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

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

July 14, 2015

Exemption No. 12023
Regulatory Docket No. FAA–2015–1518

Mr. William J. Henderson
416 Cottonseed Way
Durham, NC 27703

Dear Mr. Henderson:

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 posted to the public docket on May 8, 2015, you petitioned the Federal Aviation Administration (FAA) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial filming and photography.

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 Yuneec Q500 Typhoon.

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. 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, Mr. William J. Henderson is granted an exemption from 14 CFR §§ 61.23(a) and (c), 61.101(e)(4) and (5), 61.113(a), 61.315(a), 91.7(a), 91.119(c), 91.121, 91.151(a)(1), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b), to the extent necessary to allow the petitioner to operate a UAS to perform aerial data collection. This exemption is subject to the conditions and limitations listed below.

Conditions and Limitations

In this grant of exemption, Mr. William J. Henderson 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 Yuneec Q500 Typhoon 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 July 31, 2017, unless sooner superseded or rescinded.

Sincerely,

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

Enclosures

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, William J. Henderson, an operator of the YUNEEC Q500 ("Q500") Unmanned Aircraft System ("UAS") seeks exemption from the Federal Aviation Regulations ("FARs") as described below.

The exemption request will permit William J. Henderson to operate UASs commercially for the purpose of filming and photographing property, people, and events. William J. Henderson will provide a service that is beneficial to an industry that is already using, and seeking to use, UASs for these purposes with a legal and safe option while providing relevant experience and information to the FAA and the UAS community. This will benefit the public with the controlled operation of UASs by William J. Henderson and increased integration into the National Airspace System ("NAS").

All operations by William J. Henderson will strictly adhere to safety, applicable FARs, Operator's Handbook, applicable Airworthiness Directives, and all other guidelines from the FAA. William J. Henderson will, at all times, conduct operations in a manner as to maintain the same level of safety as current manned aircraft operations.

William J. Henderson will operate exclusively in controlled conditions, within visual line of sight ("VLOS"), at low altitudes of 400 feet above ground level ("AGL"), or no higher than 200 feet above the highest obstacle ("AHO") with prior Flight Safety District Office ("FSDO") approval. Any UAS in operation by William J. Henderson will not exceed 55 lbs. weight.

At all times William J. Henderson will, maintain safe operations, ensure current requirements are met, and consistently assure an open line of communication with the FAA.

William J. Henderson will maintain the highest of standards in all UASs operations. A thorough understanding of the importance of safety guidelines in the NAS, and a desire to promote the appropriate integration of UASs for the furtherance of aviation as a whole is the foundation upon which this William J. Henderson will operate.

The name and address of the applicant are:

William J. Henderson
Ph: 919.434.5844
Email: wjh@htc-odessa.com
Address: 416 Cottonseed Way
Durham, NC 27703

The regulations from which the exemption is requested are as follows:

14 C.F.R. Part 21;
14 C.F.R. 91.7(a) ;
14 C.F.R. 91.9(b) (2) ;
14 C.F.R. 91.109(a) ;
14 C.F.R. 91.119;
14 C.F.R. 91.105
14 C.F.R. 91.151(a) ;
14 C.F.R. 91.203(a) & (b) ;
14 C.F.R. 91.405(a) ;
14 C.F.R. 91.407(a) (1) ;
14 C.F.R. 91.409(a) (2) ;
14 C.F.R. 91.417(a).

Appendix A discusses each rule listed above and explains why exemptions pursuant to the proposal set forth in this letter are appropriate, provide an equivalent level of safety, and are in the public interest.

The Applicable Legal Standard Under Section 333

William J. Henderson submits that grant of this exemption application advances the Congressional mandate in Section 333 of the Reform Act to accelerate the introduction of UASs into the NAS if it can be accomplished safely. This law directs the Secretary of Transportation to consider whether certain UASs may operate safely in the NAS before completion of the rulemaking required under Section 332 of the Reform Act. In making this determination, the Secretary is required to determine which types of UASs do not create a hazard to users of the NAS, the public, or pose a threat to national security in light of the following:

- The UAS's size, weight, speed, and operational capability;

- Operation of the UAS in close proximity to airports and populated areas; And
- Operation of the UAS within visual line of sight of the operator.

Reform Act § 333(a) (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." Id. §333(c) (emphasis added).[1]

The Federal Aviation Act expressly grants the FAA the authority to issue exemptions. This statutory authority, by its terms, includes exempting civil aircraft, as the term is defined under §40101 of the Act, from the requirement that all civil aircraft must have current airworthiness certificate and those regulations requiring commercial pilots to operate aircraft in commercial service:

> The Administrator may grant an exemption from a requirement of a regulation prescribed under subsection (a) or (b) of this section or any of sections 44702-44716 of this title if the Administrator finds the exemption is in the public interest.

The grant of the requested exemption is in the public interest based on the clear direction in Section 333 of the Reform Act; The additional authority in the Federal Aviation Act, as amended; The strong equivalent level of safety surrounding the proposed operations; And the significant public benefit, including enhanced safety and cost savings associated with use of UASs for aerial videography/photography, the reduction or elimination of unregulated operators, and the safe integration of UASs. Accordingly, the applicant respectfully requests that the FAA grant the requested exemption without delay.

Airworthiness

Grant of the exemption to William J. Henderson will be subject to the following mandatory airworthiness conditions:

- The UAS will never exceed a gross takeoff weight (GTOW) of 55 lbs., or in excess of the Operator Handbook/Manufacturer recommendations, whichever is more restrictive.
- The Manufacturer checklist and William J. Henderson preflight checklist will be followed prior to each flight.

[1] Applicant submits that this provision places a duty on the Administrator to not only process applicants for exemptions under Section 333, but for the Administrator, if he deems the conditions proposed herein require modification in order to allow approval, to supply conditions for the safe operation of the UAS. Stunning Heights respectfully requests the opportunity to consult with FAA staff in order to address any issues or concerns that this proposal may raise that they believe may require modification.

- The aircraft registration number will be displayed on the aircraft in accordance with current regulations.
- The POH, registration, copy of exemption, checklist, and copy of maintenance records will be mandatory documents for operation and must be located with or in the base station and accessible to the PIC at all times.
- Any FAA or manufacturer required placards are placed and clearly visible on the base station or controlling device.
- All equipment installed on the UAS will be operational for flight.
- PIC will be the determining authority on the airworthiness of the UAS prior, during, and after each flight, and will cease operations upon deeming the UAS not airworthy until proper maintenance or action has been taken.
- In adherence to 14 C.F.R. §43.9 each person who maintains, performs preventative maintenance, rebuilds, or alters the UAS, airframe, motor, propeller, appliance, or component part will make an entry in the maintenance record of that equipment containing the following information:
    - Description of work performed.
    - Date of completion of work performed.
    - Name of the person performing the work.
    - Signature of the person performing the work.
- In addition to the information above, the following will be included on any maintenance records for record keeping and reporting to the FAA upon request:
    - Aircraft total time.
    - Time in service of part by method of Time since New (TSN) or Time since Overhaul (TSO).
    - Manufacturer, model, serial and/or part number when available.
- Any maintenance action that may affect flight characteristics or airworthiness will have a maintenance operational check and test flight performed by the PIC

Mandatory Operating Conditions

Grant of the exemption to William J. Henderson will be subject to the following mandatory operating conditions:

- Operations occurring within Class B airspace require coordination and approval from the FAA Flight Standards District Office having jurisdiction, and upon request with Air Traffic Control one hour prior to operations commencing (14 CFR §91.215(d)(3)). Communication commencing operations, during operations, and termination of operations by use and constant monitoring of appropriate tower frequency by ground radio.

- Operations within Class B 30NM Mode C Veil require at minimum 48 hour prior notification of the FAA Flight Standards District Office having jurisdiction. Notification and communication with Air Traffic Control upon commencing operations, during operations, and termination of operations by use and constant monitoring of appropriate tower frequency by ground radio (14 CFR §91.215(3)).
- Operations within Class C, or D airspace require notification at minimum 24 hour prior notification of the FAA Flight Standards District Office having jurisdiction, and upon request with Air Traffic Control one hour prior to operations commencing (14 CFR §91.215(d) (3)). Communication commencing operations, during operations, and termination of operations by use and constant monitoring of appropriate tower frequency by ground radio.
- Operations within 2.5 NM radius of airport runway centerline within class E, or G airspace require at a minimum 24 hour prior notification of the FAA Flight Standards District Office having jurisdiction, at a minimum 24 hour prior notification of the Airport Manager or Controlling Agency, notification and communication with any control tower, or on CTAF frequency, upon commencing operations, during operations, and termination of operations by use and constant monitoring of appropriate frequency by ground radio.
- Operations within class E or G airspace not within 2.5 NM of airport runway centerline requires constant monitoring of applicable CTAF or 123.025 (helicopter air to air) and reporting upon commencing operations, during operations, and termination of operations by ground radio.
- No operations are to be conducted within 2.5 NM in-line with runway centerline azimuth and on the approach end of a runway that is actively in use.
- All operations are required to remain at, or below, 400 feet AGL unless prior approval is received from the FAA Flight Standards District Office having jurisdiction, and no flight exceeding 400 feet AGL may go above 200 feet above the highest obstacle, or outside visible range, or beyond the capability of the UAS (whichever is lower in altitude).
- Operations are to be conducted over private or controlled-access property.
- Permission from land owner/controller required before commencing any flight.
- Operations to occur under Visual Flight Rules during Visual Meteorological Conditions (VMC).
- Aircraft to remain within Visual Line of Sight (VLOS).
- Operations to be conducted in a controlled environment with only the necessary persons present, any person present, not employed by William J. Henderson, will sign a waiver acknowledging UAS operations, proper safety procedures, and a statement acknowledging risks.
- Operations will be conducted with a visual observer (VO), in addition to the UAS pilot, who will remain in VLOS with the UAS pilot, the UAS, and the area of operations at all times. VO will assist in maintaining a controlled

environment, spotting hazards to persons or property, monitoring and communicating on appropriate ATC, CTAF, or other appropriate radio frequencies.

- UAS will not be operated below 25% battery capacity, or a battery power reserve of less than 10% flight time, whichever is the greater of the two.

Operator Requirements

William J. Henderson understands and upholds the stance that necessary precautions are required to protect aircraft already operating in the NAS, and the safety and security of the flight crew members, passengers as well as the public and property. For this reason William J. Henderson will require all pilots of the UAS to be a trained in the operation of the UASs.

The PIC and the Visual Observer will, at all times, be aware that UASs currently cannot adhere to the standard "see and avoid" requirements due to the size of the UAS impacting the distance at which it can be identified by pilots of manned aircraft. William J. Henderson maintains a zero tolerance policy for any pilot that fails to give complete right of way, and wide berth to any aircraft that comes within 1 statute mile horizontally or 2000 feet vertically of operations.

The PIC will adhere to appropriate FARs as well as follow the included UAS user Manual. The PIC will, while the exemption is in place, log all flights conducted, or any flight to meet the requirements.

The visual observer will be trained according to the Operating Manual. The VO will be required to exhibit proficiency in operating the UAS. The VO will not, at any time during operations conducted under this exemption, operate or control any portion of the flight of the UAS unless they meet the PIC requirements of this exemption.

Privacy

All flights will occur over private or controlled access property with the property owner's or controlling authority's prior consent and knowledge. Filming will be of people who have also consented to being filmed or otherwise have agreed to be in the area where filming will take place.

* * *

In summary, applicant seeks an exemption from the FARs set forth above and in Appendix A to allow commercial operations of UASs conducting aerial flights as described.

Approval of the exemption allowing commercial operations of William J. Henderson UASs will increase safety by permitting an operator to conduct a service safely that is already occurring without FAA knowledge, exemption, or adhering to prescribed safety guidelines. The exemption will also encourage the education of UAS operators and the adoption of FAA guidelines and approval for commercial UAS operations. It benefits the public through a higher level of safety of UAS operations and a service that benefits the local public and business. It also benefits the public through a smooth and well approached integration of UASs into the NAS, and continual communication with the FAA and the information gained.

The UASs operated by William J. Henderson satisfies the criteria set forth in Section 333 of the Reform Act–size, weight, speed, operating capabilities, operation within visual line of sight, and national security–and showing an equivalent level of safety to manned aircraft flights and safety focused standards of operation, providing more than adequate justification for the grant of the requested exemptions allowing commercial operations.

Respectfully,

William J. Henderson

APPENDIX A

EXEMPTION REQUEST AND EQUIVALENT LEVEL OF SAFETY SHOWINGS UNDER APPLICABLE RULES SUBJECT TO EXEMPTION

Due to the flight characteristics, such as the ability to hover, vertical takeoff and landing, and the type of operations performed by the UASs operated by William J. Henderson, William J. Henderson respectfully request that where a regulation differentiates according to class that it be permitted to operate under those regulations pertaining to helicopters.

William J. Henderson requests an exemption from the following regulations as well as any additional regulations that may technically apply to the operation of its UASs:

14 C.F.R. Part 21, Subpart H: Airworthiness Certificates 14 CFR § 91.203(a) (1)

Section 91.203(a) (1) requires all civil aircraft to have a certificate of airworthiness. Part 21, Subpart H, entitled Airworthiness Certificates, establishes the procedural requirements for the

issuance of airworthiness certificates as required by FAR § 91.203(a)(1). Given the size of the aircraft and the limited operating area associated with its utilization, it is unnecessary to go through the certificate of airworthiness process under Part 21 Subpart H to achieve or exceed current safety levels.

Such an exemption meets the requirements of an equivalent level of safety under Part 11 and Section 333 of the Reform Act. The Federal Aviation Act and Section 333 of the Reform Act 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 UAS involved.

In this case, an analysis of these criteria demonstrates that the William J. Henderson UASs operated without an airworthiness certificate, under the conditions proposed herein, will be at least as safe, or safer, than a conventional aircraft (fixed wing or rotorcraft) with an airworthiness certificate. The UASs will remain less than 55 lbs. GTOW. Will not carry a pilot or passenger, will not carry flammable fuel, and will operate exclusively within an area pre-disclosed and in compliance with conditions set forth herein. Operations under this exemption will be tightly controlled and monitored by both the operator, pursuant to the conditions set forth above, and by local public safety requirements. The FAA will have advance notice of all operations through the filings with the FSDO. Receipt of the prior permission of the land owner, or controlling authority, the size of the aircraft, the lack of flammable fuel, and the fact that the aircraft is carried to the location and not flown there all establish the equivalent level of safety. The UASs construction with absorbent material provides at least an equivalent level of safety to that of such operations being conducted with conventional aircraft that would be orders-of-magnitude larger and would be carrying passengers, cargo, and flammable fuel.

14 C.F.R. § 91.7(a): Civil aircraft airworthiness.

This regulation requires that no person may operate a civil aircraft unless it is in airworthy condition. Should the exemption be granted allowing commercial operation of the UASs without an airworthiness certificate, no standard will exist for airworthiness of the UASs. Given the size of the aircraft and the requirements that have presumably already been met in the approved standard operating procedures (for instance, the Maintenance & Inspection Manual and Safety Checklist), an equivalent level of safety will be achieved by ensuring compliance with the operating manuals prior to each flight.

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

The regulation provides:

> 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.

The equivalent level of safety will be achieved by keeping the flight manual at the ground control point where the pilot flying the UAS will have immediate access to it. The FAA has issued to others the following exemptions to this regulation: Exemption Nos. 8607, 8737, 8738, 9299, 9299A, 9565, 9565B, 10167, 10167A, 10602, 32827, and 10700.

14 C.F.R. § 91.109(2)

This regulation provides that flight crewmembers must keep a safety belt fastened while at a crewmember station. William J. Henderson UASs are by definition not manned and therefore maintain an equivalent level of safety without the use of safety belt since no danger is posed due to no persons being aboard the aircraft.

14 C.F.R. § 91.121(a)

This regulation requires that aircraft be operated at altitude in reference to an altimeter set to applicable barometric pressure. According to the Flight Manuals and information included with this exemption request the UASs operated by William J. Henderson uses GPS positioning, and the Q500 uses, in addition, a specialized sensor that limits the aircraft altitude to a predetermined height set by the PIC during preflight inspections. This, in addition to all flights being conducted by VLOS, assures altitude restrictions will be maintained by the PIC. Given the nature of the flight being limited to an upper altitude limit, the limited area of operations, the See and Avoid procedures set forth by William J. Henderson, and in light of the UASs not being operated at VFR or IFR cruising altitudes an equivalent level of safety will be achieved.

14 C.F.R. § 91.109(a) & 91.319(a) (1): Flight Instruction

These regulations provide that no person may operate a civil aircraft (except a manned free balloon) that is being used for flight instruction unless that aircraft has fully functioning dual controls. UASs are a remotely piloted aircraft and by design, do not have fully functional dual controls. Flight control is accomplished through the use of a control box that communicates with the aircraft via radio communications. If instruction is accomplished through a training program, as set forth in an equivalent level of safety will be assured. 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. See Exemption Nos. 5778K & 9862A. The equivalent level of safety will be achieved by William J. Henderson.

14 CFR § 91.119: Minimum Safe Altitudes

Section 91.119 establishes safe altitudes for operation of civil aircraft. Due to the flight characteristics of William J. Henderson UASs (vertical takeoff and landing, and ability to hover) as well as the nature of the type of flights conducted by UASs and the similarity to helicopters William J. Henderson requests to operate in accordance with section 91.119(d). The equivalent level of safety will be achieved given the size, weight, speed, and material with which the UASs are built. Furthermore; No flight will be taken without the permission of the land owner or those who control the land. Because of the advance notice to the landowner, all affected individuals will be notified of the flights. Compared to aerial photography or videography operations conducted with aircraft or rotorcraft weighing far more than the UAS and carrying flammable fuel, any risk associated with these operations will be far less than those currently allowed with conventional aircraft operating at or below 500 feet AGL. Indeed, the low-altitude operations of the UAS will maintain separation between these small-UAS operations and the operations of conventional aircraft that must comply with Section 91.119, give right of way to all manned aircraft.

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

This regulation prohibits an individual from beginning "a flight in a rotorcraft 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 20 minutes."

Given the limitations on its proposed operations and the location of those proposed operations, a longer time frame for flight in daylight VFR conditions is reasonable. William J. Henderson believes that an exemption from 14 CFR § 91.151(b) is safe and within the scope of a prior exemption. See Exemption 10673 (allowing Lockheed Martin Corporation to operate without compliance with 91.151(a)). Operating the small UAS, without 20 minutes of reserve fuel does not engender the type of risks that Section 91.151(b) was meant to prevent given the size and speed at which the UAS operates. The fact that it carries no pilot, passenger, or cargo also enhances its safety. Additionally, limiting flights to a 20 minute reserve would greatly reduce their utility. In the unlikely event that the UAS should run out of fuel, it would simply land. Given its weight and construction material, the risks are less than contemplated by the current regulation.

William J. Henderson believes that an equivalent level of safety can be achieved by maintaining 25% battery power, or 10% of time (whichever is longer) would be more than adequate to return the UAS to its planned landing zone from anywhere in its operating area.

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

This regulation provides as follows:

> (a) . . . No person may operate a civil aircraft unless it has . . . 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.

William J. Henderson UASs have no cockpit or cabin to place or carry certification. As such, the exemption and any other certifying document from the FAA will be maintained with the ground station, and placed in a manner as to be clearly visible to any government official or person authorized in the controlled operations environment.

An equivalent level of safety will be achieved by keeping these documents at the ground control point where the pilot flying the UAS will have immediate access to them. The FAA has issued numerous exemptions to this regulation. A representative sample of other exceptions includes Exemption Nos. 9565, 9665, 9789, 9789A, 9797, 9797A, 9816A, and 10700.

14 C.F.R. § 91.405(a) ; 407(a) (1) ; 409(a) (2) ; 417(a): Maintenance Inspections

Section 91.405(a) requires that an aircraft operator or owner "shall have that aircraft inspected as prescribed in subpart E of this part and shall between required inspections, except as provided in paragraph (c) of this section, have discrepancies repaired as prescribed in part 43 of this chapter . . . ." Section 91.407 similarly makes reference to requirements in Part 43; Section 91.409(a) (2) requires an annual inspection for the issuance of an airworthiness certificate.

Section 91.417(a) requires the owner or operator to keep records showing certain maintenance work that has been accomplished by certificated mechanics, under Part 43, or licensed pilots and records of approval of the aircraft for return to service.

Maintenance on William J. Henderson aircraft will be accomplished by the owner/operator pursuant to the manuals, provided by William J. Henderson, and the manufacturer. An equivalent level of safety will be achieved because the UAS is small in size, will operate only in restricted predetermined areas and is not a complex mechanical device. As provided in the attached Maintenance Manual and the Safety Checklist, which were reviewed as part of the application, the operator of the UAS will ensure that it is in working order prior to initiating flight, perform required maintenance, and keep a log of any maintenance that is performed. Moreover, William J. Henderson PIC is familiar with the aircraft, has extensive experience with UAS maintenance, and has hundreds of hours of UAS airframe and power plant maintenance, and is best suited to maintain the aircraft in an airworthy condition and to ensure an equivalent level of safety.

The Maintenance Manual provides for a 30 day/100 hour and Annual inspection of the airframe and components similar in scope to inspections on manned aircraft. This will ensure an equivalent level of safety to the maintenance requirements in Part 91.

In addition, between such inspections, should a mechanical issue arise, the aircraft will either return to its launch site or immediately land.

APPENDIX B

SUMMARY OF WILLIAM J. HENDERSON SECTION 333 EXEMPTION REQUEST

William J. Henderson hereby provides pursuant to Part 11 a summary of its exemption application to allow commercial operation of its UASs in aerial photography/videography. An exemption is requested from the following regulations:

14 C.F.R. Part 21;
14 C.F.R. 91.7(a) ;
14 C.F.R. 91.9(b) (2) ;
14 C.F.R. 91.109(a) ;
14 C.F.R. 91.119;
14 C.F.R. 91.105
14 C.F.R. 91.151(a) ;
14 C.F.R. 91.203(a) & (b) ;
14 C.F.R. 91.405(a) ;
14 C.F.R. 91.407(a) (1) ;
14 C.F.R. 91.409(a) (2) ;
14 C.F.R. 91.417(a).