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

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

August 31, 2015

Exemption No. 12674
Regulatory Docket No. FAA−2015−0938

Mr. Paul Alley
12512 Southeast 72nd Street
Newcastle, WA 98056

Dear Mr. Alley:

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 letters posted to the public docket on April 9 and July 14, 2015, you petitioned the Federal Aviation Administration (FAA). You requested to operate an unmanned aircraft system (UAS) to conduct real estate photography and aerial mapping.

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 3D Robotics Aero-M and DJI Phantom 2.

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, Mr. Paul Alley 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, Mr. Paul Alley 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 and DJI Phantom 2 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

Paul Alley
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98056

Federal Aviation Administration

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West Building Ground Floor, Room W12-140 1200
New Jersey Avenue, SE
Washington, DC
20590

Dear Sir, Madam,

My name is Paul Alley and I am writing to request an exemption from the FAA which would allow me to apply for, and receive, certificates of operations (COA's) which would allow me to operate Unmanned Aerial Systems (UAS) within the National Airspace System (NAS) for the purposes of commercial *real estate photography, and aerial mapping*. While a blanket authorization has been provided for operations below 200', this petition seeks authorization to apply for COAs covering flights up to 400' AGL for the purposes of aerial mapping and surveying.

I've held a private pilot certificate and 3rd class medical for 7 years, and flown gliders for the last 20 years, during which time I have planned and safely completed many flights in and around complex airspace in a variety of locations throughout the contiguous United States. Interacting with ATC, studying airspace, and working within the rules to maximize the safety of my operations has been paramount throughout my flying career, which has led to a flawless safety record.

Besides my close work with real estate teams to provide photography services, I have worked on GIS and aerial photography applications for a local and federal agencies, and was on a team that provided real-time ground point analysis during an aerial survey of the Grand Canyon in 2008 for the U.S. Geological Survey. I have been flying radio controlled aircraft since my childhood, and have gained hundreds of hours of experience with a variety of quadcopters, including the ones included in this petition. All of this experience has given me a deep and profound respect for the safety issues involved with operating aircraft, whether manned or unmanned, within the NAS.

Therefore, I believe an exemption to the following regulations would allow me to safely enter, and look for ways to expand, the unmanned aerial systems (uas) industry in order to serve a growing demand for aerial imagery and videography for real estate, public agencies, and other potential consumers:

Part 21 Airworthiness Certification 21, Subpart H Certification procedures for products and parts, Airworthiness Certificates
Part 61 Certification: Pilots, Light Instructors, and Ground Instructors
Part 91 General Operating and Flight Rules
    91.103(b)(2) Preflight action
    91.105 Flight crewmembers at stations
    91.109 Flight instruction
    91.119 Minimum safe altitudes
    91.121 Altimeter settings
    91.151 Fuel requirements for flights in VFR conditions
    91.405 Maintenance required
    91.407 Operation after maintenance
    91.409 Inspections
    91.417 Maintenance records

1. How the proposed UAS operation will be safely conducted to minimize risk to the NAS or to persons and property on the ground.

Prior to, and during, flight operations, the UAS crew will ensure the following:

- Provide appropriate notice to ATC and/or FSDO when planning UAS operations
- Check for NOTAMs or other temporary flight restrictions
- Conduct extensive flight planning in and around the area of operations using approved FAA sectional maps, and other sources as needed.
- Provide ample notice to residents or other people may be in the vicinity of UAS operations so they can take appropriate safety precautions (e.g. have adjacent neighbors remain indoors or away from area during operations).
- Ensure the UAS maintains a safe elevation and distance from people and property to reduce the risk of harm in the event of a UAS failure or crash.
- Provide signage and/or road traffic control in the vicinity of operations when necessary
- Prior to operations, PIC conducts thorough, systematic preflight procedure using checklists
- PIC will maintain logs for both flight time and UAS maintenance
- After each assembly, the PIC will thoroughly inspect the UAS and ensure all systems are working properly.
- UAS operation will be limited to daylight hours
- UAS operation will be limited to VFR conditions
- UAS operation will be limited to wind gusts less than 5 knots
- During operations, both participating and crew or non-participating observers within the operational area will wear OSHA approved hard hats.
- During operations, participating crew (the spotter and PIC) will maintain hands-free radio communications when not in voice range

The petitioner requests exemptions for two distinct UAS systems, one of which will serve as a fixed wing platform for aerial mapping and surveying, while the other will serve as a multi-rotor platform for real estate and architectural photography:

3D Robotics Aero-M (Primary fixed wing UAS for aerial mapping)

- Design: Single electric motor fixed wing
- Weight: 6.8 lbs (3kg)
- Payload capacity: 1.1 lbs (500g)
- Radio Frequency: 925 mHz
- Payload: Canon S100 camera
- Safety features:
    - Auto-home feature for loss of radio, gps, or VLOS
    - Auto-deployed parachute

DJI Phantom II (primary multi-rotor UAS for Real Estate Imaging)

- Design: 4 rotor
- Weight: 1kg
- Maximum load: 2.5kg (1.5kg payload)
- Radio Frequency: 925 mHz
- Payload: Sony Alpha 6000 camera with 20mm lens
- Safety Features:
    - Auto-home feature for loss of radio, gps, or VLOS

2. Procedures such as pre-flight inspections, maintenance, and repair, to ensure that the UAS is in a condition for safe flight.

Preflight: Prior to flying any certified machine the pilot in command (pic) would follow a preflight checklist to ensure all flight, control, and safety systems are in proper working order (see “Appendix A: Preflight Checklist” at the end of this document).

Inspections: Thorough inspections of flight, control, and safety systems will be conducted prior to flight operations ‘session’, which may include one or more individual flights. Essentially each time the UAS is assembled, disassembled, transported, or modified in any way the PIC will conduct a thorough inspection and ensure all systems are in working order.

Maintenance: UAS will be maintained by the PIC, or sent to the manufacturer if complex maintenance is necessary. If maintenance defects are found prior to flight operations, those defects will be fixed before any UAS flights commence. All manufacturer mechanical, firmware, and software updates will be incorporated into the UAS as soon as they are released and made available to UAS owners.

Repair: Standard repairs will be performed by the petitioner/PIC if able. If repairs require expertise beyond that of the petitioner, the UAS or broken part(s) will be sent to a repair specialist or factory for repair or replacement.

Any maintenance or repair activities will be entered into the UAS logbook.

3. Radio Frequency (RF) spectrum used for control of the UAS and associated equipment that is part of the UAS (i.e., sensors, cameras, etc.)

Flight Operations RF: 2.4 GHz ISM (industry standard FCC compliance)
Camera/Gimbal Operations RF: 2.4 GHz ISM (industry standard FCC compliance)

4. Qualifications required of any PIC(s) who will be directly responsible for the operation of the UAS, or anyone acting as an observer in the flight operation

PIC - The PIC responsible for the overall operation of the UAS covered in this petition, Paul Alley, holds a current Private Pilot certificate, has over two hundred hours of flight time in a single engine Cessna, and has several hundred hours of UAS flying experience. The PIC will maintain a minimum of 20 hours of flight time in any particular UAS being utilized as part of this petition. The primary role of the PIC is to ensure the overall safety of crew and public throughout UAS operations, ensure all FAA regulations are followed, and serve as the pilot in command of the UAS during commercial operations covered in this petition.

Observer - The primary role of the observer is to ensure the area of operations remains safe and clear throughout the flight, and also to assist with identifying any potential flight hazards or mechanical issues. The observer and the PIC will maintain radio communications when out of voice range. The observer will advise the PIC of potential hazards to avoid, or if conditions in the area of operations have changed such that continuing the flight would be unsafe.

5. Medical standards and certification of the PIC(s) directly responsible for the operation of the UAS

The PIC of any UAS utilized within this exemption will maintain a valid, current, 3rd Class Medical Certificate.

6. Description of intended UAS operation(s)

The UAS operations pertaining to this exemption request are intended to serve the aerial imaging needs of residential and commercial real estate agents, and agencies, urban, suburban, and rural communities. A typical aerial imaging session would consist of one or more flights in which images are captured from various angles, elevations, and headings

surrounding the property being imaged. These operations may include any or all of the following activities:

- Flight durations of 5 to 25 minutes
- Flight elevations of 0' to 200' AGL
- Flights in residential and/or commercially zoned (congested) areas
- Circular or grid pattern flights to ensure coverage of properties being imaged

Petitioners should describe how the proposed operation(s) would not adversely affect safety, or how they would provide a level of safety at least equivalent to that provided by the rule from which exemption is sought.

In order to maximize safe operations of UAS, the PIC will:

- Provide appropriate notice to ATC and/or FSDO when planning UAS operations
- Check for NOTAMs or other temporary flight restrictions
- Conduct extensive flight planning in and around the area of operations using approved FAA sectional maps, and other sources as needed.
- Provide ample notice to residents or other people may be in the vicinity of UAS operations so they can take appropriate safety precautions (e.g. have adjacent neighbors remain indoors or away from area during operations).
- Ensure the UAS maintains a safe elevation and distance from people and property to reduce the risk of harm in the event of a UAS failure or crash.
- Provide signage and/or road traffic control in the vicinity of operations
- Prior to operations, PIC will test the failsafe 'return home' feature that automatically routes the UAS back to it's take-off location when radio transmissions are disrupted.
- Only operate UAS which utilize automated landing/stabilization features
- PIC will maintain logs for both flight time and UAS maintenance
- Before each flight, the PIC will conduct thorough preflight inspections, using a checklist.
- After each assembly, the PIC will thoroughly inspect the UAS and ensure all systems are working properly.
- UAS operation will be limited to daylight hours
- UAS operation will be limited to VFR conditions
- UAS operation will be limited to wind gusts less than 5 knots
- During operations, both participating and crew or non-participating observers within the operational area will wear OSHA approved hard hats.
- During operations, participating crew (the spotter and PIC) will maintain hands-free radio communications when not in voice range
- The PIC will never exceed a maximum distance of 300' between the UAS and himself.

Plans to implement clearly defined operational borders and procedures to ensure public safety, which includes persons and property both in the air and on the ground:

Ground:
Areas of operation will vary based on the location of the real estate being imaged. As such, operational borders will be defined by street signage starting at least one hour before operations begin, and verbal/written communication with neighbors at least 24 hours in advance of operations. Operations will not extend beyond 100' horizontally from the property being imaged, so anyone who lives or maintain property within that area will be notified prior to operations.

Air:
PIC will relay planned area of operations to appropriate ATC authorities prior to operations, and ensure any current NOTAMs are being complied with. Prior to operations PIC will also compare proposed areas of operation with FAA sectional maps to ensure no air space conflicts or restrictions exist. Additionally, both UAS platforms listed in this petition have built in no-fly zone capability which blocks flights in the vicinity of airports and other restricted areas.

7. Proposed maximum operating speed and altitude, and describe minimum flight visibility and distance from clouds for their intended operation(s). Description of potential hazards and safety mitigations associated with these proposed conditions.

Any UAS operated as part of this exemption wil adhere to the following flight limitations

- Maximum operating speed: 30 kmh
    - While this is the top speed of UAS covered in this exemption request, the actual operational speeds ideal for aerial imaging are in the 0-7 knot range.
    - The PIC will keep all operations under 10 knots in congested residential areas
- Maximum operating altitude: 400'
    - The ideal operating altitude for most aerial imaging needs is under 200' AGL.
    - Imaging rural areas for mapping purposes could require flights up to 400' AGL.
    - UAS operations will not occur in locations where the required altitude for capturing real estate images or aerial mapping imagery interferes with air traffic or violates airspace restrictions, without prior consent from ATC authorities.
    - The operational altitude for any aerial imaging session will be conveyed and cleared with appropriate ATC authorities.
- Minimum flight visibility: 3 miles
    - As the PIC will never be further than 400 ft from the UAS during commercial operations, the PIC will be able to safely operate UAS when flight visibility is restricted to at least three miles.
- Minimum distance from clouds: 500 ft below, 2000 ft horizontal
    - This exemption would not require operations in close proximity to clouds, beyond that which is defined for VFR Class E operations.

8. Description of characteristics of the area of intended operation(s) and the associated potential hazards

Areas of intended operations can be any of the following:

- Residential areas and neighborhoods - specifically within 100' of the boundary of the property for which imagery is being collected
- Commercially zoned areas- specifically within 100' of the boundary of the property for which imagery is being collected
- Rural (uncongested) commercial/residential areas

By nature, properties involved with residential and commercial real estate have the potential of being within a congested area containing people and/or property. However, the following precautions will be taken to minimize the risk to people or property in the area of UAS operations:

- Visual signage in and around the area of operations, starting at least one hour prior to operations
- Written or verbal communication with neighboring residents and/or businesses to announce when and where flight operations will be taking place, and recommended ways to minimize danger to the public and property (parking cars in garage, keeping bystanders away from the area of operations, etc.)
- Flights will be planned in such a way to minimize the risk to neighboring properties and people (avoiding areas where piloting errors, mechanical malfunctions, or any other unexpected decent could lead to harm or property damage).

The PIC and spotter will stay alert for changing conditions in the area of operations. If anything in the area of operations becomes unsafe for completing a flight (e.g. a child runs into the front yard of a property being photographed), the UAS will be landed in a safe location, away from the emerging hazard, and operations discontinued until the area of operations can once again be cleared for safe flight.

9. Petitioners should describe if they intend to operate in the proximity of any airports

Petitioner does not intend to operate in the vicinity of any airports, or seek future approval to do so.

10. Description of how the UAS will be operated within visual line-of-sight (VLOS), in accordance with the statutory mandate under Section 333(b)(1)

PIC will maintain VLOS throughout the entire flight. If multiple photographic angles are necessary, which would block the view of the UAS from the PIC, the PIC will land the UAS and move to a position which provides VLOS to be maintained throughout the entire flight. Operations will occur during the day, and adhere to the VFR visibility and clearance

minimums defined for class E airspace (10 miles, 500’ below clouds, 2000’ horizontal cloud clearance).

Additionally, both UAS models requested for operations under this petition have “auto-home” capabilities which allow the operator to send a “home” command to the UAS in the event that visual contact is lost, which will instruct the UAS to fly to it’s starting position and land safely.

11. Description of procedures for conducting a preflight safety risk assessment to determine that the UAS is in a condition for safe flight (14 CFR § 91.7(b)) and that the planned operation can be completed safely:

UAS Condition:

- Payload (camera/gimbal) securely attached
- Propellers smooth and clear of any defects
- Propellers attached to correct motor drives
- Propeller arms straight, clear of any defects
- Controller system engaged, connected
- UAS batteries fully charged
- Controller batteries fully charged
- Home location marked
- UAS trimmed neutral

Operational Area Condition:

- Conduct a physical ‘walk-around’ the area of operations to ensure people and property are not at risk.
- Consult the appropriate FAA sectional chart to determine if there are any flight restrictions for the area of operations
- Determine whether any active NOTAMs affect planned UAS flight operations
- Check current weather conditions and short-term forecasts to ensure weather conditions are conducive to safe UAS operations
- Ensure spotter and other required personnel are ready

12. Protocol for coordinating with a Flight Standards District Office (FSDO) in the event that operations would require notification – such as motion picture and television filming, or pipeline and powerline patrol.

In the event that coordination with FSDOs is necessary (which is unlikely for the context of aerial real estate photography as areas of operations are mostly constrained to a small area), the PIC will contact/notify the relevant FSDO office. For operations based in the primary service area in and around the greater Puget Sound area, the following FSDO will be consulted for any activities which necessitate coordination with ATC.

Renton, WA 98057
(425) 227-2813

Appendix A: Preflight Checklist

Airspace:

1) Airspace clear - visual check
2) TFRs and NOTAMs - checked?
3) Airport vicinity - checked?

Environment:

1) People clear of operations area
2) Property clear of operations area
3) Road and/or walkway signage visible
4) Spotter ready - radio check
5) Wind - gusts < 5 knots

Aircraft:

1) Rotor arms and major components secured
2) Signs of cracks, damage - visual check
3) Battery secured & charged
4) Wires/controller secured
5) Payload secured
6) Props attached securely, free of damage

Controller:

1) Home location programmed
2) Batteries charged
3) Gimbal control - check
4) Radio to UAS linkage - check

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Federal Aviation Administration

U.S. Department of Transportation, Docket Operations
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20590

Response to 333 Exemption Request Denial

I received a letter informing me that the FAA is unable to process my request for an exemption from Title 14, Code of Federal Regulations (14 CFR). The letter stated that in order for my exemption request to be considered further, I must send the following:

- The reasons why granting the request would be in the public interest; that is, how it would benefit the public as a whole

- Any additional information, views, or arguments available to support your request

Please consider my responses to these items below:

The reasons why granting the request would be in the public interest; that is, how it would benefit the public as a whole

The public stands to benefit from this exemption in the following ways:

- Providing public agencies with a lower cost, safer alternative to collecting aerial imagery used in long term monitoring and and GIS analysis of solid waste facilities (dumps) and other large capital projects.
- Providing services which allow public stormwater management agencies to improve monitoring and compliance with the EPA mandated National Pollutant Discharge Elimination System by providing real-time aerial imagery and impact analysis after large storm or flood events.
- Providing public agencies with tools to monitor compliance of commercial landowners and leaseholders on public lands with regards to changes in vegetation (loss) and/or impervious surface management.

- Aerial imagery subscription services provided to commercial developers would help them meet and demonstrate pollution and stormwater management “Best Management Practices” (BMPs) throughout the construction and bonding transfer stage between private developers and public entities.
- All services, equipment, etc would be available for volunteer (free) use for situations where aerial imagery and/or mapping could assist with emergency management efforts.
- My services would allow real estate agents and other entities interested in aerial imagery to seek out a safer, regulated alternative to do-it-yourself hobbyists who may not consider airspace and other safety related issues, thereby improving airspace safety for everyone.

Any additional information, views, or arguments available to support your request

- As demonstrated by a lifelong professional commitment to public service in the science and municipal utilities sectors, I am passionate about improving the life of citizens and the public as a whole. Leveraging my close relationships with regional municipalities and utility agencies, in addition to my deep industry knowledge surrounding municipal stormwater and landfill management, I believe strongly that the professional aerial imaging services covered under this exemption request would improve the ability of project, land, and municipal managers to meet or exceed legally mandated compliance and monitoring objectives, while simultaneously minimizing cost and risk to the public. Several agencies I have met with have expressed a strong interest in utilizing a legal and regulated contractor to provide mapping and imagery services via UAS.

- Since filing my original petition for exemption, I have completed seminar/course from Forrester University’s Department of Civil Engineering: “Drones: Revolutionizing Site Inspections” (certificate attached). This course highlighted research and techniques in the areas of using GPS enabled UAS for mapping and imaging stormwater management sites in regular compliance monitoring programs, and post-storm-event documentation (attached below).

FORESTER UNIVERSITY

certifies that

Paul Alley

has earned 0.1 Continuing Education Unit (CEU)
or 1 Professional Development Hour (PDH)
by successfully completing

Drones: Revolutionizing Site Inspections

Santa Barbara, California
5/29/2015

B Tompkins

Beth Tompkins, EMBA
Director of Education and Training

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