



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

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

May 11, 2015

Exemption No. 11540
Regulatory Docket No. FAA-2015-0395

Ms. Jody L. Slaughter
President
Titan Aerial, LLC
PO Box 1374
Levelland, TX 79336

Dear Ms. Slaughter:

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.

The Basis for Our Decision

By letter dated February 12, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Titan Aerial, LLC (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial photography and videography.

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

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

Airworthiness Certification

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

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 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, Titan Aerial, 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, Titan Aerial, LLC is hereafter referred to as the operator.

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

1. Operations authorized by this grant of exemption are limited to the DJI Phantom 2 when weighing less than 55 pounds including payload. Proposed operations of any other aircraft will require a new petition or a petition to amend this exemption.
2. Operations for the purpose of closed-set motion picture and television filming are not permitted.
3. The UA may not be operated at a speed exceeding 87 knots (100 miles per hour). The exemption holder may use either groundspeed or calibrated airspeed to determine compliance with the 87 knot speed restriction. In no case will the UA be operated at airspeeds greater than the maximum UA operating airspeed recommended by the aircraft manufacturer.
4. The UA must be operated at an altitude of no more than 400 feet above ground level (AGL). Altitude must be reported in feet AGL.
5. The UA must be operated within visual line of sight (VLOS) of the PIC at all times. This requires the PIC to be able to use human vision unaided by any device other than corrective lenses, as specified on the PIC's FAA-issued airman medical certificate or U.S. driver's license.
6. All operations must utilize a visual observer (VO). The UA must be operated within the visual line of sight (VLOS) of the PIC and VO at all times. The VO may be used to satisfy the VLOS requirement as long as the PIC always maintains VLOS capability. The VO and PIC must be able to communicate verbally at all times; electronic messaging or texting is not permitted during flight operations. The PIC must be designated before the flight and cannot transfer his or her designation for the duration of the flight. The PIC must ensure that the VO can perform the duties required of the VO.
7. This exemption and all documents needed to operate the UAS and conduct its operations in accordance with the conditions and limitations stated in this grant of exemption, are hereinafter referred to as the operating documents. The operating documents must be accessible during UAS operations and made available to the Administrator upon request. If a discrepancy exists between the conditions and limitations in this exemption and the procedures outlined in the operating documents, the conditions and limitations herein take precedence and must be followed. Otherwise, the operator must follow the procedures as outlined in its operating documents. The operator may update or revise its operating documents. It is the operator's responsibility to track such revisions and present updated and revised documents to the Administrator or any law enforcement official upon request. The

operator must also present updated and revised documents if it petitions for extension or amendment to this grant of exemption. If the operator determines that any update or revision would affect the basis upon which the FAA granted this exemption, then the operator must petition for an amendment to its grant of exemption. The FAA's UAS Integration Office (AFS-80) may be contacted if questions arise regarding updates or revisions to the operating documents.

8. Any UAS that has undergone maintenance or alterations that affect the UAS operation or flight characteristics, e.g., replacement of a flight critical component, must undergo a functional test flight prior to conducting further operations under this exemption. Functional test flights may only be conducted by a PIC with a VO and must remain at least 500 feet from other people. The functional test flight must be conducted in such a manner so as to not pose an undue hazard to persons and property.
9. The operator is responsible for maintaining and inspecting the UAS to ensure that it is in a condition for safe operation.
10. Prior to each flight, the PIC must conduct a pre-flight inspection and determine the UAS is in a condition for safe flight. The pre-flight inspection must account for all potential discrepancies, e.g., inoperable components, items, or equipment. If the inspection reveals a condition that affects the safe operation of the UAS, the aircraft is prohibited from operating until the necessary maintenance has been performed and the UAS is found to be in a condition for safe flight.
11. The operator must follow the UAS manufacturer's maintenance, overhaul, replacement, inspection, and life limit requirements for the aircraft and aircraft components.
12. Each UAS operated under this exemption must comply with all manufacturer safety bulletins.
13. Under this grant of exemption, a PIC must hold either an airline transport, commercial, private, recreational, or sport pilot certificate. The PIC must also hold a current FAA airman medical certificate or a valid U.S. driver's license issued by a state, the District of Columbia, Puerto Rico, a territory, a possession, or the Federal government. The PIC must also meet the flight review requirements specified in 14 CFR § 61.56 in an aircraft in which the PIC is rated on his or her pilot certificate.
14. The operator may not permit any PIC to operate unless the PIC demonstrates the ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption, including evasive and emergency maneuvers and maintaining appropriate distances from persons, vessels, vehicles and structures. PIC qualification flight hours and currency must be logged in a manner consistent with 14 CFR § 61.51(b). Flights for the purposes of training the operator's PICs and VOs

(training, proficiency, and experience-building) and determining the PIC's ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption are permitted under the terms of this exemption. However, training operations may only be conducted during dedicated training sessions. During training, proficiency, and experience-building flights, all persons not essential for flight operations are considered nonparticipants, and the PIC must operate the UA with appropriate distance from nonparticipants in accordance with 14 CFR § 91.119.

15. UAS operations may not be conducted during night, as defined in 14 CFR § 1.1. All operations must be conducted under visual meteorological conditions (VMC). Flights under special visual flight rules (SVFR) are not authorized.
16. The UA may not operate within 5 nautical miles of an airport reference point (ARP) as denoted in the current FAA Airport/Facility Directory (AFD) or for airports not denoted with an ARP, the center of the airport symbol as denoted on the current FAA-published aeronautical chart, unless a letter of agreement with that airport's management is obtained or otherwise permitted by a COA issued to the exemption holder. The letter of agreement with the airport management must be made available to the Administrator or any law enforcement official upon request.
17. The UA may not be operated less than 500 feet below or less than 2,000 feet horizontally from a cloud or when visibility is less than 3 statute miles from the PIC.
18. If the UAS loses communications or loses its GPS signal, the UA must return to a pre-determined location within the private or controlled-access property.
19. The PIC must abort the flight in the event of unpredicted obstacles or emergencies.
20. The PIC is prohibited from beginning a flight unless (considering wind and forecast weather conditions) there is enough available power for the UA to conduct the intended operation and to operate after that for at least five minutes or with the reserve power recommended by the manufacturer if greater.
21. Air Traffic Organization (ATO) Certificate of Waiver or Authorization (COA). All operations shall be conducted in accordance with an ATO-issued COA. The exemption holder may apply for a new or amended COA if it intends to conduct operations that cannot be conducted under the terms of the attached COA.
22. All aircraft operated in accordance with this exemption must be identified by serial number, registered in accordance with 14 CFR part 47, and have identification (N-Number) markings in accordance with 14 CFR part 45, Subpart C. Markings must be as large as practicable.

23. Documents used by the operator to ensure the safe operation and flight of the UAS and any documents required under 14 CFR §§ 91.9 and 91.203 must be available to the PIC at the Ground Control Station of the UAS any time the aircraft is operating. These documents must be made available to the Administrator or any law enforcement official upon request.
24. The UA must remain clear and give way to all manned aviation operations and activities at all times.
25. The UAS may not be operated by the PIC from any moving device or vehicle.
26. All Flight operations must be conducted at least 500 feet from all nonparticipating persons, vessels, vehicles, and structures unless:
 - a. Barriers or structures are present that sufficiently protect nonparticipating persons from the UA and/or debris in the event of an accident. The operator must ensure that nonparticipating persons remain under such protection. If a situation arises where nonparticipating persons leave such protection and are within 500 feet of the UA, flight operations must cease immediately in a manner ensuring the safety of nonparticipating persons; and
 - b. The owner/controller of any vessels, vehicles or structures has granted permission for operating closer to those objects and the PIC has made a safety assessment of the risk of operating closer to those objects and determined that it does not present an undue hazard.

The PIC, VO, operator trainees or essential persons are not considered nonparticipating persons under this exemption.

27. All operations shall be conducted over private or controlled-access property with permission from the property owner/controller or authorized representative. Permission from property owner/controller or authorized representative will be obtained for each flight to be conducted.
28. Any incident, accident, or flight operation that transgresses the lateral or vertical boundaries of the operational area as defined by the applicable COA must be reported to the FAA's UAS Integration Office (AFS-80) within 24 hours. Accidents must be reported to the National Transportation Safety Board (NTSB) per instructions contained on the NTSB Web site: www.nts.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



February 12, 2015

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

RE: Exemption Request Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations

To Whom It May Concern:

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 (FMRA) and 14 CFR Part 11, Titan Aerial, LLC requests an exemption from the Federal Aviation Regulations outlined below. Titan Aerial requests exemption in order to allow its use of the DJI Phantom 2 Unmanned Aerial System (UAS) in commercial operations for purposes of aerial photography/videography, so long as such operations are conducted within and under the conditions outlined herein or as may be established by the FAA as required by Section 333 or Section 49 USC § 44701.

Titan Aerial is willing to comply with conditions that the FAA has issued in recent Section 333 exemptions, specifically Exemption 11153 (Burnz Eye View). Due to this agreement, in addition to the strong similarity of Titan Aerial's operations compared to those already approved for exemption, the FAA should be able to summarily process and approve this petition.

NAME AND ADDRESS OF THE PETITIONER

Titan Aerial, LLC
Attn: Jody L. Slaughter, President
PO Box 1374
Levelland, TX 79336
Phone: 806-893-3517
Email: jody_slaughter@titanco.com

REGULATIONS FROM WHICH THE EXEMPTION IS REQUESTED

14 CFR § 61.113(a) & (b)
14 CFR § 91.7(a)
14 CFR § 91.119(c)
14 CFR § 91.151(a)
14 CFR § 91.405(a)

14 CFR § 91.407(a)(1)
14 CFR § 91.409(a)(1) & (2)
14 CFR § 91.417(a) & (b)

The Petitioner also requests exemption from any other regulations the FAA deems necessary in order to operate the UAS as described herein.

I. DESCRIPTION OF ACTIVITIES

Titan Aerial wishes to use the DJI Phantom 2 UAS for commercial photography and videography under controlled conditions in airspace that is limited, predetermined and access-controlled. As described more-fully below and in the Titan Aerial UAS Operations Manual¹, safety will be the foremost consideration in all operations.

By operating a small, lightweight aircraft under a strict set of limitations, Titan Aerial will be able to operate UAS in the National Airspace System (NAS) while satisfying the FMRA § 333 requirement to achieve an equivalent level of safety when compared to traditional aircraft. Titan Aerial further believes that its proposed operations will actually *increase* the level of safety when compared to traditional, manned aircraft carrying combustible fuel.

II. DESCRIPTION OF AIRCRAFT

Titan Aerial plans to operate a DJI Phantom 2² UAS system. The Phantom 2 is a multi-rotor aircraft equipped with an onboard NAZA computer stabilization controller and GPS. The maximum loaded takeoff weight of the Phantom 2 is less than 3 pounds and the maximum airspeed is less than 30 knots.

Weight (Battery & Propellers Included)	1000g
Hover Accuracy (Ready To Fly)	Vertical: 0.8m; Horizontal: 2.5m
Max Yaw Angular Velocity	200°/s
Max Tilt Angle	35°
Max Ascent / Descent Speed	Ascent: 6m/s; Descent: 2m/s
Max Flight Speed	15m/s(Not Recommended)
Diagonal Length	350mm
Flight Time	25mins
Take-Off Weight	≤1300g
Operating Temperature	-10°C ~ 50°C
Supported Battery	DJI Smart Battery

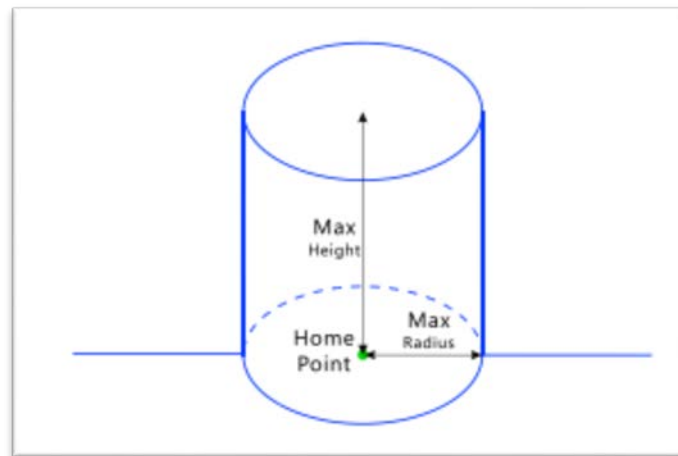
¹ See Appendix 4 for Titan Aerial UAS Operations Manual. Applicant submits this manual as a confidential document under 14 CFR 11.35 (b). The manual contains proprietary information that the applicant does not wish to be shared publicly. The manual contains operating requirements and procedures that are not available to the public and are protected from release under the Freedom of Information Act 5 USC 552.

² See Appendix 1 for manufacturer's user manual

The DJI Phantom 2 operated by Titan Aerial will also contain a DJI iOSD Mini³ to provide real-time flight telemetry to the Pilot in Command (PIC). Data points include:

- Power voltage and battery level percentage
- Distance between aircraft and home point
- Altitude
- Pitch/roll attitude
- Airspeed
- GPS status
- Aircraft nose direction
- Vertical velocity
- Azimuth angle

The NAZA controller and GPS allow the operator to set flight limits restricting the maximum altitude Above Ground Level (AGL) and maximum horizontal distance between the home point (takeoff point) and the aircraft. While the PIC will always be aware of these factors, the automated geo-fencing technology provides a useful redundancy in keeping the aircraft within the Area of Operation (AO).



III. PILOT IN COMMAND

Section 61.113(a) and (b) prescribes that—

- (a) No person who holds a private pilot certificate may act as a PIC of an aircraft that is carrying passengers or property for compensation or hire; nor may that person, for compensation or hire, act as PIC of an aircraft.
- (b) A private pilot may, for compensation or hire, act as PIC of an aircraft in connection with any business or employment if—

³ See Appendix 2 for manufacturer's user manual

- (1) The flight is only incidental to that business or employment; and
- (2) The aircraft does not carry passengers or property for compensation or hire.

In Grant of Exemption No. 11062 to Astraeus Aerial (Astraeus), the FAA determined that a PIC with a private pilot certificate operating the Astraeus UAS would not adversely affect operations in the NAS or present a hazard to persons or property on the ground.

Titan Aerial's proposed operation does not differ significantly from the situation described in Grant of Exemption No. 11062 to Astraeus. Titan Aerial plans to operate over property with the permission of the land owner/controller while also limiting access to the property during operations.

Given the similar nature of Titan Aerial's proposed operating environment to that of Astraeus, the parallel nature of private pilot aeronautical knowledge requirements to those of commercial requirements, and the airmanship skills necessary to operate the UAS, Titan Aerial believes that the additional manned airmanship experience of a commercially certificated pilot would not correlate to the airmanship skills necessary for the proposed operations. Therefore a PIC holding a private pilot certificate and a third-class airman medical certificate is appropriate for the proposed operations.

IV. ALTITUDE

Section 91.119(c) prescribes that, except when necessary for takeoff or landing, no person may operate an aircraft below an altitude of 500 feet above the surface, except over open water or sparsely populated areas. In those cases, the aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure.

Relief from § 91.119(c) is necessary because the aircraft will be operated at altitudes less than 500 feet AGL. By definition, the Unmanned Aerial Vehicle (UAV) will be operated closer than 500 feet to persons or property. An equivalent level of safety will be achieved given the size, weight, speed, and material with which the Phantom 2 is built, as well as adherence to the following procedures:

1. The UAV will not be operated over congested or densely populated areas (defined as open air assemblies of persons or other areas where a safe forced landing cannot be accomplished due to risk of endangering persons or property on the ground).
2. Flight operations will be conducted at least 500 feet from all nonparticipating persons (persons other than the PIC, Visual Observer (VO), operator trainees or essential persons), vessels, vehicles, and structures unless:
 - a. Barriers or structures are present that sufficiently protect nonparticipating persons from the UAV and/or debris in the event of an accident. Titan Aerial will 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 UAV, flight operations must cease immediately and/or;
 - b. The aircraft is operated near vessels, vehicles or structures where the owner/controller of such vessels, vehicles or structures has granted permission 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, and;

- c. Operations nearer to the PIC, VO, operator trainees or essential persons do not present an undue hazard to those persons per § 91.119(a).
3. All operations will be conducted over private or controlled-access property with permission from the land owner/controller or authorized representative. Permission from the land owner/controller or authorized representative will be obtained for each flight to be conducted.

In all situations, the PIC will make a safety assessment of the risk of operating closer than 500 feet to persons, vessels, vehicles, or structures and will only undertake the operation if he/she determines that it does not present an undue hazard. The FAA has approved similar exemptions in 11062, 11063, 11064, 11065, 11066, 11067, 11080, 11110, and 11153.

V. FUEL REQUIREMENTS

Section 91.151(a) prescribes that no person may begin a flight in an airplane under visual flight rules (VFR) conditions unless (considering wind and forecast weather conditions) there is enough fuel to fly to the first point of intended landing and, assuming normal cruising speed—

- (1) During the day, to fly after that for at least 30 minutes; or
- (2) At night, to fly after that for at least 45 minutes.

Relief from § 91.151(a) is necessary because the DJI Phantom 2 will only operate for approximately 25 minutes per charge, making operation of the aircraft impossible under this section. Safety features of the Phantom II include low battery warnings at 30% capacity and an automated landing when the battery reaches 15% capacity. These features, teamed with the small size and weight of the UAV should more than achieve an equivalent level of safety. The FAA has approved similar exemptions in 2689, 5745, 10650, 10673, 10808, 11062, 11063, 11064, 11065, 11066, 11067, 11080, 11109, 11110, 11112, and 11153.

VI. AIRWORTHINESS

Section 91.7(a) prescribes that no person may operate a civil aircraft unless it is in an airworthy condition.

The FAA has found in numerous exemptions that similar UAS operations do not require an airworthiness certificate in accordance with 14 CFR part 21, Subpart H. Titan Aerial proposes that compliance with its operating documents be a sufficient means for determining an airworthy condition. Given the size of the aircraft and the requirements by which Titan Aerial has agreed to abide, an equivalent level of safety will be achieved by ensuring compliance with the Titan Aerial/Phantom 2 manuals prior to each flight. The FAA has approved similar exemptions in 11062, 11063, 11064, 11065, 11066, 11067, 11080, 11109, 11110, and 11153.

VII. MAINTENANCE/INSPECTION

Section 91.405(a) prescribes, in pertinent part, that each owner of an aircraft shall have that aircraft inspected as prescribed in subpart E of this part and shall, between required inspections, except as provided in paragraph (c) of this section, have discrepancies repaired as prescribed in part 43, Maintenance, Preventive Maintenance, Rebuilding, and Alteration.

Section 91.407(a)(1) prescribes that no person may operate any aircraft that has undergone maintenance, preventive maintenance, rebuilding, or alteration unless it has been approved for return to service by a person authorized under § 43.7 of this chapter.

Section 91.409(a) prescribes, in pertinent part, that no person may operate an aircraft unless, within the preceding 12 calendar months, it has had—

- (1) An annual inspection in accordance with part 43 and has been approved for return to service by a person authorized by Sec. 43.7
- (2) An inspection for the issuance of an airworthiness certificate in accordance with part 21.

Section 91.417(a) and (b) prescribe, in pertinent part, that—

- (a) Each registered owner or operator shall keep the following records for the periods specified in paragraph (b) of this section:
 - (1) Records of the maintenance, preventive maintenance, and alteration and records of the 100-hour, annual, progressive, and other required or approved inspections, as appropriate, for each aircraft (including the airframe) and each engine, propeller, rotor, and appliance of an aircraft. The records must include—
 - (i) A description (or reference to data acceptable to the Administrator) of the work performed; and
 - (ii) The date of completion of the work performed; and
 - (iii) The signature and certificate number of the person approving the aircraft for return to service.
 - (2) Records containing the following information:
 - (i) The total time in service of the airframe, each engine, each propeller, and each rotor.
 - (ii) The current status of life-limited parts of each airframe, engine, propeller, rotor, and appliance.
 - (iii) The time since last overhaul of all items installed on the aircraft that are required to be overhauled on a specified time basis.
 - (iv) The current inspection status of the aircraft, including the time since the last

inspection required by the inspection program under which the aircraft and its appliances are maintained.

(v) The current status of applicable airworthiness directives (AD) and safety directives including, for each, the method of compliance, the AD or safety directive number and revision date. If the AD or safety directive involves recurring action, the time and date when the next action is required.

(vi) Copies of the forms prescribed by § 43.9(d) for each major alteration to the airframe and currently installed engines, rotors, propellers, and appliances.

(b) The owner or operator shall retain the following records for the periods prescribed:

(1) The records specified in paragraph (a)(1) of this section shall be retained until the work is repeated or superseded by other work or for 1 year after the work is performed.

(2) The records specified in paragraph (a)(2) of this section shall be retained and transferred with the aircraft at the time the aircraft is sold.

(3) A list of defects furnished to a registered owner or operator under § 43.11 of this chapter shall be retained until the defects are repaired and the aircraft is approved for return to service.

Titan Aerial requests an exemption to the above inspection/maintenance Federal Aviation Regulations (FARs) and proposes the following maintenance/inspection procedures that will achieve an equivalent level of safety:

1. Prior to each flight the PIC will inspect the UAS 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 aircraft will be prohibited from operating until the necessary maintenance has been performed and the UAS is found to be in a condition for safe flight. The Ground Control Station will be included in the preflight inspection. All maintenance and alterations will be properly documented in the aircraft records.
2. Any UAS that has undergone maintenance or alterations that affect the UAS operation or flight characteristics, e.g. replacement of a flight critical component, will undergo a functional test flight. The PIC who conducts the functional test flight will make an entry in the aircraft records.
3. The pre-flight inspection will account for all potential discrepancies, e.g. inoperable components, items, or equipment, not already covered in the relevant sections of the operating documents.
4. Titan Aerial will follow the UAS manufacturer's aircraft/component, maintenance, overhaul, replacement, inspection, and life limit requirements.
5. Titan Aerial will carry out its maintenance, inspections, and record keeping requirements, in accordance with the operating documents. Maintenance, inspection, alterations, and status of replacement/overhaul component parts will be noted in the aircraft records, including total time

in service, description of work accomplished, and the signature of the authorized person returning the UAS to service.

6. Each UAS operated under the exemption will comply with all manufacturer Safety Bulletins.
7. The authorized person will make an entry in the aircraft record of the corrective action taken against discrepancies discovered between inspections.

Adherence to the above procedures, as well as others included in the attached documentation (including a preflight checklist) should provide more than an equivalent level of safety to the above FARs. The FAA has approved similar exemptions in 11062, 11063, 11064, 11065, 11066, 11067, 11080, 11109, 11110, 11112, and 11153.

VIII. PUBLIC INTEREST

Manned aircraft conducting aerial photography/videography can weigh 6,000 pounds or more and contain one or more living souls on board. Titan Aerial's UAV will weigh less than 3 pounds and contain no living crew (the PIC and VO being remotely located from the UAV). The limited weight significantly reduces the potential for harm to participating and nonparticipating individuals or property in the event of an incident or accident. There is no risk to an onboard crew while using a UAV.

Traditional manned aircraft contain highly-flammable fuel and are at risk of fuel spillage and fire in the event of an incident or accident. The battery-powered Phantom 2 carries no fuel, eliminating this fire and environmental risk.

Traditional aerial photography/videography operations using conventional aircraft can operate in very close proximity to persons and property on the ground. While the FAA mitigates these risks in a variety of ways, the proposed UAS operations would reduce risks even further due to the limited size, weight, speed, operating conditions, and safety features of the Phantom 2.

Furthermore, as Congress outlined in the FAA Modernization and Reform Act, integration of UAS into the NAS is inherently in the public interest, as long as it can be accomplished safely. As described above, not only will the proposed UAS operations provide an *equivalent* level of safety to current operations – they will actually provide a *greatly-improved* level of safety to the public and its property.

IX. NATIONAL SECURITY

No national security issue is raised by the grant of this exemption. Given the size, load carrying capacity, speed at which it operates, and the fact that it carries no explosives or other dangerous materials, the Phantom 2 poses no threat to national security.

X. PRIVACY

All operations will be conducted over private or controlled-access property with permission from the land owner/controller or authorized representative. Permission from the land owner/controller or authorized representative will be obtained for each flight to be conducted.

XI. SUMMARY OF TITAN AERIAL, LLC. SECTION 333 EXEMPTION REQUEST

For publication in the *Federal Register*, Titan Aerial, LLC hereby provides, pursuant to Part 11, a summary of its exemption application to allow commercial operation of the DJI Phantom 2 unmanned aerial vehicle in photography/videography work. An exemption is requested from the following regulations:

- 14 CFR § 61.113(a) & (b)
- 14 CFR § 91.7(a)
- 14 CFR § 91.119(c)
- 14 CFR § 91.151(a)
- 14 CFR § 91.405(a)
- 14 CFR § 91.407(a)(1)
- 14 CFR § 91.409(a)(1) & (2)
- 14 CFR § 91.417(a) & (b)

XII. CONCLUSION

In summary, Titan Aerial, LLC seeks exemption from the FARs listed above in order to commercially-operate a small unmanned aerial vehicle of less than three pounds for the purposes of aerial photography and videography.

Approval of this exemption will enhance safety by removing the many risk factors caused by traditional, manned aircraft undertaking these operations. By replacing these large, heavy, fuel-laden aircraft with a small, lightweight, battery operated UAS system, the threat to persons and property can be virtually eliminated.

The operation of the UAS described herein, under the strict conditions outlined above and in the operating documents, will provide an equivalent level of safety to support the grant of the requested exemptions.

Satisfaction of the criteria provided in Section 333 of the Reform Act of 2012 – size, weight, speed, operating capabilities, proximity to airports and populated areas, operation within visual line of site, and with no threat to national security – more than justify the grant of the requested exemptions. This request is consistent with numerous exemptions already granted.

If I can be of any further assistance in processing this request or if you have any questions or concerns, please do not hesitate to contact me directly. Thank you for your time and attention to this request.

Sincerely,



Jody L. Slaughter
President, Titan Aerial LLC