



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

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

September 24, 2015

Exemption No. 12974  
Regulatory Docket No. FAA-2015-2798

Mr. Dan Pamenter  
Founder and President  
Aerial Photos of America  
2725 West Capitol Drive  
Appleton, WI 54914

Dear Mr. Pamenter:

This letter is to inform you that we have granted your request for exemption. It transmits our decision, explains its basis, and gives you the conditions and limitations of the exemption, including the date it ends.

By letter dated June 8, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Aerial Photos of America (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial imaging.

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

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

#### **Airworthiness Certification**

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

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

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

### **The Basis for Our Decision**

You have requested to use a UAS for aerial data collection<sup>1</sup>. 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 Photos of America 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.

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<sup>1</sup> 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 Photos of America is hereafter referred to as the operator.

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

1. Operations authorized by this grant of exemption are limited to the DJI Phantom 2 Vision+ when weighing less than 55 pounds including payload. Proposed operations of any other aircraft will require a new petition or a petition to amend this exemption.
2. Operations for the purpose of closed-set motion picture and television filming are not permitted.
3. The UA may not be operated at a speed exceeding 87 knots (100 miles per hour). The exemption holder may use either groundspeed or calibrated airspeed to determine compliance with the 87 knot speed restriction. In no case will the UA be operated at airspeeds greater than the maximum UA operating airspeed recommended by the aircraft manufacturer.
4. The UA must be operated at an altitude of no more than 400 feet above ground level (AGL). Altitude must be reported in feet AGL.
5. The UA must be operated within visual line of sight (VLOS) of the PIC at all times. This requires the PIC to be able to use human vision unaided by any device other than corrective lenses, as specified on the PIC's FAA-issued airman medical certificate or U.S. driver's license.
6. All operations must utilize a visual observer (VO). The UA must be operated within the visual line of sight (VLOS) of the PIC and VO at all times. The VO may be used to satisfy the VLOS requirement as long as the PIC always maintains VLOS capability. The VO and PIC must be able to communicate verbally at all times; electronic messaging or texting is not permitted during flight operations. The PIC must be designated before the flight and cannot transfer his or her designation for the duration of the flight. The PIC must ensure that the VO can perform the duties required of the VO.
7. This exemption and all documents needed to operate the UAS and conduct its operations in accordance with the conditions and limitations stated in this grant of exemption, are hereinafter referred to as the operating documents. The operating documents must be accessible during UAS operations and made available to the Administrator upon request. If a discrepancy exists between the conditions and limitations in this exemption and the procedures outlined in the operating documents, the conditions and limitations herein take precedence and must be followed.

Otherwise, the operator must follow the procedures as outlined in its operating documents. The operator may update or revise its operating documents. It is the operator's responsibility to track such revisions and present updated and revised documents to the Administrator or any law enforcement official upon request. The operator must also present updated and revised documents if it petitions for extension or amendment to this grant of exemption. If the operator determines that any update or revision would affect the basis upon which the FAA granted this exemption, then the operator must petition for an amendment to its grant of exemption. The FAA's UAS Integration Office (AFS-80) may be contacted if questions arise regarding updates or revisions to the operating documents.

8. Any UAS that has undergone maintenance or alterations that affect the UAS operation or flight characteristics, e.g., replacement of a flight critical component, must undergo a functional test flight prior to conducting further operations under this exemption. Functional test flights may only be conducted by a PIC with a VO and must remain at least 500 feet from other people. The functional test flight must be conducted in such a manner so as to not pose an undue hazard to persons and property.
9. The operator is responsible for maintaining and inspecting the UAS to ensure that it is in a condition for safe operation.
10. Prior to each flight, the PIC must conduct a pre-flight inspection and determine the UAS is in a condition for safe flight. The pre-flight inspection must account for all potential discrepancies, e.g., inoperable components, items, or equipment. If the inspection reveals a condition that affects the safe operation of the UAS, the aircraft is prohibited from operating until the necessary maintenance has been performed and the UAS is found to be in a condition for safe flight.
11. The operator must follow the UAS manufacturer's maintenance, overhaul, replacement, inspection, and life limit requirements for the aircraft and aircraft components.
12. Each UAS operated under this exemption must comply with all manufacturer safety bulletins.
13. Under this grant of exemption, a PIC must hold either an airline transport, commercial, private, recreational, or sport pilot certificate. The PIC must also hold a current FAA airman medical certificate or a valid U.S. driver's license issued by a state, the District of Columbia, Puerto Rico, a territory, a possession, or the Federal government. The PIC must also meet the flight review requirements specified in 14 CFR § 61.56 in an aircraft in which the PIC is rated on his or her pilot certificate.
14. The operator may not permit any PIC to operate unless the PIC demonstrates the ability to safely operate the UAS in a manner consistent with how the UAS will be

operated under this exemption, including evasive and emergency maneuvers and maintaining appropriate distances from persons, vessels, vehicles and structures. PIC qualification flight hours and currency must be logged in a manner consistent with 14 CFR § 61.51(b). Flights for the purposes of training the operator's PICs and VOs (training, proficiency, and experience-building) and determining the PIC's ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption are permitted under the terms of this exemption. However, training operations may only be conducted during dedicated training sessions. During training, proficiency, and experience-building flights, all persons not essential for flight operations are considered nonparticipants, and the PIC must operate the UA with appropriate distance from nonparticipants in accordance with 14 CFR § 91.119.

15. UAS operations may not be conducted during night, as defined in 14 CFR § 1.1. All operations must be conducted under visual meteorological conditions (VMC). Flights under special visual flight rules (SVFR) are not authorized.
16. The UA may not operate within 5 nautical miles of an airport reference point (ARP) as denoted in the current FAA Airport/Facility Directory (AFD) or for airports not denoted with an ARP, the center of the airport symbol as denoted on the current FAA-published aeronautical chart, unless a letter of agreement with that airport's management is obtained or otherwise permitted by a COA issued to the exemption holder. The letter of agreement with the airport management must be made available to the Administrator or any law enforcement official upon request.
17. The UA may not be operated less than 500 feet below or less than 2,000 feet horizontally from a cloud or when visibility is less than 3 statute miles from the PIC.
18. If the UAS loses communications or loses its GPS signal, the UA must return to a pre-determined location within the private or controlled-access property.
19. The PIC must abort the flight in the event of unpredicted obstacles or emergencies.
20. The PIC is prohibited from beginning a flight unless (considering wind and forecast weather conditions) there is enough available power for the UA to conduct the intended operation and to operate after that for at least five minutes or with the reserve power recommended by the manufacturer if greater.
21. Air Traffic Organization (ATO) Certificate of Waiver or Authorization (COA). All operations shall be conducted in accordance with an ATO-issued COA. The exemption holder may apply for a new or amended COA if it intends to conduct operations that cannot be conducted under the terms of the attached COA.
22. All aircraft operated in accordance with this exemption must be identified by serial number, registered in accordance with 14 CFR part 47, and have identification

(N–Number) markings in accordance with 14 CFR part 45, Subpart C. Markings must be as large as practicable.

23. Documents used by the operator to ensure the safe operation and flight of the UAS and any documents required under 14 CFR §§ 91.9 and 91.203 must be available to the PIC at the Ground Control Station of the UAS any time the aircraft is operating. These documents must be made available to the Administrator or any law enforcement official upon request.
24. The UA must remain clear and give way to all manned aviation operations and activities at all times.
25. The UAS may not be operated by the PIC from any moving device or vehicle.
26. All Flight operations must be conducted at least 500 feet from all nonparticipating persons, vessels, vehicles, and structures unless:
  - a. Barriers or structures are present that sufficiently protect nonparticipating persons from the UA and/or debris in the event of an accident. The operator must ensure that nonparticipating persons remain under such protection. If a situation arises where nonparticipating persons leave such protection and are within 500 feet of the UA, flight operations must cease immediately in a manner ensuring the safety of nonparticipating persons; and
  - b. The owner/controller of any vessels, vehicles or structures has granted permission for operating closer to those objects and the PIC has made a safety assessment of the risk of operating closer to those objects and determined that it does not present an undue hazard.

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

27. All operations shall be conducted over private or controlled-access property with permission from the property owner/controller or authorized representative. Permission from property owner/controller or authorized representative will be obtained for each flight to be conducted.
28. Any incident, accident, or flight operation that transgresses the lateral or vertical boundaries of the operational area as defined by the applicable COA must be reported to the FAA's UAS Integration Office (AFS–80) within 24 hours. Accidents must be reported to the National Transportation Safety Board (NTSB) per instructions contained on the NTSB Web site: [www.nts.gov](http://www.nts.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 October 31, 2017, unless sooner superseded or rescinded.

Sincerely,

/s/

John S. Duncan

Director, Flight Standards Service

Enclosures



June 8th, 2015

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

Dear Sir or Madam:

Attached please find Dan Pamenter's ( dba "Aerial Photos of America") request for an exemption from the listed Federal Aviation Regulations to allow commercial operation of its small Unmanned Aircraft Systems ("sUASs") for aerial data collection. Dan Pamenter founded Aerial Photos of America in 1974 and has been producing high quality aerial images for more than 30 years. Dan Pamenter now holds a non-current Private Pilots certificate and until recently, employed Commercial rated pilots to fly Aerial Photos of America's Cessna 177RG for a period of 17 years. Aerial Photos of America now leases planes and helicopters on a "as needed" basis, but needs to compete with unauthorized UAV photographers. Aerial Photos of America recognizes many safety, ecological and economical benefits of using sUAS's over conventional full size, piloted aircraft for low level photography. Aerial Photos of America would like to use it's DJI Phantom 2 Vision + sUAS quad copter for aerial data collection. Dan Pamenter has approximately 150 hours of recreational flying of the Phantom Vision and other similar models of sUAV's.

Thank you for your time and consideration, and please inquire with any questions.

Respectfully,



Dan Pamenter  
Founder & President  
Aerial Photos of America  
2725 W. Capitol Dr.  
Appleton, WI 54914

Ph. (920)730-9100



June 8th , 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 and Part 11 of the Federal Aviation Regulations from 14 C.F.R. 45.23(b); 14 CFR Part 21; 14 CFR 61.113(a) & (b); 91.7(a); 91.9(b) (2); 91.103(b); 91.109; 91.119; 91.121; 91.151(a) & (b); 91.405 (a); 91.407(a) (1); 91.409 (a) (2); 91.417 (a) & (b).

Dear Sir or Madam:

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 (the Reform Act) and 14 C.F.R Part 11, Aerial Photos of America. an aerial imaging firm, hereby applies for an exemption from the listed Federal Aviation Regulations ("FARs") to allow commercial operation of its Small Unmanned Aircraft Systems ("sUASs") for low level aerial imaging, 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.

As detailed in this document the requested exemption would permit the operation of sUAS under controlled conditions in airspace that is 1) limited 2) predetermined 3) controlled as to access and 4) would provide safety enhancements to the already best practices safety protocols followed by Aerial Photos of America. Approval of this exemption would thereby enhance safety and fulfill the Secretary of Transportation's (the FAA Administrator's) responsibilities to "...establish requirements for the safe operation of such aircraft systems in the national airspace system." Section 333 (c) of the Reform Act.

The name and address of the applicant is:

Aerial Photos of America  
Dan Pamenter  
Ph. (920)730-9100  
Email: [swissaerial@yahoo.com](mailto:swissaerial@yahoo.com)  
Address: 2725 W. Capitol Dr. Appleton, WI 54914

Regulations from which the exemption is requested:

14 C.F.R. Part 21  
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  
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. 203 (a) (b)  
14 C.F.R. 91.405 (a)  
14 C.F.R. 407 (a) (1)  
14 C.F.R. 409 (a) (2)  
14 C.F.R. 417 (a) (b) 1.

## **I. STATUTORY AUTHORITY FOR EXEMPTIONS**

The Federal Aviation Act expressly grants the FAA authority to issue exemptions. This statutory authority includes exempting civil aircraft, as the term is defined under 40101 of the Act, including sUASs, from the requirement that all civil aircraft must have a current airworthiness certificate.

The Administrator may grant an exemption from a requirement of a regulation prescribed under subsection (a) or (b) of this section or any sections 44702-44716 of this title if the Administrator finds the exemption in the public interest. 49 U.S.C. 44701(f) See also 49 USC 44711(a); 49 USC 44704; 14 CFR 91.203(a)(1).

Section 333(b) of the Reform Act assists the Secretary in determining whether sUASs may operate in the National Airspace System (NAS) without creating a hazard to the user, the public, or a threat to national security. In making this determination, the Secretary must consider:

- The sUAS's size, weight, speed, and operational capability;
- Whether the sUAS operates within the visual line of sight of the operator
- Whether the sUAS operated outside of highly populated areas and away from close proximity to airports.

Reform Act 333(a). If the Secretary determines that a sUAS "may operate safely in the national airspace system, the Secretary shall establish requirements for the safe operation of such aircraft in the national airspace system." Id. 333(c).

Aerial Photos of America's sUASs are multirotator vehicles, weighing 10 or fewer lbs. including payload. We operate under normal conditions at a speed of no more than 50 knots and have the capability to hover, and move in the vertical and horizontal plane simultaneously. The sUASs will operate only in the pilot's visual line of sight at all times. Such operations will insure that the sUASs will "not create a hazard to users of the national airspace system or the public." Reform Act Section 333 (b).

Given the small size of the sUASs involved and the restricted environment within which they will operate, our application falls squarely within the zone of safety (an equivalent level of safety) in which Congress envisioned that the FAA must, by exemption, allow commercial operations of sUASs to commence immediately.

Also due to the small size of the sUASs and the low altitudes and restricted areas in which our sUASs will operate, approval of the application presents no national security issue.

Given the clear direction in Section 333 of the Reform Act, the authority contained in the Federal Aviation Act, as amended; the strong equivalent level of safety surrounding the proposed operations, and the significant public benefit, including enhanced safety, the grant of the requested exemptions is in the public interest. Accordingly, Aerial Photos of America respectfully requests that the FAA grant the requested exemption without delay.

## **II. PUBLIC INTEREST**

This exemption application is expressly submitted to fulfill Congress' goal in passing Section 333(a) through (c) of the Reform Act. This law directs the Secretary of Transportation to consider whether certain unmanned aircraft systems may operate safely in the NAS before completion of the rulemaking required under Section 332 of the Reform Act. By granting an exemption the FAA will fulfill Congress' intent of allowing UAS to operate with significant safety precautions in low risk environments.

The use of sUASs on remote sites can significantly reduce the risk to pilots, photographer and the public over high speed, large, piston/turbine driven, piloted, full size aircrafts. sUASs can inspect, photograph, and collect data on hard to get to areas that otherwise would require dangerous worker inspection. Falls are the leading source of workplace fatality and injury on construction sites, and reducing falls through sUAS use for site imaging could save workers lives.

Additionally, sUASs could replace the use of helicopters and small aircraft to monitor sites. The sUASs we propose to fly in this application are under five pounds, and carry no combustible material on board, as opposed to the much larger conventionally powered small aircraft. Shifting to sUASs from helicopters and airplanes presents a marked safety increase for workers and the public.

Lastly, sUASs reduce the environmental impact by dramatically reducing the energy required for aerial imaging and data collection over any site. Our sUASs use rechargeable lithium ion batteries, as opposed to fossil fuels burned in operation of small aircraft that are many hundreds of times heavier and function at comparatively very high speeds.

### **III. EQUIVALENT LEVEL OF SAFETY**

Aerial Photos of America proposes that the exemption requested herein apply to civil aircraft that have the characteristics and that operate with the limitations listed herein. These limitations provide for at least an equivalent or even higher level of safety to operations under the current regulatory structure because the proposed operations represent a safety enhancement to the already safe protocols followed by professional aeronautical users.

Aerial Photos of America will be bound by the following limitations when conducting its sUAS operations under an FAA issued exemption:

1. The sUAS will be less than 10 pounds.
2. Flights will be operated within visual line of sight of a pilot.
3. Maximum total flight time for each operational flight will be 30 minutes. The UAS calculates battery reserve in real time, and will return to its ground station with at least 20% battery power reserve should that occur prior to the 30 minute limit.
4. Flights will be operated at an altitude never exceeding 400 feet AGL.
5. Crew for each operation will consist of the sUAS pilot who will keep the sUAS within his/her visual line of sight at all times.
6. The sUAS pilot will be trained in flight, operations, and safety procedures.
7. The sUAS will operate only in a confined area while providing construction site data collection.
8. A briefing will be conducted in regard to the planned sUAS operations prior to each day's production activities. It will be mandatory that all personnel who will be performing duties within the boundaries of the safety perimeter be present for this briefing.
9. All on-site personnel will consent to the UAS flyover on site by waiver, and the operator will obtain additional verbal or written consent of all persons who will be allowed within 100 feet of the flight operation.
10. The pilot will have been trained in operation of UASs generally and received up-to-date information on the particular UAS to be operated.
11. Written and/or oral permission from the relevant property holders will be obtained.
12. All required permissions and permits will be obtained from territorial, state, county, or city jurisdiction, including local law enforcement, fire, or other appropriate governmental agencies.
13. If the sUAS loses communications or loses its GPS signal, it will have the capability to return to a pre-determined location within the Security Perimeter and land.
14. The sUAS will have the capability to abort a flight in case of unpredicted obstacles or emergencies.

### **IV. DESCRIPTION OF SPECIFIC REGULATIONS 14 CFR Part 21,**

Subpart H: Airworthiness Certificates 14 C.F.R 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 Aerial Photos of America, an exemption from Part 21 Subpart H meets the requirements of an equivalent level of safety under Part II 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. Our small UAS will be operated at low speed in a controlled environment, at least five miles from an airport and more than three miles from any city or densely populated area. 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 conventional aircraft (fixed wing or helicopter) operating with an airworthiness certificate without the restrictions and conditions proposed.

The sUAS to be operated hereunder is less than 10 lbs. fully loaded, carries neither a pilot nor passenger, carries no explosive materials or flammable liquid fuels, and operates exclusively within a secured area. Like other civil aircraft, operations under this exemption will be tightly controlled and monitored by the operator, and under the requirements and in compliance with local public safety requirements, to provide security for the area of operation as is currently done on active construction sites. The FAA will have advance notice of all operations.

These safety enhancements, which already apply to civil aircraft operated in connection with construction sites, 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 ability to carry and external load no greater than two lbs.

#### **14 C.F.R. 45.23(b): Marking of the Aircraft**

This regulation requires certain experimental, provisionally certified aircraft, or light-sport category aircraft to be marked with letters between 2 inches and 6 inches high “limited”, “restricted”, “light-sport”, “experimental”, or “provisional”, near each entrance to a cabin, cockpit, or pilot station.

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 sUAS, 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 sUAS marked on its fuselage as required by 45.29(f) where the pilot, observers and others working with the sUAS will see the identification of the UAS as “Experimental” The FAA has issued the following exemptions to this regulation. Exemptions Nos. 10700, 8738, 10167 and 10167A.

#### **14 CFR 61.113 (a) & (b): Private pilot privileges and limitations: Pilot in command**

Sections 61.113 (a) & (b) limit private pilots to non-commercial operations. Because the UAS will not carry a pilot or passengers, the proposed operations can achieve the equivalent level of safety of current operations by requiring the pilot operating the aircraft to have completed a UAS flight training course of 100 hours before flying a UAS. Unlike a conventional aircraft that carries the pilot and passengers, the sUAS is remotely controlled with no living thing or cargo on board. The area of operation is controlled and restricted, and all flights are planned and coordinated in advance. The risks associated with commercial operations contemplated by Part 61 when drafted, that allowing operations of the sUAS as requested with a pilot who has met the minimum requirements exceeds the present level of safety achieved by 14 C.F.R. 61.113 (a) & (b).

#### **14 C.F.R. 91.7 (a): Civil aircraft airworthiness**

The regulation requires that no person may operate a civil aircraft unless it is in airworthy condition. As there is no airworthiness certificate issued for the aircraft, should this exemption be granted, no FAA regulatory standard will exist

for determining airworthiness. Given the size of the aircraft and the use of safety checklists prior to each flight, as set forth in Section B and Section G, an equivalent level of safety will be provided.

## **14 C.F.R. 91.9 (b)(2): Civil aircraft flight manual, marking, and placard requirements**

The sUAS, 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 sUAS will have immediate access to it. The FAA has issued the following exemptions to this regulation: Exemption Nos. 8607, 8737, 8738, 9299, 9299A, 9565, 9565B, 10167, 10167A, 10602, 32827, and 10700.

**14 C.F.R. 91.103: Preflight Action** This regulation requires each pilot in command to take certain actions before a flight to ensure the safety of flight. An exemption is needed from this requirement as the pilot will take separate preflight actions, including checking for weather conditions, checking flight battery requirements, checking takeoff and landing distances, and all other actions in the Preflight Checklist in the Manual. These actions will provide an equivalent level of safety.

## **14 C.F.R. 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.

By design, sUAS and remotely piloted aircraft 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 previously approved exemptions for aircraft without fully functional dual controls. See Exemption Nos. 5778K & 9862A. The equivalent level of safety provided by the fact that neither a pilot nor passengers will be carried in the aircraft, the ability to control the uUAS via radio signals from the controller, and by the size and speed of the aircraft.

## **14 C.F.R. 91.119: Minimum Safe Altitudes**

Section 91.119 establishes safe altitudes for operation of civil aircraft. Section 91.119 (d) allows helicopters to be operated at less than the minimums prescribed, provided the person operating the helicopter complies with any route or altitudes prescribed for helicopters by the FAA. This exemption is for a multirotor craft that flies similarly to a helicopter, with vertical takeoff and vertical landing, which will typically operate at altitudes of 200 AGL, so an exemption may be needed to allow such operations. The UAS will never operate at altitude higher than 400 AGL and will be in a restricted area with security perimeter, where buildings and people will not be exposed to operations without their pre-obtained consent. The equivalent level of safety will be achieved given the size, weight, speed of the UAS as well as the location where it is operated. No flight will be taken without the permission of the property owner or local officials. Because of the advance notice to the property owner and any onsite personnel, all affected individuals will be aware of the planned flight operations. Compared to flight operations with aircraft or rotorcraft weighing far more than the maximum 10 lbs. proposed herein and carrying flammable fuel, any risk associated with our operations of the sUAS will ensure separation between these small UAS operations and the operations of conventional aircraft that must comply with Section 91.119.

## **14 C.F.R. 91.121: Altimeter Settings**

This regulation requires each person operating an aircraft to maintain cruising altitude by reference to an altimeter that is set “..to the elevation of the departure airport or an appropriate altimeter setting available before departure.” As the sUAS may not have a barometric altimeter, but instead a GPS altitude read out, an exemption may be needed. An

equivalent level of safety will be achieved by the operator, pursuant to the Safety Checklist, confirming the altitude of the launch site shown on the GPS altitude indication before flight.

#### **14 C.F.R. 91.151 (a): Fuel requirements for flight in VFR conditions**

Section 91.151 (a) outlines fuel requirements for beginning a flight in VFR conditions. Our UAS is limited to operations in sterile and controlled environments as outlined above and has a limited range and flight time which require an exemption from 14 CFR 91.151 (a).

The battery powering the sUAS provides approximately 35 minutes of powered flight. To meet the 30 minute reserve requirement in 14 CFR 91.151, sUAS flights would be limited to approximately 5 minutes in length. Given the limitations on the UAS's proposed flight area and the location of its proposed operations within a predetermined area, a longer time frame for flight in daylight or night VFR conditions is reasonable.

Aerial Photos of America believes that an exemption from 14 CFR 91.151 (a) falls within the scope of prior exemptions. See Exemption 10673 (allowing Lockheed Martin Corporation to operate without compliance with FAR 91.151 (a)). Operating the small UAS, in a tightly controlled area where only people and property owners or official representatives who have signed waivers will be allowed, with less than 30 minutes of reserve fuel, does not engender the type of risks that Section 91.151 (a) was intended to alleviate given the size and speed of the small UAS. Additionally, limiting sUAS flights to 10 minutes would greatly reduce the utility for which the exemption will be granted.

An equivalent level of safety can be achieved by limiting flights to 30 minutes, or enough battery reserve to ensure that the sUAS lands at the ground station with at least 20% of battery power (as determined by the onboard monitoring system and the pilot), whichever happens first. This restriction would be more than adequate to return the sUAS to its planned landing zone from anywhere in its limited operating area. Similar exemptions have been granted to other operations, including Exemptions 2689F, 5745, 10673, and 10808.

#### **14 CFR 91.203 (a) & (b): Carrying civil aircraft certification and registration.**

The regulation provided in 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 he 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 10 lbs and is operated without an onboard pilot. Therefore there is no ability or place to carry certification and registration documents or to display them on the sUAS.

An equivalent level of safety will be achieved by keeping these documents at the ground control point where the pilot flying the sUAS will have immediate access to them, to the extent they are applicable to the sUAS. The FAA has issued numerous exemptions to this regulation. A representative sample of other exceptions includes Exemption Nos. 9565, 9665, 9789, 9789A, 9797, 9797A, 9816A, and 10700.

#### **14 CFR 91.405 (a); 407 (a)(1); 409 (a)(2); 417 (a) & (b): Maintenance inspections**

These regulations require that an aircraft operator or owner "shall have that aircraft inspected as prescribed in subpart E of this part and shall between required inspections, except as provided in paragraph © of this section, have discrepancies repaired as prescribed in part 43 of this chapter..." and others shall inspect or maintain the aircraft in compliance with Part 43.

Given that these sections and Part 43 apply only to aircraft with an airworthiness certificate, these sections will not apply to Aerial Photos of America. Maintenance will be accomplished by the operator pursuant to the flight manual and

operating handbook as referenced in the Manual. An equivalent level of safety will be achieved because these small UASs are very limited in size and will carry a small payload and operate only in restricted areas for limited periods of time. If mechanical issues arise the UAS can land immediately and will be operating from no higher than 400 feet AGL. As provided in the Manual, the operator will ensure that the UAS is in working order prior to initiating flight, perform required maintenance, and keep a log of any maintenance performed. Moreover, the operator is the person most familiar with the aircraft and best suited to maintain the aircraft in an airworthy condition to provide the equivalent level of safety.

Pursuant to 14 C.F.R. Part 11, the following summary is provided for publication in the Federal Register, should it be determined that publication is needed:

**Applicant seeks and exemption from the following rules: 14 C.F.R. Part 21, subpart H; 14 C.F.R. 45.23(b); 14 C.F.R. Parts 61.113(a)(b); 91.7 (a); 91.9(b)(2); 91.103(b); 91.109; 91.119; 91.121; 91.151(a); 91.203(a)(b); 91.405(a); 91.407(a)(1); 91.409(a)(2); 91.417(a)(b) to operate a small unmanned vehicle (55lbs or less) in construction operations.**

Approval of the exemptions allowing commercial operations of sUAS's in the construction industry enhances safety by reducing or eliminating risk. Manned aircraft monitoring construction progress creates a greater risk because the aircraft are much larger, heavier, have combustible fuel and are occupied by human pilots and photographers. In contrast, a sUAS weighing fewer than 10 lbs and powered by a small battery and no passengers eliminates virtually all catastrophic risk and carbon footprint.

## Privacy

All flights will occur over private or controlled access property with the property owner's prior consent and knowledge. Images taken will be of individuals who have also consented to being visually recorded and have agreed to be in the area where aerial photography will take place.

Respectfully,



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