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

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

May 22, 2015

Exemption No. 11659
Regulatory Docket No. FAA–2015–0545

Mr. Jeffrey Sassinsky
President
Fovea Aero Systems LLC
60 Fostertown Road
Medford, NJ 08055

Dear Mr. Sassinsky:

This letter is to inform you that we have granted your request for exemption. It transmits our decision, explains its basis, and gives you the conditions and limitations of the exemption, including the date it ends.

By letter dated March 2, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Fovea Aero Systems LLC (hereinafter petitioner or operator) for an exemption. The exemption would allow the petitioner to operate an unmanned aircraft system (UAS) to conduct surveying, monitoring, inspections, videography, photography and filmmaking.

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

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

Airworthiness Certification

The UAS proposed by the petitioner are the DJI Phantom 2 Vision+, DJI Inspire 1, and DJI S1000+.

The petitioner requested relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*. In accordance with the statutory criteria

provided in Section 333 of Public Law 112−95 in reference to 49 U.S.C. § 44704, and in consideration of the size, weight, speed, and limited operating area associated with the aircraft and its operation, the Secretary of Transportation has determined that this aircraft meets the conditions of Section 333. Therefore, the FAA finds that the requested relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*, and any associated noise certification and testing requirements of part 36, is not necessary.

The Basis for Our Decision

You have requested to use a UAS for aerial data collection. The FAA has issued grants of exemption in circumstances similar in all material respects to those presented in your petition. In Grants of Exemption Nos. 11062 to Astraeus Aerial (*see* Docket No. FAA−2014−0352), 11109 to Clayco, Inc. (*see* Docket No. FAA−2014−0507), 11112 to VDOS Global, LLC (*see* Docket No. FAA−2014−0382), and 11213 to Aeryon Labs, Inc. (*see* Docket No. FAA−2014−0642), the FAA found that the enhanced safety achieved using an unmanned aircraft (UA) with the specifications described by the petitioner and carrying no passengers or crew, rather than a manned aircraft of significantly greater proportions, carrying crew in addition to flammable fuel, gives the FAA good cause to find that the UAS operation enabled by this exemption is in the public interest.

Having reviewed your reasons for requesting an exemption, I find that—

- They are similar in all material respects to relief previously requested in Grant of Exemption Nos. 11062, 11109, 11112, and 11213;
- The reasons stated by the FAA for granting Exemption Nos. 11062, 11109, 11112, and 11213 also apply to the situation you present; and
- A grant of exemption is in the public interest.

Our Decision

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. 106(f), 40113, and 44701, delegated to me by the Administrator, Fovea Aero Systems 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.

Conditions and Limitations

In this grant of exemption, Fovea Aero Systems 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+, DJI Inspire 1, and DJI S1000+ 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 5 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 May 31, 2017, unless sooner superseded or rescinded.

Sincerely,

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

Enclosures

Fovea Aero Systems LLC

60 Fostertown Road • Medford, New Jersey 08055
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Date: March 2, 2015

U.S. Department of Transportation
Docket Operations, M-30
1200 New Jersey Avenue, SE
Room W12-140, West Building Ground Floor
Washington, DC 20590-0001

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, Fovea Aero Systems LLC hereby applies for an exemption from the Federal Aviation Regulations identified herein to allow for the commercial operation of its sUASs for the purposes of electric transmission and distribution utility systems monitoring and inspection, so long as such operations are conducted within and under the conditions outlined herein or as may be established by the Federal Aviation Administration ("FAA").

Electric transmission and distribution systems are currently inspected utilizing helicopters and fixed wing aircraft. Power transmission utility workers ("linemen") or photographic equipment are carried in the aircraft to search for current and potential power line and component defects. The use of sUASs to perform these tasks increases worker and public safety, lowers inspection costs, increases power distribution reliability and can provide better, faster, more thorough inspections than through the use of manned aircraft. These facts, among others, provide a significant and definitive public benefit and are in the public interest.

Conditions for sUAS operation as described in this application are consistent with and based upon proposed FAA sUAS regulations as outlined by the FAA on the 15th of February, 2015. Any additional conditions included herein have been included by Fovea Aero Systems LLC to add to and enhance the safe operation of sUASs when used for utility inspection and management.

The applicant contact information is:

Fovea Aero Systems LLC
Attn: Jeffrey Sassinsky
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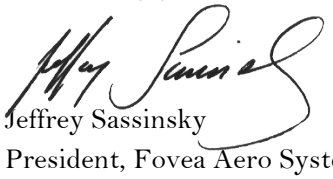
Email: jeff@foveaaero.com
Address: 60 Fostertown Road, Medford, New Jersey 08055

Fovea Aero Systems LLC contends that this application satisfies the conditions and criteria set forth in Section 333 of the Reform Act, that the operations described herein benefit the public interest as a whole in many ways and that the use of sUASs for power line and utility inspection meets or exceeds the level of safety currently experienced by traditional manned aircraft utilized for these purposes. The applicant is thankful for the Federal Aviation Administration's time and consideration.

Respectfully yours,



Jeffrey Sassinsky
President, Fovea Aero Systems LLC

I. Regulations for which Exemption is Requested

Fovea Aero Systems LLC requests exemption from the following regulations:

- Part 21, Subpart H.
- 45.23 (b).
- 45.25.
- 45.27 (a).
- 45.29.
- 61.113 (a) & (b).
- 61.133 (a).
- 91.7 (a).
- 91.9 (b)(2) & (c).
- 91.103.
- 91.105.
- 91.109 (a).
- 91.119.
- 91.121.
- 91.151 (a)(1) & (b).
- 91.203 (a) & (b).
- 91.405 (a).
- 91.407 (a)(1).
- 91.409 (a)(2).
- 91.417 (a) & (b).

A discussion of each FAR and the methods by with Fovea Aero Systems LLC will maintain a level of safety equivalent to or exceeding the rules from which exemption is sought is detailed in Section VI of this petition.

II. Statutory Authority for Requested Exemptions

This petition for exemption is submitted in accordance with Section 333 of the Reform Act. Congress has directed the FAA "to safely accelerate the integration of civil unmanned aircraft systems into the national airspace system." Pursuant to Section 333 of the Reform Act, the FAA Administrator is to permit operation of an unmanned aircraft system where it does not create a hazard to users of the national airspace system ("NAS") or the public or pose a threat to national security based on the following considerations:

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

Furthermore, the Federal Aviation Act grants the FAA Administrator general authority to grant exemptions from the agency's safety regulations and minimum standards when the Administrator decides a requested exemption is in the public interest. *See* 49 U.S.C. §§ 106(f), 44701-44716, *et seq.* A party requesting an exemption must explain the reasons why the exemption: (1) would benefit the public as a whole, and (2) would not adversely affect safety or how it would provide a level of safety at least equal to the existing rules. *See* 14 C.F.R. § 11.81.

III. Fovea Aero Systems LLC Background Information

Fovea Aero Systems LLC is dedicated to provide safe, efficient and outstanding aerial imaging services to its clients. The founder, Jeff Sassinsky, is an active pilot holding a commercial certificate, valid medical and has previously worked as a professional pilot in Part 135 operations. He has also worked as a utility line inspection photographer and has helped design aerial methods for imaging power lines and utility components.

Fovea Aero Systems LLC is actively consulting with a Part 135 helicopter operator currently performing power line inspections using manned aircraft. The operator and Fovea Aero Systems LLC are examining current methods used by manned aircraft for power line inspections and how they can be improved in both safety and effectiveness by utilizing sUASs. Additionally, Fovea Aero Systems LLC is working with power line inspection professionals to identify inspection requirements and to safely, efficiently and effectively utilize sUASs to augment and improve the inspection process.

Working closely with current Part 135 operators and power line inspection professionals has provided Fovea Aero Systems LLC with exceptional "real world" knowledge of power line inspection methods, requirements and hazards as well as ways to improve upon these operations using sUASs. This will assist Fovea Aero Systems LLC in the operation of their sUASs in a safe and efficient manner should this petition be granted.

IV. Proposed Operations

Fovea Aero Systems LLC is requesting exemptions from the Federal Aviation Regulations (the "FARs") stated herein pursuant to Section 333 of the Reform Act in order to perform power line and utility system monitoring and inspection utilizing sUASs.

Inspections and monitoring of electric transmission and distribution components are currently performed using four main methods: (i) by manned-aircraft (often helicopter and occasionally fixed-winged), (ii) by land based motor vehicle, (iii) on foot, or (iv) by a worker(s) climbing the pole / tower. In many cases, each of the aforementioned methods can be replaced or augmented by using an sUAS to perform the inspection. The sUAS can often provide all or a combination of (i) better results, (ii) improved coverage, (iii) increased worker and public safety and (iv) decreased costs over the current methods.

Fovea Aero Systems LLC will operate their sUASs with a gimbal mounted high-resolution camera. The camera system will acquire still photographs and / or video of the electric transmission components, tower, pole, base, surrounding vegetation and potential hazards to the power lines. The inspections can be completed onsite by a line worker using a live feed from the sUAS or later using the stored images. The images can be cataloged for later inspection, comparison to future inspections, assessing storm damage, asset management and for planning upgrades or future power distribution improvements and expansion.

An sUAS will provide greater visual coverage of the power line and associated components over many of the current inspection methods. Previously non-inspected areas of the power line and tower / pole can be seen and inspected using the imagery obtained by Fovea Aero Systems LLC's sUASs. This improves upon current inspection methods resulting in more reliable power distribution, fewer outages and potentially lower costs for power consumers.

The ability to inspect the power distribution system using sUASs will increase worker safety, increase public safety, decrease inspection costs, reduce power outages, and may improve natural disaster response time. Additionally, sUASs do not carry an onboard pilot, crew, passengers or flammable fuel and do not release emissions. These qualities provide a significant public benefit and are in the public interest. Each of these, as well as other public benefits, are expanded upon and discussed later in this petition. *See* Section V in this document.

A. Operation Locations and Environments

Fovea Aero Systems LLC will operate its sUASs in support of power line inspections. Most utility companies currently perform aerial inspections using a helicopter and a lineman that "glasses" the lines by viewing them from the helicopter directly or with the aid of binoculars. Others photograph the lines using an onboard photographer.

The helicopter is often required to operate in close proximity to the lines and at low altitude in order to place the lineman or photographer in a position to see the power distribution components. The helicopter may be operating for extended periods in less than optimal conditions for safety, such as directly over the power lines, with a tail wind, or in areas in which an autorotation may be difficult or

impossible in the event of an engine failure. This places the helicopter, its occupants, and possibly the public, in harms way.

An sUAS would eliminate these concerns. Its lack of occupants eliminates potential harm to the pilot, crew and onboard observers, its small size reduces or eliminates the risk to the public, its ability to image power distribution components from a relatively close distance improves inspection coverage and its low operating costs allow for more thorough and timely power line inspections. An sUAS also does not carry flammable fuel and does not release emissions.

The sUASs will be controlled via radio transmission from a Ground Control Station ("GCS"). All remote control equipment will be off the shelf industry standard devices available to both professionals and consumers and utilize FCC approved transmission and reception components.

The sUAS will be operated in the area immediately surrounding the power distribution equipment. The structures, such as high voltage power lines, are typically contained within a "right of way" owned by the power utility company. This provides Fovea Aero Systems LLC's sUASs with a safe and secure flight location. At no time will the sUAS be operated over any non-participating persons. The flight area will be monitored by the operator and / or observers for any encroaching individuals.

Fovea Aero will confer with the participating utility company regarding any known hazards or abnormal operating conditions that the utility or Fovea Aero may consider pertinent to sUAS operations. Permission from the controlling utility company will be obtained prior to conducting commercial flight operations within the right of way or in the vicinity of the power line.

Fovea Aero Systems LLC will utilize a operator specifically trained in sUAS operations for all commercial flights. When deemed necessary by Fovea Aero Systems LLC an observer(s) will be utilized for added visual coverage. They may also utilize a payload specialist and / or lineman for obtaining video or photographs and performing onsite power utility inspections via remote video feed.

The observer will be in voice contact with the operator at all times during flight via either direct contact, radio or equivalent methods, depending on the optimal observer position as determined by operator and observer. The observer, when used, will assist the operator in identifying both air and ground hazards and maintaining safe operating conditions. The flight will be altered or terminated immediately should a hazard such as a low flying aircraft or unauthorized person in the flight area be observed by either the operator or observer.

Power line right of ways are cleared of vegetation and provide very good line of sight environments. This reduces flight risks to very manageable levels. The flight area can be secured, any intruders readily spotted and flights quickly and safely terminated to multiple landing zones if need be. Additionally, the sUAS will not be operated over non-participating persons. It will remain a minimum of 50 feet from all non-power distribution structures and will not operate higher than 500 feet AGL.

Predetermined potential landing zones will be identified and briefed by the operator, observers and participating persons prior to flight. Landing zones will be selected according to proximity to obstructions, observed ground conditions and limited exposure to persons and property.

B. Operating Conditions and Limitations

All operations will be conducted according to and in compliance with the following conditions and limitations.

(A) All sUASs utilized will weigh less than 55 lbs. (25 kg).

(B) The aircraft will remain within visual line-of-sight ("VLOS") of the operator and / or visual observer(s) at all times using vision unaided by any device with the exception of corrective lenses.

(C) A visual observer ("VO") may be utilized to satisfy the VLOS and observation requirements as defined herein.

(D) The aircraft will not operate over non-participating persons.

(E) Flight operations will be conducted only between the period of official sunrise and sunset as defined in the Aeronautical Information Manual (AIM).

(F) The sUAS will yield right-of-way to other aircraft, manned or unmanned. If there is a risk of a collision, the operator will immediately maneuver away.

(G) Prior to flight, the sUAS operator will assess weather conditions using FAA approved weather sources and direct weather observation, will check airspace restrictions and TFRs and will assess the location of people and property to lessen risks if he or she loses control of the sUAS.

(H) Flight operations will be conducted only with flight visibilities at or exceeding 3 statute miles.

(I) The sUAS will not be operated in airport flight paths, restricted airspace, or areas under current Temporary Flight Restrictions (TFRs).

(J) The operator will discontinue the flight when continuing would pose a hazard to other aircraft, people or property.

(K) The sUAS will not exceed an airspeed of 87 knots (100 mph).

(L) The sUAS will not be operated at an altitude exceeding 500 feet above ground level ("AGL").

(M) Operations will not be conducted in Class A airspace.

(N) ATC permission will be obtained prior to operations in Class B, Class C, Class D or Class E airspace.

(O) The operator / observer(s) will operate / observe only one sUAS at a time.

(P) A thorough preflight of the sUAS will be conducted by the designated operator in command ("OIC") prior to the first flight of the day or after any suspected or observed anomalies or damage.

(Q) The OIC will follow the suggested preflight actions as outlined in the sUAS operator's manual or, if available, Fovea Aero Systems LLC's sUAS operation guidelines.

(R) The operator will not operate an sUAS should he or she know or has any reason to know of any physical or mental condition that would interfere with their safe operation of the aircraft.

(S) The sUAS will not be operated in a careless or reckless manner.

C. Operator Certification and Requirements

All Fovea Aero Systems LLC operators will abide by the following conditions and requirements.

(A) All operators will hold a current and valid Private, Commercial or ATP pilot certificate with ratings for one or more of the following categories: single-engine land airplane, multi-engine land airplane or rotorcraft helicopter. This requirement may be alternatively satisfied when / if FAA sUAS operator testing, certification and currency requirements are approved.

(B) All operators will be 18 years of age or older.

(C) Operators or a designated Fovea Aero Systems LLC official will make available to the FAA, upon request, the sUAS for inspection or testing.

(D) Operators or a designated Fovea Aero Systems LLC official will maintain a log of flights as practicable for future currency or flight logging requirements.

(E) An operator or a designated Fovea Aero Systems LLC official will report an accident to the FAA within 10 days of any operation that results in damage to property, other than the aircraft, estimated to exceed $25,000 for repair (including materials and labor) or fair market value in the event of total loss, whichever is less and / or results in significant injury or death.

D. sUAS Registration, Markings and Requirements

All Fovea Aero Systems LLC sUASs will be registered and marked according to the following conditions and requirements.

(A) All sUASs to be operated by Fovea Aero Systems LLC will be maintained in condition for safe operation.

(B) The sUAs will be inspected prior to flight by the OIC to ensure that it is in a condition for safe operation.

(C) All sUASs to be operated by Fovea Aero Systems LLC for commercial operations will be registered with the FAA.

(D) All sUASs to be operated by Fovea Aero Systems LLC for commercial operations will be marked with an aircraft registration number according to 14 C.F.R. Part 45 or in the largest practicable manner taking into account the size and configuration of the aircraft. *See* Section VI, subsections B, C, D and E in this document.

V. Public Benefit and Public Interest

Currently, aerial power line inspections are performed via helicopter or, occasionally, via fixed-winged aircraft. The aircraft are typically flown at low altitude and in relative close proximity to the power line, structures or components. The use of an sUAS rather than a manned aircraft in such applications will further the public interest in several areas including but not limited to the following:

- The sUAS carries no passengers, pilot or crew, thereby increasing pilot, passenger and worker safety.
- The sUAS can often eliminate the need for a worker to climb a tower or pole in order to inspect components thereby increasing worker safety.
- The sUAS carries no flammable fuel thereby increasing safety to the general public.
- The sUAS has a lower noise signature than a typical helicopter thereby improving public welfare.
- The sUAS has no emissions thereby reducing the environment impact over traditional manned aircraft.
- The sUAS is less expensive to operate than a traditional manned aircraft thereby decreasing the cost of power line inspection. This allows utility companies to inspect their infrastructure more frequently, more thoroughly and at a potential discount thereby increase public welfare.

- The sUAS is less expensive to acquire than a manned aircraft thereby allowing for more inspection crews to operate concurrently. This can result in better-maintained infrastructure and more reliable power distribution for the public.
- The sUAS may respond to natural disasters and storm-related damage quicker than manned-aircraft. This results in faster power restoration and lower outage time for the public.

VI. Discussion of Requested FAR Exemptions

Fovea Aero Systems LLC seeks an exemption from the following regulations including provisions of Part 21, 45, 61 and 91 for the purposes of conduction the operations described herein. Presented here are the specific FAR sections for which exemption is requested and the methods and safeguards by which Fovea Aero Systems LLC will ensure a level of safety equivalent to exceeding the regulations from which exemption is sought. *See* 14 C.F.R. § 11.81(e).

A. 14 C.F.R. Part 21, Subpart H – Airworthiness certificates.

Section 91.203(a)(1) requires civil aircraft to have "an appropriate and current airworthiness certificate." Part 21, Subpart H ("Airworthiness Certificates") establishes the procedural requirements and applicability for the issuance of airworthiness certificates as directed by 14 C.F.R. § 91.203(a)(1).

Equivalent level of safety: The sUASs operated will be have a gross weight less than 55 lbs. and will be flown at speeds less than 87 knots (100 mph). They do not carry a pilot or passengers, do not carry flammable fuels and will be operated in well-defined locations using an operator and, if deemed required by Fovea Aero Systems LLC, a visual observer(s). All operations will be conducted in compliance with the limitations and conditions stated in this petition for exemption. The Federal Aviation Act and Section 333 of the Reform Act both authorize the FAA to exempt aircraft from the requirement of an airworthiness certificate upon consideration of the sUASs' size, weight, speed, operational capability and proximity to airports and populated areas.

The characteristics and conditions under which the sUASs will be operated, as outlined in this petition, given the size, weight, speed, operation capability and proximity to airports and populated areas, achieve or exceed the equivalent level of safety over a manned aircraft with an airworthiness certificate used for the purposes outlined in this petition.

The FAA will have advance notice of all operations through the filing of Certificates of Waiver or Authorizations (COA) and, if deemed required by the FAA, the filing of Notices to Airman (NOTAMS) not more than 72 hours, but not less than 48 hours, prior to conducting operations under this grant of exemption.

The FAA has stated that no exemption is required from this section if a finding is made under the Reform Act that an sUAS provides an equivalent level of safety when compared to aircraft normally used for the same application. *See* granted exemptions 11138, 11062, 11067, 11080, 11114 and 11112.

B. 14 C.F.R § 45.23 (b) – Display of marks; general.

Regulation 14 C.F.R. § 45.32 (b) states: "…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."

Equivalent level of safety: These sUAS does not have a "cabin, cockpit or pilot station entrance" therefore the required marks cannot be displayed "near each entrance." Additionally, letters not less than 2 inches nor more than 6 inches may not be practical given the small size of the sUAS. If the sUAS is too small to display markings in the size described in regulation § 45.23 (b), then markings will be displayed in the largest practicable manner.

C. 14 C.F.R. § 45.25 – Location of marks on fixed winged aircraft.

Regulation 14 C.F.R. 45.25 describes the marking requirements on fixed winged aircraft. It states that the aircraft, "…must display the required marks on either the vertical tail surfaces or the sides of the fuselage…". It continues to describe the specific locations on which marks may be displayed.

Equivalent level of safety: An sUAS does not carry a pilot or passengers, does not have a cabin and may have a design that is significantly different than traditional manned aircraft. As such, the markings requirements of 14 C.F.R. § 45.25 may not be feasible given the design and layout of the aircraft. To provide an equivalent level of safety, the sUAS will display required markings on conspicuous locations of the aircraft.

D. 14 C.F.R. § 45.27 (a) – Location of marks; nonfixed-wing aircraft.

Regulation 14 C.F.R. 45.27 (a) states: "Each operator of a rotorcraft must display on that rotorcraft horizontally on both surfaces of the cabin, fuselage, boom, or tail the marks required by §45.23."

Equivalent level of safety: An sUAS does not carry a pilot or passengers, does not have a cabin and may have a design that is significantly different than traditional manned aircraft. As such, the markings requirements of 14 C.F.R. § 45.25 may not be feasible given the design and layout of the aircraft. To provide an equivalent level of safety, the sUAS will display required markings on conspicuous locations of the aircraft.

E. 14 C.F.R. § 45.29 – Size of marks.

Regulation 14 C.F.R. 45.29 describes the required size of marks and the characteristic of lettering for aircraft. In many cases it dictates that marks must be at least 12 inches high.

Equivalent level of safety: An sUAS is, by definition, significantly smaller and may have a design and layout significantly different than traditional manned aircraft. As such, the size and layout of markings as stated in 14 C.F.R. § 45.29 may not be feasible due to the inherent characteristics of sUASs. To provide an equivalent level of safety, the sUAS will display required markings on conspicuous locations of the aircraft. If the aircraft is too small to display markings in standard size, then the aircraft will display markings in the largest practicable manner.

F. 14 C.F.R § 61.113 (a) & (b) and 14 C.F.R. § 61.133 (a) - Private pilot privileges and limitations; pilot in command; commercial pilot privileges and limitations.

Regulation 14 C.F.R. § 61.113 restricts private pilots from flying aircraft for compensation or hire and would require a second class medical certificate. Regulation 14 C.F.R. § 61.133 requires a pilot to hold a commercial pilot's license when acting as pilot in command of an aircraft used for compensation or hire. This is intended to ensure that the skill and competency of any PIC matches the airspace in which the PIC will be operating, as well as requiring certifications if the pilot is carry passengers or cargo for hire.

Equivalent level of safety: Fovea Aero Systems LLC sUASs will be operated as part of a commercial operation, however they do not carry passengers or cargo. Additionally, they remain below 500 feet AGL, are operated at less than 87 knots (100 mph), will not be operated over non-participating individuals, are under 55 lbs. and do not carry flammable fuel. In FAA Docket No. FAA-2014-0352, the FAA determined that sUAS operations did not warrant the additional cost and restrictions imposed by requiring the operator to have a commercial pilot certificate and class II medical certificate.

Fovea Aero Systems LLC's operators will posses at least a private pilot certificate and a valid class III medical certificate. Additionally, the operators will attend sUAS specific training either at a third party location or through a custom designed in-house program specifically tailored to Fovea Aero Systems LLC's operations, sUASs and operating environment. This program will be developed using input and guidance from currently operating sUAS training programs and will follow industry standard processes and procedures. The program will consist of industry standard ground based and hands on training in a controlled flight environment.

Section 333 also requires operations to not pose a threat to national security. The security screening conducted by the Transportation Security Administration ("TSA") of certificated airmen satisfies this requirement and applies to all Fovea Aero Systems LLC's operators.

Using these processes, procedures and restrictions, the level of safety of sUAS operations for the uses as outlined herein is equivalent to or significantly exceed those as regulated by §61.113 and §61.133.

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

The regulations states: "No person may operate a civil aircraft unless it is in airworthy condition."

Equivalent level of safety: The FAA has stated that no exemption is required to the extent that the requirements of Part 21 are waived or found inapplicable. Fovea Aero Systems LLC requests that the requirements for § 91.7 be treated in accordance with FAR Part 21 Subpart H. Additionally, Fovea Aero Systems LLC operators will inspect the aircraft prior to flight in order to ensure it is in a condition that is safe for flight. *See* granted exemption 11062.

H. 14 C.F.R. § 91.9 (b)(2) & (c) – Approved flight manual in the aircraft.

Regulation 14 C.F.R. § 91.9 (b)(2) states: "No person may operate a U.S.-registered civil aircraft … For which an Airplane or Rotorcraft Flight Manual is not required by §21.5 of this chapter, unless there is available in the aircraft a current approved Airplane or Rotorcraft Flight Manual, approved manual material, markings, and placards, or any combination thereof."

Regulation 14 C.F.R. § 91.9 (c) states: "No person may operate a U.S.-registered civil aircraft unless that aircraft is identified in accordance with part 45 of this chapter."

Equivalent level of safety: Fovea Aero Systems LLC requests an exemption from this regulation in part as outlined in the request for exemption from regulation 14 C.F.R. § 91.203 (a) and (b). An equivalent level of safety will be achieved by maintaining the proper documentation at the location of the Ground Control Station readily available to the operator. This includes the sUAS operation manual as provided by the manufacturer or equivalent documents as created by Fovea Aero Systems LLC.

Additionally, the FAA, in accordance with FAA Office of Chief Counsel's Opinion dated August 8, 2014, the UAS flight manual, registration certificate and other documentation will be kept at the control station with the operator during flight. The Chief Counsel's Office has held that for all UAS operations, this alternate method constitutes full compliance with the regulations. *See* granted exemption 11062.

I. 14 C.F.R. § 91.103 – Preflight action.

14 C.F.R. § 91.103 requires the PIC to become familiar with specific information before each flight, including information contained in the FAA-approved Flight Manual on board the aircraft.

Equivalent level of safety: The sUAS does not have a Flight Manual on board because of its inherent design and lack of on board pilot. The operator will review information prior to flight to maintain the safety of the operation, including but not limited to, the weather, battery levels, landing and takeoff distances and aircraft performance data. The operator will refer to the manufacturer supplied sUAS manual for technical data and information as provided. The manual will be kept at the ground station during operations.

The FAA has stated that no exemption is required (*see* Grant of Exemption No. 11062, p. 20) however, an exemption is requested to the extent that an FAA-approved Flight Manual is required.

J. 14 C.F.R. § 91.105 - Flight crewmembers at stations.

This section contains requirements for crewmembers during takeoff and landing of the aircraft. The regulation requires crewmembers to be at the crewmember's station unless absence is necessary to perform their duties. It also requires crewmembers to keep safety belt(s), including their shoulder harness if so equipped, fastened.

sUASs do not carry pilots or passengers and therefore do not have a "crewmember station." However sUASs do have a Ground Control Station from which an operator controls the aircraft via radio signals. The Ground Control Station may be at a fixed location or may be movable. However, because it is not a physical part of the aircraft, the Ground Control Station may not have a seat(s) and does not utilize safety belts.

Visual observers, when deemed necessary by Fovea Aero Systems LLC, may be at various locations in the vicinity of the flight operations area in order to provide the best line of sight view of the sUAS during flight. The visual observers may or may not be at a fixed location and may or may not utilize a seat. The seat will not be equipped with safety belts.

Equivalent level of safety: The sUAS operator will remain at the Ground Control Station where the control of the aircraft takes place for the duration of the flight. Visual observers, when deemed necessary by Fovea Aero Systems LLC, will be positioned in the flight operations area according to the operator's determination of the optimal viewing area given the planned flight. The use of safety belts is not feasible because the crewmember stations are not physically a part of the aircraft and are not in motion.

K. 14 C.F.R. § 91.109 (a) – Flight instruction.

14 C.F.R. § 91.109 (a) states that, "No person my operate a civil aircraft (except a manned free balloon) that is being used for flight instruction unless that aircraft has fully functioning dual controls." sUASs do not have functioning dual controls by design. They are piloted using a Flight Control System / Ground Control Station that communicates with the aircraft via radio signals.

Equivalent level of safety: During flight instruction, there are no pilots or passengers on the aircraft and the Ground Control Station will be a safe distance from the aircraft. The aircraft will remain a safe distance from non-participating individuals causing no safety hazard.

Given the size and speed of the sUAS, an equivalent level of safe training can be performed without dual controls because no pilot or passengers are aboard the aircraft and it is a safe distance from the public and structures.

The FAA has previously approved exemptions for flight training without dual controls for a number of aircraft. *See* Granted Exemptions: 11109, 11138 and 11110.

L. 14 C.F.R. § 91.119 – Minimum safe altitudes.

14 C.F.R. § 91.119 prescribes that an aircraft may not be operated closer than 500 feet to any person, vessel, vehicle or structure. The nature of the operations described herein may require operation in relatively close proximity to items such as power line towers or poles. However, operations will not be conducted over non-participating individuals.

Equivalent level of safety: The sUASs operated by Fovea Aero Systems LLC are far smaller than manned aircraft, such as rotorcraft and fixed winged aircraft, used for similar operations. Additionally, the sUASs do not carry a pilot or passengers, weigh less than 55 lbs., do not carry flammable fuel, will not exceed 87 knots (100 mph) and will not be operated over non-participating persons. The sUASs will be operated below 500 feet AGL with the use of an operator and, if determined to be required by Fovea Aero Systems LLC, a visual observer(s) to avoid risk to aircraft, persons and property. This provides an equivalent or greater level of safety than achieved with conventional aircraft currently performing similar operations.

See Granted Exemptions: 4063, 11138, 11136, 11112, 11110, 11109, 11080, 11066, 11063, 11062 and 11067.

M. 14 C.F.R. § 91.121 – Altimeter settings.

14 C.F.R. § 91.121 requires an aircraft to be operated by reference to an altimeter that is set to the elevation of the departure airport or barometric pressure when operating below 18,000 feel MSL. Some sUAS contain a barometric pressure sensor. Others utilize GPS sensors to determine altitude. Typically barometric pressure sensors are corrected to the point of takeoff; not a departure airport.

Equivalent level of safety: The operator will confirm the elevation of the launch site prior to launch. This will be compared to the GPS sensor or barometric sensor derived altitude as displayed on the sUAS telemetry reading at the Ground Control Station. The operator will then determine the maximum permissible altitude to maintain flight below 500 feet AGL and will not exceed this altitude. The maximum permissible altitude will also be monitored and estimated by visual means through the use of the operator and / or visual observer(s) as a secondary backup to sUAS telemetry data. This provides a level a safety equal to or exceeding the regulation.

See Granted Exemptions: 11153, 11150, 11138, 11136 and 11159.

N. 14 C.F.R. § 91.151 (a)(1) & (b) – Fuel requirements for flight in VFR conditions.

14 C.F.R. § 91.151 (a) (1) states: "No person may begin a flight in an airplane under VFR conditions unless (considering wind and forecast weather conditions) there is enough fuel to fly to the first point of intended landing and, assuming normal cruising speed – (1) During the day, to fly after that for at least 30 minutes…"

14 C.F.R. § 91.151 (b) states: "No person may begin a flight in a rotorcraft under VFR conditions unless (considering wind and forecast weather conditions) there is enough fuel to fly to the first point of intended landing and, assuming normal cruising speed, to fly after that for at least 20 minutes."

The sUAS will be operated only during daylight hours in VFR conditions. The technical limitations of most sUASs limit total flight time to approximately 30 minutes before the battery is depleted. This means that no meaningful flight time would be possible given the limitations of § 91.151 (a) (1) and (b).

Equivalent level of safety: The sUAS flight will be terminated with at least 20% reserve power. This allows the sUAS to return to its landing zone with adequate power remaining to conduct a safe and controlled landing. Given the sUAS's size, weight and speed, the sUAS when operated with this limitation provides an equivalent or greater level of safety than manned aircraft represented by this regulation.

See Granted Exemptions: 2689F, 5745, 10673, 10808, 11138, 11136, 11112, 10650 and 10159.

O. 14 C.F.R. § 91.203 (a) & (b) – Carry civil aircraft certification and registration.

The regulation states: (a) "…no person may operate a civil aircraft unless it has … an appropriate and current airworthiness certificate." Furthermore: (b) "No person may operate a civil aircraft unless the airworthiness certificate required by paragraph (a) of this section or a special flight authorization issued under §91.715 is displayed at the cabin or cockpit entrance so that it is legible to passengers or crew."

Equivalent level of safety: In regard to 14 C.F.R. § 91.203 Part (a), an equivalent level of safety is achieved through the methods and characteristics as outlined in the request for exemption from 14 C.F.R. Part 21, Subpart H.

In regard to 14 C.F.R. § 91.203 Part (b), the sUAS does not carry a pilot or passengers, does not have a "cabin or cockpit entrance" and does not have onboard storage in which to carry certification and registration documents. An equivalent level of safety will be achieved by maintaining the proper documentation at the Ground Control Station readily available to the operator. The FAA has issued numerous exemptions to this regulation. *See* granted exemptions 9565A, 9565B, 9789, 9789A, 9797, 9797A, 9816A and 9816.

Additionally, the FAA, in accordance with FAA Office of Chief Counsel's Opinion dated August 8, 2014, the UAS flight manual, registration certificate and other documentation will be kept at the control station with the operator during flight. The Chief Counsel's Office has held that for all UAS operations, this alternate method constitutes full compliance with the regulations. *See* granted exemption 11062.

P. 14 C.F.R. §§ 91.405 (a), 91.407 (a)(l), 91.409 (a)(2), 91.417 (a) & (b) – Maintenance inspections.

The regulations 14 C.F.R. §§ 91.405 (a), 91.407 (a)(1), 91.409 (a)(2) and 91.417 (a) & (b) specify maintenance and inspection standards in reference to 14 C.F.R. Part 43. Specifically, 14 C.F.R. § 91.405 (a) requires that each owner or operator of an aircraft, "…[s]hall have the aircraft inspected as prescribed in subpart E of this part and shall between required inspection … have discrepancies repaired as prescribed in part 43 of this chapter." An exemption is required from these regulations because Part 43 and these sections apply only to aircraft with an airworthiness certificate, which the sUASs will not have.

Equivalent level of safety: The sUASs will be maintained and inspected in accordance with the manufacturer-supplied manual. This includes maintenance, overhaul, replacement and inspection requirements for the sUASs. The operator, prior to the first flight of the day and as deemed necessary otherwise, will undertake preflight inspection procedures in order to ensure the sUAS is in a condition for safe operation. Discrepancies that may affect the safety of flight will be addressed and repaired if required. The operator, and Fovea Aero Systems LLC, will maintain the sUASs in a condition for safe operation. Given the size, characteristics and operating limitations of sUASs as described herein, this provides a level of safety equivalent to or greater than manned aircraft performing similar operations.