

**U.S. Department of Transportation**

**Docket Management System**

**1200 New Jersey Avenue, SE**

**AMENDED 1-24-15**

**Washington, D.C. 20590**

**January 24, 2015**

**Amended Petition for Exemption Section 333**

**Michael Scott Dunn DBA Aerial Imaging Systems**

523 Hickory Lane

Pendleton, SC 29670

864-314-0416

Email [apachepilot1958@aol.com](mailto:apachepilot1958@aol.com)

**RE: Exemption Request Section 333** of the **FAA Reform Act of the Federal Aviation Regulations** from 14 CFR 91.7(a);91.119 (c); 91.121; 91.151 (a)(1); 91.405(a); 91.407(a)(1); 91.409(a)(1)and (2); 91.417(a)&(b)

Dear Sir or Maam,

This is an Amended petition to replace the document submitted on January 23, 2015. This petition is submitted by **Michael Scott Dunn, DBA, Aerial Imaging Systems**, who will hereafter be referred to as the "petitioner". The majority of this request for exemption will be based on prior **Exemption No. 11138** issued to **Mr. Douglas Trudeau, Realtor**, issued by the **Federal Aviation Administration** on **January 6, 2015, Regulatory Docket No. FAA-2014-0481**. My request for exemption will utilize the same make and model of UAS. I plan to perform the same type of operations, with certain additions to be specified, as requested in **Exemption No. 11138**.

It is the request of the petitioner for exemptions listed above in order to legally and safely operate the **DJI Phantom 2 Vision Plus UAS**, in the National Airspace System, for the purpose of Unmanned Aerial Photography and Videography for the real estate, construction, and utilities industries for commercial

gain and enhancement of Public awareness of UAS operation; and finally enhanced safety for both the General Public and Flight Crews.

The petitioner, **Michael Scott Dunn**, is a FAA certificated **Airline Transport Pilot-(Rotorcraft), Commercial Pilot Single and Multi-Engine Instrument Airplane; CFII-(Rotorcraft)**; and holds an **Airframe and Power plant Mechanic** Certificate. The petitioner has over 4000 flight hours, with more than 2500 hours in rotorcraft. The petitioner has extensive experience with remotely operated VLOS Unmanned model aircraft with some 300 plus flight hours in single and multi-rotor UAS's. The petitioner has owned a flight School, aerial photography business, a helicopter tour business, has held Letters of Authority in good standing; and is currently a Base Aviation Manager and Lead Pilot for a National EMS Air Ambulance Operator.

It is the petitioners position that the operations for which exemption is requested are safer and more cost effective than using manned aircraft, and for those reasons are in the Public Interest; and would be of benefit in identifying areas of operation that may need additional oversight as well as raising public awareness and interest in this rapidly growing facet of aviation. (**Reference Exemption No. 11138**)

The petitioner will outline in this document:

1. **Request for exemptions by Part and Subpart**
2. **Petitioners protocols and procedures for operations**
3. **Request for relief from Airport Proximity Limitation**
4. **The Unmanned Aircraft System (UAS)**
5. **The Public Interest**

## **1. REQUESTS FOR EXEMPTION BY PART AND SUBPART**

### **14 CFR 91.7(A)**

Prohibits the operation of an aircraft without an airworthiness certificate. Petitioner requests exemption based on previous **Exemption No. 11138**. The FAA has ruled that this make and model of aircraft (UAS) does not require an airworthiness certificate.

#### **14 CFR 91.119(C)**

States that no person may operate an aircraft below the following altitudes: *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.

The petitioner will never operate any UAS over an altitude of 300 AGL. The majority of the operations proposed will operate around 100 to 150 feet AGL as this usually provides the best angle of capture for the type of photography and videography operations proposed.

The UAS utilized for this exemption is of exceptionally light weight and is not capable of speeds over 30 knots. The UAS is equipped with GPS guided auto pilot with a return home function in case loss of control by the PIC and is powered by sealed batteries thereby reducing the chance of post impact fire to nearly zero.

There will be cases when the 500 foot distance from structures will need to be exempted. (Example: Aerial Video of a 2 story home roof to determine and/or document extent of storm damage.) In this type of operation every assurance will be made to keep persons outside of a reasonable, safe, clear area of operations and will only be conducted with the express permission of the property owner. See **Protocols and Procedures Section**.

The petitioner will implement procedures and policies to ensure that any person in the general vicinity of operations will be aware of such operations and ensure that all non-essential personnel are cleared of the area of operations. See **Protocols and procedures Section 3**.

The petitioner therefore requests relief in part from **14 CFR 91.119(C)**

#### **14 CFR 91.121**

Altimeter Settings.

The petitioner requests relief from **91.121** for the following reason. The UAS is equipped with GPS derived altitude capability, however due to the limited altitude requested in this exemption, the FAA has previously granted Exemption for these types of operations. **Reference Exemption No. 11138**

#### **14 CFR 91.151(a)**

No person may begin a flight in an airplane under VFR conditions unless (considering wind and forecast weather conditions) unless there is enough fuel to fly to the first point of intended landing and, assuming normal cruise speeds

(a)(1) During the day to fly for at least 30 minutes.

The petitioner requests relief from **91.151(a)** due to the fact that the UAS is equipped with a battery and percentage indicator system. The UAS has a flight capability on full charge of approximately 20 to 25 minutes depending on camera usage and other variables. The petitioner has established that the maximum flight will be 10 minutes on a fully charged battery. This constitutes landing with approximately 50 percent fuel remaining. The petitioner believes that this follows the spirit and intent of the rule with a great margin of safety.

No UAS operations will be conducted at night, as defined by Federal Aviation Regulations.

**14 CFR 91.405(a)**

Maintenance required;

The petitioner requests relief in part from **91.405(a)(1)** based on the **Protocols and Procedures Section on Maintenance and Maintenance Records. Also reference Exemption No. 11138**

**14 CFR 91.407(a)(1)**

Operation after maintenance, preventive maintenance, rebuilding, or alteration;

The petitioner requests relief from **91.407(a)(1)** based on the **Protocols and Procedures Section on Maintenance, Return to service after maintenance, and Maintenance records. Reference Exemption No. 11138**

**14 CFR 91.409(a)(1)(2)**

Inspections;

The petitioner requests relief from **91.409(a)(1)(2)** based on the **Protocols and Procedures Section on Inspections. Reference Exemption No. 11138**

**14 CFR 91.417(a)(b)**

Maintenance records;

The petitioner requests relief from **91.417(a)(b)** based on the **Protocols and Procedures Section on Maintenance records.**

## **Aerial Imaging Systems**

### **2. Protocols and Procedures for UAS operations.**

- A. Preflight**
- B. Area Security**
- C. Limitations of Operations**
- D. Airworthiness**
- E. Maintenance and Records**
- F. Pilot in Command Requirements**
- G. Visual Observer and Requirements**
- H. Reporting of Incidents and Accidents**

## A. Preflight Inspection of UAS

(1). Preflight of the Unmanned Aerial System will follow the instructions in the DJI instruction and User Manual. The Pilot in Command will certify that a preflight inspection has been accomplished with the date and time and signature in the UAS logbook. The preflight shall include the aircraft, transmitter, and batteries, motors, rotors, landing gear, camera and gimbal mount. As a part of the preflight the Pilot in Command will assure that weather conditions, area security, and any other information essential to safe operation has been obtained.

## B. Area Security

(1). The PIC of the UAS will ensure that the operational area for the purposes of UAS flight shall be cleared of all nonessential persons at all times the UAS is in flight. Additionally all nonessential persons shall be required to remain clear of the operations area by a minimum distance of 150 feet during operations. PIC shall ensure that clearly marked signs are posted at all ingress\egress points to the operations areas. These signs will be of white background with red lettering stating the following: "Unmanned aircraft operations underway. Please remain clear."

(2). In the event of a breach by nonessential persons into the operations area during the flight of UAS, the PIC shall immediately terminate flight operations until such time as the area can be cleared of these persons.

(3). The UAS area of operation is defined as the Horizontal flight path(s) of the UAS as well as the Vertical flight path and Maximum altitude to be reached. Additionally the area between the UAS's current position and its Home location is also considered operational area as it will proceed direct to its home location in the event of loss of ground control.

**All nonessential persons will not be allowed within 150 feet of any part of the operational area during flight operations.**

## C. Limitations of Operations

- (1) The UAS shall be operated in Day time only, as defined by **14 CFR**
- (2) UAS night operations are prohibited.
- (3) The UAS shall be operated by VLOS at all times
- (4) A Visual Observer shall be utilized at all times and must maintain VLOS at all times.
- (5) The UAS shall remain within 1000ft horizontal distance of the PIC at all times.
- (6) The UAS to be utilized is the **DJI Phantom 2 Vision + Unmanned Aircraft System**. No other systems will be operated.
- (7) The UAS will have an altitude restriction of 300ft AGL.

- (8)** The UAS will not be operated at a speed exceeding 30 Knots.
- (9)** Operations Documents will be accessible to the PIC at all times and must be accessible during UAS operations and made available to the Administrator on request.
- (10)** PIC must inspect and ensure that UAS and ground control station is in airworthy condition prior to each operation; if determined un-airworthy, all operations will be suspended until such time as necessary maintenance has been performed and the UAS is determined to be in a safe condition for flight.
- (11)** An operational flight test is required after any maintenance or alterations that may affect UAS operation or flight.
- (12)** UAS maintenance must follow Manufactures aircraft/component, maintenance, overhaul, and replacement, inspection, and life limit requirements.
- (13)** The operator must carry out its maintenance, inspections, and record keeping requirements, in accordance with the operating documents. Maintenance and inspection, and alterations must be noted in the aircraft records, including total flight hours, description of work performed, and the signature of the authorized person returning the UAS to service.
- (14)** UAS must comply with all Manufacturers' Safety Bulletins.
- (15)** An authorized person must make an entry in the aircraft record of the corrective action taken against discrepancies discovered between inspections.
- (16)** UAS must be operated by a PIC possessing at least a Private Pilot Certificate, with most appropriate Class and Category and at least a current Third Class Medical.
- (17)** PIC must meet the flight review requirements of 14 CFR 61.56 in an aircraft in which the PIC is rated.
- (18)** Prior to operations for which exemption is requested the PIC must have accumulated and logged , in a manner consistent with 14 CFR 61.51(b), a minimum of 25 hours of total time as a UAS rotorcraft pilot including at least 10 hours of UAS multi-rotor.
- (19)** Prior to operations PIC must have accumulated and logged a minimum of 5 hours as a UAS pilot in make and model listed in exemption. PIC must log at a minimum 3 takeoffs and landings in the preceding 90 days to meet currency requirements.
- (20)** PIC is required to operate the UAS in accordance with 14 CFR 91.119.
- (21)** No Private Pilot may operate UAS within 5 nautical miles of an airport reference point as denoted on a current FAA chart.
- (22)** Operations with 5 NM of an airport must be conducted by a PIC who holds at least a Commercial Pilot Certificate Rotorcraft and a current Second Class Medical.
- (23)** No operations are allowed in the surface areas of Class B, C, and D airspace.
- (24)** No operations are allowed if the return home function and/or autopilot are, or are suspected to be malfunctioning.
- (25)** UAS shall not be operated from a moving platform of any type.
- (26)** No operations shall be conducted without an appropriate Certificate of Authority issued by the Administrator.
- (27)** A Visual Observer shall be utilized at all times when operating the UAS.
- (28)** Should the PIC or Visual Observer detect that a manned aircraft is being operated in close proximity to the operations area, the UAS shall give right of way to the manned aircraft, and the PIC shall cease operations and land until such time as the manned aircraft has cleared the area.
- (29)** The UAS will not be operated any closer than 500 feet to any structure without the express permission of the structure owner.

## **D. UAS Airworthiness**

**(1)** The PIC shall ensure that the UAS is in an airworthy condition before each flight. Airworthiness shall be determined by a preflight inspection in accordance with DJI operating documents and any and all applicable Federal Aviation Regulations, and any additional requirements as defined by the Administrator. PIC shall document each preflight inspection by date, Aircraft total Flight time to date, any discrepancies noted, and signature and certificate number. Any discrepancy noted shall be addressed before UAS operation.

## **E. UAS Maintenance and Records**

**(1).** The operator shall maintain aircraft maintenance logbooks. Each UAS shall have its own and separate maintenance log book. DJI documents, handbooks, user manuals, supplements, Safety Bulletins, etc., shall be the only approved documents for performing repairs, maintenance, inspections, overhauls, or replacement of life limited components. A record of each preflight inspection will additionally be recorded in these logbooks. The preflight inspection must be conducted by the PIC for that operation. Preflight signoff shall include at least the following information: date of operation, Aircraft Total time, aircraft serial or operating number, PIC signature and certificate number.

**Example:** Preflight inspection completed, No defects noted. 1-1-15, ACFTT 50.1 hours, UAS number 1, Scott Dunn ATP 3150000.

**(2).** Any required maintenance, inspection, alteration or repair must be completed by an approved person. At the completion of this work the approved person must make an entry in the aircraft log book that at least includes: Date, Aircraft serial or operating number, brief description of the discrepancy, inspection, alteration or repair, the reference material used as guidance for the repair, statement approving the aircraft for return to service, and signature of person who completed the work.

**Example:** 1-1-15 UAS 1, ACFTT 50.1 hours, replaced number 3 rotor with new rotor, IAW DJI Phantom 2 Vision + User Manual. Flight or ops check completed. Aircraft is approved for return to service. Scott Dunn

**(3).** Maintenance records shall be kept with the UAS at all times and shall be made available to any authorized agency or the Administrator upon request.

## **F. Pilot in Command Requirements**

- (1).** The Pilot in Command shall hold at least a Private Pilot Certificate and a current Third Class Medical whenever conducting operations. Operator prefers that the Certificate be in the most appropriate Class and Category to the UAS being operated. In this case a Rotorcraft rating.
- (2).** The Pilot in Command shall have at least 25 hours of rotorcraft UAV flight time before performing any operation for which exemption is requested.
- (3).** The Pilot in Command shall have at least 5 hours in make and model before performing any operation for which exemption has been requested.
- (4).** The Pilot in Command shall perform a pre-flight inspection before each flight is conducted.
- (5).** The Pilot in Command shall observe all Federal Aviation Regulations at all times with the exceptions of the exemptions requested by the operator. In those cases the Pilot in Command shall adhere to company operating standards or Federal Aviation Administration Limitations placed upon exemptions, whichever is more stringent.
- (6).** The Pilot in Command must hold a Commercial Pilot Certificate with Rotorcraft Class and Category and a current Second Class Medical to operate within 5 NM of an airport.
- (7).** The Pilot in Command will not operate the UAS without a Visual Observer present.
- (8).** The Pilot in Command must have 3 takeoff and landings within the preceding 90 days.
- (9).** The Pilot in Command must maintain a record of flight information to establish currency and that he or she meets the requirements of this section.

## **G. Visual Observers: Responsibilities and Requirements**

- (1). A Visual Observer shall be used during any and all operations of the UAS System.
- (2). The Visual Observer shall maintain communication with the PIC at all times during UAS operation.
- (3). The Visual Observer shall maintain Visual Contact with the UAS at all times. In the event that Visual Contact is lost the VO will notify the PIC who will immediately cease operations and land the aircraft.
- (4). The Visual Observer shall also help the PIC maintain area of operations security and ensure that all nonessential persons remain clear of the area of operations. In the event of

a breach by unauthorized person(s) the VO shall notify the PIC and operations will cease immediately.

(5). The Visual Observer shall also assist the PIC in looking for manned aircraft traffic near the operations area. If manned aircraft traffic is observed near the operations area, the VO will notify the PIC who will immediately cease operations and land the UAS.

## **H. Reporting of Incidents and/or Accidents**

Any incident or accident, or flight operation that transgresses the lateral or vertical boundaries of the operational area as defined by the applicable COA will be reported within 24 hours to:

FAA UAS Integration Office (AFS-80)

Accidents: National Transportation Safety Board

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

## **3. Request for Relief from Airport Proximity Limitation**

The petitioner understands the FAA's concern for placing restrictions on the proximity a UAS can be operated in relation to an airport. However, the petitioner believes that certain relief can be granted in this matter based on the circumstances of the flight, altitude of the flight, and the area of the flight in relation to traffic patterns and protected instrument approach corridors. Also, the size and traffic of the airport certainly should be considered as a factor. The petitioner believes that pilot qualifications, ratings, and aeronautic experience; as well as communication with the airport,

any ATC controlling facility, and aircraft in the area would fully mitigate any dangers. The petitioner also believes that since many rural airports often host model and remote controlled aircraft clubs and events without affecting normal operations, that measures could be put in place to ensure the safety of operation and integration of UAS' in close proximity to certain airports. From a commercial standpoint a great deal of potential opportunity is lost when an area of close to 78.5 square miles is off limits. As UAS operations become more prominent consumers will demand these services closer to airport facilities. It would not be in the interest of aviation or the public in general, to restrict these consumers from products or services because of their proximity to an airport. This could cause a negative impact to both the consumer and the airport. The petitioner therefore proposes the following reasonable restrictions that would ensure that the majority of these consumers could be serviced and the safety of operation of manned aircraft could be assured.

As previously stated most operations in the Scope of this requested Exemption will be conducted at 100 to 150 feet AGL. Any manned aircraft operating in the vicinity of an airport should not be at these altitudes over persons or property unless they are in the process of a take-off or landing. Additionally they should be well aligned with either the approach or departure runway at these altitudes.

The petitioner therefore requests relief in part from the 5 NM limitation concerning proximity to an airport based on the following restrictions. Note: Class B, C, and D airports not included in this relief request. Airspace must be E or G for relief to be requested.

1. Altitude restriction of 150 feet AGL within 3 to 5 Nautical miles of an airport.
2. Altitude restriction of 100 feet AGL within 1 to 3 Nautical miles of an airport.
3. No flight on the extended centerlines or 5 degrees to either side of any active or used runway out to 2 Nautical miles from Airport reference point.
4. Notify airport of proposed time, distance and heading from airport of UAS operation.
5. Request issuance of NOTAM specifying UAS operations.
6. No flight within 1 NM of airport. This would mitigate the possibility of operating near the airport traffic patterns.
7. The PIC shall make "in the blind" broadcasts of UAS operations on the appropriate frequency stating. "Unmanned Aircraft Operations underway. Distance and bearing from airport and operating altitude".
8. The Pilot in Command of the UAS must be a Certificated Commercial Pilot with Class and Category Rating most appropriate to the UAS for which the Exemption is granted. In this case. Commercial Pilot Rotorcraft with a current Second Class Medical.
9. Anytime the PIC or Visual Observer has visual contact with a manned aircraft, or anytime an aircraft requests, operations will be immediately suspended and UAS will descend and land immediately.
10. Aircraft has onboard programmable altitude restriction capability to help mitigate the possibility of inadvertent altitude deviation. This function must be used during operations within 5 nautical miles of an airport.

11. The dorsal (top) area of the aircraft will be painted a bright safety orange to increase visibility of the aircraft from manned aircraft.

The petitioner believes that these restrictions and requirements safely mitigate the potential hazards associated with operations near small, low volume airports. In fact, the petitioner believes that this limitation would make this operation safer than many others that are conducted at these types of airports; to include: aerobatics training, parachute operations, and Amateur Radio Controlled Aircraft Clubs that are frequently located on these types of airports.

The altitude restrictions requested would eliminate the possibility of a collision with manned aircraft as there is no reasonable circumstance where a manned aircraft should be at or near these altitudes, unless being on short final for approach or on departure. In fact the petitioner believes that any manned aircraft operating at, or near these altitude restrictions, other than on short final for approach or on departure, would be operating in a careless and reckless manner.

Petitioner also believes that requiring that the PIC hold a Commercial Pilot Certificate of most appropriate Class and Category helps to ensure that the operator has the knowledge, aeronautical experience, radio communication skills, and ability to safely operate within close proximity to airports located in class E and G airspace.

Petitioner also believes that in the highly unlikely event of a collision between a UAS and a manned aircraft that the damage possibility, is no more than that of a small sized bird strike due to the extremely light weight and size of the UAS. However, the petitioner should like to reiterate that the restrictions requested in this relief would make such a collision improbable, if not nearly impossible.

## 4. The Unmanned Aircraft System UAS

The petitioner will operate **the DJI Phantom 2 Vision + UAS System**. This shall be the only system operated by the petitioner. The petitioner has attached the hyperlinks for the operating and user documents for the system as additional supplements for this petition. No modification to the factory system is to be utilized other than the dorsal surface area of the aircraft will be painted a bright safety orange to help manned aircraft see the unit while in flight. Please see attached supplemental documents.

[DJI Phantom 2 Vision Plus Quick Start Guide](#)

[DJI Phantom 2 Vision Plus User's Manual](#)

[DJI Phantom 2 Vision Plus Smart Flight Battery Safety Guidelines](#)

## **5. The Public Interest**

The request for this exemption is in the Public Interest as it is safe to assume that there are many consumer applications for the services that can be provided by UAS systems. It is clear that the Congress of the United States, the business sector, and the consumer want to integrate Unmanned Aircraft Systems into the National Airspace System and utilize their unique and cost effective capabilities. It is also in the Public Interest that many of the low level flight operations now conducted by manned aircraft could be accomplished with these light, fire resistant unmanned aircraft that can operate at a fraction of the cost to both the operator and consumer. These aircraft can be operated without risk of loss of life or limb, and without significant financial impact to the operator or any person or property on the ground in the event of the loss of an aircraft. Finally the petitioner believes that granting this exemption would help to further by Administrators process of integration of UAS systems and possibility help to create additional regulations and guidance to be used as these systems become more widely utilized.

## **Abbreviations**

**VLOS VISUAL LINE OF SIGHT**

**PIC PILOT IN COMMAND**

**VO VISUAL OBSERVER**

**UAS UNMANNED AIRCRAFT SYSTEM**

Please forward any questions or concerns to the address or email below.

Sincerely,

**Michael Scott Dunn, DBA, Aerial Imaging Systems**

523 Hickory Lane

Pendleton, SC 29670

apachepilot1958@aol.com