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

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

August 03, 2015

Exemption No. 12284
Regulatory Docket No. FAA–2015–2127

Mr. Robert Zarracina
President
Flight Ventures Ltd
4827 McDonald Drive Circle North
Stillwater, MN 55082

Dear Mr. Zarracina:

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 29, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Flight Ventures Ltd (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial film making, photography, videography, surveying, data acquisition, site, structural and patrolling inspections, search and rescue, remote sensing, community awareness, education, training and research operations.[1]

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

[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 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 Phantom 3, Sensefly Exom, Sensefly eBee, Ag Eagle and Precision Hawk.

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.

[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.

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, Flight Ventures Ltd 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, Flight Ventures Ltd is hereafter referred to as the operator.

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

1. Operations authorized by this grant of exemption are limited to the DJI Phantom 3, Sensefly Exom, Sensefly eBee, Ag Eagle and Precision Hawk 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 August 31, 2017, unless sooner superseded or rescinded.

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

Enclosures

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Robert Zarracina – President
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May 29, 2015

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

Re: Exemption Request Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012, 49 U.S.C. § 44701(f), and Part 11 of the Federal Aviation Regulations

Dear Sir or Madam:

Flight Ventures Ltd, pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 (Reform Act), Subsection (f) of 49 U.S.C. § 44701, and 14 C.F.R. Part 11, requests an exemption from the Federal Aviation Regulations (FARs) listed below and discussed in Appendix A to allow Flight Ventures Ltd to conduct commercial operations with small Unmanned Aircraft System (sUAS) to provide aerial film making, photography, videography, surveying, data acquisition, site, structural and patrolling inspections for pipeline, energy, utility, construction, real estate, precision agriculture and other industries, search and rescue, remote sensing, community awareness, education, training and research operations.

Performing these services with a sUAS is in the public interest for several reasons, which are detailed further herein and include: (1) dramatically reducing safety risks inherent in manned operations, both in the air and on the ground; (2) inspecting locations where humans are not able visit without incurring substantial risk; (3) enhancing capabilities to utilize the sUAS to assist first responders on safety or environmental incidents; (4) and improving access to and control of various sites and operations.

The use of the sUAS for these services will reduce the need to either operate manned aircraft in a difficult environment and reduce the environmental impact of conventional aircraft operations or add to the safety when other non-aircraft related methods prove hazardous or risky. In addition, the small, lightweight, and easily controllable operating characteristics of the sUASs' provide for safe operations over site locations.

Exemptions Requested

Flight Ventures Ltd requests exemptions from the following regulations:

14 C.F.R. Part 21;
14 C.F.R. 45.23(b);
14 C.F.R. 61.113(a) and (b);
14 C.F.R. 91.7(a);
14 C.F.R. 91.119(c);
14 C.F.R. 91.121;
14 C.F.R. 91.151(a);
14 C.F.R. 91.203(a) and (b);
14 C.F.R. 91.405(a);
14 C.F.R. 91.407(a)(1);
14 C.F.R. 91.409(a)(1) and (2);
14 C.F.R. 91.417(a) and (b).

Operating Conditions

Flight Ventures Ltd requests an exemption subject to the conditions listed in Appendix B, which are substantially similar to the operating conditions required for the FAA's previous grants of exemptions under Section 333.

In accordance with the conditions approved in previous exemption grants, Flight Ventures Ltd is requesting authority to operate the sUAS within visual line of sight and below 400 feet AGL except as provided by FAA Air Traffic Control via COA. Flight Ventures Ltd will use the elevation of the highest predominant terrain within 1 mile of the launch point and within the visual line of sight (VLOS) as a ground reference point to establish the 400 feet ceiling. In other words, Flight Ventures Ltd will not operate the sUAS any higher than 400 feet above the highest point within 1 mile from the launch point, and will only do so provided the sUAS is within the line of sight. These operating conditions, along with those listed in Appendix B, would provide an equivalent level of safety for the reasons described below. The sUAS is visible up to 2,000 meters (1.24 miles) in a clear sky, making the selection of the predominant terrain within 1 mile of the launch point as a ground reference a logical and easily manageable reference.

Operator Requirements

As a condition to the grant of the exemptions, Flight Ventures Ltd will require that the PIC hold at least a private pilot certificate and a valid third-class medical certificate. The PIC will have accumulated and logged a minimum number of flight cycles and hours for daytime operations, as required by the FAA. The PIC will also be subject to the FAA flight review requirements.

The PIC and all observers will be required to have completed a Flight Ventures Ltd training program.

Flight Ventures Ltd respectfully submits that the operator qualifications takes into account the operating conditions and characteristics of the particular sUAS in use.

Public Interest

Flight Ventures Ltd respectfully submits that its use of the sUAS in lieu of manned operations, which are currently conducted with conventional fixed and rotary winged aircraft, offers increased safety benefit and will achieve an enhanced level of safety, as mandated under Section 333(c) of the Reform Act. Approval of this application also will benefit the public interest by allowing better, safer, and more cost efficient information gathering for various industries.

Conventional aerial survey and inspection operations using manned aircraft involve very heavy aerial vehicles that must transit to the operational location and carry significant quantities of combustible fuels and a multi-person crew in piloting and observation roles. These operations become even more difficult if the terrain is mountainous. By contrast, the sUAS light weight, including its payload and use of batteries for power, allows it to be carried to and from the area of activity, removing the need for airborne pilots and observers, and poses less risk to people and infrastructure on the ground, as well as other aircraft.

Additionally, no national security issues are or will be raised by the grant of the requested exemptions due to the sUAS small size and extremely limited load-carrying capacity, as well as its operational limitations and absence of flammable fuel. On the other hand, the sUAS is likely to enhance national security through better and more accurate monitoring of critical national infrastructure.

The grant of the requested exemption is in the public interest based on the clear direction in Section 333 and 49 U.S.C. § 44701(f), the equivalent and enhanced level of safety of the proposed operations, the significant public benefit, and cost savings to be realized as a result of the use of sUAS for aerial inspection and survey services. Moreover, the FAA has already granted similar exemptions for sUAS used to conduct high-resolution aerial imaging and surveying operations. Accordingly, the applicant respectfully requests that the FAA grant the requested exemption without delay.

Privacy Concerns

The proposed operations will take place only in largely unpopulated, remote areas that are owned or leased, controlled by Flight Ventures Ltd or the owner of record. Access to these areas is restricted to employees and authorized personnel only. No privacy issues are raised by this application.

Federal Register Summary

Pursuant to 14 C.F.R. § 11.81(f), the following summary is provided for publication in the Federal Register, should the FAA determine that publication is needed:

Docket No.: No. FAA-2015- Petitioner: Flight Ventures Ltd. Section of 14 CFR: Part 21, § 45.23(b), § 61.113(a) and (b), § 91.7(a), § 91.119(c), § 91.121, § 91.151(a), § 91.405(a), § 91.407(a)(1), § 91.409(a)(2), § 91.417(a) and (b). Description of Relief Sought: Flight Ventures Ltd is seeking an exemption to conduct commercial operations using a small-unmanned aircraft (55 pounds or less) in remote areas of the United States.

Under 49 U.S.C. § 44701(f), the "Administrator may grant an exemption from a requirement of a regulation prescribed under subsection (a) or (b) of this section or any of sections 44702-44716 of [Title 49] if the Administrator finds the exemption is in the public interest." *See* Exemption Nos. 11109, 11110, 11136, 11166, 11167, 11170, 11172. Flight Ventures Ltd requests that the FAA not request public comment on its application because it would not set a precedent and because the relief requested is identical to exemptions granted previously. 14 C.F.R. § 11.87.

Sincerely,

Robert A Zarracina
Flight Ventures Ltd

APPENDIX A

EXEMPTION REQUEST AND EQUIVALENT LEVEL OF SAFETY SHOWINGS UNDER APPLICABLE RULES SUBJECT TO EXEMPTION

Flight Ventures Ltd 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, Subpart H: Airworthiness Certificates

Part 21, Subpart H, entitled Airworthiness Certificates, establishes the procedural requirements for the issuance of airworthiness certificates as required by § 91.203(a)(1). Given the size and weight of the aircraft, the operating conditions, design safety features, and the proposed conditions and limitations, it is unnecessary to go through the certificate of airworthiness process under Part 21 Subpart H to achieve or exceed current safety levels.

Such an exemption meets the requirements of an equivalent level of safety under Part 11 and Section 333. Section 333 and 49 U.S.C. § 44701(f) both authorize the FAA to exempt aircraft from the requirement for an airworthiness certificate, upon consideration of the size, weight, speed, operational capability, and proximity to airports and populated areas of the sUAS involved.

In this case, an analysis of these criteria demonstrates that the sUAS operated without an airworthiness certificate, under the conditions proposed herein, will be at least as safe, or safer, than a conventional aircraft (fixed wing or rotorcraft) with an airworthiness certificate. The sUAS weighs less than 10 pounds fully loaded. It will not carry a pilot, passenger or flammable fuel. The sUAS operates exclusively within a controlled area pre-disclosed and in compliance with conditions set forth herein. Unlike other civil aircraft, operations under this exemption will be tightly controlled and monitored by the PIC and observer(s), pursuant to the conditions set forth in Appendix B, the Operator's Manual, and local public safety requirements. The FAA will have advance notice of all operations through the filing of NOTAMs. The lack of flammable fuel and the fact that the aircraft is carried to the location and not flown there all establish the equivalent level of safety. The sUAS provides at least an equivalent level of safety to that of such operations being conducted with conventional aircraft that would be orders-of-magnitude larger and would be carrying passengers, cargo, and flammable fuel.

14 C.F.R. § 45.23 (b). Marking of the Aircraft

The regulation requires that marks include only the Roman capital letter "N" and the registration number is displayed on limited, restricted or light-sport category aircraft or experimental or provisionally certificated aircraft, the operator must also display on that aircraft near each entrance to the cabin, cockpit, or pilot station, in letters not less than 2 inches nor more than 6 inches high, the words "limited," "restricted," "light-sport," "experimental," or "provisional," as applicable. Even though the UAS will have no airworthiness certificate, an exemption may be needed as the UAS will have no entrance to the cabin, cockpit or pilot station on which the word "Experimental" can be placed. Given the size of the sUAV, two-inch lettering will be impossible. The word "Experimental" will be placed on the fuselage in compliance with §45.29 (f). The equivalent level of safety will be provided by having the sUAV marked on its fuselage as required by §45.29 (f) where the pilot, observer and others working with the sUAV will see the identification of the UAS as "Experimental." The FAA has issued the following exemptions to this regulation to Exemptions Nos. 10700, 8738, 10167 and 10167A.

14 C.F.R. §§ 61.113(a) & (b): Commercial Pilot Privileges

Sections 61.113(a) & (b) limit private pilots to non-commercial operations. Unlike a conventional aircraft that carries a pilot, passengers, and cargo, the sUAS is remotely controlled with no passengers or property of others on board. The area of operation is controlled and restricted, and all flights are planned and coordinated in advance as set forth in the Operator's Manual. In conjunction with the required training of the PIC and observers, the level of safety provided by the requirements included in the Operator's Manual exceeds that provided by a single individual holding a commercial pilot certificate operating a conventional aircraft. The proposed operations will achieve at least an equivalent level of safety.

14 C.F.R. § 91.7(a): Minimum Safe Altitudes

Section 91.7(a) prohibits an individual from operating a civil aircraft unless it is in an airworthy condition. No FAA standard exists for determining an aircraft's airworthiness when an airworthiness certificate is not issued. As the FAA has done with previous exemption grants, airworthiness will be ensured and an equivalent level of safety will be achieved by compliance with the operating documents prior to every flight.

14 C.F.R. § 91.119(c): Minimum Safe Altitudes

Section 91.119 establishes safe altitudes for operation of civil aircraft. Specifically, Section 91.119(c) limits aircraft flying over areas other than congested areas to an altitude of 500 feet above the surface, except over open water or sparsely populated areas. In those cases, the aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure. Because some of the aerial inspection and survey work must be accomplished at altitudes less than 500 feet AGL and nonparticipating employees may be working within 500 feet of the sUAS, an exemption from Section 91.119(c) is needed.

The equivalent level of safety will be achieved because the sUAS, given its size, weight, speed, and materials, does not pose a serious risk. Also, every flight will be conducted over land controlled by Flight Ventures Ltd. Flight Ventures Ltd will notify all effected individuals of sUAS operations in advance to ensure they are aware of the planned flights. Compared to aerial inspection operations conducted with aircraft or rotorcraft weighing far more than 10 pounds and carrying flammable fuel, any risk associated with these operations will be far less than those currently allowed with conventional aircraft operating at or below 500 feet AGL. Exemption Nos. 11156, 11158, 11159.

14 C.F.R. § 91.121: Altimeter Setting

Section 91.121 requires each person operating an aircraft to maintain cruising altitude by reference to an altimeter that is set "to the elevation of the departure airport or an appropriate altimeter setting available before departure." As the sUAS may not have a barometric altimeter, but instead a GPS altitude read out, an exemption is required. An equivalent level of safety will be achieved by the operator, pursuant to the Operator's Manual, confirming the altitude of the launch site shown on the GPS altitude indicator before flight.

14 C.F.R. § 91.151(a): Fuel Requirements for Flight in VFR Conditions

This regulation prohibits an individual from beginning "a flight in an airplane under VFR conditions unless (considering wind and forecast weather conditions) there is enough fuel to fly to the first point of intended landing and, assuming normal cruising speed – (1) During the day, to fly after that for at least 30 minutes; or (2) At night, to fly after that for at least 45 minutes." The sUAS batteries provide approximately 50 minutes of powered flight. Without an exemption from 14 C.F.R. § 91.151, the sUAS's flights would be limited to approximately 10 minutes in length because the PIC would require the last 30 minutes to satisfy section 91.151(a). Given the limitations on its proposed operations, a longer time frame for flight in VFR conditions is reasonable.

Flight Ventures Ltd believes that an exemption from 14 C.F.R. § 91.151(a) provides an equivalent level of safety and is consistent with prior exemptions. Operating the sUAS, without 30 minutes of reserve fuel does not engender the type of risks that Section 91.151(a) was meant to prevent given the size and speed at which the sUAS operates. In the unlikely event that the sUAS' battery runs low, it would simply follow the pre-programmed command to land at a designated location, usually the departure point. Given its weight and construction material, the risks are less than contemplated by the current regulation.

Flight Ventures Ltd believes that an equivalent or enhanced level of safety can be achieved by maintaining 10 minutes of reserve power which, allowing at least 30 minutes of flight time, if not more, would be more than adequate to return the sUAS to its planned landing zone from anywhere in its limited operating area. Exemption 10673 (allowing Lockheed Martin Corporation to operate without compliance with 91.151(a)); *see also* Exemptions 2689F, 5745, 10673 and 10808.

14 C.F.R. §§ 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b): Maintenance Inspections

Section 91.405(a) requires that an aircraft operator or owner "shall have that aircraft inspected as prescribed in subpart E of this part and shall between required inspections, except as provided in paragraph (c) of this section, have discrepancies repaired as prescribed in part 43 of this chapter." Section 91.407 similarly makes reference to requirements in Part 43. Section 91.409(a)(2) requires an annual inspection for the issuance of an airworthiness certificate. Section 91.417(a) requires the owner or operator to keep records showing certain maintenance work that has been accomplished by certificated mechanics, under Part 43, or licensed pilots and records of approval of the aircraft for return to service. A qualified person prior to each flight and at predefined intervals as part of the maintenance schedule will perform pre-flight checks.

The pre-flight checklist includes but may not be limited to:

1. Visual inspection of the airframe;
2. Visual inspections of propeller;
3. Verify GPS acquisition;
4. Plan and upload mission;
5. Video and payload check;
6. Controls check;
7. Gyro/control surfaces check;
8. Throttle check
9. Altimeter check;
10. Check sensors; and
11. Verify failsafe's are set correctly.

An equivalent level of safety will be achieved because the sUAS will carry no external payload, will operate only in restricted predetermined areas, and is not a complex mechanical device. In addition, the operator will ensure that the sUAS is in working order prior to initiating flight, perform required maintenance, and keep a log of any maintenance that is performed. Moreover, the operator is the person most familiar with the aircraft and is best suited to maintain the aircraft in an airworthy condition and to ensure an equivalent level of safety. Last, the Operator's Manual will have instructions to develop and document maintenance, overhaul, replacement, and inspection requirements in the absence of Flight Ventures Ltd requirements, and procedures to document and maintain maintenance records for the sUAS. The sUAS maintenance guidelines provide an equivalent level of safety to the maintenance requirements in Part 91.

APPENDIX B

FLIGHT VENTURES LTD OPERATING LIMITATIONS

1. Operations authorized by the grant of exemption are limited to the sUAS that weigh less than 55 lbs.

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

3. The sUAS will not be operated at an altitude more than 400 feet above the highest predominant terrain except as may be provided by FAA Air Traffic Control (ATC) via COA. The highest predominant terrain is the defined as terrain within 1 mile of the launch point and within the visual line of sight of the PIC. All altitudes reported to ATC shall be in feet AGL.

4. The sUAS 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.

5. All operations must use a visual observer (VO). The VO and PIC must be able to communicate verbally at all times. The PIC must be designated before the flight. The PIC must ensure that the VO can perform the functions prescribed in the operating documents.

6. The operating documents and this grant of exemption must be accessible during sUAS operations and made available to the Administrator upon request. If a conflict exists between the conditions and limitations in the exemption and the procedures outlined in the operating documents, the conditions and limitations in the exemption take precedence and must be followed. Otherwise, Flight Ventures Ltd must follow the procedures as outlined in its operating documents. Flight Ventures Ltd may update or revise its operating documents. It is Flight Ventures Ltd's responsibility to track such revisions and present updated and revised documents to the Administrator upon request. Flight Ventures Ltd must also present updated and revised documents if it petitions for extension or amendment to this grant of exemption.

7. Prior to each flight the PIC must inspect the sUAS to ensure that it is in a condition for safe flight. The PIC shall not operate the aircraft if the inspection reveals a condition that affects the safe operation of the sUAS until the necessary maintenance has been performed and the sUAS is found to be in a condition for safe flight. The Ground Control Station, if utilized, must be included in the preflight inspection. All maintenance and alternations must be properly documented in the aircraft records.

8. Any that has undergone maintenance or alterations that affect the sUAS operation or flight characteristics (e.g., replacement of a flight critical component) must undergo a functional test flight in accordance with the Operator's Manual. The PIC who conducts the functional test flight must make an entry in the aircraft records of the flight. The requirements and procedures for a functional test flight and aircraft record entry shall be included in the Operator's Manual.

9. The pre-flight inspection must account for all discrepancies, e.g. inoperable components, items, or equipment, not already covered in the relevant sections of the operating documents.

10. The operator must follow sUAS manufacturers component, maintenance, overhaul, replacement, inspection, and life limit requirements.

11. Flight Ventures Ltd must carry out its maintenance, inspections, and record keeping requirements, in accordance with the operating documents. Maintenance, inspection, alterations, and status of replacement/overhaul component parts must be noted in the aircraft records, including total time in service, description of work accomplished, and the signature of the person authorized to return the sUAS to service.

12. Each sUAS operated under this exemption must comply with all manufacturer Safety Bulletins or Airworthiness Directives if applicable.

13. The PIC must possess at least a private pilot certificate and at least a current third class medical certificate. The PIC must also meet the flight review requirements specified in 14 C.F.R. § 61.56 in an aircraft in which the PIC is rated on his or her pilot certificate.

14. Flight Ventures Ltd may not permit any PIC to operate, unless the PIC meets the operator's qualification criteria and demonstrates the ability to safely operate, the sUAS in a manner consistent with how the sUAS 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 C.F.R. § 61.51(b). The PIC must ensure that the VO is trained appropriately in order to fulfill his or her duties. A record of training and qualification must be documented and made available upon prior documented flight experience obtained in compliance with applicable regulations may satisfy this requirement. Flights for the purposes of training the operator's PICs and VOs (training, proficiency, and experience building), 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 these operating conditions.

15. Operations may not be conducted during night, as defined in 14 C.F.R. § 1.1. All operations must be conducted under visual flight rules (VFR) conditions. Flights under special visual flight rules (SVFR) or instrument flight rules (IFR) conditions are not authorized.

16. The sUAS may not operate within 5 nautical miles of an airport reference point as denoted on a current FAA published aeronautical chart unless a letter of agreement with that airport's management is obtained, and the operation is conducted in accordance with a NOTAM as required by Flight Ventures Ltd's COA. The letter of agreement with the airport management must be made available to the Administrator upon request.

17. The sUAS 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 sUAS loses communications or loses its GPS signal, the sUAS must return to a pre-determined location within the security perimeter and land or be recovered in accordance with the Operator's Manual.

19. The PIC must abort the flight in the event of unpredicted obstacles, other aircraft incursions or emergencies in accordance with the Operator's Manual.

20. sUAS operations must be completed within 50 minutes flight time.

21. Flight Ventures Ltd must obtain an ATC issued COA prior to conducting any operations under this exemption. This COA will also require the filing of the NOTAM not more than 72 hours in advance, but not less than 48 hours prior to the operation.

22. All aircraft operated in accordance with the requested exemption must be identified by serial number, registered in accordance with 14 C.F.R. Part 47, and have identification (N-Number) markings in accordance with 14 C.F.R. Part 45, Subpart C. Markings shall be as large as practicable.

23. The radio frequency spectrum used for operation and control of the sUAS must comply with Federal Communication (FCC) or other appropriate government oversight agency requirements.

24. The documents required under 14 C.F.R. §§ 91.9 and 91.203 must be available to the PIC at the Ground Control Station of the sUAS any time the aircraft is operating. These documents shall be made available to the Administrator or any law enforcement official upon request.

25. The sUAS must remain clear and yield the right of way to all other manned operations and activities at all times.

26. The sUAS may not be operated from any moving device or vehicle.

27. The sUAS may not be operated over congested or densely populated areas.

28. Flight operations must be conducted at least 500 feet from all nonparticipating persons, vessels, vehicles, structures, and public access roads unless if operated near vessels, vehicles or structures where the owner / controller of such vessels, vehicles or structures has granted permission 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.

29. Operations nearer than 500 feet to the PIC, VO, operator trainees or essential persons as defined in the operating documents are permitted if those operations do not present an undue hazard to those persons per § 91.119(a) as determined by the PIC.

30. All operations must be conducted over private or controlled access property unless an exception is granted.

31. Any incident, accident, or flight operation that transgresses the lateral or vertical boundaries of the operational area as defined by the applicable COA shall 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.

APPENDIX C

SMALL UNMANNED AERIAL SYSTEM DESCRIPTION

Flight Ventures Ltd Corporate Overview: Flight Ventures Ltd is a Minnesota company with its headquarters in Stillwater, Minnesota.

sUAS Operating Overview: The sUAS utilized are either a fixed or rotary-wing aircraft constructed of foam or rugged polycarbonate materials. The aircraft are easy to assemble or come pre-assembled. The sUAS can be operated manually or in fully autonomous flight modes. Creating pre-planned flight paths in autonomous mode is as simple as clicking on reference points on a geo-referenced maps. Pre-mission waypoints, landing zones, and flight area dimensions can be entered during preflight planning ensuring the sUAS operates only within specified boundaries and pre-determined flight parameters.

The DJI Phantom 3 (Phantom) and Sensefly Exom (Exom) are quad copter drones while the Sensefly eBee (eBee), Ag Eagle (Eagle) and Precision Hawk (Hawk) are fixed wing drones.

The Phantom is a battery-powered drone allowing flight times up to 23 minutes. Diagonally it measures approximately 590mm (23.25 inches) including rotor blades. Takeoff weight is 1280 grams.

The Exom is a battery-powered drone allowing flight times up to 22 minutes. It measures approximately 7.0 H x 22 L x 32 W inches. Rotor blade diameter measures 13 inches. Takeoff weight is 3.7 pounds.

The eBee is a battery-powered drone allowing flight times up to 50 minutes. Its wingspan is 38 inches. Takeoff weight is 1.52 pounds.

The Eagle is a battery-powered drone allowing flight times up to 40 minutes. Its wingspan is 56 inches. Takeoff weight is 3 pounds.

The Hawk is a battery-powered drone allowing flight times up to 40 minutes. Its wingspan is 48 inches. Takeoff weight is 3 pounds.

Many advanced safety features makes these drones on of the safest choices for commercial operations. Safety features include geo-fencing, position hold and self-leveling, return home, emergency landing and stop. The Exom includes rotor blade shrouding.

Operator's Manual – The respective UAS Operator's Manual, provided by the respective manufacturer, will be followed at all times and available during all appropriate flight operations.

Takeoff and Landing style/type – The sUAS is ground or hand launched and can be tube launched with additional equipment. The sUAS lands by returning to a pre-determined rally point. Once it reaches a pre-selected altitude, it heads toward the landing waypoint, descending until it lands and / or skids to a stop.

Navigation System – Specific maps can be downloaded to the display screen (such as VFR air sectional and geographic maps), which are overlaid with GPS positional data. Waypoints can be created before and during flight operations creating specific locations and sequences for the aircraft in use.

Defined "Keep Out" Areas – The navigation software allows for preplanning Keep Out Areas, also know as geo-fencing, that allow the operator to designate airspace he or she does not want the sUAS to enter. If defined flight paths pass through an area designated as keep-out, the individual waypoints and waypoint connection segments turn red as a warning. Additionally, if a mission is uploaded and intersects with a keep out area, a warning is presented to the user. Also, if an aircraft in flight is navigated into a designated keep out area, an audible warning is sounded.

Maintenance – The sUAS require very little maintenance, and operators may perform most required maintenance in the field with the field repair kit.

Command and Control Systems - The sUAS Ground Control Station (GCS) allows the operator simultaneous control over aircraft and payloads. The display screen provides all essential flight data to the operator. Telemetry data is transmitted to the command station at least once per second.

Displayed on GCS:

- Current position
- Registered home position
- Any autopilot flight plans
- Registered emergency landing zone
- Aircraft attitude
- Altitude
- Airspeed
- Groundspeed
- Compass reading/heading
- Estimated wind heading
- Communication strength
- Range from home
- Bearing from home
- Duration of current mission
- Rate of climb
- Mode of the aircraft
- Battery level

Emergency Procedures and System Failures

Loss of Link – The sUAS does not need constant signal from the GCS to continue flying. Communications outages are detected by the system and are reported to the PIC. During the communication outage, the sUAS continues on its pre-determined flight path until a failsafe is triggered. Once a failsafe is triggered, the sUAS will perform in accordance with the failsafe conditions uploaded before launch. This is accomplished without input from the operator.