

ArchAerial

Capture the most of your world.

Arch Aerial, LLC
30707 McKinney Dr.
Tomball, TX 77375
(281) 974 - 5752

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

October 16th, 2014

RE: Exemption Request Under Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations

To Whom It May Concern:

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 ("FAA Reform Act") and 14 C.F.R. Part 11, Arch Aerial LLC (AALLC) requests an exemption from Federal Aviation Regulations ("FARs") detailed below for the Arch Aerial OCTO multi-rotor aircraft. Arch Aerial would like to specifically request exemptions from 14 CFR 21, 14 CFR 91.203, 14 CFR 45.23, 14 CFR 45.29, 14 CFR 91.9, 14 CFR 61.113, 14 CFR 61.133, 14 CFR 91.109, 14 CFR 91.119, 14 CFR 91.121, 14 CFR 91.151, 14 CFR Subpart E (91.401 – 91.417), FAA Policy 8900.227 Paragraph 16(c)(4) and Paragraph 16(e)(1). These regulations will be listed in an itemized form below.

14 CFR 21
14 CFR 91.203
14 CFR 45.23
14 CFR 45.29
14 CFR 91.9
14 CFR 61.113
14 CFR 61.133
14 CFR 91.109
14 CFR 91.119
14 CFR 91.121
14 CFR 91.151
14 CFR Subpart E (91.401 – 91.417)
FAA Policy 8900.227 Paragraph 16(c)(4) and Paragraph 16(e)(1).

The Arch Aerial OCTO is an eight-rotor UAS that weighs 7.0 pounds, and is operated using a radio control 2.4 GHz transmitter, and monitored using an Android or Windows-based ground control station, connected via radio telemetry in the 915 MHz band. The

Arch Aerial OCTO can carry a payload of up to 13 pounds, and has been operated with a payload of high-resolution DSLR cameras, infrared cameras, and video cameras for photography, videography, geospatial analysis and photogrammetry. This request for an exemption would support a COA application to use the Arch Aerial OCTO multi-rotor UAS for agricultural survey, film production, property survey, aerial photography, pipeline survey, and for monitoring damage in the event of a natural disaster.

AALLC has extensive operational experience in the United States and abroad, and designed the AALLC OCTO for topographic survey and aerial mapping. AALLC staff members have assisted American research institutions abroad in survey and supplemental aerial photography.¹ AALLC is requesting this exemption in order to operate the AALLC OCTO for low-altitude aerial photography in unpopulated areas for primarily precision agricultural survey and property survey.

The FAA recently granted 6 companies an exemption to use small UAS to film for movie and TV production companies.² AALLC is also requesting this exemption to use the AALLC OCTO to film and photograph for movie and TV production companies, and asserts that the AALLC OCTO is as safe, if not safer than the platforms in use by these companies.

The presence of UAS and their integration into the NAS has been in the public eye for quite some time now, and both the private and public sectors have shown a significant amount of interest in paving the way for safe and responsible UAS operation. AALLC is fully committed to this mission, and desires to operate small AALLC UAS for both research and commercial purposes using the Flight Restrictions (FRs) listed below.

The Arch Aerial OCTO will be operated in accordance with the following FRs:

- Flight operations will occur only in Class E or Class G airspace
- Flight operations will occur at no more than 400 feet above ground level
- Flight operations will occur using an electric power source
- Flight operations will not risk the safety of the PIC or VO, or fly over any members of the general public
- Flight operations will avoid congested or populated areas, which the FAA designates as yellow on VFR charts
- Flight operations will be operated within VLOS, with one PIC and one ground-based VO within an audible distance of the PIC
- Flight operations will occur only during daylight hours
- Flight operations will not be conducted within a 5 NM radius from the center of any FAA designated airport
- Flight operations will only be conducted with permission from the land owner
- Flight operations will comply with all NOTAMs and TFRs

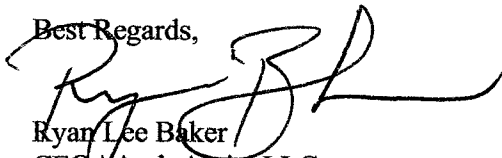
¹ <http://www.dayofarchaeology.com/tag/arch-aerial-llc/>

² https://www.faa.gov/news/press_releases/news_story.cfm?newsId=17194

AALLC is submitting this petition on its own behalf. If the FAA requires any modifications to our Arch Aerial OCTO exemption request, Arch Aerial requests the opportunity to amend this petition to include any modifications the FAA may require before granting or rejecting the petition for exemption. Arch Aerial will amend its petition to meet any additional standards for the integration of small UAS operation into the NAS.

AALLC also requests that the FAA keep materials labeled "Confidential" from the public record for the purpose of maintaining our intellectual property.

Best Regards,



Ryan Lee Baker
CEO, Arch Aerial LLC
rbaker@archaerial.com
(281) 974 - 5752
30707 McKinney Dr.
Tomball, TX 77375

ATTACHED:

Exemption Requests

Arch Aerial OCTO Manual

Monthly Maintenance Inspection Checklist

Arch Aerial OCTO Go-For-Flight Pre-Flight Checklist

EXEMPTION REQUESTS

AALLC requests exemption for the following statutes:

14 CFR 21
14 CFR 91.203
14 CFR 45.23
14 CFR 45.29
14 CFR 91.9
14 CFR 61.113
14 CFR 61.133
14 CFR 91.109
14 CFR 91.119
14 CFR 91.121
14 CFR 91.151
14 CFR Subpart E (91.401 – 91.417)
FAA Policy 8900.227 Paragraph 16(c)(4) and Paragraph 16(e)(1).

14 CFR 21 | Airworthiness Certificates

AALLC requests an exemption from Section 14 CFR Part 21 which requires the issuance of an Airworthiness Certificate for flight operation, while the FAA is still carrying out research and development for UAS standards and regulation.

AALLC's OCTO multi-rotor aircraft weights only approximately 7.0 pounds, and can carry a maximum payload of up to 13 pounds. It will not carry fuel or passengers, and will obey the operational requirements (FRs) outlined in the introduction to this exemption petition. The AALLC OCTO can travel at most 0.5 NM from launch due to power supply constraints and forward speed limitations. We assert that the AALLC OCTO, as compared to manned aircraft, significantly reduces the risk to crew, passengers, property, and the general public due its small size, limited range, and FR outlined above.

In the event that the FAA requires AALLC to obtain an Experimental Airworthiness Certificate or traditional Airworthiness Certificate in order to receive an exemption from Section 333, AALLC requests an opportunity to pursue such a certification.

14 CFR 91.203 | Civil Aircraft; Certifications Required

Section 14 CFR 91.203 requires that aircraft carry on board the aircraft's Airworthiness Certificate. The subsection (b) further states that the Airworthiness Certificate should be "displayed at the cabin or cockpit entrance so that it is legible to passengers or crew".

The AALLC OCTO has requested an exemption in the previous section (14 CFR 21 | Airworthiness Certificates). In the event that the FAA required AALLC to obtain an experimental Airworthiness Certificate, AALLC would pursue such a certification and

keep the relevant information on the ground with the PIC and VO at their designated ground station.

Subsection (b) does not apply to the AALLC OCTO, as it does not carry passengers or crew, or have a “cockpit” entrance. AALLC proposes mounting the AALLC identification information (mailing address, phone number, COA ID Number, or any other information deemed relevant to the FAA) and the UAS identification information (UAS unique number issued by AALLC, and Airworthiness Certificate information if required) on a visible exterior surface of the AALLC OCTO.

14 CFR 45.23 | Display of marks; general.

Subsections (a) and (b) for 14 CFR 45.23 require that the operator of the aircraft display the registration number on the side of the aircraft, and at various positions “near each entrance to the cabin, cockpit, or pilot station, in letters not less than 2 inches nor more than 6 inches high”.

AALLC’s OCTO does not have a cabin, cockpit, passengers or crew, and as such has no means of mounting it to these structures. AALLC proposes that it keeps identification information and an AALLC OCTO manual with the PIC and VO at the ground station. AALLC also proposes that in place of the markings required by 14 CFR 45.23, it keeps registration information and the AALLC mailing address, email address, and phone number permanently affixed to a visible exterior surface of the AALLC OCTO.

14 CFR 45.29 | Size of marks.

Subsections (a) and (b) of 14 CFR 45.29 provide for the size and dimensions of the markings noted in 14 CFR 45.23. Subsection (b) section (iii) states that “Marks at least 3 inches high may be displayed on an aircraft for which the FAA has issued an experimental certificate under § 21.191 (d), § 21.191 (g), or § 21.191 (i) of this chapter to operate as an exhibition aircraft, an amateur-built aircraft, or a light-sport aircraft when the maximum cruising speed of the aircraft does not exceed 180 knots CAS”.

AALLC proposes that the mounted identification information listed in the previous two sections will be sufficient for identification for the AALLC OCTO. As the OCTO is only 7.0 pounds and does not have the space on board to post 3 inch letters, we propose that AALLC keeps registration information and the AALLC identification information (mailing address, email address, phone number, or any other information the FAA deems relevant for identification purposes) permanently affixed to a visible exterior surface of the AALLC OCTO and with the PIC and VO on the ground.

14 CFR 91.9 | Civil aircraft flight manual, marking, and placard requirements.

Section 14 CFR 91.9 requires those operating an aircraft to keep a Flight Manual on board the aircraft during operation.

AALLC requests an exemption from this section as the AALLC OCTO does not carry passengers or crew and would not benefit from keeping a Flight Manual on board the aircraft during operation. AALLC will keep a Flight Manual with the PIC and VO at the ground station.

14 CFR 61.113 | Private pilot privileges and limitations: Pilot in command and 14 CFR 61.133 | Commercial pilot privileges and limitations.

14 CFR 61.113 stipulates, “No person who holds a private pilot certificate may act PIC that is carrying passengers or property for compensation or hire”. Subsection (b) of this part stipulates that the PIC may conduct flight 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.”

As AALLC requests that the AALLC OCTO be operated with only ground school and a passing score on the FAA Written Examination, AALLC requests that the AALLC OCTO be allowed to operate for compensation or hire to complete market research for use for agricultural survey, pipeline survey, oil rig survey, monitoring damage or movement of environmentally sensitive materials in the event of an environmental disaster, property survey, film production, and aerial photography. Considering that the AALLC OCTO does not carry passengers or property, and there is no equivalent flight certification for UAS PICs and VOs, AALLC requests that the PIC and VO be required to complete only an FAA approved ground school program and pass the FAA Written Examination.

14 CFR 91.109 | Flight instruction; Simulated instrument flight and certain flight tests.

14 CFR 91.109 stipulates, “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.”

AALLC requests an exemption from this part, as the AALLC OCTO uses on board software and a small RC transmitter for flight operation, which can accommodate “Instructor” override with the correct RC transmitter. We feel that this override, along with training within VLOS for the PIC, VO, student, and instructor, is sufficient for the operation of AALLC OCTO UAS.

14 CFR 91.119 | Minimum safe altitudes: General.

14 CFR 91.119 requires that the PIC operate at “...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.”

Following current FAA guidelines, the AALLC OCTO operates below 400 feet and within VLOS. Considering that we intend to operate within VLOS and below 400 feet,

the AALLC OCTO cannot comply with this request. AALLC will operate within all guidelines and proposed operation procedures outlined above. In addition, AALLC will fly only over private property with written permission from the property owner for flight, image capture, image storage, and image transfer (in accordance with Texas House Bill 912, published September 2013).

14 CFR 91.121 | Altimeter settings.

14 CFR 91.121 stipulates that the PIC “operating an aircraft shall maintain the cruising altitude or flight level of that aircraft, as the case may be, by reference to an altimeter that is set, when operating – (i) The current reported altimeter setting of a station along the route and within 100 nautical miles of the aircraft.”

The AALLC OCTO maintains an altitude using the barometric altitude reading and the GPS reading for altitude on board, transmitted through the 915 MHz telemetry dongle to tablet, Android device, or PC. Considering that the AALLC uses primarily a barometric altitude reading, and the AALLC OCTO will only be in flight for around 20-30 minutes, even drastic changes in barometric pressure will not affect the altitude reading.

14 CFR 91.151 | Fuel requirements for flight in VFR conditions.

14 CFR 91.151 requires that the PIC may not begin a flight under VFR “unless (considering wind and forecast weather conditions) there is enough fuel to fly to the first point of intended landing...”

The AALLC OCTO does not use liquid fuel, but instead uses a lithium polymer battery that utilizes electric energy instead of fuel. Considering this clarification, and the fact that the AALLC OCTO cannot fly more than 0.5 NM from its launch point, AALLC requests an exemption from 14 CFR 91.151.

14 CFR Subpart E (91.401 – 91.417) | General Operating and Flight Rules

Subsections 91.405 and 91.407 of 14 CFR Subpart E require that routine and regularly scheduled maintenance be performed upon the aircraft before flight. Furthermore, Section 91.407 Part (1) stipulates that no person may operate an aircraft unless “It has been approved for return to service by a person authorized under §43.7 of this chapter”.

AALLC requests exemption from these points, and proposes that the PIC and VO be allowed to perform maintenance reviews and inspections once a month, and pre-flight checks before *every* flight. The ‘Monthly Maintenance Inspection Checklist’ and ‘Pre-Flight Checklist’ are both attached to this petition. The PIC and VO will be able to repair broken arms, replace broken or worn propellers, and calibrate using the flight software. Further diagnosis or maintenance that requires tools not available to the PIC or VO in the field will be performed by AALLC.

FAA Policy 8900.227 Paragraph 16(c)(4) and Paragraph 16(e)(1).

Policy 8900.227 Paragraphs 16(c)(4) and 16(e)(1) stipulate that the PIC and VO must have valid medical evaluations, classified as FAA second-class medical certificates, in order to perform as the Pilot In Command or the Visual Observer.

Considering that the PIC and VO will both be on the ground, and that the AALLC OCTO cannot travel further than 0.5 NM, AALLC proposes that the PIC and VO only be required to have 20/20 vision or corrective lenses or contacts.