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

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

June 25, 2015

Exemption No. 11916
Regulatory Docket No. FAA–2015–1255

Mr. Mike Ostrom
General Manager
Tukuh Technologies, LLC
1600 Genessee, Suite 860
Kansas City, MO 64102

Dear Mr. Ostrom:

This letter is to inform you that we have granted your request for exemption. It transmits our decision, explains its basis, and gives you the conditions and limitations of the exemption, including the date it ends.

By letter dated April 2, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Tukuh Technologies, LLC (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial imaging for the agriculture, energy production and transmission, engineering, manufacturing and construction industries for mapping, surveying and inspections operations..

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 SenseFly eBee.

In accordance with the statutory criteria provided in Section 333 of Public Law 112−95 in reference to 49 U.S.C. § 44704, and in consideration of the size, weight, speed, and limited

operating area associated with the aircraft and its operation, the Secretary of Transportation has determined that this aircraft meets the conditions of Section 333. Therefore, the FAA finds that relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*, and any associated noise certification and testing requirements of part 36, is not necessary.

The Basis for Our Decision

You have requested to use a UAS for aerial data collection[1]. The FAA has issued grants of exemption in circumstances similar in all material respects to those presented in your petition. In Grants of Exemption Nos. 11062 to Astraeus Aerial (*see* Docket No. FAA−2014−0352), 11109 to Clayco, Inc. (*see* Docket No. FAA−2014−0507), 11112 to VDOS Global, LLC (*see* Docket No. FAA−2014−0382), and 11213 to Aeryon Labs, Inc. (*see* Docket No. FAA−2014−0642), the FAA found that the enhanced safety achieved using an unmanned aircraft (UA) with the specifications described by the petitioner and carrying no passengers or crew, rather than a manned aircraft of significantly greater proportions, carrying crew in addition to flammable fuel, gives the FAA good cause to find that the UAS operation enabled by this exemption is in the public interest.

Having reviewed your reasons for requesting an exemption, I find that—

- They are similar in all material respects to relief previously requested in Grant of Exemption Nos. 11062, 11109, 11112, and 11213;
- The reasons stated by the FAA for granting Exemption Nos. 11062, 11109, 11112, and 11213 also apply to the situation you present; and
- A grant of exemption is in the public interest.

Our Decision

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. 106(f), 40113, and 44701, delegated to me by the Administrator, Tukuh Technologies, 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 the extent necessary to allow the petitioner to operate a UAS to perform aerial data collection. This exemption is subject to the conditions and limitations listed below.

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

Conditions and Limitations

In this grant of exemption, Tukuh Technologies, 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 SenseFly eBee 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 June 30, 2017, unless sooner superseded or rescinded.

Sincerely,

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

Enclosures

Tukuh Technologies

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

April 2, 2015

Re: Exemption Request Under Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations

Dear Sir or Madam:

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 (the Reform Act) and 14 C.F.R. § 11.61, Tukuh Technologies, LLC (Tukuh) hereby petitions for an exemption from the listed Federal Aviation Regulations ("FARs") detailed below and in Appendix A for commercial operation of the eBee Unmanned Aircraft System manufactured by SenseFly SA of Switzerland.

- 14 C.F.R. § 61.113(a) & (b)
- 14 C.F.R § 91.7 (a)
- 14 C.F.R. § 91.119 (c)
- 14 C.F.R. § 91.151 (a) (1)
- 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)

The requested exemption would authorize the eBee unmanned aircraft system (UAS) operations to conduct aerial imaging for the agriculture, energy production and transmission, engineering, manufacturing and construction industries for mapping, surveying and inspections operations. Use of the eBee will reduce the need to operate conventional aircraft for mapping and surveying, as well as more expensive equipment currently required to perform inspections of power transmission systems, pipeline systems, vertical structures and other types of infrastructure.

The public benefits in using a UAS compared to conventional aircraft or other equipment is an equivalent or greater level of safety to the public and/or operators of both airborne or land based equipment, often in dangerous environments that involve hazardous materials, high voltage, high heights and/or extreme temperatures. Additional benefits occur when UAS operations for critical infrastructure inspection are significantly faster than conventional methods, thereby allowing for a more timely assessment of risk, repair, and/or mitigation of potential failures. Lastly, a significant public benefit is the zero carbon foot print of the UAS compared to alternative options.

Tukuh UA flight operations will be subject to strict requirements and in conditions that ensure at least an equivalent level of safety to currently authorized operations using manned aircraft, and under conditions as may be modified by the FAA as required by Section 333. All of the UA flight operations will be flown in accordance with the Tukuh UAS Aviation Standard Operating Procedures Manual[1] (TASOP) and the specific UAS manufacturer User Manual[1] (SenseFly-eBee). Maintenance will be in accordance with the specific UAS manufacturer Maintenance Procedures Document[1] (SenseFly-eBee). Tukuh requests the FAA treat the TASOP and SenseFly documents as proprietary and not include them in the public docket.

[1] Exhibits to this petition contain proprietary information, an in accordance with 14 C.F.R. § 11.35 (b), are not to be included in the Federal Docket Management System (FDMS). Pursuant to Section 11.35 (b), the FAA has mandated that "when we are aware of proprietary information filed with a comment, we do not place it in the docket. We hold it in a separate file to which the public does not have access, and place a note in the docket that we have received it."

1. Unmanned Aircraft System (UAS) - SenseFly Ebee

Characteristics

The eBee is a small (37.8-inch wingspan) and ultra-light (maximum take-off weight of 1.7 pounds) platform made of flexible foam that performs precision aerial mapping missions with an on-board GPS and related flight management software (eMotion) that allows the operator to safely and efficiently plan a mission in 3D and monitor it in real-time. Because of the embedded camera protected by a foam envelope, the eBee can take a collection of high-definition, still images that can later be used to generate maps and contour lines of the surveyed area.

The four main characteristics of the eBee include:

a. Very light weight

The eBee is so light that the operator can launch it by hand and let it land on almost any surface without requiring a parachute or landing net (belly land). Its low impact energy (38 J in case of a controlled emergency landing) also significantly reduces the risk of hazardous situations. Finally, the wings of the eBee are detachable and made of flexible foam with no hard or sharp edges and almost no internal strengthening structure.

b. Electric-powered

The eBee is electric powered. Brushless engine technology makes it silent and reliable. The propeller is attached with a rubber band to the body of the plane so that it can easily flex away in case of contact with any object.

c. Semi-automatic flight

The artificial intelligence incorporated within the eBee autopilot system continuously analyzes data from the Inertial Measurement Unit and the onboard GPS and takes care of all the aspects of the flight under the supervision of the operator.

d. Option for Manual control

Additionally, the eBee provides an override capability that allows the operator to take manual actions during the flight (Go to Home, Go Land, Hold and Resume the mission) and also suspend automated operations and take manual control of the aircraft with the remote controller provided with the system, should it become necessary to respond emergent circumstances.

Airworthiness & Safety

The SenseFly eBee is an inherently airworthy and safe UAS, see UAS manufacturer Justification of Airworthiness and Safety Assessment[1] (SenseFly-eBee). The FAA has approved grants of exemption (exemption No. 11170 and 11136) for eBee UAS operations in the NAS for commercial operations in the agriculture and survey industry. Additionally, the Army Corps of Engineers, New Orleans District has obtained a Certificate of Waiver or Authorization (COA) for levee investigations and monitoring, and the University of New Mexico for research into safety of flight procedures. Throughout the world the SenseFly eBee UAS has obtained flight approvals in nine countries besides the U.S. for VLOS operations; Switzerland, Australia, France, Norway, Sweden, United Kingdom, Canada, Germany and Denmark.

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2. Operation of the Unmanned Aircraft System (UAS) - SenseFly Ebee

eBee flight operations will be flown in accordance with the TASOP and the specific UAS manufacturer User Manual[1] (SenseFly eBee). Maintenance will be in accordance with the specific UAS manufacturer Maintenance Procedures Document[1] (SenseFly eBee). The UA will be operated with both a Pilot-in-Command (PIC) and a ground based Visual Observer (VO).

Operating Conditions

The following is a summation of the more important operating requirements and restrictions from the TASOP applicable to this exemption request, a complete review of the TASOP is required to completely assess Tukuh UA flight operations procedures:

- UA flight operations will be conducted over private and public lands with permission from the land owner and/or government agency responsible for the management of such lands;
- Tukuh's General Manager will approve all flight operation;
- UA flight operations will be during the day and under visual meteorological conditions;
- UA will be flown with-in Visual Line-of-Sight (VLOS) of both the PIC and VO at all times;
    - Visual contact with the UA is required at all times
- PIC and VO will be in voice communication at all times;
- The UA will be flown in Class G airspace at no higher an altitude of 400 ft. Above Ground Level (AGL)
- UA flight operations will not be conducted over congested areas or open air assemblies of people;
- PIC will give way to manned aircraft operations and operate the UA to avoid and remain well clear of manned aircraft;
- UA flight operations will be conducted outside of 5 nautical miles (NM) of an airport or helipad unless a letter of agreement with the airport's management is obtained;
- All flights will obtain an Air Traffic Organization (ATO) issued Certificate of Waiver or Authorization (COA) prior to conducting flight operations. Included in the COA request will be a request for a Notice to Airman (NOTAM).

Operator Requirements

The eBee is an ultra-light UA made of flexible foam with no sharp or hard edges characterized by a high level of pre-programmed controls and various built-in technical capabilities (programming of a geo-fence, automatic wind detection) that prevent the operator from doing a mission outside of the operating limits. All flights are pre-programmed with GPS guidance and do not require human intervention; nevertheless human override is possible by clicking on one of the multiple "action" buttons or by using the remote controller provided with each eBee UAS. In the case of unplanned events, either the autopilot reacts immediately or the operator can choose between different pre-programmed or manual actions. Those procedures include a Flight Termination System (emergency landing procedure, triggered by the autopilot or the operator in charge: given its very light weight, the eBee will initiate a gliding approach to the ground at very low speed around the current location). Moreover, the kinetic energy of the aircraft is 60 J in-flight at cruise speed. In comparison, the kinetic energy of a football is

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about 110 J when thrown by hand. Given the inherent safe operation of the eBee UA the following operator requirements are proposed:

- PIC will hold an FAA private pilot certificate and a current third class airman medical certificate;
- The PIC and VO will have completed and passed the UAS manufacturer's Training Program[1] (SenseFly ebee) with documentation;
- Complete the Tukuh UAS Education and Training Program[1]
- Review and be familiar with the Tukuh UAS Aviation Standard Operating Procedures Manual and pass an annual written examination.

3. The Name and address of the applicant:

Tukuh Technologies, LLC
Attn: Mike Ostrom
Ph: 816-500-4096
Email: Mike.Ostrom@Tukuh.com
Address: 1600 Genessee, Suite 860, Kansas City, MO 64102

If you have any further questions or require additional information, please do not hesitate to contact me. Thank you for your consideration of this matter.

Respectfully submitted,

Mike Ostrom
General Manager

Appendices:

A. Exemption Request and Equivalent Level of Safety Showings under applicable rules subject to Exemption
B. Tukuh UAS Aviation Standard Operating Procedures Manual[1] (TASOP)
C. UAS manufacturer User Manual[1] (SenseFly-eBee)
D. UAS manufacturer Justification of Airworthiness and Safety Assessment[1] (SenseFly-eBee)
E. UAS manufacturer Maintenance Procedures Document[1] (SenseFly-eBee)
F. UAS manufacturer's Training Program[1] (SenseFly ebee)
G. Tukuh UAS Education and Training Program[1]

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Appendix A

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

14 C.F.R. § 61.113(a) & (b); 61.133(a): Private Pilot Privileges and Limitations; Pilot in Command;

The regulation prescribes, in pertinent part, that;

(a) No person who holds a private pilot certificate may act as pilot in command of an aircraft that is carrying passengers or property for compensation or hire; nor may that person, for compensation or hire, act as pilot in command of an aircraft.

(b) A private pilot may, for compensation or hire, act as pilot in command of an aircraft in connection with any business or employment if:

(1) The flight is only incidental to that business or employment; and

(2) The aircraft does not carry passengers or property for compensation or hire.

Relief request with explanation:

To allow flight operations with a pilot holding only a private pilot certificate. Given the safety features of the eBee UAS and the fact that the missions are pre-programmed and monitored in real-time with a specific flight management software (eMotion) and that the eBee UA cannot carry a pilot or passengers, the proposed operations can achieve the equivalent level of safety of current manned flight operations by requiring the PIC operating the UA to have a private pilot's license rather than a commercial pilot's license. This equivalent level of safety is achievable with the aeronautical knowledge required of a private pilot certificate, specific UA manufacturer platform training (eBee), adherence to company training and currency requirements, and the Tukuh Aviation Standard Operating Procedures.

14 C.F.R. § 91.7(a): Civil aircraft airworthiness

This regulation prescribes that;

(a) No person may operate a civil aircraft unless it is in airworthy condition.

Relief request with explanation:

To allow flight operations without an airworthiness certificate. Should the exemption be granted allowing operation of the eBee UA without an airworthiness certificate, no FAA regulatory standard will exist for airworthiness of the eBee UA. Previous airworthiness assessments given to the eBee UA, among others, include:

- Viafield and Advanced Aviation Solutions LLC under exemptions No. 11170 and 11136;
- New Mexico State University: https://newscenter.nmsu.edu/Articles/view/10208/nmsu-uas-flight-test-center-conducts-ebee-airworthiness-assessment;
- USACE New Orleans, who coordinated with the Department of Army and the FAA to obtain all authorizations required in order to operate the eBee UAS for levee system monitoring,

documentation of construction progress, and extensive oblique photography of USACE structures & activities.

Given the size of the aircraft and the requirements contained in the Maintenance Procedures Document[1] (SenseFly eBee), and the User Manual[1] (SenseFly eBee) an equivalent level of safety will be provided and the PIC can determine that the UA is in a condition for safe flight.

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

The regulation prescribes that;

(c) Over other than congested areas. 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.

Relief request with explanation:

To allow for flight operations below 500 feet as permitted in Grant of Exemptions No. 11170 and 11136 to Viafield and Advanced Aviation Solutions LLC. Given that the eBee UA will only be operated over private and public lands with permission of the land owner and/or managing government agency an equivalent level of safety can be achieved. Before every flight, the operator will define a working area radius and a flight area ceiling, preventing the eBee to go beyond the flight area. The landowner and/or managing land personnel and any non-participating personnel will be briefed of the expected route of flight and the associated risks to persons and property on the ground. If necessary a geofence can be programmed into the flight plan with a distance allowing for a standoff slant range of 500 ft to avoid non-participating personnel, and any structures, vehicles or property that are deemed insufficiently protected from the eBee UA. Due to the small size and weight of the eBee UA, the material with which it is built and its specific safety procedures (among others ground detection), the hazard to persons, vessels, vehicles, and structures is not comparable to manned aircraft and should be considered in granting the exemption.

14 C.F.R. § 91.121 Altimeter Settings

The regulation prescribes that;

(a) Each person operating an aircraft shall maintain the cruising altitude or flight level of that aircraft, as the case may be, by reference to an altimeter that is set, when operating—

(1) Below 18,000 feet MSL, to—

(i) The current reported altimeter setting of a station along the route and within 100 nautical miles of the aircraft;

(ii) If there is no station within the area prescribed in paragraph (a)(1)(i) of this section, the current reported altimeter setting of an appropriate available station; or

(iii) In the case of an aircraft not equipped with a radio, the elevation of the departure airport or an appropriate altimeter setting available before departure.

Relief request with explanation:

To allow for setting barometric altimeter to zero feet AGL instead of local barometric pressure. Given that the eBee UA will fly below 400 feet AGL and will not need to maintain hemispherical cruising altitudes in order to de-conflict with other aircraft, an appropriate altimeter measurement presented to the pilot should be above ground level and should be based on the barometric pressure at the point of launch. To provide an equivalent level of safety, the UAS's AGL altimeter will be set to zero on the ground prior to every flight. Since the aircraft will fly no more than 50 minutes, even rapid changes in barometric pressure will have limited effect on the safety of the flight.

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

The regulation prescribes that;

> (a) No person may begin 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;

Relief request with explanation:

To allow for replacement of the required 30 minutes of flight time reserves with a reserve of 25% battery power remaining. Given the area of operation for the eBee, Tukuh believes that an equivalent level of safety is already achieved with the specific procedure preventing the eBee to accept a take-off order if the battery level is below a given value. Moreover, the eBee UAS has integrated “low” and “critical” battery level warnings and implemented a “return to Home” (and “Go Land”) actions in these situations.

14 C.F.R. Subpart E §§ 91.405(a) Maintenance required, 91.407(a)(1) Operation after maintenance, preventive maintenance, rebuilding, or alteration, 91.409(a)(1) and (2) Inspections, and 91.417(a) and (b) Maintenance records

14 C.F.R Subpart E in totality prescribes that the operator is primarily responsible for maintaining the aircraft in an airworthy condition, including compliance with Parts 39 and 43.

Specifically § 91.405(a) requires that aircraft discrepancies are repaired between required inspections, §§ 91.407 and 91.409 requires the aircraft to be approved for return to service by a person authorized under § 43.7 after maintenance and inspection, § 91.409 requires an annual inspection for the issuance of an airworthiness certificate, and §91.417 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.

Relief request with explanation:

To allow for all inspections, maintenance and approvals for return to service by the PIC or owner. SenseFly proposes that the maintenance of the eBee will be accomplished by the owner or the operator according to the Maintenance Procedures Document[1] (SenseFly eBee), and the User Manual[1] (SenseFly eBee). An equivalent level of safety will be achieved because the eBee is small in size, it is not a complex mechanical device and does carry any external payload. 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. Finally, before every flight, the eBee automatically runs a sequence of pre-flight tests to make sure that every sensor and every critical part is operating properly. If a problem is detected, the eBee will not be able to be switched-on and a message error is displayed on the main screen of eMotion. The owner or the operator can then refer to the eBee user manual to troubleshoot this issue. Several parts of the eBee are easily interchangeable (propellers, wings), which allows the operator to make sure the wings and propulsion system are always airworthy when a mission is initiated.