



15 January 2015

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

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 CFR Part 11, UAV-IQ LLC ("UAV-IQ"), seeks an exemption from Federal Aviation Regulations ("FARs") detailed below for the eBee Ag Unmanned Aircraft System manufactured by SenseFly SA of Switzerland.

The aviation experience of the applicants and the type of agricultural operations requested for consideration closely match those granted to Advanced Aviation Solutions LLC in Exemption No. 11136, and the model UAS requested is identical. The operations would be subject to the same conditions and limitations.

This requested exemption would support an application for a commercial Certificate of Authorization to use the system to support agriculture. The eBee Ag system consists of a lightweight (1.5 lb) battery operated aircraft, a PC-based ground control station, and associated communications equipment. The aircraft carries an onboard geo-referenced still camera that allows it to conduct precision photogrammetry and crop scouting at the resolutions necessary for precision agriculture. This high-resolution data can direct variable seeding rates as well as the precise application of fertilizer and chemicals reducing their use. This data helps farmers to maximize yields while reducing costs and impacts to the environment. By approving these exemptions, the FAA will create benefits to both agriculture and the environment which are ultimately in the public interest.

Unless otherwise specified in this grant of exemption, the UAS, the UAS PIC, and the UAS operations will comply with all applicable parts of 14 CFR including, but not limited to, parts 45, 47, 61, and 91. These operations will also be subject to strict operating requirements defined in the eBee user manual.

The PIC and VO will meet the requirements outlined in FAA Policy N 8900.227 Section 16 Personnel Qualifications. Additionally, the PIC and VO will perform maintenance on the system and will complete a course of maintenance instruction as part of their initial training.

We submit that the combination of the aircraft's light weight, historically demonstrated flight performance, fully qualified flight crew and strict operation under the guidelines established in 8900.227, the FAA can have confidence that the operation will have an equivalent or greater level of safety of manned aircraft performing the same mission.

In regards to privacy concerns, all flights will occur over private or controlled access property with the property owner's prior consent and knowledge. Inspection will be in areas where the owners will have consented to the inspections or otherwise have agreed to allow the UAS and the operator to be in the area where inspection will take place.

The regulations from which the exemption is requested are as follows: 14 CFR 61.113(a) and (b), 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 UAV-IQ to operate UAS for the purpose of aerial imagery to support agriculture. This exemption is subject to the conditions and limitations listed below.

1. Operations authorized by this grant of exemption are limited to the following aircraft described in the operating documents which is a fixed-wing aircraft weighing approximately 1.5 pounds: senseFly eBee Ag (eBee Ag). Proposed operations of any other aircraft will require a new petition or a petition to amend this grant.
2. The UA may not be flown at an indicated airspeed exceeding 70 knots.
3. The UA must be operated at an altitude of no more than 400 feet above ground level (AGL), as indicated by the procedures specified in the operating documents. All altitudes reported to ATC must be in feet AGL.
4. 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.
5. All operations must utilize a visual observer (VO). 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. 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 functions prescribed in the operating documents.
6. The operating documents and this grant of exemption must be maintained 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 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 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.
7. Prior to each flight the PIC must inspect the UAS to ensure it is in a condition for safe flight. 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. The Ground Control Station must be included in the preflight inspection. All maintenance and alterations must be properly documented in the aircraft records.
8. Any UAS 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. The PIC who conducts the functional test flight must make an entry in the aircraft records.
9. The pre-flight inspection section in the operating documents must account for all discrepancies, i.e. inoperable components, items, or equipment, not already covered in the relevant sections of the operating documents.
10. The operator must follow the UAS aircraft/component, maintenance, overhaul, replacement, inspection, and life limit requirements.
11. The operator must carry out its maintenance, inspections, and record keeping requirements, in accordance with the operating documents. Maintenance, inspection, and alterations must be noted in the aircraft records, including total flight hours, description of work accomplished, and the signature of the PIC returning the UAS to service.
12. Each UAS operated under this exemption must comply with all manufacturer System and Safety Bulletins.

13. The PIC must make an entry in the aircraft record of the corrective action taken against discrepancies discovered between inspections.
14. The Pilot in Command (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 CFR 61.56 in an aircraft in which the PIC is rated on his or her pilot certificate.
15. The operator may not permit any PIC to operate unless that PIC has demonstrated through the operator's training that the PIC is able 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. A record of training must be documented and made available upon request by the Administrator. 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, said training operations may only be conducted during dedicated training sessions.
16. 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.
17. All operations shall be conducted in Class G airspace.
18. The UA may not operate within 5 nautical miles of the airport reference point as denoted on a current FAA-published aeronautical chart.
19. 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.
20. If the UA loses communications or loses its GPS signal, it must return to a predetermined location within the planned operating area and land or be recovered in accordance with the operating documents.
21. The PIC must abort the flight in the event of unpredicted obstacles or emergencies in accordance with the operating documents.
22. The PIC is prohibited from beginning a flight unless (considering wind and forecast weather conditions) there is enough power to fly at normal cruising speed to the intended landing point and land the UA with 30% battery power remaining.
23. The operator must obtain an Air Traffic Organization (ATO) issued Certificate of Waiver or Authorization (COA) prior to conducting any operations under this grant of exemption. This COA will also require the operator to request a Notice to Airman (NOTAM) not more than 72 hours in advance, but not less than 48 hours prior to the operation.
24. 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 (NNumber) markings in accordance with 14 CFR part 45, Subpart C. Markings must be as large as practicable.
25. Before conducting operations, the radio frequency spectrum used for operation and control of the UA must comply with the Federal Communications Commission (FCC) or other appropriate government oversight agency requirements.
26. The 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.
27. The UA must remain clear and yield the right of way to all other manned aviation operations and activities at all times.

28. The UAS may not be operated by the PIC from any moving device or vehicle.

29. The UA may not be operated over congested or densely populated areas.

30. 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 and/or;

b. the aircraft is operated near vessels, vehicles or structures where the land owner/controller 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, and

c. operations nearer to the PIC, VO, operator trainees or essential persons do not present an undue hazard to those persons per § 91.119(a).

31. All operations shall be conducted over private or controlled-access property with permission from the land owner/controller or authorized representative. Permission from land owner/controller or authorized representative will be obtained for each flight to be conducted.

32. 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.nts.gov](http://www.nts.gov).

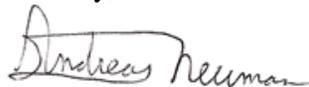
We are prepared to modify or amend any part of this request to satisfy the need for an equivalent level of safety. We look forward to working with your office. Please contact us at any time if you require additional information or clarification.

UAV-IQ requests the FAA treat Appendices B, C, D and E as proprietary under 14 C.F.R. 11.35(b) and does not include these documents in the public docket.

The name and contact information of the applicant are:

UAV-IQ LLC  
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Sincerely,



Andreas Neuman  
Chief Executive Officer

Appendices:

- A. Exemption Request and Equivalent Level of Safety
- B. Maintenance Procedures
- C. Training Program
- D. Aviation Experience
- E. User Manual

## EXEMPTION REQUESTS AND EQUIVALENT LEVEL OF SAFETY

UAV-IQ requests an exemption from the following regulations as well as any additional regulations that may technically apply to the operation of the SenseFly eBee Ag:

### **14 CFR 61.113 Private pilot privileges and limitations: Pilot in Command and 61.133 Commercial pilot privileges and limitations.**

The regulation provides that no person that holds a private pilot certificate may act as pilot in command of an aircraft for compensation or hire. Subparagraph (b) allows a private pilot to 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.

Since there are currently no means available for the pilot of a UAS to gain the experience in an equivalent category and class in order to apply for a commercial pilot's license, we propose to generate an equivalent level of safety by requiring our pilots to hold a private pilot certificate. Since the aircraft cannot carry passengers or property, we feel we meet the intent of 61.113 Subparagraph (b) even though the intent of this application is to conduct a business.

### **14 CFR 91.119 Minimum safe altitudes: General.**

The regulation provides that over sparsely populated areas the aircraft cannot be operated closer than 500 feet to any person, vessel, vehicle, or structure. Since the aircraft will be operating at a maximum of 400 feet AGL, we cannot comply with this requirement.

To provide an equivalent level of safety we will only fly over private property with the permission of the land owner. The land owner will be briefed of the expected route of flight and the associated risks to persons and property on the ground. We maintain that due to the small size of the eBee Ag, the hazard to persons, vessels, vehicles, and structures is not comparable to manned aircraft and should be considered in granting the exemption. (See appendix C section 6.4.1 Consideration about risks related to ground impacts)

The aircraft will not be operated over congested areas nor over any open air assembly of persons. The aircraft will be operated at an altitude allowing, if a power unit fails, an emergency landing without undue hazard to persons or property on the surface.

### **14 CFR 91.121 Altimeter settings.**

The regulation provides that aircraft shall maintain cruising altitudes by reference to an altimeter setting available within 100 nautical miles of the aircraft. The aircraft will fly below 400 feet AGL and will not need to maintain hemispherical cruising altitudes in order to de-conflict with other aircraft. As such, 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 CFR 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. We feel the intention of this paragraph is to provide a reserve of energy as a safety buffer for go-arounds and other delays to landing.

The eBee Ag is battery operated and the maximum duration of flight from a single battery charge is 50 minutes. Since the aircraft will never fly more than 1/2 nm from the point of intended landing, a full battery charge at launch will ensure that we meet the reserve energy requirement of this paragraph.

The PIC will not initiate flight unless there is enough power to fly to the first point of intended landing and, assuming normal cruising speed, land the UA with 30% battery power remaining.

#### **14 CFR Subpart E (91.401 - 91.417) - Maintenance, Preventive Maintenance, and 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 the PIC perform maintenance and inspection of the aircraft and "be authorized to approve the aircraft for return to service."

As provided in the attached Maintenance Procedures (Appendix D) and User's Manual (Appendix E), the PIC will ensure that the aircraft is in an airworthy condition prior to flight and conduct detailed inspections after every 10 hours. UAV-IQ requests the FAA treat these two documents as proprietary under 14 C.F.R. 11.35(b) and does not include these documents in the public docket.

Maintenance performed by the PIC is limited to repairing small cracks, replacing a propeller, and updating software and firmware. All other maintenance will be performed by the manufacturer. The PIC will document work performed in accordance with 91.417. We feel that due to the size, construction, and simplicity of the aircraft, the PIC can ensure an equivalent level of safety.