



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

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

July 22, 2015

Exemption No. 12113
Regulatory Docket No. FAA-2015-1073

Mr. Cody A. Porter
CEO/sUAS Operator
KADOO AERIAL, LLC
2111 West 9th Street
Joplin, MO 64801

Dear Mr. Porter:

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 April 8, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of KADOO AERIAL, LLC (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial photography and videography, inspections, and monitoring.

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. However, the FAA received one comment made to the docket. In granting this exemption, the FAA has determined that the proposed operations can safely be conducted under the conditions and limitations of this exemption. As with exemptions issued to Aeryon Lab, Astraeus Aerial, Clayco, Inc., and VDOS Global, LLC, failure to comply with the document's conditions and limitations is grounds for immediate suspension or rescission of the exemption.

Airworthiness Certification

The UAS proposed by the petitioner is a X-UAV Skysurfer MAX.

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 collection¹. 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 Astraesus 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,

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.

delegated to me by the Administrator, KADOO AERIAL, LLC 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.

Conditions and Limitations

In this grant of exemption, KADOO AERIAL, LLC 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 X-UAV Skysurfer MAX 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.

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

April 8, 2015

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

Re: Exemption Request Pursuant to Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations from: 14 CFR 21 subpart H; 14 CFR 45.23(b); 14 CFR 61.113(a) and (b); 14 CFR 91.7(a); 14 CFR 91.9(b) (2); 14 CFR 91.103; 14 CFR 91.109; 14 CFR 91.119(c); 14 CFR 91.121; 14 CFR 91.151(a); 14 CFR 91.203 (a) And (b); 14 CFR 91.405 (a); 14 CFR 91.407 (a) (1) 14 CFR 91.409 (a) (1) and (2); 14 CFR 91.417(a) and (b).

Dear Sir or Madam:

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 (the "Reform Act") and 14 CFR Part 11, KADDO AERIAL LLC, operator of an Unmanned Aircraft System (UAS),

Commercial operation of an UAS, as described herein, which are equipped with camera(s) and sensors, would operate in the following manner:

- Routine inspections of Power Electric Utility insulators.
- Right-of-Way inspections for Electric Power Utility and Natural and/or Gas petroleum pipeline inspection.
- Power sub-station inspections.
- Natural Gas pump station inspection.
- Crop and Agricultural monitoring.
- Aerial photography and/or video for public and/or private use including real estate, architecture, land surveying, engineering and other related professional activities.
- Aerial video and/or photography for public and/or private use including television, public events, cinematography and news gathering.
- Aerial inspection/photography of residential/commercial structures under contract with the owners or local government authority.
- Aerial inspection/photography of residential/commercial utility infrastructure including but not limited to electrical power lines, wind turbines and cell towers with help of F.L.I.R. (Forward Looking Infrared Camera) cameras.
- Aerial video/photography or providing live video feed to assist with search and rescue operations in cases of an emergency or natural disaster only when the local authorities or government has requested.

Hereby applies for an exemption from the listed Federal Aviation Regulations ("FARs") to allow commercial operation of its UAS, 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 described fully below, the requested exemption would permit the operation of a UAS under controlled conditions in the NAS that would be a) limited b) controlled c) predetermined and d) will provide safety enhancements to the already safe operations in the industry presently using conventional aircraft. 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:

KADOO AERIAL, LLC

Attn: Cody A. Porter, CEO/ sUAS Operator

Phone: 417-499-7687

Email: KDOWK@GMAIL.COM

Address: 2111 West 9th St.

Joplin, Missouri 64801

Regulations from which the exemption is requested:

14 CFR Part 21 subpart H

14 CFR 45.23 (b)

14 CFR 61.113 (a) & (b)

14 CFR 91.7 (a)

14 CFR 91.9 (b) (2)

14 CFR 91.103

14 CFR 91.109

14 CFR 91.119 (c)

14 CFR 91.121

14 CFR 91.151 (a)

14 CFR 91.203 (a) & (b)

14 CFR 91.405 (a)

14 CFR 91.407 (a) (1)

14 CFR 91.409 (a) (2)

14 CFR 91.417 (a) & (b)

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 national airspace system (NAS) before completion of the rulemaking required under Section 332 of the Reform Act. In making this determination, the Secretary is required to determine which types of UASs do not create a hazard to users of the NAS or the public or pose a threat to national security in light of the following:

- The UAS's size, weight, speed, and operational capability;
- Operation of the UAS in close proximity to airports and populated areas; and
- Operation of the UAS within visual line of sight of the operator.

Reform Act § 333 (a). Lastly, if the Secretary determines that such vehicles “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) (emphasis added) Applicant interprets this provision to place the duty on the Administrator to not only process applications for exemptions under section 333, but for the Administrator to craft conditions for the safe operation of the UAS, if it should be determined that the conditions set forth herein do not fulfill the statutory requirements for approval.

The Federal Aviation Act expressly grants the FAA the authority to issue exemptions. This statutory authority by its terms includes exempting civil aircraft, as the term is defined under §40101 of the Act that includes sUAS, 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).

KADOO AERIAL LLC, sUAS are rotorcraft, weighting 55 or fewer lbs. including payload. They 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. They will operate only in line of sight and will operate only within a sterile area. Such operations will insure that the sUAS 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 sUAS involved and the restricted sterile environment within which they will operate, the applicant falls squarely within that zone of safety (an equivalent level of safety) in which Congress envisioned that the FAA must, by exemption, allow commercial operations of UASs to commence immediately. Also due to the size of the UASs and the restricted areas in which the relevant sUAS 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, reduction in environmental impacts, including reduced emissions associated with allowing UASs, the grant of the requested exemptions is in the public interest.

Accordingly, the applicant respectfully requests that the FAA grant the requested exemption without delay.

AIRCRAFT AND EQUIVALENT LEVEL OF SAFETY

The operation limitations proposed for an equivalent or higher level of safety because operations will further enhance the safety of the persons and/or property using conventional aircraft. The applicant 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 operations conducted with conventional aircraft. These limitations and conditions to which KADOO AERIAL, LLC agrees to be bound when conducting commercial operations under an FAA issued exemption include:

These limitations and conditions to which the applicant agrees to adhere to when conducting commercial operations under the FAA issued exemption as set forth in the Flight Operations Manual (FOM) include:

- The UAS will weigh less than 55 lbs.
- The UAS will have a maximum operating speed of no more than 50mph.
- Flights will be operated within line of sight of the Pilot in Command (PIC) and/or Visual Observer (VO).
- Maximum flight time for each operational flight will be 30 minutes. Flights will be terminated at 25% battery power reserve or 30 minutes of flight time whichever occurs first.
- Flights will be operated at an altitude of no more than 400 feet Above Ground Level (AGL) and not more than 200 feet above an elevated platform from which filming is planned.
- Minimum crew for each operation will consist of the sUAS Pilot, the Visual Observer (VO) and may include but not limited to a Camera Operator.
- The UAS pilot will be a designated Pilot in Command (PIC).
- A briefing will be performed regarding the planned UAS operations prior to each day's flight consisting of all the days' production activities and/or flight plan.
- All flights will occur under Visual Flight Rules Meteorological Conditions (VMC) only.
- The flights will occur no closer than a 5 mile radius of the geographic center/Airport Reference Point (ARP) of a tower controlled or uncontrolled airport.
- If operations will be within a 5 mile radius of the geographic center/Airport Reference Point (ARP) of a tower controlled or uncontrolled airport the respective airports will be contacted advising them of the estimated flight time, flight duration, elevation of flight and other pertinent information.
- The operator will obtain verbal/written consent of all persons involved with the planned operation and ensure that only consenting persons will be allowed within 100 feet of the flight operation, and the radius may be reduced to 30 feet based upon an equivalent level of safety determination, as required under the FOM.
- The PIC and VO will have been trained in operation of sUAS and receive up-to-date information for the particular sUAS to be operated.
- The PIC and VO will be able to communicate by voice clearly without interruption.
- Written and/or verbal permission and permits will be obtained from territorial, state, county or city jurisdictions, including law enforcement, fire or other appropriate governmental agencies.
- If the UAS loses communications with the remote controller or loses GPS signal, the UAS will have the capability to return to a pre-determined location within a designated location and land autonomously.
- The UAS will have the capability to abort a flight in case of unpredicted obstacles, weather, or

emergencies.

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

The UAS to be operated hereunder is less than 55 lbs. fully loaded, carries neither a pilot nor passenger, carries no explosive materials or flammable liquid fuels, and operates exclusively within a secured and designated area. Unlike other civil aircraft, operations under this exemption will be tightly controlled and monitored by both the operator and under the requirements and in compliance with local public safety requirements. The FAA will have advance notice of all operations. These safety enhancements provide a greater degree of safety to the public and property owners than conventional operations conducted with airworthiness certificates issued under 14 C.F.R. Part 21, Subpart H. Lastly, application of these same criteria demonstrates that there is no credible threat to national security posed by the UAS, due to its size, speed of operation, location of operation, lack of explosive materials or flammable liquid fuels, and inability to carry a substantial external load.

14 C.F.R. § 45.23 (b). Marking of the Aircraft

The regulation requires:

When marks include only the Roman capital letter "N" and the registration number is displayed on limited, restricted or light-sport category aircraft or experimental or provisionally certificated aircraft, the operator must also display on that aircraft near each entrance to the cabin, cockpit, or pilot station, in letters not less than 2 inches nor more than 6 inches high, the words "limited," "restricted," "light-sport," "experimental," or "provisional," as applicable.

Even though the UAS will have no airworthiness certificate, an exemption may be needed as the UAS will have no entrance to the cabin, cockpit or pilot station on which the word "Experimental" can be placed. Given the size of the UAS, two-inch lettering will be impossible. The word "Experimental" will be placed on the fuselage in compliance with §45.29 (f). The equivalent level of safety will be provided by having the UAS marked on its fuselage as required by §45.29 (f) where the pilot, observer and others working with the UAS will see the identification of the UAS as "Experimental." The FAA has issued the following exemptions to this regulation to Exemptions Nos. 10700, 8738, 10167 and 10167A.

14 C.F.R. § 61.113 (a) and (b): Private Pilot Privileges and Limitations: Pilot in Command.

Pursuant to 14 CFR 61.113 (a) & (b), no person who holds a private pilot certificate may act as a pilot in command of an aircraft that is carrying passengers or property for compensation or hire. KADOO AERIAL, LLC may achieve an equivalent level of safety as achieved by current Regulations because the applicant's sUAS do not carry any pilots or passengers nor property. KADOO AERIAL, LLC sUAS do not carry any pilots or passengers nor property therefore I am requesting an exemption to 14 CFR 61.113(a) although helpful, a pilot's license will not ensure that right control by remote skills required to pilot a sUAS. The risks attendant to the operation of a sUAS is far less than the risk levels inherent in the commercial activities outlined in 14 CFR 61. The level of safety provided by the requirements included in the Manual exceeds that provided by a single individual holding a commercial pilot's certificate operating a conventional aircraft. The risks associated with the operation of the sUAS are so diminished from the level of risk associated with commercial operations contemplated by Part 61 when drafted, that allowing operations of the sUAS as requested with a private pilot as the PIC 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 will be no airworthiness certificate issued for the aircraft, should this exemption be granted, no FAA regulatory standard will exist for determining airworthiness. Given the size of the aircraft for maintenance and use of safety check lists prior to each flight an equivalent level of safety will be provided.

14 C.F.R. § 91.9 (b) (2): Civil Aircraft Flight Manual in the Aircraft.

Section 91.9 (b) (2) provides: No person may operate a U.S.-registered civil aircraft ... (2) for which an Airplane or Rotorcraft Flight Manual is not required by §21.5 of this chapter, unless there is available in the aircraft a current approved airplane or Rotorcraft Flight Manual, approved manual material, markings, and placards, or any combination thereof. The UAS, given its size and configuration has no ability or place to carry such a flight manual on the aircraft, not only because there is no pilot on board, but because there is no room or capacity to carry such an item on the aircraft. The equivalent level of safety will be maintained by keeping the flight manual at the ground control point where the pilot flying the UAS will have immediate access to it. 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 flight to insure the safety of flight. As FAA approved rotorcraft flight manuals will not be provided for the aircraft an exemption will be needed. The PIC will take all actions as stated in the FOM in Section 4 under Normal Procedures including but not limited to reviewing weather, flight battery requirements, landing and takeoff distances and aircraft performance data before initiation of flight as well as checking sUAS for any possible damage that might cause less than favorable flight conditions.

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. UAS and remotely piloted aircraft, by their design do not have fully functional dual controls. Flight control is accomplished through the use of a control box that communicates with the aircraft via radio communications. The FAA has approved exemptions for flight training without fully functional dual controls for a number of aircraft and for flight instruction in experimental aircraft. The equivalent level of safety provided by the fact that neither a pilot nor passengers will be carried in the aircraft and by the size and speed of the aircraft.

14 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. As this exemption is for a UAS that is a helicopter and the exemption requests authority to operate at altitudes up to 400 AGL, or not more than 200 above an elevated platform from which filming is planned, an exemption may be needed to allow such operations. As set forth herein, the UAS will never operate at higher than 400 AGL. It will however be operated 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 participants in the filming activity, all affected individuals will be aware of the planned flight operations. Compared to flight operations with aircraft or rotorcraft weighting far more than the maximum 55lbs. proposed herein and the lack of flammable fuel, any risk associated with these operations is far less than those presently presented with conventional aircraft operating at or below 500 AGL. In addition, the low-altitude operations of the UAS will ensure separation between the sUAS 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 UAS 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 check list and live flight data monitoring, confirming the altitude of the launch site shown on the GPS altitude indicator before flight.

14 C.F.R. § 91.151(a): Fuel Requirements for Flight in VFR Conditions

Section 91.151 (a) prohibits an individual from beginning “a flight in an airplane under VFR conditions unless (considering wind and forecast weather conditions) there is enough fuel to fly to the first point of intended landing, and, assuming normal cruising speed – (1) During the day, to fly after that for at least 30 minutes; or (2) At night, to fly after that for at least 45 minutes.”

The battery powering the UAS provides approximately 50 minutes of powered flight. To meet the 30 minute reserve requirement in 14 CFR §91.151, UAS flights would be limited to approximately 20 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 twilight VFR conditions is reasonable.

Applicant believes that an exemption from 14 CFR §91.151(a) falls within the scope of prior exemptions. Operating the 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 UAS flights to 10 minutes would greatly reduce the utility for which the exemption will be granted. Applicant believes that an equivalent level of safety can be achieved by limiting flights to 30 minutes or 25% of battery power— whichever happens first. This restriction would be more than adequate to return the UAS to its planned landing zone from anywhere in its limited operating area.

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

The regulation provides in pertinent part:

(a) Except as provided in § 91.715, no person may operate a civil aircraft unless it has within it the following:

(1) An appropriate and current airworthiness certificate. . . .

(b) No person may operate a civil aircraft unless the airworthiness certificate required by paragraph (a) of this section or a special flight authorization issued under §91.715 is displayed at the cabin or cockpit entrance so that it is legible to passengers or crew. The UAS fully loaded weighs no more than 55 lbs. and is operated without an onboard pilot. As such, there is no ability or place to carry certification and registration documents or to display them on the UAS. An equivalent level of safety will be achieved by

keeping these documents at the ground control point where the pilot flying the UAS will have immediate access to them, to the extent they are applicable to the UAS.

14 C.F.R. §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 (c) 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 section and Part 43 apply only to aircraft with an airworthiness certificate, these sections will not apply to the applicant. Maintenance will be accomplished by the operator pursuant to the flight manual and operating handbook. An equivalent level of safety will be achieved because the UAS is very limited in size and will carry a small payload and operate only in restricted areas for a limited period of time. If mechanical issues arise the UAS can land immediately and will be operating from no higher than 400 feet AGL. 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. An equivalent level of safety will be achieved because maintenance and inspections will be performed in accordance with the UAS Manufacturer's User Manual. As provided in the FOM, the operator will ensure that the UAS is in working order prior to initiating flight and perform required maintenance needed.

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 an exemption from the following rules: 14 C.F.R. §21, subpart H; 14 C.F.R 45.23(b); 14 C.F.R. §§ 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) and (b); 91.405 (a); 91.407 (a) (1); 91.409 (a) (2); 91.409 (a) (2) and 91.417 (a) & (b) to operate commercially a small unmanned vehicle (55lbs or less).

Given the small size of the UAS and the controlled environment provided the proposed operations will adhere to the Reform Act’s safety requirements. The approval of this application presents no national security issues and will enhance safety by reducing risk. Regarding the level of safety surrounding the proposed operations and the public benefit, reduction in environmental impacts, including but not limited to reduced emissions and noise, possibility to lower consumer cost by detecting electricity and natural gas leaks while at the same time reducing the risk associated with performing possibly hazardous task on foot. The grant of the requested exemption is in the public interest. Able to fly and inspect where larger manned aircraft are unable to maneuver or restricted to fly below 500 ABL. Ability to deploy an sUAS on site of a search and rescue with infrared technology to help government and law enforcement officials locate persons in a timely manner, especially in areas where storms occur often and time is a critical factor. If in air flight failure occurs the sUAS weighs less than 55 pounds, so if property damage were to occur it would be minimal to none compared to a larger 4,000lbs + manned

aircraft carrying the equivalent equipment. sUAS are powered by batteries and do not carry a combustible material such as Jet A or other equivalent fuel on board like jets and piston powered are required to have therefore lowering the risk associated with combustible fuel. These lightweight aircraft operate at slow speeds, close to the ground, and in a sterile environment and, as a result, are far safer than conventional operations conducted with turbine helicopters operating in close proximity to the ground and people.

Additional Information

The applicant, Cody A. Porter, has been involved in the building and piloting of remote controlled aircraft for more than 11 years. Also the primary pilot, Cody A. Porter, has an in-depth understanding of the capabilities and safety concerns involved in using this technology as an asset to the community. The public Satisfaction of criteria provided in Section 333 of the Reform Act of 2012 provide more than adequate justification for the grant of the requested exemptions allowing the commercial operation of the applicant's sUAS.

Privacy

All flights will occur over private or controlled access property with the property owner's prior consent and knowledge. Filming will be of people who have also consented to being filmed or otherwise have agreed to be in the area where filming will take place. The grant of this exemption request will provide improved safety in both day and night operations. Satisfaction of the criteria provided in Section 333 of the Reform Act of 2012-size, weight, speed, operating capabilities, proximity to airports and populated areas and operation within visual line of sight and national security – provide more than adequate justification for the grant of the requested exemptions allowing commercial operation of applicant's UAS.

Sincerely,

A handwritten signature in black ink, appearing to read 'Cody Porter'.

CODY A. PORTER
KADOO AERIAL

sUAS Additional information

sUAS to be used as follows but not limited to providing they are within the requirements of the exemptions granted by the FAA:

KADOO AERIAL, LLC, first in operation sUAS will be X-UAV Skysurfer MAX, with a 1510mm(59.5inches) Wingspan, 1085mm (42.7inch) overall length, with a wing area of 483 sq. in, making the total wing load 9.54 oz./sq. Ft. , and a total operating weight of 1000g or 2.2lbs. The power will be provided by a Tiger Motor MT2216-9 w/ 7x4 propeller and a T-Motor ESC for motor control, which provides 380 watts of power maximum. The control surfaces including the aileron, rudder, and elevator, will be controlled by KST DS245H metal gear servos with 9 grams of torque, abs plastic control horns and carbon fiber rods will be used to connect the servo to the control surface. The Battery used for the Electric Brushless motor will be a 4 cell Lithium Polymer 14.8 volt Battery with 3000maH or 3aH. The Receiver will use a separate 2 cell 7.4 volt Battery with 1600mah of power. The Receiver will operate at 2.4 GHz with the Spektrum AR9110 and will provide the ability to log flight data as well as 2 battery inputs for added safety in case of battery failure. The Transmitter used to control the sUAS will be the Spektrum DX9 with telemetry which transmits live data such as battery voltage, signal quality, motor temperature, airspeed, and altitude. The sUAS will also carry a 3DR Pixhawk Board for fail safe and return to home mode that will notify wirelessly over a 433 MHz signal if the flight conditions become less than favorable. The X-UAV Skysurfer MAX will also carry a 32 channel 200mw 5.8 GHz EzUHF wireless video transmitter for the camera operator which will enable him/her to view live video to insure the camera is correctly angled to view the multispectral and/or Forward Looking Infrared Camera image is correctly in frame. The Live video receiver for the Observing camera operator will be a Lumenier Slim LCD FPV Monitor with 5.8GHz 32CH Diversity Receiver that also includes a DVR built to eliminate an on board camera, making the Skysurfer MAX lighter in design.