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

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

July 29, 2015

Exemption No. 12221
Regulatory Docket No. FAA–2015–2005

Mr. Stephen Thomas and Ms. Svetlana Thomas
GeoDrone Robotics, LLC
4301 Stretton Farm Court
Woodbridge, VA 22192

Dear Mr. Thomas and Ms. Thomas:

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 May 16, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of GeoDrone Robotics, LLC (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct surveying, aerial photography, videography, inspection, and training[1].

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 DJI Inspire 1.

[1] The petitioner also requested authority to conduct UAS training. At this time, the FAA is unable to authorize UAS operations for training until a further assessment is completed. When the FAA completes its review, we will proceed accordingly and no further action will be required by the petitioner. However, the petitioner is permitted to train its own pilot in commands and visual observers in accordance with condition no. 14 and the other conditions and limitations in this exemption.

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[2]. 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, GeoDrone Robotics, LLC is granted an exemption from 14 CFR §§ 61.23(a) and (c), 61.101(e)(4) and (5), 61.113(a), 61.315(a), 91.7(a), 91.119(c), 91.121, 91.151(a)(1), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b), to

[2] 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.

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, GeoDrone Robotics, LLC is hereafter referred to as the operator.

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

1. Operations authorized by this grant of exemption are limited to the DJI Inspire 1when 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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May 16, 2015

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

RE: Stephen Thomas and Svetlana Thomas, Owners, GeoDrone Robotics for Exemption Request Pursuant to Section 333 of the FAA Reform Act

Dear Sir/Madam,

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 (the Reform Act) and 14 C.F.R. Part 11, Stephen Thomas and Svetlana Thomas, GeoDrone Robotics, LLC, owners and operators of Small Unmanned Aircraft Systems (sUAS) that are equipped to perform aerial photography, videography and terrain features, hereby applies for an exemption from the listed Federal Aviation Regulations (FARs) to allow commercial operation of an sUAS, so long as such operations are conducted within and under the conditions outlined herein or as may be established by the FAA as required by Section 333.1

The proposed exemption, if granted, would allow GeoDrone Robotics, LLC, to conduct commercial operation of sUAS meeting or exceeding all of the operational and safety requirements Congress has set forth in Section 333. Statutory Authority Section 333, titled "Special Rules for Certain Unmanned Aircraft Systems", provides a mechanism for seeking expedited FAA authorization of safe civil UAS operations in the National Air Space (NAS). Section 333(a) states that the FAA "shall determine if certain unmanned aircraft systems may operate safely in the national airspace system before completion of the (comprehensive) plan and rulemaking required by section 332(b)(1) of this Act or the guidance required by section 334 of the Act." In Section 332(b)(1), Congress made it clear that Section 333 provides a mechanism for "expedited operation authorization" if several factors are met. The petitioner meets all requirements to permit FAA approval of commercial UAS operations.

The Petitioner Requests Relief from the Following Regulations:

14 C.F.R. Part 21
14 C.F.R. 45.23 (b)
14 C.F.R. 91.7 (a)

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14 C.F.R. 91.119
14 C.F.R. 91.121
14 C.F.R. 91.151(a)
14 C.F.R. 91.203 (a) & (b)
14 C.F.R. 91.215
14 C.F.R. 91.405
14 C.F.R. 91.407
14 C.F.R. 91.409
14 C.F.R. 91.417
14 C.F.R. 91.109

Stephen and Svetlana Thomas, GeoDrone Robotics, LLC is petitioning for exemption to enable GeoDrone Robotics, LLC to operate a DJI Inspire 1 quadcopter. This quadcopter has an advanced flight controller that constantly updated and recorded using a high-strength, intelligent GLONASS + GPS system. This dual positioning system allows for greater safety and higher precision. See attached Inspire 1 User Manual v1.2 for more information. In addition the Inspire 1 has an advanced Inertial Measurement Unit (IMU) that has a 6-axis gyroscope and accelerometer to monitor any change in the sUAS's attitude and movement. These systems allow the Inspire 1 to operate safely and compensate and adjust immediately to hold its precise position at all times. In addition the DJI Inspire 1 can accommodate two operators a Pilot In Command (PIC) and a payload operator. This also enhances safety by allowing the PIC to operate the sUAS and concentrate only on flying the sUAS while the payload operator controls the camera. The sUAS will be equipped with cameras, camera stabilizing gimbals and on-screen displays (OSD) providing the PIC with altitude, airspeed, battery life and direction. The GLONASS + GPS system will be used to limit the altitude above the ground and limit the distance it flies from the PIC. The Inspire 1 has GPS guided failsafe functions that command the autopilot to fly the sUAS back to the original launch site autonomously. This failsafe will be triggered if the system loses the minimum number of GLONASS + GPS signals or if the signal from the transmitter is lost or if the PIC decides to abort the flight.

GeoDrone Robotics is owned operated by Stephen and Svetlana Thomas. Stephen has been involved with analysis of Air and Missile defense as a contractor supporting Secretary of the Air Force Actuations, the Ballistic Missile Defense Organization, and the Joint Chiefs of Staff. He has owned and operated remote controlled (RC) aircraft for over 30 years and has flown fixed wing, traditional rotary wing, and multirotor sUAS. GeoDrone Robotics employs various RC pilots that also meet the minimum criteria of 100 hrs. of flight time on the Inspire 1 and hold at least a Sport Pilot License. Current applicants hold either a Private Pilot License (PPL) or Airline Transport Pilot (ATP) license. Some of our candidates are retired USAF and received their training and flight experience through the U.S. military.

Our Commercial Activities Will Include:

- **Aerial Surveying**
- **Event Photography/Videography**
- **Real Estate Photography/Videography**
- **Aerial Filming and Photography**

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- **Construction Site Inspections and Monitoring**
- **Building Inspections**
- **Roof Inspections**
- **Transmission Line Inspections**
- **Transceiver Tower Inspections**
- **Water Tower Inspections**
- **Bridge Inspections**
- **sUAS Training and Safe Operations**

FCC Information

The Inspire 1's C1 transmitter used for controlling the sUAS complies with part 15 of the FCC rules. Please refer to the User Manual (downloadable at this link http://www.dji.com/product/inspire-1/download) page 62 FCC Compliance.

Operation is subject to the following two conditions:

(1) This device may not cause harmful interference,
(2) This device must accept any interference received, including interference that may cause undesired operation.

The C1 transmitter used for controlling the sUAS is wireless technology which has been tested and found to be compliant with the applicable regulations governing a radio transmitter in the 2.400GHz to 2.4835GHz frequency range.

Pilot In Command and Observer Qualifications and Duties

The PIC will maintain at least a Sport Pilot License and a current Class III medical certificate, plus at least 10 hrs. Of flight time on the DJI Inspire 1 and at least 2 hrs. Of flight time with 3 takeoffs and landings within 30 days of sUAS operations. The PIC will have at least 100 hrs. Total flight time and at least 20 hrs. Flying RC aircraft of that 10 hrs. On the DJI Inspire 1.

The PIC is responsible for the safe and efficient operation of the aircraft. Specific duties include all preflight preparation, in flight operation, and post flight requirements. Procedures including but not limited to:

- Utilize the FAA B4UFLY App to verify legal and safe operation in the planned flight area.
- Perform Pre-Flight Check List.
- Ensure Safe Flight Operations.
- Perform Risk Assessment and Mitigation Plan to Persons and Property.
- Assess Site Suitability.

The Observer must have the visual acuity to observe the sUAS and be able to communicate clearly with the PIC utilizing hand signals, verbally, 2 way radios, or by cellular communications.
The Observer's duties are:

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- Creating a pre-flight weather report utilizing a personal weather station to collect data on the wind speed, ambient temperature, and barometric pressure.
- Notifying the PIC of any impending obstacles in the flight path of the sUAS.
- Notifying the PIC of any deviations in the planned flight path of the sUAS.
- Notifying the PIC if unauthorized persons enter the area of the planned flight.

General Operating Standards

- Before an operation of a sUAS within 5NM of an airport with a control tower, the control tower will be called to gain permission to operate the sUAS. The PIC will give the position, altitude, and the times the sUAS will be operated. The sUAS will not be operated at an altitude of over 150 ft. AGL. Weather minimums will be 3 miles visibility and a 1000 ft. ceiling.

- Before an operation of a sUAS within 5NM of a non-tower controlled airport, airport operators will be notified and the PIC will give the right of way to avoid flying in the proximity of full-scale aircraft. At no time will the sUAS be operated within the final approach course and the takeoff course of any runway. The sUAS will not be operated at an altitude of over 200 ft. AGL.

- Weather minimums will be 3 miles visibility and a 1000 ft. ceiling.

- GeoDrone Robotics, LLC will only operate its sUAS in line of sight of a PIC and/or Observer and will operate at sites that are a 'sufficient distance' from populated areas. Such operations will insure that the sUAS will not create a hazard to users of the NAS or the public.

- All of our operations will be under 200 ft. AGL if we are operating within 30 miles reach of a mode c vail.

- Maximum flight time for each operational flight will be less than 30 minutes.

- Flights will be terminated at 25% battery power reserve should that occur prior to the 20 minute limit.

- The sUAS will utilize 'GPS fences' so that it will not be operated at an altitude of no more than 400 ft. AGL, and not more than 200 ft. above an elevated platform from which data collection is planned.

- Minimum crew for each operation will consist of the PIC, and the Visual Observer.

- The sUAS operated by the petitioner weighs less than 55 lbs., including the payload.

- The sUAS will operate at speeds of no more than 50 knots, can hover, and can simultaneously move vertically and horizontally.

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- All operations must utilize a Visual Observer. The Visual Observer and the PIC must be able to communicate by voice, 2 way radio, cellular, or hand signals at all times during flight operations.

- Flight operations will be restricted to flights over water, public or private property with the permission of the property owner(s).

- All required permits will be obtained from state and local government prior to operation.

- sUAS will not be operated over densely populated areas.

- sUAS will not be operating over any open-air assembly of people.

- sUAS will not be operating over heavily trafficked roads.

- All new to service sUAS both custom and pre-manufactured will have a minimum of 25 logged flight hours and deemed safe by the PIC prior to commercial operations.

- Flight operations will also adhere to the specifications stated in the DJI Safety Guidelines. (downloadable at this link http://www.dji.com/product/inspire-1/download)

- The sUAS will be maintained in accordance with the maintenance specified in the User Manual and the Maintenance Manual (downloadable at this link http://www.dji.com/product/inspire-1/download).

How This Request Is To the Betterment of Our Community

The sUAS operated by GeoDrone Robotics, LLC are powered by batteries, are small, quieter, lighter, and more maneuverable than larger aircraft running on combustible fuel, thus leaving a very small environmental impact. Our sUAS operate at lower altitudes and have no people on board, thereby reducing the risk levels associated with traditional aircraft and larger UAS. These factors increase the safety of operation and reduce the risk of death or serious bodily injury by our aircraft. Also, with a limited payload and short flight duration, there is little risk to national security. Low altitude data collection methods are more efficient than ground based observations or manned aircraft imagery for displaying detailed characteristics of ground based objects. Because of the above mentioned characteristics of our sUAS, GeoDrone Robotics, LLC intends to sell their data at a significantly reduced cost allowing for more clients to be able to afford this type of data. The benefits of unmanned sUAS data collection methods and continued development and improvement of small sensors and increased flight times will benefit future clients greatly.

GeoDrone Robotics will make our sUAS available to first responders in our community who might require assistance, including fire fighters, police, sheriff, etc., will remaining subject to all limitations cited in this application.

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Exemption Requests and Equivalent Level of Safety

Stephen and Svetlana Thomas, Owners of GeoDrone Robotics, LLC requests an exemption from the following regulations as well as any additional regulations that may technically apply to the operation of the sUAS.

14 C.F.R. Part 21, Airworthiness Certificates:

This part establishes the procedures for the issuance of an airworthiness certificate. While the FAA continues to work to develop airworthiness standards for Unmanned Aerial Systems, we request an experimental certificate be issued for our sUAS's under either or both of the following provisions: 21.191 Experimental certificates. Experimental certificates are issued for the following purposes:

(a) **Research and Development.** Testing new aircraft design concepts, new aircraft equipment, new air craft installations, new aircraft operating techniques, or new uses for aircraft.

(b) **Showing Compliance with Regulations.** Conducting flight test and other operations to show compliance with the airworthiness regulations including flights to show compliance for issuance of type and supplemental type certificates, flights to substantiate major design changes, and flights to show compliance with the function and reliability requirements of the regulations. Since the experimental certificate can be used for commercial purposes such as market surveys, sales demonstrations, and customer crew training, we would expect that an experimental certificate would permit our commercial purpose as well. The aircraft will not carry persons or property, will not carry fuel, and will only fly under strict operational requirements. The sUAS's light weight, being constructed primarily of carbon fiber and plastic contribute to the low risk of injury or property damage. We propose that the sUAS will be at least as safe, if not safer, than a conventionally certified aircraft performing the same commercial operations. If an experimental air worthiness certificate is not appropriate for this application, then we request an exemption of 14 C.F.R. Part 21, Subpart H, and the requirement for an airworthiness certificate in general, citing the equivalent level of safety outlined in the previous paragraph.

14 C.F.R. 45.23 Display of Marks; General and 45.49 Size of Marks:

These regulations provide that each aircraft must display "N" and the aircraft's registration number in letters at least 3" high. Additionally, the aircraft must display the word "EXPERIMENTAL" in letters at least 2" high near the entrance to the cabin, cockpit, or pilot station. The sUAS does not have an entrance in which the word "EXPERIMENTAL" can be placed, and may not have a registration number assigned to it by the FAA. We propose to achieve an equivalent level of safety by including the word "EXPERIMENTAL" in the placard on the top of the aircraft, where the PIC, Visual Observer, and others in the vicinity of the aircraft while it is preparing for launch will be able to see the designation. Additionally, a permanent placard that will provide the aircraft's registration information will be placed at the location of the ground station. Finally, we will display at the ground station a high contrast flag or banner that contains the words "Unmanned Aircraft Ground Station" in letters 3" high or greater. Since the aircraft will operate within ¾NM of the ground station, the banner should be visible to anyone that observes the aircraft and chooses to investigate its point of origin. Additional temporary signs will be erected in the flight area that will state "Caution, Unmanned Aerial Vehicle in Use, Please Stay Back 500 ft. From The Operating Area."

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14 C.F.R. 91.7 Prohibits the Operation of an Aircraft Without an Airworthiness Certificate:
As no such certificate will be applicable in the form contemplated by the FARs, this Regulation is inapplicable.

91.119 Minimum Safe Altitudes:
The regulation states that over sparsely populated areas the aircraft cannot be operated closer than 500 ft. to any person, vessel, vehicle, or structure. Since the typical mission of the sUAS would be photography or survey of persons, vessels, vehicles or structures, it would be necessary to operate closer than 500 ft. to the items listed. Operations will only be flown over property or persons where a careful pre-planned flight path has been plotted. In the event of a malfunction or emergency landing, a DJI DropSafe Ballistic Parachute System may be used or mission abort with return to home function will occur. In either event, the hazard to persons or property on the surface will be very limited. Therefore we maintain that due to the small size of the sUAS and the embedded safety equipment and procedures used, the hazard to persons, vehicles and structures are minimal compared to manned aircraft, which should be considered in granting the exemption.

CFR 91.121 Altimeter Settings:
The regulation requires that aircraft shall maintain cruising altitudes by reference to an altimeter setting available within 100 NM of the aircraft. The sUAS will always fly below 400 ft. AGL and will not need to maintain cruising altitudes in order to prevent conflict with other aircraft. An Above Ground Level altimeter measurement above the takeoff point is transmitted via radio from the sUAS's on-board computer to the display screen held by the PIC, providing a constantly updated AGL readout. The DJI's flight controller can be configured to geo-fence the sUAS to remain under 400 ft. maximum altitude.

14 C.F.R. 91.151 Fuel Requirements for Flight in VFR Conditions:
The regulation provides that no person may begin a flight in an airplane under day-VFR conditions unless there is enough fuel to fly to the first point of intended landing and to fly after that for at least 30 minutes. The purpose of this is to provide an emergency reserve of fuel as a safety buffer for delays to landing. Since the aircraft will never fly more than ¾ NM from the point of intending landing, a full battery charge at launch will ensure that we meet the reserve energy requirement stated above.

14 C.F.R. 91.203(a) & (b) Civil Aircraft: Certifications Required:
The regulation provides that an airworthiness certificate, with the registration number assigned to the aircraft and a registration certificate must be aboard the aircraft. Additionally, subparagraph (b) provides that the airworthiness certificate be "displayed at the cabin or cockpit entrance so that it is legible to passengers or crew." At a maximum gross weight of 55 pounds, the sUAS is too small to carry documentation, does not have an entrance, and is not capable of carrying passengers or crew. To obtain an equivalent level of safety and meet the intent of 91.203, we propose that documents deemed appropriate for this aircraft by the FAA will be with the crew at the ground control station and available for inspection upon request. In order to identify the aircraft, we propose that the information found on airworthiness and registration certificates be permanently affixed to the aircraft via placard containing the following information plus the word "EXPERIMENTAL" to satisfy the requirement of 14 C.F.R. 45.23.

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14 C.F.R. Subpart E (91.401 – 91.417) – Maintenance, Preventive Maintenance, Alterations:

The regulation provides that the operator is primarily responsible for maintaining the aircraft in an airworthy condition, including compliance with part 39 and 43. Paragraphs 91.407 and 91.409 require that the aircraft be "approved for return to service by a person authorized under 43.7" after maintenance and inspection. It is our intention that our maintenance personnel along with the PIC perform maintenance and inspection of the aircraft and "be authorized to approve the aircraft for return to service." The PIC will ensure that the aircraft is in an airworthy condition prior to every flight and in addition conduct detailed inspections after every five hours of flight. All maintenance will be performed by GeoDrone Robotics, LLC maintenance personnel with coordination from the PIC in accordance with the DJI manual. If required maintenance is beyond the ability of the GeoDrone Robotics, LLC maintenance personnel or the PIC, the maintenance will be performed by the manufacturer or their designated repair facility. The GeoDrone Robotics, LLC maintenance personnel in coordination with the PIC will document work performed in accordance with 91.417. We feel that due to the size, construction, and simplicity of the aircraft, our maintenance personnel and the PIC can ensure an equivalent level of safety.

14 C.F.R. 91.109 Flight Instruction; Simulated Instrument Flight and Certain Flight Tests:

The regulation states that "No person may operate a civil aircraft that is being used for flight Instruction unless that aircraft has fully functioning dual controls." Training will be conducted by GeoDrone Robotics, LLC. We have the ability to provide dual controls utilizing two C1 transmitters with a wired link between the transmitters. One transmitter is designated the master transmitter and the other transmitter is designated as a slave. Please refer to the attached DJI Inspire 1 User Manual. The PIC instructor, utilizing the master transmitter, will be at all times be able assume control of the sUAS.

14 C.F.R. 91.215 ATC Transponder and Altitude Reporting Equipment and Use:

This regulation states all aircraft operating within 30NM of class A, B and C airspace must be equipped with automatic pressure altitude reporting equipment having a Mode C capability that automatically replies to Mode C interrogations. Due to the small size and lifting capabilities of our UASs we cannot carry a traditional transponder. All of our operations will be under 250 ft. if we are operating within the 30NM reach of a mode c vail.

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Conclusion

By granting Stephen Thomas and Svetlana Thomas, Owners, GeoDrone Robotics, LLC the requested exemptions, the FAA will help ensure the development of safe and successful commercial UAS operations and will advance the public knowledge and perception for such operations of sUAS. GeoDrone Robotics, LLC personnel have a long history with Remote Controlled Aircraft and have worked closely with the U.S. Military in areas of Counter UAS operations as well as Joint Air and Missile Defense. We are committed to promoting the sUAS research efforts of policymakers by sharing data from our commercial sUAS operations and serving as a resource for future sUAS research opportunities.

GeoDrone Robotics, LLC's sUAS will used , under authorization by the US DOT-FAA, are small, light-weight (under 55 lbs.) devices that will be operated only in daylight within the line of sight of the PIC and Visual Observer, they will operate under 400 ft. AGL and outside 5 miles from any airport or location with aviation activities, unless the air traffic control (ATC) authorities have been properly notified and that the ATC authorities have authorized each flight within the specified radius of their facilities.

GeoDrone Robotics, LLC seeks an exemption pursuant to 14 C.F.R. and Section 333 of the FAA Modernization and Reform Act of 2012 (FMRA), which will permit the safe operation of our sUAS commercially, without an Airworthiness Certificate. By granting this Petition, the FAA Administrator will be fulfilling the Congressional mandate of the FMRA of 2012, while also advancing the interests of the public, by allowing GeoDrone Robotics, LLC to safely, efficiently, and economically operate our sUAS commercially within the NAS. In accordance with the FAA Regulations and the FMRA of 2012, Section 333, GeoDrone Robotics, LLC respectfully requests that the Administrator grant this petition for an exemption from the requirements of 14 C.F.R Sections.

Sincerely,

Stephen Thomas, Svetlana Thomas
GeoDrone Robotics, LLC

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