



January 9, 2015

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

Re: Exemption Request Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations from 14 C.F.R. 45.23(b); 14 CFR Part 21; 14 CFR 61.113 (a) & (b); 91.7 (a); 91.9 (b) (2); 91.103(b); 91.109; 91.119; 91.121; 91.151(a); 91.203(a) & (b); 91.405 (a); 91.407(a) (1); 91.409 (a) (2); 91.417 (a) & (b).

To Whom It May Concern:

In pursuant with Section 333 of the FAA Modernization and Reform Act of 2012 and 14 C.F.R. Part 11, OpenSky Drones LLC (OpenSky), an operator of a small Unmanned Aircraft System (sUAS) for the motion picture and television industry, seeks an exemption from the Federal Aviation Regulations (FARs) to allow commercial operations of its sUAS. Regulations ("FARs") to allow commercial operation of its sUASs, so long as such operations are conducted within and under the conditions outlined herein or as may be established by the FAA as required by Section 333.

As described more fully below, the requested exemption would permit the operation of small, unmanned and relatively inexpensive sUAS under controlled conditions in airspace that is limited, predetermined, controlled as to access and would provide safety enhancements to the already safe operations in the film and television industry presently using conventional aircraft. Approval of this exemption would thereby enhance safety and fulfill the Secretary of Transportation's (the FAA Administrator's) responsibilities to "...establish requirements for the safe operation of such aircraft systems in the national airspace system." Section 333(c) of the Reform Act.

Information Supporting this Petition as Specified in 14 C.F.R. §11.81

(a) Your name and mailing address and, if you wish, other contact information such as a fax number, telephone number, or e-mail address;

OpenSky Drones, LLC.  
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- (b) The specific section or sections of 14 C.F.R. from which OpenSky seeks an exemption
- 21 – Subpart H Certification procedures for products and parts, Airworthiness Certificates
  - 45.23 – Display of marks; general
  - 61.113 - Private pilot privileges and limitations: Pilot in command
  - 91.103 – Preflight Actions
  - 91.105 – Flight crewmembers at stations
  - 91.109 – Flight instruction; Simulated instrument flight and certain flight tests

- 91.119 – Minimum safe altitudes: General
- 91.121– Altimeter settings
- 91.151– Fuel requirements for flights in Visual Flight Rules (VFR) conditions
- 91.203 – Civil aircraft: certification required
- 91.405 – Maintenance required
- 91.407 – Operation after maintenance, preventative maintenance, rebuilding, and alteration
- 91.409 – Inspections
- 91.417 – Maintenance records

(c) The extent of relief OpenSky seeks, and the reason OpenSky seeks the relief  
OpenSky seeks an exemption from several provisions of 14 C.F.R. Parts 21, 45, 61, and 91 to the extent to operate small UASs to record aerial video for cinematographic purposes.

This exemption application is expressly submitted to fulfill Congress' goal in passing Section 333(a) through (c) of the Reform Act. This law directs the Secretary of Transportation to consider whether certain unmanned aircraft systems may operate safely in the national airspace system (NAS) before completion of the rulemaking required under Section 332 of the Reform Act. In making this determination, the Secretary is required to determine which types of UASs do not create a hazard to users of the NAS or the public or pose a threat to national security in light of the following:

- The UAS's size, weight, speed, and operational capability;
- Operation of the UAS in close proximity to airports and populated areas; and
- Operation of the UAS within visual line of sight of the operator.

Reform Act § 333 (a). Lastly, if the Secretary determines that such vehicles “may operate safely in the national airspace system, the Secretary shall establish requirements for the safe operation of such aircraft in the national airspace system”

The Federal Aviation Act expressly grants the FAA the authority to issue exemptions. This statutory authority by its terms includes exempting civil aircraft, as the term is defined under §40101 of the Act, that includes sUASs, from the requirement that all civil aircraft must have a current airworthiness certificate.

The Administrator may grant an exemption from a requirement of a regulation prescribed under subsection (a) or (b) of this section or any sections 44702-44716 of this title if the Administrator finds the exemption in the public interest. 49 U.S.C. §44701(f) *See also* 49 USC §44711(a); 49 USC §44704; 14 CFR §91.203 (a) (1).

#### **14 C.F.R. 21 – Subpart H Certification procedures for products and parts, Airworthiness Certificates**

OpenSky seeks exemption from **14 C.F.R. 21, Subpart H** which states the certification procedures for products and parts as well as airworthiness certificates. The sUAS to be operated hereunder is less than 55 lbs. fully loaded, carries neither a pilot nor passenger, carries no explosive materials or flammable liquid fuels, and operates exclusively within a secured area as set out in the Manual. Unlike other civil aircraft, operations under this exemption will be tightly controlled and monitored by both the operator, pursuant to the Manual's requirements, and under the requirements and in compliance with local public safety requirements, to provide security for the area of operation as is now done with conventional filming. The FAA will have advance notice of all operations. These safety enhancements, which already apply to civil aircraft operated in connection with motion picture and television production, provide a greater degree of safety to the public and property owners than conventional operations conducted with airworthiness certificates issued under 14 C.F.R. Part 21, Subpart H. Lastly, application of these same criteria demonstrates that there is no credible threat to national security posed by the UAS, due to its size, speed of operation, location of operation, lack of

explosive materials or flammable liquid fuels, and inability to carry a substantial external load. OpenSky has developed our own training procedures and regulations to promote and provide safe flying experiences for our PIC(s) which can be viewed in section (e) of this petition. Unlike other civil aircraft, operations under this exemption will be tightly controlled and monitored by both the operator, pursuant to the Manual's requirements, and under the requirements and in compliance with local public safety requirements, to provide security for the area of operation.

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

OpenSky seeks exemption from **14 C.F.R. 45.23**, which discusses the display of marks. Specifically, section 45.23 states, "(a) each operator of an aircraft must display on that aircraft marks consisting of the Roman capital letter "N" (denoting United States registration) followed by the registration number of the aircraft. Each suffix letter used in the marks displayed must also be a Roman capital letter (b) when 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".

OpenSky will need exemption from this regulation due to the small size of the aircraft and that there is no cabin, cockpit, or pilot station for the aircraft. The words "Experimental" has been placed on the fuselage in compliance with §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): Private Pilot Privileges and Limitations: Pilot in Command.**

OpenSky seeks exemption from 14 C.F.R. 61.113, which discusses private pilot privileges and limitations for the Pilot in command (PIC).

OpenSky is seeking exemption from this regulation, because OpenSky believes that there is inconclusive evidence that a person with a private pilot certificate can successfully maneuver a sUAS without first hand flight experience with the particular sUAS. In fact, having a private pilot license does not automatically ensure competence at flying an sUAS in 3<sup>rd</sup> person view as required to properly operate an sUAS within the required line of sight. However, we believe that the PIC and our FOVO (Field Operation Visual Observer) must be able to understand and correctly interact with the general aviation community. Therefore, we believe our own flight training with the sUAS will be more than satisfactory. Our PIC and FOVO will be both certified in Ground School training to be able to properly interact with General Aviation protocols. They will also actively pursue a private pilot's license as well have the necessary medical qualifications.

**14 C.F.R. 91.103 - Preflight Actions**

OpenSky seeks exemption from 14 C.F.R. 91.103 which states that each pilot in command shall, before beginning a flight, become familiar with all available information concerning that flight. This information must include: (a) For a flight under IFR or a flight not in the vicinity of an airport, weather reports and forecasts, fuel requirements, alternatives available if the planned flight cannot be completed, and any known traffic delays of which the pilot in command has been advised by ATC; actions, including reviewing weather, flight battery requirements, landing and takeoff distances, and aircraft performance data before starting a flight.

OpenSky's will be operating our sUAS in VFR. Our operations manual already includes preflight procedures directly pertaining to our sUAS which includes equipment checklist as well a preplanning details regarding weather conditions, review of any possible flight path of general aviation, our mission flight path and weather conditions amongst other parameters required to complete the mission.

#### **14 C.F.R. 91.105 – Flight crewmembers at stations**

OpenSky seeks exemption from 14 C.F.R. 91.105, which discusses flight crewmembers at stations. Specifically, 91.105 states “(a) During takeoff and landing, and while en route, each required flight crewmember shall (1) Be at the crewmember station unless the absence is necessary to perform duties in connection with the operation of the aircraft or in connection with physiological needs; and (2) Keep the safety belt fastened while at the crewmember station. (b) Each required flight crewmember of a U.S.-registered civil aircraft shall, during takeoff and landing, keep his or her shoulder harness fastened while at his or her assigned duty station. This paragraph does not apply if (1) The seat at the crewmember’s station is not equipped with a shoulder harness; or (2) The crewmember would be unable to perform required duties with the shoulder harness fastened. OpenSky will need exemption from this regulation due to the fact that the sUAS will not have a flight crew or crew stations other than the PIC and a FOVO. The PIC will also not have to be restrained into a seat via shoulder harness or safety belt at the time of the flight.

#### **14 C.F.R. 91.109 - Flight instruction; Simulated instrument flight and certain flight tests**

OpenSky seeks exemption from 14 C.F.R. 91.109, which discusses flight instruction, simulated instrument flight, and certain flight tests. Specifically, 91.109 states “(a) No person may operate a civil aircraft (except a manned free balloon) that is being used for flight instruction unless that aircraft has fully functioning dual controls. However, instrument flight instruction may be given in an airplane that is equipped with a single, functioning throw over control wheel that controls the elevator and ailerons, in place of fixed, dual controls, when (1) The instructor has determined that the flight can be conducted safely; and (2) The person manipulating the controls has at least a private pilot certificate with appropriate category and class ratings. (b) An airplane equipped with a single, functioning throw over control wheel that controls the elevator and ailerons, in place of fixed, dual controls may be used for flight instruction to conduct a flight review required by §61.56 of this chapter, or to obtain recent flight experience or an instrument proficiency check required by §61.57 when (1) The airplane is equipped with operable rudder pedals at both pilot stations; (2) The pilot manipulating the controls is qualified to serve and serves as pilot in command during the entire flight; (3) The instructor is current and qualified to serve as pilot in command of the airplane, meets the requirements of §61.195(b), and has logged at least 25 hours of pilot-in-command flight time in the make and model of airplane; and (4) The pilot in command and the instructor have determined the flight can be conducted safely. (c) No person may operate a civil aircraft in simulated instrument flight unless (1) The other control seat is occupied by a safety pilot who possesses at least a private pilot certificate with category and class ratings appropriate to the aircraft being flown. (2) The safety pilot has adequate vision forward and to each side of the aircraft, or a competent observer in the aircraft adequately supplements the vision of the safety pilot; and (3) Except in the case of lighter-than-air aircraft, that aircraft is equipped with fully functioning dual controls. However, simulated instrument flight may be conducted in a single-engine airplane, equipped with a single, functioning, throw over control wheel, in place of fixed, dual controls of the elevator and ailerons, when (i) The safety pilot has determined that the flight can be conducted safely; and (ii) The person manipulating the controls has at least a private pilot certificate with appropriate category and class ratings. (d) No person may operate a civil aircraft that is being used for a flight test for an airline transport pilot certificate or a class or type rating on that certificate, or for a part 121 proficiency flight test, unless the pilot seated at the controls, other than the pilot being checked, is fully qualified to act as pilot in command of the aircraft”. Again, Except when necessary for takeoff or landing, no person may operate an aircraft below the following altitudes: (a) Anywhere. An altitude allowing, if a power unit fails, an emergency landing without undue hazard to persons or property on the surface. (b) Over congested areas. Over any congested area of a city, town, or settlement, or over any open air assembly of persons, an altitude of 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet of the aircraft. (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. (d) Helicopters, powered parachutes, and weight-shift-control aircraft. If the operation is conducted without hazard to persons or property on the surface— (1) A helicopter may be operated at less than the minimums prescribed

in paragraph (b) or (c) of this section, provided each person operating the helicopter complies with any routes or altitudes specifically prescribed for helicopters by the FAA; and (2) A powered parachute or weight-shift-control aircraft may be operated at less than the minimums prescribed in paragraph (c) of this section (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; or (2) At or above 18,000 feet MSL, to 29.92" Hg. (b) The lowest usable flight level is determined by the atmospheric pressure in the area of operation as shown in the following table:

OpenSky believes that there is inconclusive evidence that a person with a private pilot certificate or license can successfully maneuver or train someone to use an sUAS without first hand flight experience with the particular sUAS. Flying in 3<sup>rd</sup> person orientation requires built-up experience in that form of flying for many years. Therefore, we believe our own flight training, pilot protocols and first hand experiences with the sUAS as laid out in our Flight Operations Manual meets and exceeds the requirements necessary to safely operate our sUAS for the tasks we purpose. Also, the sUAS will be operated by a remote control, which will only require a single person operator and dual controls will not be necessary.

**14 C.F.R. 91.119 – Minimum safe altitudes: General**

OpenSky seeks exemption from 14 C.F.R. 91.119, which discusses minimum safe altitudes. As this exemption is for a sUAS that is a helicopter and the exemption requests authority to operate at altitudes up to 400 AGL, or not more than 200 above an elevated platform from which filming is planned, an exemption may be needed to allow such operations. As set forth herein, except for the limited conditions stated in the Manual, the UAS will never operate at higher than 400 AGL. It will however be operated in a restricted area with security perimeter, where buildings and people will not be exposed to operations without their pre-obtained consent.

The equivalent level of safety will be achieved given the size, weight, speed of the UAS as well as the location where it is operated. No flight will be taken without the permission of the property owner or local officials. Because of the advance notice to the property owner and participants in the filming activity, all affected individuals will be aware of the planned flight operations as set forth in the Manual. Compared to flight operations with aircraft or rotorcraft weighting far more than the maximum 55lbs. proposed herein and the lack of flammable fuel, any risk associated with these operations is far less than those presently presented with conventional aircraft operating at or below 500 AGL in the movie industry. In addition, the low-altitude operations of the sUAS will ensure separation between these small- UAS operations and the operations of conventional aircraft that must comply with Section 91.119.

**14 C.F.R. 91.121 – Altimeter settings**

OpenSky seeks exemption from 14 C.F.R. 91.121, which discusses altimeter settings for lowest usable flight level.

C.F.R. 91.121 states,

Current altimeter setting	Lowest usable flight level
29.92 (or higher)	180
29.91 through 29.42	185
29.41 through 28.92	190
28.91 through 28.42	195
28.41 through 27.92	200
27.91 through 27.42	205
27.41 through 26.92	210

(c) To convert minimum altitude prescribed under §§91.119 and 91.177 to the minimum flight level, the pilot shall take the flight level equivalent of the minimum altitude in feet and add the appropriate number of feet specified below, according to the current reported altimeter setting:"

Current altimeter setting	Adjustment factor
29.92 (or higher)	None
29.91 through 29.42	500
29.41 through 28.92	1,000
28.91 through 28.42	1,500
28.41 through 27.92	2,000
27.91 through 27.42	2,500
27.41 through 26.92	3,000

OpenSky's sUAS uses both GPS altitude and barometric sensors and relays that information to our ground station. However, this data is used help the sUAS to automatically maintain position hold at the required elevation and therefore this code is not pertinent the functionality of this sUAS.

**14 C.F.R. 91.151- Fuel requirements for flights in Visual Flight Rules (VFR) conditions**

OpenSky seeks exemption from 14 C.F.R. 91.151, which discusses fuel requirements for flight in VFR conditions. Specifically, 91.151 states "(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; or (2) At night, to fly after that for at least 45 minutes. (b) No person may begin a flight in a rotorcraft 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, to fly after that for at least 20 minutes".

OpenSky's sUAS has a typical mission time of less than 15 minutes with maximum flight time of 25 minutes. Since this amount less than the 30 minute reserve minimum, this reserve minimum would not even make sense in allowing the sUAS a chance to fly. According to OpenSky's aircraft flight manual, the PIC is instructed to maintain flight until battery power reaches 25%, or 1<sup>st</sup> level warning. At this level, landing procedures will be initiated. Once the sUAS reads 20%, 2<sup>nd</sup> level warning, the flight control system automatically take over and initiates safe landing sequence at the logged in takeoff point. OpenSky policy outlined in our Flight Operations Manual achieves satisfactory safety standards.

OpenSky believes that an appropriate and current airworthiness certificate would not be necessary to fly a sUAS given the size of the aircraft and the necessary level of skill needed to operate the aircraft. Before putting in to service, each of our sUAS goes through our own airworthiness procedures of minimum test flight and reliability checks. Also, our sUAS are recalibrated each at the site location before each flight to ensure that all systems functions as designed. OpenSky seeks exemption from this regulation because we believe this rule was not meant for a sUAS and operators.

**14 C.F.R. 91.405, 91.407, 91.409, and 91.417**

OpenSky seeks exemption from 14 C.F.R. 91.405, 91.407, 91.409, and 91.417, which discusses required aircraft maintenance, operation after maintenance, preventive maintenance, rebuilding, or alteration, inspections, and maintenance records. In OpenSky's aircraft flight manual, maintenance and inspection procedures have been established for the aircraft. OpenSky believes these regulations are meant for manned operated aircrafts and not unmanned systems, therefore making them unnecessary. Nevertheless, we seek an exemption from any such specific provisions to the extent FAA finds it necessary to grant this request.

(d) The reasons why granting OpenSky's request would be in the public interest; that is, how it would

benefit the public as a whole.

OpenSky is classified as an engineering company by the U.S. Department of Transportation and provides services to aerial support for commercial interest. OpenSky's use of a sUAS can assist in making task safer and minimize human exposure to being at dangerous elevations. OpenSky's sUAS usage in the aerial photography and cinematography will also reduce the time required to capture the needed scenes as compared to convention helicopters or airplanes. Ultimately, the result is quick completion of task and a reduction of dangerous elevation perspective needs.

(e) The reasons why granting the exemption would not adversely affect safety, or how the exemption would provide a level of safety at least equal to that provided by the rule from which OpenSky seeks exemption. Our Engineering department will provide a level of safety that exceeds the level of safety required by the FAA for its use on sUAS. The following are OpenSky's safety procedures, features, regulations, and operating specifications for our sUAS:

- Our Squadron Leader/Chief Pilot in Charge is an engineer who has 10 years of RC Model building and flight experience with over 1000 flight hours in Fixed-wing, Helicopter and Multi-Rotor 3<sup>rd</sup> person flight. He has been involved with flight design, experimentation and system optimization for model industry since 2008 through SAPAC, Inc. models.
- Our staff includes an FAA-rated commercial flight instructor (ret) who coordinates our FOVO team in integration with general aviation.
- The Pilot In Command (PIC) and Field Operations Visual Observer (FOVO) will be required to wear hard hats, safety vests, and safety glasses to protect the head and eyes from potential mishaps during given operational flights including training or testing of sUAS.
- The flight area of the sUAS will be observed for best take off and landing locations. Desired conditions include: flat and level surfaces clear of debris, at least 15ft from power lines and structures, and a minimum distance of 12ft from the PIC and observers.
- The sUAS will also be in the Visual Line of Sight (VLOS) to both the PIC and FOVO during all flights.
- Flights must take place during good weather conditions with no rain, low laying clouds, or heavy winds. All flights will take place during daylight hours with no evening or late night flights.
- The PIC(s) of the sUAS will at least have 12 training hours or 24 flights accrued before being designated working flights.
- All batteries must be charged completely before each flight and each flight must end when the battery has a 30% power level remaining.
- A visual safety inspection will occur before each flight, testing propeller tightness, security mount of camera/detection equipment, remote range test, and proper safety equipment is adorned to PIC and FOVO.
- The sUAS will be flown under a height of 500 ft AGL.
- No PIC or FOVO will engage in, nor may a PIC or FOVO permit, any activity during a critical phase of flight so as to ensure that the sUAS is in a condition for safe flight operation and in a configuration appropriate for the purpose of the intended flight.
- If there is more than just an operator at a site during a flight, the PIC operator and observer or FOVO will maintain two-way communication with each other during all operations; if unable to maintain two-way communications, or if any condition occurs that may otherwise cause the operation to be unsafe, the operator will immediately conclude the operation.
- If the communication link is lost, the sUAS will go into fail-safe mode and safely descend to its designated home-point location. If the communication link is reconnected during fail-safe mode, control of the sUAS can be regained before landing occurs at the home-point location.
- There is no fuel or payload on the sUAS, therefore there will be no potential explosives or risk of explosion if a crash occurs with the sUAS.
- The sUAS will feature a built in compass that will be recalibrated at every site to maintain accurate directional readings. The compass will also help in keeping the sUAS stable during

flights.

- The sUAS will record GPS location data once Ready to Fly status has been obtained. A minimum of 6 satellites will activate the Ready to Fly status.
- The weight of the sUAS is less than 20 lbs.
- The aircrafts vertical and horizontal aspect concerning hovering accuracy is less than 0.5m and 1.5m respectfully. With a maximum wind resistance of 18mph.
- The typical aircraft wheelbase will be less than 1000mm in length.
- The aircraft runs off a Li-Po battery.

(f) A summary FAA can publish in the FEDERAL REGISTER, stating: (1) The rule from which you seek the exemption; and (2) A brief description of the nature of the exemption you seek

Petitioner: OpenSky Drones, LLC.

Sections of 14 C.F.R. Affected: 21 Subpart H; 45.23(b); 61.113(a)(b); 91.103; 91.105; 91.109; 91.119(c); 91.121(a)(1)(iii); 91.151(a)(1); 91.203; 91.405; 91.407; 91.409; and 91.417

Description of Relief Sought: Petitioner seeks relief from the requirements of 14 C.F.R. 21 Subpart H; 45.23(b); 61.113(a)(b); 91.103; 91.105; 91.109; 91.119(c); 91.121(a)(1)(iii); 91.151(a)(1); 91.203; 91.405; 91.407; 91.409; and 91.417 to Cinematographic filming subject to operating procedures that meet or exceed those that FAA requires.

(g) Any additional information, views or arguments available to support your request

Please see the introduction to this exemption request.

(h) If you want to exercise the privileges of your exemption outside of the United States, the reason why you need to do so

The Operations described in this exemption request will be conducted wholly within the United States.

Attached hereto, and submitted as a **confidential** document, is our Field Operations Manual. We respectfully submit that good cause exists so that this confidential manual does not need to be published in the Federal Register.

Please do not hesitate to contact me via email at dan@OpenSkydrones.com if you have any questions or concerns.

Respectfully submitted,



Dan Q Pham, P.E.  
Vice President  
OpenSky Drones, LLC