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

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

July 22, 2015

Exemption No. 12116
Regulatory Docket No. FAA–2015–1059

Mr. Paul Ramirez
President & COO
Unmanned Ad-Hoc Industries, Inc.
519 E Oak Hill Drive
Spring, TX 77386-1282

Dear Mr. Ramirez:

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 12, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Unmanned Ad-Hoc Industries, Inc. (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial photography and videography.

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

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

Airworthiness Certification

The UAS proposed by the petitioner is a High Endurance Folding Frame (HEFF).

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, Unmanned Ad-Hoc Industries, 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) and (b), to the extent necessary to allow the petitioner to operate a UAS to perform aerial data collection. This exemption is subject to the conditions and limitations listed below.

[1] Aerial data collection includes any remote sensing and measuring by an instrument(s) aboard the UA. Examples include imagery (photography, video, infrared, etc.), electronic measurement (precision surveying, RF analysis, etc.), chemical measurement (particulate measurement, etc.), or any other gathering of data by instruments aboard the UA.

Conditions and Limitations

In this grant of exemption, Unmanned Ad-Hoc Industries, 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 High Endurance Folding Frame (HEFF) when weighing less than 55 pounds including payload. Proposed operations of any other aircraft will require a new petition or a petition to amend this exemption.

2. Operations for the purpose of closed-set motion picture and television filming are not permitted.

3. The UA may not be operated at a speed exceeding 87 knots (100 miles per hour). The exemption holder may use either groundspeed or calibrated airspeed to determine compliance with the 87 knot speed restriction. In no case will the UA be operated at airspeeds greater than the maximum UA operating airspeed recommended by the aircraft manufacturer.

4. The UA must be operated at an altitude of no more than 400 feet above ground level (AGL). Altitude must be reported in feet AGL.

5. The UA must be operated within visual line of sight (VLOS) of the PIC at all times. This requires the PIC to be able to use human vision unaided by any device other than corrective lenses, as specified on the PIC's FAA-issued airman medical certificate or U.S. driver's license.

6. All operations must utilize a visual observer (VO). The UA must be operated within the visual line of sight (VLOS) of the PIC and VO at all times. The VO may be used to satisfy the VLOS requirement as long as the PIC always maintains VLOS capability. The VO and PIC must be able to communicate verbally at all times; electronic messaging or texting is not permitted during flight operations. The PIC must be designated before the flight and cannot transfer his or her designation for the duration of the flight. The PIC must ensure that the VO can perform the duties required of the VO.

7. This exemption and all documents needed to operate the UAS and conduct its operations in accordance with the conditions and limitations stated in this grant of exemption, are hereinafter referred to as the operating documents. The operating documents must be accessible during UAS operations and made available to the Administrator upon request. If a discrepancy exists between the conditions and

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

8. Any UAS that has undergone maintenance or alterations that affect the UAS operation or flight characteristics, e.g., replacement of a flight critical component, must undergo a functional test flight prior to conducting further operations under this exemption. Functional test flights may only be conducted by a PIC with a VO and must remain at least 500 feet from other people. The functional test flight must be conducted in such a manner so as to not pose an undue hazard to persons and property.

9. The operator is responsible for maintaining and inspecting the UAS to ensure that it is in a condition for safe operation.

10. Prior to each flight, the PIC must conduct a pre-flight inspection and determine the UAS is in a condition for safe flight. The pre-flight inspection must account for all potential discrepancies, e.g., inoperable components, items, or equipment. If the inspection reveals a condition that affects the safe operation of the UAS, the aircraft is prohibited from operating until the necessary maintenance has been performed and the UAS is found to be in a condition for safe flight.

11. The operator must follow the UAS manufacturer's maintenance, overhaul, replacement, inspection, and life limit requirements for the aircraft and aircraft components.

12. Each UAS operated under this exemption must comply with all manufacturer safety bulletins.

13. Under this grant of exemption, a PIC must hold either an airline transport, commercial, private, recreational, or sport pilot certificate. The PIC must also hold a current FAA airman medical certificate or a valid U.S. driver's license issued by a state, the District of Columbia, Puerto Rico, a territory, a possession, or the Federal government. The PIC must also meet the flight review requirements specified in 14 CFR § 61.56 in an aircraft in which the PIC is rated on his or her pilot certificate.

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

15. UAS operations may not be conducted during night, as defined in 14 CFR § 1.1. All operations must be conducted under visual meteorological conditions (VMC). Flights under special visual flight rules (SVFR) are not authorized.

16. The UA may not operate within 5 nautical miles of an airport reference point (ARP) as denoted in the current FAA Airport/Facility Directory (AFD) or for airports not denoted with an ARP, the center of the airport symbol as denoted on the current FAA-published aeronautical chart, unless a letter of agreement with that airport's management is obtained or otherwise permitted by a COA issued to the exemption holder. The letter of agreement with the airport management must be made available to the Administrator or any law enforcement official upon request.

17. The UA may not be operated less than 500 feet below or less than 2,000 feet horizontally from a cloud or when visibility is less than 3 statute miles from the PIC.

18. If the UAS loses communications or loses its GPS signal, the UA must return to a pre-determined location within the private or controlled-access property.

19. The PIC must abort the flight in the event of unpredicted obstacles or emergencies.

20. The PIC is prohibited from beginning a flight unless (considering wind and forecast weather conditions) there is enough available power for the UA to conduct the intended operation and to operate after that for at least five minutes or with the reserve power recommended by the manufacturer if greater.

21. Air Traffic Organization (ATO) Certificate of Waiver or Authorization (COA). All operations shall be conducted in accordance with an ATO-issued COA. The exemption holder may apply for a new or amended COA if it intends to conduct operations that cannot be conducted under the terms of the attached COA.

22. All aircraft operated in accordance with this exemption must be identified by serial number, registered in accordance with 14 CFR part 47, and have identification (N−Number) markings in accordance with 14 CFR part 45, Subpart C. Markings must be as large as practicable.

23. Documents used by the operator to ensure the safe operation and flight of the UAS and any documents required under 14 CFR §§ 91.9 and 91.203 must be available to the PIC at the Ground Control Station of the UAS any time the aircraft is operating. These documents must be made available to the Administrator or any law enforcement official upon request.

24. The UA must remain clear and give way to all manned aviation operations and activities at all times.

25. The UAS may not be operated by the PIC from any moving device or vehicle.

26. All Flight operations must be conducted at least 500 feet from all nonparticipating persons, vessels, vehicles, and structures unless:
    a. Barriers or structures are present that sufficiently protect nonparticipating persons from the UA and/or debris in the event of an accident. The operator must ensure that nonparticipating persons remain under such protection. If a situation arises where nonparticipating persons leave such protection and are within 500 feet of the UA, flight operations must cease immediately in a manner ensuring the safety of nonparticipating persons; and
    b. The owner/controller of any vessels, vehicles or structures has granted permission for operating closer to those objects and the PIC has made a safety assessment of the risk of operating closer to those objects and determined that it does not present an undue hazard.

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

27. All operations shall be conducted over private or controlled-access property with permission from the property owner/controller or authorized representative. Permission from property owner/controller or authorized representative will be obtained for each flight to be conducted.

28. Any incident, accident, or flight operation that transgresses the lateral or vertical boundaries of the operational area as defined by the applicable COA must be reported to the FAA's UAS Integration Office (AFS−80) within 24 hours. Accidents must be reported to the National Transportation Safety Board (NTSB) per instructions contained on the NTSB Web site: www.ntsb.gov.

If this exemption permits operations for the purpose of closed-set motion picture and television filming and production, the following additional conditions and limitations apply.

29. The operator must have a motion picture and television operations manual (MPTOM) as documented in this grant of exemption.

30. At least 3 days before aerial filming, the operator of the UAS affected by this exemption must submit a written Plan of Activities to the local Flight Standards District Office (FSDO) with jurisdiction over the area of proposed filming. The 3-day notification may be waived with the concurrence of the FSDO. The plan of activities must include at least the following:
    a. Dates and times for all flights;
    b. Name and phone number of the operator for the UAS aerial filming conducted under this grant of exemption;
    c. Name and phone number of the person responsible for the on-scene operation of the UAS;
    d. Make, model, and serial or N−Number of UAS to be used;
    e. Name and certificate number of UAS PICs involved in the aerial filming;
    f. A statement that the operator has obtained permission from property owners and/or local officials to conduct the filming production event; the list of those who gave permission must be made available to the inspector upon request;
    g. Signature of exemption holder or representative; and
    h. A description of the flight activity, including maps or diagrams of any area, city, town, county, and/or state over which filming will be conducted and the altitudes essential to accomplish the operation.

31. Flight operations may be conducted closer than 500 feet from participating persons consenting to be involved and necessary for the filming production, as specified in the exemption holder's MPTOM.

Unless otherwise specified in this grant of exemption, the UAS, the UAS PIC, and the UAS operations must comply with all applicable parts of 14 CFR including, but not limited to, parts 45, 47, 61, and 91.

This exemption terminates on July 31, 2017, unless sooner superseded or rescinded.

Sincerely,

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

Enclosures

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April 12, 2015

To: US Department of Transportation
Docket Management System
1200 New Jersey Ave, SE
Washington, DC 20590
(*Submitted electronically to the Federal Docket Management System-FDMS*)

From: Paul Ramirez, President & COO
Unmanned Ad-Hoc Industries, Inc.
519 E Oak Hill Drive
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Re: Request for Exemption under section 333 of the FAA Reform Act

Summary of Exemption Request

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012, and the Federal Aviation Administration's general exemption authority under Title 49, United States Code, Section 44701(f), Unmanned Ad-Hoc Industries, Inc. ("UAI") hereby petitions for exemptions from the following Federal Aviation Regulations specified in Title 14 of the Code of Federal Regulations:

14 CFR Part 21, Subpart H
14 CFR 45.23(a)
14 CFR 61.113(a)(b)
14 CFR 61.133(a)
14 CFR 91.7(a)
14 CFR 91.109(a)
14 CFR 91.119(c)
14 CFR 91.9(b)(2)
14 CFR 91.121
14 CFR 91.151(a)(1)
14 CFR 91.203(a)(b)
14 CFR 91.319(a)(1)
14 CFR 91.405(a)
14 CFR 91.407(a)(1)
14 CFR 91.409(a)(1)(2)
14 CFR 91.417(a)(b)

These proposed exemptions, if granted, will allow UAI to operate their High Endurance Folding Frame ("HEFF") Unmanned Aircraft System ("UAS") and will benefit the following commercial applications:

Agriculture, Oil, Gas, and Mineral Survey/Scan
3-Dimensional Terrain and Structural Modeling
Disaster Response, including Emergency Search & Rescue
Critical Infrastructure Monitoring, including Spectral & Thermal Analysis
Security Awareness

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The HEFF UAS uses multiple, swappable onboard cameras to capture high definition imagery and video that may be translated into three dimensional models of a surveyed area. UAI's use of the UAS will grant landowners, corporations, emergency response teams, and others an overall greater awareness, heightened security, safety, as well as negate the need for conventional aircraft assistance. This results in enhanced efficiency for any activity conducted, as well as an immediate environmental benefit.

Operation under the anticipated exemption will be subject to strict conditions and requirements, ensuring at minimum, an equivalent level of safety to currently authorized operating standards and procedures per FAA Regulations.

Supplemental Information:
The following information is to be submitted separately to assist the FAA in making an effective evaluation:

Part A: Production Acceptance & Technical Specification of the High Endurance Folding Frame (HEFF)
Part B: Unmanned Ad-Hoc Industries, Inc. Flight Operations and VLAUAS Guidelines
Part C: Operator and Observer Training Standard and Certification Example
Part D: HEFF Aircraft Logbook and Maintenance Reporting
Part E: UAI Summary of Manned and Unmanned Experience & Certifications

Background of Applicant

Unmanned Ad-Hoc Industries, Inc.
Attn: Paul Ramirez
519 E Oak Hill Drive
Spring, Texas 77386
Phone: (888) 396-5924, ext. 1
Email: Paul.Ramirez@globaluai.com

Unmanned Ad-Hoc Industries was formed in 2014 to fill a clear need in the UAS commercial market for remote sensing applications. UAI has assembled a group of professionals each with over 9 years of worldwide UAS experience in safety, flight operations, project and site management, engineering design, and system integration; bringing an unparalleled level of professionalism and safety expertise to an emerging market. UAI is strictly a services provider, and will not sell any of its UAS components individually.

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Aircraft Overview

The HEFF aircraft is of quad-rotor design, based around a custom fabricated carbon fiber chassis. Two lithium polymer batteries power four counter-rotating electric motors in order to provide exceptional predictability, endurance, stability, and control. In operational configuration, the aircraft weighs less than 25lbs and has dimensions of; length 31", width 41", and height 23". Maximum flight endurance is 45 minutes, while maximum limited airspeed is 60 knots. Although highly maneuverable, the HEFF aircraft was designed with intent to hover in place primarily. GPS utilization and redundant altimeter technology onboard the HEFF's flight controlling computer ensure an accurate physical position is always maintained while minimizing potential failures. The aircraft, via its tablet computer Ground Control Station, is capable of autonomous launch and recovery, as well as waypoint routing. A handheld remote controller acts as the Operator's direct line to aircraft control, and is capable of initiating an automatic return home sequence. Should Command and Control ("C2"), data link, or battery level (20%) become jeopardized, the aircraft will automatically execute a pre-programmed emergency sequence. Depending on the emergency, this may include hovering in place for a preset time, returning home on a planned route, or landing autonomously.

UAI will require at least one company-trained, FAA Ground School certified Operator and one company-trained Visual Safety Observer during operations in order to maintain positive physical and visual control of the aircraft at all times. Because the HEFF is equipped with typical aircraft navigation lighting it is clear that the unmanned aircraft is more clearly visible during night time conditions when compared to the ability to visually spot the vehicle during daylight hours. For this reason UAI believes that by operating its aircraft above 400 feet, near airports, or generally near populated areas in which people are not made aware and consent to unmanned operations will cause unacceptable safety risk and will not operate within these conditions. If granted exemption, UAI will yield right-of- way to all manned operations, as well as file appropriate NOTAMs prior to any operations in the NAS.

Aircraft Lighting:

Forward & Aft Left:	Red
Forward & Aft Right:	Green
Atop Aircraft:	Red Rotating Beacon
Below Aircraft:	White Strobe

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Training

UAS Operator
UAI requires every Operator to be fully qualified on its HEFF UAS appropriately. Trainees are given demonstration in general skills such as; maintaining altitude, maintaining visual line of sight, general navigation principles, obstacle avoidance, air traffic de-confliction, and emergency procedures. Qualification as an Operator for the HEFF UAS requires the Operator trainee to show proficient levels of all aforementioned skill areas, with special emphasis on emergency procedures.

UAS Safety Observer
UAI requires every person who will be acting as a flight safety observer to be proficient in airspace knowledge, emergency procedures, aeronautical chart interpretation and airspace safety, ground operations, ATC radio frequency communication. Two-Way radio communication will be established between the UAS operator and safety observer(s) during flight operations. HEFF Level 1 operator certification is the minimum standard for safety observer qualification.

Currency is maintained through monthly aircraft flights and instruction.

Authority for Petition

Section 333, titled "Special Rules for Certain Unmanned Aircraft Systems," provides a method for seeking expedited FAA authorization of safe, civil UAS operation in the National Airspace System ("NAS").

Section 333(a) states that the Secretary of Transportation "shall determine if certain Unmanned Aircraft Systems may operate safely in the National Airspace System before completion of the plan and rule-making required by Section 332 of this Act or the guidance required by Section 334 of this Act."

Section 333(b) outlines any factors the Secretary of Transportation must consider in order to determine whether commercial UAS operation should be approved. These factors include at minimum "[the UAS's] size, weight, speed, operational capability, proximity to airports and populated areas, and operation within visual line of sight do not create a hazard to users of the National Airspace System or the public or pose a threat to National Security […]"

Section 333(c) states that should the Secretary determine a certain UAS may operate safely in the NAS, "the Secretary shall establish requirements for safe operation of such aircraft systems in the National Airspace System."

Section 44701(f) of Title 49, United States Code, states that "The [FAA] Administrator may grant an exemption from a requirement of a regulation prescribed under subsection (a) or (b) of this section or any of sections 44702-44716 of this title if the Administrator finds the exemption is in public interest."

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Explanations

14 CFR Part 21, Subpart H: Procedural requirements for issuing and changing design approvals, production approvals, airworthiness certificates, and airworthiness approvals

Section 91.203(a)(1) requires all civil aircraft to have a certificate of airworthiness. Part 21, 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 weight of the HEFF aircraft (25 lbs) and the limited operating area associated with its utilization, it is unnecessary to go through the certificate of airworthiness process under Part 21 Subpart H to achieve or exceed current safety levels.

Such an exemption meets the requirements of an equivalent level of safety under Part 11 and Section 333 of the Reform Act. The Federal Aviation Act 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 UAS involved.

In this case, an analysis of these criteria demonstrates that the HEFF operated without an airworthiness certificate, under the conditions proposed herein, will be at least as safe, or safer, than a conventional aircraft (fixed wing or rotorcraft) with an airworthiness certificate. The HEFF weighs 25 lbs fully configured. It will not carry a pilot or passenger, will not carry flammable fuel, and will operate exclusively within an area pre-disclosed and in compliance with conditions set forth herein. Operations under this exemption will be tightly controlled and monitored by both the operator, pursuant to the conditions set forth above, and by local public safety requirements. The FAA will have advance notice of all operations through the filing of NOTAMs. Receipt of the prior permission of the land owner, the size of the aircraft, the lack of flammable fuel, and the fact that the aircraft is carried to the location and not flown there all establish the equivalent level of safety.

- Lightweight (<25lbs), small form factor aircraft
- Powered by sealed lithium polymer batteries, eliminating fuel spillage or risk of fire
- Remote crew location, eliminating risk in the event of an incident
- Waypoint/Route programming capability, ensuring obstacle/obstruction avoidance
- Built in fail-safe modes (hover in place, return to home, autonomous landing)

After consideration of the size, weight, speed, and limited operating area associated with the aircraft and its operation, UAI believes exemption from 14 CFR Part 21 should be granted.

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14 CFR 45.23(a): Display of marks; general

The HEFF does not have an entrance to a cabin, cockpit or pilot station in order to place required markings. Due to the size of the aircraft, 2 inch lettering is not possible. The HEFF will have a 1" marking denoting its tail number which will achieve an equivalent level of safety as required by §45.29(f) in which the pilot, observer, and others ground crew personnel attending to work on the aircraft will see each aircraft with a specific marking to denote aircraft serial number. Aircraft to be flown will be registered in accordance with 14 CFR part 47.

UAI requests exemption be granted from 14 CFR Part 45.

14 CFR 61.113(a) and (b); 61.133(a): Private pilot privileges and limitations; Pilot in Command; Commercial Pilot Privileges and Limitations

UAI's intent:

- Provide UAS services over property only with permission from landowner
- Display appropriate warning signage on all borders of property during operation
- Maintain high level UAS airmanship skillset via UAI specified currency & training requirements
- Ability to achieve equivalent level of safety required by current regulations
- As operation of UAS is fundamentally different than manned aircraft, the current level of air and ground instruction of all aircraft operators (see Supplemental Information, Part E) is sufficient for safe UAV operations. A private pilot's license does not apply to UAV operations and should not be considered as a minimal qualification to perform unmanned aircraft operations. Furthermore, a commercial pilot certificate as prescribed in Part 61.133 is outside the scope of the proposed unmanned aircraft operations as no carrying of persons or property will be performed.

UAI believes exemption from 14 CFR 61.113(a) and (b); 61.133(a) should be granted.

14 CFR 91.7(a): Civil aircraft airworthiness

This regulation requires that no person may operate a civil aircraft unless it is in airworthy condition. As there is no published standard for validating airworthiness condition of the HEFF aircraft, UAI will abide by internal company process documentation to validate operational functionality which will achieve an equivalent level of safety by ensuring compliance with all maintenance and inspection manuals (Supplemental Information, Part D).

UAI believes exemption from 14 CFR 91.7(a) should be granted.

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14 CFR 91.119(c): Minimum safe altitudes

Section 91.119 establishes safe altitudes for operation of civil aircraft. Specifically, 91.119(c) limits aircraft flying over areas other than congested areas to an altitude of 500 feet above the surface, except over open water or sparsely populated areas. In those cases, the aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure.

An equivalent level of safety will be achieved given the size, weight, speed, and material with which the HEFF is built. Flight operations will not occur without the permission of the land owner/authorized agent or those who control the land. Because of the advance notice to the landowner, all affected individuals will be aware of the unmanned flight operations. Compared to aerial survey operations conducted with aircraft or rotorcraft carrying flammable fuel, any risk associated with these operations will be far less than those currently allowed with conventional aircraft operating at or below 500 feet AGL. The low-altitude operations of the UAS will maintain separation between these small-UAS operations and the operations of conventional aircraft that must comply with Section 91.119.

The ideal altitude for the projects proposed within this request will be at or below 400 feet above ground level and standard operational procedures will provide for a constant airspace awareness to allow for maximum separation between small UAS operations and operations of conventional manned aircraft. Additionally, UAI operators and observers will display appropriate warning signage on all perimeters of surrounding property while UAV operations are in progress.

UAI believes exemption from 14 CFR 91.119(c) should be granted, as an equivalent level of safety will be achieved.

14 CFR 91.9(b)(2): Civil Aircraft Flight Manual in the Aircraft

The regulation requires that any person to 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."

Given the size of the HEFF, it 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 achieved by keeping the flight manual (Supplemental Information, Part A) at the ground control point where the pilot flying the UAS will have immediate access to required flight manual documentation.

UAI believes exemption from 14 CFR 91.9(b)(2) should be granted, as an equivalent level of marking and documentation will be achieved.

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14 CFR 91.109(a) & 91.319(a)(1): Flight Instruction

These regulations provide 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.
In operational configuration, the HEFF is a remotely piloted aircraft and does not have fully functional dual controls. Flight control is accomplished through the use of a control box or ground control station that communicates with the aircraft via line-of-sight radio communications. The flight plan is pre-programmed into the autopilot before or during flight and may also receive manual pilot input control functions to alter the pre-programmed flight. If instruction is accomplished through a training program, as set forth in Part C of the Supplemental Information**,** an equivalent level of safety will be assured. 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 (5778K & 9862A). The equivalent level of safety will be achieved by the manufacturer providing the training and through the use of experienced and qualified pilots familiar with the HEFF.

UAI believes exemption from 14 CFR 91.109(a) & 91.319(a)(1) should be granted.

14 CFR 91.203 (a) & (b): Carrying Civil Aircraft Certification and Registration

This regulation provides as follows:
(a) […] no person may operate a civil aircraft unless it has […] 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 HEFF when fully configured for flight operations weighs no more than 25 lbs. As such, there is no ability or place to carry certification and registration documents or to display them on the UAS. In addition, there is no pilot on board the aircraft.

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. The FAA has issued numerous exemptions to this regulation.

UAI believes exemption from 14 CFR 91.203 (a) & (b) should be granted, as the regulation is not applicable to its HEFF UAS.

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14 CFR 91.121: Altimeter settings

Section 91.121 requires aircraft operators to maintain cruising altitude or flight level by reference to an altimeter. As the HEFF UAS utilizes Global Positioning System and internal redundant barometric altimeters flight level will be determined using this type of instrumentation.

UAI believes exemption from 14 CFR 91.121 should be granted, as the regulation is not applicable.

14 CFR 91.151(a)(1): Fuel requirements for flight in VFR conditions

Due to the HEFF UAS being battery powered, UAI believes exemption from 14 CFR 91.151(a)(1) should be granted, as the regulation is not applicable.

14 CFR 91.405(a), 91.407(a)(1), 91.409(a)(1), 91.409(a)(2), 91.417(a)(b): Maintenance Requirements

Section 91.405(a) requires 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 […]" Section 91.407 similarly makes reference to requirements in Part 43; Section 91.409(a)(2) requires an annual inspection for the issuance of an air worthiness certificate. Section 91.417(a) requires the owner or operator to keep records showing certain maintenance work that has been accomplished by certificated mechanics, under Part 43, or licensed pilots and records of approval of the aircraft for return to service.

UAI has prescribed a specific process and inspection standard that will allow an equivalent level of safety to be achieved as a result of diligent and consistently applied maintenance practices. The aircraft operator is responsible for accurate status upkeep of the maintenance record to include the battery maintenance log, ensuring the UAS is in safe condition for flight operations, and ensuring all software is current prior to aircraft operation. Through this, UAI believes exemption from the listed regulations should be granted.

Summary

UAI believes that approval from the FAA will enhance efficiency and safety in any operation its HEFF UAS conducts, due to reducing the need for manned aircraft. Due to its camera-only payload capability, lack of cargo, fuel or combustible materials in general, aircraft size, weight, and limited operating area, the HEFF UAS presents no major risk to individuals, nor poses any threat to National Security. While adhering to at least an equivalent level of safety of all current regulations, UAI firmly believes exemptions to the listed regulations should be granted, and operation of its HEFF UAS commercially should be permitted.