



Environmental & Mine Permitting Services

September 4<sup>th</sup>, 2014

United States Department of Transportation  
Federal Aviation Administration  
Docket Management System  
1200 New Jersey Ave., SE  
West Building Ground Floor Room W12-140  
Washington, DC 20590

**Re: Exemption Request Pursuant To Section 333 of the FAA Reform Act of 2012**

Dear Sir or Madam:

EnviroMINE, Inc. seeks exemption from the requirements of 14 C.F.R. §§ 91.9(b), 91.203(a), 91.203(b), 45.23(b) and 21.185. This exemption will permit EnviroMINE, Inc. to operate an unmanned aerial system ("UAS") over areas of the States of California and western Arizona suitable for, or in use by, surface mining while keeping the documents required immediately accessible to the pilot at the ground control station.

The exemption will relieve EnviroMINE, Inc. from the airworthiness certificate standards and the requirement to have a certificate of airworthiness issued for its UAS. This exemption will also permit any required markings concerning the operational status of the UAS to be displayed on a banner or flag displayed at the ground control station during operation

EnviroMINE is also seeking relief from the requirements of having a private or commercial pilot's certification to operate the UAS for the purposes identified. The UAS is very lightweight and the operating parameters will be very similar, if not the same, as a remote control model UAS used by hobbyists. Individuals controlling the eBee will be experienced in safe operations of the remotely controlled UAS and will complete training by the manufacturer prior to UAS use for commercial purposes.

EnviroMINE will implement safety procedures and flight restrictions to prevent ground or airborne accidents involving the UAS. Information on flight parameters and conditions for all missions will be maintained by EnviroMINE and will be available to the FAA upon request. Operations will be completed under the guidance provided by the Academy of Model Aeronautics (AMA) National Model Aircraft Safety Code, FAA safety standards for remote control model aircraft and/or UAS standards otherwise established by the FAA.

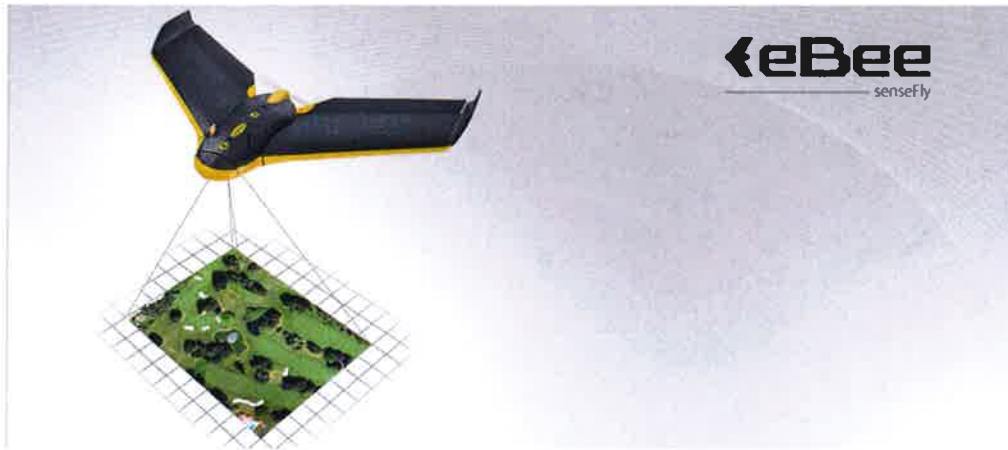
## INTRODUCTION

EnviroMINE, Inc. (EnviroMINE) is a 22 year-old firm specializing in planning, permitting and compliance work for mining operations in the California and western Arizona. EnviroMINE utilizes aerial imagery for the purpose of producing accurate surface maps for mine operations and regulatory agencies through the use of mapping software. Often times, the aerial imaging available to EnviroMINE is from public sources and can be relatively inaccurate and/or outdated. As presented in this Petition, EnviroMINE seeks to operate its UAS for the special purpose of collecting aerial photographs to create surface maps and updated imagery in the support of and use by biologists, archaeologists, mine operators and the agencies that regulate these operations.

### Characteristics of the Aircraft

EnviroMINE seeks an exemption to operate an eBee senseFly UAS for commercial purposes within the national airspace system ("NAS"). Built in Switzerland, the eBee consists of a flexible foam wing, a digital camera and a ground control station (Figure 1). The eBee system has a gross system weight of approximately 1.7 pounds and a wingspan of 38 inches. This vehicle has a single, rear mounted plastic propeller and an electric motor powered by a lithium polymer battery.

**Figure 1: The eBee**



The four main characteristics of the eBee are:

1. Very light weight

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

2. 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.

3. Semi-automatic flight

The artificial intelligence incorporated within the eBee autopilot system continuously analyzes data from the Inertial Measurement Unit and from the onboard GPS and takes care of all the aspects of the flight under the supervision of the operator. Ground station software allows the operator to produce a 3-D flight plan prior to the mission, simulate the flight, monitor the drone's parameters during flight and allow the pilot to control the trajectory of the eBee during flight.

4. Option for Manual control

Additionally, the eBee provides an override capability that allows the operator to take manual actions during the flight such as Go to Home, Go Land, Hold and Resume the Mission. suspend automated operations can also be suspended by the operator and take manual control of the aircraft should it become necessary to respond emergent circumstances, thanks to the remote controller provided with the system.

The eBee does not create a hazard to users of the NAS or the public, or otherwise create a threat considering its size, weight, speed or operational capability. The specifications of the eBee are listed in the table below:

**Table 1. eBee Specifications**

Weight (inc. camera)	1.7 lb
Wingspan	38 in
Material	EPP foam, carbon structure & composite parts
Propulsion	electric pusher propeller, 160 W brushless DC motor
Battery	11.1 V, 2100 mAh
Camera (default)	16 Megapixel IXUS/ELPH
Operational Characteristics	
Maximum flight time	50 minutes
Cruising speed	22-35 miles/hour
Radio link range	up to 1.86 miles
Maximum coverage (single flight)	6.2 square miles
Ground sampling distance (GSD)	down to 0.39 in.
Orthomosaic accuracy	down to 1.18 in.
Digital Elevation Model (DEM) accuracy	down to 1.96 in.
3D flight planning	yes

The airworthiness of the eBee has already been demonstrated for different projects involving state/federal agencies or universities in the United States. This includes, among others, the New Mexico State University in Las Cruces, NM (see article at <https://newscenter.nmsu.edu/Articles/view/10208/nmsu-uas-flight-test-center-conducts-ebec-airworthiness-assessment>) and the U.S. Army Corps of Engineers (USACE), New Orleans. The USACE 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.

Flight approvals for the eBee have been obtained from the national civil aviation authorities in a number of countries including:

- Switzerland (flight approval for VLOS operations)
- Canada (flight approval for VLOS operations)
- Australia (flight approval for VLOS operations)
- France (flight approval for Extended-VLOS operations)
- Germany (flight approval for VLOS operations)
- United Kingdom (flight approval for VLOS operations)
- Norway (flight approval for VLOS operations)
- Sweden (flight approval for VLOS operations)
- Denmark (flight approval for VLOS operations)

### **Mandatory Operating Conditions**

The grant of the exemption to EnviroMINE for the eBee will be subject to the following operating conditions, based on the operating conditions set forth by the Academy of Model Aeronautics. The main restrictions are summarized below:

- Operations to be conducted over private, controlled-access, or public property where approved;
- Permission from the land owner/authority required before commencing any flight;
- Operations over congested areas shall be avoided;
- Operations must not interfere with manned aircraft operations, must yield the right of way to manned aircraft, and operators must See & Avoid other aircraft and obstacles at all times
- Operations limited to Visual Flight Rules Meteorological Conditions (VMC) and daylight hours
- Aircraft operations must remain within Visual Line of Sight (VLOS) and will be visually monitored at all times;
- VLOS guaranteed with a GPS geo-fence around operator of 0.5 nautical mile
- Flight ceiling pre-programmed at 400 feet or less;
- All operations conducted within 5 miles from an airport shall only be initiated after verbal coordination with the airport authority, or air traffic control when a control tower is present at the airport;
- All operations shall comply with required permissions and permits established

by territorial, state, county or city jurisdictions; including local law enforcement, fire, or other appropriate governmental agencies.

- The eBee operations will be compliant with existing safety procedures inherent to the activities of the related company.

In support of EnviroMINE's exemption request, a Justification of Airworthiness and Safety Assessment for the eBee; eBee Operators Training Documentation; and eBee's Inspection and Maintenance Requirements have been provided to the FAA under separate, confidential cover.

EnviroMINE provides the following information in support of its petition for exemption:

**A. Name and Address of the Petitioner.**

The name, address and contact information of the Petitioner is:

EnviroMINE, Inc.  
Attn: Mr. Dennis Fransway  
3511 Camino Del Rio South  
Suite 403  
San Diego, CA 92108  
Phone: 619-284-8515  
e-mail: dennis@enviromineinc.com

**B. The Specific Sections of 14 C.F.R. From Which EnviroMINE Seeks Exemption.**

EnviroMINE, Inc., the Petitioner, pursuant to the provisions of the Federal Aviation Regulations and the FAA Modernization and Reform Act of 2012, Section 333, seeks relief from the following specific sections of Title 14 of the Code of Federal Regulations:

- 14 CFR 21.185;
- 14 C.F.R. 45.23(b) & 45.29;
- 14 CFR 61;
- 14 C.F.R. 91, et seq.;
- 14 CFR 121;
- 14 CFR 407 (a) (1);
- 14 CFR 409 (a) (2); and
- 14 CFR 417 (a) & (b).

**C. The Extent of Relief EnviroMINE Seeks And The Reasons It Seeks The Relief.**

**1. Relief from 14 C.F.R. § 21.185.**

EnviroMINE seeks to exempt the eBee UAS from 14 C.F.R. § 21.185: *Issue of airworthiness certificates for restricted category aircraft.*

EnviroMINE seeks relief from the airworthiness certificate requirements of the Federal Aviation Regulations. EnviroMINE proposes to operate the eBee commercially without an airworthiness certificate for the special purpose of conducting aerial photography services over the States of California and western Arizona, per specific operating limitations. EnviroMINE seeks relief from the airworthiness certificate requirements of 14 C.F.R. § 21.185 to the extent that the eBee, which has not yet been type certificated by the FAA, may be operated as if it were a restricted category aircraft for a single, defined, special purpose operation such as aerial mapping.

EnviroMINE seeks relief from the airworthiness certificate requirements of the FAR because operation of the eBee will not create a hazard to users of the NAS, the public or present a threat to national security.

The proven safe operational history of the eBee in the NAS demonstrates that the eBee has operated safely in the NAS without creating a hazard to aircraft or people on the ground. In addition, EnviroMINE has specified parameters for the eBee's intended operation pursuant to this exemption. As a result, the FAA may approve operation of the eBee, without an airworthiness certificate, by setting specific operating limitations to ensure a level of safety equivalent to that provided by airworthiness certification.

## **2. Relief from 14 C.F.R. § 45.23(b) & 45.29.**

EnviroMINE seeks an exemption from 14 C.F.R. § 45.23(b) and § 45.29: *Display of marks; general.*

EnviroMINE requests relief from the requirement of Section 45.23(b) that the word "Experimental" be displayed on the eBee near each entrance to the cabin, cockpit, or pilot point. Additionally, these regulations provide that each aircraft must display "N" and the aircraft's registration number in letters at least 2 inches high.

Given the size of the unmanned eBee (wingspan of 37.8 inches), the vehicle has no ability to carry passengers since it has no cabin, cockpit, door entrances or pilot point on the UAS. The equivalent level of safety will be achieved by placing a sticker with a copy of the AMA membership of the operator in charge on the upper part of the eBee.

In addition, each operator will display at the ground station a high contrast flag or banner that with the words "Unmanned Aircraft System Ground Station" in letters 3 inches high or greater. Since the aircraft will operate within 1/2 nautical mile of the ground station, the banner should be visible to anyone that observes the aircraft and chooses to investigate its point of origin.

## **3. Relief From 14 C.F.R. § 61.**

EnviroMINE seeks an exemption from 14 C.F.R. § 61: *Certification: Pilots, Flight Instructors, And Ground Instructors.*

Pursuant to 14 C.F.R. § 61 no person may serve as a required pilot flight crewmember of a civil aircraft of the United States, unless that person has on their person or in the aircraft the authorization or certificates as listed in 14 C.F.R. § 61.3. EnviroMINE can achieve an equivalent level of safety as achieved by current Regulations because

EnviroMINE's UAS does not carry any pilots or passengers. Further, a pilot license will not ensure remote control piloting skills. In addition, the risks attendant to the operation of EnviroMINE's UASs is far less than the risk levels inherent in operating a conventional aircraft whether for private or commercial activities outlined in 14 C.F.R. § 61, *et seq.*

#### **4. Relief from § 91.9(b).**

EnviroMINE seeks an exemption from 14 C.F.R. § 91.9: *Civil Aircraft flight manual, marking, and placard requirements.*

Relief from § 91.9(b) is requested because the eBee weighs approximately 1.7 pounds at its maximum gross weight and cannot carry the approved Airplane Flight manual on the vehicle. Since the eBee is unmanned, the aircrew member is located at a ground control station. At all times the UAS is operating, EnviroMINE will maintain the approved Airplane Flight Manual at the ground control station for immediate accessibility by the operating aircrew member.

#### **5. Relief from § 91.121**

EnviroMINE seeks an exemption from 14 C.F.R. § 91.121: *Altimeter settings.*

Relief from § 91.121 is requested because the eBee UAS continuously analyzes data from the Inertial Measurement Unit and the onboard GPS to determine elevation. Once the flight area has been designated, the planning system downloads a base Digital Elevation Model (DEM) for the specific area into the UAS which allows the unit to continuously monitor the elevation above ground level (AGL). This information is monitored at the ground control station during the entire flight.

#### **6. Relief from § 91.203(a) and (b).**

EnviroMINE seeks an exemption from 14 C.F.R. § 91.203(a) and (b). Section 91.203: *Civil aircraft: Certifications required,*

EnviroMINE requests relief from the requirement of Section 91.203(a) that an appropriate and current airworthiness certificate and an effective U.S. registration certificate be carried within the aircraft. Also, EnviroMINE requests relief from the requirement of Section 91.203(b) that the airworthiness certificate be displayed at the cabin or cockpit entrance so that it is legible to passengers or crew. The eBee is incapable of carrying passengers or crew and has no cabin, cockpit, or door entrances. The UAS operator is located at the ground control station and no passengers are carried at any time. EnviroMINE will keep the documents required by Sections 91.203(a) and (b) at the ground control station, where it will be immediately available to the operator of the UAS at all times the unmanned aerial vehicle is operating.

#### **7. Relief from § 91.405 (a); 407 (a) (1); 409 (a) (2); 417(a) & (b).**

EnviroMINE seeks an exemption from 14 C.F.R. 91.405 (a); 407 (a) (1); 409 (a) (2); 417(a) & (b): *Maintenance Inspections.*

The above-cited Regulations require aircraft owners and operators to have the aircraft inspected and repaired and to have repairs made if discrepancies are noted between inspections.

These Regulations only apply to aircraft with an airworthiness certificate. They will not apply to EnviroMINE should its requested exemption be granted. EnviroMINE will conduct a routine, manufacturer recommended, inspection and maintenance program that involves regular software updates and repair/replacement procedures for any damaged hardware. As a result, an equivalent level of safety will be achieved as required by the intent of the regulations.

**D. The Reasons Why Granting EnviroMINE's Request would be In the Public Interest.**

Granting the EnviroMINE Petition will further the public interest by allowing EnviroMINE the ability to safely and economically collect aerial photographs in an efficient manner over areas of the States of California and western Arizona which are suitable, or being used, for mining. Imagery collected will be utilized for developing topographic maps and surface models in support of surface mine operations and regulatory agencies. The eBee will provide safe, efficient, and economical aerial photography and mapping operations to further each of these fields, all of which are critical to the well-being of the general public.

The specific operations that EnviroMINE will perform with the eBee demonstrate how the requested exemption will directly benefit the above-referenced industries and the public. In the mining industry, the eBee will be used to aid in site inspections, topographic surveying, biological monitoring, evaluating geology and planning proposed mines. Construction aggregate (sand & gravel) is the second most utilized natural resource in the world and is necessary for building roads, bridges and all other infrastructure necessary for a modern society. Use of the eBee will allow mine operators to manage this resource to provide the materials to build and maintain the infrastructure systems used by the public on a daily basis. Monitoring biological conditions (vegetation & wildlife) on, and in, the vicinity of the mine is also beneficial to the public since it is a strong indication of potential environmental consequences developing. In addition agencies responsible for regulating this industry will be able to monitor permit compliance by these operations using the aerial photos, maps and surface models developed.

The eBee is a battery powered UAS that serves as a safe, efficient, and economical alternative to the manned aircraft traditionally utilized to obtain aerial imagery. By reducing the amount of manned aircraft needed to perform aerial photographs, an exemption allowing the use of an eBee UAS to collect these photographs would reduce the amount of manned aircraft in the NAS, reduce noise and air pollution, as well as increase the safety of life and property both in the air and on the ground.



The eBee will be operated over properties where access is controlled by gates and fencing. In addition, the eBee will not be operated in close proximity to any person, vessel, vehicle, or structure, except when necessary for takeoff or landing.

**E. Reasons Why EnviroMINE's Exemption Will Not Adversely Affect Safety or How The Exemption Will Provide a Level of Safety At Least Equal To Existing Rule:**

This exemption would maintain the level of safety established by Section 91.9(b) because EnviroMINE will keep the approved Airplane Flight Manual at the ground control station where the pilot in command flying the eBee will have immediate access to the document.

Previous exemptions granted by the FAA concerning Section 91.9(b) establish that safety is not adversely affected when the approved Aircraft Flight Manual is maintained at the ground control station of a UAS, where it can be immediately accessed by the pilot in command. Section 91.9(b) "requires aircraft to carry the flight manual so the pilot would have ready access to the aircraft limitations while in flight." The eBee UAS will always be operated without any passengers or crew onboard and is incapable of carrying flight manuals or additional documents. If attempted, the UAS would most likely be unable to fly.

The FAA has previously granted similar exemptions through Exemption Nos. 8607, 8737, 8738, 9299, 9430, 9554, 9564, 9565, 10167, 10602, 10673, 10835, 10869 and 10968.

This exemption would maintain the level of safety established by Sections 91.203(a) and (b) because EnviroMINE will keep the required documents at the ground control station where the pilot in command flying the eBee will have immediate access.

Previous exemptions granted by the FAA concerning Sections 91.203(a) and (b) establish that safety is not adversely affected when the Airworthiness Certificate and U.S. registration certificate are kept at the ground control station of the UAS, where it can be immediately accessed by the operator in command. Specifically, the FAA has held that the intent of Sections 91.203(a) and (b) is better served by having the required documents in the control of the operator.

The original intent of the subject regulation was to display the airworthiness and registration documents so they would be easily available to FAA inspectors and passengers for inspection and verification of the airworthiness and registration of the aircraft. In this case, the aircraft is incapable of carrying passengers or crew.

The missions for which eBee is intended will prevent the UAS from being available for the inspections normally prescribed for civil aircraft. Further, it will be operated from a known departure and arrival point, under the constant control of a pilot-in-command. The intent of the regulation is best served by having the required documents in the control of the UAS operator and available for inspection if requested.

This exemption would maintain the level of safety established by Section 45.23(b) and Section 45.29 by displaying a banner at the ground control station a high contrast flag or banner that with the words "Unmanned Aircraft System Ground Station" in letters 3 inches high or greater. Since the aircraft will operate within 1/2 nautical mile of the ground station, the banner should be visible to anyone that observes the aircraft and chooses to investigate its point of origin.

In seeking this exemption, EnviroMINE submits that the eBee can operate safely in the NAS above the State of California and western Arizona without creating a hazard to aircraft or people on the ground. Accordingly, the FAA may approve its use without an airworthiness certificate as demonstrated by: (i) the safe operational history and current use of the eBee in the NAS; (ii) the characteristics of the eBee; and (iii) the specific operating limitations. In support of this position and exemption request, EnviroMINE has submitted to the FAA, under separate, confidential cover, a Justification of Airworthiness and Safety Assessment for the eBee; eBee Operators Training Documentation; and eBee's Inspection and Maintenance Requirements.

The eBee is currently operating safely in the NAS pursuant to Certificates of Authorization ("COA") granted by the FAA. These include New Mexico State University and the U.S. Army Corps of Engineers, New Orleans District.

EnviroMINE proposes to only conduct aerial photography flight operations over areas of the States of California and western Arizona that are not near airports or helipads or over residential areas.

Specifically, EnviroMINE's proposed area of flight operations includes areas suitable for mining that are:

1. On active mining operations in or near urban areas, EnviroMINE will maintain a 100 yard, horizontal buffer between the eBee and congested properties. Flight paths shall not cross over residences.
2. Not within 5 miles of any airport or helipad without proper notification. If an airport is located within 5 miles of a proposed UAS flight the airport operator, the control tower (if an air traffic facility is located at the airport) or the flight service station will be notified of the proposed flight.
3. Not more than 400 feet above ground level.

In summary, EnviroMINE seeks to operate its eBee areas of California and western Arizona suitable for, or in use by, mining operations while maintaining safe distances from any populated areas, airports or helipads.

In seeking this exemption, EnviroMINE proposes to commercially operate the eBee without satisfying the restricted category airworthiness certification process specified in 14 C.F.R. § 21.185 as well as other regulations as discussed above. EnviroMINE proposes to operate the eBee, for the special purpose of conducting aerial photography

for environmental mapping and mining operations over the States of California and western Arizona, pursuant to the following specific operating limitations:

1. The eBee will be operated at or below 400 ft. above ground level (AGL).
2. The eBee shall be operated within ½ nautical mile, and in line of sight, of the pilot in command.
3. The eBee shall be operated pursuant to Visual Flight Rules (VFR) and only during daylight hours.
4. The duration of each flight shall not exceed 40 minutes or 25% battery power whichever is lower.
5. The eBee shall operate from on-site takeoff/landing locations directly next to the pilot in command.
6. EnviroMINE's UAS has a GPS flight mode where it will return to the takeoff location and land if communication with the remote control pilot is lost.
7. Operation of the eBee with any inoperative instruments or equipment shall be prohibited.
8. The eBee shall be maintained in accordance with the Manufacturer's Maintenance Manual.

EnviroMINE understands that the Administrator may stipulate special conditions for the intended operation of the eBee in accordance with Section 333 of the FAA Modernization and Reform Act of 2012.

**F. A Summary That Can Be Published In The *Federal Register*, stating: The Rules From Which EnviroMINE Seeks Exemption:**

EnviroMINE's Petition is made pursuant to the FAA Modernization and Reform Act of 2012, Section 333, which directs the Secretary of Transportation to determine if certain UAS may operate safely in the NAS. As such, EnviroMINE's request for exemption may be granted pursuant to the authority of Section 333 and 14 C.F.R. Part 11. Specifically, EnviroMINE, Inc. seeks exemption from the requirements of 14 CFR 21; 14 C.F.R. 45.23(b); 14 CFR 61.113 (a) & (b); 14 C.F.R. 91, et seq.; 14 CFR 121; 14 CFR 407 (a) (1); 14 CFR 409 (a) (2); and 14 CFR 417 (a) & (b).

This exemption will permit EnviroMINE, Inc. to operate an unmanned aerial vehicle system over areas of the State of California and western Arizona while keeping the documents required by the regulations at the ground control station and immediately accessible to the pilot. Furthermore, the exemption will relieve EnviroMINE, Inc. from the airworthiness certificate standards and the requirement to have a certificate of airworthiness for its unmanned aerial vehicle system. This exemption will also permit

any required markings concerning the operational status of the UAS to be displayed on a banner or flag displayed at the ground control station.

**1. 14 C.F.R. 21 and 14 C.F.R. 91: Airworthiness Certificates, Manuals and the Like.**

14 C.F.R. 21, Subpart H, entitled Airworthiness Certificates, sets forth requirements for procurement of necessary airworthiness certificates in relation to FAR § 91.203(a)(1). The size, weight and enclosed operational area of EnviroMINE's UASs permits exemption from Part 21 because EnviroMINE's UASs meet an equivalent level of safety pursuant to Section 333 of the Reform Act. The FAA is authorized to exempt aircraft from the airworthiness certificate requirement under both the Act (49 U.S.C. § 44701 (f)) and Section 333 of the Reform Act in consideration of the weight, size, speed, maneuverability and proximity to areas such as airports and dense populations. EnviroMINE's eBee UAS meets or exceeds each of the elements.

14 C.F.R. 91.7(a) prohibits the operation of an aircraft without an airworthiness certificate. As no such certificate will be applicable in the form contemplated by the FARs, this Regulation is inapplicable.

14 C.F.R. § 91.9 (b) (2) requires an aircraft flight manual in the aircraft. As there are no pilots or passengers, and given the size of the UAS, this Regulation is inapplicable. An equivalent level of safety will be achieved by maintaining a manual at the flight operations center. The FAA has previously issued exemptions to this regulation in Exemption Nos. 8607, 8737, 8738, 9299, 9299A, 9565, 9565B, 10167, 10167A, 10602, 10700 and 32827.

14 C.F.R. § 91.121 regarding altimeter settings is inapplicable insofar as EnviroMINE's UASs utilizes an electronic global positioning system and downloaded Digital Elevation Models to provide elevation and altitude that is continuously monitored at the ground control station.

14 C.F.R. § 91.203 (a) and (b) provides for the carrying of civil aircraft certifications and registrations. They are inapplicable for the same reasons described in the above discussions. The equivalent level of safety will be achieved by maintaining such certifications and registrations at the EnviroMINE's flight operations center.

**2. 14 C.F.R. § 45.23: Marking of the Aircraft.**

Applicable Codes of Federal Regulation require aircraft to be marked according to certain specifications. EnviroMINE's UASs are, by definition, unmanned. They therefore do not have a cabin, cockpit or pilot station on which to mark certain words or phrases. Further, two-inch lettering is difficult to place on such small aircraft. In lieu of aircraft markings, EnviroMINE will display at the ground station a high contrast flag or banner that with the words "Unmanned Aircraft System Ground Station" in letters 3 inches high or greater. Since the aircraft will operate within 1/2 nautical mile of the ground station, the banner should be visible to anyone that observes the aircraft and chooses to investigate its point of origin.

### **3. 14 C.F.R. § 61.113: Private Pilot Privileges and Limitations.**

Pursuant to 14 C.F.R. §§ 61.113 (a) & (b), private pilots are limited to non-commercial operations. EnviroMINE can achieve an equivalent level of safety as achieved by current Regulations because EnviroMINE's UASs do not carry any pilots or passengers. The risks attendant to the operation of EnviroMINE's UASs is far less than the risk levels inherent in the commercial activities outlined in 14 C.F.R. § 61, *et seq.* Thus, allowing EnviroMINE to operate its UAS will exceed current safety levels in relation to 14 C.F.R. §61.113 (a) & (b).

### **4. 14 C.F.R. 91.119: Minimum Safe Altitudes.**

14 C.F.R. § 91.119 prescribes safe altitudes for the operation of civil aircraft. EnviroMINE's eBee UAS will never operate at an altitude greater than 400 AGL. Given the areas the eBee will be operated over plus the size, weight, maneuverability and speed of EnviroMINE's UAS, an equivalent level of safety will be achieved.

### **5. 14 C.F.R. 91.405 (a); 407 (a) (1); 409 (a) (2); 417(a) & (b): Maintenance Inspections.**

The cited Regulations require aircraft owners and operators to have an aircraft inspected at certain times and to have discrepancies repaired if discrepancies are detected between inspections.

These Regulations only apply to aircraft with an airworthiness certificate. They will not apply to EnviroMINE should its requested exemption be granted. EnviroMINE conducts a routine maintenance program that involves regular software updates and repair/replacement measures for any damaged hardware. Therefore, an equivalent level of safety will be achieved.

### **6. Conclusion**

EnviroMINE seeks an exemption pursuant to 14 C.F.R. § 11.61 and Section 333 of the FAA Modernization and Reform Act of 2012, which will permit safe operation of the eBee commercially for the special purpose of conducting aerial photographs over areas in California and western Arizona that are suitable, or in use, for mining. This photography will be used to develop maps and surface models for use by mine operators, regulatory agencies and advancing the interests of the public.

Granting EnviroMINE's request for exemption will reduce current risk levels and thereby enhance safety when compared to conventional aircraft. Conducting aerial photography has relied on the use of large, conventional aircraft powered by flammable, liquid fuel. EnviroMINE's UAS is significantly smaller, lighter and more maneuverable than a conventional aircraft. Also, the UAS does not carry any flammable fuel, rather it relies on an electric motor and lithium battery for propulsion.

EnviroMINE's eBee is not capable of carrying people and as a result the likelihood of

death or serious bodily injury is significantly limited. EnviroMINE's operation of its UASs, weighing less than 2.0 pounds and travelling at speeds lower than 50 knots, in areas suitable for or in use by, surface mining operations will provide at least an equivalent level of safety as that achieved under current FARs.

As discussed above, the eBee has operated safely in the NAS without creating a hazard to users of the NAS, the public, or create any threat to national security. EnviroMINE respectfully requests that the FAA grant its exemption request without delay.

Sincerely,  
EnviroMINE, Inc.

  
Warren R. Coalson  
President