

Exemption No. 11138

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, DC 20591

In the matter of the petition of

DOUGLAS TRUDEAU, REALTOR®

for an exemption from Part 21; and
§§ 45.23(b); 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); and 91.417(a) & (b) of
Title 14, Code of Federal Regulations

Regulatory Docket No. FAA-2014-0481

GRANT OF EXEMPTION

By letter dated July 12, 2014, Mr. Douglas Trudeau, Realtor®, of Tierra Antigua Realty (Trudeau), 1650 E River Road, Suite 202, Tucson, AZ 85718 petitioned the Federal Aviation Administration (FAA) for an exemption from part 21, subpart H; and Sections 45.23(b), 61.113(a) and (b), 91.7(a), 91.9(b)(2), 91.103(b), 91.109, 91.119, 91.121, 91.151(a), 91.203(a) and (b), 91.405(a), 91.407(a)(1), 91.409(a)(2), and 91.417(a) and (b) of Title 14, Code of Federal Regulations (14 CFR). The proposed exemption would allow Trudeau to operate the PHANTOM 2 Vision+ quad-copter unmanned aircraft system (UAS) to conduct aerial videography and cinematography to enhance academic community awareness for those individuals and companies unfamiliar with the geographical layout of the metro Tucson area and augment real estate listing videos.

The petitioner requests relief from the following regulations:

Part 21 prescribes the procedural requirements for issuing and changing design approvals, productions approvals, airworthiness certificates, and airworthiness approvals.

AFS-14-373-E

Section 45.23(b) prescribes that 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.

Section 61.113(a) and (b) prescribes that—

(a) no person who holds a private pilot certificate may act as a pilot in command of an aircraft that is carrying passengers or property for compensation or hire; nor may that person, for compensation or hire, act as pilot in command of an aircraft.

(b) a private pilot may, for compensation or hire, act as pilot in command of an aircraft in connection with any business or employment if:

- (1) The flight is only incidental to that business or employment; and
- (2) The aircraft does not carry passengers or property for compensation or hire.

Section 91.7(a) prescribes that no person may operate a civil aircraft unless it is in an airworthy condition.

Section 91.7(b) prescribes that the pilot in command of a civil aircraft is responsible for determining whether that aircraft is in condition for safe flight and that the PIC shall discontinue the flight when unairworthy mechanical, electrical, or structural conditions occur.

Section 91.9(b)(2) prohibits operation of U.S.-registered civil aircraft 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.

Section 91.103(b) prescribes that a pilot shall for any flight, become familiar with runway lengths at airports of intended use, and takeoff and landing distance information.

Section 91.109(a) prescribes, in pertinent part, 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.

Section 91.119 prescribes that, 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.

Section 91.121 requires, in pertinent part, 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."

Section 91.151(a) prescribes that 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 [emphasis added].

Section 91.203(a) prohibits, in pertinent part, any person from operating a civil aircraft unless it has within it (1) an appropriate and current airworthiness certificate; and (2) an effective U.S. registration certificate issued to its owner or, for operation within the United States, the second copy of the Aircraft registration Application as provided for in § 47.31(c).

Section 91.203(b) prescribes, in pertinent part, that no person may operate a civil aircraft unless the airworthiness certificate 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.

Section 91.405(a) requires, in pertinent part, that an aircraft operator or owner shall have that aircraft inspected as prescribed in subpart E of the same part and shall, between required inspections, except as provided in paragraph (c) of the same section, have discrepancies repaired as prescribed in part 43 of the chapter.

Section 91.407(a)(1) prohibits, in pertinent part, any person from operating an aircraft that has undergone maintenance, preventive maintenance, rebuilding, or alteration unless it has been approved for return to service by a person authorized under § 43.7 of the same chapter.

Section 91.409(a)(2) prescribes, in pertinent part, that no person may operate an aircraft unless, within the preceding 12 calendar months, it has had an inspection for the issuance of an airworthiness certificate in accordance with part 21 of this chapter.

Section 91.417(a) and (b) prescribes, in pertinent part, that—

(a) Each registered owner or operator shall keep the following records for the periods specified in paragraph (b) of this section:

(1) Records of the maintenance, preventive maintenance, and alteration and records of the 100-hour, annual, progressive, and other required or approved inspections, as appropriate, for each aircraft (including the airframe) and each engine, propeller, rotor, and appliance of an aircraft. The records must include—

(i) A description (or reference to data acceptable to the Administrator) of the work performed; and

(ii) The date of completion of the work performed; and

(iii) The signature, and certificate number of the person approving the aircraft for return to service.

(2) Records containing the following information:

(i) The total time in service of the airframe, each engine, each propeller, and each rotor.

(ii) The current status of life-limited parts of each airframe, engine, propeller, rotor, and appliance.

(iii) The time since last overhaul of all items installed on the aircraft which are required to be overhauled on a specified time basis.

(iv) The current inspection status of the aircraft, including the time since the last inspection required by the inspection program under which the aircraft and its appliances are maintained.

(v) The current status of applicable airworthiness directives (AD) and safety directives including, for each, the method of compliance, the AD or safety directive number and revision date. If the AD or safety directive involves recurring action, the time and date when the next action is required.

(vi) Copies of the forms prescribed by § 43.9(d) of this chapter for each major alteration to the airframe and currently installed engines, rotors, propellers, and appliances.

(b) The owner or operator shall retain the following records for the periods prescribed:

(1) The records specified in paragraph (a)(1) of this section shall be retained until the work is repeated or superseded by other work or for 1 year after the work is performed.

(2) The records specified in paragraph (a)(2) of this section shall be retained and transferred with the aircraft at the time the aircraft is sold.

(3) A list of defects furnished to a registered owner or operator under § 43.11 of this chapter shall be retained until the defects are repaired and the aircraft is approved for return to service.

The petitioner supports his request with the following information:

The petitioner has provided the following information – contained in his petition and supporting documentation including: 1) Supplemental Response for Petition, 2) PHANTOM Flying Flow Chart V1.0 (Simplified Version), PHANTOM Quick Start Manual v1.7, PHANTOM Advanced Manual v.1.4, 3) PHANTOM 2 Vision+ User Manual 4) restricted areas map, 5) personal protocols and controls, and 6) Safety/Flight Manual (all hereinafter referred to as operating documents).

The FAA has organized the petitioner’s information into four sections: 1) the unmanned aircraft system (UAS), 2) the UAS Pilot In Command (PIC), 3) the UAS operating parameters and 4) Public Interest.

Unmanned Aircraft System

The petitioner states he plans to operate a UAS, the PHANTOM 2 Vision+, which is comprised of an unmanned aircraft (UA or PHANTOM) and a transportable ground station. The PHANTOM is referred to as a quad-copter with a maximum gross weight of about 3 pounds. It is equipped with four rotors that are driven by electric motors powered by batteries. The UA has a maximum airspeed of 30 knots. Petitioner plans to attach a small ultra-

lightweight GoPro 3+ camera to his UA and operate the UA over various areas near Tucson, Arizona to enhance academic community awareness and augment real estate listing videos. Petitioner makes the following representations of operational enhancements which he proposes to abide by to ensure this exemption will provide a level of safety at least equal to existing rules:

- He will only operate in reasonably safe environments that are strictly controlled, are away from power lines, elevated lights, airports and actively populated areas; and
- He will conduct extensive preflight inspections and protocols, during which safety carries primary importance.

The petitioner states that given the size, weight, speed, and limited operating area associated with the aircraft to be utilized by him, an exemption from 14 CFR part 21, Subpart H (Airworthiness Certificates) and § 91.203 (a) and (b) (Certifications required), subject to certain conditions and limitations, is warranted and meets the requirements for an equivalent level of safety under 14 CFR part 11 and Section 333 of P.L. 112-95 (Section 333).

Petitioner requests an exemption from § 45.23 *Marking of the aircraft* because his UA will not have a cabin, cockpit or pilot station on which to mark certain words or phrases. Further, he states that two-inch lettering is difficult to place on such a small aircraft with dimensions smaller than the minimal lettering requirement. Regardless of this, petitioner states that he will mark his UAS in the largest possible lettering by placing the word “Experimental” on its fuselage as required by § 45.29(f) so that he or anyone assisting him as a spotter will see the markings.

The petitioner states that an exemption from §§ 91.405(a), 91.407(a)(1), 91.409(a)(2) and 91.417(a) and (b) *Maintenance inspections* may be required and should be granted since they only apply to aircraft with an airworthiness certificate. However, the petitioner states as a safety precaution he will perform a preflight inspection of his UAS before each flight as outlined in his operating documents.

UAS Pilot in Command (PIC)

The petitioner asserts that under § 61.113 (a) and (b) private pilots are limited to non-commercial operations, however he can achieve an equivalent level of safety as achieved by current regulations because his UAS does not carry any pilots or passengers. Further, he states that, while helpful, a pilot license will not ensure remote control piloting skills. He further indicates that the risks of operating a UAS are far less than the risk levels inherent in the commercial activities outlined in 14 CFR part 61, et seq., thus he requests an exemption from § 61.113 *Private Pilot Privileges and Limitations: Pilot in command*.

Regarding UAS operational training, the petitioner states he has flown numerous practice flights in remote areas as a hobbyist simulating flights for future commercial use to gain familiarization with the characteristics of his UAS’ performance under different temperature

and weather conditions. He further states that he practices computerized simulated flights to maintain adequate skills and response reflex time.

In a supplemental request to the FAA, the petitioner requests consideration of a 120 day temporary airman certificate in accordance with § 63.13, to allow him time to obtain a private pilot certificate or to allow the FAA time to establish minimum UAS airman certification standards.

UAS Operating Parameters

The petitioner states that he will abide by the following additional operating conditions under this exemption:

- operate his UAS below 300 feet and within a radius distance of 1000 feet from the controller to both aid in direct line of sight visual observation;¹
- operate the UAS for 3-7 minutes per flight;
- land his UAS prior to the manufacturer's recommended minimum level of battery power;
- operate his UAS only within visual line of sight (VLOS);
- use the UAS' global positioning system (GPS) flight safety feature whereby it hovers and then slowly lands if communication with the remote control pilot is lost;
- conduct all operations under his own personal and flight safety protocols (including posting a warning sign reading: "Attention Aerial Photography in Progress – Remain Back 150 feet") contained in the operating documents and will actively analyze flight data and other sources of information to constantly update and enhance his safety protocols;
- contact respective airports if operations will be within 5 miles to advise them of his estimated flight time, flight duration, elevation of flight and other pertinent information;
- always obtain all necessary permissions prior to operation; and
- have procedures in place to abort flights in the event of safety breaches or potential danger.

Petitioner states that § 91.7(a) prohibits the operation of an aircraft without an airworthiness certificate. The petitioner asserts that since there is currently no certificate applicable to his operation, this regulation is inapplicable.

Petitioner states that § 91.9(b)(2) requires an aircraft flight manual in the aircraft, however since there are no pilots or passengers on board his aircraft and given its size, this regulation is inapplicable. He further indicates an equivalent level of safety will be achieved by maintaining a safety/flight manual with the UAS ground station.

¹ As specified in Douglas Trudeau Supplementary Information No. 2

Although petitioner requests an exemption from § 91.103(b) *Preflight action*, he provides no information supporting his request.

Similarly, the petitioner requests an exemption from § 91.109 *Flight instruction; simulated instrument flight and certain flight test*, and provides no information indicating how safety will be maintained if an exemption to this section is granted.

Petitioner states that § 91.119 prescribes safe altitudes for the operation of civil aircraft, but that it allows helicopters to be operated at lower altitudes in certain conditions. Petitioner states he will not operate his UAS above the altitude of 300 feet above ground level (AGL) and will also only operate in safe areas away from the public and traffic, thus “providing a level of safety at least equivalent to or below those in relation to minimum safe altitudes.” The petitioner asserts that given the size, weight, maneuverability, and speed of his UAS, an equivalent or higher level of safety will be achieved.

Petitioner indicates that § 91.121 *Altimeter settings* is inapplicable since he UAS utilizes electronic GPS with a barometric sensor.

While petitioner requests an exemption from § 91.151(a) *Fuel requirements for flight in VFR conditions*, he provides no information supporting his request for this exemption.

Public Interest

The petitioner states that aerial videography for geographical awareness and for real estate marketing has been around for a long time through manned fixed wing aircraft and helicopters, but for small business owners, its expense has been cost-prohibitive. Granting this exemption to the petitioner would allow him to provide this service at a much lower cost. Further, the petitioner indicates his small UAS will pose no threat to the public given its small size and lack of combustible fuel when compared to larger manned aircraft. The petitioner also states that the operation of his UAS will minimize ecological damage and promote economic growth by providing information to companies looking to relocate or build in the Tucson metro area.

Discussion of Public Comments:

A summary of the petition was published in the Federal Register on August 8, 2014 (79 FR 46500). The petition received five comments. During the comment period, the petitioner submitted supplemental information in response to several of the comments.

Of the five comments received, including four from trade organizations and one submitted by an individual, three raised concerns with the petition and one was specifically opposed. The other two supported the petition. Three trade organizations submitted letters expressing various concerns with the petition for exemption, including the Air Line Pilots Association

International (ALPA), the National Agricultural Aviation Association (NAAA), and the United States Hang Gliding & Paragliding Association (USHPA).

ALPA expressed concern regarding certain conditions outlined in Trudeau's petition. ALPA noted that the proposed operations will be for "compensation or hire," and believes the UAS pilot must hold at least a current FAA Commercial Pilot Certificate with an appropriate category and class rating for the type of aircraft being flown and a current second-class airman medical certificate. ALPA also noted that this is the requirement for compensation or hire operations in the National Airspace System (NAS) today. NAAA and USHPA raised similar concerns on pilot qualification. NAAA and USHPA asserted that the operator should hold a pilot certificate and be thoroughly familiar with the limitations of manned aircraft flight. NAAA further stated that requirements for UAS pilot licensing should be developed along with other rigorous rules and qualifications to ensure safe integration of the unmanned aircraft into the NAS. The Small UAV Coalition (Coalition) disagreed with ALPA, NAAA and USHPA, asserting that a pilot certification should not be required for small unmanned operations such as the petitioner's.

The FAA has carefully reviewed the concerns expressed in these comments and the discussion regarding knowledge, training, and medical certification required by holders of both private and commercial pilot certificates. Additional details are available in the ensuing analysis of this issue with regard to 14 CFR part 61.

ALPA stated that the petitioner asserts that although he plans to fly below 300 feet above the surface and will generally not operate near populated areas, he also states he plans to survey real estate development which ALPA believes are by definition populated areas. ALPA also stated that the petitioner's area of operations as outlined in his exhibits show he would be within the airport traffic area of both Tucson International Airport and Davis-Monthan AFB. ALPA also raised concerns about whether the petitioner's UAS' barometric sensor will enable him to accurately address his altitude restrictions. ALPA also asserted that processes or mitigations, such as redundant control capability, fail-safe systems, and backups, and specific, validated procedures for system and equipment failures, must be in place to ensure the aircraft and its control system(s) operate to the same level of safety as other aircraft operated commercially in the NAS. NAAA stated commercial UAS should have to receive airworthiness certification by the FAA to ensure they can safely operate in the NAS without posing a hazard to persons or property.

ALPA commented that command and control (C2) link failures are one of the most common failures on a UAS, and that lost link mitigations should require safe modes to prevent UA fly-away or other scenarios. If lost-link occurs, mitigations like auto-hover, auto-land, return-to-home and geo-fencing boundary protection must be incorporated into the navigation and control systems for the UAS to safely land or re-establish C2.

The FAA agrees and carefully examined the proposed operation to ensure that the vehicle design and the petitioner's supporting documentation addressed potential hazards related to C2 failure. The FAA finds that the UAS to be operated by Trudeau has sufficient design features to address these hazards. Further detail is contained in the analysis of the UAS below.

Regarding use of the NAS, ALPA noted there must be means to ensure the UA remains within the defined airspace and to ensure the hazard of other aircraft intruding on the operation is mitigated. ALPA stated given the absence of an onboard pilot, the means to meet the requirements to "see and avoid" must be specified. ALPA also expressed concern, stating that "because the waiver request is not for a specific operation but rather for all operations of the same general type, the FAA's oversight task is considerably increased." Per the conditions and limitations below, the FAA has prescribed operator, pilot and notification requirements to ensure that appropriate oversight can occur.

The FAA agrees and has required specific conditions and limitations outlined below related to the use of a visual observer, that the pilot be a current FAA certificated private pilot and that a notice-to-airmen (NOTAM) be issued prior to operations.

NAAA stated that it represents the interests of small business owners and pilots licensed as commercial applicators and ensuring safe low-level airspace includes minimizing obstructions which are difficult to be seen and identified by the pilots. NAAA members operate in low-level airspace, and clear low-level airspace is vital to the safety of these operators. NAAA stated that seeing and avoiding other aircraft and hazardous obstructions is the backbone for agricultural safety, and agricultural pilots depend on pilots of other aircraft to perform their see and avoid functions needed to prevent collisions. NAAA believes that UA operations at low altitudes will increase the potential of collision hazards with agricultural aircraft. NAAA requested that operators of UAS develop ways of making the presence of UAS known to VFR air traffic if they are to be integrated into the NAS and, for areas with less UAS activity, recommended a procedure for issuing NOTAMs when they are present.

The FAA agrees and has incorporated this into the conditions and limitations of this exemption. NAAA's notification concerns are also addressed by the conditions and limitations that will require an Air Traffic Organization issued Certificate of Waiver or Authorization (COA) to address airspace requirements and notification. Further detail is contained in the analysis of the UAS operating parameters below.

NAAA proposed UAS comply with 13 measures similar to those presented by the North Dakota Agricultural Aviation Association to the North Dakota Department of Commerce, the organization awarded the North Dakota UAS test site.

The FAA believes the limitations under which the petitioner will operate (i.e. VLOS and at or below 300 feet AGL) and the UAS emergency procedures as outlined in the petitioner's supplemental documentation are sufficient mitigations to this risk so that the operations will

not adversely affect safety. Further, the FAA addressed additional concerns raised by NAAA by adding operating conditions and limitations regarding operations in the proximity of airports, stand-off distance from clouds, altitude restrictions, and operating distance from non-participating persons. Further detail is contained in the analysis of the UAS operating parameters below.

The USHPA also raised concerns about the identification marking regulations as well as the petitioner's need to coordinate his operations with airports and comply with local and state notification regulations associated with his type of activity.

Commenter James Lee wrote in support of Trudeau's petition, so long as he does not fly higher than 200 feet within a quarter mile from an airport or any flight path or flight operation and never flies above 400 feet AGL.

The FAA considered USHPA's and Mr. Lee's concerns and included conditions and limitations to address these issues as outlined below.

Lastly, the Small UAV Coalition submitted extensive comments supporting the petition. These included suggestions that the FAA: apply regulations differently to small UAVs versus those in the air transport category, not require all seven factors outlined in Section 333 as a prerequisite for every exemption (i.e. beyond visual line of sight (VLOS); weight; size, altitude, airspace, geographic area, and proposed technology), and consider Trudeau's safety protocols including his posting of signs warning of flights as sufficient to enable operations in populated areas. Regarding use in the NAS, the Small UAV Coalition stated, in part, that the FAA's safety evaluation of UAV operations should not hinge on the type of operation (i.e. public, commercial, recreational or philanthropic) rather operational risks and steps that can be taken to eliminate or reduce such risks. The Small UAV Coalition also commended the petitioner for developing a "Personal Protocols and Controls" document that details how he will contact any airport within a 5 mile radius in advance of his proposed UAV operation.

The FAA's analysis is as follows:

Unmanned aircraft system (UAS)

The petitioner requested relief from 14 CFR part 21, *Certification procedures for products and parts*. In accordance with the statutory criteria provided in Section 333 of P.L. 112-95 in reference to 49 USC § 44704, and in consideration of the size, weight, speed, and limited operating area associated with the aircraft and its operation, the Secretary of Transportation has determined that this aircraft meets the conditions of Section 333. Therefore, the FAA finds that the requested relief from 14 CFR part 21, and any associated noise certification and testing requirements of part 36, is not necessary.

Manned aircraft conducting aerial filming and photography can weigh 5,000 lbs. or more, are operated by an onboard pilot and may carry other onboard crewmembers, as well as 100

gallons or more of fuel. The petitioner's UA weighs less than 3 lbs. The pilot and crew will be remotely located from the aircraft. The limited weight reduces the potential for harm to persons or damage to property in the event of an incident or accident. The risk to an onboard pilot and crew during an incident or accident is eliminated with the use of a UAS for the proposed operation.

Manned aircraft are at risk of fuel spillage and fire in the event of an incident or accident. The Phantom 2 Vision+ carries no fuel, and therefore the risk of fire following an incident or accident due to fuel spillage is eliminated.

This exemption does not require an electronic means to monitor and communicate with other aircraft, such as transponders or sense and avoid technology. Rather the FAA is mitigating the risk of these operations by placing limits on altitude, requiring stand-off distance from clouds, permitting daytime operations only, and requiring that the UA be operated within VLOS and yield right of way to all manned operations. Additionally, the exemption provides that the operator will request a notice to airmen (NOTAM) prior to operations to alert other users of the NAS. These mitigations address concerns raised by NAAA and ALPA regarding awareness of UAS operations occurring in the airspace

The petitioner's UAS has the capability to operate safely after experiencing certain in-flight contingencies or failures and uses an auto-pilot system to maintain UAS stability and control. The UAS is also able to respond to a loss of GPS or a lost-link event with pre-coordinated automated flight maneuvers. These safety features provide an equivalent level of safety compared to a manned aircraft holding a restricted airworthiness certificate performing a similar operation and address concerns raised by ALPA and NAAA.

Regarding the petitioner's requested relief from 14 CFR 45.23(b), *Display of marks*, the petitioner requests this relief under the assumption that marking with the word "experimental" will be required as a condition of a grant of exemption. However, this marking is reserved for aircraft that are issued experimental certificates under 14 CFR 21.191. The petitioner's UAS will not be certificated under § 21.191, and therefore the "experimental" marking is not required. Since the petitioner's UAS will not be certificated under § 21.191, a grant of exemption for § 45.23(b) is not necessary.

Regarding the petitioner's requested relief from 14 CFR 91.405(a), *Maintenance required*, 91.407(a)(1), *Operation after maintenance, preventive maintenance, rebuilding, or alteration*, 91.409(a)(2), *Inspections*, and 91.417(a) and (b), *Maintenance records*, the FAA has determined that relief from § 91.409(a)(1) is also necessary because it is an alternate inspection requirement of § 91.409(a)(2). The petitioner proposes to inspect and ensure that the UAS is in a condition for safe flight.

Therefore, the FAA finds that adherence to the petitioner's operating documents and the conditions and limitations below, describing the requirements for maintenance, inspection,

and recordkeeping, are sufficient to ensure that safety is not adversely affected. Accordingly, the FAA finds that exemption from 14 CFR 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b) is warranted.

Pilot In Command (PIC) of the UAS

Regarding the petitioner's requested relief from 14 CFR 61.113(a) and (b), *Private pilot privileges and limitations*, the petitioner requested regulatory relief to operate his UAS without an FAA-certificated pilot. In support of his request, the petitioner states that "while helpful, a pilot license will not ensure remote control piloting skills." However, the FAA does not possess the authority to exempt the petitioner from the statutory requirement to hold an airman certificate, as prescribed in 49 USC § 44711.² Although Section 333 provides limited statutory flexibility relative to 49 USC § 44704 for the purposes of airworthiness certification, it does not provide similar flexibility relative to other sections of Title 49.

Unlike operations pursuant to public COAs, the FAA is also requiring a pilot certificate for UAS operations for two reasons, the first of which is to satisfy the statutory requirements as stated above. The second is because pilots holding an FAA issued private or commercial pilot certificate are subject to the security screening by the Department of Homeland Security that certificated airmen undergo. As previously determined by the Secretary of Transportation, the requirement to have an airman certificate ameliorates security concerns over civil UAS operations conducted in accordance with Section 333.

Given these grounds, the FAA must determine the appropriate level of pilot certification for the petitioner's proposed operation.

Under current regulations, civil operations for compensation or hire require a PIC holding a commercial pilot certificate per 14 CFR part 61. Based on the private pilot limitations in accordance with pertinent parts of 14 CFR 61.113(a) and (b), a pilot holding a private pilot certificate cannot act as a PIC of an aircraft for compensation or hire unless the flight is only incidental to a business or employment. However, in Grant of Exemption No. 11062 to *Astraeus Aerial (Astraeus)*, the FAA determined that a PIC with a private pilot certificate operating the *Astraeus UAS* would not adversely affect operations in the NAS or present a hazard to persons or property on the ground.

As discussed above, the petition received three comments registering concern about pilot certification. ALPA stated its opposition to the proposed operation by a non-certificated pilot without a required medical certificate. ALPA believes that the operation should be conducted by a PIC holding a current FAA commercial pilot certificate with an appropriate category and

² 49 USC § 44711 prohibits a person from serving "in any capacity as an airman with respect to a civil aircraft, aircraft engine, propeller, or appliance used, or intended for use, in air commerce...without an airman certificate authorizing the airman to serve in the capacity for which the certificate was issued".

class rating for the type of aircraft being flown and a current second-class airman medical certificate. NAAA stated that the UAS pilot should be a commercial pilot or have similar training and can demonstrate knowledge of aviation safety and communication procedures. USHPA stated that since the petitioner has not indicated any restriction to location of his operations, nor his knowledge of airspace rules, and because his operations would constitute commercial operations, he should be required to meet that level of certification.

The FAA has analyzed the petitioner's proposed operation, considered the comments above, and determined it does not differ significantly from the situation described in Grant of Exemption No. 11062 (Astraeus). The petitioner plans to operate in the NAS over private property while also limiting access to the property at times he is operating the UA. Given: 1) the similar nature of the petitioner's proposed operating environment to that of Astraeus, 2) the parallel nature of private pilot aeronautical knowledge requirements to those of commercial requirements [ref: Exemption No. 11062], and 3) the airmanship skills necessary to operate the UAS, the FAA finds that the additional manned airmanship experience of a commercially certificated pilot would not correlate to the airmanship skills necessary for the petitioner's proposed operations. Therefore, the FAA finds that a PIC holding a private pilot certificate and a third-class airman medical certificate is appropriate for the proposed operations.

With regard to the airmanship skills necessary to operate the UAS, the petitioner has provided no training program, minimum flight time hours, or test standards to demonstrate his capability to meet some of the conditions and limitations below including avoiding hazards, reacting to emergencies, or maintaining specific distances from persons or property. The petitioner indicates he avoids risks that may cause a crash and that he has flown numerous practice flights in remote areas as a hobbyist simulating flights for future commercial use to gain familiarization with the characteristics and performance of this UAS under different temperature and wind conditions. He also mentions his computerized simulated flights to maintain adequate skills and response reflex time.

Since the petitioner provides no information regarding a training program, minimum flight time hours, or test standards to demonstrate his capability to operate safely, and in response to concerns raised by ALPA, NAAA, and USHPA, the FAA reviewed the minimum requirements for providing a waiver to manned operations under 14 CFR 91.119. While this process applies to an operator seeking a waiver rather than an exemption, the exemption process is similar. Manned operations that require relief from 14 CFR 91.119 in the form of a waiver have established minimum requirements for pilot personnel (PIC).³

³ FAA Order 8900.1, Volume 3, Chapter 7, Section 1 *Issue a Certificate of Waiver or Authorization: § 91.119(b) and/or (c) (Minimum Safe Altitudes)* and FAA Order 8900.1, Volume 3, Chapter 8, Section 1, *Issue a Certificate of Waiver for Motion Picture and Television Filming*.

- 1) at least 500 hours logged as the PIC and at least 20 hours logged as the PIC in the aircraft type;
- 2) a minimum of 25 hours (or 100 hours in the case of motion picture operations) in the same category and class of aircraft to be used; and
- 3) a minimum of 5 hours in the make and model aircraft to be used under the waiver.

However, given the relative size, weight, speed and operating parameters of the proposed UAS operations and its accompanying reduction in risk to persons and property when compared to manned operations, these minimum requirements should be reduced, but not eliminated. UAS operators still need to establish airmanship skills in order to meet the conditions and limitations listed below such as the ability to maneuver near but maintain specific distances from persons and property, respond to unexpected emergencies, or avoid objects as well as the ability to avoid potential conflicts with manned aircraft. In consideration of the above, the FAA must determine the appropriate level of pilot flight hours necessary to qualify the PIC for the petitioner's proposed operations. The FAA has considered minimum skills and associated flight-hours necessary to practice and build proficiency in these skills. The petitioner is responsible for assessing its operations and identifying any additional skills required to operate safely under normal and abnormal conditions. Normal condition skills may include the ability to maintain altitude, maintain VLOS, and navigational skills. Abnormal condition skills may include the ability to avoid obstacles, avoid air traffic, and respond to loss of link.

In making its determination the FAA considered the requirements proposed by Astraeus in Exemption No. 11062. The FAA notes that the petitioner's proposed operation is similar to that authorized in Exemption No. 11062 because both include operations closer than 500 feet from persons, vessels, vehicles, and structures. In Exemption No. 11062, the FAA required that prior to conducting operations for the purpose of motion picture filming (or similar operations), the PIC must have accumulated and logged, in a manner consistent with 14 CFR 61.51(b), 25 hours of total time as a UAS rotorcraft pilot including at least 10 hours logged as a UAS pilot with a multi-rotor UAS. Prior to operations under Exemption No. 11062, the PIC must also have accumulated and logged a minimum of 5 hours as a UAS pilot operating the same make and model of UAS to be used for operations under the exemption. For clarification, the FAA considers these minimum hour requirements to be inclusive rather than additive; i.e. 5 hours make and model time may be included in the 10 hours of multi-rotor time and the 10 hours may be included in the total 25 hours of UAS rotorcraft time. In addition to the hour requirements, the PIC must accomplish 3 take-offs and landings in the preceding 90 days (for currency purposes). The FAA finds that at a minimum, the flight-hour requirements in Exemption No. 11062 are appropriate to practice and build proficiency in the skills necessary to safely conduct the petitioner's proposed operations. The FAA also finds that prior documented flight experience that was obtained in compliance with applicable regulations would satisfy this requirement. Training, proficiency, and experience-building flights can also be conducted under the grant of exemption to accomplish the required flight

time. During training, proficiency, and experience-building flights the PIC is required to operate the UA with appropriate distances in accordance with 14 CFR 91.119.

The flight-hours above are considered appropriate given the circumstances of the proposed operation and the description provided by the petitioner of the preparations he has undertaken to conduct the UAS operation safely. The petitioner may determine through its safety assessment that additional hours are necessary to address all potential flight hazards and requisite airmanship skills. Consequently, the FAA has included in the conditions and limitations below that the petitioner may not permit any PIC to operate unless that PIC is able to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption, including evasive and emergency maneuvers and maintaining appropriate distances from persons, vessels, vehicles and structures.

In conclusion, the FAA finds that prior to operations the PIC must, at a minimum, hold a private pilot certificate, a third-class airman medical certificate, and completed the minimum flight hour and currency requirements as stated in the conditions and limitations below. Thus, the FAA finds relief from 14 CFR 61.113(a) and (b) is warranted.

In a supplemental request to the FAA, the petitioner requests consideration of a 120 day temporary airman certificate in accordance with 14 CFR 63.13, to allow him time to obtain a private pilot certificate. The requested relief is not applicable to pilot certificates because, 14 CFR 63.1, *Applicability*, states this part prescribes the requirements for issuing flight engineer and flight navigator certificates and the general operating rules for holders of those certificates, only. Thus, 14 CFR 63.13 does not provide a basis from which to issue a temporary pilot certificate as requested by the petitioner and the requested relief is denied.

The petitioner has also indicated he will supplement his proposed operation(s) with a spotter, hereafter referred to as a visual observer (VO). The conditions and limitations below stipulate that the PIC must ensure that the VO can perform the functions prescribed in the operating documents. Additionally, as discussed in Exemption No. 11109 to Clayco, Inc., there are no regulatory requirements for visual observer medical certificates. Although a medical certificate is not required for a VO, the UA must never be operated beyond the actual visual capabilities of the VO, and the VO and PIC must have the ability to maintain visual line of sight (VLOS) with the UA at all times. It is the responsibility of the PIC to be aware of the VO's visual limitations and limit operations of the UA to distances within the visual capabilities of both the PIC and VO. Moreover, the VO will not be operating the aircraft. Therefore, as in Grant of Exemption No. 11062 to Astraeus, the FAA does not consider a medical certificate necessary for the VO.

Operating parameters of the UAS

Regarding the petitioner's requested relief from 14 CFR 91.7(a) *Civil aircraft airworthiness*, petitioner's request is based on his belief that since no FAA regulatory standard exists for

determining airworthiness of the UAS, the regulation is inapplicable. While the petitioner's UAS will not require an airworthiness certificate in accordance with 14 CFR part 21, Subpart H, the FAA considers the petitioner's compliance with his operating documents to be sufficient means for determining an airworthy condition. Therefore, relief from § 91.7(a) is granted. The petitioner is still required to ensure that his aircraft is in an airworthy condition – based on compliance with the operating documents prior to every flight, and as stated in the conditions and limitations below.

Additionally, in accordance with 14 CFR 91.7(b), the PIC of the UAS is responsible for determining whether the aircraft is in a condition for safe flight. The FAA finds that the PIC can comply with this requirement, therefore relief from § 91.7(b) is not necessary.

Regarding the petitioner's requested relief from 14 CFR 91.9 *Civil aircraft flight manual, marking, and placard requirements* and 14 CFR 91.203(a) and (b) *Civil aircraft: Certifications required*, the FAA has previously determined that relief from these sections is not necessary. Relevant materials may be kept in a location accessible to the PIC in compliance with the regulations.

Regarding the petitioner's requested relief from 14 CFR 91.103, *Preflight Action*, the petitioner requires each PIC to take certain actions before flight to ensure the safety of the flight. The exemption is needed because the pilot will take separate preflight actions as referenced in the operating documents. Although there will be no approved Airplane or Rotorcraft Flight Manual available, the FAA believes that the petitioner can comply with the other applicable requirements in 14 CFR 91.103(b)(2). The procedures outlined in the operating documents address the FAA's concerns regarding compliance with § 91.103(b). The PIC will take all actions including reviewing weather, flight battery requirements, landings, and takeoff distances and aircraft performance data before initiation of flight. The FAA has imposed stricter requirements with regard to visibility and distance from clouds; this is to both keep the UA from departing the VLOS and to preclude the UA from operating in the NAS. The FAA also notes the risks associated with sun glare; the FAA believes that the PIC's and VO's ability to still see other air traffic, combined with the PIC's ability to initiate a return-to-home sequence, are sufficient mitigations in this respect. The PIC will also account for all relevant site-specific conditions in his or her preflight procedures. Therefore, the FAA finds that exemption from 14 CFR 91.103 is not necessary.

Regarding the petitioner's requested relief from 14 CFR 91.109(a), *Flight instruction; Simulated instrument flight and certain flight tests*, the petitioner did not describe training scenarios in which a dual set of controls would be utilized or required, i.e. dual flight instruction, provided by a flight instructor or other company-designated individual, that would require that individual to have fully functioning dual controls. Rather, the petitioner refers to his "numerous practice flights in remote areas as a hobbyist." But, as outlined above, the FAA is requiring that the petitioner's PIC possess at least a private pilot's certificate. Also, the currency requirements expressed in the conditions and limitations below will help ensure

that a PIC training on the UAS has the authority to operate the UAS during training flights as PIC in accordance with § 61.31(l). The FAA will impose a limitation that those training operations are only conducted during dedicated training sessions. As such, the FAA finds that the petitioner can conduct his operations without the requested relief from § 91.109.

The petitioner's requested relief from 14 CFR 91.119, *Minimum safe altitudes*, relief from § 91.119(a), which requires operating at an altitude that allows a safe emergency landing if a power unit fails, is not granted. The FAA expects the petitioner to be able to perform an emergency landing without undue hazard to persons or property on the surface if a power unit fails. Relief from § 91.119(b), operation over congested areas, is not granted, because, as discussed below, operations over congested areas will not be permitted under this exemption.

Relief from § 91.119(c) is necessary because the aircraft will be operated at altitudes below 300 feet AGL. Section 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 states that he will operate pursuant to the following, self-imposed restrictions related to § 91.119:

- operate in reasonably safe environment that are strictly controlled, are away from power lines, elevated lights, airports and actively populated areas away from public and traffic;
- conduct all operations under his own personal safety protocols (including posting a warning sign reading: "Attention Aerial Photography in Progress – Remain Back 150 Feet") contained in the operating documents and will actively analyze flight data and other sources of information to constantly update and enhance his safety protocols;
- contact respective airports if operations will be within 5 miles to advise them of his estimated flight time, flight duration, elevation of flight and other pertinent information; and
- always obtain all necessary permissions prior to operation.

The petitioner proposes to avoid "actively populated areas" but does not explain how these areas are determined. As in Exemption No. 11110 (Trimble Navigation, Ltd.), the FAA notes that avoidance of areas which are depicted in "yellow" on VFR charts is a practicable step in assuring that operations are not conducted over congested or densely populated areas. However, using these "yellow" areas solely to make this determination is not sufficient. Pilots may obtain information regarding congested areas from the local Flight Standards District Office (FSDO). Therefore, operations over congested or densely populated areas are prohibited as stated in the conditions and limitations below.

The petitioner did not describe stand-off distances from persons, vessels, vehicles and structures. Section 91.119(c) requires that aircraft operate no closer than 500 feet to these persons or objects. As discussed in Exemption No. 11109 (Clayco, Inc.), operations conducted closer than 500 feet to the ground may require that the UA be operated closer than

500 feet to essential persons, or objects that would not be possible without additional relief. Therefore, the FAA is requiring that prior to conducting UAS operations, all persons not essential to flight operations (nonparticipating persons) must remain at appropriate distances. In open areas, this requires the UA to remain 500 feet from all persons other than essential flight personnel (i.e. PIC, VO, operator trainees or essential persons). The FAA has also considered the UA's maximum gross weight of approximately 3 pounds. If barriers or structures are present that can sufficiently protect nonparticipating persons from the UA or debris in the event of an accident, then the UA may operate closer than 500 feet to persons afforded such protection. The operator must also ensure that nonparticipating persons remain under such protection. If a situation arises where nonparticipating persons leave such protection and are within 500 feet of the UA, flight operations must cease immediately. When considering how to immediately cease operations, the primary concern is the safety of those nonparticipating persons. In addition, the FAA finds that operations may be conducted closer than 500 feet to vessels, vehicles and structures when the owner/controller of any such vessels, vehicles or structures grants permission for the operation and the PIC makes a safety assessment of the risk of operating closer to those objects and determines that it does not present an undue hazard.

Thus, the FAA finds that relief from § 91.119(c) is warranted provided adherence to the procedures in the operating documents and the FAA's additional conditions and limitations outlined below. Relief from § 91.119(a) is unwarranted as the FAA expects the petitioner to be able to perform an emergency landing without undue hazard to persons or property on the surface. Relief from §§ 91.119(b) is not granted and 91.119(d) is not applicable.

Regarding the petitioner's requested relief from 14 CFR 91.121 *Altimeter Settings*, the petitioner has a barometric altimeter and GPS derived altitude capabilities. However, as stated in the conditions and limitations below, the FAA requires any altitude reported to ATC to be in feet AGL. The petitioner may choose to set the altimeter to zero feet AGL rather than local barometric pressure or field altitude before flight. Considering the limited altitude of the proposed operations, relief from 14 CFR 91.121 is granted to the extent necessary to comply with the applicable conditions and limitations stated below.

Regarding the petitioner's requested relief from § 91.151 (a) *Fuel requirements for flight in VFR conditions*, prior relief has been granted for manned aircraft to operate at less than prescribed minimums, including Exemption Nos. 2689, 5745, and 10650. In addition, similar UAS-specific relief has been granted in Exemption Nos. 8811, 10808, and 10673 for daytime, VFR conditions. The petitioner's only reference to this section is his commitment to land the UAS prior to the manufacturer's recommended minimum level of battery power. The operating documents indicate that two low-voltage (low battery) alerts are issued - warning that the first alert should be followed (30% - low battery level warning). Further, the petitioner has indicated his flights will last only 3-7 minutes each. Also, the UAS has an automated function which results in immediate landing when a low battery is detected. These

factors provide the FAA with sufficient reason to grant the relief from 14 CFR 91.151(a) as requested in accordance with the conditions and limitations below, that prohibit the PIC from beginning a flight unless (considering wind and forecast weather conditions) there is enough power to fly to the first point of intended landing and, assuming normal cruising speed, land the UA with 30% battery power remaining.

Regarding an Air Traffic Organization (ATO) issued Certificate of Waiver or Authorization (COA), the majority of current UAS operations occurring in the NAS are being coordinated through Air Traffic Control (ATC) by the issuance of a COA. This is an existing process that not only makes local ATC facilities aware of UAS operations, but also provides ATC the ability to consider airspace issues that are unique to UAS operations. The COA will require the operator to request a NOTAM, which is the mechanism for alerting other users of the NAS to the UAS activities being conducted. The conditions and limitations below prescribe the requirement for the petitioner to obtain an ATO-issued COA.

Public Interest

The FAA finds that a grant of exemption is in the public interest. The enhanced safety and reduced environmental impact achieved using a UA with the specifications described by the petitioner and carrying no passengers or crew, rather than a manned aircraft of significantly greater proportions, carrying crew in addition to flammable fuel, gives the FAA good cause to find that the UAS operation enabled by this exemption is in the public interest. The following table summarizes the FAA's determinations regarding the relief sought by the petitioner:

Relief considered (14 CFR)	FAA determination (14 CFR)
Part 21	Relief not necessary
45.23(b)	Relief not necessary
61.113(a) and (b)	Relief granted with conditions and limitations
63.13	Relief not granted
91.7(a)	Relief granted with conditions and limitations
91.9(b)(2)	Relief not necessary
91.103(b)	Relief not necessary
91.109	Relief not necessary
91.119	Paragraph (c) granted with conditions and limitations
91.121	Relief granted with conditions and limitations
91.151(a)	Paragraph 91.151(a)(1), day, granted with conditions and limitations
91.203(a) and (b)	Relief not necessary
91.405(a)	Relief granted with conditions and

Relief considered (14 CFR)	FAA determination (14 CFR)
	limitations
91.407(a)(1)	Relief granted with conditions and limitations
91.409(a)(1) and (2)	Relief granted with conditions and limitations
91.417(a) and (b)	Relief granted with conditions and limitations

The FAA's Decision

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. 106(f), 40113, and 44701, delegated to me by the Administrator, Mr. Douglas Trudeau, Realtor®, of Tierra Antigua Realty, is granted an exemption from 14 CFR 61.113(a) and (b), 91.7(a), 91.119(c), 91.121, 91.151(a)(1), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b) to the extent necessary to allow petitioner to operate an unmanned aircraft systems (UAS) for the purpose of aerial videography/cinematography and augment real estate listing videos. This exemption is subject to the conditions and limitations listed below.

Conditions and Limitations

Relative to this grant of exemption, Trudeau is hereafter referred to as the operator.

The following documents provided by the operator in its petition, 1) Supplemental Response for Petition, 2) PHANTOM Flying Flow Chart V1.0 (Simplified Version), PHANTOM Quick Start Manual v1.7, PHANTOM Advanced Manual v.1.4, 3) PHANTOM 2 Vision+ User Manual 4) restricted areas map, 5) personal protocols and controls, and 6) Safety/Flight Manual, are hereinafter referred to as operating documents.

Failure to comply with any of the conditions and limitations of this grant of exemption will be grounds for the immediate suspension or rescission of this exemption.

- 1) Operations authorized by this grant of exemption are limited to the following aircraft described in the operating documents which is a quad-rotor aircraft weighing less than 3 pounds: PHANTOM 2 Vision+ Unmanned Aircraft System. Proposed operations of any other aircraft will require a new petition or a petition to amend this grant.
- 2) The UA may not be flown at an indicated airspeed exceeding 30 knots.
- 3) The UA must be operated at an altitude of no more than 300 feet above ground level (AGL), as indicated by the procedures specified in the operating documents. All altitudes reported to ATC must be in feet AGL.

- 4) The UA must be operated within visual line of sight (VLOS) of the Pilot In Command (PIC) at all times. This requires the PIC to be able to use human vision unaided by any device other than corrective lenses, as specified on the PIC's FAA-issued airman medical certificate.
- 5) All operations must utilize a visual observer (VO). The UA must be operated within the visual line of sight (VLOS) of the VO at all times. The VO may be used to satisfy the VLOS requirement as long as the PIC always maintains VLOS capability. The VO and PIC must be able to communicate verbally at all times. The PIC must be designated before the flight and cannot transfer his or her designation for the duration of the flight. The PIC must ensure that the VO can perform the functions prescribed in the operating documents.
- 6) The operating documents and this grant of exemption must be accessible during UAS operations and made available to the Administrator upon request. If a discrepancy exists between the conditions and limitations in this exemption and the procedures outlined in the operating documents, the conditions and limitations herein take precedence and must be followed. Otherwise, the operator must follow the procedures as outlined in its operating documents. The operator may update or revise its operating documents. It is the operator's responsibility to track such revisions and present updated and revised documents to the Administrator upon request. The operator must also present updated and revised documents if he petitions for extension or amendment to this grant of exemption. If the operator determines that any update or revision would affect the basis upon which the FAA granted this exemption, then the operator must petition for amendment to its grant of exemption. The FAA's UAS Integration Office (AFS-80) may be contacted if questions arise regarding updates or revisions to the operating documents.
- 7) Prior to each flight, the PIC must inspect the UAS to ensure it is in a condition for safe flight. If the inspection reveals a condition that affects the safe operation of the UAS, the UAS is prohibited from operating until the necessary maintenance has been performed and the UAS is found to be in a condition for safe flight. The Ground Control Station must be included in the preflight inspection. All maintenance and alterations must be properly documented in the aircraft records.
- 8) Any UAS maintenance or alterations that affect the UAS operation or flight characteristics, e.g. replacement of a flight critical component, must undergo a functional test flight. The PIC who conducts the functional test flight must make an entry in the aircraft records.
- 9) The pre-flight inspection section in the operating documents must account for all discrepancies, i.e. inoperable components, items, or equipment, not already covered in the relevant sections of the operating documents.

- 10) The operator must follow the UAS manufacturer's aircraft/component, maintenance, overhaul, replacement, inspection, and life limit requirements.
- 11) The operator must carry out its maintenance, inspections, and record keeping requirements, in accordance with the operating documents. Maintenance, inspection, and alterations must be noted in the aircraft records, including total flight hours, description of work accomplished, and the signature of the authorized person returning the UAS to service.
- 12) Each UAS operated under this exemption must comply with all manufacturer Safety Bulletins.
- 13) The authorized person must make an entry in the aircraft record of the corrective action taken against discrepancies discovered between inspections.
- 14) UAS operations must be conducted by a PIC possessing at least a private pilot certificate and at least a current third-class medical certificate. The PIC must also meet the flight review requirements specified in 14 CFR 61.56 in an aircraft in which the PIC is rated on his or her pilot certificate.
- 15) Prior to operations conducted for the purpose of aerial videography/cinematography and augmenting real estate listing videos (or similar operations), 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 logged as a UAS pilot with a multi-rotor UAS. Prior documented flight experience that was obtained in compliance with applicable regulations may satisfy this requirement. Training, proficiency, and experience-building flights can also be conducted under this grant of exemption to accomplish the required flight time. However, said training operations may only be conducted during dedicated training sessions. During training, proficiency, and experience-building flights the PIC is required to operate the UA with appropriate distances in accordance with 14 CFR 91.119.
- 16) Prior to operations conducted for the purpose of aerial videography/cinematography and augmenting real estate listing videos (or similar operations), the PIC must have accumulated and logged, in a manner consistent with 14 CFR 61.51(b), a minimum of 5 hours as UAS pilot operating the make and model of the UAS to be used in operations under the exemption; 5 hours make and model time may be included in the 10 hours of multi-rotor time prescribed above. The PIC must accomplish 3 take-offs and landings in the preceding 90 days (for currency purposes). Training, proficiency, experience-building, and take-off and landing currency flights can be conducted under this grant of exemption to accomplish the required flight time and 90 day currency. However, said training operations may only be conducted during dedicated training sessions. During training, proficiency, and experience-building flights the

PIC is required to operate the UA with appropriate distances in accordance with 14 CFR 91.119.

- 17) The operator may not permit the PIC to operate the UAS for the purpose of aerial videography/cinematography and augmenting real estate listing videos (or similar operations), unless the PIC has demonstrated and logged in a manner consistent with 14 CFR 61.51(b), the ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption, including evasive and emergency maneuvers and maintaining appropriate distances from people, vessels, vehicles and structures.
- 18) UAS operations may not be conducted during night, as defined in 14 CFR 1.1. All operations must be conducted under visual meteorological conditions (VMC).
- 19) The UA may not operate within 5 nautical miles of an airport reference point as denoted on a current FAA-published aeronautical chart.
- 20) The UA may not be operated less than 500 feet below or less than 2,000 feet horizontally from a cloud or when visibility is less than 3 statute miles from the PIC.
- 21) If the UA loses communications or loses its GPS signal, it must return to a pre-determined location within the planned operating area and land or be recovered in accordance with the operating documents.
- 22) The PIC must abort the flight in the event of unpredicted obstacles or emergencies in accordance with the operating documents.
- 23) The PIC is prohibited from beginning a flight unless (considering wind and forecast weather conditions) there is enough power to fly at normal cruising speed to the intended landing point and land the UA with 30% battery power remaining.
- 24) The operator must obtain an Air Traffic Organization (ATO) issued Certificate of Waiver or Authorization (COA) prior to conducting any operations under this grant of exemption. This COA will also require the operator to request a Notice to Airman (NOTAM) not more than 72 hours in advance, but not less than 48 hours prior to the operation.
- 25) All aircraft operated in accordance with this exemption must be identified by serial number, registered in accordance with 14 CFR part 47, and have identification (N-Number) markings in accordance with 14 CFR part 45, Subpart C. Markings must be as large as practicable.

- 26) Before conducting operations, the radio frequency spectrum used for operation and control of the UA must comply with the Federal Communications Commission (FCC) or other appropriate government oversight agency requirements.
- 27) The documents required under 14 CFR 91.9 and 91.203 must be available to the PIC at the Ground Control Station of the UAS any time the UAS is operating. These documents must be made available to the Administrator or any law enforcement official upon request.
- 28) The UA must remain clear and yield the right of way to all manned aviation operations and activities at all times.
- 29) The UAS may not be operated by the PIC from any moving device or vehicle.
- 30) The UA may not be operated over congested or densely populated areas.
- 31) Flight operations must be conducted at least 500 feet from all nonparticipating persons, vessels, vehicles, and structures unless:
 - a. Barriers or structures are present that sufficiently protect nonparticipating persons from the UA and/or debris in the event of an accident. The operator must ensure that nonparticipating persons remain under such protection. If a situation arises where nonparticipating persons leave such protection and are within 500 feet of the UA, flight operations must cease immediately and/or;
 - b. The aircraft is operated near vessels, vehicles or structures where the owner/controller of such vessels, vehicles or structures has granted permission and the PIC has made a safety assessment of the risk of operating closer to those objects and determined that it does not present an undue hazard, and;
 - c. Operations nearer to the PIC, VO, operator trainees or essential persons do not present an undue hazard to those persons per § 91.119(a).
- 32) All operations shall be conducted over private or controlled-access property with permission from the land owner/controller or authorized representative. Permission from land owner/controller or authorized representative will be obtained for each flight to be conducted.
- 33) Any incident, accident, or flight operation that transgresses the lateral or vertical boundaries of the operational area as defined by the applicable COA must be reported to the FAA's UAS Integration Office (AFS-80) within 24 hours. Accidents must be reported to the National Transportation Safety Board (NTSB) per instructions contained on the NTSB Web site: www.nts.gov.

Unless otherwise specified in this grant of exemption, the UAS, the UAS PIC, and the UAS operations must comply with all applicable parts of 14 CFR including, but not limited to, parts 45, 47, 61, and 91.

This exemption terminates on January 31, 2017, unless sooner superseded or rescinded.

Issued in Washington, DC, on January 5, 2015.

/s/

John S. Duncan

Director, Flight Standards Service