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

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

September 4, 2015

Exemption No. 12763
Regulatory Docket No. FAA−2015−2585

Ms. Jennifer A. Lee
Seale & Ross
Counsel
200 North Cate Street
Hammond, LA 70401

Dear Ms. Lee:

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 June 3, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of ELOS Environmental, LLC (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial inspection and data collection, aerial photography, and aerial videography, all in connection with environmental consulting projects involving environmental and construction monitoring, mapping, site inspection.

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

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

Airworthiness Certification

The UAS proposed by the petitioner are the DJI Phantom 2 Vision+ and the DJI Phantom 3.

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, ELOS Environmental, 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)

[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.

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, ELOS Environmental, 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 Vision+ and the DJI Phantom 3 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

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BOARD CERTIFIED ESTATE PLANNING AND ADMINISTRATION SPECIALIST[1*]
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BY THE LOUISIANA BOARD OF LEGAL SPECIALIZATION*

IN TAXATION[4]
ADMITTED IN TEXAS[5]
ADMITTED IN MISSOURI[6]

June 3, 2015

Via Electronic Submission (regulations.gov)

Mr. Anthony Foxx, Secretary of Transportation
U.S. Department of Transportation
Docket Operations
1200 New Jersey Avenue, SE
Room W12-140, West Building Ground Floor
Washington, DC 20590

Re: ELOS Environmental, LLC Petition for Exemption under Section 333 of FAA Modernization and Reform Act of 2012 and Part 11 of the Federal Aviation Regulations from 14 C.F.R. § 21, Subpart H; 45.21; 45.23(b); 45.25; 45.27; 45.29; 61.113(a) and (b); 91.7(a); 91.103; 91.105; 91.119; 91.121; 91.151(a); 91.405(a) and (d); 91.407(a)(1); 91.409(a)(2); and 417(a) and (b)

Dear Mr. Foxx:

On behalf of ELOS Environmental, LLC (ELOS), and pursuant to Section 333 of the Federal Aviation Administration Reform and Modernization Act of 2012 (FMRA), I submit this petition seeking ELOS's exemption from the Federal Aviation Regulations (FARs) described above and more particularly herein. ELOS requests an exemption to commence commercial operations of small a Unmanned Aircraft System (UAS) in the National Airspace System (NAS) for the purposes of aerial inspection and data collection, aerial photography, and aerial videography, all in connection with environmental consulting projects involving environmental and construction monitoring, mapping, site inspection, and the like.

ELOS's proposed operations of a UAS do not create a hazard to users of the national airspace system or the public due the UAS's size, weight, speed, operational capability, proximity to airports and populated areas, and operation within visual line of sight (VLOS). Further, the proposed operations do not pose a threat to national security.

ELOS' petition is similar to Exemption Nos. 11062, 11109, 11112, and 11213 granted by the FAA in all material respects. In those Grants of Exemption, the FAA found that the enhanced safety achieved using an UAS with the specifications described by the petitioners where the UAS would be carrying no passengers or crew (as opposed to a manned aircraft of significantly greater proportions, carrying crew and flammable fuel) gave the FAA good cause to find that the UAS operations enabled by those exemptions were in the public interest. Similarly, described herein are the public

interests that may be served by granting an exemption to ELOS; ELOS's proposed operations and the UAS; and precautions ELOS will implement and follow when operating the UAS.

Also, as of March 23, 2015, the FAA automatically grants to a UAS operator with a Section 333 exemption a blanket Certificate of Authorization (COA) for flights at or below 200 feet, provided the UAS weights less than 55 pounds; operations are conducted during daytime Visual Flight Rules (VFR) conditions; operations are within visual line of sight (VLOS) of the pilots; and the UAS remains specified distances away from airports or heliports. If ELOS is provided with a Section 333 exemption, it will also comply with these conditions, making a blanket COA applicable.

Finally, in the event the FAA grants ELOS a Section 333 exemption and then changes the applicable rules regarding UAS operation for commercial purposes to no longer require an UAS operator to possess at least a private pilot certificate and third-class medical certificate, ELOS requests that it automatically be deemed to meet the applicable requirements of the FAA regarding UAS operations for commercial purposes so that no additional license or certificate is necessary.

1. Applicant ELOS Environmental, LLC

The name and address of the applicant is:

Elos Environmental, LLC
Attn: Lucas Watkins, President
43177 East Pleasant Ridge Road
Hammond, LA 70401
985.662.5501
lwatkins@elosenv.com
www.elosenv.com

ELOS is a wetland services company that provides professional environmental services throughout the Gulf South, particularly in Louisiana. The company offers environmental consulting, research, and advisory services to a variety of clients, including individuals, businesses, organizations, public agencies, and federal, state, and local governments. ELOS provides a range of services, including endangered species surveys, environmental program development, environmental monitoring, cultural resources management, mitigation consultation, wetland delineations, forest management, wetland restoration, GIS|GPS mapping services, environmental studies, and environmental compliance. It also works in oil and gas exploration, as well as in production and transmission activities. ELOS's consulting often involves inspecting, documenting, and/or monitoring:

- land parcels (forests and timber land), open spaces, wetlands, and coast lines
- wildlife, including aquatic habitats and endangered species' habitats
- conditions of various habitats, wildlife, restricted activities, and changes due to natural, man-made, and extraordinary events
- archaeological sites
- activities of landowners and other surface activities
- activities of exotic and invasive plant species

ELOS has been in operations since 2006.[1] It is based in Hammond, Louisiana, but works throughout the state and region. The company's key environmental staff is comprised of 10 professionals, representing 50+ years of experience. ELOS works with various regulatory and governing agencies on a daily basis, including the U.S. Army Corps of Engineers, Department of Natural Resources, Department of Environmental Quality, U.S. Coast Guard, Department of Wildlife and Fisheries, and the State Lands Office.

2. Public Interest in Granting Exemption to ELOS

The underlying purpose of all environmental services ELOS provides is protection of the environment for the benefit of the public. This stewardship of the environment on behalf of those in the public sector may manifest itself as inspecting and monitoring environmentally critical forests, streams, rivers, wetlands, coastal resources, wildlife, endangered species, and other natural resources. Especially in Louisiana, monitoring levees, land masses, and coastal lines for the purposes of preserving life and land is crucial. In the private sector, delineating wetlands for preservation purposes or monitoring pipelines or construction projects all have protection of the environment as the primary goal.

In addition to helping protect the environmental for all, authorizing ELOS to perform aerial data collection, photography, and videography with a UAS will also positively impact the public from a monetary perspective. For example, some public projects require annual environmental monitoring. Enabling ELOS to partially complete that work by using an UAS will benefit the public with reduced costs and potential liability, as well as increased documentation and accuracy.

Also, ELOS's ability to use a UAS for performing aerial data collection, photography, and videography in connection with natural disasters is of great importance. In the event of a natural or manmade disaster, ELOS will be able to quickly assist with disaster assessments for its public or private clients. ELOS would also be able to view areas previously inaccessible or difficult to assess by traditional means.
Equally important is the positive environmental impact ELOS will make while providing its services. ELOS's ability to use a UAS will reduce direct and indirect environmental impacts from ground-based vehicular intrusion and noise. Also, the noise and air pollution associated with conventional manned aircraft would be eliminated. Finally, and most important for the State of Louisiana, use of a UAS would enable ELOS to monitor changes such as coastal erosion without having any further environmental impact.

Additionally, use of a UAS instead of a helicopter or airplane has increased safety considerations. A UAS carries no passengers, pilot, or crew, thereby increasing safety for those individuals. A UAS has no flammable fuel, increasing safety to the general public.

In summary, the FAA's grant of ELOS's petition would benefit the public as a whole by allowing work related to the environment to be completed more cost efficiently, more accurately, and with reduced costs and environmental impacts as compared to more traditional methods of aerial inspection and data collection, photography, and videography. There are also safety benefits, in addition to educational data and research opportunities ELOS may provide.

[1] ELOS Environmental, LLC formerly operated as Krebs LaSalle Environmental LLC, which commenced operations in 2006. The company changed its name to ELOS Environmental, LLC in 2011.

3. ELOS's Exemption Would Not Adversely Affect Safety

A. Proposed UAS – DJI Phantom

ELOS proposes operating a small and unmanned quadcopter, the DJI Phantom 2 Vision+ and the DJI Phantom 3 (an upgraded version) to conduct aerial site inspections, data collection, photography, and videography in connection with its various environmental consulting projects. ELOS requests exemptions for use of both versions of the DJI Phantom (DJI Phantom 2 Vision+ and DJI Phantom 3 (an upgraded version once it becomes available)). Following are specifications for the DJI Phantom 2 Vision+:

i. *Flight Time*

The Phantom's maximum flight time is 25 minutes.

ii. *Weight*

The Phantom weighs 2.74 pounds.

iii. *Compass*

The Phantom features a compass which reads geomagnetic information and assists the global positioning system (GPS) in accurately calculating the UAS's position and altitude. Importantly, it and other features help ensure the operator and UAS comply with all flight restrictions so as to "not create a hazard to users of the national airspace system or the public or pose a threat to national security" as described by Section 333(b)(1) of the FMRA.

iv. *Flight Radar*

The Phantom is equipped with flight radar that displays the current position of the Phantom in relation to the operator. Exceeding the control range of the remote controller triggers the Phantom to automatically fly back to the original takeoff point and land safely.

v. *Flight Control System*

The Phantom is equipped with a built-in Flight Control System and the shielded, antistatic compass described above. The Flight Control System features a failsafe function that automatically activates under certain circumstances, such as if the remote controller is powered off, if the UAS has flown outside effective control range, if the signal between the UAS and the remote controller is blocked, or if there is a signal problem caused by interference. If activated, the failsafe function returns the Phantom back to its home point or start location and lands. Even if the GPS mode is not active, the failsafe function will execute a controlled descend and automatic landing.

vi. ***No Fly Zone***

The Phantom's software includes pre-programmed "no fly zones" to increase flight safety and prevent accidental flights into restricted area, which assesses the database of NAS. Restricted areas include airports throughout the world. A "warning zone" has been set around the safety zone, and a warning message appears in the application if the operator flies within 320 feet of the safety zone.

vii. ***Other Flight Limitations***

The Phantom's software prevents the UAS from flying into restricted areas such as airports. The restricted areas include Class A safety zones (major international airports) where there is a no-fly zone and restricted-altitude zones and Class B safety zones (smaller airports), which includes no-fly and warning zones.

If the Phantom is within 1.5 miles of Class A safety zone, takeoff is prevented, and the operator cannot initiate flight. Between 1.5 and 8 miles around an airport, the Phantom may fly may at a maximum altitude of 35 feet, which increases so that the Phantom can fly up to 400 feet if it is five miles from an airport.

In the event the Phantom accidentally flies within the safety zone, the Phantom will automatically descend to the restricted height. If there is a loss of GPS signal, the Phantom will land immediately once the signal returns. The operator can still control the UAS; however, he cannot make it ascend in altitude.

viii. ***Mobile Vision***

The Phantom operator may track the UAS's flight through the DJI Vision app installed on his mobile device. Use of this application allows the operator to see what the Phantom sees through a mobile device such as an iPhone.

ix. ***Manufacturer Updates***

DJI, the manufacturer, regularly updates its website and the DJI Vision application with fixes, upgrades, etc. The Phantom and associated mobile app can connect to receive manufacturer firmware and application updates, news, alerts, and support.

x. ***UAS / Manufacturer Documents and Manuals***

The DJI Phantom 2 Vision User Manual, Quick Start Guide, and Pilot Training Guide are all available online for download at www.dji.com/product/phantom-2-vision/download.

The DJI Phantom 3 Professional User Manual and Quick Start Guide are available online for download at www.dji.com/product/phantom-3/download.

B. DJI Phantom Factory Specifications

Aircraft	
Supported Battery	DJI 5200mAh LiPo Battery
Weight (Battery and Propellers)	2.74 pounds
Hover Accuracy (Ready To Fly)	Vertical: 0.8m; Horizontal: 2.5m
Max Yaw Angular Velocity	200°/s
Max Tiltable Angle	35°
Max Ascent/Descent Speed	Ascent: 6m/s; Descent: 2m/s
Max Flight Speed	15m/s
Diagonal Motor-Motor Distance	350mm
Gimbal	
Working Current	Static : 750mA; Dynamic : 900mA
Control Accuracy	±0.03°
Controllable Range	Pitch : -90°—0°
Maximum Angular Speed	Pitch : 90°/s
Camera	
Operating Environment Temperature	0℃-40℃
Sensor Size	1/2.3"
Effective Pixels	14 megapixels
Resolution	4384×3288
HD Recording	1080p30 & 720p
Recording FOV	110° / 85°
Remote Control	
Operating Frequency	5.728 GHz—5.85 GHz
Communication Distance (Open Area)	CE Compliance: 400m; FCC Compliance: 800m
Receiver Sensitivity (1%PER)	-93dBm
Transmitter Power	CE Compliance: 25mW; FCC Compliance: 100mW
Working Voltage	120 mA@3.7V
Built-In LiPo Battery Working Current/Capacity	3.7V, 2000mAh
Range Extender	
Operating Frequency	2412-2462MHz
Communication Distance (Open Area)	500-700m
Transmitter Power	20dBm
Power Consumption	2W
DJI Vision App	
Mobile Device System Requirement	iOS version 6.1 or above; Android system version 4.0 or above
Mobile Device Support	iOS recommended: iPhone 4s, 5, 5s, 6, 6Plus, iPod touch 5 (available but not recommended: iPad 3, 4, mini) Android recommended: Samsung Galaxy S3, S4, Note 2, Note 3, or phones of similar configuration

C. Procedures for Ensuring UAS's Condition is Safe for Flight

ELOS is committed to ensuring its operation of the Phantom and unmanned flights do not create a hazard to users of the national airspace system or the public, or pose a threat to national security. As such, ELOS will operate the Phantom only under the following conditions:

- Flight operations will be conducted only in daylight hours and under visual meteorological conditions (VMC);
- The wind speed is not greater than 15 knots, which information is obtained from the nearest NOAA reporting station;
- The area to be inspected, monitored, or otherwise viewed is clearly defined on a plot plan drawing or map, with the path of flight and altitudes pre-determined;
- The flight path is at least 500 feet from all non-participating persons, vessels, vehicles, and/or structures unless consent is granted or protective barriers/structures are in place;
- Flight operations present no hazard to the Pilot in Command (PIC), Visual Observer (VO), trainees, or any other persons;
- Flight plan and schedule have been reviewed with and approved by ELOS leadership; and
- Flight plan is communicated to all ELOS and client personnel in the area.

In addition, ELOS has implemented procedures to make sure the Phantom is in a condition that is safe for every flight. Before initiating each flight, the UAS operator/PIC will check the following items:

- Phantom remote controller, smart battery, and range extender plus mobile device are fully charged;
- Propellers are mounted correctly;
- Gimbal clamp has been removed;
- Damping absorbers are in good condition and not broken or worn;
- Anti-drop kits have been mounted correctly;
- Camera lens cap has been removed;
- Micro-SD card has been inserted;
- Gimbal is functioning as normal;
- DJI Vision app on the mobile device can connect to the camera;
- Compass has been calibrated;
- Flight radius and altitude limits (400 feet) have been reviewed with and approved by ELOS leadership;
- Flight radius is limited to the property boundaries of ELOS's client (or ELOS has otherwise obtained consent from property owner);
- VO is stationed at the required initial observation point according to the flight plan and in view of the PIC;
- VO has means for continual verbal communication with PIC;
- There are no inoperable components of UAS;
- All required site safety permits are approved and in possession of the PIC;
- Motors can start and function as normal; and
- Flight Indicator Lights on the UAS verify that the home point is set to current location.

The above items are to be verified on ELOS's Pre-Flight Checklist, which is attached hereto as Exhibit A. After checking these items, the PIC must sign and date the Pre-Flight Checklist and file it in the UAS Inspection and Maintenance Record Book.

D. Radio Frequency (RF) Spectrum

The Phantom's remote controller ground station (which is used for control of the UAS) has an operating frequency of 5.278 – 5.85 GHz. It is Federal Communications Commission (FCC) compliant with a communication distance in an open area of 800 m (875 yards). Following are other specifications:

Operating Frequency	5.728 GHz—5.85 GHz
Communication Distance (open area)	FCC Compliance: 800m
Receiver Sensitivity	(1%PER) -93dBm
Transmitter Power	FCC Compliance: 100mW
Working Voltage	120 mA@3.7V
Built-in LiPo Battery Working Current/Capacity	3.7V, 2000mAh

E. Qualifications for Pilot in Command (PIC)

ELOS will ensure the PIC directly responsible for the operation of the Phantom on behalf of ELOS is properly certified and experienced. First, any PIC retained by ELOS to operate a UAS will possess at least a private pilot certificate and current third-class medical certificate. The PIC will also be required to have accumulated and logged at least 25 hours of total time as a UAS rotorcraft pilot, including at least 10 hours logged as a UAS pilot with a multi-rotor UAS.

Before operating the Phantom, the PIC will also have accumulated and logged a minimum of five hours as UAS pilot, specifically operating the Phantom 2 Vision+, including accomplishing at least three take-offs and landings during dedicated training sessions in the preceding 90 days.

Finally, the PIC will have demonstrated the ability to safely operate the Phantom in a manner consistent with how it will be operated on ELOS's behalf. This will include completing evasive and emergency maneuvers and maintaining appropriate distances from people, vessels, vehicles, and structures.

F. Medical Standards for the Pilot in Command (PIC)

The PIC will possess at least a current third-class medical certificate.

G. Proposed Operation of the UAS

i. *Intended UAS Operations*

ELOS will use the Phantom for the purposes of aerial inspection, documentation, data collection, and monitoring, photography, and videography, all in connection with environmental consulting, research, advisory, and business services it provides. ELOS's clients include individuals, businesses, organizations, public agencies, and federal, state,

and local governments; thus, the different types of services it provides to different types of clients vary widely. For example, it works with public agencies and governments to perform work inspecting, documenting, and/or monitoring plants, animals, and land formations (as further discussed in Section 1). ELOS has also been retained to provide environmental and construction monitoring, mapping, and site inspection.

However diverse the specific projects may be, ELOS's use of a UAS allows it to provide accurate information to clients more efficiently, more often, and at less expense. In the case where a public agency or government is ELOS's client, this ultimately translates into a reduction of taxpayer money required for the project. In addition, safety is improved and the risk to people and property is reduced when compared to more traditional means of obtaining the same information. Importantly, the environmental impact of using a battery operated UAS instead of a helicopter is greatly reduced. In situations of wildlife monitoring, a small, relatively quiet UAS is less bothersome than a traditional aircraft.

As ELOS's services relate to environmental work, Phantom operations will likely be conducted above non-populated areas. Clients retain ELOS to provide data collection, monitoring services, etc. of plants, animals, and the land, so there is little risk that people will be affected by ELOS's operations of a UAS, which will not be conducted in urban areas.

ELOS's clients do not include airports, so no operations will occur within five miles of the geographic center of a non-towered airport as denoted on current FAA-published aeronautical chart unless a letter of agreement with that airport's management is obtained and the operation is conducted in accordance with Notice to Airmen as required by the Applicant's COA.

ii. ***Intended Area of UAS Operations***

As described above, ELOS will use the Phantom for the purposes of the various environmental services rendered to its clients. The UAS will be operated on ELOS's clients' private land, unless its client is a public agency or federal, state, or local government that request such services on public land. Before commencement of any flight, ELOS's client will be informed of the operation.

ELOS's operations will be restricted to Class G airspace. The Phantom will not be operated by the PIC from any moving device or vehicle.

iii. ***Proposed Speed, Altitude and Visibility***

While the Phantom is capable of attaining a maximum speed of almost 30 knots (15 m/s), ELOS does not intend to operate the UAS at that speed. ELOS will use the Phantom for aerial inspection, documentation, data collection, monitoring, photography, and videography. These purposes can best be achieved by operating the Phantom at a much slower speed, around 4 knots or less (2 m/s), to capture the best quality photographs and video or make proper observations. Also, the Phantom's flight time will be maximized by operating at a slower speed. When traveling to a specified section (and

over that of which there is no interest), the Phantom may be operated at a faster speed, but the UAS will not be flown at a speed exceeding a ground speed of 30 knots.

The purposes for ELOS's operation of a UAS (*i.e.*, aerial photography and videography, inspection, monitoring, etc.) require the aircraft to be closer rather than farther away from the ground to obtain good quality images and information. Therefore, the altitude at which all of the ELOS's operations of the Phantom will be conducted will be below 400 feet. Additionally, the Phantom's Flight Control System ensures the UAS always operates below that level.

ELOS will not operate the Phantom less than 500 feet below or less than 2,000 feet horizontally from a cloud when visibility is less than three miles from the PIC. If the PIC encounters unpredicted obstacles or emergencies, including obscured visibility, operations will be aborted immediately.

iv. *Operation within VLOS*

The Phantom will be operated within the visual line of sight 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. All operations will use a visual observer (VO), and the VO may be used to satisfy the visual line of sight requirement as long as the VO always maintains VLOS capability and the VO and PIC are able to communicate verbally at all times.

v. *Preflight Inspection*

Prior to each flight, and as further described above in Section 3(C), the PIC will inspect the Phantom to ensure it is in a condition for safe flight. If the inspection reveals a condition that affects the safe operation of the UAS, the flight will not commence until the necessary maintenance has been performed and the UAS is re-inspected and found to be in a condition for safe flight. All maintenance and alterations will be properly documented and filed in the UAS Inspection and Maintenance Record Book. *See also Exhibit A, ELOS's "Pre-Flight Checklist"*.

If the Phantom has undergone maintenance or alterations that affect UAS operations or flight characteristics, it must undergo a flight functional test. The PIC who conducts the flight functional test will make an entry in the UAS aircraft records of the flight.

vi. *Operating and Flight Precautions*

The Phantom will not be operated directly over any person, except authorized and consenting personnel, or below an altitude that is hazardous to persons or property on the surface in the event of a UAS failure or emergency.

If the Phantom loses communications or its GPS signal, the UAS will return home to the original takeoff point. The Phantom's flight will be aborted in the event of unpredicted obstacles or emergencies. Each Phantom flight will be completed within 25 minutes flight time or with 25% battery power remaining, whichever occurs first.

vii. *Certificate of Waiver or Authorization (COA)*

Prior to conducting any operations, ELOS will obtain an Air Traffic Organization (ATO) issued Certificate of Waiver or Authorization (COA) for the Phantom. The Phantom aircraft will be identified with its serial number, registered and marked in accordance with applicable regulations, with such marking to be as large as practicable.

viii. *Flight User Manual*

DJI's Flight User Manual for the Phantom will be available to the PIC at the ground control station any time the UAS is operating.

ix. *Right of Way*

The Phantom will remain clear of and yield the right of way to all manned aircraft operations at all times.

x. *Accident Reports*

Any incident, action, or flight operation that transgresses the lateral or vertical boundaries of the operational area described in the applicable COA will be reported to the FAA's Integration Office within 24 hours. Accidents will be reported to the National Transportation Safety Board (NTSB). Further flight operations will not be conducted until the incident, accident, or transgression is reviewed by the AFS-80 and authorization to resume is provided.

4. Relief Requested by ELOS

A. In General

The FAA is expected to release rules applicable to the operation of UASs for commercial purposes next year. Until such time, it is appropriate for the FAA to allow certain commercial operations of small UASs through the exemption process as Congress has directed the FAA "to safely accelerate the integration of civil unmanned aircraft systems into the national airspace system."[2] ELOS's proposed operations and restricted use of the Phantom; the UAS's size and built-in safety features; and the areas of operation in no way pose threats to the NAS or public, or create a national security issue.

B. Specific Sections of Federal Aviation Regulations

ELOS requests exemptions from the following specific regulations:

14 CFR § 21, Subpart H
14 CFR § 45.21
14 CFR § 45.23(b)
14 CFR §45.25
14 CFR § 45.27

[2] FMRA§ 332(a)(1)

14 CFR § 45.29
14 CFR § 61.113(a) and (b)
14 CFR § 91.7(a)
14 CFR § 91.103
14 CFR § 91.105
14 CFR § 91.119
14 CFR § 91.121
14 CFR § 91.151(a)
14 CFR § 91.405(a) and (d)
14 CFR § 91.407(a)(1)
14 CFR § 91.409(a)(2)
14 CFR § 417(a) and (b)

i. 14 CFR 21, Subpart H: Airworthiness Certificate

ELOS requests an exemption from 14 CFR 21, Subpart H, which establishes the procedures for the issuance of an airworthiness certificate. ELOS requests an exemption because the Phantom meets an equivalent level of safety pursuant to Section 333 of the FMRA due to its small size, light weight, and remote, rural operating environment.

ii. 14 CFR 45.21: General

ELOS requests an exemption from 14 CFR 45.21, which provides that except as provided in §45.22, no person may operate a U.S. registered aircraft unless that aircraft displays nationality and registration marks in accordance with the requirements of this section and §§45.23 through 45.33. Currently there are no procedures for obtaining a registration mark for the UAS by the FAA, but ELOS is agreeable to having a registration number assigned and to displaying it where practicable relative to §§45.23, 45.27, and 45.29.

iii. 14 CRF 45.23(b): Marking of the Aircraft

ELOS requests an exemption from 14 CFR 45.23(b), which requires that "…the operator must also display on that aircraft near each entrance to the cabin, cockpit, or pilot station, in letters not less than 2 inches nor more than 6 inches high, the words 'limited,' 'restricted,' 'light-sport,' 'experimental,' or 'provisional,' as applicable."

ELOS requests an exemption from this requirement since the Phantom does not have a cabin, cockpit, or pilot station entrance on or near which the required marks can be displayed. Also, two to six-inch lettering is not practical due the small size of the UAS. ELOS will place the word "Experimental" on the UAS in compliance with §45.29(f) and in the largest practicable manner, which will provide an equivalent level of safety.

iv. 14 CFR 45.25: Location of Marks on Fixed-Wing Aircraft

ELOS requests an exemption from 14 CFR 45.25, which describes marking requirements on fixed wing aircraft. The Phantom is a multirotor quadcopter and not a fixed-wing aircraft. Thus, 14 CFR 45.25 is not applicable.

v. 14 CRF 45.27: Location of Marks on Nonfixed-Wing Aircraft

ELOS requests an exemption from 14 CFR 45.27, which provides that each operator of a rotorcraft must display on that rotorcraft horizontally on both surfaces of the cabin, fuselage, boom, or tail the marks required by §45.23. The Phantom is small and does not have cabin, fuselage, boom, or tail to display the marks required by §45.23. As such, the marking requirements of this section are not feasible, though the UAS will display the required marking in the largest practicable manner in conspicuous locations.

vi. 14 CFR 45.29: Size of Marks

ELOS requests an exemption from 14 CFR 45.29, which provides that the registration marks for rotorcraft must be at least 12 inches high. Due to its small size, the Phantom does not have a surface area large enough to display marks at least 12 inches high. The UAS will display the required marking in the largest practicable manner in conspicuous locations.

vii. 14 CFR 61.113(a) and (b): Private Pilot Privileges and Limitations; PIC

ELOS requests an exemption from 14 CFR 61.113 (a) and (b), which restricts private pilots from flying aircraft for compensation or acting as PIC unless the flight is only incidental to that business or employment. Currently there are no standards for private or commercial UAS operations, and ELOS proposes using private pilots with a third class medical in support of its own operations. Because of the Phantom's size, weight, speed, and limited area where it would be operated by ELOS, a PIC with a private pilot's license and the above described training and logged hours would ensure public safety and prevent any hazards to the NAS.

viii. 14 CFR 91.7(a): Civil Aircraft Airworthiness

ELOS requests an exemption from 14 CFR 91.7(a), which provides that no person may operate a civil aircraft unless it is in airworthy condition. If an exemption from 14 CFR 21, Subpart H is granted, no airworthiness certificate will be required. Thus, this requirement may be inapplicable, assuming that airworthy condition means having an airworthiness certificate. ELOS will, however, ensure that maintenance requirements are met, all preflight checks are completed, and an equivalent level of safety will be provided.

ix. 14 CFR 91.103: Preflight Action

ELOS requests an exemption from 14 CFR 91.103, which requires the PIC to perform certain preflight inspections before flight. The PIC will take actions before initiation of any flight to ensure the safety of the same, including performing the Phantom preflight check and reviewing weather reports, forecasts, flight battery requirements, takeoff and landing distances, and aircraft performance data.

x. 14 CFR 91.105: Flight Crewmembers at Stations

ELOS requests an exemption from 14 CFR 91.105 as this section is not applicable due to the Phantom carrying no flight crewmembers.

xi. 14 CFR 91.119(c): Minimum Safe Altitudes

ELOS requests an exemption from 14 CFR 91.119(c), which prohibits operating an aircraft at an altitude of less than 500 feet except over open water or sparely populated areas, and in those cases, no closer than 500 feet to any person, vessel, vehicle, or structure. ELOS's petition requests authority to operate at altitudes up to 400 feet above the surface. Because of the remote location of the UAS's operation and its size, weight, and limited speed, and the consent of the property owner, the equivalent level of safety will be achieved. There will be no increased hazard to the public or users of the NAS.

xii. 14 CFR 91.121: Altimeter Settings

ELOS requests an exemption from 14 CFR 91.121, which requires an aircraft to be operated by reference to an altimeter that is set to the elevation of the departure airport or an appropriate altimeter setting available before departure. The Phantom will not have a barometric altimeter, but instead a GPS altitude read out. Therefore, an exemption is requested. An equivalent level of safety will be achieved by the operator confirming the altitude of the launch site as shown on the GPS prior to takeoff. The operator will also monitor the UAS and control its maximum height.

xiii. 14 CFR 91.151(a): Fuel Requirements for Flight in VFR Conditions

ELOS requests an exemption from 14 CFR 91.151(a), which prohibits a person from beginning a flight in an airplane under VFR conditions unless there is enough fuel to fly to the first point of intended landing and then, during the day, for at least 30 minutes.

ELOS will operate the Phantom with an equivalent level of safety by terminating the flight after 25 minutes or at a 25% battery power level (whichever occurs first). The UAS also features an aircraft battery monitoring system, and it will alert the operator of low battery voltage and return the aircraft to its take off location before battery capacity is depleted. ELOS will not operate the Phantom at night.

xiv. 14 CFR 91.405(a) and (d); 91.407(a)(1); 91.409(a)(2); and 91.417(a) and (b): Maintenance Inspections

ELOS requests an exemption from 14 CFR 91.405 (a) and (d); 91.407(a)(1); 91.409(a)(2); and 91.417(a) and (b), which specify maintenance and inspection standards. These sections and Part 43 only apply to aircraft with an airworthiness certificate, so they are inapplicable to ELOS.

Instead, ELOS will perform maintenance in accordance with DJI's Phantom User Manual and Phantom Pilot Training Guide, keeping a log of any maintenance performed. It will also inspect the UAS and ensure it is in a condition safe for flight before initiating

any flight. An equivalent level of safety will be achieved because the Phantom is small in size and operates in a limited area for limited periods of time.

5. Summary for the Federal Register

The following summary is provided for publication in the Federal Register, should it be determined that publication is needed:

Petitioner requests exemptions from the following rules:

14 C.F.R. § 21, Subpart H; 14 C.F.R. § 45.21; 14 C.F.R. § 45.23(b); 14 C.F.R. §45.25; 14 C.F.R. § 45.27; 14 C.F.R. § 45.29; 14 C.F.R. § 61.113(a) and (b); 14 C.F.R. § 91.7(a); 14 C.F.R. § 91.103; 14 C.F.R. § 91.105; 14 C.F.R. § 91.119; 14 C.F.R. § 91.121; 14 C.F.R. § 91.151(a); 14 C.F.R. § 91.405(a) and (d); 14 C.F.R. § 91.407(a)(1); 14 C.F.R. § 91.409(a)(2); and 14 C.F.R. § 417(a) and (b)

Petitioner seeks an exemption for the purposes of aerial inspection and data collection, photography, and videography, all in connection with environmental consulting services.

6. Conclusion

ELOS Environmental, LLC's Petition for Exemption satisfies the criteria set forth in the FMRA, and ELOS's proposed operations would benefit the public and pose no threat to national security. The proposed operations described in this Petition for Exemption are similar to those in previously issued grants of exemptions, and the FAA should grant the requested exemptions allowing ELOS to operate a UAS to perform aerial inspection and data collection, photography, and videography in connection with it environmental consulting services. Thank you in advance for your consideration.

Respectfully submitted,

Jennifer Lee

Counsel for ELOS Environmental, LLC

Exhibit A

UAS Pre-Flight Checklist

_____

Client

_____

Flight Area

The PIC must verify the following before each flight:

- ○ Flight operations will be conducted in daylight hours and under visual meteorological conditions (VMC)
- ○ The area to be inspected, monitored, or otherwise viewed is clearly defined on a plot plan drawing or map, with the path of flight and altitudes pre-determined
- ○ The flight path is at least 500 feet from all non-participating persons, vessels, vehicles, and/or structures unless consent is granted or protective barriers/structures are in place
- ○ Flight operations present no hazard to the PIC, VO (visual observer), or any other persons
- ○ Flight plan and schedule have been reviewed with and approved by ELOS leadership
- ○ Flight plan is communicated to all ELOS and client personnel in the area

The PIC must also check the following before initiating flight:

- ○ Phantom remote controller, smart battery, and range extender are fully charged
- ○ Mobile device/smart phone is fully charged
- ○ Propellers are mounted correctly
- ○ Gimbal clamp has been removed
- ○ Damping absorbers are in good condition and not broken or worn
- ○ Anti-drop kits have been mounted correctly
- ○ Camera lens cap has been removed
- ○ Micro-SD card has been inserted
- ○ Gimbal is functioning as normal
- ○ DJI Vision app on the mobile device can connect to the camera
- ○ Compass has been calibrated
- ○ Flight radius and altitude limits (400 feet) have been reviewed with and approved by ELOS leadership
- ○ Flight radius is limited to the property boundaries of ELOS's client (or ELOS has otherwise obtained consent from property owner)
- ○ VO is stationed at the required initial observation point according to the flight plan and in view of the PIC
- ○ VO has means for continual verbal communication with PIC
- ○ There are no inoperable components of UAS
- ○ All required site safety permits are approved and in possession of the PIC
- ○ Motors can start and function as normal
- ○ Flight Indicator Lights on the UAS verify that the home point is set to current location

All of above items have been checked and verified by the PIC:

Pilot In Command (Print Name) *Signature* *Date*