

Jan 12,2015

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

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

Dear Sir or Madam:

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 (the Reform Act) and 14 C.F.R. Part 11, Texas UAV Professionals, developer and operator of Small Unmanned Aircraft Systems (“sUASs”) equipped to conduct inspections for the utility and construction industries, hereby applies for an exemption from the listed Federal Aviation Regulations (“FARs”) to allow commercial operation of its sUASs, so long as such operations are conducted within and under the conditions outlined herein or as may be established by the FAA as required by Section 333.¹

The name and address of the applicant is:

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The applicant requests relief from the following regulations:

Part 21, Certification Procedures for Products and Parts, prescribes, in pertinent part, the procedural requirements for issuing and changing design approvals, production approvals, airworthiness certificates, and airworthiness approvals.

Section 45.23(b) prescribes, in pertinent part, 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) prescribe that -

- (a) No person who holds a private pilot certificate may act as a pilot in command (PIC) of an aircraft that is carrying passengers or property for compensation or hire; nor may that person, for compensation or hire, act as PIC of an aircraft.
- (b) A private pilot may, for compensation or hire, act as PIC 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 91.9(b)(2) prescribes, in pertinent part, that no person may operate 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 prescribes that each PIC shall, before beginning a flight, become familiar with all available information concerning that flight. This information must include -

- (b) For any flight, runway lengths at airports of intended use, and the following takeoff and landing distance information:
 - (1) For civil aircraft for which an approved Airplane or Rotorcraft Flight Manual containing takeoff and landing distance data is required, the takeoff and landing distance data contained therein; and
 - (2) For civil aircraft other than those specified in paragraph (b)(1) of this section, other reliable information appropriate to the aircraft, relating to aircraft performance under expected values of airport elevation and runway slope, aircraft gross weight, and wind and temperature.

Section 91.109 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 paragraph (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 prescribes, 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 visual flight rules (VFR) conditions unless (considering wind and forecast weather conditions) there is enough fuel to fly to the first point of intended landing and, assuming normal cruising speed -

- (1) During the day, to fly after that for at least 30 minutes; or
- (2) At night, to fly after that for at least 45 minutes.

Section 91.203(a) prescribes, in pertinent part, that no person may operate 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) prescribes, in pertinent part, that each owner of an aircraft operator or owner shall have that aircraft inspected as prescribed in subpart E of this part and shall, between required inspections, except as provided in paragraph (c) of this section, have discrepancies repaired as prescribed in part 43, Maintenance, Preventive Maintenance, Rebuilding, and Alteration.

Section 91.407(a)(1) prescribes that no person may operate any 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 this 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.

Section 91.417(a) and (b) prescribe, 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 that 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) 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 shall be retained until the defects are repaired and the aircraft is approved for return to service.

Texas UAV Professionals (TUP) supports its request with the following information:

The TUP's information is organized into four sections: (1) the Unmanned Aircraft System (UAS), (2) the UAS pilot in command (PIC), (3) the UAS Operating Parameters, and (4) the Public Interest.

The petitioner provides a supplemental proprietary Texas UAV Professionals (TUP) UAS Flight Manual (the Manual) in support of its exemption request.

Unmanned Aircraft System (UAS)

TUP's UAS are multirotor aircraft with final assembly by Texas UAV Professionals, LLC, a Texas-based company. TUP's UAS are under 55lbs and fly under 65 knots. All operations will be below 400 feet AGL. The UAS will only be flown within 1 mile and Visual Line of Sight (VLOS) of the PIC. All transmissions will be on FCC approved frequencies such as 2.4ghz, 5.8ghz, etc. TUP UAS will only be flown over property that TUP has been given explicit permission to have safe access to.

The UAS carry no explosive materials or flammable liquid fuels. They operate without any pilots or passengers on board. The crew is on the ground within VLOS at all times for air traffic avoidance. The UAS, in the event of control signal loss has the ability to return to a pre-determined location within a safe landing area, as detailed in the Manual, and land.

The UAS has the ability to abort a mission in case of emergency. It can land immediately or return to land automatically or under PIC manual control depending on the type of emergency. In the case of emergency incapacitation of the PIC the UAS can return and land safely on its own.

These operations would otherwise be performed by a full size aircraft, likely a helicopter, weighing at least 2000lbs carrying a pilot, crew and 100 gallons of fuel. When flown in the same area and in the same conditions the UAS poses a much smaller risk to the national airspace, property and persons in the area. Additionally the UAS has a much lower noise profile than full size operations. TUP requests exemption from § 45.23(b) as there is no entrance to the cabin, cockpit, or pilot station on which the word "Experimental" can be placed. The petitioner states that given the size of the UA, 2-inch lettering would be impossible. The petitioner asserts that an equivalent level of safety will be provided by having the word "Experimental" marked on the fuselage in accordance with § 45.29(f), enabling the pilots and others working with the UAs to see and observe the aircraft's "Experimental" markings.

TUP believes the maintenance requirements in §§ 91.405(a), 91.407(a)(1), 91.409(a)(2), 91.417(a) and (b) apply only to aircraft with an airworthiness certificate and are therefore not applicable to our UAS operations. In place of these requirements TUP will perform regular maintenance based on logged data as outlined in the manual. TUP's regular maintenance schedule in addition to the aircrafts limited size, payload and operational constraints will provide an equivalent level of safety in the maintenance and operation of TUP UAS.

UAS Pilot In Command (PIC)

The UAS is remotely controlled and operates within a limited airspace. The limited weight and speed in addition to not carrying a pilot or passenger's significantly reduces the level of risk of flight operations compared to full size operations. We propose the PIC require a standard Private Pilot License and Class 3 medical. We propose the additional requirement of a commercial pilot's license would provide no additional safety to the flight operations of the UAS. In addition to the Private Pilot's License having the pilots complete a UAS training service as listed in the Manual is proposed. This would give the PIC the needed familiarity with the aircraft they will use in flight.

UAS Operating Parameters

All operations will be conducted in accordance with the Manual and any local safety requirements. All standard flight operations will be conducted within 1 mile and visual line of sight of the PIC, in Class G airspace below 400 Feet AGL at least 5 miles from an airport. If there are any operations that might include flight within 5 miles of an airport TUP will notify the local Flight Standards District Office (FSDO) and airport controller (ATC). TUP will follow additional safety related instructions from the FSDO and Tower for operations within 5 miles of the airport. TUP will give a daily briefing, as noted in the Manual, with mandatory attendance by anyone potentially involved in the flight safety area.

The UAS in most cases can gain access to the property for inspection without overflying other property or persons, unlike a full size aircraft which often must overfly unrelated property and persons to gain access for inspection. The lack of exposure to unrelated property and persons improves the safety relative to full size aircraft.

TUP UAS missions are all flown within VLOS with crew available on the ground to assist in keeping persons and property at safe distances throughout a mission. Being on the ground enables the crew to actively control the inspection area and warn other persons immediately if an emergency exists. Full-size operations often do not have crew on the ground to actively control the inspection area or warn persons in the case of an emergency.

TUP asserts the use of UAS during inspections will offer a significant safety increase to operators, personnel, property and the public because of the UAS ability to obtain inspection data using a low weight aircraft staying in Class G airspace below 400 feet AGL over a controlled inspection area with limited to no exposure to anything outside the specified inspection area. Because of these factors, the petitioner asserts that UAS operations will result in a significant safety increase for personnel and the general public compared to the use of current inspection methods such as helicopters, and small aircraft.

TUP requests exemption from§ 91.7(a) because our UAS do not have airworthiness certificates. Consequently, there is not applicable regulatory standard available to determine airworthiness. The equivalent level of safety will be provided through adherence to the maintenance and safety checklist usage standards proscribed in the Manual.

TUP asserts that given the size and configuration and unmanned nature of the UA, it is not possible to carry a flight manual on board the aircraft. Additionally, because of the same limiting factors, there is no ability to carry certification and registration documents, or display them on the UA. Therefore we request an exemption from§§ 91.9(b)(2) and 91.203(a) and (b). An equivalent level of safety will be provided by storing the flight manual and applicable certification and registration documents at the ground control point where the UAS pilot will have immediate access to them.

TUP requests exemption from§ 91.103 because preflight actions for UAS vary from those outlined by the regulation. The Manual requires the pilot to take preflight actions prescribed by the preflight checklists. Checklists include analysis of weather conditions, checking flight battery requirements and assessment of takeoff and landing distances. TUP asserts that these actions will provide an equivalent level of safety.

TUP requests exemption from the requirement to have fully functional dual controls in aircraft used for flight instruction, prescribed by § 91.109. UAS, by design, do not have fully functional dual controls and are controlled instead through the use of a control box that uses radio communications for aircraft control. The equivalent level of safety is provided because the aircraft are unmanned, can be controlled remotely, are relatively small, and operate at slower speeds than the aircraft envisioned by the regulation.

TUP requests exemption from § 91.119 which outlines minimum safe altitudes for aircraft. The UAS operated by TUP operates much as a helicopter in flight with vertical takeoff and landing capabilities. The UAS has the ability to hover in one location and maneuver in any direction and speed as needed for safety without loss of control or lift. Purely vertical operations, straight up and straight down, are fully within the capability of these UAS even in windy conditions. The UAS operations will be limited to areas where TUP has been given prior authority to operate from land owners, local government or property managing authority. Inspection areas will be cleared and monitored by TUP on the ground where crew members can give persons immediate information and direction about the mission as it is occurring. The UAS can maintain all flight operations entirely inside the inspection areas unlike full size aircraft which require significant overfly of areas unrelated to the inspections simply to get to and from the base of operations. Additionally, UAS operations within city limits will be limited to 20 knots GS. The small size, weight, speed and low altitude operations of UASs mean that vehicles and basic structures provide significant protection for persons from UASs in the case of an emergency. The lower risk to persons and immediately available ground crew means in most emergencies the UAS can land in the immediate area, unlike full size operations, removing any further risk to the national airspace. The totality of these factors results in a more controlled and limited exposure to the national airspace than is possible with full size aircraft inspections. The ability to operate below 400 feet AGL for inspections will ensure the separation with conventional aircraft complying with § 91.119. In addition to less exposure to the national airspace the requirement, as listed in the Manual, to stay 500 feet away from any persons in the open maintains a safe separation between the UAS and persons. Full size aircraft performing the same inspections will often have to overfly persons in congested areas. TUP believes an equivalent level of safety will be achieved because of the limited size, low weight, low speed, operational separation, operational location and totality of control of inspection area of the UAS compared to flight operations with larger aircraft and/or rotor craft.

TUP requests exemption from the requirements of § 91.121, our UAS may have GPS altitude read-outs instead of barometric altimeters. The altitude readout will be verified relative to the launch site altitude by the PIC prior to flight. All operations will be AGL relative to the ground level calibrated at takeoff. These procedures will result in an equivalent level of safety.

TUP requests exemption from the requirements of § 91.151(a). Our UAS are battery powered and are limited to approximately 35 minutes of powered flight. A 30 minute fuel reserve would affectively limit operations to 5 minutes of flight time, negatively impacting efficiency and utility. Additionally with the limited area of operation, size and speed of the UA the level of risk does not rise to the level that the regulation is intended to mitigate. An equivalent level of safety can be achieved by requiring at least 20% of battery power remaining (as determined by the onboard monitoring system and the PIC) when the UA lands at a safe landing area.

Public Interest

TUP believes that given the small size and low speed of the UA involved, limited airspace, totality of control of inspection area and removal of unrelated overfly areas, this proposed operation falls directly in the zone of “equivalent level of safety” in which Congress envisioned that the FAA must, by exemption, allow commercial operations of UAS to commence immediately. Also because of the size of the UA and the limited area of operations of the UAS, approval of the application presents no national security issue. Given the clear direction in Public Law 112–95 § 333 the strong equivalent level of safety surrounding the proposed operations, and the significant public benefit, including enhanced safety, reduced noise, reduction in costs through more efficient inspection operations, granting the requested exemptions is in the public interest.