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

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

September 11, 2015

Exemption No. 12833
Regulatory Docket No. FAA−2015−2431

Mr. Daryl G. Crouse
Terp et al, LLC
920 Orizaba Avenue
Long Beach, CA 90804

Dear Mr. Crouse:

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 May 31, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Terp et al, LLC (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial photography, videography, surveying, closed-set filming[1], photogrammetry, inspections, education, and search and rescue operations.

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 Yuneec Q500 and 3D Robotics Iris+.

[1] By email received on August 27, 2015, the petitioner requested removal of closed-set filming from the proposed operations.

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[2]. 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, Terp et al, 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

[2] 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.

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, Terp et al, 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 Yuneec Q500 and 3D Robotics Iris+ 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

Before the

FEDERAL AVIATION ADMINISTRATION

Washington, DC

PETITION FOR EXEMPTION TO OPERATE SMALL UNMANNED AIRCRAFT SYSTEMS

FAA Regulatory Docket No. _____

I. SUMMARY

Terp et al, LLC., a California company ("Terp et al"), located at 920 Orizaba Ave., Long Beach, CA 90804 seeks authority to commercially operate a unmanned aircraft system fleet pursuant to Federal Aviation Regulations (14 C.F.R. § 1.61) and Section 333 of the FAA Modernization and Reform Act of 2012, Special Rules for Certain Unmanned Aircraft Systems. Terp et al also seeks exemption from the requirements of certain provisions of 14 C.F.R. Parts 21, 36, 45.23(b), 61.23(a) and (c), 61.101(e)(4) and (5), 61.113(a) and (b), 61.133(b), 61.315(a), 91.7(a), 91.9 (b)(2), 91.103(b)(1), 91.109(a), 91.119(c), 91.121, 91.151, 91.203(a) and (b) 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b). The proposed exemptions, if granted, would allow Terp et al to conduct commercial operations of small unmanned aircraft systems ("UAS") weighing 55 pounds or less.

II. BACKGROUND

Terp et al is a cutting edge professional services and technology company. Consistent with Congressional intent in enacting Section 222, Terp et al seeks to utilize remote flying and viewing technology to create value for its clients in education and research. Terp et al seeks the requested

exemptions and a Certificate of Authorization permitting Terp et al to offer a suite of services to various industries and use cases, such as:

- Aerial photography, videography, and surveying;
- Closed-set filming and aerial photography;
- Surveying, monitoring, inspections, videography, photography and filmmaking;
- Aerial imaging for safety, monitoring, inspecting and/or recording of secured and controlled environment construction sites, proposed development sites, inspections of property, and photography for realty advertisements;
- Precision photogrammetry and crop scouting;
- Search operations for missing persons;
- Educational research, technical demonstrations and training;
- Precision agriculture, market research, surveying, mapping and inspection; and
- Oil and gas pipeline inspections, solar installation inspections, power line/cable inspections, cooling tower inspections, forestry, critical infrastructure inspections, wind turbine inspections, and radiation measurement and monitoring

III. STATUTORY AUTHORITY

Section 333, Special Rules for Certain Unmanned Aircraft Systems, provides a procedure for seeking expedited FAA authorization for safe civil UAS operations in the NAS. Subpart a states that the FAA "shall determine if certain unmanned aircraft systems may operate safely in the national airspace system before completion of the [comprehensive] plan and rulemaking required by 332(b)(1) of this act or the guidance required by section 334 of this Act." In Section 332(b)(1), Congress made it clear that section 333 provides a procedure for "expedited operational authorization."

Section 333(b) identifies factors that the FAA should consider in determining whether commercial US operations should be approved when, "as a result of their size, weight, speed, operational capability, proximity to airports and populated areas, and operation within the visual

line of sight do not create a hazard to users of the [NAS] or the public or pose a threat to national security."

In addition, Section 44701(f) confers a general authority to grant exemptions from the FAA's safety regulations and minimum standards when the administrator decides a requested exemption is in the public interest.

IV. TERP ET AL EXEMPTIONS REQUESTED

Terp et al requests relief from:

14 C.F.R. Part 21 prescribes, in pertinent part, procedural requirements for issuing and changing design approvals; production approvals; airworthiness certificates; and airworthiness approvals.

14 C.F.R. Part 36 sets forth noise standards for aircraft type and airworthiness certification.

14 C.F.R. Part 45.23(b) sets forth the requirement, if applicable, that the word "Restricted" be displayed on the unmanned aircraft near each entrance to the cabin, cockpit or pilot station.

14 C.F.R. Part 61.23(a) and (c) sets forth requirements for medical certificates.

14 C.F.R. Part 61.101(e)(4) and (5) prescribes recreational pilot privileges and limitations.

14 C.F.R. Part 61.113(a) and (b) prescribes private pilot privileges and limitations.

14 C.F.R. Part 61.133(b) prescribes commercial pilot privileges and limitations.

14 C.F.R. Part 91.7(a) prescribes, in pertinent part, that no person may operate a civil aircraft unless it is in an airworthy condition.

14 C.F.R. Part 91.9 (b)(2) prohibits operation of US registered civil aircraft unless there is available in the aircraft a current approved Airplane or Rotorcraft Flight Manual, approved manual material, markings, and records, or any combination thereof.

14 C.F.R. Part 91.103(b)(1) prescribes, in pertinent part, that each pilot in command shell, before beginning a flight, become familiar with all available information concerning that flight, include, "for any flight, runway lengths at airports of intended use, and the following takeoff and landing distance:… For civil aircraft forwards and approved Airplane or Rotorcraft Flight Manual containing takeoff and landing distance data is required, the takeoff and landing distance data contained therein."

14 C.F.R. Part 91.109(a) provides that "no person may operate a civil aircraft (except in manned free balloon) that is being used for flight instruction unless the aircraft has fully functioning dual controls."

14 C.F.R. Part 91.119(c) prescribes that, except when necessary for takeoff or landing, no person may operate an aircraft below the certain altitudes under certain conditions.

14 C.F.R. Part 91.121 requires, in pertinent part, each person operating an aircraft to maintain cruising altitude by reference to an altimeter that is set "to the elevation of the departure airport or an appropriate ultimate setting available before departure."

14 C.F.R. Part 91.151 prescribes that 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.

14 C.F.R. Part 91.203(a) and (b) prohibits, in subpart (a), any person operating a civil aircraft unless it has within it (1) an appropriate concurrent airworthiness certificate; and (2) an effective US registration certificate issued to its owner or, for operation within the United States, the second copy of the Aircraft Registration Application as provided for in §43.3 7(c). Section 91.203 prescribes, in subpart (b), that no person may operate a civil aircraft unless and airworthiness certificate or a special flight authorization issued under §91.715 legible to passengers or crew is displayed at the capital cockpit.

14 C.F.R. Part 91.407(a)(1) prohibits, in pertinent part, any person from operating an aircraft that has undergone maintenance, inventive maintenance, rebuilding, or alteration unless it has been approved for return to service by a person authorized under §43.7 of the same chapter.

14 C.F.R. Part 91.409(a)(1) and (2) prescribes, in pertinent part, that no person may operate aircraft unless, within the preceding 12 calendar months, it has had an inspection for the issuance of an airworthiness certificate in accordance with part 21 of this chapter.

14 C.F.R. Part 91.417(a) and (b) prescribes, in pertinent part, that 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 which 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, and (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, and (vi) copies of the forms prescribed by §43.9(d) of this chapter for each major alteration to the airframe and currently installed engines, rotors, propellers, and appliances.

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.

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.

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.

V. TERP ET AL'S OPERATIONS SATISFY SECTION 333 REQUIREMENTS

a. Terp et al's UAS Fleet

Terp et al proposes to operate two small UAS under this exemption.

Yuneec Q500

Terp et al seeks an exemption to operate a Yuneec Q500 for compensation or hire. The Q500 is comprised of a multi-rotor unmanned aircraft and one handheld ground control station. The Q500 is equipped with four rotors driven by four lithium polymer battery powered electric motors. Design and operational characteristics are provided in Operating Manual available at http://www.yuneec.com/download/TyphoonQ500PUserManualV1.pdf

3DR Iris+

Terp et al seeks an exemption to operate a 3DR Iris+ for compensation or hire. The 3DR Iris+ is comprised of a multi-rotor unmanned aircraft and one handheld ground control stations. The 3DR Iris+ is equipped with four rotors driven by four lithium polymer battery powered electric motors. Design and operational characteristics are provided in the Operating Manual available at http://3drobotics.com/wp-content/uploads/2015/02/IRIS-Plus-Operation-Manual-vH-web.pdf.

b. Pilot In Command (PIC) and Operations

All Terp et al Flight Crews, including PIC and Visual Observers (VO), will be qualified as directed by FAA and Terp et al Standard Operating Procedure (SOP).

All flight crewmembers, including PIC and VO, will have an understanding of, and comply with, Title 14 Code of Federal Regulations, and/or Agency directives and regulations, applicable to the airspace where the UAS will operate. Specifically all flight crew members will receive training on the rules and responsibilities described in 14 CFR Part 91 Sections 91.111, 91.113 and

91.115 regarding cloud clearance, flight visibility and the pilot controller glossary, including standard ATC phraseology and communication.

The PIC must possess at least a current private pilot certificate and third class medical certificate. The PIC must also meet the flight review requirements specified in 14 CFR Section 61.56 in an aircraft in which the PIC is rated on his/her pilot certificate.

Prior to operations, the PIC must have accumulated and logged, in a manner consistent with 14 CFR Section 61.51(b), a minimum of 25 hours of total time as a UAS pilot and at least ten hours logged as a UAS pilot with similar UAS type (fixed wing or rotary). Prior documented flight experience that was obtained in compliance with applicable regulations may satisfy this requirement. Training, proficiency, and experience building flights are requested to be conducted under this grant of exception to accomplish the required flight cycles and flight time. During training, proficiency, and experience building flights, all persons not essential for flight operations will be considered non-participants and the PIC will operate the UAS with appropriate distance from non-participants in accordance with 14 CFR Section 91.119.

The UAS shall remain clear and yield the right of way to all other manned aviation operations and activities at all times.

The UAS shall be operated at an altitude of no more than 400 feet above ground level (AGL). All altitudes reported to ATC will be in feet.

The multi-rotor UAS shall not be flown at a ground speed exceeding 30 mph.

Fixed wing and hybrid UAS shall be flown at a ground speed not to exceed the maximum design limitation air speed of 57 mph as stated in the operating manuals.

UAS Operations will be conducted under visual meteorological conditions (VMC). The UAS will not be operated less than 500 feet below or less than 2000 feet horizontally from a cloud or when visibility is less than 3 statute miles from the PIC.

If the UAS loses communications or loses its GPS signal, it must return to a pre-determined location within the planned operating area and land or be recovered in accordance with Terp et al SOP.

The UAS PIC must abort the flight in the event of unpredicted obstacles or emergencies in accordance with operating documents.

The UAS PIC is prohibited from beginning a flight unless (considering wind and forecast weather conditions) there is enough power to fly at normal cruising speed to the intended landing point and land the UAS with 25% battery power remaining.

c. Terp et al's UAS Operating Parameters

The UAS operated in accordance with this proposed exemption shall be identified by serial numbers, registered in accordance with 14 CFR part 47, and have identification (N-Number) markings in accordance with 14 CFR part 45, Subpart C. Markings will be as large as practicable.

The UAS documents required under 14 CFR 91.9 and 91.203 shall be available to the PIC at the Ground Control Station of the UAS anytime the aircraft is operating. Those documents shall be available to the Administrator or any law enforcement official upon request.

Any UAS incidents, accidents or flight operations that transgress the lateral or vertical boundaries of the operational area as defined by the applicable COA shall be reported to the FAA's

UAS Integration Office (AFS-80) within 24 hours. Accidents shall be reported to the National Transportation Safety Board (NTSB) per instructions contained on the NTSB Web site: www.ntsb.gov.

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

The UAS shall not be operated over congested or densely populated areas. These areas include but are not limited to the yellow areas depicted on World Aeronautical Charts (WAC), Sectional Aeronautical Charts (Sectionals), or Terminal Area Charts (TAC). Each work site will also be evaluated based on local conditions.

Operations of UAS may be conducted at distances less than 500 feet from participating persons, vessels, vehicles or structures that perform an essential function in connection with these special purpose operations. Operations closer than 500 feet from the PIC, VO, operator trainees and essential persons are permitted when operationally necessary; but never so close to present an undue hazard. This is consistent with Exemption No. 11138.

Operations of UAS may be conducted at distances less than 500 feet from unoccupied vessels, vehicles or structures owned by the land owner/controller when the land owner/controller grants such permission, and the PIC makes a safety assessment of the risk from operations and determines that it does not present an undue hazard to persons or property. This is consistent with Exemption No. 11138.

Flight operations will be conducted at least 500 feet from all nonparticipating persons unless barriers or structures are present that sufficiently protect nonparticipating persons from the

UAS and/or debris in the event of an accident. Terp et al shall 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 UAS, flight operations will cease immediately. This is consistent with Exemption No. 11138.

All operations of UAS shall be conducted with the 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.

The UAS will not operate within 5 nautical miles of an airport reference point as denoted on a current FAA-published aeronautical chart unless a letter of agreement with that airport's management is obtained, and the operation is conducted in accordance with a NOTAM as required by the operator's COA. The letter of agreement with the airport management will be made available to the Administrator upon request. This is consistent with Exemption No 11159.

The UAS must be operated within VLOS of the PIC and VO at all times. This requires the PIC to be able to use human vision to see the UAS unaided by any device other than corrective lenses, as specified on the PIC's FAA issued medical certificate.

All UAS operations must utilize a VO. 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. The PIC and VO 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 functions prescribed in Terp et al's SOP.

The UAS will not be operated by the PIC from any moving device or vehicle. Operations will not be conducted during night as defined in 14 CFR 1.1.

Terp et al will conduct preflight safety risk assessments to determine that the UAS is in a condition for safe flight (14 CFR Section 91.7(b)) and that the planned operation can be completed safely. Specific procedures are addressed in Terp et al's SOP, and UAS Operation Manuals.

Terp et al's operations do not require a notification to Flight Standards District Offices (FSDOs).

Terp et al shall obtain an Air Traffic Organization (ATO) issued Certificate of Waiver or Authorization (COA) prior to conducting any operations outside the parameters of this requested grant of exemption. Additionally, Terp et al will request a Notice to Airmen (NOTAM) not more than 72 hours, but not less than 48 hours prior to the operation.

Prior to operations conducted for the purpose of precision agriculture (or similar operations), the PIC must have accumulated and logged in a manner consistent with 14 CFR Section 61.51(b), a minimum of five hours as a UAS PIC operating the make and model of the UAS to be utilized for operations under this requested exemption, and three take-offs and landings in the preceding 90 days. Training, proficiency, experience-building, and take-off and landing currency flights are requested to be conducted under this grant of exemption to accomplish the required flight time and 90 day currency. During training, proficiency, experience building, and take-off and landing currency flights all personnel not essential for flight operations are considered nonparticipants, and the PIC must operate the UAS with appropriate distance from nonparticipants in accordance with 14 CFR Section 91.119.

All operations must utilize a VO. The VO may be used to satisfy the Visual Line of Sight (VLOS) requirement as long as the PIC always maintain VLOS capability. The VO and PIC must be able to communicate verbally at all times. This condition and limitation is consistent with all FAA approved Exemptions.

VI. Terp et al's Requested Exemption Promotes the Public Interest

Granting Terp et al's petition for exemption will further the public interest because Terp et al seeks to perform necessary and vital services for public and private organizations. Such services include research, education, agricultural, search and rescue. The Terp et al unmanned aircraft fleet are battery-powered UAS that serve as a safe, efficient, and economical alternative to the demand aircraft traditionally utilized in obtaining aerial imagery within these industries. An exemption allowing Terp et al's UAS fleet to operate would reduce the amount of manned aircraft operating in the NAS, reduce noise and air pollution. In addition, the safety of life and property both in the air and on the ground would be improved.

By reducing the number of manned aircraft operating in the NAS airport congestion caused by arriving and departing aircraft will be reduced. The Terp et al UIS fleet does not require an airport to take off or land. A reduction of manned aircraft conducting aerial imagery flights would mean air traffic control handling less traffic during the ground, takeoff, departure, arrival and landing phases of flight operations.

Aerial imagery missions using the Terp et al UAS fleet, instead of manned aircraft, benefits the public by drastically reducing air and noise pollution generated during manned aircraft operations. The Terp et al UAS fleet, a battery powered electric motor, is the most viable

environmentally conscious alternative to internal combustion aircraft. The maximum gross weight of 5 pounds per UAS has less physical mass for collateral damage to life and property whether on the ground or in the air.

a. Exemption From The Requirements Of Section 91.9(b) Would Not Adversely Affect Safety

This exemption would maintain the level of safety established by Section 91.9(b) because Terp et al will keep the approved Airplane Flight Manual at the ground control station where the pilot in command will have immediate access to the document.

Previous exemptions granted by the FAA concerning Section 91.9(b) establish that safety is not adversely affected when the approved Aircraft Flight Manual is kept at the ground control station of a UAS, where it can be immediately accessed by the pilot in command. Section 91.9(b) "requires aircraft to carry the flight manual so the pilot would have ready access to the aircraft limitations while in flight." Exemption No. 8607. However, the FAA has also found that UAS will always be operated without any passengers or crew onboard, and that "requiring these special-use aircraft [UAS] to carry superfluous paper documents may present a safety hazard to the integrity of the [UAS]." Id. The FAA has previously granted exemptions in circumstances similar, in all material respects, to those presented herein (e.g., Exemption Nos. 8607, 8737, 8738, 9299, 9430, 9554, 9564, 9565, 10167, 10602, 10673, 10835, 10869, 10968).

b. Exemption From The Requirements Of Section 91.203(a) and (b) Would Not Adversely Affect Safety

This exemption would maintain the level of safety established by Sections 91.203(a) and (b) because Terp et al will keep the required documents at the ground control station where the pilot in command will have immediate access.

Previous exemptions granted by the FAA concerning Sections 91.203(a) and (b) establish that safety is not adversely affected when the Airworthiness Certificate and U.S. registration certificate are kept at the ground control station of the UAS, where it can be immediately accessed by the pilot in command. Specifically, the FAA has held that the intent of Sections 91.203(a) and (b) is better served by having the required documents in the control of the UAS operator (pilot in command), reasoning as follows: "The original intent of the subject regulation was to display the airworthiness and registration documents so they would be easily available to FAA inspectors and passengers for inspection and verification of the airworthiness and registration of the aircraft . . . In this case, the aircraft will always be operated without any passengers or crew."

The missions for which UASs are intended will prevent the need for aircraft normally prescribed for civil aircraft. Further, it will be operated on strictly confined missions from a known departure and arrival point, under the constant control of a pilot-in-command. Requiring these special-use aircraft to carry superfluous paper documents may present a safety hazard to the integrity of the [UAS]. FAA operating limitations and special arrangements with Air Traffic Control (ATC) for surveillance of [UAS] flights adequately compensate for the requirements for carrying airworthiness and registration documents. The intent of the regulation is better served by having the required documents in the control of the aircraft operator and available for inspection under the special conditions prescribed in this exemption.

The FAA has previously granted exemptions in circumstances similar, in all material respects, to those presented herein (e.g., Exemption Nos. 8607, 8737, 8738, 9299, 9564, 9565,

10167, 10602, 10673, 10835, 10869, 10968).

VII. CONCLUSION

As set forth above, Terp et al seeks an exemption pursuant to 14 C.F.R. § 11.61 and Section 333 of the FAA Modernization and Reform Act of 2012, which will permit safe operation of the Terp et al UAS fleet commercially, without an airworthiness certificate, for the purposes described above. By granting this Petition, the FAA Administrator will be fulfilling the Congressional mandate of the FAA Modernization and Reform Act of 2012, and the public, by allowing Terp et al to safely, efficiently, and economically operate the UAS fleet commercially within the NAS.

WHEREFORE, in accordance with the Federal Aviation Regulations and the FAA Modernization and Reform Act of 2012, Section 333, Terp et al respectfully requests that the Administrator grant this Petition for an exemption from the requirements of 14 C.F.R. Parts 21, 36, 45.23(b), 61.23(a) and (c), 61.101(e)(4) and (5), 61.113(a) and (b), 61.133(b), 61.315(a), 91.7(a), 91.9 (b)(2), 91.103(b)(1), 91.109(a), 91.119(c), 91.121, 91.151, 91.203(a) and (b) 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b).

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