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

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

June 8, 2015

Exemption No. 11774
Regulatory Docket No. FAA–2015–0870

Mr. Joshua Furnald
Ramaker & Associates, Inc.
1120 Dallas Street
Sauk City, WI 53583

Dear Mr. Furnald:

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 March 25, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Ramaker & Associates, Inc. (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial photography, mapping, surveying, videography, and inspections.

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 are the DJI Phantom 2 Vision+, DJI Inspire 1, Draganflyer X4-P, and Draganflyer X4ES.

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, Ramaker & Associates, Inc. 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.

[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.

Conditions and Limitations

In this grant of exemption, Ramaker & Associates, Inc. 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 Phantom 2 Vision+, DJI Inspire 1, Draganflyer X4-P, and Draganflyer X4ES 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 June 30, 2017, unless sooner superseded or rescinded.

Sincerely,

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

Enclosures

Table of Contents

APPLICATION FOR CERTIFICATE OF AUTHORIZATION

March 25, 2015
U.S. Dept. of Transportation, Docket Operations
West Building Ground Floor, Room w12-140
1200 New Jersey Avenue, SE.
Washington, DC 20590

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

Dear Sir or Madam:

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 (the "Reform Act") and 14 C.F.R. Part 11, Ramaker & Associates, Inc. ("Ramaker") seeks an exemption from Federal Aviation Regulations ("FARs") detailed below for the following described Unmanned Aerial System, which includes an Unmanned Aircraft (UAV) and ground station-based equipment and crew:

I. THE UNMANNED AIRCRAFT ("UAV"):

A. UAV Model #1

- A lightweight (3.5 lb. gross weight with all on-board equipment), battery operated 4-motor rotorcraft in the form of a quadcopter that takes off and lands vertically. Manufactured by DJI, Model - Phantom 2 Vision+

SEE ATTACHED HERETO: Phantom2 Vision+, Pilot Training Guide, Quick Start Guide, Release Notes, User Manual, Battery Safety Guidelines ("Exhibit 1")

THE UAV

- An on-board flight computer with GPS navigation and location ability that receives signals for flight controls from a ground-based transmitter/controller;
- An on-board camera capable of capturing imagery in the form of full color, high definition still photos and video;
- An on-board telemetry system that delivers flight data from the on-board flight computer to the on-board radio transmitter including altitude AGL, horizontal and vertical speed, compass direction of flight and direction back to its launch site;
- Various safety systems including return to launch point in case of communication or mechanical failure.

THE GROUND STATION BASED PART OF THE SYSTEM

- A Pilot in Command (PIC) in operational control of a flight operation from beginning to end and who controls the UAV while in the air;
- A Handheld 100 mW, 5.8 GHZ radio transmitter/controller operated by the PIC to control the UAV while in flight;
- A 20 dBm Range Extender operating at 2.4 MHz.
- A Visual Observer (VO) is a person who provides a second pair of eyes to visually track the UAV while in flight.

B. UAV MODEL #2

- A lightweight UAV (7.5 lb. gross weight with all on-board equipment), battery operated 4-motor rotorcraft in the form of a quadcopter that takes off and lands vertically. Manufactured by DJI, Model – Inspire 1

SEE ATTACHED HERETO FOR DETAILS: Inspire 1 - Maintenance Manual, Quick Start Guide, Safety Guidelines, User Manual with Features, Intelligent Flight Battery Safety Guidelines ("Exhibit 2")

THE UAV SUMMARY

- An on-board flight computer with GPS navigation and location ability that receives signals for flight controls from a ground-based transmitter/controller;
- An on-board camera capable of capturing imagery in the form of full color, high definition still photos and video;
- An on-board telemetry system that delivers flight data from the on-board flight computer to the on-board radio transmitter including altitude AGL, horizontal and vertical speed, compass direction of flight and direction back to its launch site;
- Various safety systems including return to launch point in case of communication or mechanical failure.

SUMMARY OF THE GROUND STATION BASED PART OF THE SYSTEM

- A Pilot in Command (PIC) in operational control of a flight operation from beginning to end and who controls the UAV while in the air;
- A 100mW, 2.4GHz radio transmitter/controller operated by the PIC to control the UAV while in flight;
- A 20 dBm Ranger Extender operating at 2412MHZ – 2462 MHZ

- A radio receiver receiving live video and flight data from the on-board camera and computer projects it all together onto a screen for the PIC to view during flight;
- A Visual Observer (VO) is a person who provides a second pair of eyes to visually track the UAV while in flight.

C. UAV MODEL #3

- A lightweight UAV (5.5 lb. gross weight with all on-board equipment), battery operated 4-motor rotorcraft in the form of a quadcopter that takes off and lands vertically. Manufactured by Draganflyer, Model – X4-P

SEE ATTACHED HERETO FOR DETAILS: X4-P User Manual ("Exhibit 3")

THE UAV SUMMARY

- An on-board flight computer with GPS navigation and location ability that receives signals for flight controls from a ground-based transmitter/controller;
- An on-board camera capable of capturing imagery in the form of full color, high definition still photos and video;
- An on-board telemetry system that delivers flight data from the on-board flight computer to the on-board radio transmitter including altitude AGL, horizontal and vertical speed, compass direction of flight and direction back to its launch site;
- Various safety systems including return to launch point in case of communication or mechanical failure.

SUMMARY OF THE GROUND STATION BASED PART OF THE SYSTEM

- A Pilot in Command (PIC) in operational control of a flight operation from beginning to end and who controls the UAV while in the air;
- A 100mW, 2.4GHz radio transmitter/controller operated by the PIC to control the UAV while in flight;
- A radio receiver receiving live video and flight data from the on-board camera and computer projects it all together onto a screen for the PIC to view during flight;
- A Visual Observer (VO) is a person who provides a second pair of eyes to visually track the UAV while in flight.
- Data Link Type: 2.4 GHz two way
- Data Transmission Power: 50 mW (18 dBm)
- Video Link Type: 5.8 GHz two way
- Video Transmission Power - 19 dBm

D. UAV MODEL #4

- A lightweight UAV (6.0 lb. gross weight with all on-board equipment), battery operated 4-motor rotorcraft in the form of a quadcopter that takes off and lands vertically. Manufactured by Draganflyer, Model – X4ES

See attached hereto for details: User Manual ("Exhibit 4")

THE UAV SUMMARY

- An on-board flight computer with GPS navigation and location ability that receives signals for flight controls from a ground-based transmitter/controller;
- An on-board camera capable of capturing imagery in the form of full color, high definition still photos and video;
- An on-board telemetry system that delivers flight data from the on-board flight computer to the on-board radio transmitter including altitude AGL, horizontal and vertical speed, compass direction of flight and direction back to its launch site;
- Various safety systems including return to launch point in case of communication or mechanical failure.
- Advanced Flight Data Control – recorded to Gb mirco SD card on UAV

SUMMARY OF THE GROUND STATION BASED PART OF THE SYSTEM

- A Pilot in Command (PIC) in operational control of a flight operation from beginning to end and who controls the UAV while in the air;
- Data Link Type: 2.4 GHz two way
- Data Transmission Power: 50 mW (18 dBm)
- Video Link Type: 5.8 GHz two way
- Video Transmission Power - 19 dBm
- Flight Data Controller – saved to internal memory
- A Visual Observer (VO) is a person who provides a second pair of eyes to visually track the UAV while in flight.

II. PROPOSED COMMERCIAL USE OF UAV

The requested exemption would support an application for a commercial Certificate of

Authorization to use the above described UAV to support the following:

- Aerial inspection of cellular, television or radio towers and related equipment affixed to the towers ("Communication Facilities")
- Aerial mapping of uninhabited parcels of land exceeding two acres
- Aerial surveying and inspection of large-scale, commercial construction projects
- Aerial Videography of real estate
- Aerial inspection of commercial structures

III. SAFETY IS INCREASED AND DANGER REDUCED BY THE PROPOSED UAV USAGE

The UAVs are safer than full-scale aircraft because UAVs are powered by batteries, are smaller, lighter and more maneuverable than larger aircraft running on combustible fuel. Additionally, UAVs operate at lower altitudes with no people on board and will thereby reduce current risk levels and enhance safety and diminish the likelihood of death or serious bodily injury. With a small payload, flights below 400 feet AGL, and a maximum flight time of only 45 minutes, UAVs offer little or no risk to national security, the public, air safety or communication.

The proposed UAV use to inspect Communication Facilities will reduce hazards to persons in general. For instance, individuals who currently conduct Communication Facility inspections by physically climbing, inspecting and photographing Communication Facilities is thought to be the most dangerous occupation in America. Thirteen climbers died working on Communication Facilities in 2013. All but two of the accidents were on cell or cell-related sites.[1] According to OSHA, tower climbing was the most dangerous job in America in 2006.[2] More fatalities occurred in 2013 than the previous two years combined. Similarly, the petitioner has agreed to refrain from piloting the UAV over non-participants of the commercial activity or in populated areas.[3]

The UAV's are effective and preferable tools for the type of photography proposed by Petitioner. Low level, aerial, oblique photos and video from several angles are far more effective than ground-based imagery for displaying the characteristics of large, complex properties, commercial properties, construction sites and land parcels. Companies in the past have chartered 2-seat full-sized helicopters or small piloted aircraft for this purpose, which has proven to be both costly

---

[1] Probulica, *Feds to Look Harder at Cell Carriers When Tower Climbers Die,* http://www.propublica.org/article/feds-to-look-harder-at-cell-carriers-when-tower-climbers-die, accessed March 15, 2015.
[2] United States Department of Labor – Occupational Safety & Health Administration ("OSHA"),https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=SPEECHES&p_id=1267, accessed March 15, 2015.
[3] OSHA, https://www.osha.gov/doc/topics/communicationtower/index.html, accessed March 15, 2015.

and dangerous. The benefits of reduced cost and improved quality of presentation and safety from the UAV will be valuable to and benefit the Petitioner and the public.

Additionally, we request that we be allowed to use our system to benefit first responders nearby when practicable who might require assistance, including fire fighters, the police, the sheriff, et al., while remaining subject to all limitations cited in this application as we do so.

IV. THE APPLICANT WILL FOLLOW RESTRICTIONS DICTATED BY N 8900.227

The UAV will be operated with both a PIC and a VO in accordance with FAA Policy N 8900.227 "Operational Requirements for UAV" and with the following Restrictions:

(a) No flight shall be made with a UAV Gross weight exceeding 50 pounds;
(b) All operations shall occur in FAA Class G airspace at no more than 400 feet AGL, at an airspeed of no more than 25 knots and no further than 3/4 Nautical Miles (NM) from the PIC;
(c) All operations shall utilize a visual observer (VO). The VO and PIC must be able to communicate by voice at all times during a flight operation;
(d) Flights over private property shall obtain the permission of the property owner prior to commencement of site inspection, videography etc.
(e) The PICs must have a private pilot's license or a commercial pilot's license, and at minimum, a Class III medical certificate. PICs must have accumulated and logged, in a manner consistent with 14 CFR §61.51 (b), a minimum of 100 flight cycles and 25 hours of total time as a UAV rotorcraft pilot and at least ten hours logged as a UAV pilot with a similar UAV type;
(f) All required permits will be obtained from state and local government prior to operation;
(g) The UAV will not be operated over densely populated areas or at air shows;
(h) The UAV shall be observable by the PIC or VO at all times without any visual aids other than prescription glasses or contact lenses
(i) The UAV will not be operated over any open-air assembly of people;
(j) The UAV will not be operated over heavily trafficked roads;
(k) The UAV will be operated below 200 feet AGL when 5 nautical miles or less from an airport or heliport;
(m) Operations will be restricted to day only and weather conditions equivalent to VFR;
(n) The PIC will brief the VO and property owner about the operation and risk before the first flight at each new location;
(o) No flight may be made without a Pre-Flight Inspection by the PIC before each operation to ascertain that the UAV is in a condition safe for flight.

V. APPLICATION SUMMARY

The PIC and VO will meet the requirements outlined in FAA Policy N 8900.227 §16 Personnel Qualifications. Additionally, the PIC and VO will perform maintenance on the system and will complete a course of maintenance instruction as part of their initial training.

Petitioner submits that the combination of the UAV's light weight, flight performance and ability, fully qualified flight crew and strict operation under the guidelines established in N 8900.227, and under all of the Restrictions (a) through (o) listed above, the FAA can have full confidence that the operation will have an equivalent or greater level of safety than manned aircraft performing the same mission.

The name and contact information of the applicant:

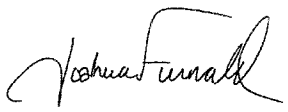
Ramaker & Associates, Inc.
1120 Dallas Street
Sauk City, WI 53583
(608) 643-4100
www.Ramaker.com

The regulations from which the exemption is requested are listed below. Beside each regulation number is the page of the attached Addendum upon which each may be found together with our proposed equivalent level of safety for each regulation:

This COA follows all precedent established by the FAA and breaks no new legal ground. This COA is in accordance with protocols outlined in this petition for exemption, the enclosed manuals for respective UAVs ("Aircraft Operations Manual"), and any other requirements established by the FAA pursuant to Section 333 of the Reform Act.

The Petitioner is prepared to modify or amend any part of this request to satisfy the need for an equivalent level of safety. Please contact us at any time if you require additional information or clarification. We look forward to working with your office.

Sincerely,



Joshua Furnald, Esq.
In-House Counsel for Ramaker & Associates, Inc.

Addendum

Ramaker & Associates, Inc. requests an exemption from the aforementioned regulations as well as any additional regulations that may technically apply to the operation of the UAV.

I. INTRODUCTION TO PETITIONER

Ramaker and Associates, Inc. ("Ramaker") is an engineering and consulting firm based in Sauk City, Wisconsin. Ramaker is an employee owned entity with more than 20 years of experience successfully designing, monitoring and completing complex engineering projects in all of the United States. Ramaker's primary focus is on aquatic design, architecture, civil, environmental, MEP, surveying, technology and telecommunications.

II. RELEVANT AUTHORITY RELATED TO PETITIONER'S CERTIFICATE OF AUTHORIZATION

This petition for exemption is submitted to advance Congress' goal of integrating UAV safely into the National Airspace System ("NAS"). In the Reform Act, Congress directed the FAA "to safely accelerate the integration of civil unmanned aircraft systems in the national airspace system," and, under Section 333 of that law, directed the Secretary of Transportation ("FAA Administrator") to consider whether certain unmanned aircraft systems may operate safely in the NAS before completion of the rule making required under Section 332 of the Reform Act.[4]

In making this determination, the FAA Administrator is required to determine which types of UAV do not create a hazard to users of the NAS or the public or pose a threat to national security in light of the following:

- The UAV size, weight, speed, and operational capability;
- Operation of the UAV in close proximity to airports and populated areas; and
- Operation of the UAV within visual line-of-sight of the operator.[5]

---

[4] Reform Act, Supra Note 1
[5] *Id.* at § 333(b)(1).

If the Secretary determines that such vehicles "may operate safely in the National Airspace System, the Secretary **shall establish requirements** for the safe operation of such aircraft in the National Airspace System."[6]

The FAA Administrator has general authority to grant exemptions from FAA safety regulations and minimum standards when the Administrator decides a requested exemption is in the public interest.[7] A party requesting an exemption must explain the reasons why the exemption: (1) would benefit the public as a whole and; (2) would not adversely affect safety or how it would provide a level of safety at least equal to the existing rules.[8] Therefore, the Petitioner will demonstrate how the proposed UAV infrastructure inspection will benefit the public and that the proposed operation will not adversely affect safety of the public and to those operating in the NAS.

III. QUALIFICATION FOR APPROVAL UNDER SECTION 333 OF THE REFORM ACT

A. The Petitioner's Proposed Usage Does not Create a Hazard to Users of the NAS or the Public Because of the Reduced Size, Weight, Speed and Operational Capability of the UAV.

The proposed operations in this petition for exemption qualify for expedited approval under Section 333 of the Reform Act. Each of the statutory criteria and other potentially relevant factors are satisfied.

The proposed operations would permit use of small and relatively inexpensive UAVs under controlled conditions in airspace that is: (1) limited; (2) predetermined; (3) controlled as to access, and; (4) would pose an increased level of safety beyond what exists when the proposed services are completed by manned, full size aircraft or physical accessing and/or climbing the Communication Facilities, construction sites or buildings.

---

[6] *Id.* § 333(c)(emphasis added).
[7] *See* 49 U.S.C. § 44701(f) (authorizing the grant of exemptions from a requirement of regulations prescribed purUAnt to section 44701 (a) - (b) and sections 44702-44716).
[8] *See* 14 C.F.R. § 11.81; FAA, Petition for Exemptions

Petitioner's UAVs weigh less than 50 pounds (including payload). Petitioner's UAV's operate at a speed of no more than 25 knots and have the capability to hover and move in vertical and horizontal planes simultaneously.

Such operations will insure that the UAV will "not create a hazard to users of the National Airspace System or the public" given the small size of the UAV involved and the restricted environment within which it will operate. This petition for exemption falls squarely within that zone of safety in which Congress envisioned that the FAA must, by exemption, allow commercial operations of UAV to commence immediately.

B. The Petitioner's Proposed Usage Does not Create a Hazard to Users of the NAS or the Public because the Operation of the UAV will be conducted in Controlled or Sterile Locations, Away from Airports and in Unpopulated Areas.

The Petitioner's proposed usage does not create a hazard to users of the NAS or the public because the UAV's shall be flown on Private Property after permission is secured from the Landlord or Agent. All concerned parties will be given notice prior to the operations. Additionally, Petitioner envisions UAV operations be limited to Aerial inspection of Communication facilities, large-scale, commercial construction projects and commercial structures.

C. The Petitioner's Proposed Usage Does not Create a Hazard to Users of the NAS or the Public because Operation of UAVs will be conducted within VLOS of the PIC or VO at all Times

Petitioner's UAV will operate in line-of-sight and only in an area described here and in Exhibits 1, 2, and 3. Petitioner shall not utilize visual aids other than prescribed glasses or contact lenses. Petitioner shall always:

- Determine the UAV's proximity to all aviation activities (and other hazards) and
- Exercise effective control of the UAV and
- Comply with §§ 91.111, 91.113., 91.115, and
- Prevent the UAV's from creating a collision hazard and
- VO will inform the PIC when losing sufficient visual contact with the UAV.

D. The UAV will remain below 400 AGL at all times during the operation.

The Petitioner's UAV will not fly above 400 AGL at any time. The Petitioner will launch, operate and recover the UAV from the ground level. Petitioner will not launch, operate or recover the UAV from a structure or building. The inspection method that Petitioner will utilize will not require the UAV to pass above 400 feet AGL to successfully complete any inspection. Therefore, Petitioner's proposed usage will not pose a hazard to the NAS because the UAV will not operate above 400AGL at any time during the duration of the flight.

Given the foregoing, the Petitioner's proposed usage does not pose a hazard to the NAS or to the public. Considering the clear statutory language in Section 333 of the Reform Act, the authority contained in the Federal Aviation Act, as amended, the equivalent level of safety to the public and to the men and women conducting infrastructure inspections, and the reduction in environmental effects, the grant of the requested exemptions is in the public interest. Accordingly, Petitioner respectfully requests that the FAA grant the requested exemption without delay.

IV. REGULATIONS FROM WHICH EXEMPTION IS REQUESTED

The Federal Aviation Act expressly grants the FAA Administrator the authority to issue exemptions. By its terms, this statutory authority includes exempting civil aircraft, as the term is defined under the Act, including UAV, from its safety regulations and minimum standards when the Administrator decides a requested exemption is in the public interest.[9]

Petitioner asks an exemption from several interrelated provisions of 14 C.F.R. Parts 21, 45 and 91 for purposes of conducting aerial surveys and inspections using UAV. Listed below are: (1) the specific sections of 14 C.F.R. for which exemption is sought; and (2) the operating procedures and safeguards that Petitioner

[9] *See* 49 U.S.C. § 44701(f) authorizing the grant of exemptions from requirements of regulations prescribed pursuant to §§ 44710(a) and (b), §§ 44702 – 44716.

has established which will ensure a level of safety equal to or better than the rules from which exemption is sought.[10]

A. 14 C.F.R. Part 21, Subpart H - Airworthiness Certificates and 14 C.F.R. §91.203(a)(1).

The Petitioner seeks an exemption from 14 C.F.R. Part 21, Subpart H, which establishes the procedural requirements for the issuance of airworthiness certificates as required by 14 C.F.R§ 91.203(a)(1). Given the size and limited operating area associated with the UAV to be utilized by the Petitioner, an exemption from Part 21, Subpart H meets the requirements of an equivalent level of safety under Part 11 and Section 333 of the Reform Act.

The Federal Aviation Act[11] and Section 333 of the Reform Act[12] both authorize the FAA to exempt aircraft from the requirement for an airworthiness certificate, upon consideration of the size, weight, speed, operational capability and proximity to airports and populated areas of the particular UAV. In all cases, an analysis of these criteria demonstrates that the UAV operated without an airworthiness certificate, in the restricted environment and under the conditions proposed will be at least as safe, or safer, than a conventional rotorcraft operating with an airworthiness certificate without the restrictions and conditions of the proposed UAV operations.

Equivalent Level of Safety

The UAV to be operated hereunder is less than 50 lbs. fully loaded, carries neither a pilot nor passenger, carries no explosive materials or flammable liquid fuels, and operates exclusively within a secured area as set out in the Manual. Unlike other civil aircraft, the proposed operations in this petition for exemption will be controlled and monitored by the operator, pursuant to the Manual's requirements. Moreover, the FAA will have advance notice of all operations conducted under this exemption.

---

[10] *See* 14 C.F.R. § 11.81(e) which requires a petition for exemption to include: "the reasons why granting the exemption would not adversely affect safety, or how the exemption would provide a level of safety at least equal to that provided by the rule from which you seek exemption."

[11] *See* 49 U.S.C. § 44701(f).

[12] *See* Reform Act, *Supra note 1*

These safety enhancements, which already apply to civil aircraft operated in connection with existing inspection operations, provide a greater degree of safety to the public and property owners than conventional operations conducted with airworthiness certificates issued under 14 C.F.R. Part 21, Subpart H. Lastly, application of these same criteria demonstrates that there is no credible threat to national security posed by the UAV, due to its size, speed of operation, location of operation, lack of explosive materials or flammable liquid fuels, and inability to carry a substantial external load.

B. 14 C.F.R. Part 27: Airworthiness Standards: Normal Category Rotorcraft.

14 C.F.R. Part 27 sets forth the procedural requirements for airworthiness certification of normal category rotorcraft. To the extent the Petitioner's UAV would otherwise require certification under Part 27, as a rotorcraft, Petitioner requests an exemption from Part 27's airworthiness standards for the same reasons identified in the exemption request from 14 C.F.R. Part 21, Subpart H.

C. Aircraft Marking and Identification Requirements: 14 C.F.R. §§ 91.9(c), 45.23(b) and 45.27(a).

This petition seeks an exemption from the aircraft marking and identification requirements of 14 C.F.R. §§ 91.9(c), 45.23(b), and 45.27(a).

14 C.F.R. § 91.9(c), Civil aircraft flight manual, marking, and placard requirements, provides that:

> No person may operate a U.S.-registered civil aircraft unless that aircraft is identified in accordance with part 45 of this chapter.[13]

14 C.F.R. § 45.23(b), Markings of the Aircraft, states:

> When marks include only the Roman capital letter "N" and the registration number is displayed on limited, restricted or light-sport category aircraft or experimental or provisionally certificated aircraft, the operator must also display on that aircraft near each entrance to the cabin, cockpit, or pilot station, in letters not less than 2 inches nor more than 6 inches high, the words "limited,"

---

[13] 14 C.F.R. § 91.9(c).

"restricted," "light-sport," "experimental," or "provisional," as applicable.[14]

14 C.F.R. § 45.27(a), Rotorcraft, states:

> Each operator of a rotorcraft must display on that rotorcraft horizontally on both surfaces of the cabin, fuselage, boom, or tail the marks required by §45.23.[15]

Exemption from § 45.23(b) is warranted because the UAV has no entrance to the cabin, cockpit, or pilot station on which the registration number can be placed. Moreover, given the size of the UAV, two-inch lettering would be impossible.

Given the nature of the specific relief sought by this exemption request, Petitioner requires relief from the associated marking and identification requirements of § 45.27(a) and § 91.9(c), which would require compliance with § 45.23(b).

Equivalent Level of Safety

An equivalent level of safety for exemptions to the aircraft marking and identification requirements of §§ 91.9(c), 45.23(b), and 45.27(a), will be provided by having the UAV marked on its fuselage as required by § 45.29(f) where the pilot, observer, and others working with the UAV will see the identification of the UAV as "Experimental." Additionally, Petitioner will ensure compliance with any requests of UAV marking by the FAA.

The FAA has issued the following exemptions to the aircraft marking requirements of § 45.23(b): Exemptions Nos. 10700, 8738, 10167 and 10167A.

D. 14 C.F.R. § 61.113 (a) and (b): Private Pilot Privileges and Limitations: Pilot in Command.

This petition seeks an exemption from the private pilot privileges and limitations of §§ 61.113 (a) and (b), which states:

> (a) Except as provided in paragraphs (b) through (h) of this section, no person who holds a private pilot certificate may act as pilot in command of an aircraft that is carrying passengers or property for compensation or hire; nor may that person, for compensation or hire, act as pilot in command of an aircraft.

---

[14] 14 C.F.R. § 45.23(b).
[15] 14 C.F.R. § 45.27(a).

> (b) A private pilot may, for compensation or hire, act as pilot in command of an aircraft in connection with any business or employment if:
>
> > (1) The flight is only incidental to that business or employment; and
> >
> > (2) The aircraft does not carry passengers or property for compensation or hire.[16]
>
> 14 C.F.R. § 61.113(a) limits private pilots to being in command of non-commercial flights.

14 C.F.R. § 61.113(b)(1) provides an exception that allows a private pilot to command an aircraft without passengers or property, in connection with business or employment if "[t]the flight is only incidental to that business or employment."[17] The stated exception likely does not apply to the proposed operations under this petition for exemption, as the flights are not incidental to the proposed aerial surveys and inspections but rather essential to it. Accordingly, the Petitioner seeks an exemption to 14 C.F.R. § 61.113(a)'s commercial limitation and/or 14 C.F.R. § 61.113(b)(1)'s requirement that the flight be incidental to the business to benefit from the exception.

Equivalent Level of Safety

As required by the Manual, Petitioner's UAV operators acting as PIC will hold a commercial and/or private pilot certification and have rotorcraft experience. Because the UAV will not carry a pilot or passengers, the proposed operations can achieve the equivalent level of safety to 14 C.F.R. §§ 61.113 (a) and (b).

Unlike a conventional aircraft that carries the pilot and passengers, the UAV is remotely controlled with no passengers on board. Moreover, the area of operation is controlled and restricted, and all flights are planned, coordinated, and briefed to the appropriate official in advance.

Petitioner can achieve an equivalent level of safety as achieved by current Regulations because the UAV does not carry any pilots or passengers. Further, while helpful, a pilot license will not ensure remote control piloting skills, though

---

[16] 14 C.F.R. § 61.113 (a) and (b).
[17] 14 C.F.R. §61.113 (b)(1)

Petitioner's pilot vetting and training programs will ensure the PIC has substantial experience on the airframe. Further, private pilot licensees will operate Petitioner's UAV with the same skill. The risks attendant to the operation of Petitioner's UAV are far less than the risk levels inherent in the commercial activities outlined in 14 C.F.R. § 61, *et seq.* Thus, allowing Petitioner to operate its UAV with a private pilot as the PIC will exceed current safety levels in relation to 14 C.F.R. §§ 61.113 (a) and (b).

E. 14 C.F.R. § 91.9(B)(2): Civil Aircraft Flight Manual in the Aircraft.

The Petitioner seeks an exemption from the flight manual requirements of 14 C.F.R. § 91.9(b)(2), which states:

> (b) No person may operate a U.S.-registered civil aircraft
>
> (2) For which an Airplane or Rotorcraft Flight Manual is not required by § 21.5 of this chapter, unless there is available in the aircraft a current approved airplane or Rotorcraft Flight Manual, approved manual material, markings, and placards, or any combination thereof.[18]

Given its size, configuration, and load capacity, the UAV has no ability to carry such a manual on the aircraft, not only because there is no pilot on board, but because there is simply no room or capacity to carry such an item on the aircraft.

Equivalent Level of Safety

The safety related purpose of this manual requirement can be equally satisfied by maintaining the UAV flight manual at the ground control point where the pilot flying the UAV will have immediate access to it. Accordingly, Petitioner requests an exemption from § 91.9(b)(2)'s flight manual requirements, on the condition that the UAV flight manual be available at the control point during each operation.

> The FAA has issued the following exemptions to this regulation: Exemption Nos. 8607, 8737, 8738, 9299, 9299A, 9565, 9565B, 10167, 10167A, 10602, 32827, and 10700.

F. 14 C.F.R. § 91.7(a): Civil Aircraft Airworthiness.

This petition seeks an exemption from 14 C.F.R. § 91.7(a), which requires that a civil aircraft be in an airworthy condition to be operated. Inasmuch there

[18] 14 C.F.R. §91.8 (b)(2)

will be no airworthiness certificate issued for the UAV, should this exemption be granted, no FAA regulatory standard will exist for determining airworthiness.

Equivalent Level of Safety

Given the size of the UAV and the requirements contained in the Manual for maintenance and use of safety checklists prior to each flight, an equivalent level of safety will be provided.

> The FAA has issued exemptions to this regulation in the following situations: Exemption Nos. 8607, 8737, 8738, 9299, 9299A, 9565, 9565B, 10167, 10167A, 10602, 32827, and 10700.

G. 14 C.F.R. § 91.103: Preflight Action.

This petition seeks an exemption from § 91.103, which requires a PIC to become familiar with specific information before each flight, including information contained in the FAA approved Flight Manual on board the aircraft.[19] Inasmuch as an FAA approved flight manual will not be provided for the UAV, an exemption is requested.

Equivalent Level of Safety

An equivalent level of safety will be provided by following the Aircraft Operations Manual comprehensive preflight checklist. The PIC will take all actions, including reviewing weather, flight battery requirements, landing and takeoff distances, and aircraft performance data, before initiation of flight.

H. 14 C.F.R. § 91.109(a): Flight Instruction.

The Petitioner seeks an exemption from 14 C.F.R. § 91.109(a), which provides that "no person may operate a civil aircraft (except a manned free balloon) that is being used for flight instruction unless that aircraft has fully functional dual controls."[20] UAV and remotely piloted aircraft, by their design do not have fully functional dual controls. Instead, flight control is accomplished through the use of a control box communicating with the UAV via radio communications.

---

[19] 14 C.F.R. §91.03
[20] 14 C.F.R. § 91.109(a).

Equivalent Level of Safety

Given the size and speed of the UAV, an equivalent level of safe training can still be performed without dual controls because no pilot or passengers are aboard the UAV, and all persons will be a safe distance away should the UAV experience any difficulties during flight instruction.

The FAA has approved exemptions for flight training without fully functional dual controls for a number of aircraft and for flight instruction in experimental aircraft.[21]

I. 14 C.F.R. § 91.119: Minimum Safe Altitudes.

This petition seeks an exemption from the minimum safe altitude requirements of 14 C.F.R.§ 91.119. This Section prescribes the minimum safe altitudes under which aircraft may not operate, including 500 feet above the surface and away from any person, vessel, vehicle, or structure in non-congested areas.[22] Section § 91.119(d)(1) allows for a helicopter to operate at less than those minimum altitudes when it can be operated "without hazard to persons or property on the surface," provided that "each person operating the helicopter complies with any routes or altitudes specifically prescribed for helicopters by the FAA.

To provide the intended inspections, the UAV will normally need to be operated within a range of approximately 50 feet from the infrastructure being inspected. Accordingly, due to the nature of the proposed operations, the PIC and the VO may at times be less than 500 feet away from structures during the operation, and an exemption is therefore required.

Equivalent Level of Safety

Compared to flight operations with rotorcraft weighing far more than the maximum 50 pounds proposed herein, and the lack of flammable fuel, any risk associated with these operations is far less than those presently presented with conventional aircraft. An equivalent level of safety will be achieved given the size, weight, speed of the UAV as well as the location where it is operated. As set forth

---

[21] *See* Exemption Nos. 5778K and 9862A.
[22] *See* 14 C.F.R. § 91.119(c).

in the Manual, the UAV will be operated in a restricted area, where buildings and people will not be exposed to operations. Because of the advance notice, all affected individuals will be aware of the planned flight operations as set forth in the Manual. Furthermore, by operating at such lower altitudes, the UAV will not interfere with other aircraft that are subject to the minimum safe altitude regulations.

J. 14 C.F.R. § 91.121: Altimeter Settings.

The Petitioner seeks an exemption from 14 C.F.R. § 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.[23] An exemption is required because the UAV does not have a barometric altimeter, but rather a GPS altitude read out.

Equivalent Level of Safety

An equivalent level of safety will be achieved by following the procedures set forth in the Manual. As prescribed in the Manual, the operator will confirm the altitude of the launch site shown on the GPS altitude indicator before flight. Prior to each flight, the PIC will reset the altimeter to zero and will fly the UAV below 400 feet AGL. Moreover, the PIC will use the GPS altitude indicator to constantly monitor the UAV height, thus ensuring operation at safe altitudes.

K. 14 C.F.R. § 91.151(a): Fuel Requirements for Flight in VFR Conditions.

The Petitioner seeks an exemption from 14 C.F.R. § 91.151(a)'s fuel requirements for flight in VFR conditions. Section 91.151(a) states:

> (a) No person may begin a flight in an airplane under VFR conditions unless (considering wind and forecast weather conditions) there is enough fuel to fly to the first point of intended landing and, assuming normal cruising speed
>
> (1) During the day, to fly after that for at least 30 minutes; or
>
> (2) At night, to fly after that for at least 30 minutes.[24]

---

[23] *See* 14 C.F.R. § 91.121.
[24] 14 C.F.R. § 91.151(a).

The battery powering the UAVs described provide less than one half-hour of powered flight. An exemption from the 30 minute reserve requirement in 14 CFR § 91.151 is therefore required.

Equivalent Level of Safety

An equivalent level of safety can be achieved by limiting flights to 30 minutes or 25% of battery power, whichever happens first. This restriction would be more than adequate to return the UAV to its planned landing zone from anywhere within its limited operating area. Operation of the UAV with less than 30 minutes of reserve fuel does not engender the type of risks that Section 91.151(a) was intended to alleviate given the size and speed of the small UAV. Moreover, operations will be limited to controlled areas where permission to perform UAV services has been obtained and all concerned parties given notice.

This request for exemption falls within the scope of prior exemptions.[25]

L. 14 C.F.R. §§ 91.203(a) and (b): Carrying Civilian Aircraft Certification and Registration.

This petition seeks an exemption from civil aircraft certification and registration requirements of 14 C.F.R. §§ 91.203 (a) and (b). The regulations provide in pertinent part:

> (a) Except as provided in § 91.715, no person may operate a civil aircraft unless it has within it the following:
>
> (1) An appropriate and current airworthiness certificate
>
> (b) No person may operate a civil aircraft unless the airworthiness certificate required by paragraph (a) of this section or a special flight authorization issued under § 91.715 is displayed at the cabin or cockpit entrance so that it is legible to passengers or crew.[26]

In addition to the fact that Petitioner is seeking an exemption from the airworthiness certificate requirements, an exemption to this regulation is necessary

---

[25] *See e.g.* Exemption 10673 (allowing Lockheed Martin Corporation to operate without compliance with § 91.151 (a)); *see also* FAA Exemptions 2689F, 5745, 10673, and 10808.

[26] 14 C.F.R. §§ 91.203 (a) and (b).

because: (1) the UAV's load capacity and size does not allow it to carry certification and registration documents; (2) the UAV does not have a cabin or cockpit entrance at which the documents could be displayed; and (3) there are no passengers or crew for whom the certificates need be displayed.

Equivalent Level of Safety

To the extent these regulations are applicable to the proposed UAV operations, an equivalent level of safety will be achieved by keeping these documents at the ground control point where the pilot flying the UAV will have immediate access to them.

The FAA has issued numerous exemptions to this regulation. A representative sample of other exceptions include Exemption Nos. 9565, 9665, 9789, 9789A, 9797, 9797A, 9816A, and 10700.

M. 14 C.F.R. §§ 91.405(a)(1); 91.407(a)(1); 91.409(a)(1); 91.417(a) and (b): Maintenance Inspections

The Petitioner seeks an exemption from the maintenance inspection requirements of 14 C.F.R. §§ 91.405(a); 91.407(a)(1); 91.409(a)(2); 91.417 (a) and (b). These regulations specify maintenance and inspection standards in reference to 14 C.F.R. Part 43.[27] An exemption to these regulations is needed because Part 43 and the stated sections apply only to aircraft with an airworthiness certificate, which the UAV will not have.

Equivalent Level of Safety

An equivalent level of safety will be achieved because maintenance and inspections will be performed in accordance with the Aircraft Operations Manual.[28] As provided in the Manual, the PIC will ensure that the UAV is in working order prior to initiating flight, oversee and assist in performance of required maintenance, and keep a log of any maintenance performed. The PIC is the person most familiar with

---

[27] *See e.g.* 14 C.F.R. § 91.405(a) (stating that each owner or operator of an aircraft inspected as prescribed in subpart E of this part and shall between required inspections . . . . have discrepancies repaired as prescribed in part 43 of this chapter").

[28] See Manual

the aircraft and best suited to maintain the aircraft in an airworthy condition to provide the equivalent level of safety.

If mechanical issues arise, the UAV can land immediately and will be operating from no higher than 400 feet AGL in an unpopulated area. Moreover, the UAV's small size, carrying capacity, and the fact that flight operations will only take place in restricted areas for limited periods of time, create less risk than the same factors associated with conventional fixed-wing aircraft and rotorcraft performing the same operation.

V. PUBLIC INTEREST

Consistent with the requirements of 14 C.F.R. § 11.81(d), Petitioner offers the following reasons why granting this petition for exemption is in the public interest, i.e., how granting it would benefit the public as a whole. Approval of exemptions allowing commercial operations of small and lightweight UAV in the infrastructure inspection industry benefits the public as a whole in several ways.

First, granting the Petitioner's exemption helps fulfill Congress' goal in passing Section333(a) through (c) of the Reform Act, namely, the FAA Administrator's assessment of whether certain UAV may operate safely in the National Airspace System before completion of the rule making required under Section 332 of the Reform Act.

Next, the Petitioner's proposed operation significantly improves safety and reduces risk concerning infrastructure inspection by alleviating human exposure to dangers associated with current aerial survey and inspection methods. Manned helicopters performing utility-power generation inspections and patrols have experienced an exceedingly high number of accidents and fatalities.

Other Communication Facility inspection methods include utilizing a climber or team of climbers. To employ this method, human beings must physically climb the Communication Facility and document the condition of the Facility using hand-held cameras. In 2013 approximately one individual perished per month while conducting these activities. These deaths and injuries can be completely avoided by replacing this work with a UAV, PIC and VO.

Further, Petitioner's UAV are battery powered and create no emissions. If Petitioner's UAV crashes, there is no fuel to ignite and explode. Any impact of

Petitioner's lightweight UAV is far less than a full size helicopter. The public's interest is furthered by minimizing ecological impact of an accident and by reducing human exposure to potentially harmful emissions associated with manned aircraft.

Finally, aerial surveys and videography/photography are valuable tools for commercial inspections. However, problems with safety, cost, statistical integrity, and logistics continue to impede aerial surveys and inspections from conventional manned aircraft. The use of UAVs addresses these problems and is a powerful tool for performing a wide-range of inspection, survey, videography and photography applications. The public as a whole will benefit from the safer and more cost-effective utility aerial services that UAV operations provide.

VI. PRIVACY

All flights will occur over Operations to be conducted over public or controlled access property. Additionally, all flight operations will be conducted in an area devoid of spectators or uninvolved participants. All permissions will be gained by all official personnel, landlords, organizations and/or individuals present in the surveyed or photographed area.

Additionally, the U.S. Supreme Court has held that "'[a] person traveling in an automobile on public thoroughfares has no reasonable expectation of privacy . . . .'"[29] Therefore, Petitioners use of UAV does not pose a privacy threat to motorists traveling on the roadway inadvertently captured on video because they have no reasonable expectation of privacy. However, to further protect individuals who have had their image captured during an inspection, the Petitioner will sanitize the likenesses of individuals from the final product provided to the customer.

VII. FEDERAL REGISTER SUMMARY

A. *14 C.F.R. Part 21, Subpart H* - Airworthiness Certificates and 14 C.F.R. § 91.203(a)(1).

B. *14 C.F.R. Part 27*: Airworthiness Standards: Normal Category Rotorcraft.

---

[29] *U.S. v. Jones*, 132 132 S.Ct. 945 (2012) quoting *U.S. v. Knotts*, 460 U.S. 276, 281 (1983).

C. *14 C.F.R. §§ 91.9(c), 45.23(b) and 45.27(a):* Aircraft Marking and Identification Requirements

D. *14 C.F.R. § 61.113 (a) and (b)*: Private Pilot Privileges and Limitations: Pilot in Command.

E. *14 C.F.R. § 91.9(B)(2)*: Civil Aircraft Flight Manual in the Aircraft.

F. *14 C.F.R. § 91.7(a)*: Civil Aircraft Airworthiness.

G. *14 C.F.R. § 91.103*: Preflight Action.

H. *14 C.F.R. § 91.109(a)*: Flight Instruction.

I. *14 C.F.R. § 91.119*: Minimum Safe Altitudes.

J. *14 C.F.R. § 91.121*: Altimeter Settings

K. *14 C.F.R. § 91.151(a)*: Fuel Requirements for Flight in VFR Conditions

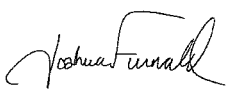
L. *14 C.F.R. § 91.203(a) and (b)*: Carrying Civilian Aircraft Certification and Registration.

M. *14 C.F.R. §§ 91.405(a)(1); 91.407(a)(1); 91.409(a)(1); 91.417(a) and (b)*: Maintenance Inspections

VIII. CONCLUSION

The Petitioner moves the FAA Administrator to grant this exemption. Given the foregoing, the Petitioner's proposed usage does not pose a hazard to the NAS or to the public. Considering the clear statutory language in Section 333 of the Reform Act, the authority contained in the Federal Aviation Act, as amended, the equivalent level of safety to the public and to the men and women conducting infrastructure inspections, and the reduction in environmental effects, the grant of the requested exemptions is in the public interest. Accordingly, Petitioner respectfully requests that the FAA grant the requested exemption without delay.

Thank you,



Joshua J. Furnald
Ramaker & Associates, Inc.
1120 Dallas Street

Sauk City, WI 53583
Counsel for Petitioner
Submitted on March 25, 2015

Exhibit 1

Begins on Following Page

EXHIBIT 1