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

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

September 3, 2015

Exemption No. 12747
Regulatory Docket No. FAA–2015–2530

Ms. Jennifer Pecora
President
Ohio Valley Archaeology Inc.
4889 Sinclair Road, Suite 210
Columbus, OH 43229

Dear Ms. Pecora:

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 Ohio Valley Archaeology Inc. (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial photography, videography, mapping, and surveying.

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

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

Airworthiness Certification

The UAS proposed by the petitioner are the DJI Phantom 2 and DJI Phantom 3.

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, Ohio Valley Archaeology Inc. 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)

[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.

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, Ohio Valley Archaeology Inc. is hereafter referred to as the operator.

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

1. Operations authorized by this grant of exemption are limited to the DJI Phantom 2 and DJI Phantom 3 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 September 30, 2017, unless sooner superseded or rescinded.

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

Enclosures

Ohio Valley Archaeology, Inc.

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June 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.

Dear Sir or Madam:

In pursuant with Section 333 of the FAA Modernization and Reform Act of2012 and 14 C.F.R. Part 11, Ohio Valley Archaeology, Inc. (OVAI), an operator of small Unmanned Aircraft System (sUAS) for the aid in compliance with the National Historic Preservation Act and archaeology in general, seeks an exemption from the Federal Aviation Regulations (FARs) to allow commercial operations of its sUASs.

OVAI's requested exemption would allow commercial operation of DJI Phantom 2 and DJI Phantom 3 sUASs under controlled conditions for the purpose of aerial photography, videography, mapping, Structure from Motion (SFM) and photogrammetry. Both sUASs weigh less than 3 lbs, have a maximum speed of 35 mph and have multiple built-in safety functions. OVAI would only operate the sUASs under conditions that are:

1. Performed in an area of operation limited in size suitable to the specific use, in advance of flight.
2. Planned in advance to minimize hazards to persons and property in the air and on the ground.
3. Operated in area of reasonably limited or controlled access to provide safety to those not involved in the operations.
4. Under environmental conditions that are safe for all persons and property involved and not involved in the operations.
5. Below 500 ft.
6. Within the line of site (LOS) of the person in control (PIC).

Conditions for sUAS operation as described in this application are consistent with and based upon proposed FAA sUAS regulations as outlined by the FAA on the 15th of February, 2015. Any additional conditions included herein have been included by OVAI to add to and enhance the safe operation of sUASs during operations.

The applicant contact information is:

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President
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I. Statutory Authority for Requested Exemptions

This petition for exemption is submitted in accordance with Section 333 of the Reform Act. Congress has directed the FAA "to safely accelerate the integration of civil unmanned aircraft systems into the national airspace system." Pursuant to Section 333 of the Reform Act, the FAA Administrator is to permit operation of an unmanned aircraft system where it does not create a hazard to users of the national airspace system ("NAS") or the public or pose a threat to national security based on the following considerations:

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

Furthermore, the Federal Aviation Act grants the FAA Administrator general authority to grant exemptions from the agency's safety regulations and minimum standards when the Administrator decides a requested exemption is in the public interest. *See* 49 U.S.C. §§ 106(f), 44701-44716, *et seq*. A party requesting an exemption must explain the reasons why the exemption: (1) would benefit the public as a whole, and (2) would not adversely affect safety or how it would provide a level of safety at least equal to the existing rules.

II. Ohio Valley Archaeology, Inc. Background Information

Ohio Valley Archaeology, Inc (OVAI) was established in 1997 and was incorporated in 2006 by Jennifer L. Pecora who is sole owner and President of the company. OVAI is an SBA certified Small Business (SBE), Woman Owned Small Business (WOSB) and Small Disadvantaged Business. We provide cultural resources services for all project types in compliance with the National Historic Preservation Act (NHPA) of 1966 (e.g., records searches, research, cultural resource management plans, Phase I-III archaeological surveys, and Section 106 & 110 NHPA documentation) and archaeological-geophysical services worldwide. We have completed over 800 cultural resources reports and boast an excellent agency review record.

OVAI also works closely with numerous academic institutions, as well as, state, county and local historical societies for the purpose of archaeology and historic preservation. OVAI's involvement with these institutions has been both for educational and commercial purposes and often involve collaboration with the general public with the intent of furthering the awareness and interest of archaeology and historic preservation.

III. Public Interest

OVAI is currently an industry leader in ground based remote sensing in the form of magnetometry, ground penetrating radar, magnetic resistance, etc. These forms of remote sensing greatly improve the documentation of archaeological sites and other historical resources. They also provide new perspectives and yield information that was previously undetectable with traditional techniques. Being non-invasive, remote sensing techniques are also more cost effective. For these reasons, OVAI's remote sensing services are in high demand. OVAI routinely shares its remote sensing results at professional conferences and in public presentations.

OVAI's services have garnered much public attention and interest. From Revolutionary War forts to long-lost prehistoric Native American earthworks, archaeological and historical resources are economically important at the local, state, and federal levels. OVAI plays a major role in advancing the documentation and preservation of such resources.

OVAI believes that the use of sUASs for the purpose of archaeology and historic preservation will greatly enhance its services both publicly and commercially. The ability to accurately collect current aerial photographs and incorporate them with other data will benefit the public interest in archaeology and historic preservation and commercial compliance with the NHPA. In addition, the ability to incorporate sUAS collected data into various processes, such as SFM and photogrammetry, would increase the educational value of a historical resource and aid in the NHPA consultation process between federal agencies, state historic preservation offices, and the general public.

IV. Proposed Operations

a). **Intended use of sUAS**

As mentioned above, OVAI specializes in archaeology and historic preservation for public interest and for compliance with the NHPA. Consequently, OVAI would incorporate sUASs to identify, document and evaluate archaeological and other historical resources. The sUASs would be used to: 1) accurately collect aerial photographs, 2) incorporate information gathered from aerial photographs into the management of historic resources or the planning process of commercial development, 3) when applicable, process the collected data with photogrammetry software to create 3-D renderings of landscapes and Digital Elevation Models (DEM) that can be subjected to terrain analysis, 4) apply photographs to SFM to create 3-D renderings of historical architecture, 5) determine the visual impacts of proposed developments on historic resources, 6) accurately document various features related to historical and archaeological resources.

b). **Environments in which sUAS Intend to be Operated**

Grant of the exemption to OVAI will be subject to the following mandatory conditions, which are based upon operating conditions set forth for operation of sUAS by public entities pursuant to Certificates of Authorization, with additional restrictions:

- Operations to avoid congested or populated areas,
- Operations to be conducted over private or controlled-access property.
- Permission from land owner/controller required before commencing any flight.
- Operations to occur during Visual Flight Rules Meteorological Conditions (VMC).
- sUAS to remain within Visual Line of Sight (VLOS) of the PIC.
- Operations to occur during daylight hours.
- Above Ground Level (AGL) altitude to be restricted to 500 feet.
- No operation will be conducted within 5 NM of an airport, without authorization.
- Operation will be in accordance with the NOTAM as required by the operator's COA.
- All required permissions and permits will be obtained from territorial, state, county or city jurisdictions, including local law enforcement, fire, or other appropriate governmental agencies.

c). **Equivalent Level of Safety**

OVAI in collaboration with Insite Ed & Consulting has developed a Safety and Health Program that is implemented on all OVAI projects. OVAI will incorporate all applicable health and safety procedures while conducting sUAS operations. In addition, OVAI intends to incorporate the following limitations and conditions specific to sUAS operations:

- All sUASs utilized will weigh less than 55 lbs. (25 kg).
- The aircraft will remain within visual line-of-sight ("VLOS") of the operator and / or visual observer(s) at all times using vision unaided by any device with the exception of corrective lenses.
- A visual observer ("VO") may be utilized to satisfy the VLOS and observation requirements as defined herein.
- The aircraft will not operate over non-participating persons.
- Flight operations will be conducted only between the period of official sunrise and sunset as defined in the Aeronautical Information Manual (AIM).
- The sUAS will yield right-of-way to other aircraft, manned or unmanned. If there is a risk of a collision, the operator will immediately maneuver away.
- Prior to flight, the sUAS operator will assess weather conditions using FAA approved weather sources and direct weather observation, will check airspace restrictions and TFRs and will assess the location of people and property to lessen risks if he or she loses control of the sUAS.
- Flight operations will be conducted only with flight visibilities at or exceeding 3 statute miles.
- The sUAS will not be operated in airport flight paths, restricted airspace, or areas under current Temporary Flight Restrictions (TFRs).
- The operator will discontinue the flight when continuing would pose a hazard to other aircraft, people or property.
- The sUAS will not exceed an airspeed of 87 knots (35 mph).
- The sUAS will not be operated at an altitude exceeding 500 feet above ground level ("AGL").
- Operations will not be conducted in Class A airspace.
- The operator / observer(s) will operate / observe only one sUAS at a time.
- A thorough preflight of the sUAS will be conducted by the designated person in control
- ("PIC") prior to the first flight of the day or after any suspected or observed anomalies or damage.
- The PIC will follow the suggested preflight actions as outlined in the sUAS operator's manual or, if available.
- The operator will not operate an sUAS should he or she know or has any reason to know of any physical or mental condition that would interfere with their safe operation of the aircraft.
- The sUAS will not be operated in a careless or reckless manner.
- ATC permission will be obtained prior to operations in Class B, Class C, Class D or Class E airspace.

d). **Person in Control (PIC)**

- All operators will be 18 years of age or older.
- Operators or a designated OVAI official will make available to the FAA, upon request, the sUAS for inspection or testing.
- Operators will maintain a log of flights as practicable for future currency or flight logging requirements.
- An operator or a designated OVAI official will report an accident to the FAA within 10 days of any operation that results in damage to property, other than the aircraft, estimated to exceed $25,000 for repair (including materials and labor) or fair market value in the event of total loss, whichever is less and / or results in significant injury or death.

V. Requested FAR Exemptions

Ohio Valley Archaeology, Inc. requests exemption from the following regulations:

- Part 21, Subpart H.
- 45.23 (b).
- 45.25.
- 45.27 (a).
- 45.29.
- 61.113 (a) & (b).
- 61.133 (a).
- 91.7 (a).
- 91.9 (b)(2) & (c).
- 91.103.
- 91.105.
- 91.109 (a).
- 91.119.
- 91.121.
- 91.151 (a)(1) & (b).
- 91.203 (a) & (b).
- 91.405 (a).
- 91.407 (a)(1).
- 91.409 (a)(2).
- 91.417 (a) & (b).

VI. Discussion of Requested FAR Exemptions

A). 14 C.F.R. Part 21, Subpart H – Airworthiness certificates.

Section 91.203(a)(1) requires civil aircraft to have "an appropriate and current airworthiness certificate." Part 21, Subpart H ("Airworthiness Certificates") establishes the procedural requirements and applicability for the issuance of airworthiness certificates as directed by 14 C.F.R. § 91.203(a)(1).

Equivalent level of safety: The sUASs operated will have a gross weight less than 55 lbs. and will be flown at speeds less than 87 knots (100 mph). They do not carry a pilot or passengers, do not carry flammable fuels and will be operated in well-defined locations using an operator and, if deemed required by OVAI, a visual observer(s). All operations will be conducted in compliance with the limitations and conditions stated in this petition for exemption. The Federal Aviation Act and Section 333 of the Reform Act both authorize the FAA to exempt aircraft from the requirement of an airworthiness certificate upon consideration of the sUASs' size, weight, speed, operational capability and proximity to airports and populated areas.

The characteristics and conditions under which the sUASs will be operated, as outlined in this petition, given the size, weight, speed, operation capability and proximity to airports and populated areas, achieve or exceed the equivalent level of safety over a manned aircraft with an airworthiness certificate used for the purposes outlined in this petition.

The FAA will have advance notice of all operations through the filing of Certificates of Waiver or Authorizations (COA) and, if deemed required by the FAA, the filing of Notices to Airman (NOTAMS) not more than 72 hours, but not less than 48 hours, prior to conducting operations under this grant of exemption.

The FAA has stated that no exemption is required from this section if a finding is made under the Reform Act that an sUAS provides an equivalent level of safety when compared to aircraft normally used for the same application. *See* granted exemptions 11138, 11062, 11067, 11080, 11114 and 11112.

B). 14 C.F.R § 45.23 (b) – Display of marks; general.

Regulation 14 C.F.R. § 45.32 (b) states: "…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."

Equivalent level of safety: These sUAS does not have a "cabin, cockpit or pilot station entrance" therefore the required marks cannot be displayed "near each entrance." Additionally, letters not less than 2 inches nor more than 6 inches may not be practical given the small size of the sUAS. If the sUAS is too small to display markings in the size described in regulation § 45.23 (b), then markings will be displayed in the largest practicable manner.

C). 14 C.F.R. § 45.25 – Location of marks on fixed winged aircraft.

Regulation 14 C.F.R. 45.25 describes the marking requirements on fixed winged aircraft. It states that the aircraft, "…must display the required marks on either the vertical tail surfaces or the sides of the fuselage…". It continues to describe the specific locations on which marks may be displayed.

Equivalent level of safety: An sUAS does not carry a pilot or passengers, does not have a cabin and may have a design that is significantly different than traditional manned aircraft. As such, the markings requirements of 14 C.F.R. § 45.25 may not be feasible given the design and layout of the aircraft. To provide an equivalent level of safety, the sUAS will display required markings on conspicuous locations of the aircraft.

D). 14 C.F.R. § 45.27 (a) – Location of marks; nonfixed-wing aircraft.

Regulation 14 C.F.R. 45.27 (a) states: "Each operator of a rotorcraft must display on that rotorcraft horizontally on both surfaces of the cabin, fuselage, boom, or tail the marks required by §45.23."

Equivalent level of safety: An sUAS does not carry a pilot or passengers, does not have a cabin and may have a design that is significantly different than traditional manned aircraft. As such, the markings requirements of 14 C.F.R. § 45.25 may not be feasible given the design and layout of the aircraft. To provide an equivalent level of safety, the sUAS will display required markings on conspicuous locations of the aircraft.

E). 14 C.F.R. § 45.29 – Size of marks.

Regulation 14 C.F.R. 45.29 describes the required size of marks and the characteristic of lettering for aircraft. In many cases it dictates that marks must be at least 12 inches high.

Equivalent level of safety: An sUAS is, by definition, significantly smaller and may have a design and layout significantly different than traditional manned aircraft. As such, the size and layout of markings as stated in 14 C.F.R. § 45.29 may not be feasible due to the inherent characteristics of sUASs. To provide an equivalent level of safety, the sUAS will display required markings on conspicuous locations of the aircraft. If the aircraft is too small to display markings in standard size, then the aircraft will display markings in the largest practicable manner.

F). 14 C.F.R § 61.113 (a) & (b) and 14 C.F.R. § 61.133 (a) - Private pilot privileges and limitations; pilot in command; commercial pilot privileges and limitations.

Regulation 14 C.F.R. § 61.113 restricts private pilots from flying aircraft for compensation or hire and would require a second class medical certificate. Regulation 14 C.F.R. § 61.133 requires a pilot to hold a commercial pilot's license when acting as pilot in command of an aircraft used for compensation or hire. This is intended to ensure that the skill and competency of any PIC matches the airspace in which the PIC will be operating, as well as requiring certifications if the pilot is carry passengers or cargo for hire.

Equivalent level of safety: OVAI's UASs will be operated as part of a commercial operation, however they do not carry passengers or cargo. Additionally, they remain below 500 feet AGL, are operated at less than 87 knots (100 mph), will not be operated over non-participating individuals, are under 55 lbs. and do not carry flammable fuel. In FAA Docket No. FAA-2014-0352, the FAA determined that sUAS operations did not warrant the additional cost and restrictions imposed by requiring the operator to have a commercial pilot certificate and class II medical certificate.

G). 14 C.F.R. § 91.7 (a) – Civil aircraft airworthiness.

The regulations states: "No person may operate a civil aircraft unless it is in airworthy condition."

Equivalent level of safety: The FAA has stated that no exemption is required to the extent that the requirements of Part 21 are waived or found inapplicable. OVAI requests that the requirements for § 91.7 be treated in accordance with FAR Part 21 Subpart H. Additionally, OVAI operators will inspect the aircraft prior to flight in order to ensure it is in a condition that is safe for flight. *See* granted exemption 11062.

H). 14 C.F.R. § 91.9 (b)(2) & (c) – Approved flight manual in the aircraft.

Regulation 14 C.F.R. § 91.9 (b)(2) states: "No person may operate a U.S.-registered civil aircraft … 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."

Regulation 14 C.F.R. § 91.9 (c) states: "No person may operate a U.S.-registered civil aircraft unless that aircraft is identified in accordance with part 45 of this chapter."

Equivalent level of safety: OVAI requests an exemption from this regulation in part as outlined in the request for exemption from regulation 14 C.F.R. § 91.203 (a) and (b). An equivalent level of safety will be achieved by maintaining the proper documentation at the location of the Ground Control Station readily available to the operator. This includes the sUAS operation manual as provided by the manufacturer or equivalent documents as created by OVAI. Additionally, the FAA, in accordance with FAA Office of Chief Counsel's Opinion dated August 8, 2014, the UAS flight manual, registration

certificate and other documentation will be kept at the control station with the operator during flight. The Chief Counsel's Office has held that for all UAS operations, this alternate method constitutes full compliance with the regulations. *See* granted exemption 11062.

I). 14 C.F.R. § 91.103 – Preflight action.

14 C.F.R. § 91.103 requires the PIC to become familiar with specific information before each flight, including information contained in the FAA-approved Flight Manual on board the aircraft.

Equivalent level of safety: The sUAS does not have a Flight Manual on board because of its inherent design and lack of on board pilot. The operator will review information prior to flight to maintain the safety of the operation, including but not limited to, the weather, battery levels, landing and takeoff distances and aircraft performance data. The operator will refer to the manufacturer supplied sUAS manual for technical data and information as provided. The manual will be kept at the ground station during operations.

The FAA has stated that no exemption is required (*see* Grant of Exemption No. 11062, p. 20) however, an exemption is requested to the extent that an FAA-approved Flight Manual is required.

J). 14 C.F.R. § 91.105 - Flight crewmembers at stations.

This section contains requirements for crewmembers during takeoff and landing of the aircraft. The regulation requires crewmembers to be at the crewmember's station unless absence is necessary to perform their duties. It also requires crewmembers to keep safety belt(s), including their shoulder harness if so equipped, fastened.

sUASs do not carry pilots or passengers and therefore do not have a "crewmember station." However sUASs do have a Ground Control Station from which an operator controls the aircraft via radio signals. The Ground Control Station may be at a fixed location or may be movable. However, because it is not a physical part of the aircraft, the Ground Control Station may not have a seat(s) and does not utilize safety belts.

Visual observers, when deemed necessary by OVAI, may be at various locations in the vicinity of the flight operations area in order to provide the best line of sight view of the sUAS during flight. The visual observers may or may not be at a fixed location and may or may not utilize a seat. The seat will not be equipped with safety belts.

Equivalent level of safety: The sUAS operator will remain at the Ground Control Station where the control of the aircraft takes place for the duration of the flight. Visual observers, when deemed necessary by OVAI, will be positioned in the flight operations area according to the operator's determination of the optimal viewing area given the planned flight. The use of safety belts is not feasible because the crewmember stations are not physically a part of the aircraft and are not in motion.

K). 14 C.F.R. § 91.109 (a) – Flight instruction.

14 C.F.R. § 91.109 (a) states 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." sUASs do not have functioning dual controls by design. They are piloted using a Flight Control System / Ground Control Station that communicates with the aircraft via radio signals.

Equivalent level of safety: During flight instruction, there are no pilots or passengers on the aircraft and the Ground Control Station will be a safe distance from the aircraft. The aircraft will remain a safe distance from non-participating individuals causing no safety hazard. Given the size and speed of the sUAS, an equivalent level of safe training can be performed without dual controls because no pilot or passengers are aboard the aircraft and it is a safe distance from the public and structures.

The FAA has previously approved exemptions for flight training without dual controls for a number of aircraft. *See* Granted Exemptions: 11109, 11138 and 11110.

L). 14 C.F.R. § 91.119 – Minimum safe altitudes.

14 C.F.R. § 91.119 prescribes that an aircraft may not be operated closer than 500 feet to any person, vessel, vehicle or structure. The nature of the operations described herein may require operation in relatively close proximity to items such as power line towers or poles. However, operations will not be conducted over non-participating individuals.

Equivalent level of safety: The sUASs operated by OVAI are far smaller than manned aircraft, such as rotorcraft and fixed winged aircraft, used for similar operations. Additionally, the sUASs do not carry a pilot or passengers, weigh less than 55 lbs., do not carry flammable fuel, will not exceed 87 knots (100 mph) and will not be operated over non-participating persons. The sUASs will be operated below 500 feet AGL with the use of an operator and, if determined to be required by OVAI, a visual observer(s) to avoid risk to aircraft, persons and property. This provides an equivalent or greater level of safety than achieved with conventional aircraft currently performing similar operations *See* Granted Exemptions: 4063, 11138, 11136, 11112, 11110, 11109, 11080, 11066, 11063, 11062 and 11067.

M). 14 C.F.R. § 91.121 – Altimeter settings.

14 C.F.R. § 91.121 requires an aircraft to be operated by reference to an altimeter that is set to the elevation of the departure airport or barometric pressure when operating below 18,000 feel MSL. Some sUAS contain a barometric pressure sensor. Others utilize GPS sensors to determine altitude. Typically barometric pressure sensors are corrected to the point of takeoff; not a departure airport.

Equivalent level of safety: The operator will confirm the elevation of the launch site prior to launch. This will be compared to the GPS sensor or barometric sensor derived altitude as displayed on the sUAS telemetry reading at the Ground Control Station. The operator will then determine the maximum permissible altitude to maintain flight below 500 feet AGL and will not exceed this altitude. The maximum permissible altitude will also be monitored and estimated by visual means through the use of the operator and / or visual observer(s) as a secondary backup to sUAS telemetry data. This provides a level a safety equal to or exceeding the regulation. *See* Granted Exemptions: 11153, 11150, 11138, 11136 and 11159.

N). 14 C.F.R. § 91.151 (a)(1) & (b) – Fuel requirements for flight in VFR conditions.

14 C.F.R. § 91.151 (a) (1) states: "No person may begin 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…"

14 C.F.R. § 91.151 (b) states: "No person may begin a flight in a rotorcraft 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, to fly after that for at least 20 minutes." The sUAS will be operated only during daylight hours in VFR conditions. The technical limitations of most sUASs limit total flight time to approximately 30 minutes before the battery is depleted. This means that no meaningful flight time would be possible given the limitations of § 91.151 (a) (1) and (b).

Equivalent level of safety: The sUAS flight will be terminated with at least 20% reserve power. This allows the sUAS to return to its landing zone with adequate power remaining to conduct a safe and controlled landing. Given the sUAS's size, weight and speed, the sUAS when operated with this limitation provides an equivalent or greater level of safety than manned aircraft represented by this regulation. *See* Granted Exemptions: 2689F, 5745, 10673, 10808, 11138, 11136, 11112, 10650 and 10159.

O). 14 C.F.R. § 91.203 (a) & (b) – Carry civil aircraft certification and registration.

The regulation states: (a) "…no person may operate a civil aircraft unless it has … an appropriate and current airworthiness certificate." Furthermore: (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."

Equivalent level of safety: In regard to 14 C.F.R. § 91.203 Part (a), an equivalent level of safety is achieved through the methods and characteristics as outlined in the request for exemption from 14 C.F.R. Part21, Subpart H.

In regard to 14 C.F.R. § 91.203 Part (b), the sUAS does not carry a pilot or passengers, does not have a "cabin or cockpit entrance" and does not have onboard storage in which to carry certification and registration documents. An equivalent level of safety will be achieved by maintaining the proper documentation at the Ground Control Station readily available to the operator. The FAA has issued numerous exemptions to this regulation. *See* granted exemptions 9565A, 9565B, 9789, 9789A, 9797, 9797A, 9816A and 9816.

Additionally, the FAA, in accordance with FAA Office of Chief Counsel's Opinion dated August 8, 2014, the UAS flight manual, registration certificate and other documentation will be kept at the control station with the operator during flight. The Chief Counsel's Office has held that for all UAS operations, this alternate method constitutes full compliance with the regulations. *See* granted exemption 11062.

P). 14 C.F.R. §§ 91.405 (a), 91.407 (a)(l), 91.409 (a)(2), 91.417 (a) & (b) – Maintenance inspections.

The regulations 14 C.F.R. §§ 91.405 (a), 91.407 (a)(1), 91.409 (a)(2) and 91.417 (a) & (b) specify maintenance and inspection standards in reference to 14 C.F.R. Part 43. Specifically, 14 C.F.R. § 91.405 (a) requires that each owner or operator of an aircraft, "…[s]hall have the aircraft inspected as prescribed in subpart E of this part and shall between required inspection … have discrepancies repaired as prescribed in part 43 of this chapter." An exemption is required from these regulations because Part 43 and these sections apply only to aircraft with an airworthiness certificate, which the sUASs will not have.

Equivalent level of safety: The sUASs will be maintained and inspected in accordance with the manufacturer-supplied manual. This includes maintenance, overhaul, replacement and inspection

requirements for the sUASs. The operator, prior to the first flight of the day and as deemed necessary otherwise, will undertake preflight inspection procedures in order to ensure the sUAS is in a condition for safe operation. Discrepancies that may affect the safety of flight will be addressed and repaired if required. The operator, and OVAI, will maintain the sUASs in a condition for safe operation. Given the size, characteristics and operating limitations of sUASs as described herein, this provides a level of safety equivalent to or greater than manned aircraft performing similar operations.

Ohio Valley Archaeology, Inc. contends that given the size, weight, speed, operating capabilities, lack of proximity to restricted or populated areas, operation within visual line of sight, national security and the conditions discussed in this application satisfy the criteria set forth in section 333 of the Reform Act; furthermore, given that the public interest in archaeology and historic preservation is already high, the use of sUASs will only advance the public's awareness and knowledge of historic properties. The applicant is thankful for the Federal Aviation Administration's time and consideration.

Sincerely,

Jennifer L. Pecora, MA
President