U.S. Department
of Transportation
**Federal Aviation
Administration**

800 Independence Ave., S.W.
Washington, D.C. 20591

August 26, 2015

Exemption No. 12604
Regulatory Docket No. FAA–2015–1881

Mr. Jonathan F. Mayhall
Counsel
Lanier Ford Shaver and Payne P.C.
P. O. Box 2087
Huntsville, AL 35804

Dear Mr. Mayhall:

This letter is to inform you that we have granted your request for exemption. It transmits our decision, explains its basis, and gives you the conditions and limitations of the exemption, including the date it ends.

By letter dated May 21, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of AirGon, LLC (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial photography, data collection, training programs[1], and demonstration flights.

See Appendix A for the petition submitted to the FAA describing the proposed operations and the regulations that the petitioner seeks an exemption.

The FAA has determined that good cause exists for not publishing a summary of the petition in the Federal Register because the requested exemption would not set a precedent, and any delay in acting on this petition would be detrimental to the petitioner.

[1] The petitioner requested authority to conduct UAS training. At this time, the FAA is unable to authorize UAS operations for training until a further assessment is completed. When the FAA completes its review, we will proceed accordingly and no further action will be required by the petitioner. However, the petitioner is permitted to train its own pilot in commands and visual observers in accordance with condition no. 14 and the other conditions and limitations in this exemption.

Airworthiness Certification

The UAS proposed by the petitioner is an AV-900.

The petitioner requested relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*. In accordance with the statutory criteria provided in Section 333 of Public Law 112−95 in reference to 49 U.S.C. § 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, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*, and any associated noise certification and testing requirements of part 36, is not necessary.

The Basis for Our Decision

You have requested to use a UAS for aerial data collection[2]. The FAA has issued grants of exemption in circumstances similar in all material respects to those presented in your petition. In Grants of Exemption Nos. 11062 to Astraeus Aerial (*see* Docket No. FAA−2014−0352), 11109 to Clayco, Inc. (*see* Docket No. FAA−2014−0507), 11112 to VDOS Global, LLC (*see* Docket No. FAA−2014−0382), and 11213 to Aeryon Labs, Inc. (*see* Docket No. FAA−2014−0642), the FAA found that the enhanced safety achieved using an unmanned aircraft (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.

Having reviewed your reasons for requesting an exemption, I find that—

- They are similar in all material respects to relief previously requested in Grant of Exemption Nos. 11062, 11109, 11112, and 11213;
- The reasons stated by the FAA for granting Exemption Nos. 11062, 11109, 11112, and 11213 also apply to the situation you present; and
- A grant of exemption is in the public interest.

[2] Aerial data collection includes any remote sensing and measuring by an instrument(s) aboard the UA. Examples include imagery (photography, video, infrared, etc.), electronic measurement (precision surveying, RF analysis, etc.), chemical measurement (particulate measurement, etc.), or any other gathering of data by instruments aboard the UA.

Our 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, AirGon, LLC is granted an exemption from 14 CFR §§ 61.23(a) and (c), 61.101(e)(4) and (5), 61.113(a), 61.315(a), 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 the petitioner to operate a UAS to perform aerial data collection. This exemption is subject to the conditions and limitations listed below.

Conditions and Limitations

In this grant of exemption, AirGon, LLC is hereafter referred to as the operator.

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 AV-900 when weighing less than 55 pounds including payload. Proposed operations of any other aircraft will require a new petition or a petition to amend this exemption.

2. Operations for the purpose of closed-set motion picture and television filming are not permitted.

3. The UA may not be operated at a speed exceeding 87 knots (100 miles per hour). The exemption holder may use either groundspeed or calibrated airspeed to determine compliance with the 87 knot speed restriction. In no case will the UA be operated at airspeeds greater than the maximum UA operating airspeed recommended by the aircraft manufacturer.

4. The UA must be operated at an altitude of no more than 400 feet above ground level (AGL). Altitude must be reported in feet AGL.

5. The UA must be operated within visual line of sight (VLOS) of the 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 or U.S. driver's license.

6. All operations must utilize a visual observer (VO). The UA must be operated within the visual line of sight (VLOS) of the PIC and 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; electronic messaging or texting is not permitted during flight operations. 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 duties required of the VO.

7. This exemption and all documents needed to operate the UAS and conduct its operations in accordance with the conditions and limitations stated in this grant of exemption, are hereinafter referred to as the operating documents. The operating documents 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 or any law enforcement official upon request. The operator must also present updated and revised documents if it 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 an 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.

8. Any UAS that has undergone 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 prior to conducting further operations under this exemption. Functional test flights may only be conducted by a PIC with a VO and must remain at least 500 feet from other people. The functional test flight must be conducted in such a manner so as to not pose an undue hazard to persons and property.

9. The operator is responsible for maintaining and inspecting the UAS to ensure that it is in a condition for safe operation.

10. Prior to each flight, the PIC must conduct a pre-flight inspection and determine the UAS is in a condition for safe flight. The pre-flight inspection must account for all potential discrepancies, e.g., inoperable components, items, or equipment. If the inspection reveals a condition that affects the safe operation of the UAS, the aircraft is prohibited from operating until the necessary maintenance has been performed and the UAS is found to be in a condition for safe flight.

11. The operator must follow the UAS manufacturer's maintenance, overhaul, replacement, inspection, and life limit requirements for the aircraft and aircraft components.

12. Each UAS operated under this exemption must comply with all manufacturer safety bulletins.

13. Under this grant of exemption, a PIC must hold either an airline transport, commercial, private, recreational, or sport pilot certificate. The PIC must also hold a current FAA airman medical certificate or a valid U.S. driver's license issued by a state, the District of Columbia, Puerto Rico, a territory, a possession, or the Federal government. 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.

14. The operator may not permit any PIC to operate unless the PIC demonstrates 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 persons, vessels, vehicles and structures. PIC qualification flight hours and currency must be logged in a manner consistent with 14 CFR § 61.51(b). Flights for the purposes of training the operator's PICs and VOs (training, proficiency, and experience-building) and determining the PIC's ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption are permitted under the terms of this exemption. However, training operations may only be conducted during dedicated training sessions. During training, proficiency, and experience-building flights, all persons not essential for flight operations are considered nonparticipants, and the PIC must operate the UA with appropriate distance from nonparticipants in accordance with 14 CFR § 91.119.

15. 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). Flights under special visual flight rules (SVFR) are not authorized.

16. The UA may not operate within 5 nautical miles of an airport reference point (ARP) as denoted in the current FAA Airport/Facility Directory (AFD) or for airports not denoted with an ARP, the center of the airport symbol as denoted on the current FAA-published aeronautical chart, unless a letter of agreement with that airport's management is obtained or otherwise permitted by a COA issued to the exemption holder. The letter of agreement with the airport management must be made available to the Administrator or any law enforcement official upon request.

17. 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.

18. If the UAS loses communications or loses its GPS signal, the UA must return to a pre-determined location within the private or controlled-access property.

19. The PIC must abort the flight in the event of unpredicted obstacles or emergencies.

20. The PIC is prohibited from beginning a flight unless (considering wind and forecast weather conditions) there is enough available power for the UA to conduct the

intended operation and to operate after that for at least five minutes or with the reserve power recommended by the manufacturer if greater.

21. Air Traffic Organization (ATO) Certificate of Waiver or Authorization (COA). All operations shall be conducted in accordance with an ATO-issued COA. The exemption holder may apply for a new or amended COA if it intends to conduct operations that cannot be conducted under the terms of the attached COA.

22. 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.

23. Documents used by the operator to ensure the safe operation and flight of the UAS and any 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 aircraft is operating. These documents must be made available to the Administrator or any law enforcement official upon request.

24. The UA must remain clear and give way to all manned aviation operations and activities at all times.

25. The UAS may not be operated by the PIC from any moving device or vehicle.

26. All 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 in a manner ensuring the safety of nonparticipating persons; and
    b. The owner/controller of any vessels, vehicles or structures has granted permission for operating closer to those objects 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.

    The PIC, VO, operator trainees or essential persons are not considered nonparticipating persons under this exemption.

27. All operations shall be conducted over private or controlled-access property with permission from the property owner/controller or authorized representative. Permission from property owner/controller or authorized representative will be obtained for each flight to be conducted.

28. 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.ntsb.gov.

If this exemption permits operations for the purpose of closed-set motion picture and television filming and production, the following additional conditions and limitations apply.

29. The operator must have a motion picture and television operations manual (MPTOM) as documented in this grant of exemption.

30. At least 3 days before aerial filming, the operator of the UAS affected by this exemption must submit a written Plan of Activities to the local Flight Standards District Office (FSDO) with jurisdiction over the area of proposed filming. The 3-day notification may be waived with the concurrence of the FSDO. The plan of activities must include at least the following:
    a. Dates and times for all flights;
    b. Name and phone number of the operator for the UAS aerial filming conducted under this grant of exemption;
    c. Name and phone number of the person responsible for the on-scene operation of the UAS;
    d. Make, model, and serial or N−Number of UAS to be used;
    e. Name and certificate number of UAS PICs involved in the aerial filming;
    f. A statement that the operator has obtained permission from property owners and/or local officials to conduct the filming production event; the list of those who gave permission must be made available to the inspector upon request;
    g. Signature of exemption holder or representative; and
    h. A description of the flight activity, including maps or diagrams of any area, city, town, county, and/or state over which filming will be conducted and the altitudes essential to accomplish the operation.

31. Flight operations may be conducted closer than 500 feet from participating persons consenting to be involved and necessary for the filming production, as specified in the exemption holder's MPTOM.

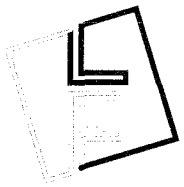
Unless otherwise specified in this grant of exemption, the UAS, the UAS PIC, and the UAS operations must comply with all applicable parts of 14 CFR including, but not limited to, parts 45, 47, 61, and 91.

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

Sincerely,

/s/
John S. Duncan
Director, Flight Standards Service

Enclosures



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May 21, 2015

U.S. Department of Transportation, Docket Operations
West Building Ground Floor, Room W 12-140
1200 New Jersey Ave., SE
Washington, DC 20590

Re: Exemption Request Pursuant to Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations from 14 C.F.R. Part 21, Subpart H and 14 C.F.R. §§ 61.23(a), 61.101(e)(4) 61.113(a) and (b), 61.133(a), 61.315(a), 91.7(a), 91.9(b), 91.119, 91.121, 91.151(a), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b).

Dear Sir or Madam:

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 (the "Act") and 14 C.F.R. Part 11, AirGon, LLC ("AirGon") seeks exemption from the Federal Aviation Regulations ("FARs") identified below. AriGon seeks expedited approval and exemption to allow commercial use of its AV-900 small Unmanned Aircraft System ("UAS") for the purpose of aerial photography, data collection, training programs, and demonstration flights. All operations will follow strict operational limitations as described in this document and the attached "AV-900 Mission Planning Guide," "AV-900 Operations Guide," the "AV-900 System Guide," the "AV-900 Training Guide," and the "AV-900 Pre-flight Checklist" (collectively, the "Operating Documents"), as well as all recommendations, limitation, and conditions by the FAA.

A. **Background**.

1. AirGon, LLC.

AirGon is the airborne micro metric mapping subsidiary of the GeoCue Group ("GeoCue"). GeoCue has been providing workflow and production solutions for sensor-

based mapping since 2003. GeoCue has a long history in providing tools and technology used in creating accurate mapping products from manned aircraft sensor data. GeoCue is now applying this reservoir of experience to the challenges of collecting metric mapping information using low cost technology.

AirGon is focused on creating metric mapping information from hyper-economical, small UAS. AirGon offers a complete range of products and services aimed at rapid collection of accurate analytic data and the creation of 2D and 3D derivative products.

2. AV-900.

The AV-900 is a vertical take-off and landing ("VTOL") hexcopter built on the DJI-S900 commercial kit. It is 39.4" diameter, 19.7" tall (excluding the 7.9" GNSS mast) and has a typical takeoff weight of 14.872 lbs. (with a standard 6S 21,000mAh battery, NEX-5 camera and 20 mm lens) and maximum takeoff weight of 18.07 lbs. The AV-900 system uses the "3D" Robotics "Pixhawk" realization of the PX4 autopilot system, which supports the multiple waypoint navigation necessary for precision mapping and contains a number of failsafe features to ensure safe operations. For additional information on the AV-900 please see the Operating Documents, which specify manufacturing information, aircraft performance, operating limits, normal and emergency operating procedures, and maintenance procedures. Although the AV-900 is a proprietary system, all major components of the system have been approved in previous grants of exemption. UAS based on the DJI-S900 kit have been previously approved by the FAA in Exemptions 11305 and 11326, and UAS incorporating the Pixhawk autopilot have been approved in Exemptions 11192 and 11166. All operating parameters in this case are identical or substantially similar to the approved operating parameters in the Exemptions listed above as well as those in Exemptions 1109, 1112, and 11213.

B. **Publication in the Federal Register**.

Pursuant to 14 C.F.R. § 11.87, AirGon requests that the FAA not publish this petition request in the Federal Register and not delay action based on the following:

1. This petition for exemption does not set precedent.
2. The requested relief is identical or substantially similar to the that granted previously, specifically, Exemptions Nos. 11062, 11109, 11112, 11213, 11305, 11326, 11192, 11166, and others.
3. A delay in action on this petition would result in lost opportunities revenues from potential operations as well as a delay in the public benefit of granting this

petition. In addition, a competitive advantage for unapproved commercial UAS operators exists and continues to grow every day.

Notwithstanding your decision on whether to publish this petition in the Federal Register, all of the Operating Documents submitted with this petition contain confidential, proprietary information that is not available to the general public. Pursuant to 14 C.F.R. § 11.35(b), AirGon requests that the Operating Documents not be published in the Federal Register or made available to the general public.

C. **Statutory Authority**.

1. FAA Modernization and Reform Act of 2012, Section 333.

Section 333(a) states that the FAA "shall determine if certain unmanned aircraft systems may operate safely in the national airspace before completion of the plan and rulemaking required by section 332." Section 333(b) lays out factors for the FAA to consider in making the determination under Section 333(a). Specifically, the FAA shall determine "which types of unmanned aircraft systems, if any, as a result of their size, weight, speed, operational capability, proximity to airports and populated areas, and operation within visual line of sight do not create a hazard to users of the national airspace system or the public or pose a threat to national security." Section 333(b)(2) also specifies that the FAA shall determine whether a certificate of authorization or airworthiness certification is required for the operation of an UAS. Finally, Section 333(c) provides that the "Secretary shall establish requirements for the safe operation of such aircraft systems in the" NAS. As noted above, the FAA has previously found that UAS substantially similar to the AV-900 meet the requirements of Section 333 and accordingly has granted exemptions from the regulations at issue in this petition.

2. How AirGon meets the criteria laid forth in Section 333.

Below are the criteria laid forth in Section 333(b) and a detailed description of how AirGon meets each of these criteria.

a. Size, Weight, and Speed.

The AV-900's airframe weighs 8.85 lbs. and it has a maximum takeoff weight of 18.08 lbs., when loaded with battery and camera, its diameter is 39.4," and its height is 19.7". The maximum horizontal speed is 20 mph and the maximum climb and decent rates are 200 fpm. The AV-900 is a small, lightweight aircraft that operates at relatively slow speeds and will pose little to no hazard to people or structures on the ground. Therefore, the size, weight, and speed of the AV-900 make it a considerably

safer alternative to manned, fixed wing or rotary aircraft for aerial imaging and mapping applications.

b. Operational Capacity.

The primary function of the AV-900 is to collect high resolution/high accuracy mapping data in support of small area metric mapping operations. High resolution data generated from the cameras on the AV-900 offer a wide range of applications including: orthophoto generation, precision asset location, dense point cloud collection, volumetric analysis, and other related small area mapping tasks. The sites where AirGon intends to operate are controlled access areas such as quarries, surface mines, and construction sites during the grubbing and surface preparation phases. The maximum size is typically less than 556 acres with an average size around 140 acres. The data from these flights will help companies and mine operators maximize mine yields, and will improve the efficiency of construction site preparation, which is of great benefit to the economy and to the public.

The AV-900 is a vertical take–off and landing system. Therefore, it can be launched on-site, without need for a runway or transit to and from the site. Once airborne, the AV-900 will fly at an altitude of 400 ft. AGL or less over the designated site. Prior to the Flight, in accordance with the procedures set out in the Operational Documents, the Pilot in Command ("PIC") sets a designated flight area and flight parameters to ensure that the AV-900 will remain within the confines of the site, not exceed a maximum altitude of 400 ft. AGL, and remain within the visual line of sight ("VLOS") of the PIC and Visual Observer ("VO"). In the event of a critical issue such as a low battery state or loss of data link, the AV-900 will perform a safe landing procedure or return-to-launch sequence. In addition, the PIC may override the autopilot with manual control if necessary. Additional information about the operational capacity of the AV-900, including safety procedures can be found in the attached Operational Documents. The AV-900's small operational footprint and built-in safety protocols provide a safer alternative for aerial imaging than manned aircraft and would pose a minimal hazard to the NAS or the public.

c. Proximity to Airports/Populated Areas.

As noted above, AirGon plans to use the AV-900 to primarily conduct operations over mining, quarry, and construction sites. All AirGon operations will be conducted over private, controlled access property. The job sites where AirGon will operate are typically secured with perimeter fencing and regulated by the Occupational Safety and Health Administration ("OSHA") and/or the Mine Safety and Health Administration ("MSHA"). In addition, many of the job sites will likely be in remote or

industrial areas away from populated areas. In the event that one of the job sites are within 5 NM of an airport, AirGon will take all appropriate safety measures including obtaining a letter of agreement with the airport's management. By operating at low altitudes over controlled access, generally remote sites, the AV-900 will pose minimal risk to the NAS and individuals and property on the ground.

d. Visual Line of Site ("VLOS").

The AV-900 will be flown in accordance with day Visual Flight Rules ("VFR") and only in Visual Meteorological Conditions ("VMC") during day-light hours. The AV-900 will operate within 1NM and VLOS of the PIC and the Visual Observer ("VO") positioned next to the PIC at an altitude of 400 ft. AGL or less. The PIC and VO will be responsible for ensuring that the AV-900 remains within VLOS at all times. Should the AV-900 escape VLOS, the PIC will engage the AV-900's safety features to ensure that the AV-900's flight is safely terminated in accordance with the procedures set forth in the Operational Documents.

D. Basis for Petition.

1. Name and Address of the Petitioner.

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Madison, AL 35758
256.461.8289
www.airgon.com

2. 14 C.F. R. – Regulations for which exemption is requested.

a. Part 21, Subpart H
b. 61.23(a)
c. 61.101(e)(4)
d. 61.113(a) and (b)
e. 61.133(a)
f. 61.315(a)
g. 91.7(a)
h. 91.9(b)
i. 91.119(c)
j. 91.121
k. 91.151(a)
l. 91.405(a)

m. 91.407(a)(1)
n. 91.409(a)(2)
o. 91.417(a) and (b)

3. The extent of relief sought and reason for seeking relief.

a. 14 C.F.R. Part 21, Subpart H: Airworthiness Certificates.

14 C.F.R. Part 21 Subpart H establishes the requirements for the issuance of an airworthiness certificate. The FAA has determined that no exemption of this section is required if a finding is made under the Reform Act that the UAS selected provides an equivalent level of safety when compared to aircraft normally used for the same application. The physical characteristics and operational capacity of the AV-900 is similar to that of UAS aircraft approved in previous exemption requests; therefore, no exemption is believed to be necessary. However, if the FAA determines that an exemption is needed, AirGon hereby requests exemption from Part 21, Subpart H.

Section 333 authorizes the FAA to exempt a UAS from the requirements of an airworthiness certificate based on consideration of the following: size, weight, speed, operational capability, proximity to airports and populated areas, and operation within VLOS. As noted above, the AV-900 and procedures developed by AirGon are consistent with all physical and operational conditions established by the FAA. The combination of the limited operating limitations and the AV-900 lightweight airframe results in a safer alternative for aerial surveying than currently offered by traditional manned aircraft.

b. 14 C.F.R. §§ 61.23(a), 61.101(e)(4), 61.113(a) and (b), 61.133(a), 61.315(a): Pilot Qualifications.

AirGon seeks exemption from the above regulations to the extent that they require the PIC of an UAS to have a commercial pilot's license with a current medical certificate. Section 61.23(a) sets out the operations requiring a medical certificate and the level of certificate required. Sections 61.113(a) and (b) limit private pilots to non-commercial operations. Likewise §§ 61.315(a) and 61.101(a) limits light-sport and recreational pilots, respectively, to non-commercial operations. Section 61.133(a) requires an individual with a commercial pilot's license to be pilot in command of an aircraft for compensation or hire. All AirGon pilots will be required to have a valid driver's license in addition to a sport-pilot, recreational, or private pilot certificate and will complete training in conducting operations using the AV-900. Prior to conducting operations for AirGon clients all AirGon pilots will be required to demonstrate their ability to safely operate the AV-900 including performing evasive and emergency maneuvers and maintaining an appropriate distance from persons, vessels, vehicles, and

structures. All AirGon pilots will also be required to log flight hours and currency in a manner consistent with 14 C.F.R. § 61.51(b).

Given the reduced risks associated with operation of the AV-900 due to its small, size, operational limitations, and lack of an onboard pilot or passengers, AirGon operations will achieve an equivalent level of safety by requiring the PIC to possess a recreational or sport pilot license and a valid driver's license only. Indeed, the FAA has approved commercial UAS operations by PIC's with a similar level of certification in previous cases including Exemption 11305.

c. 91.7(a): Civil Aircraft Airworthiness.

14 C.F.R. § 91.7(a) provides that no person may operate a civil aircraft unless it is in airworthy condition. Should the exemption be granted allowing commercial operation of the AV-900 without an airworthiness certificate, no standard will exist for airworthiness of the AV-900. As a result AirGon seeks full exemption from this regulation.

AirGon will achieve an equal level of safety by following the procedures in the Operational Documents, which contain pre-flight protocol for each flight, safety checks, and comprehensive maintenance procedures. The FAA has previously approved exemption from this regulation for other UAS based on the DJI-900, including in Exemption 11240.

d. 91.9(b): Civil Aircraft Flight Manual in the Aircraft.

Section 91.9(b) states that no person may operate an aircraft unless there is a current approved flight manual for the aircraft onboard. The AV-900 has no ability or place to carry such a flight manual on the aircraft. In addition, the AV-900 is unmanned and the PIC is located at the ground control station. AirGon therefore seeks exemption from the requirement to carry the aircraft flight manual onboard. The equivalent level of safety will be achieved by keeping the flight manual at the ground control station where the PIC will have access to it. The FAA has approved operation under these conditions in Exemptions No. 11062, 11240, and 11305 among others.

e. 91.119: Minimum Safe Altitudes.

AirGon requests an exemption from § 91.119. Section 91.119 establishes safe altitudes for operation of civil aircraft. Section 91.119(c) limits aircraft flying over areas other than congested areas to an altitude of 500 ft. AGL, except over open water or sparsely populated areas. In those cases, the aircraft may not be operated closer than

500 ft. to any person, vessel, vehicle, or structure. An exemption is required because the proposed UAS operations will need to occur below 400 ft. AGL. Further, due to the nature of the proposed operations, the PIC and other flight crew may at times be less than 500 ft. away from the UAS.

An equivalent level of safety will be achieved because of the size, weight, speed, and material of AV-900 and the operational limitations discussed above. All operations will be conducted with the permission of the property owner, and the PIC will be able to control the site and ensure that all affected individuals will be aware of the operations and will stay a safe distance away from operations or under a protective covering. Any risk associated with AirGon's operations will be significantly less than that of manned aircraft, which are heavier, must have onboard flight personnel, and must travel to and from the job site. In addition, the low-altitude operations of the AV-900 will maintain separation between AirGon's operations and the operations of conventional aircraft that must comply with § 91.119.

f. 91.121: Altimeter Settings.

AirGon seeks exemption from § 91.121, which requires a person operating an aircraft to maintain cruising altitude or flight level by reference to an altimeter that is set to the elevation of the departure airport or barometric pressure. The Pixhawk autopilot on board the AV-900 will have a barometric altimeter, which is automatically set to 0 when the Return to Launch ("RTL") location of the AV-900 is established just prior to launch. However, the barometric altimeter will only be used by the autopilot in two circumstances: (1) the GPS signal is not sufficient to determine the altitude of the AV-900; or (2) the AV-900 is at an AGL below 33 ft. Therefore, because the barometric altimeter will not be used directly by the PIC, AirGon seeks exemption to the extent necessary.

An equivalent level of safety will be achieved because, first, the AV-900 will report GPS AGL altitude to the PIC via radio telemetric feed. Second, as described above, for situations in which the GPS signal cannot deliver accurate altitude data, the autopilot will use the barometric altimeter to ensure the AV-900 operates at the proper altitude. Finally, all operations will be conducted within VLOS and in accordance with the operational constraints described above.

g. 91.151(a): Fuel Requirements for Flight in VFR Conditions.

Airgon seeks exemption from § 91.151(a), which requires an individual to ensure that, for a flight in VFR conditions, there is enough fuel to fly for an additional 30 minutes after reaching the first point of intended landing. The nominal flight time for

the AV-900 is 22 minutes; therefore, no flight of the AV-900 would be possible under this regulation.

An equivalent or greater level of safety exists via the safety features described in the Operational Documents. Specifically, during the flight, the level of battery power is communicated to the control station via telemetry. In the event of either loss of telemetry or the battery level falling below 20% capacity, the AV-900 will automatically return to its launch station. In addition, in the event either of these features were to fail, the PIC could take control of the AV-900 and safely return it to the ground. Further, unlike with a manned aircraft, given the size and relative cost of the AV-900, as well as the fact that it carries no passengers, in an emergency situation the PIC can sacrifice the AV-900 to protect persons and property.

h. 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b): Maintenance & Inspections.

AirGon seeks exemption from §§ 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b). These sections specify maintenance and inspection standards in reference to 14 C.F.R. Part 43 for aircraft to maintain an airworthiness certificate. The UAS that AirGon intends to operate will not have an airworthiness certificate and therefore exemption is needed.

AirGon will provide an equivalent level of safety by performing maintenance and inspections in accordance with the Operational Documents. In addition, prior to each flight, AirGon pilots will complete the pre-flight checklist, ensuring that all critical systems of the UAS are functioning properly. The Operational Documents contain recordkeeping requirements for routine, interval, and post-flight maintenance. As a whole, the maintenance and inspection procedures set out in the Operational Documents will ensure that an equivalent or higher level of safety is achieved, especially when combined with the size and operational limitations of the AV-900.

4. How the request benefits the public as a whole.

The AV-900 is a safe, efficient and economical alternative to the manned aircraft that are currently being used to conduct aerial imaging of mining, quarry, and construction operations. There are four major reasons why the public would benefit from granting AirGon exemptions from these regulations: reducing the burden on Air Traffic Controllers (ATC), reducing air pollution, reducing the risk to life and property on

the ground, and maximizing the efficiency and effectiveness of mine and quarry operations.

The AV-900 can take-off and land on-site and operate at an altitude of 400 ft. AGL or less within VLOS of the PIC; therefore, there is no need for ATC to provide coordination during ground, take-off, departure, transit, arrival, and landing phases of flight. Reducing the burden placed on ATC will provide a significant benefit to the public.

The AV-900 will reduce pollution. A traditional aircraft must take-off and land at an airport and therefore must fly to and from the site. The necessity to travel to and from the site wastes a significant amount of fuel. In contrast, the AV-900 is light weight, uses electric batteries and motors instead of fuel and internal-combustion engines, and can be launched and landed on-site. Therefore, the AV-900 will significantly reduce the fuel and energy consumption needed to perform aerial surveying.

The small size and relatively low speed of the AV-900 will also reduce the risk to life and property on the ground. The AV-900 weighs, at maximum 18.07 lbs. and has a maximum speed of 20 mph. In the event of failure, the AV-900 poses significantly less risk to persons and property on the ground than manned aircraft which carry flammable fuel and weigh significantly more than the AV-900. Also, as mentioned above, the AV-900 will only operate over the job site and will not be required to commute to an airport. This will all but eliminate the risk to persons and property outside of the job site.

Conducting site surveys via UAS also provides significant safety benefits over conducting surveys using ground-based surveyors. When performing ground-based surveys, surveyors and support personnel must be intermingled with active mining equipment. Collecting data via UAS removes personnel from areas with mining equipment resulting in a significantly lower risk of injury to surveyors and support personnel.

Finally, use of the AV-900 will allow mine and quarry operators to obtain accurate surveys of their sites at a cost significantly less than that of manned operations. As has been noted above, surveying done by manned aircraft is more expensive, more dangerous, and less efficient than surveying using UAS technology. In addition, aerial surveying via UAS is more accurate and safer than ground-based surveying. Ground-based surveying is especially dangerous on mine and quarry sites as data collection personnel must operate in the midst of active mining equipment. Therefore, by granting this exemption mine and quarry operators will be able to obtain more accurate information about their sites more often than possible under current circumstances.

Thus, mine and quarry operators will be able to more efficiently and economically conduct their mining operations and maximize yields from their sites. This will reduce the cost of raw materials, invigorating the markets for these materials. In addition, maximizing yields will provide significant environmental benefits such as reducing waste. Similar to the benefits in the mining and quarry fields, aerial UAS surveying of construction sites in the site preparation phase will reduce site preparation time, and reduce the overall cost of construction.

5. Additional Information, views, and arguments.

The following documents have been included as Appendices to this Petition. Appendix A, B, C, and D have been submitted confidentially for proprietary reasons and will not be available to the public:

Appendix A – AV-900 System Guide
Appendix B – AV-900 Operations Guide
Appendix C – AV-900 Mission Planning Guide
Appendix D – AV-900 Training Guide
Appendix E – AV-900 Pre-flight Checklist

6. Summary for Federal Register.

Pursuant with Section 333 of the FAA Modernization and Reform Act of 2012, AirGon, LLC requests exemption from the following Federal Aviation Regulations that are found under Title 14 of the Code of Federal Regulations: Part 21 Subpart H, 61.23(a), 61.101(e)(4) 61.113(a) and (b), 61.133(a), 61.315(a), 91.7(a), 91.9(b), 91.119, 91.121, 91.151(a), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b).

Sincerely,

Jonathan Mayhall
Counsel for AirGon, LLC

Enclosures

EXHIBIT A
AV-900 SYSTEM GUIDE

AV-900 System Guide

- Operational Envelope
- Safety
- Maintenance

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Revision History

Revision	Author	Date	Notes
1.0	L. Graham	3/15/2015	Initial Creation

EXHIBIT C
MISSION PLANNING GUIDE

AV-900 Mission Planning Guide

February 11, 2015

Revision History

Revision	Author	Date	Notes
1.0	S. Riddell	1/26/2015	Initial Creation
1.1	L. Graham	1/27/2015	Editorial revisions
1.2	S. Riddell	2/11/2015	Added figures