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

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

September 15, 2015

Exemption No. 12851
Regulatory Docket No. FAA−2015−2669

Mr. William D. Janicki
Counsel for UAV Solutions, Inc.
Morrison and Foerster LLP
12531 High Bluff Drive
San Diego, CA 92130

Dear Mr. Janicki:

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

By letter dated June 5, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of UAV Solutions, Inc. (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial data capture for engineering, infrastructure, energy, agriculture, real estate, sports, wildlife, and insurance.

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 Inspire 1, DJI Spreading Wings S-1000, and DJI Phantom 3.

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

The Basis for Our Decision

You have requested to use a UAS for aerial data collection[1]. The FAA has issued grants of exemption in circumstances similar in all material respects to those presented in your petition. In Grants of Exemption Nos. 11062 to Astraeus Aerial (*see* Docket No. FAA−2014−0352), 11109 to Clayco, Inc. (*see* Docket No. FAA−2014−0507), 11112 to VDOS Global, LLC (*see* Docket No. FAA−2014−0382), and 11213 to Aeryon Labs, Inc. (*see* Docket No. FAA−2014−0642), the FAA found that the enhanced safety achieved using an unmanned aircraft (UA) with the specifications described by the petitioner and carrying no passengers or crew, rather than a manned aircraft of significantly greater proportions, carrying crew in addition to flammable fuel, gives the FAA good cause to find that the UAS operation enabled by this exemption is in the public interest.

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

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

Our Decision

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

[1] Aerial data collection includes any remote sensing and measuring by an instrument(s) aboard the UA. Examples include imagery (photography, video, infrared, etc.), electronic measurement (precision surveying, RF analysis, etc.), chemical measurement (particulate measurement, etc.), or any other gathering of data by instruments aboard the UA.

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, UAV Solutions, Inc. 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 Inspire 1, DJI Spreading Wings S-1000, and DJI Phantom 3 when weighing less than 55 pounds including payload. Proposed operations of any other aircraft will require a new petition or a petition to amend this exemption.

2. Operations for the purpose of closed-set motion picture and television filming are not permitted.

3. The UA may not be operated at a speed exceeding 87 knots (100 miles per hour). The exemption holder may use either groundspeed or calibrated airspeed to determine compliance with the 87 knot speed restriction. In no case will the UA be operated at airspeeds greater than the maximum UA operating airspeed recommended by the aircraft manufacturer.

4. The UA must be operated at an altitude of no more than 400 feet above ground level (AGL). Altitude must be reported in feet AGL.

5. The UA must be operated within visual line of sight (VLOS) of the PIC at all times. This requires the PIC to be able to use human vision unaided by any device other than corrective lenses, as specified on the PIC's FAA-issued airman medical certificate or U.S. driver's license.

6. All operations must utilize a visual observer (VO). The UA must be operated within the visual line of sight (VLOS) of the PIC and VO at all times. The VO may be used to satisfy the VLOS requirement as long as the PIC always maintains VLOS capability. The VO and PIC must be able to communicate verbally at all times; electronic messaging or texting is not permitted during flight operations. The PIC must be designated before the flight and cannot transfer his or her designation for the duration of the flight. The PIC must ensure that the VO can perform the duties required of the VO.

7. This exemption and all documents needed to operate the UAS and conduct its operations in accordance with the conditions and limitations stated in this grant of exemption, are hereinafter referred to as the operating documents. The operating

documents must be accessible during UAS operations and made available to the Administrator upon request. If a discrepancy exists between the conditions and limitations in this exemption and the procedures outlined in the operating documents, the conditions and limitations herein take precedence and must be followed. Otherwise, the operator must follow the procedures as outlined in its operating documents. The operator may update or revise its operating documents. It is the operator's responsibility to track such revisions and present updated and revised documents to the Administrator or any law enforcement official upon request. The operator must also present updated and revised documents if it petitions for extension or amendment to this grant of exemption. If the operator determines that any update or revision would affect the basis upon which the FAA granted this exemption, then the operator must petition for an amendment to its grant of exemption. The FAA's UAS Integration Office (AFS−80) may be contacted if questions arise regarding updates or revisions to the operating documents.

8. Any UAS that has undergone maintenance or alterations that affect the UAS operation or flight characteristics, e.g., replacement of a flight critical component, must undergo a functional test flight prior to conducting further operations under this exemption. Functional test flights may only be conducted by a PIC with a VO and must remain at least 500 feet from other people. The functional test flight must be conducted in such a manner so as to not pose an undue hazard to persons and property.

9. The operator is responsible for maintaining and inspecting the UAS to ensure that it is in a condition for safe operation.

10. Prior to each flight, the PIC must conduct a pre-flight inspection and determine the UAS is in a condition for safe flight. The pre-flight inspection must account for all potential discrepancies, e.g., inoperable components, items, or equipment. If the inspection reveals a condition that affects the safe operation of the UAS, the aircraft is prohibited from operating until the necessary maintenance has been performed and the UAS is found to be in a condition for safe flight.

11. The operator must follow the UAS manufacturer's maintenance, overhaul, replacement, inspection, and life limit requirements for the aircraft and aircraft components.

12. Each UAS operated under this exemption must comply with all manufacturer safety bulletins.

13. Under this grant of exemption, a PIC must hold either an airline transport, commercial, private, recreational, or sport pilot certificate. The PIC must also hold a current FAA airman medical certificate or a valid U.S. driver's license issued by a state, the District of Columbia, Puerto Rico, a territory, a possession, or the Federal

government. The PIC must also meet the flight review requirements specified in 14 CFR § 61.56 in an aircraft in which the PIC is rated on his or her pilot certificate.

14. The operator may not permit any PIC to operate unless the PIC demonstrates the ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption, including evasive and emergency maneuvers and maintaining appropriate distances from persons, vessels, vehicles and structures. PIC qualification flight hours and currency must be logged in a manner consistent with 14 CFR § 61.51(b). Flights for the purposes of training the operator's PICs and VOs (training, proficiency, and experience-building) and determining the PIC's ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption are permitted under the terms of this exemption. However, training operations may only be conducted during dedicated training sessions. During training, proficiency, and experience-building flights, all persons not essential for flight operations are considered nonparticipants, and the PIC must operate the UA with appropriate distance from nonparticipants in accordance with 14 CFR § 91.119.

15. UAS operations may not be conducted during night, as defined in 14 CFR § 1.1. All operations must be conducted under visual meteorological conditions (VMC). Flights under special visual flight rules (SVFR) are not authorized.

16. The UA may not operate within 5 nautical miles of an airport reference point (ARP) as denoted in the current FAA Airport/Facility Directory (AFD) or for airports not denoted with an ARP, the center of the airport symbol as denoted on the current FAA-published aeronautical chart, unless a letter of agreement with that airport's management is obtained or otherwise permitted by a COA issued to the exemption holder. The letter of agreement with the airport management must be made available to the Administrator or any law enforcement official upon request.

17. The UA may not be operated less than 500 feet below or less than 2,000 feet horizontally from a cloud or when visibility is less than 3 statute miles from the PIC.

18. If the UAS loses communications or loses its GPS signal, the UA must return to a pre-determined location within the private or controlled-access property.

19. The PIC must abort the flight in the event of unpredicted obstacles or emergencies.

20. The PIC is prohibited from beginning a flight unless (considering wind and forecast weather conditions) there is enough available power for the UA to conduct the intended operation and to operate after that for at least five minutes or with the reserve power recommended by the manufacturer if greater.

21. Air Traffic Organization (ATO) Certificate of Waiver or Authorization (COA). All operations shall be conducted in accordance with an ATO-issued COA. The

exemption holder may apply for a new or amended COA if it intends to conduct operations that cannot be conducted under the terms of the attached COA.

22. All aircraft operated in accordance with this exemption must be identified by serial number, registered in accordance with 14 CFR part 47, and have identification (N−Number) markings in accordance with 14 CFR part 45, Subpart C. Markings must be as large as practicable.

23. Documents used by the operator to ensure the safe operation and flight of the UAS and any documents required under 14 CFR §§ 91.9 and 91.203 must be available to the PIC at the Ground Control Station of the UAS any time the aircraft is operating. These documents must be made available to the Administrator or any law enforcement official upon request.

24. The UA must remain clear and give way to all manned aviation operations and activities at all times.

25. The UAS may not be operated by the PIC from any moving device or vehicle.

26. All Flight operations must be conducted at least 500 feet from all nonparticipating persons, vessels, vehicles, and structures unless:
    a. Barriers or structures are present that sufficiently protect nonparticipating persons from the UA and/or debris in the event of an accident. The operator must ensure that nonparticipating persons remain under such protection. If a situation arises where nonparticipating persons leave such protection and are within 500 feet of the UA, flight operations must cease immediately in a manner ensuring the safety of nonparticipating persons; and
    b. The owner/controller of any vessels, vehicles or structures has granted permission for operating closer to those objects and the PIC has made a safety assessment of the risk of operating closer to those objects and determined that it does not present an undue hazard.

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

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

28. Any incident, accident, or flight operation that transgresses the lateral or vertical boundaries of the operational area as defined by the applicable COA must be reported to the FAA's UAS Integration Office (AFS−80) within 24 hours. Accidents must be

reported to the National Transportation Safety Board (NTSB) per instructions contained on the NTSB Web site: www.ntsb.gov.

If this exemption permits operations for the purpose of closed-set motion picture and television filming and production, the following additional conditions and limitations apply.

29. The operator must have a motion picture and television operations manual (MPTOM) as documented in this grant of exemption.

30. At least 3 days before aerial filming, the operator of the UAS affected by this exemption must submit a written Plan of Activities to the local Flight Standards District Office (FSDO) with jurisdiction over the area of proposed filming. The 3-day notification may be waived with the concurrence of the FSDO. The plan of activities must include at least the following:
    a. Dates and times for all flights;
    b. Name and phone number of the operator for the UAS aerial filming conducted under this grant of exemption;
    c. Name and phone number of the person responsible for the on-scene operation of the UAS;
    d. Make, model, and serial or N−Number of UAS to be used;
    e. Name and certificate number of UAS PICs involved in the aerial filming;
    f. A statement that the operator has obtained permission from property owners and/or local officials to conduct the filming production event; the list of those who gave permission must be made available to the inspector upon request;
    g. Signature of exemption holder or representative; and
    h. A description of the flight activity, including maps or diagrams of any area, city, town, county, and/or state over which filming will be conducted and the altitudes essential to accomplish the operation.

31. Flight operations may be conducted closer than 500 feet from participating persons consenting to be involved and necessary for the filming production, as specified in the exemption holder's MPTOM.

Unless otherwise specified in this grant of exemption, the UAS, the UAS PIC, and the UAS operations must comply with all applicable parts of 14 CFR including, but not limited to, parts 45, 47, 61, and 91.

This exemption terminates on September 30, 2017, unless sooner superseded or rescinded.

Sincerely,

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

Enclosures

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Re: ***Petition of UAV Solutions, Inc. for an Exemption Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 to Operate Unmanned Aircraft Systems for Aerial Data Collection***

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, UAV Solutions, Inc. ("UAV SOLUTIONS") hereby applies for an exemption from the Federal Aviation Regulations identified below to allow for the commercial operation of the DJI Inspire 1 ("Inspire"), the DJI Spreading Wings S-1000 ("Spreading Wings"), and the DJI Phantom 3 ("Phantom") unmanned aircraft systems for aerial data collection.

UAV SOLUTIONS requests that the FAA review this petition pursuant to its "summary grant" process as the FAA has already granted exemptions similar in all material respects to this petition. See FAA Grant of Exception Nos. 11062, 11109, 11112, and 11213. The reasons stated by the FAA in granting the exemptions listed above also apply to this petition, and the grant of this petition is in the public interest.

I. REGULATIONS FOR WHICH EXEMPTION IS REQUESTED

UAV SOLUTIONS requests exemption from the following regulations:

- 14 C.F.R Part 21, Subpart H;
- 14 C.F.R Part 27;
- 14 C.F.R § 45.23(b);
- 14 C.F.R. § 45.27(a);
- 14 C.F.R § 61.113;
- 14 C.F.R § 91.7(a);
- 14 C.F.R § 91.9(b)(2);
- 14 C.F.R § 91.9(c);
- 14 C.F.R § 91.103;
- 14 C.F.R § 91.109(a);
- 14 C.F.R § 91.119;
- 14 C.F.R § 91.121;

- 14 C.F.R § 91.151(a) & (b)
- 14 C.F.R § 91.203 (a) & (b);
- 14 C.F.R § 91.405(a);
- 14 C.F.R § 91.407(a)(l);
- 14 C.F.R § 91.409(a)(2);
- 14 C.F.R § 91.417 (a) & (b).

This petition incorporates the material contained in the User Manuals for Inspire, the Spreading Wings, and the Phantom 3 (together, the "Manuals").

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 ("UAS") 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. 14 C.F.R. § 11.81.

III. DESCRIPTION OF UAV SOLUTIONS AND ITS SERVICES

UAV SOLUTIONS provides aerial data capture and imaging services for a variety of industries including engineering, infrastructure, energy, agriculture, real estate, sports, wild life, and insurance. UAV SOLUTIONS is headquartered in Del Mar, California.

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IV. DESCRIPTION OF PROPOSED OPERATIONS

UAV SOLUTIONS is requesting exemptions from applicable Federal Aviation Regulations (FARs) pursuant to Section 333 of the Reform Act to perform aerial data capture and imaging services for a variety of industries including engineering, infrastructure, energy, agriculture, real estate, sports, wild life, and insurance.

This type of aerial imagery and data collection is typically performed by helicopter or fixed wing aircraft. Use of a UAS will reduce safety risks because the UAS will not carry flammable fuel or a pilot, and UAS operations can be performed at considerable savings. The UAS will also allow for better imagery than can be produced by using a helicopter or fixed wing aircraft.

A. Aircraft to be Operated

1. DJI Inspire 1

UAV SOLUTIONS will use the Inspire as one of the aircraft to provide its services. The FAA has already approved the Inspire for commercial use in FAA Exemption No. 11679 (FAA Docket No. FAA-2015-0706). The Inspire is shown in Figure 1 below.

Figure 1– DJI Inspire 1

The Inspire is more fully described in the Inspire User Manual.

2. DJI Spreading Wings S-1000

UAV SOLUTIONS will use the Spreading Wings as one of the aircraft to provide its services. The FAA has already approved the Spreading Wings for commercial use in FAA

Exemption No. 11521 (FAA Docket No. FAA-2014-0947). The Spreading Wings is shown in Figure 2 below.

Figure 2– DJI Spreading Wings S-1000

The Spreading Wings is more fully described in the Spreading Wings User Manual.

3. DJI Phantom 3

UAV SOLUTIONS will use the Phantom 3 as one of the aircraft to provide its services. The FAA has already approved the Phantom 3 for commercial use in FAA Exemption No. 11696 (FAA Docket No. FAA-2015-0746). The Phantom 3 is shown in Figure 3 below.

Figure 3– DJI Phantom 3

The Phantom 3 is more fully described in the Phantom 3 User Manual.

B. UAV SOLUTIONS's Proposed Operations Demonstrate an Equivalent Level of Safety

1. General Description of Proposed Flight Operations

UAV SOLUTIONS proposes to operate within the limitations and performance specifications listed in this application and in the Manuals. These limitations provide for at least an equivalent, or higher, level of safety for operations under the current regulatory structure because the proposed operations are safer than conventional operations using helicopters or fixed wing aircraft which carry an operator and flammable fuel. The proposed flight operations are similar in all material respects to operations already approved by the FAA and are therefore subject to the FAA's "summary grant" process.

The proposed operations do not create any hazard to users of the national airspace system or pose a threat to national security. The aircraft are battery operated with a maximum flight time of less than 25 minutes. The vehicles weigh less than 55 pounds. The vehicles will be operated at or below 400 feet AGL within the visual line of sight of the pilot in command. UAV SOLUTIONS's operations will be over private or controlled access property with the permission of the owner/controller or authorized agent.

Manned aircraft are at risk of fuel spillage and fire in the event of an incident or accident. The proposed UAS carry no fuel, and therefore the risk of fire following an incident or accident due to fuel spillage is eliminated. Compared to manned aircraft, the UAS being operated by the petitioner reduces the risk to participating persons in close proximity to the aircraft due to the limited size, weight, operating conditions, and design safety features.

The petitioner's aircraft have the capability to operate safely after experiencing certain in-flight failures, as specified in the Manuals. The aircraft are also able to respond to a lost-link event with a pre-coordinated, predictable, automated flight maneuver.

2. Specific Limitations on Proposed Flight Operations

Given the small size involved, the restricted environment within which they will operate, the procedures listed below, and pilot certification requirements, UAV SOLUTIONS's proposed operations would "not create a hazard to users of the national airspace system or the public or pose a threat to national security." Reform Act Section 333(b)(1).

1. The aircraft weigh less than 55 pounds.

2. Each aircraft will be identified by serial number, registered with the FAA, and have identification (N-Number) markings as large as practicable.

3. Flights will be operated within visual line of sight of the pilot in command (PIC).

4. Prior to each flight, a zero altitude initiation point will be established and confirmed for accuracy by PIC.

5. The PIC will ensure that before each flight, there is enough available power for the UAS 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.

6. The aircraft will be operated during daylight and in VFR conditions.

7. Flights will not exceed 400 feet AGL.

8. Flights will be operated at a lateral distance of at least 500 feet from any persons or property not associated with the operation who have not given prior permission.

9. Flights will be limited to a groundspeed of 100 mph.

10. Minimum crew for each flight will consist of a PIC and an Observer.

11. The PIC will hold either an airline transport, commercial, private, recreational, or sport pilot certificate. The PIC will also hold a current FAA airman medical certificate or a valid U.S. driver's license issued by a state or the Federal Government. The PIC will also meet the flight review requirements specified in 14 CFR § 61.56.

12. Prior to the flight, a Mission Plan will be created setting forth the limitations for the flight as well as contact information for the PIC.

13. The flight operations will yield the right of way to other manned aircraft operations.

14. All persons who are not involved with UAV SOLUTIONS's operations will be required to be at least 500 feet from flight operations.

15. The aircraft will only operate over private or controlled access property with the permission of the owner/controller or authorized representative.

16. The UAS will not operate within 5 nautical miles of an airport unless a letter of agreement is obtained.

17. All required permissions and permits will be obtained from territory, state, county or city jurisdictions prior to flight.

18. Prior to commencing operations, UAV SOLUTIONS will obtain a Certificate of Waiver or Authorization (COA) from the FAA.

19. If the aircraft loses communications, it will have the capability to return to a pre-determined location within the operational area and land.

20. If the aircraft loses its GPS signal it will have the capability of being flown manually to a predetermined location within the operational area and land.

21. The flight will be aborted in case of unpredicted obstacles or emergencies.

22. UAS operations will be conducted within the parameters of the Manuals.

3. Flight Recovery, Lost Communications, and Lost GPS Procedures

The flight recovery, lost communications, and lost GPS procedures are more fully documented in the attached Manuals.

V. SPECIFIC FAR EXEMPTIONS REQUESTED

UAV SOLUTIONS seeks an exemption from several interrelated provisions of 14 C.F.R. Parts 21, 45, 61, and 91 for purposes of conducting the requested operations. Listed below are (1) the specific FAR sections for which exemption is sought, and (2) the operating procedures and safeguards that UAV SOLUTIONS has established which will ensure a level of safety better than or equal to the rules from which exemption is sought. *See* 14 C.F.R. § 11.81 (e).

A. 14 C.F.R. Part 21, Subpart H – Airworthiness Certificates and 14 C.F.R. § 91.203(a)(1)

The FAA has stated that no exemption is needed from this section if a finding is made under the Reform Act that the UAS selected provides an equivalent level of safety when compared to aircraft normally used for the same application. These criteria are met with this petition, and therefore no exemption is needed. *See* Grant of Exemption No. 11062, Docket No. FAA 2014-0352 at 13-14, 22. If, however, the FAA determines that there are some characteristics of the UASs that fail to meet the requirements of the Reform Act, an exemption is requested.

Equivalent Level of Safety: The UASs are safe when taking into account their size, weight, speed, and operational capability. They weigh less than 55 pounds and will be flown at speeds less than 100 miles per hour, and in visual line of sight of the operator. The UASs do

not carry pilots, passengers, explosive materials, or flammable liquid fuels. The UASs will be operated within the parameters of their respective Manuals.

The proposed operations will be at least as safe as, or safer than, conventional rotorcraft or fixed wing aircraft operating with an airworthiness certificate without the restrictions and conditions proposed here.

B. 14 C.F.R. Part 27 Airworthiness Standards: Normal Category Rotorcraft

14 C.F.R. Part 27 sets forth the procedural requirements for airworthiness certification of normal category rotorcraft. To the extent the UASs would otherwise require certification under Part 27, UAV SOLUTIONS seeks an exemption from Part 27's airworthiness standards for the same reasons identified in the request for exemption from 14 C.F.R. Part 21, Subpart H.

C. 14 C.F.R. §§ 45.23(b), 45.27(a) and 91.9(c): Aircraft Marking and Identification Requirements

14 C.F.R. §45.23(b), Markings of the Aircraft states:

> When marks include only the Roman capital letter "N" and the registration number is displayed on limited, restricted or light-sport category aircraft or experimental or provisionally certificated aircraft, 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.

14 C.F.R. § 45.27(a) states:

> **Rotorcraft.** 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.

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.

In a previous Grant of Exemption, the FAA determined that exemption from these requirements was warranted provided that the aircraft "have identification (N-Number) markings in accordance with 14 CFR part 45, Subpart C if the markings are "as large as practicable." *See* Exemption No. 11062, Docket No. FAA 2014-0352, at p. 14.

Equivalent Level of Safety: UAV SOLUTIONS will mark all UASs with their N-Number in a prominent spot on the fuselage with markings that are as large as practicable.

D. 14 C.F.R. § 61.113: Private Pilot Privileges and Limitations

UAV SOLUTIONS seeks exemption from 14 CFR § 61.113, which restricts private pilots from flying aircraft for compensation or hire and would also require a second class medical certificate. The purpose of Part 61 is 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 carrying passengers or cargo for hire.

While the UAS will be operated as part of a commercial operation, they carry neither passengers nor cargo. In the Grant of Exemption in FAA Docket No. FAA-2014-0352, the FAA determined that the unique characteristics of UAS operation outside of controlled airspace did not warrant the additional cost and restrictions attendant with requiring the PIC to have a commercial pilot certificate and a class II medical certificate. The FAA has also determined that the required knowledge for a commercial pilot covers the same fundamental principles as a private pilot.

The FAA has also granted exemptions allowing operations by people who hold an airline transport, commercial, private, recreational, or sport pilot certificate with a current FAA airman medical certificate or a valid U.S. driver's license issued by a state or the Federal Government. The PIC must also meet the flight review requirements specified in 14 CFR § 61.56. See FAA Exemption No. 11374.

UAV SOLUTIONS will ensure the PIC will meet the requirements listed in the above paragraph. UAV SOLUTIONS will also ensure the PIC will have completed the manufacturers' training guidelines outlined in the Manuals.

The FAA stated in its grant of an exception to Astraeus Aerial the "the FAA considers the overriding safety factor for the limited operations proposed by the petitioner to be the airmanship skills acquired through UAS-specific flight cycles, flight time, and specific make and model experience, culminating in verification through testing." See Exemption No. 11062, Docket No. FAA 2014-0352, at p. 18. The proposed operations can achieve an equivalent level of safety by requiring the knowledge and experience in the UAS operations described above.

The restrictions UAV SOLUTIONS has placed on its UAS operations meet or exceed the restrictions similarly imposed on Astraeus Aerial in FAA Docket No. FAA-2014-0352 and those listed in the FAA's "summary grant" process.

E. 14 C.F.R. § 91.7(a): Civil Aircraft Airworthiness

UAV SOLUTIONS seeks an exemption from 14 C.F.R. § 91.7(a), which requires that a civil aircraft be in airworthy condition to be operated. The FAA has stated that no exemption is required to the extent that the requirements of Part 21 are waived or found inapplicable. Accordingly, UAV SOLUTIONS requests that the requirements for Section 91.7 be treated in accordance with FAR Part 21 Subpart H. *See* Grant of Exemption No. 11062, p. 19.

F. 14 C.F.R. § 91.9(b)(2): Civil Aircraft Flight Manual in the Aircraft; 14 C.F.R. §§ 91.203(a) and (b): Carrying Civil Aircraft Certification and Registration

Pursuant to 14 C.F.R. § 91.9(b)(2):

> (b) No person may operate a U.S.-registered civil aircraft -
> …
>
> (2) For which an Airplane or Rotorcraft Flight Manual is 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.

Pursuant to 14 C.F.R. § 91.203(a) and (b):

> (a) Except as provided in § 91.715, no person may operate a civil aircraft unless it has within it the following:
>
> (1) An appropriate and current airworthiness certificate…
>
> (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.

UAV SOLUTIONS does not request an exemption from this section but instead notifies the FAA that, 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 PIC during flight. The Chief Counsel's Office has held that for all UAS operations, this alternate method constitutes full compliance with the regulations. *See also* Grant of Exemption No. 11062, pp. 19-20, and Grant of Exemption No. 8607.

G. 14 C.F.R. § 91.103: Preflight Action

UAV SOLUTIONS seeks an exemption from 14 C.F.R. § 91.103, which requires a PIC to become familiar with specific information before each flight, including information contained in the FAA-approved Flight Manual on board the aircraft. The aircraft will not have a Flight Manual on board. The PIC will take all actions including reviewing weather, flight battery requirements, landing and takeoff distances and aircraft performance data before initiation of flight. Under these circumstances, the FAA has stated that no exemption is required. *See* Grant of Exemption No. 11062, p. 20. An exemption is requested to the extent that an FAA-approved Flight Manual is required.

Equivalent Level of Safety: An equivalent level of safety will be provided by following the Manuals. The PIC will take all required preflight actions - including performing all required checklists and reviewing weather, flight requirements, battery charge, landing and takeoff distance, aircraft performance data, and contingency landing areas - before initiation of flight. The Manuals will be kept at the ground station with the operator at all times.

H. 14 C.F.R. § 91.109(a): Flight Instruction

UAV SOLUTIONS seeks an exemption from 14 C.F.R. § 91.109(a), which provides that "[n]o person may operate a civil aircraft (except a manned free balloon) that is being used for flight instruction unless that aircraft has fully functioning dual controls." UASs and remotely piloted aircraft, by their design, do not have functional dual controls. Instead, flight control is accomplished through the use of the Ground Control Station (GCS) that communicates with the aircraft via radio communications.

Equivalent Level of Safety: When flight instruction is performed, no pilots will be on board the aircraft and the GCS will be a safe distance from the aircraft and the public, causing no safety hazard. Given the size and speed of the UAS, an equivalent level of safe training can still be achieved without dual controls because no pilot or passengers are aboard the aircraft, and all persons will be a safe distance away in the event that the aircraft experiences any difficulties during flight instruction. In addition, UAV SOLUTIONS will conduct flight training at a remote facility away from population centers. These training flights will comply with the provisions in the Manuals. Accordingly, UAV SOLUTIONS's proposed method of operation provides superior levels of safety.

I. 14 C.F.R. § 91.119(c): Minimum Safe Altitudes in Uncongested Areas

UAV SOLUTIONS requests an exemption from the minimum safe altitude requirements of 14 C.F.R. § 91.119(c). Section 91.119(c) prescribes that an aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure. The Manuals provide for UAV SOLUTIONS operations at least 500 feet from persons and structures not involved in

the operations. The FAA has already determined that relief from Section 91.119(c) is warranted for UAS operations in uncongested areas with similar flight restrictions as those imposed by UAV SOLUTIONS. *See* Grant of Exemption No. 11062, p. 20-21.

Equivalent Level of Safety: Compared to flight operations with rotorcraft or fixed wing aircraft weighing far more than the maximum weights proposed herein, and given the lack of flammable fuel, any risk associated with these operations is far less than those that presently exist with conventional aircraft. An equivalent level of safety will be achieved given the size, weight, and speed of the UAS, as well as the locations where it is operated . In order to avoid any risk to aircraft, flight operations will be restricted to 400 feet AGL or below. Other aircraft are already prohibited from operating closer than 500 from structures where UAV SOLUTIONS proses to operate. This is airspace where other aircraft do not normally operate. As set forth in the Manuals and herein, the UAS will be operated in the remote sites, away from persons or structures not involved in the operation. All persons who are not involved with UAV SOLUTIONS's operations will be required to be at least 500 feet from flight operations. This will pose no risk to the public because other aircraft are not operating in these areas.

J. 14 C.F.R. § 91.121: Altimeter Settings

This petition seeks an exemption from 14 C.F.R. § 91.121, which requires a person operating an aircraft to maintain cruising altitude or flight level by reference to an altimeter that is set to the elevation of the departure airport. The UASs proposed here use both barometric pressure sensors and GPS to determine altitude but do not have the ability to set in a current altimeter setting. An exemption is required to the extent that the UAS does not have a barometric altimeter setting. The altitude of the UAS is monitored by the PIC on the ground control station and by the visual observer.

Equivalent Level of Safety: The FAA has stated that an equivalent level of safety can be achieved if the aircraft will be operated at or below 400 feet AGL and within visual line-of-sight in addition to GPS based altitude information relayed in real time to the operator. *See* Grant of Exemption No. 11062, p. 20-21. As the attached Manuals indicate, the UAS will be operated at or below 400 feet AGL and otherwise comply with the limitations in the Grant of Exemption No. 11062.

K. 14 C.F.R. § 91.151(a): Fuel Requirements for Flight in VFR Conditions

UAV SOLUTIONS requests an exemption from 14 C.F.R. § 91.151(a)'s fuel requirements for flight in VFR conditions. Section 91.151 states:

(a) 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; or

(2) At night, to fly after that for at least 45 minutes.

Here, the technological limitations on the UAS battery power means that no meaningful flight operations can be conducted while maintaining a 30 minute reserve. The aircraft are battery powered with a maximum flight time of less than 25 minutes. The PIC will ensure that before each flight, there is enough available power for the UAS 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.

Equivalent Level of Safety: The FAA has stated that an equivalent level of safety is provided if the UAS flight is conducted under daytime VFR flight conditions using VLOS, and terminated with at least 25% reserve battery power still available. *See* Grant of Exemption No. 11062, p. 21-22. The FAA's "summary grant" process provides that the PIC is prohibited from beginning a flight unless there is enough available power 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. *See* FAA Exemption No. 11374 (FAA Docket No. 2015-0091 at p. 5). The limitations here provide that the PIC will ensure that before each flight, there is enough available power for the UAS 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.

L. 14 C.F.R. §§ 91.405(a), 91.407(a)(l), 91.409(a)(2); 91.417(a) and (b): Maintenance Inspections

UAV SOLUTIONS seeks an exemption from the maintenance inspection requirements contained in 14 C.F.R. § 91.405(a), 91.407(a)(l), 91.409(a)(2); 91.417(a) and (b). These regulations specify maintenance and inspection standards in reference to 14 C.F.R. Part 43. *See*, *e.g.*, 14 C.F.R. § 91.405(a) (stating 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 inspections ... have discrepancies repaired as prescribed in part 43 of this chapter"). An exemption from these regulations is needed because Part 43 and these sections only apply to aircraft with an airworthiness certificate, which the UAS proposed here will not have.

Equivalent Level of Safety: An equivalent level of safety will be achieved because maintenance and inspections will be performed in accordance with the Manuals. This includes maintenance, overhaul, replacement, and preflight inspection requirements. *See*

Exemption No. 11062 (FAA Docket No. 2014-0352, at p. 14-15) and Exemption No. 11374 (FAA Docket No. 2015-0091, at p. 4).

UAV SOLUTIONS will follow the UAS manufacturer's maintenance requirements. Flights will not be conducted unless a flight operations checklist is performed that includes all of the aircraft's components.

VI. PUBLIC INTEREST

Granting UAV SOLUTIONS's petition for exemption furthers the public interest. National policy set by Congress favors early integration of UAS into the NAS in controlled, safe working environments such as proposed in this petition. By granting this petition, the FAA will fulfill Congress's intent of allowing UAS to operate safely in the NAS before completion of the rulemaking required under Section 332 of the Reform Act.

Moreover, use of UAS will promote the efficient use of resources. The use of the UAS propped here will also decrease safety-related incidents involving traditional aircraft. The public has an interest in promoting science and technology education and in reducing the hazards and emissions associated with alternate use of helicopters and small airplanes to conduct similar operations.

VII. PRIVACY

All flights will occur over private or controlled access property with the owner's consent. All flights will be conducted in accordance with any federal, state or local laws regarding privacy.

VIII. SUMMARY FOR FEDERAL REGISTER

Pursuant to 14 C.F.R. Part 11, the following summary is provided for publication in the Federal Register, should it be determined that publication is needed:

UAV SOLUTIONS seeks an exemption from the following rules for aeronautical and UAS training and education of middle and high school students: 14 C.F.R Part 21, Subpart H; 14 C.F.R Part 27; 14 C.F.R § 45.23(b); 14 C.F.R. § 45.27(a); 14 C.F.R § 61.113; 14 C.F.R § 91.7(a); 14 C.F.R § 91.9(b)(2); 14 C.F.R § 91.9(c); 14 C.F.R § 91.103; 14 C.F.R § 91.109(a); 14 C.F.R § 91.119; 14 C.F.R § 91.121; 14 C.F.R § 91.151(a) & (b) 14 C.F.R § 91.203 (a) & (b); 14 C.F.R § 91.405(a); 14 C.F.R § 91.407(a)(l); 14 C.F.R § 91.409(a)(2); 14 C.F.R § 91.417 (a) & (b).

The exemption will promote science and technology education and training while enhancing safety by reducing risk to the operator, the general public and property owners from the

substantial hazards associated with performing equivalent training and education using traditional conventional aircraft and rotorcraft.

UAV SOLUTIONS requests that the FAA grant this petition using the "summary grant" process such that publication in the Federal Register is not required. This petition would not set a precedent, and any delay in acting on this petition would be detrimental to the petitioner.

IX. ATTACHMENTS

Available online at http://www.dji.com/products

Attachment 1: Inspire 1 User Manual
Attachment 2: Spreading Wings S-1000 User Manual
Attachment 3: Phantom 3 User Manual

If you have any questions or require any additional information, please do not hesitate to contact the undersigned attorneys for UAV SOLUTIONS.

X. CONCLUSION

Satisfaction of the criteria provided in Section 333 of the Reform Act - size, weight, speed, operating capabilities, proximity to airports and populated areas, operation within visual line of sight, and national security considerations - provides more than adequate justification for the grant of the requested exemptions to permit UAV SOLUTIONS to operate the UASs proposed here. Furthermore, this petition warrants review by the FAA under the "summary grant" process for immediate approval.

Respectfully submitted,
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