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

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

June 26, 2015

Exemption No. 11919
Regulatory Docket No. FAA–2015–1268

Mr. Eric Gakstatter
Discovery Management Group, LLC
P.O. Box 663
19760 Bellevue Way
West Linn, OR 97068

Dear Mr. Gakstatter:

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 April 3, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Discovery Management Group, LLC (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial mapping to enhance academic community awareness, augment real estate listing videos, filmmaking, golf course mapping, agricultural mapping, and photogrammetry.

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

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

Airworthiness Certification

The UAS proposed by the petitioner is a DJI Phantom 2.

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

[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, Discovery Management Group, LLC is hereafter referred to as the operator.

Failure to comply with any of the conditions and limitations of this grant of exemption will be grounds for the immediate suspension or rescission of this exemption.

1. Operations authorized by this grant of exemption are limited to the DJI Phantom 2 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

Discovery Management Group, LLC, Oregon – Section 333 Exemption Petition

April 3, 2015

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

Re: Exemption Request Section 333 of the FAA Reform Act of the Federal Aviation Regulations from 14 C.F.R. Part 21; 14 C.F.R. 45.23(b); 14 C.F.R. 91.7(a); 91.9(b) (2); 91.103(b); 91.109; 91.119(a)(b), 91.121; 91.151(a); 91.203(a)&(b); 91.405(a); 91.407(a)(1); 91.409(a) (2); 91.417(a)&(b); 14 C.F.R. 407(a)(1); 14 C.F.R. 409(a)(2); and 14 C.F.R. 417(a)&(b)

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, Discovery Management Group, LLC ("Discovery"), the owner and operator of the DJI Phantom 2 quad-copter Unmanned Aircraft System (UAS), seeks an exemption from the Federal Aviation Regulations ("FARs") listed below so that Discovery can operate our small ultra-light weight UAS commercially in airspace regulated by the Federal Aviation Administration ("FAA"). Discovery will utilize an experienced, licensed pilot holding an FAA third-class airman medical certificate as the operator[1] (Pilot in Charge [PIC]) and a visual observer (VO)[2] that can perform the functions prescribed in the operating manual for all flights under this Exemption, if granted.

The requested exemption would support an application for a commercial Certificate of Authorization to use the system to perform aerial mapping to enhance academic community awareness, augment real estate listing videos, filmmaking, golf course mapping, agricultural mapping, and photogrammetry for various industries.

Use of the DJI Phantom 2 UAS for aerial mapping reduces the need to operate conventional aircraft for the same purpose and provides very high quality imagery at a fraction of the dollar cost and danger to human life[3][4] of using conventional aircraft. By

[1] See Appendix A for PIC qualifications and certifications.
[2] Note; the VO will not be operating the UAS.
[3] *See* National Aeronautics and Space Administration. 2000. U.S. Civil Rotorcraft Accidents, 1963 Through 1997. http://www.ihst.org/portals/54/industry_reports/NASA%20TP%20209597.pdf

approving these exemptions, the FAA will create benefits through safer survey methods by UAS, resulting in decreased potential for loss of life and enhanced efficiency and productivity for the affected activities, as well as environmental benefits, which are all ultimately in the public interest.

Committed to safety with each flight, Discovery's, exemption request would permit operation of ultra-light weight, unmanned (piloted by remote control) and comparatively inexpensive UAS in tightly controlled and limited airspace. Currently, similar lightweight, remote controlled UAS's are legally operated by unmonitored amateur hobbyists with no safety plan or controls in place to prevent catastrophe. In addition, Douglas Trudeau (Exemption No. 11138) and Slugwear, Inc (Like On A Tree; Exemption No. 11157) were granted exemptions for these types of surveys with the DJI Phantom 2.

Discovery has created and will follow its UAS Flight Protocols and Controls[5] for safe operation to avoid and prevent public hazard, as well as manned aircraft hazards/catastrophe. This will act to further safety protocols exclusive to lightweight UAS's specific video and photography usage as Discovery records flight data and other information gained through permitted flight operations to share with the FAA through any required FAA reports to assist with future protocol and safety regulation.

Granting Discovery's request comports with the Secretary of Transportation's (FAA Administrator's) responsibilities and authority to not only integrate UAS's into the national airspace system, but to "...establish requirements for the safe operation of such aircraft systems [UAS's] in the national airspace system" under Section 333(c) of the Reform Act specific to the use of UAS's for real estate/Realtor purposes. Further, Discovery, will conduct its own operations in compliance with the protocols described herein or as otherwise established by the FAA.

For the reasons stated below, Discovery, respectfully request the grant of an exemption allowing Discovery to operate ultra-light weight, remote controlled UAS's for community awareness, enhance real estate listing videos for homeowners, filmmaking, golf course mapping, agricultural mapping, and photogrammetry for various industries. All of which will promote local economic growth through increased employment and increased tax base. Both with public safety in mind by keeping heavier manned aircraft containing combustible fuel that that poses potential public hazard.

---

[4] *See* Helicopter Accident Analysis Team. 1998. The Final Report of the Helicopter Accident Analysis Team. June 1998. http://www.ihst.org/portals/54/industry_reports/HAAT-FinalReport.pdf

[5] See Appendix B. for Discovery's UAS Flight Protocols and Safety Controls. Applicant submits this manual as a confidential document under 14 CFR 11.35 (b). The manual contains proprietary information that the applicant does not wish to be shared publically. The manual contains operating requirements and procedures that are not available to the public and are protected from release under the Freedom of Information Act 5 USC 552.

I. Contact Information:

Eric Gakstatter
Discovery Management Group, LLC
PO Box 663 – 19760 Bellevue Way
West Linn, OR 97068
Mobile: (541) 829-3443
Email: Ericpg@gps-mapping.com

II. The Specific Sections of Title 14 of the Code of Federal Regulations From Which Discovery Requests Exemption are:

14 CFR Part 21;
14 C.F.R. 45.23(b);
14 C.F.R. 91, et seq.;
14 CFR 407 (a) (1);
14 CFR 409 (a) (2); and,
14 CFR 417 (a) & (b).

III. The Extent of relief Discovery seeks and the Reason Discovery Seeks Such Relief:

Discovery submits this application in accordance with the Reform Act, 112 P.L. 95 §§ 331-334, seeking relief from any currently applicable FARs operating to prevent Discovery contemplated commercial cinematic, academic and other flight operations within the national airspace system. The Reform Act in Section 332 provides for such integration of civil unmanned aircraft systems into our national airspace system as it is in the public's interest to do so. Discovery's, ultra-light weight UAS meets the definition of "small unmanned aircraft" as defined in Section 331 and therefore the integration of Discovery's ultra-light weight UAS is expressly contemplated by the Reform Act. Discovery would like to operate its ultra-light weight UAS prior to the time period by which the Reform Act requires the FAA to promulgate rules governing such craft. Thereby, providing direct experience and valuable information for formal regulation that can be administered uniformly to all agriculture, mapping, and real estate related UAS aerial video and photography.

The Reform Act guides the Secretary in determining the types of UAS's that may operate safely in our national airspace system. Considerations include: The weight, size, speed and overall capabilities of the UAS's; Whether the UAS will be operated near airports or heavily populated areas; and, Whether the UAS will be operated by line of sight. 112 P.L. 95 § 333 (a). Each of these items reflect in favor of an exemption for Discovery. Discovery's UAS utilizes four (4) counter-rotating propellers for balance, control and stability. Weighing less than five (5) pounds (far below the maximum 55 pound limit); including camera with gimbal. Discovery's UAS is equipped with a compass, GPS, auto return safety technology if communication is lost between the UAS and the controller, Real-Time Fight Data Display[6], and a No Fly Zone[7] software default setting to force the device to abide by International Civil Aviation Organization regulations.

Discovery considers safety as foremost with each flight. Discovery's small UAS is designed to hover in place via GPS and operate in less than a 24 knot (15 mph) wind. For safety, stability and fear of financial loss, Discovery will not fly in winds exceeding 16 kph (10 mph) nor exceed an indicated airspeed of 29 knots (15 m/s). Built-in safety

---

[6] Real-Time Flight Data includes UAS flight height, horizontal speed, vertical speed, and distance from the PIC.

[7] DJI's "No Fly Zone": Two classes in this mode limit the DJI Phantom 2's ability to fly near restricted airport air space. Class A will not allow the UAS to take off within 1.5 miles of the GPS location of an airport. Class B will has incorporated an increasing height limit from 35 feet AGL at 1.5 miles from an airport, increasing to 400 feet at 5 miles an airport. The UAS control system will also automatically warn the PIC when the UAS has approached within 330 feet of the 5-mile buffer zone around an airport. This software will also not allow the user to set GPS waypoints within 5 miles of the 5-mile No Fly Zone around an airport. For further details, visit http://www.dji.com/fly-safe/category-mc.

systems include a GPS mode that allows Discovery's UAS to hover in place when radio controls are released. With three modes to choose from, Discovery will utilize the *Smart Mode* for aerial videography/photography. This is the safest, most reliable and stable mode to prevent accident and hazard. When PIC communication is lost, Discovery's UAS is designed to slowly descend to point of take-off (*Return to Home*). Discovery will not operate the UAS near Airports, Hospitals, nor Police heliports, and will not operate near areas where general public is within fifty to one hundred (50-100) yards depending on location, conditions and weather. Discovery's PIC and VO will be on constant alert for any manned aircraft (Police/Medical helicopters, etc.) or other UAS, and prepared to land/abort immediately to the nearest and safest ground point should a manned aircraft or UAS approach Discovery's location, or Discovery suspects manned aircraft or UAS may approach near our location. Discovery's UAS is capable of vertical and horizontal operations, and is only flown within the line of sight of both the PIC and VO.

Utilizing battery power rather than combustible fuels, flights with Discovery's UAS generally last between five (5) to seven minutes, with an altitude under 400 feet. Discovery will utilize a fresh fully charged battery with each flight as a safety precaution; full flight time limit for each battery is nine (9) to 12 minutes as tested. Discovery will not operate our UAS at or below manufacturer recommend minimum charge levels for operation; preferring to remain well within a safe operating range to insure adequate communication between radio control and UAS to eliminate potential for crash, loss of control or hazard. Reserve batteries are at hand with each exercise to insure replacement for sufficient safe level of operation.

Discovery does not believe in taking risk that may cause a crash that could create hazard to the public/property/manned aircraft, and have no desire to lose an investment. Discovery has clocked numerous practice flights in remote areas as a hobbyist simulating flights for future commercial use to gain familiarization with the characteristics of this specific UAS's performance under different temperature and weather conditions. Discovery also practices computerized simulated flights to maintain adequate skills and response reflex time, for the sake of safety.

Discovery is extremely cautious when operating any UAS and will not "create a hazard to users of the national airspace system or the public." 112 P.L. 95 § 333 (b).

Given the small size and weight of Discovery's UAS, it falls well within Congress's contemplated safety zone when it promulgated the Reform Act and the corresponding directive to integrate UAS's into the national airspace system. Discovery's UAS, used in hobby flight, has a demonstrable safety record and does not pose any threat to the general public or national security.

IV. How Discovery's Request Will Benefit the Public As A Whole:

Aerial videography for geographical awareness in real estate, filmmaking, golf course mapping, agricultural mapping, and photogrammetry for various industries has been around for a long time through manned fixed wing aircraft and helicopters. For small budget companies, farms and average homeowners, the expense of manned aerial videography is cost prohibitive. Only large companies can afford to absorb such expense, this depriving the remainder of the public from a valuable marketing and mapping tool. Manned aircraft pose a threat to the public through potential catastrophic crash that Oregon has experienced in the past with private and public officials involved

in crashes in recent years[8]. Furthermore, Discovery's PIC, Eric Gakstatter, is an editor for GPS World magazine and Geospatial Solutions. He has written several articles on UAS and intends to continue writing such articles to raise awareness and education of productive and safe UAS operations.

Congress has already proclaimed that it is in the public's interest to integrate commercially flown UAS's into the national airspace system, hence the passing of the Reform Act. Granting Discovery's exemption request furthers the public interest through academic/visual awareness of the geographical benefits around Oregon. Discovery's ultra-light weight UAS is battery-powered and creates no emissions that can harm the environment. The consequence of my ultra-light weight UAS crashing is far less than a full size helicopter or fixed wing aircraft; which are heavy, contain combustible fuel and can cause catastrophic devastation to the public.

The public's interest is furthered by minimizing ecological and crash threat by permitting aerial video/photo capture through our battery operated ultra-light weight UAS's. Permitting Discovery to immediately fly within national air space furthers economic growth by offering cost-effective videography and mapping products.

V. Reasons Why Discovery's Exemption Will Not Adversely Affect Safety Or How The Exemption Will Provide a Level of Safety At Least Equal To Existing Rule:

Discovery's exemption will not adversely affect safety. Quite the contrary, for the reasons stated, permitting Discovery to log more flight time in FAA controlled airspace, with communication with the FAA, will allow us to contribute to the innovation and implementation of new and novel techniques for realtors, filmmaking, golf courses, agricultural mapping, and photogrammetry for various industries as well as continuing to educate the public through publishing articles. In addition, Discovery submits the following representations of enhancements to current aerial videography and photography for real estate, filmmaking, golf courses, agricultural mapping, and photogrammetry for various industries:

- Discovery's UAS weighs less than 5 pounds complete with a small ultra-light weight high quality GoPro 4 Black camera;
- Discovery will only operate this UAS below 400 feet, as recommended by the FAA Modernization and Reform Act of 2012;
- Discovery's UAS will only operate for 10 minutes per flight;
- Discovery will land this UAS prior to manufacturer recommended minimum level of battery power, 30% battery power remaining. Also, Discovery's UAS has an automated function which results in immediate landing when a low battery is detected;
- Discovery will pilot this UAS through remote control by line of sight;
- Discovery's UAS has GPS-controlled autopilot system to maintain UAS stability and control,
- Discovery's UAS has an Auto Return-to-Home & Landing function to increase

[8] *Three injured in helicopter crash in rural Douglas County,* http://www.kpic.com/news/local/Helicopter-crashes-in-Douglas-County-229583111.html *'Ax Men' pilot dies in Oregon helicopter crash,* http://www.kptv.com/story/23447746/one-person-killed-in-linn-county-logging-helicopter-crash

safe return of the UAS to the ground,

- A pre-programmed flight safety feature whereby Discovery's UAS automatically hovers and then slowly lands if communication with the remote control pilot is lost;
- Discovery will actively analyze flight data and other sources of information to constantly update and enhance safety protocols;
- Discovery will only operates in reasonably safe environments that are strictly controlled and are away from: power lines, elevated lights, airports and actively populated areas;
- Discovery will conduct extensive pre-flight inspections and protocol review, during which safety carries primary importance;
- Any maintenance or alterations of Discovery's UAS that could affect operation or flight characteristics will require a functional test flight before returning to work;
- Discovery will always obtain all necessary permissions prior to operation, including issuing a notice-to-airmen (NOTAM) prior to operations; and,
- Discovery will have procedures in place to abort flights in the event of safety breaches or potential danger.
- In recognition of the FAA's Exemption No. 11062, and specifically Exemption No. 11138 for the same UAS model (DJI Phantom 2); prior to conducting operations for the purpose of aerial photography/videography, Discovery's PIC will have accumulated 25 hours of total time as a UAS rotorcraft pilot including at least 10 hours as a UAS pilot with a multi-rotor UAS. Prior to operations, Discovery's PIC must also have accumulated a minimum of 5 hours as a UAS pilot operation the DJI Phantom 2. In addition to the hour requirements, the PIC must accomplish 3 take-offs and landings in the preceding 90 days (for currency purposes).

Discovery's, safety protocols provide a level of safety equal to or exceeding existing rules. It is important to note that absent the integration of commercial UAS into our national airspace system, helicopters are the primary means of aerial video and photography for community awareness and real estate. While the safety record of such helicopters is astounding, there has been local incidents involving loss of life as well as extensive property damage; it is far safer to operate a battery powered ultra-light weight UAS.

- First, the potential loss of life is diminished because UAS's carry no people on board and Discovery will only operate its UAS in specific areas away from mass populations.

- Second, there is no fuel on board a UAS and thus the potential for fire or explosions is greatly diminished.

- Third, the small size and extreme maneuverability of Discovery's UAS allow the PIC to remotely pilot away from and avoid hazards quickly and safely. Lastly, given its small size and weight, even when close enough to capture amazing images, Discovery's UAS need not be so close to the objects they are focused on through the technology and use of post editing software allowing pan and zoom.

Accordingly, Discovery's UAS has been experimentally operated for familiarization/competency and will continue to operate at and above current safety levels. Furthermore, Discovery's PIC has accumulated 25 hours of total time as a UAS

multi-rotor pilot. Discovery's PIC has also accumulated more than 5 hours as a UAS pilot operation the DJI Phantom 2.

VI. A Summary The FAA May Publish in the Federal Register:

A. 14 C.F.R. 21 and 14 C.F.R. 91: Airworthiness Certificates, Manuals and The Like.

14 C.F.R. Part 21, Subpart H, entitled Airworthiness Certificates, sets forth requirements for procurement of necessary airworthiness certificates in relation to FAR § 91.203(a)(1). The size, weight and enclosed operational area of Discovery's UAS permits exemption from Part 21 because Discovery's UAS meets (and exceeds) an equivalent level of safety pursuant to Section 333 of the Reform Act. The FAA is authorized to exempt aircraft from the airworthiness certificate requirement under both the Act (49 U.S.C. § 44701 (f)) and Section 333 of the Reform Act. Both pieces of legislation permit the FAA to exempt UAS's from the airworthiness certificate requirement in consideration of the weight, size, speed, maneuverability and proximity to areas such as airports and dense populations. Discovery's current UAS meets or exceeds each of the elements.

14 C.F.R. 91.7(a) prohibits the operation of an aircraft without an airworthiness certificate. As no such certificate will be applicable in the form contemplated by the FARs, this Regulation is inapplicable. However, Discovery's PIC will still ensure that the UAS is in an airworthy condition based on compliance with the operating documents prior to every flight.

14 C.F.R. § 91.9 (b) (2) requires an aircraft flight manual in the aircraft. As there are no on board pilots or passengers, and given the size of the UAS, this Regulation is inapplicable. An equivalent level of safety will be achieved by maintaining a safety/flight manual delineating areas where safety can be defined[9]. The FAA has previously issued exemptions to this regulation in Exemption Nos. 8607, 8737, 8738, 9299, 9299A, 9565, 9565B, 10167, 10167A, 10602, 10700 and 32827. However, Discovery's UAS operations manual will be kept in a location accessible by Discovery's PIC.

14 C.F.R. § 91.103 regarding preflight action. Discovery's PIC will take certain actions before flight to ensure safety of the flight. These will include reviewing weather, flight battery requirements[9], landings, and takeoff distances and aircraft performance data before initiation of the flight.

14 C.F.R. § 91.121 regarding altimeter settings is inapplicable insofar as Discovery's UAS utilizes electronic GPS with a barometric sensor. According to the manufacturer of Discovery's UAS, the GPS sensor is accurate to 2.6 feet Vertical and 8.2 feet Horizontal. These accuracies are adequate for Discovery to safely operate the UAS for its exempted purposes.

14 C.F.R. § 91.203 (a) and (b) provides for the carrying of civil aircraft certifications and registrations. They are inapplicable for the same reasons described above. The equivalent level of safety will be achieved by maintaining any such required certifications and registrations by Discovery in a location accessible by Discovery's PIC.

[9] See Appendix B and C

B. 14 C.F.R. § 45.23: Marking of The Aircraft.

> Applicable Codes of Federal Regulation require aircraft to be marked according to certain specifications. Discovery's UAS, by definition, is unmanned. Therefore the UAS does not have a cabin, cockpit or pilot station on which to mark certain words or phrases. Further, two-inch lettering is difficult to place on such small aircraft with dimensions smaller that minimal lettering requirement. The FAA has previously issued exemptions to this regulation through Exemptions Nos. 8738, 10167, 10167A and 10700.

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

> 14 C.F.R. § 91.119(a) and (b) prescribes safe altitudes for the operation of civil aircraft. It allows helicopters to be operated at lower altitudes in certain conditions. Discovery's UAS will never operate at an altitude greater than 400 AGL; safely within the standard 400 AGL as recommended by the FAA Modernization and Reform Act of 2012. Discovery will however operate its UAS in safe areas away from areas depicted in "yellow" on VFR charts, providing a level of safety at least equivalent to or below those in relation to minimum safe altitudes. Discovery will conduct all operations under Discovery's Protocols and Controls[10], including posting a warning sign reading: "Attention Aerial Photography in Progress – Remain Back 150 Feet". Discovery will operate its UAS in accordance with Exemption No. 11109, which may require the UAS be operated closer than 500 feet to essential persons. Non-participating persons must remain at appropriate distances (500 feet) from the UAS, and if they need to be closer than 500 feet, non-participating persons will remain behind barriers or structures that can sufficiently protect them from the UAS debris in the event of an accident. Given the size, weight, maneuverability and speed of Discovery's UAS, an equivalent or higher level of safety will be achieved.

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

> The above-cited Regulations require, amongst other things, aircraft owners and operators to "have [the] 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. . . ."

These Regulations only apply to aircraft with an airworthiness certificate. They will not, therefore, apply to Discovery's UAS. However, as a safety precaution Discovery's PIC and VO will inspect Discovery's UAS before and after each flight.

[10] See Appendix B.

A Summary the FAA May Publish in the Federal Register:

A. 14 C.F.R. 21 and 14 C.F.R. 91: Airworthiness Certificates, Manuals and The Like.

14 C.F.R. 21, Subpart H, entitled Airworthiness Certificates, sets forth requirements for procurement of necessary airworthiness certificates in relation to FAR § 91.203(a)(1). The size, weight and enclosed operational area of Discovery's UAS permits exemption from Part 21 because Discovery's UAS meets an equivalent level of safety pursuant to Section 333 of the Reform Act. The FAA is authorized to exempt aircraft from the airworthiness certificate requirement under both the Act (49 U.S.C. § 44701 (f)) and Section 333 of the Reform Act. Both pieces of legislation permit the FAA to exempt UAS's from the airworthiness certificate requirement in consideration of the weight, size, speed, maneuverability and proximity to areas such as airports and dense populations. Discovery's UAS meets or exceeds each of the elements. 14 C.F.R. 91.7(a) prohibits the operation of an aircraft without an airworthiness certificate. As no such certificate will be applicable in the form contemplated by the FARs, this Regulation is inapplicable. 14 C.F.R. § 91.9 (b) (2) requires an aircraft flight manual in the aircraft. As there are no pilots or passengers, and given the size of the UAS's, this Regulation is inapplicable. An equivalent level of safety will be achieved by maintaining a manual. The FAA has previously issued exemptions to this regulation in Exemption Nos. 8607, 8737, 8738, 9299, 9299A, 9565, 9565B, 10167, maintenance program that involves regular software updates and curative measures for any damaged hardware. Therefore, an equivalent level of safety will be achieved.

In summary, Discovery seeks an exemption from the following Regulations:

14 C.F.R. 21, subpart H; 14 C.F.R. 45.23(b); 14 C.F.R. § 91.7 (a); 14 C.F.R. § 91.9 (b)(2); 14 C.F.R. § 91.103(b); 14 C.F.R. § 91.109; 14 C.F.R. § 91.119 (a)(b); 14 C.F.R. § 91.121; 14 C.F.R. § 91.151(a); 14 C.F.R. §§ 91.203(a) and (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. § 91.409 (a) (2); and, 14 C.F.R. §§ 91.417 (a) & (b) to commercially operate Discovery's small unmanned vehicle/lightweight unmanned aircraft vehicle in community awareness, real estate operations, filmmaking, golf course mapping, agricultural mapping, and photogrammetry for various industries and to develop economic platforms for real estate and golf courses.

Currently, area awareness, filmmaking, real estate aerial videography/photography, golf course mapping, agricultural mapping, and photogrammetry for various industries relies primarily on the use of larger aircraft running on combustible fuel, posing potential risk to the public. Granting Discovery's request for exemption will reduce current risk levels and thereby enhance safety. Discovery's UAS craft does not contain potentially explosive fuel, is smaller, lighter and more maneuverable than conventional real estate video and photographic aircraft with much less flight time. Further, Discovery will operate at lower altitudes and in controlled airspace eliminating potential public risk flying to and from established air fields. Discovery has been informally analyzing flight information and will compile safety protocols and the implementation of a flight operations manual for real estate usage that exceeds currently accepted means and methods for safe flight. Formal collection of information shared with the FAA will enhance the FAA's internal efforts to establish protocols for complying with the FAA Modernization and Reform Act of 2012.

There are no personnel on board Discovery's UAS and therefore the likelihood of death or serious bodily injury is significantly diminished. Discovery's operation of its UAS, weighing less than 5 pounds and travelling at lower speeds within limited areas will provide an equivalent level of safety as that achieved under current FARs. Accordingly, Discovery respectfully request that the FAA grant Discovery's exemption request and Discovery is willing to cooperate in sharing information to benefit the FAA, safety of manned aircraft, and the general public at large.

Respectfully submitted,

Eric Gakstatter
Discovery Management Group, LLC
PO Box 663 – 19760 Bellevue Way
West Linn, OR 97068
Mobile: (541) 829-3443
Email: Ericpg@gps-mapping.com