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

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

September 1, 2015

Exemption No. 12692
Regulatory Docket No. FAA−2015−1461

Mr. Nathan Progar
EarthRes, Inc.
6912 Old Easton Road
Pipersville, PA 19044

Dear Mr. Progar:

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 posted to the public docket on May 6 and June 15, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of EarthRes, Inc. (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial photography and surveys.

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 3D Robotics Aero−M.

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 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, EarthRes, 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.

Conditions and Limitations

In this grant of exemption, EarthRes, Inc. is hereafter referred to as the operator.

[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.

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 3D Robotics Aero−M 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

regulations.gov
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EarthRes, Inc. - Exemption/Rulemaking

This Other document was issued by the **Federal Aviation Administration** (FAA)

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ID: FAA-2015-1461-0001

Content

SUBMITTED ELECTRONICALLY
01 April 2015
U.S. Department of Transportation
Docket Management System
1200 New Jersey Avenue SE
Washington, DC 20590

RE: Petition for Exemption from 14 CFR Parts 61.113 (a), 91.119 (c), 91.121, 91.151 (a) (1), 91.405 (a) and (b), 91.407 (a) (1), 91.409(a) (1) and (2), 91.417 (a) and (b) according to Section 333 of the FAA Reform Act of 2012

Dear Sir or Madam:
Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 and 14 CFR Part 11, EarthRes, Inc. is applying for an exemption from regulations detailed below in order to conduct aerial photography and surveys with a small unmanned aircraft system, the model Aero-M manufactured by 3DRobotics. The manufacturer states that it has developed the fixed-wing Aero-M specifically for high resolution visual spectrum aerial maps.
Exemption Petitioner:
EarthRes, Inc.
Attn: Mr. Nathan Progar
6912 Old Easton Rd., Pipersville, PA 19044
215.766.1211
Separately submitted as confidential documents under 14 CFR Section 11.35 (b) are:
1) 3DRobotics Aero-M Operation Manual v3
2) EarthRes Flight Operations Manual v1 (FOM)
3) EarthRes Flight Checklist v1
These documents contain proprietary information that is not available to the public and are protected from release under the Freedom of Information Act 5 USC 552 et.seq.
All of us at EarthRes appreciate and thank you for your time and attention reviewing our petition. We look forward to working with the FAA to enter the emerging UAS market in the safest manner possible.

Document Information

Date Posted:
May 6, 2015

Show More Details

Submitter Information

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United States

State or Province:
PA

ZIP/Postal Code:
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Organization Name:
EarthRes, Inc.

Comments

0
Comments Received *

Docket Information

This document is contained in
FAA-2015-1461

Related Dockets:

Respectfully,
Nathan Progar
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None

Related RINs:
None

Related Documents:
None

* This count refers to the total comment/submissions received on this *document*, as of 11:59 PM yesterday. Note: Agencies review all submissions, however some agencies may choose to redact, or withhold, certain submissions (or portions thereof) such as those containing private or proprietary information, inappropriate language, or duplicate/near duplicate examples of a mass-mail campaign. This can result in discrepancies between this count and those displayed when conducting searches on the Public Submission document type. For specific information about an agency's public submission policy, refer to its website or the Federal Register document.

SUBMITTED ELECTRONICALLY

01 April 2015

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

EarthRes
ENGINEERING AND SCIENCE
www.earthres.com 800-264-4553

RE: Petition for Exemption from 14 CFR Parts 61.113 (a), 91.119 (c), 91.121, 91.151 (a) (1), 91.405 (a) and (b), 91.407 (a) (1), 91.409(a) (1) and (2), 91.417 (a) and (b) according to Section 333 of the FAA Reform Act of 2012

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All of us at EarthRes appreciate and thank you for your time and attention reviewing our petition. We look forward to working with the FAA to enter the emerging UAS market in the safest manner possible.

Respectfully,

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Contents

Description of Petitioner

The mission of EarthRes is to provide our clients with superior services by partnering with them to develop sensible solutions. The EarthRes team consists of hardworking, passionate engineers and scientists who develop successful solutions for our clients' technical and operational challenges. Our dedicated staff works together to promote success, encourage team growth, and make EarthRes a fun, and rewarding firm to work for and with.

EarthRes maintains a staff of professional engineers, scientists, geologists, and consultants with experience from around the globe. We actively maintain professional, governmental, and industry certifications and support membership in those organizations to help our team members stay current in their fields and our clients' markets.

EarthRes wishes to conduct aerial photography and surveys of restricted access quarries, landfills, and similar properties by small unmanned aircraft. In preparation to do so, EarthRes has prepared a Flight Operations Manual (FOM) and supporting checklists which promote safe flying, ensure the safety of people and property, protect privacy, and comply with applicable FAA requirements.

Description of UAS

3DRobotics Aero-M is a purpose built fixed-wing aircraft designed to conduct aerial photography and surveying. Thrust is provided by a Tiger electric motor powered by a lithium polymer battery. 3DRobotics on-board PixHawk controller provides autopilot mission abilities and manual control of the aircraft while monitoring GPS, compass, and airspeed sensors. Operators use Spektrum's DX7s remote control to manipulate control surfaces manually and select between manual and autonomous modes of operation.

The Aero-M includes emergency fail-safes, pre-programmed behaviors designed to prevent crashes. If the Aero-M loses GPS signal in a flight mode that requires GPS (loiter, auto, return-to-launch, guided), it will land autonomously. If contact is lost with the controller, the Aero-M will return to the launch point and circle at 100 m or approximately 328' AGL. If the controller fails to re-connect, the Aero-M will land autonomously. If the Aero-M battery reaches 25% charge capacity, it will return to the launch point and land autonomously.

The aircraft has a 74" wingspan, 51" length, and weighs 6.8 pounds with the standard 6000 mAh battery. No flammable fuels are onboard. Typical flight speed during survey missions is 33 mph, and maximum speed of the aircraft is 60 mph. Maximum flight time on a 6 Ah battery is 40 minutes.

Exemptions Requested

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

Section 61.113 (a) Limits private pilot certificate holders from acting as pilot in command (PIC) of flights carrying passengers or property for compensation, unless the flight meets the provisions of section 61.113 (b) through (h). It is the intention of EarthRes to conduct surveying flights for compensation without PIC's possessing a commercial pilot's license, concurrent to FAA Grant of Exemption No. 11062 to Astraeus Aerial and No. 11192 to Viking Unmanned Aerial Systems, Inc. In these exemptions it was the FAA's determination that PIC of UAS matching the characteristics of the Aero-M and proposed operating environment would have the airmanship

skills necessary to operate safely with private pilot certification. EarthRes agrees with this determination and is requesting exemption with the limitation that PIC's must hold current private pilot certificate and third-class airman medical certificate.

14 CFR 91.119 (c) Minimum safe altitudes: *Over other than congested areas.*

EarthRes is proposing to operate at the request of property owners or managers (clients) and flight operations will be limited to their property. Proposed property types include quarries, landfills, aggregate and mineral stockpiles, etc. where access is limited by fences and gates to ensure public safety from explosives, heavy machinery, unstable earth, etc. Regardless of property type, EarthRes and the property owner will ensure that only authorized and informed personnel are on the property. Personnel essential to flight operations include the PIC, VO(s), and a client liaison responsible for ensuring ongoing security of survey area. All other personnel will be outside of the survey/flight area or inside of buildings or vehicles capable of withstanding the Aero-M's size, weight, and speed without damage and fully protecting any personnel inside.

EarthRes proposes exemption to operate within 500' but no less than 100' of buildings and vehicles described above with the owner's informed consent. For vehicles and buildings which consent has not been given and for non-essential personnel, flights will not occur within 250', more than twice the manufacture's recommendation.

14 CFR 91.121 Altimeter settings.

Manned aircraft commonly have barometric altimeters that must be adjusted during flight for changes in atmospheric conditions in order to correctly report the aircraft's altitude, AGL. The Aero-M uses GPS, established and verified during preflight according to the FOM, to derive altitude. 0' AGL is set upon GPS initiation and AGL is reported in reference to the departure point. EarthRes proposes to utilize the GPS reported AGL from departure point for the duration of the flight, and maintains that all flights will be conducted below 400' AGL. Safety is ensured by the limited operating area of the UAS and is concurrent to the findings of the FAA in Grant of Exception No. 11192.

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

Section 91.151 ensures, prior to takeoff, that there is enough fuel onboard to reach the intended destination with sufficient fuel in reserve for unplanned or emergency use. The Aero-M is battery powered and has a maximum flight time of 40 minutes, too short of a period to effectively meet existing requirements. EarthRes proposes limiting flights to 75% of battery capacity or 30 minutes, whichever comes first, leaving 25% or approximately 10 minutes of flight time in reserve. This amount of reserve maintains safe ability, considering the limited area of operation, for a safe landing.

14 CFR 91.405 (a) and (b), 91.407 (a) (1), 91.409 (a) (1) and (2) Maintenance and Inspections.

Required inspections and discrepancies repaired between required inspections pertains to certificated manned aircraft and procedures conducted by licensed maintenance personnel. In the absence of certification requirements for sUAS and sUAS maintenance personnel, alternatives must be developed. EarthRes will conduct and document inspection, maintenance, and replacement as described in the FOM. Since most parts of the aircraft are not user serviceable but are user replaceable due to size, expense, and complexity, safety is maintained by ensuring that discrepancies are replaced when found and logged as described in the FOM.

14 CFR 91.417 (a) and (b) Maintenance Records.

Maintenance records will be logged and available to the PIC during flight operations according to procedures in the FOM. sUAS maintenance is much simpler than maintenance of manned aircraft and by providing a record of deficiencies and mitigating maintenance maintains safety and traceability of maintenance performed.

Pilot in Command

The PIC must hold a private pilot certificate and a third-class medical certificate, be current in the aircraft named on the certificate, and be in compliance with the training and testing specified in the FOM. PIC must maintain visual sight of the aircraft and remain in communication with the visual observer(s). The pilot must be prepared to take over manual control of the aircraft during autonomous flight in case of equipment failure, emergency, or other aircraft.

Visual Observers

At least one visual observer will be used during all flights, training or survey. Observers will be provided with sufficient training to communicate clearly to the PIC any turning instructions required to stay clear of conflicting traffic. Observers will receive training on rules and responsibilities described in:

a) 14 CFR 91.111, Operating Near Other Aircraft
b) 14 CFR 91.13, Right-of-Way Rules, cloud clearance, in-flight visibility

The PIC will record the observer's name in the flight log. The PIC is responsible for instructing the observer on maintaining communications during the flight, either within verbal proximity or through radio communications as described in the FOM.

UAS Operations

All operations will be according to the FOM, under the operational control of the PIC, and in accordance with any FAA conditions and limitations.

1) The aircraft will be the 3DRobotics Aero-M unless an amendment to this petition or COA is approved by the FAA.
2) UAS operations will be limited to aerial photography and surveying unless an amendment to this petition or COA is approved by the FAA.
3) The UAS will not be flown in excess of 60 mph or exceeding any other Manufacturer limitation.
4) UAS Manufacturer safety bulletins will be followed and incorporated into operating documents.
5) UAS flight operations will occur only in Class G airspace less than 400' AGL within line of sight of the PIC and VO, unaided by any device other than corrective lenses.
6) Visibility must be greater than 3 miles from the PIC, and the UAS may not be operated within 500' below or 2,000' horizontally from a cloud.
7) UAS will not be operated in other than VMC during daylight hours, as detailed in 14 CFR § 1.1.
8) All UAS operated will be registered with the FAA pursuant to 14 CFR § 47, and will display, as large as practical, the N number according to 14 CFR § 45 subpart C.

9) All operations will utilize a VO, who will meet the qualifications, perform the duties, and maintain communication with the PIC as described in the EarthRes FOM. VO will not perform other duties or tasks during flight.
10) Prior to flight, the PIC must perform preflight checks, described in the FOM, to ensure the UAS is in a condition safe for flight. Any discrepancies must be resolved or the UAS is prohibited from flight operations.
11) Inspections and Maintenance will be performed and documented according to the FOM.
12) Functional test flights in connection with maintenance requirements will be documented according to the FOM.
13) The PIC will hold at minimum a private pilot certificate and third-class medical certificate. PIC must meet the requirements set forth in the FOM and flight review requirements, according to 14 CFR § 61.56, in an aircraft which the PIC is rated.
14) All RF spectrum used (915MHz, 2.4GHz, and 5.8GHz) will be in compliance with FCC and any other government agency requirements.
15) Incidents, accidents, or flight that transgresses the lateral or vertical boundaries of the operation area will be reported to the FAA's UAS Integration Office within 24 hours.
16) UAS accidents will be reported to the NTSB per NTSB instructions.

Benefits to the Public

The proposed operation of UAS will allow EarthRes to mitigate safety risks for clients who must conduct haphazard bulk material surveys. Unable to perform this type of survey safely from the ground, the UAS will replace the need for larger and more costly manned aircraft. The surveys provide detailed information that will help clients plan safe use of explosives, additional bulk material transfers, and visually verify the safety of a location prior to letting ground personnel enter. The reduction of manned aircraft flights increases available NAS and completes the same mission expeditiously with contact on the ground to the client reducing errors and omissions in surveys requiring additional manned flights. The overall result of the planned operations also decreases expensive airframe maintenance and reduces the environmental impact of surveying by eliminating the use of fossil fuel in aircraft. Neighbors of surveyed facilities also benefit by eliminating the need for loud, low flights from manned aircraft during surveys and replaces the larger aircraft with a small, lightweight, electric aircraft.

Safety Summary

Pursuant to 14 CFR § 11, the following summary is provided for publication in the Federal Registrar:

EarthRes requests exemption from 14 CFR Parts 61.113 (a), 91.119 (c), 91.121, 91.151 (a) (1), 91.405 (a) and (b), 91.407 (a) (1), 91.409(a) (1) and (2), 91.417 (a) and (b) according to Section 333 of the FAA Reform Act of 2012 to operate a small unmanned aerial vehicle for the purposes of aerial photography and surveys.

The proposed survey aircraft does not carry people, cargo, or flammable liquid fuels. The size and weight of the Aero-M is a small fraction of traditional manned survey aircraft and flies a slower, safer speeds. There is no risk

to the public's privacy considering that all operations will be restricted to property for which the owner or manager has granted permission.

As proposed, the sUAS operations will enhance safety, reduce the risk of entering hazardous areas for our client's employees and contractors. Procedures, training, and airmanship of sUAS personnel in the FOM will let EarthRes achieve safety levels in the NAS and on ground, which are equivalent to or greater than current manned aviation standards.