

November 12, 2014

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

Aerial Media Systems

Brian M Walk

757 Dakota trail

Franklin Lakes, NJ 07417

Re: Request for exemption from multiple regulatory provisions to allow the use of small unmanned aerial systems over land controlled by employees of Aerial Media Systems (AMS) to assist in the safe capture of video, images, and surveying of persons and property for commercial broadcast.

Aerial Media Systems (AMS) respectfully requests exemption from several provisions of the Federal Aviation Regulations (“FAR”), specifically portions of 14 C.F.R. Parts 45, 61, and 91 to allow, commercial operations of its unmanned aerial system in remote, rural, and closed production sets, areas of the United States, as further defined herein, by a Pilot in Command holding an Airline Transport pilot certificate, the Motion picture and television operations manual, and the Aerial Media Systems Flight Operations Manual.

Brian Walk, and his company Aerial Media Systems, is an experienced FAA Air Transport Pilot. Mr. Walk is currently responsible for a single aircraft IS-BAO stage II private flight department. Mr. Walk has extensive knowledge and respect for the F.A.R.s that govern and certify manned aircraft. Mr. Walk has been an avid R/C model flyer for over twenty years. Aerial Media Systems has been actively involved in the technical development of UAV/UAS service applications to provide high definition video and surveying capability with small unmanned and light weight UASs. Aerial Media Systems exemption request would permit its operation of lightweight, unmanned (remotely controlled in line of sight) UASs in tightly controlled and limited airspace. Predetermined, specifically marked areas of operation, cordoned off locations and corresponding enhancements to current safety controls will allow Aerial Media Systems to operate within current safety parameters and new ones being implemented. As identified, similar lightweight, commercially available remote controlled UASs are legally operated by amateurs with no flight experience, or practices in place to prevent accidents from occurring. Aerial Media Systems employs fully licensed and current pilots that are also experts in the flight characteristics of the UAS/UAV in which Aerial Media Systems operates.

Accordingly, the grant of an exemption is consistent with Congress' intent, reflected in Section 333 of the FAA Modernization and Reform Act of 2012 (Modernization Act),<sup>1</sup> that safe systems be permitted in the national airspace prior to the issuance of final regulations governing general use of these systems.

**Section 1:** A summary of this request suitable for publication in the Federal Register is provided as section 1. As well answers to questions posed by Section 333 Public Guidance PDF, as numbered.

**Section 2:** See Attached Documentation Labeled Section 2 Provides the manufacturer's information, aircraft information, and fail safe programming. The manufacturer information related to the normal and abnormal procedures, as well as maintenance and inspection procedures.

**Section 3:** See Attached Documentation Labeled Section 3 Provides Aerial Media Systems Flight Operations Manual for all flights flown under the exemption request. Please See Attached Flight Operations Manual.

**Section 4:** The specific sections of 14 CFR from which we seek exemption

## Section 1.

**Section 333 Public Guidance 1,6,7,8,9.** Aerial Media Systems will operate as safely as possible, taking every precaution to minimize risk to the NAS or to persons and property on the ground. Brian Walk and Aerial Media Systems exemption will not adversely affect safety to persons or property by following the strict guidance set forth by its procedures and the operator's years of experience. By allowing Aerial Media Systems to operate, Aerial Media Systems pilots will be able to gain valuable real world experience that is unattainable any other way. Much like operating a commercial or corporate aircraft. Experience is gained through practical and safe real world experience. With this experience Aerial Media Systems will develop existing techniques and protocols, as well as develop new ones. In addition, Aerial Media Systems submits its Flight operations Manual attached to this Exemption Request. Included in the Aerial Media Systems Flight Operations Manual.

- Pilot in Command Qualifications and duties
- Second in Command Qualifications and duties
- Spotter qualifications and duties
- FAA Medical Requirements
- Pilot currency requirements
- Crew Resource Management objectives
- Safety Management System

Aerial Media Systems strives to provide a level of safety that exceeds the existing regulations. Aerial Media Systems strives to operate its UAS/UAV as closely and within practicality to the already proven safe F.A.R.s. It is significantly safer to operate a battery powered lightweight UAS piloted by FAA licensed pilots than the current helicopter based aerial cinematography

systems. First, and foremost the potential loss of life is zero because UASs do not carry an on board crew and Aerial Media Systems only operates them in specific areas away from dense populations. UAS are battery powered, carrying no flammable liquids, thus the potential for fire or explosions is greatly diminished. Third, the small size and extreme maneuverability of Aerial Media Systems UASs allow our remote control pilots to avoid hazards. Given their small size and weight, they pose less of an environmental and noise impact than conventional manned helicopter based systems available today. Aerial Media Systems UAS systems produce less noise than ground power units used to power small corporate aircraft. Thus reducing the acoustic footprint.

- Aerial Media Systems UASs weigh less than 55 pounds Max Tax off Weight
- Aerial Media Systems only operates its UASs below 400 feet;
- Aerial Media Systems UASs only operate for 5-25 minutes per flight;
- Aerial Media Systems lands its UASs when they reach 30% battery power;
- Aerial Media Systems remote control pilots operate Aerial Media Systems UASs by line of sight;
- Aerial Media Systems remote control pilots have video backup should they somehow lose sight of the UAS;
- Aerial Media Systems staffs each flight with a remote control pilot, technician and spotter with communication systems enabling real time communication between them;
- Aerial Media Systems UASs have GPS flight modes whereby they hover and then slowly land if communication with the remote control pilot is lost or battery power is below 30%;
- Aerial Media Systems actively analyses electronic flight data and other sources of information to constantly update and enhance safety protocols;
- Aerial Media Systems only operates in secured areas that are strictly controlled, are away from airports and populated areas;
- Aerial Media Systems conducts extensive briefing prior to flight, emphasizing safety.

Aerial Media Systems recognizes there is always a potential hazard to those on the ground. These people will be protected by the fact that no one will be allowed entry into the operations area without prior permission. Security will be established for the operations area as part of the pre-flight inspections. Each person within the operations area will be briefed about the UAS system's flight and give consent to be in the operations area.

Aerial Media Systems UASs utilizes four or eight counter-rotating propellers for balance, control and stability in all segments of flight. Each craft weighs less than 55 pounds, including cinematic or other research equipment. Each of Aerial Media Systems small unmanned aircraft are designed to primarily hover in place and operate at less than a 50 knot maximum speed. They are capable of vertical and horizontal operations but operate only within the line of sight of the remote control pilot. In addition to the remote control pilot, Aerial Media Systems uses a spotter/ Second in Command and a technician, such that, at minimum, three Aerial Medial Systems personnel govern the safe flight of an Aerial Media Systems aircraft at all times. Utilizing battery power and not combustible fuels, flights generally last between five and twenty minutes. Aerial Media Systems does not operate its UASs with less than 30 percent battery capacity. Safety systems in place include a GPS mode that allows Aerial Media Systems UASs to hover in place if communication with the radio control pilot is lost and then slowly descend the UAS at 30 percent battery capacity. Aerial Media Systems aircraft are programmed, in some instances, to slowly follow a predetermined set of waypoints to return to a safety point predetermined by the Pilot-In-Command if communications are lost.

Aerial Media Systems will not operate its UASs within 5 miles of airports and does not operate them over uncontrolled populated areas. The UAS operating software and GPS navigation systems do not allow any of the Aerial Media Systems UAS vehicles to operate near airports or FAA mandated no-fly zones. In the event an operation needs to be conducted closer to an airport, Aerial Media Systems will inform the airport operator and airport air traffic control tower of the contemplated operation and will comply with any directions issued by air traffic control at that airport. Aerial Media Systems only operates its UASs in predetermined areas and only in compliance with safety protocols such as those contained within the well established Motion Picture and Television Operations Manual, as well as within its own Flight Operations Manual. Aerial Media Systems Flight Operations Manual is tailored to UAS flight, and as closely as practical follows guidelines set forth for the operation of the multi-crew manned aircraft.

Aerial Medial Systems operation of its fleet of small unmanned aircraft will not "create a hazard to users of the national airspace system or the public." 112 P.L. 95 § 3 3 3 (b). Given the small size and weight of Aerial Media Systems UASs, combined with their operation in cordoned off and well-controlled areas, Aerial Media Systems flight operations fall within Congress's contemplated safety zone when it disseminated the Reform Act and the corresponding directive to integrate UASs into the national airspace system. Aerial Media Systems UASs have a demonstrable safety record and do not pose any threat to the general public or national security.

**Section 333 Public Guidance 2.** Aerial Media Systems procedures and checklists are based on full sized aircraft checklists. They are completed by professional pilots who understand the checklists and their uses. Please see attached General Operations Manual and Checklists in section 2.

**Section 333 Public Guidance 3.** All Aerial Media Systems equipment complies with the Federal Communications Commission. All equipment either operates

under 2.4 or 5.8 GHZ frequencies which are publicly available to Futaba and Spektrum radios for model use.

**Section 333 Public Guidance 4.** All Aerial Media Systems Pilots and spotters who will be responsible for the operation of the UAS will meet the General Operations Manual Minimum Requirements. Section 2.5 of the General Operations Manual. See below: Section 2 Aircraft Crew members

## Section 2: Aircraft Crew Members

### 2.1 Minimum Flight Crew:

Normally, the minimum flight crew will be 2 pilots 1 spotter for dual operation DJI S1000 or 1 pilot and 1 spotter for Phantom.

### 2.2 Pilot-in-Command (PIC):

The PIC is responsible for the safe and efficient operation of the aircraft. Specific duties include all preflight preparation, inflight operation, post flight requirements, all GOM procedures including but not limited to:

- Safe in flight operations
- Risk Mitigation
  - o To Persons and property
- Airfield Suitability
- Weight and balance

### 2.3 Second-in Command (SIC)

Assists as directed and responsible for all duties delegated by the PIC. Normally the SIC will, at a minimum, complete the following:

- Camera or Payload management
- Spotting for the P.I.C.
  - o Obstructions
  - o Any signal degrading obstacles

### 2.4

#### 2.4 Spotter-

To assist the P.I.C. when an S.I.C. is not required for payload management.

- Spot obstructions and signal degrading foliage

**Section 333 Public Guidance 5.** Petitioners should describe the medical standards and certification of the PIC (s) directly responsible for operation of the UAS. See Below Section 2.5 from General Operations Manual

2.5 Crew Qualification Responsibilities

Pilots will maintain

- FAA Commercial Pilot License
- A Minimum of FAA 1st class medical
- 2 hours of flying per month
- 3 take off and landings in the type to be flown

Records Keeping and Publications Currency

-All personnel will maintain their own records

2.6 Pilot Health and Medical:

Pilots must maintain an FAA Class 1 Medical at all times. Crewmembers will remove themselves from flight duties when they are not capable of safely performing their required duties due to illness or injury.

5. Aerial Media Systems Pilots will be help to the same FAA Class 1 Medical requirements of commercially rated FAA pilots.

**Section 333 Public Guidance 10.** The UAS must be operated within visual line-of-sight (VLOS), in accordance with the statutory mandate under Section 333(b)(1). Petitioners should describe how they intend to comply with his mandate.

Through the use of a 2 or 3 person crew. 1 PIC, 1 Camera or payload operator, and 1 Spotter. VLOS will be maintained at all times to ensure VLOS. All of the areas in which Aerial Media Systems will operate will be closed and cordoned off. All of these areas will be visible from the PIC and Spotters location without obstruction.

**Section 333 Public Guidance 12.** Aerial Media Systems intends to work side by side with the all local and Federal enforcement agencies. As a professional, and Chief Pilot has had a long standing and excellent relationship with the Saddle Brook New Jersey FSDO. Aerial Media Systems intends on continuing the relationship and abiding by all requests.

## Section 4:

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).

### **14 C.F.R. Part 21, Subpart H: Airworthiness Certificates 14 C.F.R. §91.203 (a) (1)**

Subpart H, entitled Airworthiness Certificates, establishes the procedural requirements for the issuance of airworthiness certificates as required by FAR §91.203 (a) (1). Given the size and limited operating area associated with the aircraft to be utilized by the Applicant, an exemption from Part 21 Subpart H meets the requirements of an equivalent level of safety under Part 11 and Section 333 of the Reform Act. The Federal Aviation Act (49 U.S.C. §44701 (f)) and Section 333 of the Reform Act both authorize the FAA to exempt aircraft from the requirement for an airworthiness certificate, upon consideration of the size, weight, speed, operational capability, and proximity to airports and populated areas of the particular UAS. In all cases, an analysis of these criteria demonstrates that the UAS operated without an airworthiness certificate, in the restricted environment and under the conditions proposed will be at least as safe, or safer, than a conventional aircraft (fixed wing or rotorcraft) operating with an airworthiness certificate without the restrictions and conditions proposed.

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.

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

The regulation requires:

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.

Even though the UAS will have no airworthiness certificate, an exemption may be needed as the UAS will have no entrance to the cabin, cockpit or pilot station on which the word "Experimental" can be placed. Given the size of the sUAV, two-inch lettering will be impossible. The word "Experimental" will be placed on the fuselage in compliance with §45.29 (f).

The equivalent level of safety will be provided by having the sUAV marked on its fuselage as required by §45.29 (f) where the pilot, observer and others working with the sUAV will see the identification of the UAS as “Experimental.” The FAA has issued the following exemptions to this regulation to Exemptions Nos. 10700, 8738, 10167 and 10167A.

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

Sections 61.113 (a) & (b) limit private pilots to non-commercial operations. Because the UAS will not carry a pilot or passengers, the proposed operations can achieve the equivalent level of safety of current operations by requiring the PIC operating the aircraft to have a private pilot’s license rather than a commercial pilot’s license to operate this small UAS. Unlike a conventional aircraft that carries the pilot and passengers, the sUAS is remotely controlled with no living thing on board. The area of operation is controlled and restricted, and all flights are planned and coordinated in advance as set forth in the Manual. The level of safety provided by the requirements included in the Manual exceeds that provided by a single individual holding a commercial pilot’s certificate operating a conventional aircraft. The risks associated with the operation of the sUAS are so diminished from the level of risk associated with commercial operations contemplated by Part 61 when drafted, that allowing operations of the sUAS as requested with a private pilot as the PIC exceeds the present level of safety achieved by 14 C.F.R. §61.113 (a) & (b).

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

The regulation requires that no person may operate a civil aircraft unless it is in airworthy condition. As there will be no airworthiness certificate issued for the aircraft, should this exemption be granted, no FAA regulatory standard will exist for determining airworthiness. Given the size of the aircraft and the requirements contained in the Manual for maintenance and use of safety check lists prior to each flight, as set forth in Sections J, L and Q, an equivalent level of safety will be provided.

**14 C.F.R. § 91.9 (b) (2): Civil Aircraft Flight Manual in the Aircraft.**

Section 91.9 (b) (2) provides:

No person may operate a U.S.-registered civil aircraft ...

(2) For which an Airplane or Rotorcraft Flight Manual is not required by §21.5 of this chapter, unless there is available in the aircraft a current approved airplane or Rotorcraft Flight Manual, approved manual material, markings, and placards, or any combination thereof. May 27, 2014 Page Seven The sUAS, given its size and configuration has no ability or place to carry such a flight manual on the aircraft, not only because there is no pilot on board, but because there is no room or capacity to carry such an item on the aircraft.

The equivalent level of safety will be maintained by keeping the flight manual at the ground control point where the pilot flying the sUAS will have immediate access to it. The FAA has issued the following exemptions to this regulation: Exemption Nos. 8607, 8737, 8738, 9299, 9299A, 9565, 9565B, 10167, 10167A, 10602, 32827, and 10700.

**14 C.F.R. § 91.103: Preflight action**

This regulation requires each pilot in command to take certain actions before flight to insure the safety of flight. As FAA approved rotorcraft flight manuals will not be provided for the aircraft an exemption will be needed. An equivalent level of safety will be provided as set forth in Sections J and K of the Manual. The PIC will take all actions including reviewing weather, flight battery requirements, landing and takeoff distances and aircraft performance data before initiation of flight.



**14 C.F.R. §91.109: Flight instruction:**

Section 91.103 provides that 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. sUASs and remotely piloted aircraft, by their design do not have fully functional dual controls. Flight control is accomplished through the use of a control box that communicates with the aircraft via radio communications. The FAA has approved exemptions for flight training without fully functional dual controls for a number of aircraft and for flight instruction in experimental aircraft. See Exemption Nos.5778K & 9862A. The equivalent level of safety provided by the fact that neither a pilot nor passengers will be carried in the aircraft and by the size and speed of the aircraft.

**14 C.F.R. §91.119: Minimum safe altitudes**

Section 91.119 establishes safe altitudes for operation of civil aircraft. Section 91.119 (d) allows helicopters to be operated at less than the minimums prescribed, provided the person operating the helicopter complies with any route or altitudes prescribed for helicopters by the FAA. 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 Section K of 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**

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

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

Section 91.151 (a) prohibits an individual from beginning "a flight in an airplane under VFR conditions unless (considering wind and forecast weather conditions) there is enough fuel to fly to the first point of intended landing, and, assuming normal cruising speed – (1) During the day, to fly after that for at least 30 minutes; or (2) At night, to fly after that for at least 45 minutes." The battery powering the sUAS provides approximately 40 minutes of powered flight. To meet the 30 minute reserve requirement in 14 CFR §91.151, sUAS flights would be limited to approximately 10 minutes in length. Given the limitations on the UAS's proposed flight area and the location of its proposed operations within a predetermined area, a longer time frame for flight in daylight or night VFR conditions is reasonable.

Applicant believes that an exemption from 14 CFR §91.151(a) falls within the scope of prior exemptions. See Exemption 10673 (allowing Lockheed Martin Corporation to operate without compliance with FAR 91.151 (a)). Operating the small UAS, in a tightly controlled area where only people and property owners or official representatives who have signed waivers will be allowed, with less than 30 minutes of reserve fuel, does not engender the type of risks that Section 91.151(a) was intended to alleviate given the size and speed of the small UAS. Additionally, limiting sUAS flights to 10 minutes would greatly reduce the utility for which the exemption will be granted. Applicant believes that an equivalent level of safety can be achieved by limiting flights to 30 minutes or 30% of battery power whichever happens first than adequate to return the sUAS to its planned landing zone from anywhere in its limited operating area. Similar exemptions have been granted to other operations, including Exemptions 2689F, 5745, 10673, and 10808.

**14 C.F.R. §91.203 (a) and (b): Carrying Civil Aircraft Certification and Registration**

The regulation provides in pertinent part:

(a) Except as provided in § 91.715, no person may operate a civil aircraft unless it has within it the following:

(1) An appropriate and current airworthiness certificate. . . .

(b) No person may operate a civil aircraft unless the airworthiness certificate required by paragraph (a) of this section or a special flight authorization issued under §91.715 is displayed at the cabin or cockpit entrance so that it is legible to passengers or crew.

The UAS fully loaded weighs no more than 55 lbs and is operated without an onboard pilot. As such, there is no ability or place to carry certification and registration documents or to display them on the sUAS.

An equivalent level of safety will be achieved by keeping these documents at the ground control point where the pilot flying the sUAS will have immediate access to them, to the extent they are applicable to the sUAS. The FAA has issued numerous exemptions to this regulation. A representative sample of other exceptions includes Exemption Nos. 9565, 9665, 9789, 9789A, 9797, 9797A, 9816A, and 10700.

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

These regulations require that an aircraft operator or owner “shall have that aircraft inspected as prescribed in subpart E of this part and shall between required inspections, except as provided in paragraph (c) of this section, have discrepancies repaired as prescribed in part 43 of this chapter...” and others shall inspect or maintain the aircraft in compliance with Part 43.

Given that these section and Part 43 apply only to aircraft with an airworthiness certificate, these sections will not apply to the applicant. Maintenance will be accomplished by the operator pursuant to the flight manual and operating handbook as referenced in the Manual.(See Sections L and Q) An equivalent level of safety will be achieved because these small UASs are very limited in size and will carry a small payload and operate only in restricted areas for limited periods of time. If mechanical issues arise the UAS can land immediately and will be operating from no higher than 400 feet AGL. As provided in the Manual, the operator will ensure that the UAS is in working order prior to initiating flight, perform required maintenance, and keep a log of any maintenance performed. Moreover, the operator is the person most familiar with the aircraft and best suited

Aerial Media Systems respectfully requests that the FAA grant its exemption request Without delay.

Sincerely,

Brian M. Walk