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

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

May 12, 2015

Exemption No. 11561
Regulatory Docket No. FAA–2015–0382

Mr. Zane Anderson
President
Airborne Information Systems
dba Aerial Patrol Incorporated
6 Braeswood Place
Maumelle, AR 72113

Dear Mr. Anderson:

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 February 15, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Airborne Information Systems dba Aerial Patrol Incorporated (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial photography, videography, thermal imaging, and inspection of electric transmission lines, electrical substations, gas pipelines, and associated telemetry equipment.

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.

Airworthiness Certification

The UAS proposed by the petitioner is a DJI S900 Hexacopter.

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[1]. 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.

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, Airborne Information Systems dba Aerial Patrol Incorporated 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

[1] 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.

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, Airborne Information Systems dba Aerial Patrol Incorporated 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 DJI S900 Hexacopter 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 May 31, 2017, unless sooner superseded or rescinded.

Sincerely,

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

Enclosures

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February 15, 2015

U.S. Department of Transportation
Docket Management System
1200 New Jersey Avenue SE
Washington, D.C. 20590

Re: Exemption Request Pursuant To Section 333 of the FAA Reform Act of 2012

Dear Sir:
This letter is for the purpose of petitioning the Secretary of Transportation and Federal Aviation Administration for exemption to the below referenced Federal Aviation Regulations that currently apply to Unmanned Aircraft Systems (UAS).

> NOTE: For purposes of this request, the Petitioner uses the nomenclature "UAS" to include the *aerial vehicle* and the *ground station component*, which together comprise the "system". When speaking of the aerial component only, the term Unmanned Aerial Vehicle (UAV) is used.

Airborne Information Systems (AIS) is a dba of Aerial Patrol Incorporated (API), headquartered in Maumelle, Arkansas. API, holder of Air Carrier Certificate VLNA 335S, was incorporated in 1983 and is in the business of operating helicopters for the support of public utility companies and various industrial customers. Most of its business is associated with inspection of electric transmission lines, electrical substations, gas pipelines, and associated telemetry equipment, such as fiber optic lines, microwave, radio, and cellular communications networks. Much of the work we perform for these customers is aerial photography including digital stills, videography, and thermal imaging. This work is done at low levels and sometimes can't be conducted because of noise constraints or safety considerations.

AIS would like to augment API's current capabilities by offering the services of a UAS. This would be especially helpful when getting detailed shots of electrical powerlines, substations, and associated equipment where hovering a manned helicopter in close proximately to them could be catastrophic in the event of a mechanical failure. (See addendum for photos for examples of typical powerline

damages) The UAV's have the added benefit of producing virtually no rotor wash or noise. When operating low-level, noise is often a concern when animals are nearby.

Many powerlines are located in close proximity to poultry houses and near livestock. In certain areas, racehorse training facilities are common. In API's operating area there, are several places where powerlines traverse wildlife sanctuaries or exotic animal habitats. Some places within API's operating area are no-fly zones due to helicopter noise. Some of these areas are currently inspected by personnel actually climbing structures, while others are remain virtually inaccessible by any ordinary means. UAS are particularly well suited to perform these inspections. AIS and API believe that UAS can perform these operations with less impact on persons and animals in certain critical areas, and is in that regard, in the public interest. Obviously, it goes without saying that keeping energy flowing is in the public interest.

Consistent with existing conditions and limitations previously granted, AIS proposes to supplement existing aircraft operations with UAS, which will inspect powerlines, including supporting structures as well as the various wires and components connecting those structures, substations and towers in areas where manned aircraft can't operate due to noise concerns. In certain circumstances where necessary, such as for the inspection of transmission conductors, these operations may be conducted from a moving vehicle.

The UAS operations proposed in this petition will be consistent with previously granted UAS Section 333 exemptions and FAA guidance.

Petitioner Information

Airborne Information Systems, a dba of Aerial Patrol Incorporated
6 Braeswood Place
Maumelle, Arkansas 72113
Phone: (501) 352-3861
Fax: (501) 851-3469

Specific Regulations for Which Exemption is Sought

Several regulations have been previously determined by other granted exemptions either not to be applicable or not to require relief, so these will not be addressed. The petitioner will accept any conditions and limitations as previous exemptions.

- 14 CFR part 21 – Certification procedures for products and parts
- 14 CFR 45.23(b) – Display of marks
- 14 CFR 61.133(a) – Commercial pilot privileges and limitations
- 14 CFR 91.7(b) – Civil aircraft airworthiness
- 14 CFR 91.9(b)(2) – Civil aircraft flight manual, marking, and placard requirements
- 14 CFR 91.103 – Preflight action
- 14 CFR 91.109(a) – Flight instruction; simulated instrument flight and certain flight tests

- 14 CFR 91.203(a) and (b) – Civil aircraft: Certifications required

However, the petitioner may need relief from others as evidenced by previous petitioners. Specifically, relief is requested from the following the FARs.

- 14 CFR 91.7(a) – Civil aircraft airworthiness
- 14 CFR 91.405(a) – Maintenance required
- 14 CFR 91.409(a)(2) – Inspections
- 14 CFR 91.417(a) and (b) – Maintenance records
- 14 CFR 91.119(b) – Minimum safe altitudes, over congested areas
- 14 CFR 91.119(c) – Minimum safe altitudes, over other than congested areas
- 14 CFR 91.121 – Altimeter settings
- 14 CFR 91.151(a) – Fuel requirements for flight in VFR conditions

Extent of, and Reason for Seeking Relief

14 CFR 61.133 Commercial pilot privileges and limitations

This section requires the PIC of an aircraft engaged in operations for compensation or hire have qualifications listed in 61.123, 125, 127, and 129. As argued and granted previously, AIS requests that in lieu of these requirements that the PIC meet the requirements of:

- 14 CFR 61.113(a) and (b) – Private pilot privileges and limitations
- 14 CFR 61.23 – Medical certificates: Requirement and duration
- 14 CFR 61.56 – Flight review
- 14 CFR 61.57 – Recent flight experience: Pilot in command

14 CFR §91.7(a) – Civil aircraft airworthiness

The regulation requires that no person may operate a civil aircraft unless it is in airworthy condition. Because airworthiness certificate has been issued for the aircraft, no FAA regulatory standard exists for determining airworthiness. Given the size of the aircraft and the requirements contained in the Petitioner's Operations Manual for the use of an inspection checklist prior to each flight, an equivalent level of safety will be provided.

14 CFR 91.119(b) – Minimum safe altitudes, congested area

Paragraph (b) of this section states that the minimum safe altitude "over any congested area of a city, town, or settlement, or over any open air assembly of persons, [is] an altitude of 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet of the aircraft." The Petitioner proposes to conduct flights on property owned by, or property under a utility easement that may lie in areas considered to be "congested". These flights will be hovering flights at or near zero ground speed, and at altitudes below 100' AGL. They will be conducted entirely over utility property or easements, and at an altitude and in a fashion that should a power unit fail, procedures that will ensure that it will not drift from utility property.

14 CFR 91.119(c) – Minimum safe altitudes, other than congested area
Paragraph (c) of this section states that the minimum altitude allowed "over other than congested areas [be] 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 operations proposed by this exemption request require that operations be conducted in close proximity to structures. Under section (c), the Petitioner requests that no restrictions with regard to minimum distances from structures, vessels, and vehicles, and a 200-foot minimum distance from persons not associated with the operation be granted. Petitioner further requests that with regard to crew required for the operation of the UAS, *no* minimum distance be required.

Under certain conditions—such as inspection of conductors strung across several consecutive spans of a transmission line—a single flight of as long as a mile might be required. In this instance, in order for the PIC to maintain the necessary spatial orientation and for the Visual Observer to assure situational awareness, the crew proposes to follow the UAV from a safe distance in a moving vehicle.

14 CFR 91.121 – Altimeter settings
This regulation requires the pilot to set the altimeter to the current "altimeter setting" or ground elevation along the route of flight. This regulation does not pertain to the operation of UAS because the altimeter is specifically intended to be read by the onboard pilot. Neither the pilot nor altimeter are onboard the UAV. Operations will typically be avoided around airports, so there will not be a local altimeter setting available. Also, there is no "route of flight", as all operations will be within visual range of the PIC. The PIC will need to know the height of the aircraft above the ground primarily to keep from venturing into airspace used by manned aircraft. That information is sent to the pilot in real time via telemetry, and is rendered in feet AGL. This arrangement satisfies the intent of the regulation and provides for an equivalent degree of safety.

14 CFR 91.151(a) and (b) – Fuel requirements for flight in VFR conditions
Paragraph (a) of this regulation states in pertinent part, "no person may begin a flight in an airplane unless there is enough fuel to fly to the first point of intended landing and, assuming normal cruising speed...during the day, to fly after that for at least 30 minutes." This part pertains to airplanes, and while a "multirotor" UAS is not certificated and is therefore neither an airplane nor rotorcraft, its flight characteristics are inarguably more closely associated with a rotorcraft than an airplane, so the appropriate paragraph would be (b) rotorcraft, and not (a) airplanes. Paragraph (b) requires the craft to be able to fly to the point of intended landing and thereafter for 20 minutes.

The Petitioner proposes to employ a UAS that has an 18-minute battery life, and can therefore not comply with the 20-minute requirement of 91.151(b). However, telemetry provides a constant indication of remaining power, along with a low-voltage visual and audible warning when the power gets critically low. In this event, the UAS can be landed safely within a minute or two while maintaining some power in reserve. The Petitioner requests that the reserve requirement be set at 20% instead of 20 minutes.

14 CFR §91.405(a) – Maintenance required
This section requires periodic inspections, repairs made as necessary, and those procedures documented. Inspections will be performed before the first flight of each day and repairs completed in accordance with the AIS Operations Manual, thus assuring an equivalent level of safety.

14 CFR § 91.407 Operation after maintenance, preventive maintenance, rebuilding, or alteration
This section requires that after maintenance, proper entries be made in the aircraft record, and that necessary certain checks, including flight checks be performed. Flight checks will be performed prior to the first flight of the day in accordance with the AIS Operations Manual to ensure proper functionality of all systems and components.

14 CFR §91.409 – Inspections
This section requires that annual and 100-hour inspections be performed on certain aircraft, and that they be returned to service by properly authorized personnel. The petitioner asserts that the personnel that operate the UAS have received training on its proper care and maintenance, and are as qualified to determine that it is in condition for safe flight than the personnel authorized by 43.7, thereby achieving an equivalent level of safety.

14 CFR 91.417(a) & (b) – Maintenance records
This section describes requirements for maintenance recordkeeping. The Petitioner will maintain records of all inspections, maintenance, alterations, and repairs in accordance with the AIS form AIS-002. They will be kept on site by the PIC and will be available to the Administrator or his representative.

Public Interest
No one could disagree that keeping the power flowing safely across America is in the public interest. Aerial Patrol Inc. has been in the business of helping keep the oil, gas, and electricity flowing for over 30 years using conventional manned helicopters. We view the use of UAS as a useful tool that we can use to augment our current capabilities. There are places, especially where noise is a concern, that we cannot currently provide our patrol and inspection service. There are other situations, such as hovering over an electric substation or a natural gas pumping station where our hazard mitigation assessment has determined that the risk of a manned aircraft loaded with jet fuel is too great for the mission to be attempted. Often, we have to perform detailed inspections (See attached photos) while hovering in the middle of the Height-Velocity (HV) curve. There are other times when the sheer size of a Bell Jet Ranger prohibits us from maneuvering into the position where we need to be to conduct our inspection.

We believe that a small UAS could allow us to perform certain of our current missions more safely and effectively, while at the same time having less environmental impact on the public. We are not requesting that we be allowed to do anything we are not currently doing, only that we be allowed to do it with a lightweight, quiet UAV instead of a 3,200-pound turbine helicopter. We anticipate that virtually all of our flights will continue to be conducted in manned helicopters, and that the UAS will be used for

niche missions where its unique flight characteristics and capabilities suit the mission profile and requirements.

Level of Safety

We believe that our proposed operation under this requested exemption will be performed at a level of safety equivalent to, or exceeding current methods employed. As stated before, most of the missions are currently being performed in a 3,200-pound Jet Ranger with a crew of three. Because of HV considerations, power requirements, or physical size constraints, some mission can't be performed safely in a helicopter and have to be done by a man climbing a tower or pole, or someone going into a place on foot where gas is leaking. Opposed to the current procedures employed, we believe that the lightweight, fuel-less aircraft remotely piloted from a safe distance, is a much safer and more practicable means of conducting these niche operations.

The operations proposed by this exemption request require that operations be conducted in close proximity to structures. The Petitioner understands the need to keep aircraft at a safe distance from the general public, but *500 feet is the minimum for student pilots operating a 10,000-pound multiengine airplane with 200 gallons of highly flammable fuel onboard*. Even a 10,000-pound helicopter operated by a student pilot can fly closer than *that* to persons on the surface. The Petitioner argues that a 20-pound multirotor aircraft with a sextuple-redundancy powerplant operating at a maximum speed of 30 mph would pose much less of a hazard than either of these previous examples.

Our affiliated company has previously had a waiver issued under Order 8900.1, Volume 3, Chapter 7, Section 1, Paragraph 3-185 C and F, which allowed flight in fixed wing aircraft as close as 200 feet from persons, with *no restrictions* regarding distances from vessels, vehicles, or structures. The Petitioner believes that an equivalent level of safety can be achieved with the practices and safeguards contained in its Operating Manual.

Under paragraph (c), the Petitioner requests that no restrictions with regard to minimum distances from structures, vessels, and vehicles, and a 200-foot minimum distance from persons not associated with the UAS operation be granted. Petitioner further requests that with regard to crew required for the operation of the UAS, no minimum distance be required.

Our parent company operates helicopters over congested areas in compliance with 91.119(a), which states in pertinent part that if "a power unit fails, an emergency landing without undue hazard to persons or property on the surface" and (d). Since our operations are conducted directly above the utility right-of-way (ROW), even though we operate below the altitudes of 91.119(b) or (c), we can always land on their easement, and therefore cause no undue hazard to persons or property on the surface. Our proposed UAS operation will operate under those same parameters. We propose that the UAV fly at or below 100' AGL, and wholly within the lateral boundaries of the utility's right-of-way/easement.

Our UAS has three pairs of opposing powerplants, and it will automatically and instantly match the thrust of the opposing powerplant in the event of a loss of power. Under this condition, it maintains full controllability and adequate power to affect a normal landing on the ROW. Should the craft lose GPS data, it will automatically enter a preprogrammed descent and land protocol. If the control link between the UAS and the PIC should be compromised, it will automatically initiate a return-to-launch (return to home) maneuver.

We have discussed this potential enterprise with the electric utility company engineers, and they feel certain that because our craft is relatively small and is mostly made from non-conductive materials, that it poses no serious threat to any of their high-voltage components. Conversely, these high-voltage transmission lines and their electromagnetic fields don't pose any significant threat to the electronics/communication links onboard the aircraft. Obviously, we won't operate at such a close proximity that the UAV's controllability is compromised.

With respect to operating the UAS from a moving vehicle, the Petitioner believes and it has been demonstrated using model aircraft that the closer the PIC is to the aircraft, the more precise control he has over the craft. Additionally the closer he is to the aircraft the earlier he can detect an anomaly, and can react to it therefore mitigating any potential adverse effects. Our proposed operation requires the aircraft to fly in close proximity to powerlines and other such structures, and it makes no sense for the PIC to have to continuously relocate and conduct separate missions each time the aircraft moves a few hundred feet. Control of the aircraft from a moving vehicle *enhances safety* under this scenario; therefore we request that we not have this restriction.

As stated earlier, the requirement of a 20-minute fuel reserve for rotorcraft, which is the more appropriate aircraft to equate a multirotor to, is not germane to our operation because a rotorcraft's fuel may not be usable, and is subject to operation of pumps and other devices and systems that may actually limit its availability. Out of trim (uncoordinated) flight can limit fuel's availability, and in turbulent conditions, sloshing may cause intermittent power surges. All these factors that contribute to the 20-minute reserve aren't relevant to electric-powered aircraft, which have no limitations on the availability of its power.

Also, the regulation states that prior to beginning a flight the rotorcraft have enough fuel to fly to the point of intended landing and to fly afterwards for 20 minutes. Since in our typical scenario the departure point and landing point are the same, *no* fuel is required to fly between those points, so prior to beginning the flight the only fuel required to be onboard is 20 minutes. The regulation does not state how much if any, fuel has to be in reserve upon landing. Our UAV has 18 minutes of battery life, which should be sufficient to begin a flight, and we propose to land with 20% or 3.5 minutes held in reserve. 20% voltage is a level that allows for full power with reserve, which the Petitioner believes meets or exceeds the fuel requirements of 91.151.

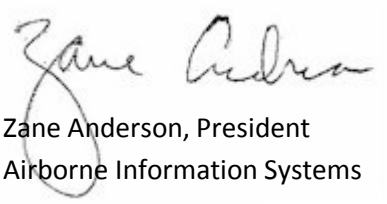
Publication Summary

Pursuant to 14 CFR Part 11, the following summary is provided for publication in the Federal Register
Petitioner seeks an exemption from the following rules:

- 14 CFR part 21 – Certification procedures for products and parts
- 14 CFR 45.23(b) – Display of marks
- 14 CFR 61.133(a) – Commercial pilot privileges and limitations
- 14 CFR 91.7(a) – Civil aircraft airworthiness
- 14 CFR 91.7(b) – Civil aircraft airworthiness
- 14 CFR 91.9(b)(2) – Civil aircraft flight manual, marking, and placard requirements
- 14 CFR 91.103 – Preflight action
- 14 CFR 91.109(a) – Flight instruction; simulated instrument flight and certain flight tests
- 14 CFR 91.119(b) – Minimum safe altitudes, over congested areas
- 14 CFR 91.119(c) – Minimum safe altitudes, over other than congested areas
- 14 CFR 91.121 – Altimeter settings
- 14 CFR 91.151(a) – Fuel requirements for flight in VFR conditions
- 14 CFR 91.203(a) and (b) – Civil aircraft: Certifications required
- 14 CFR 91.405(a) – Maintenance required
- 14 CFR 91.409(a)(2) – Inspections
- 14 CFR 91.417(a) and (b) – Maintenance records

The purpose of the proposed exemption is for the operation of UAS weighing less than 55 pounds for the inspection of powerlines and pipelines and associated equipment. These aircraft will be operated above the utility's right-of-ways below 400 feet AGL. The maximum speed is 30 mph, and they will be operated by visual line of sight with the pilot. Additionally, a visual observer will maintain a vigil for other aircraft and incursions into the proposed flight area. All flights will be conducted in daytime VMC by pilots holding at least a Private Pilot Certificate and a minimum of a current Class 3 Medical Certificate. Additionally, the Pilot In Command will maintain currency requirements of FAR 61.56 and 61.57.

Respectfully submitted,



Zane Anderson, President
Airborne Information Systems

Aircraft

The aircraft the Petitioner purposes is a DJI S900, equipped with a DJI A2 flight controller/autopilot, capable of preprogrammed autonomous functions, including:

- Auto hover
- Auto descent and land
- Auto orientation
- Rotation around a GPS waypoint
- Multiple assignable waypoint flight planning

Among the built-in safety features of the S900 are:

- Automatic compensation upon loss of a power unit
- Upon loss of GPS signal, the aircraft will conduct an autonomous emergency landing without any action by the PIC.
- Upon loss of control link, the aircraft will automatically conduct a “return to home” (return to launch) procedure.
- When low voltage is indicated, the aircraft will automatically enter a descend and land procedure.

Telemetry linked to the pilot’s display includes:

- Altitude (AGL)
- Speed (Knots)
- Distance from home (Feet)
- Battery life (Percent)

Physical Specifications

- Diagonal Dimension 35.4 inches
- Height 14.2 inches
- Takeoff Weight 10.4 ~ 18.1 pounds
- Hover Time 18min @ 15 pounds TO Weight