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

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

September 1, 2015

Exemption No. 12688
Regulatory Docket No. FAA–2015–1303

Mr. Cameron Patterson
CC Patterson & Associates
13400 Highway 66
Ashland, OR 97520

Dear Mr. Patterson:

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 letters dated April 17, July 9, and July 21, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of CC Patterson & Associates (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial imagery acquisition for orthophoto and terrain modeling in support of geography information system modeling.

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 3 and DJI Inspire 1.

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, CC Patterson & Associates 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, CC Patterson & Associates 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 3 and DJI Inspire 1 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 September 30, 2017, unless sooner superseded or rescinded.

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

Enclosures

17 April 2015

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

RE: Petition of CC Patterson & Associates for Exemption Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 For Small UAS Aerial Survey Operations

To Whom it May Concern:

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 and 14 CFR Part 11, CC Patterson & Associates (CCPA), hereby applies for an exemption from Federal Aviation Regulations (FARs) identified below, to allow commercial operations of small unmanned aerial systems.

This exemption is in accordance with protocols outlined in this petition, the DJI UAS manufacturer's operations and/or instructions manual, DJI UAS User's Manuals, DJI UAS Quick Start Guides, and any other requirements established by the FAA pursuant to Section 333.

This exemption would permit commercial operation of the DJI Phantom 3 and DJI Inspire 1 UASs by CCPA, to conduct airborne imagery acquisition for orthophoto and terrain modeling in support of geographic information system modeling of natural and cultural resources, hydrology, wetland delineation and restoration, forestry, habitat conservation, and other remote-sensing related activities in which CCPA is normally engaged. CCPA is a small consulting firm specializing in the use of geographic information systems and airborne remote sensing data to support conservation ecology-related projects, primarily in Southern Oregon. This exemption is in support of CCPA's projected shift to UAV-based data collection operations from sub-contracted manned aircraft operations, for low-altitude, high-resolution ortho-imagery and 3D point cloud generation with lidar, multispectral and thermal sensors.

All UAV operations conducted under this exemption will be flown by a PIC certified by the FAA as a Private Pilot with ratings for Single Engine Land, Instrument Airplane; and with a current FAA Medical Certificate or valid US driver's license.

The name and address of the Petitioner is:

Cameron Patterson
CC Patterson & Associates
13400 Hwy 66, Ashland, Oregon 97520
(541)488-1757
cam.patterson@cascadegeo.com

Regulations from which Exemption is requested:
14 CFR 21(H), 14 CFR 61.23(a) and (c), 61.113(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).
Appendix 1 to this petition summarizes the justification for each requested exemption.

Section 333 "Summary Grant" Eligibility:

This petition for exemption is similar in all significant characteristics to many existing Section 333 exemptions granted for low altitude aerial UAS survey operations.

CCPA proposes to conduct commercial UAS operation entirely with aircraft manufactured by DCI, Inc. including the Phantom 3 and the Inspire 1, according to manufacturer recommendations for maintenance and safe operation, as limited by the Conditions and Limitations of this exemption, should it be granted.

Aircraft Registration
All UAS aircraft operated under the proposed exemption will be registered and identified with N-number markings in the largest size practicable in accordance with 14 CFR 45(c), 47.

PIC Certification
All UAS aircraft will be operated under the proposed exemption by a PIC holding an Airman Certificate from the FAA, and current medical or valid US Driver's License.

Section 333 Safety Evaluation Supporting Information

Regarding the Unmanned Aircraft System and its Operation

1. UAS operational characteristics. The UAS's proposed for operation under this exemption include the commercially available DJI Phantom and DJI Inspire 1. These systems have both been previously approved by the FAA for Section 333 exemptions. They are both electric quad-copters weighing significantly less than 55 lbs , with IMU, GPS, and flight systems that are in extensive use for hobbies and recreational purposes; and their flight characteristics and specifications are available at the manufacturer's web site, and summarized in Appendix 2.
2. Operational procedures will closely follow the manufacturer's recommendations, with these additional conditions and limitations:
    a. No closed set TV/Motion picture filming will be conducted
    b. No UAS operations exceeding 87 kt groundspeed
    c. No operations above 400 feet AGL, or within 500' below or 2000' horizontally from a cloud, or when visibility is less than 3 mi from PIC.
    d. All operations conducted in daytime VFR conditions within PIC's unaided VLOS
    e. All operations will utilize a qualified Visual Observer (VO) in accordance with the proposed FAA rule for small UAS, with PIC-VO verbal communication maintained at all times.
    f. Valid Sec.333 exemption operating documentation will be maintained during operations and made available to FAA upon request.
    g. Safe functional test flights shall be conducted after maintenance procedures
    h. Responsibility for safe operating condition of the UAS is the responsibility of the operator.
    i. PIC will conduct a full safety pre-flight inspection prior to each operation. No operation of UAS without ensured condition for safe operation.
    j. Operator will follow UAS manufacturer's maintenance, overhaul, replacement, inspection and life limit recommendations for aircraft and components, and comply with all manufacturer's safety bulletins.

Regarding the UAS PIC and Visual Observer

3. All UAS operations will be under the direct responsibility of Cameron Patterson, who holds an airman certification from the FAA as a Private Pilot with ratings for Airplane Single Engine Land and Instrument, with training and logbook conditions complete for Commercial certification. Total logged PIC flight time is 256 hrs, with endorsements for High-performance Complex single engine, and Tailwheel. All commercial operations will utilize a Visual Observer, who will receive sufficient training on a safe test range to assure safe and efficient operations and communications prior to deployment on a commercial project.
4. The PIC will maintain either a FAA medical certification or a valid US driver's license for all UAS operations.

Regarding the Mission Protocols and Areas of Operation of the UAS

5. UAS operations covered under this exemption will generally take place over unpopulated or sparsely populated rural areas.
6. Any operations that take place in proximity to persons or sensitive property will maintain a 500' direct separation unless said persons are associated with and aware of the UAV operations, or have been notified and provided both consent and appropriate safety protocols (such as staying indoors).
7. In general, all operations will be conducted in accordance with the FAA's March 23 2015 "blanket" COA for operations under 200' AGL. All prospective data collections falling outside the blanket COA parameters, such as operations within 5 NM of a tower controlled airport will be conducted under individual COA applications submitted through the FAA's UAS Civil COA Portal.
8. Each UAS data collection mission will be conducted in accordance with an individualized plan of operation that, at a minimum, plans for flight-time, flight lines, altitudes, PIC and VO locations, LZs and lines of sight, obstacles, ground elevations, pre-operation site inspection, analysis of topographic obstacles, restricted areas, NAS designations, potential on-ground safety considerations, loss of communication protocols, emergency procedures, and collision avoidance procedures for other manned and unmanned aircraft. All pre-operation planning will be done in a Geographic Information System that includes lidar or other existing elevation data, airspace horizontal and vertical boundaries, towers, transmission lines, trees and other obstructions, landing areas, and requirements for minimum weather and visibility conditions.
9. Each data collection operation will be logged with all details of the operation on a flight-by-flight basis.
10. All other conditions and limitations specified by the Section 333 Exemption, including UAS "return to base," loss of communication protocols, and any other condition not described herein, will be complied with.

Appendix 1

FAR section	Subject	Justification
14 CFR 21(H)	Airworthiness Certification	Not applicable to small UAS
14 CFR 61.23	PIC Medical	PIC will have EITHER current medical OR valid US driver's license
14 CFR 61.113(a)	Private Pilot PIC for compensation or hire	Private pilot certification demonstrates adequate NAS knowledge for non-passenger commercial operation
14 CFR § 91.7 (a)	Airworthiness requirement	Designed for manned aircraft; not applicable to small UAS
14 CFR § 91.119(c)	Minimum safe altitudes	Separation from manned aircraft by UAV dictates lower operating altitudes
14 CFR § 91.121	Altimeter settings	Not applicable to small UAS ops
14 CFR § 91.151(a)	Fuel requirements	Not applicable to small UAS ops
14 CFR § 91.405 (a)	Maintenance	Not necessary to assure small UAS operation safety. PIC inspection substituted in operating procedures
14 CFR § 91.407(a1)	Return to service	Not applicable to small UAS
14 CFR § 91.409(a1,2)	Annual inspection	Not necessary to assure small UAS operation safety. Implementing all manufacturer recommendations and operator responsibility substituted in operating procedures
14 CFR § 91.417(a,b)	Maintenance records	Not necessary to assure small UAV operation safety. Mfg. recs and operator responsibility subst.

Appendix 2

UAS Specification	**DJI Phantom 3**	**DJI Inspire 1**
Aircraft type	Quadcopter	Quadcopter
Weight	1.20 kg	2.93 kg
Size (diagonal width)	35 cm	58cm
Maximum Speed	16m/s (36 mph)	22 m/s (49 mph)
GNSS positioning	GPS/GLONASS (autonomous)	GPS/GLONASS (autonomous)
Payload	12mp digital camera and 3-axis gimbal	12mp digital camera and 3-axis gimbal
Remote control communications Frequency range	2.400Ghz - 2.483Ghz	2.400Ghz - 2.483Ghz 5.725Ghz – 5.825Ghz
Max communications range	2000m (unobstructed line of sight)	2000m (unobstructed line of sight)
Flight Battery Capacity/Max Flight Duration	4480mAh/ 23 min (approx)	5700mAh/ 18 min (approx)

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Cameron C. Patterson - Additional Information

This Other document was issued by the **Federal Aviation Administration** (FAA)

For related information, **Open Docket Folder**

Content

9 July 2015
U.S. Department of Transportation
Docket Management System
1200 New Jersey Ave., SE
Washington, DC 20590

RE: Request for additional Information to Petition of CC Patterson & Associates for Exemption Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 For Small UAS Aerial Survey Operations

To Whom it May Concern:

This letter is to provide additional information relevant to the petition request referenced above,
in response to the July 6, 2015 letter from the FAA (Brittany Newton) regarding how this request would be in the public interest, and to provide additional information to support our request.

1. This exemption would benefit the public as a whole primarily by significantly reducing both the expense (primarily to public agency clients) and risk to manned aircraft operators and people on the ground, associated with collecting high resolution aerial mapping information for small (generally less than 1000 acres) wetland and habitat restoration sites, and other ecological conservation sites for which CC Patterson & Associates normally is required to contract with manned aircraft camera platform providers. We expect to realize a 5-10 fold cost reduction for monitoring the type of small restoration sites where we often work, and with the availability of new 3D vision photogrammetric tools, we also expect to replace some of the manned lidar data acquisitions we currently have planned.

2. This exemption request is similar in all material respects to relief previously requested in Grant of Exemptions Nos. 11062, 11109, 11112, and 11213, as referenced in many of

Comments Not Accepted

ID: FAA-2015-1303-0003

Document Information

Date Posted:
Jul 16, 2015

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Submitter Information

Submitter Name:
Cameron C. Patterson

Docket Information

This document is contained in
FAA-2015-1303

Related Dockets:
None

Related RINs:
None

Related Documents:
- U.S. DOT/FAA - Request for Additional Information
- CC Patterson & Associates - Petition for Exemption

the Section 333 exemptions currently being granted by the FAA for proposed aerial data collection activities similar in all material respects to those we propose with this exemption request.

Sincerely,

Cameron C. Patterson
Petitioner

21 July 2015

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

RE: Petition of CC Patterson & Associates for Exemption Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 For Small UAS Aerial Survey Operations

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This exemption would permit commercial operation of the DJI Phantom 3 and DJI Inspire 1 UASs by CCPA, to conduct airborne imagery acquisition for orthophoto and terrain modeling in support of geographic information system modeling of natural and cultural resources, hydrology, wetland delineation and restoration, forestry, habitat conservation, and other remote-sensing related activities in which CCPA is normally engaged. CCPA is a small consulting firm specializing in the use of geographic information systems and airborne remote sensing data to support conservation ecology-related projects, primarily in Southern Oregon. This exemption is in support of CCPA's projected shift to UAV-based data collection operations from sub-contracted manned aircraft operations, for low-altitude, high-resolution ortho-imagery and 3D point cloud generation with lidar, multispectral and thermal sensors.

All UAV operations conducted under this exemption will be flown by a PIC certified by the FAA as a Private Pilot with ratings for Single Engine Land, Instrument Airplane; and with a current FAA Medical Certificate or valid US driver's license.

a) The name and address of the Petitioner is:

Cameron Patterson
CC Patterson & Associates
13400 Hwy 66, Ashland, Oregon 97520
(541)488-1757
cam.patterson@cascadegeo.com

b) Regulations from which Exemption is requested:

14 CFR 21(H), 14 CFR 43.7, 14 CFR 43.11, 14 CFR 45.11, 14 CFR 45.21, 14 CFR 45.23(b), 14 CFR 45.27, 14 CFR 45.29, 14 CFR 61.23(a) and (c), 61.113(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).

c) Extent of Relief Sought and Reasons for Request:

Attachment A below lists the regulations from which relief is sought, together with the reason why each regulation is not consistent with the safe commercial use of UAS to support our existing conservation mapping operations.

This petition for exemption is similar in all significant characteristics to many existing Section 333 exemptions granted for low altitude aerial UAS survey operations.

CCPA proposes to conduct commercial UAS operation entirely with aircraft manufactured by DCI, Inc. including the Phantom 3 and the Inspire 1, according to manufacturer recommendations for maintenance and safe operation, as limited by the Conditions and Limitations of this exemption, should it be granted.

d) Reasons why granting the request would be in the public interest

This exemption would benefit the public as a whole primarily by significantly reducing both the expense (primarily to public agency clients) and risk to manned aircraft operators associated with collecting high resolution aerial mapping information for small (generally less than 1000 acres) wetland and habitat restoration sites, and other ecological conservation sites for which CC Patterson & Associates normally is required to contract with manned aircraft camera platform providers. We expect to realize a 5-10 fold cost reduction for monitoring the type of small restoration sites where we often work, and with the availability of new 3D vision photogrammetric tools, we also expect to replace some of the manned lidar acquisitions we currently have planned. These cost reductions will be passed through to our public sector clients through reduction in data acquisition costs and associated reduction in the overall cost of ecological mapping projects they undertake.

e) Reasons why Public Safety would be improved by granting the request

All airborne high-resolution data acquisition operations conducted under the proposed Section 333 exemption by CCPA would replace current data collection methods requiring manned aircraft flying at relatively high-risk low survey altitudes. With the safety measures, operational limitation and procedures summarized below, data collection operations by CCPA under a Section 333 exemption would not adversely affect public safety, and would provide a level of safety equal to that provided by each rule from which an exemption is sought.

- **Aircraft Registration**

All UAS aircraft operated under the proposed exemption will be registered and identified with N-number markings in the largest size practicable in accordance with 14 CFR 45(c), 47.

- **PIC Certification**

All UAS aircraft will be operated under the proposed exemption by a PIC holding an Airman Certificate from the FAA, and current medical or valid US Driver's License.

- **Regarding the Unmanned Aircraft System and its Operation**

1. UAS operational characteristics. The UAS's proposed for operation under this exemption include the commercially available DJI Phantom and DJI Inspire 1. These systems have both been previously approved by the FAA for Section 333 exemptions. They are both electric quad-copters weighing significantly less than 55 lbs , with IMU, GPS, and flight systems that are in extensive use for hobbies and recreational purposes; and their flight characteristics and specifications are available at the manufacturer's web site, and summarized in Appendix 2.
2. Operational procedures will closely follow the manufacturer's recommendations, with these additional conditions and limitations:
    a. No closed set TV/Motion picture filming will be conducted

b. No UAS operations exceeding 87 kt groundspeed
c. No operations above 400 feet AGL, or within 500' below or 2000' horizontally from a cloud, or when visibility is less than 3 mi from PIC.
d. All operations conducted in daytime VFR conditions within PIC's unaided VLOS
e. All operations will utilize a qualified Visual Observer (VO) in accordance with the proposed FAA rule for small UAS, with PIC-VO verbal communication maintained at all times.
f. Valid Sec.333 exemption operating documentation will be maintained during operations and made available to FAA upon request.
g. Safe functional test flights shall be conducted after maintenance procedures
h. Responsibility for safe operating condition of the UAS is the responsibility of the operator.
i. PIC will conduct a full safety pre-flight inspection prior to each operation. No operation of UAS without ensured condition for safe operation.
j. Operator will follow UAS manufacturer's maintenance, overhaul, replacement, inspection and life limit recommendations for aircraft and components, and comply with all manufacturer's safety bulletins.

- **Regarding the UAS PIC and Visual Observer**

3. All UAS operations will be under the direct responsibility of Cameron Patterson, who holds an airman certification from the FAA as a Private Pilot with ratings for Airplane Single Engine Land and Instrument, with training and logbook conditions complete for Commercial certification. Total logged PIC flight time is 256 hrs, with endorsements for High-performance Complex single engine, and Tailwheel. All commercial operations will utilize a Visual Observer, who will receive sufficient training on a safe test range to assure safe and efficient operations and communications prior to deployment on a commercial project.
4. The PIC will maintain either a FAA medical certification or a valid US driver's license for all UAS operations.

- **Regarding the Mission Protocols and Areas of Operation of the UAS**

5. UAS operations covered under this exemption will generally take place over unpopulated or sparsely populated rural areas.
6. Any operations that take place in proximity to persons or sensitive property will maintain a 500' direct separation unless said persons are associated with and aware of the UAV operations, or have been notified and provided both consent and appropriate safety protocols (such as staying indoors).
7. In general, all operations will be conducted in accordance with the FAA's March 23 2015 "blanket" COA for operations under 200' AGL. All prospective data collections falling outside the blanket COA parameters, such as operations within 5 NM of a tower controlled airport will be conducted under individual COA applications submitted through the FAA's UAS Civil COA Portal.
8. Each UAS data collection mission will be conducted in accordance with an individualized plan of operation that, at a minimum, plans for flight-time, flight lines, altitudes, PIC and VO locations, LZs and lines of sight, obstacles, ground elevations, pre-operation site inspection, analysis of topographic obstacles, restricted areas, NAS designations, potential on-ground safety considerations, loss of communication protocols, emergency procedures, and collision avoidance procedures for other manned and unmanned aircraft. All pre-operation planning will be done in a Geographic Information System that includes lidar or other existing elevation data,

airspace horizontal and vertical boundaries, towers, transmission lines, trees and other obstructions, landing areas, and requirements for minimum weather and visibility conditions.

9. Each data collection operation will be logged with all details of the operation on a flight-by-flight basis.
10. All other conditions and limitations specified by the Section 333 Exemption, including UAS "return to base," loss of communication protocols, and any other condition not described herein, will be complied with.

f) **Summary for publication in the Federal Register**

CC Patterson & Associates is an environmental consulting firm engaged in processing airborne remote sensing data for planning and monitoring habitat restoration and other conservation projects. In our petition, we request that an exemption be granted from certain regulations defined in 14 CFR 21(H), 14 CFR 43.7, 43.11, 45.11, 45.23(b), 45.27, and 45.29; 14 CFR 61.23(a) and (c), 61.113(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). These exemptions are similar or identical in nature to those currently being granted by the FAA under Section 333 for similar survey and mapping operations by other small businesses.

Appendix 1

FAR section	**Subject**	**Justification**
14 CFR 21(H)	Airworthiness Certification	Not applicable to small UAS.
14 CFR 43.7, 43.11, 45.11 , 45.21, 45.23(b) 45.27, 45.29	Display of placards, records and markings on aircraft	Not applicable to UAS due to small size.
14 CFR § 91.119(c)	Minimum safe altitudes	Separation from manned aircraft by UAV dictates lower operating altitudes
14 CFR § 91.121	Altimeter settings	Not applicable to small UAS ops
14 CFR § 91.151(a)	Fuel requirements	Not applicable to small UAS ops

14 CFR § 91.405 (a)	Maintenance	Not necessary to assure small UAS operation safety. PIC inspection substituted in operating procedures
14 CFR § 91.407(a1)	Return to service	Not applicable to small UAS
14 CFR § 91.409(a1,2)	Annual inspection	Not necessary to assure small UAS operation safety. Implementing all manufacturer recommendations and operator responsibility substituted in operating procedures
14 CFR § 91.417(a,b)	Maintenance records	Not necessary to assure small UAV operation safety. Mfg. recs and operator responsibility subst.

Appendix 2

UAS Specification	**DJI Phantom 3**	**DJI Inspire 1**
Aircraft type	Quadcopter	Quadcopter
Weight	1.20 kg	2.93 kg
Size (diagonal width)	35 cm	58cm
Maximum Speed	16m/s (36 mph)	22 m/s (49 mph)
GNSS positioning	GPS/GLONASS (autonomous)	GPS/GLONASS (autonomous)
Payload	12mp digital camera and 3-axis gimbal	12mp digital camera and 3-axis gimbal

Remote control communications Frequency range	2.400Ghz - 2.483Ghz	2.400Ghz - 2.483Ghz 5.725Ghz – 5.825Ghz
Max communications range	2000m (unobstructed line of sight)	2000m (unobstructed line of sight)
Flight Battery Capacity/Max Flight Duration	4480mAh/ 23 min (approx)	5700mAh/ 18 min (approx)