Privileges and Limitations: PIC

Pursuant to 14 C.F.R. §§ 61.113 (a) & (b), private pilots are limited to non-commercial operations. AREP can achieve an equivalent level of safety as achieved by current Regulations because our UAS's do not carry any pilots or passengers. Further, while helpful, a pilot license will not ensure remote control piloting skills. The risks attended to the

[3] Appendix C - Flight Check/Flight Safety Protocols

operation of our UAS's are far less than the risk levels inherent in the commercial activities outlined in 14 C.F.R. § 61, et seq. Therefore, AREP can operate our UAS's to meet and exceed current safety levels in relation to 14C.F.R. §61.113 (a) & (b).

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

14 C.F.R. § 91.119 prescribes safe altitudes for the operation of civil aircraft. It allows helicopters to be operated at lower altitudes in certain conditions. Our UAS's will never operate at an altitude greater than 300 AGL; safely below the standard of 400 AGL. AREP will operate our UAS's in safe areas away from public and traffic, providing a level of safety at least equivalent to or below those in relation to minimum safe altitudes. Given the size, weight, maneuverability and speed of our UAS's, an equivalent or higher level of safety will be achieved.

E. 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 our UAS's. However, as a safety precaution, we inspect our UAS's 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 our UAS's permits exemption from Part 21 because our UAS's meet 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. Our UAS's meets or exceed 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.

In summary, AREP seeks an exemption from the following Regulations:

14 C.F.R. 21, subpart H; 14 C.F.R. 45.23(b); 14 C.F.R. §§ 61.113 (a) & (b); 14 C.F.R. § 91.7 (a); 14 C.F.R. § 91.9 (b)(2); 14 C.F.R. § 91.103(b); 14 C.F.R. § 91.109; 14 C.F.R. § 91.119; 14 C.F.R. § 91.121; 14 C.F.R. § 91.151(a); 14 C.F.R. §§ 91.203(a) and (b); 14 C.F.R. § 91.405 (a); 14 C.F.R. § 91.407 (a)(1); 14 C.F.R. § 91.409 (a)(2); 14 C.F.R. § 91.409 (a) (2); and, 14 C.F.R. §§ 91.417 (a) & (b) to commercially operate AREP's, small unmanned vehicle/lightweight unmanned aircraft vehicle in community awareness and real estate operations, and to develop economic platforms for real estate to enhance the experience of those seeking to relocate to the metro San Antonio area. Currently, area awareness and real estate aerial videography/photography relies primarily on the use of larger aircraft running on combustible fuel, which poses a potential risk to the public. Granting AREP's, request for exemption will reduce current risk levels and thereby enhance safety. Our UAS crafts do not contain potentially explosive fuel, are smaller, lighter and more maneuverable than conventional real estate video and photographic aircraft with much less flight time. Further, we operate at lower altitudes and in controlled airspace eliminating potential public risk flying to and from established airfields. AREP has been informally analyzing flight information and will compile safety protocols and the implementation of a flight operations manual for real estate usage that exceeds currently accepted means and methods for safe flight. 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 our UAS's and therefore the likelihood of death or serious bodily injury is significantly diminished. Our operation of the UAS's, weighing less than 5 pounds and travelling at lower speeds within limited areas will provide an equivalent level of safety as that achieved under current FARs. Accordingly I, Damon Darnall, President of AREP 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,

Damon Darnall / AREP

Damon Darnall / AREP

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