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

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

May 13, 2015

Exemption No. 11578
Regulatory Docket No. FAA–2015–0369

Mr. Thomas L. Gemmell
Counsel for Sanborn Map Company, Inc.
Husch Blackwell LLP
120 South Riverside Plaza, 22nd Floor
Chicago, IL 60606

Dear Mr. Gemmell:

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

The Basis for Our Decision

By letter dated February 6, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Sanborn Map Company, Inc. (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial surveying 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.

Discussion of Public Comments:

The FAA received one individual comment in opposition to the petition. In granting this exemption, the FAA has determined that the proposed operations can safely be conducted under the conditions and limitations of this exemption. As with exemptions issued to Aeryon Lab, Astraeus Aerial, Clayco, Inc., and VDOS Global, LLC, failure to comply with the document's conditions and limitations is grounds for immediate suspension or rescission of the exemption.

Airworthiness Certification

The UAS proposed by the petitioner is a Leptron Avenger.

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 relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*, and any associated noise certification and testing requirements of part 36, is not necessary.

The Basis for Our Decision

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

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

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

Our Decision

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. 106(f), 40113, and 44701, delegated to me by the Administrator, Sanborn Map Company, 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 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, Sanborn Map Company, 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 Leptron Avenger 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 May 31, 2017, unless sooner superseded or rescinded.

Sincerely,

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

Sanborn Map Company's Petition for Exemption
For Purposes of Operating Small Unmanned Aircraft System

FAA Rules Docket: _____

Name and Address of Petitioner

Sanborn Map Company, Inc.
1935 Jamboree Drive, Suite 100
Colorado Springs, CO 80920

Counsel for Petitioner

Thomas L. Gemmell
HUSCH BLACKWELL LLP
120 South Riverside Plaza, 22nd Floor
Chicago, Illinois 60606
(312) 526-1523
tom.gemmell@huschblackwell.com

A. Summary

The Sanborn Map Company, Inc. seeks exemption from the requirements of 14 C.F.R. §§ 45.27(a), 61.113(a) and (b), 91.7(a), 91.105, 91.119(c), 91.121(a)(1)(iii), 91.151(b), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b). This exemption will permit The Sanborn Map Company, Inc. to operate an unmanned aircraft system while keeping the documents required by the regulations at the ground control station and immediately accessible to the pilot in command. Furthermore, the exemption will relieve The Sanborn Map Company, Inc. from the airworthiness certificate standards and the requirement to have a certificate of airworthiness issued for its UAS. This exemption will also permit any required markings concerning the operational status of the UAS to be displayed on the fuselage of the unmanned aircraft.

B. Introduction

The Sanborn Map Company, Inc. (hereinafter referred to as "Sanborn") is a 148 year-old design, geospatial and infrastructure management firm with a long and well-recognized history in mapping and surveying. Sanborn excels in the collection of aerial imagery from manned, fixed-wing aircraft for the purpose of making highly accurate aerial maps for a range of clients and various applications. In addition to operating a fleet of conventional fixed-wing aircraft, Sanborn has recently acquired a Leptron Avenger Unmanned Aircraft System (hereinafter referred to as the "Leptron Avenger"). As set forth in this Petition, Sanborn seeks to operate its Leptron Avenger for the special purpose of aerial surveying, continuing an established legacy that has always sought the highest standards of operations and safety.

Pursuant to 14 C.F.R. § 11.81 (*Petition for Exemptions*.), Sanborn provides the following information in support of its petition:

C. Background

1. LEPTRON AVENGER

Sanborn seeks an exemption to operate a Leptron Avenger for compensation or hire within the national airspace system ("NAS")[1]. The Leptron Avenger is comprised of an airborne unmanned aircraft and a transportable ground station. The Leptron Avenger has a maximum gross weight of approximately 35 pounds, while having a wingspan of 72.5 inches and a length of 58 inches. The Leptron Avenger unmanned aircraft is equipped with two rotors driven by a Lithium-ion Polymer battery powered 10W electric motor.

Figure 1 depicts the Leptron Avenger with registration number displayed in accordance with 14 C.F.R. Part 45.

2. Proven Operational History of the Leptron Avenger in the NAS.

[1] Sanborn has reserved registration number N824LP, and will submit an Aircraft Registration Application upon the grant of the exemptions sought by this petition.

The Leptron Avenger is currently operating safely within the NAS pursuant to approximately fourteen (14) Certificates of Authorization ("COA") granted by the Federal Aviation Administration ("FAA") to the Middle Tennessee State University; Sinclair Community College in Dayton, Ohio; the U.S. Army Corps of Engineers (Jacksonville District, for operations in South Florida); Mississippi State University for the Pearl River Basin; and the University of Florida.

D. Basis for Petition

Sanborn, by and through undersigned counsel, pursuant to Federal Aviation Regulations (FAR) (14 C.F.R. § 11.61)[2] and the FAA Modernization and Reform Act of 2012 ("FMRA"), Section 333, *Special Rules for Certain Unmanned Aircraft Systems* ("Section 333"), hereby respectfully petitions the Administrator for an exemption from the requirements of 14 C.F.R. §§, 45.27(a), 61.113(a) and (b), 91.7(a), 91.105, 91.119(c), 91.121(a)(1)(iii), 91.151 (b), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), 91.417(a) and (b).

1. Section 333

Congress identifies Section 333 as a pathway for "expedited operational authorization" of certain unmanned aircraft systems ("UAS") in the national airspace system (NAS). Section 332(b)(1) ("expedited operational authorization.").[3] Under Section 333 Congress mandates that the FAA "shall determine if certain unmanned aircraft systems may operate safely in the national airspace system before completion of the plan and rulemaking required by section 332 of this Act or the guidance required by section 334 of this Act" (Section 333(a)) upon consideration of its "size, weight, speed, operational capability, proximity to airports and populated areas, and

[2] 14 C.F.R. § 11.61(b) ("Using a petition for exemption, you may ask FAA to grant you relief from current regulations in 14 C.F.R.")

[3] *See also* www.faa.gov/uas/legislative_programs/section_333/ (noting that Section 333 grants the FAA "the statutory flexibility to expedite requirements for the safe operation of certain aircraft systems in the NAS.").

operation within visual line of sight." Section 333(b)(1). If the FAA makes such a determination, the FAA "shall [also] establish requirements for the safe operation." Section 333(c). The FAA further may find that the UAS does not require "airworthiness certification under section 44704 of title 49, United States Code." Section 333(b)(2).

2. 49 U.S.C. § 44701

The FAA is further authorized to grant exemptions from its safety regulations and minimum standards under 49 U.S.C. § 44701 ("Section 44701") "if the Administrator finds the exemption is in the public interest." Section 44701(f) (authorizing the grant of exemptions from safety regulations and minimum standards under section 44701(a) and (b) and sections 44702-44716).[4]

For the reasons addressed herein, this Petition qualifies for expedited approval of Sanborn's request for exemption under both Sections 333 and 44701.

E. The Leptron Avenger UAS Meets the Statutory Criteria for Exemption under Section 333

Given its small size, light weight, slow speed, limited load capacity, superior operational capabilities, and that the operations will be conducted only during the day, under visual meteorological conditions ("VMC"), within visual line of sight ("VLOS") of the Pilot In Command ("PIC") with the assistance of a visual safety observer ("VO") and not in the proximity of airports or populated areas, the Leptron Avenger UAS is the very sort of UAS that qualifies for expedited approval under Section 333.

1. Section 333(b)(1) Criteria

a. Size

[4] *See e.g.* 49 USC §44711(a) ((1) prohibiting operations without airworthiness certificate; (2) prohibiting serving as airman without airman's certificate; (5) prohibiting commercial operations in violation of regulations); 49 USC §44704 (issuance of airworthiness certificate); 14 C.F.R. §91.203 (a)(1) (carry airworthiness certificate)).

The Leptron Avenger measures approximately 19.75 inches in height and 58 inches wide, with a wingspan of 72.5 inches.

b. Weight

The Leptron Avenger has a maximum gross weight of 35 lbs.

c. Speed

The Leptron Avenger has a maximum autopilot limited speed of approximately 12 Meters per second (m/s). However, Sanborn typically operates the aircraft at below 10 m/s

d. Operational Capability

The Leptron Avenger was specially designed for high or low altitude surveillance, photography, and sensor management. Supported by electric batteries that are rechargeable, the Leptron Avenger can fly for up to 2 hours and carry a variety of cameras or sensors. Other Operational metrics of the Leptron Avenger are as follows:

Unmanned Aircraft System	The Leptron Avenger is an UAS that is comprised of an unmanned aircraft and a transportable ground station.
Serial No.	LEP822
Unmanned Aircraft Dimensions	Rotor Diameter: 72.25 in. Length: 83.93 in.
Engine (Propulsive Unit)	Engine (Propulsive Unit) The aircraft uses a 10,000 Watts electric main motor and a 2,200 watt tail motor Electric-powered propulsion systems. a. Type of Motor - 395 KV Electric Main, 900 KV Electric tail b. Current draw range – Total System current draw cruise = 30 Amps and Max total system current draw = 360 Amps c. All electrical demands are derived from the unmanned aircraft's battery system. Make: LEPTRON-AVGR Model: 1000

Propeller and Propeller Limits	FAA Propeller Type Certificate: None Propeller Type: 2-blade, hinged (folding), carbon fiber reinforced plastic, fixed pitch, tractor Diameter (Nominal): 17.25 in.
Battery Command & Control	Thunder Power Air Vehicle Battery P/N Leptron 6S powers the motor, and battery command and control.
Airspeed Limits	Vne (Never Exceed Speed) 12 m/s) Vno (Maximum Structural Cruising Speed) 48 knots (25 m/s) Va (Maneuvering Speed) 12 m/s knots (25 m/s) Landing Speed: VTOL – Vertical 1.5 M/s
Empty Weight C.G. Range	3-3.5 inches for or aft of datum
Datum	Center of main rotor shaft
Maximum Weights	14.52 KG/32 lbs.
Empty Weight	4.99 KG/11 lbs. NOTE: Empty Weight Excludes weight of battery and payload modules.
Frequencies	902-928 MHz (ISM Band) 2.4 GHz (ISM Band) NOTE: FCC license is not required to utilize the above frequencies; uplink and downlink are on the 900Mhz band. If video is utilized, uplink, downlink, and video are all on 2.4 Ghz.
Computer Software	Avionics embedded processor – UTC Aerospace Cloud Cap Technologies
Max. Operating Altitude	20,000 ft. +
Control Surface Movements	MAIN ROTOR – VARIABLE PITCH +/-5 TAIL ROTOR – VARIABLE PITCH +12/-12°

Nominal Endurance	30 minutes above 32 °F (0 °C) 15 minutes below 32 °F (0 °C)
Ambient Outside Air Temperature (OAT)	Maximum OAT: 120 °F (49 °C) Minimum OAT At Altitude: 0°F
Wind Limitation	40 MPH
Maintenance	This Leptron Avenger must be maintained in accordance with the Leptron Maintenance Operation Manual, or later FAA accepted revision.

e. Proximity of Airports/Populated Areas

Flight operations pursuant to this Petition will be tightly controlled and restricted to Class G airspace, which is defined as earth surface up to 1,200 feet above ground level and earth surface to the base of controlled airspace (Class B, C, D, and E), and not in the proximity of airports or populated areas. The Leptron Avenger will not be operated within 5 nautical miles of the geographic center of a non-towered airport unless a letter of agreement with that airport's management is obtained, such letter to be made available to the Administrator upon request, and the operation is conducted in accordance with a NOTAM as required by the operator's COA. Operations will avoid congested or densely populated areas and comply with 14 C.F.R. 91.119.

f. Visual Line-of-Sight

The Leptron Avenger will at all times be flown by Sanborn only in the daytime (not at night) under VMC within VLOS of the PIC (typically within a range less than 500 feet) with the further assistance of a VO with whom the PIC will have the ability for direct and continuous verbal communications[5] so as to ensure that the flight operations remain within the PIC's VLOS

[5] VO will at all times be in proximity of PIC so as to allow direct verbal communications. In addition, the PIC and VO will maintain direct communications through cell or push-to-talk communications capability throughout the duration of flight.

and prescribed flight boundaries and deconflict with objects in the air and on the ground. Thus, pursuant to the FAA's Interim Operational Approval Guidelines for UAS the proposed operations provide an approved method of control and collision avoidance to satisfy the "see and avoid" requirement of 14 C.F.R. § 91.113:

> While considerable work is ongoing to develop a certifiable "detect, sense, and avoid" system, no current solution exists. Compliance with the "see and avoid" aspect of 14 C.F.R. 91.113, *Right-of-Way Rules: Except Water Operations*, becomes one of the primary issues in UAS operational approvals. As a result, alternate methods of compliance are required to accomplish the "see and avoid" function. See and avoid risk mitigation strategies are normally based on the use of visual observers or other methods of segregation.

Interim Operational Approval Guidance 08-01, *Unmanned Aircraft Systems Operations in the U.S. National Airspace System* (March 13, 2008) at 8. Only qualified and current PIC's and VOs, as provided in the FOD (as defined below), will be used.

2. Other Factors

a. Leptron Avenger Safety Systems

The Leptron Avenger UAS is replete with mechanisms to ensure safe operations and protect persons and property on the ground. In addition to having experienced operator/PIC and VO, the Leptron Avenger UAS has a variety of inherent safety systems, including:

- Redundant Communications: The Avenger has (2) simultaneous communications links that allow for backup and safe operations. This includes a 2.4 GHz wireless hand held radio and a 900 MGhz laptop ground station link. Both links must be terminated to execute a 'Lost Communication' return home logic.
- Flight Plan Altitude Settings: The Avenger has the ability for the operators to set Maximum and Minimum flight altitudes for a specific flight 'corridor' for safe operations.
- Flight Logic: The Avenger has the ability for the operators to set safety return

logic including: Exceeding a pre-set flight timer, Loss of GPS, Loss of Communications, Max and Min Altitude, and Low Voltage.

- Ground Station Warnings: The Avenger Ground station has many visual operator cues for error conditions such as low RSSI strength, low battery, low RPM, low system parameters, and many other real time conditions. The system also offers color coded 'Dashboard' lights for the operator.
- Double Entry: The Avenger Ground Station has double entry response window for all in-flight parameter changes. This allows the user to not send incorrect information without a two verification mouse clicks.

b. Flight Operations Documents

To ensure consistent safety operations, Sanborn has developed a comprehensive and detailed set of flight operations documents (FOD) for the Leptron Avenger UAS based on Sanborn's extensive use and experience, procedures and notices provided by the UAS manufacturer, and guidance the FAA has provided to obtain exemption under Section 333. The FOD is comprised of the Sanborn Standard Operating Procedures, the Sanborn Maintenance and Safety Manual, the Leptron Remotely Piloted Vehicle Operators Manual, and the Leptron Inspection and Maintenance Manual. *See* Exhibit A (submitted on a confidential basis).

In seeking this exemption, Sanborn proposes to operate the Leptron Avenger pursuant to the following specific operating limitations, as also addressed in the FOD:

1. Flight operations are permitted only in Class G Airspace.
2. The Leptron Avenger shall only be operated below 1,200 feet above ground level (AGL)
3. The Leptron Avenger shall be operated within line of sight of the pilot in command and safety observer.
4. The Leptron Avenger shall be operated pursuant to Day Visual Flight Rules (VFR) in

visual meteorological conditions (VMC). The Leptron Avenger shall be operated only during daylight hours (*i.e.* between the end of morning civil twilight and the beginning of evening civil twilight, as published in the American Air Almanac, converted to local time).

5. The duration of each flight shall not exceed 1.5 hours, or with 20% battery power remaining, whichever occurs first.

6. The Leptron Avenger shall operate from on-site takeoff/landing locations directly next to the pilot in command and co-located VO. The pilot in command and the VO shall be able to verbally communicate during all operations. If the operation is from a watercraft, the pilot in command and VO shall remain co-located on the same watercraft.

7. Operation of the Leptron Avenger with any inoperative instruments or equipment is prohibited.

8. The Leptron Avenger shall be operated pursuant to 14 C.F.R. Part 91, operating requirements.

9. For the proposed flight operation, only one Leptron Avenger shall be airborne at any given time.

10. The PIC shall give the local Air Traffic Control (ATC) a single pre-flight call with the location, approximate start time, and approximate finish time of the operation. The PIC shall notify the local ATC upon completion of the operation.

11. For any flight operations over U.S. Government or state managed lands, Sanborn shall coordinate with the appropriate authority and ensure that the property owners have at least twelve (12) hours of advance notice prior to the proposed flight operations. Coordination shall include anticipated periods of operation, purpose of the flights, and contact information for the operator should questions or issues arise.

12. The UA shall be marked with an identification (N-Number) in accordance with 14 C.F.R. § 45.23, such markings to be as large as practicable pursuant to 14 C.F.R. § 45.29(f), and identified by a serial number registered in accordance with 14 C.F.R. Part 47.

13. The UA shall only be operated at or below an airspeed of 12 Meters Per Second.

14. Prior to performing any flight operations, the PIC and VO shall have successfully completed a qualifying process, as provided in the FOD.

15. Prior to performing any flight operations, a flight demonstration administered by an operator-qualified PIC and provided in the FOD, shall be performed and successfully completed. Documentation of such demonstration shall be made in the aircraft records and such records shall be made available to the Administrator upon request.

16. The UA shall 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.

17. The UA shall at all times remain clear and yield the right of way to all other manned operations and activities (*e.g.* gliders, ultralights, parachutes).

18. The radio frequency spectrum used for operation and control of the UA shall comply with the requirements of the Federal Communications Commission (FCC) or other appropriate government oversight agency.

19. Any time the UA is operating, all documents required under 14 C.F.R. § 91.9 and § 91.203 shall be available to the PIC at the GCS. Such documents shall be made available to the Administrator or any law enforcement official upon request.

20. The UAS shall not be operated by the PIC from any moving vehicle or device; however the UAS may be operated by the PIC from a stationary watercraft.

21. The UA shall not be operated directly over any person, except authorized and consenting personnel involved in the flight/filming operations, below an altitude that is hazardous to

persons or property on the ground in the event of a UAS failure or emergency.

22. The UA shall at all times be operated to ensure a safe distance away from all participating and non-participating personnel.

23. Other than for takeoff and landing, the UA shall be operated at least 100 feet away from persons involved in the flight/filming operations (participating persons), such participating persons shall at all times be essential to the flight/filming operations and have provided prior written consent to their participation in such operations. This distance may be reduced to no less than 30 feet if it would not adversely affect safety and such person provides his/her prior consent.

24. The UA shall at all times be operated 500 feet away from persons not involved in the flight/filming operations (non-participating persons). This distance may be reduced to no less than 200 feet if it would not adversely affect safety and such person provides his/her prior consent.

25. Prior to each flight the PIC shall inspect the UAS, including for any inoperable components, items or equipment, to ensure the UAS is in a condition for safe flight. If the inspection reveals a condition that affects safe operations, the UAS shall not be operated until the necessary maintenance has been performed and the UAS is found to be in a condition for safe flight. Any discrepancies and all maintenance or alterations shall be documented in the aircraft records, such records to be made available to the Administrator upon request.

26. Any UAS that has undergone maintenance or alternations that affect the UAS operation or flight characteristics, e.g. replacement of a flight critical component, shall undergo a functional test flight in accordance with the FOD. The operator shall make an entry in the UA record of such test flight.

27. Record of the UAS maintenance, preventive maintenance, alternations, status of replacement/overhaul component parts, and the total time in service of the UAS shall be documented and maintained in accordance with the FOD.

28. Except as may be designated otherwise for FailSafe operations, the UA shall take off and land at a location within the boundaries of the subject property next to the PIC.

29. Upon loss of communication or GPS signal, the UA shall return to a predetermined location within the boundaries of the landowner's property and land or be recovered in accordance with the FOD.

30. In the event of an emergency or unanticipated obstacle to planned operations, the UAS operation shall be aborted and the UA, if airborne, shall return to a predetermined location.

31. The PIC shall possess at least a private pilot certificate and at least a current third-class medical certificate, and prior to operations shall have met the FAA's currency and recency of experience requirements.

32. Prior to operations, the PIC shall have accumulated and logged (in a manner consistent with 14 C.F.R. § 61.51(b)) a minimum of 200 flight cycles and 25 hours of total time as a UAS rotorcraft pilot and at least ten (10) hours as a UAS pilot with a similar UAS type (dual-rotor), such log of which shall be made available to the Administrator upon request.

33. Prior to operations, the PIC shall have accumulated and logged (in a manner consistent with 14 C.F.R. § 61.51(b)) a minimum of five (5) flight hours as a UAS pilot operating the make and model of UAS to be used for operations under the exemption (*e.g.* Leptron Avenger) and three (3) take-offs and three (3) landings in the preceding 90 days, such log of which shall be made available to the Administrator upon request.

34. The UAS shall be maintained in accordance with the Leptron Inspection & Maintenance

Manual, including any amendments or updates thereto. All amendments or updates shall be tracked and a record of such amendments or updates shall be maintained and made available to the Administrator upon request.

35. All maintenance to be performed on the UAS shall be performed by a technician qualified pursuant to the criteria provided in the FOD.

36. The UAS shall comply with all manufacturer safety bulletins.

37. Prior to conducting any operations, the operator shall obtain a Certificate of Waiver or Authorization (COA). Pursuant to such COA, operator shall request of a Notice to Airman (NOTAM) not more than 72 hours in advance, but not less than 48 hours prior to the operation.

38. At least three (3) days before scheduled operations, operator shall submit a written Plan of Activities to the local Flight Standards District Office (FSDO) with jurisdiction over the area of proposed operations, such submission of which may be waived with the concurrence of the FSDO. If required by the FSDO to be submitted, the Plan of Activities shall include: dates and times for all flights; operator's and on-scene flight operator's name and phone number; UAS make, model and serial or N-number; PIC's name and certificate number; statement that the operator has obtained permission from property owners and/or local officials to conduct the operations (such list of those who gave permission to be made available upon request); description of the planned flight activity, including, as applicable, maps or diagrams of the area, city, town, county and/or state over which the operation will be conducted, and the altitudes essential to accomplish the operation; signature of the exemption holder or representative.

39. The UA shall not operate within 5 nautical miles of the geographic center of a non-towered airport unless a letter of agreement with that airport's management is obtained,

such letter to be made available to the Administrator upon request, and the operation is conducted in accordance with a NOTAM as required by the operator's COA.

40. Any incident, accident or flight operation that transgresses 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 within 24 hours. Accidents shall also be reported to the National Transportation Safety Board (NTSB). Further flight operations shall not be conducted until the incident, accident or transgression is reviewed by UAS Integration Office and authorization to resume operations is provided.

41. The UAS shall be operated pursuant to the FOD, such manual to be made available to the Administrator upon request. If a discrepancy exists between the FOD and the conditions and limitations directed by the Administrator in granting the exemption, the conditions and limitation in the exemption shall take precedence and be followed.

c. Privacy

Sanborn will comply with all federal, state, and/or local privacy regulations that may apply in the areas in which Sanborn will operate the Leptron Avenger pursuant to this Petition. Further, Sanborn's policy, as outlined in the FOD, is to avoid any operations that might invade personal privacy.

d. Physical Security

In order to ensure its safe and proper use, Sanborn will be the only operator of the UAS and the UAS will at all times remain in Sanborn's custody.

3. Sanborn's History of Safe Operations Flying the Leptron Avenger UAS

Sanborn has amassed nearly 10,000 fixed-wing flight hours in the past four years of aerial surveying with only one accident and has conducted local test flights of the Leptron Avenger UAS by FAA certified pilots checking operations, flight deconfliction and safety

procedures of over 50 hours.

4. Lack of Threat to the NAS, Public, or National Security

Those reasons addressed, including meeting Section 333(b)(1) criteria, Sanborn's established record of safety, operations pursuant to the FOD, and the other factors discussed, demonstrate that the Leptron Avenger UAS will be operated safely in the NAS without creating a hazard to other aircraft or persons or property on the ground or pose a threat to national security.

For all of these reasons, Sanborn's proposed operations using the Leptron Avenger qualify for expedited approval of the sought exemption pursuant to Section 333 for the specified uses and under the proposed operating requirements and restrictions.

F. Sanborn's Operations Pursuant to This Petition Qualify for Exemption Under Section 44701.

Granting Sanborn's request for exemption would benefit the public and have no adverse effect on safety. Accordingly, Sanborn's operations pursuant to this Petition also qualify for an exemption from the FAA's related safety regulations under Section 44701.

1. Public Interest Benefits

The public would greatly benefit from granting Sanborn's petition for exemption so it can use the Leptron Avenger UAS. The Leptron Avenger is a battery powered UAS that serves as a safe, efficient, and economical alternative to manned aircraft traditionally use for aerial surveying. No pilot or crew need be airborne, thereby providing for superior safety to persons and property in the air and on the ground than that provided by manned aircraft performing the same operations. Granting the exemption would also reduce the number of manned aircraft in the NAS and, as a result, reduce the environmental impact of such operations, as well as provide for better aerial imaging and production and, as a result, a more robust economy. Using the Leptron Avenger also provides the benefit of greater operational flexibility and reduced cost when

compared to manned aircraft.

(a) Increased Aircrew Safety and Reduced Risk to Persons/Property On Ground

Because the Leptron Avenger is unmanned, the proposed operations eliminates the risk to pilot and crew associated with flying such aerial-surveying missions at low altitude, in confined airspace. Further, given its small size and weight and low airspeed, using the Leptron Avenger also reduces the risk of damage or injury to persons or property on the ground, and in the air, were there to be a mishap.

(b) Reduced Environmental Impact

Using the Leptron Avenger UAS instead of manned aircraft also benefits the public by eliminating or greatly reducing air and noise pollution associated with traditional aerial surveying operations. Because it is battery powered (using rechargeable batteries) and uses electric motors, the Leptron Avenger UAS consumes no fuel and generates no air pollution, and creates very little noise. As a result, the public is benefited as a result of reduced environmental impact, reduced operator and other human exposure, and greater fuel conservation, which serves additionally to support our government's specific efforts to reduce the U.S.'s carbon footprint.[6]

(c) Fewer Manned Aircraft In NAS and Reduced Need for ATC Handling

The Leptron Avenger also does not require a runway or helipad to takeoff or land and will not be operated within the proximity of any airports. As such, fewer aircraft will need to be handled by air traffic control during ground, takeoff, departure, arrival, and landing phases. Operations pursuant to this Petition (unmanned, VLOS, below 1,200' AGL, and not within proximity to airports) will further reduce the number of manned aircraft flying or transiting at or above 500' AGL to and from the areas of surveying operations as well as congestion around

[6] Reducing the U.S.'s carbon footprint is a high priority and consistent with the U.S. Environmental Protection Agency's regulatory efforts to phase out the use of fossil fuels.

airports due to aircraft arrival and departure.

(d) Superior Aerial Imagery and Increased Benefit to U.S. Economy

Better aerial footage can also be obtained using the small and nimble Leptron Avenger than can be obtained using manned aircraft or other ground-based methods. Due to its small size and superior flight performance characteristics, the Leptron Avenger allows for images to be taken from certain locations and angles and with better precision than using manned aircraft. As a result, less time is needed in the air to obtain the desired footage, which in addition to providing the benefit of fewer aircraft in the NAS and associated reduced risk to objects and persons and property in the air and on the ground, reduced noise, etc., allows for the production of surveys, which benefits consumers. This additionally ensures that companies such as Sanborn and its customers remain competitive and profitable, thereby providing their employees greater job stability, which ultimately contributes further to the U.S. economy through increased consumer spending.

(e) Increased Operational Flexibility and Reduced Cost

Using the Leptron Avenger also provides the benefit of greater operational flexibility and reduced cost when compared to manned aircraft. Instead of each time having to hire a manned aircraft at thousands of dollars/hour, subject to the pilot's schedule and availability, Sanborn can operate the Leptron Avenger, which it has purchased and outfitted at lower combined cost, innumerable times and at the convenience of Sanborn's and its customers schedules.

2. No Adverse Safety Effects

Granting Sanborn's Petition will also not adversely affect aviation safety or pose any undue risks to the public. The operations pursuant to this Petition will be in accordance with Sanborn's FOD and in compliance with all applicable public safety requirements. Accordingly, and as detailed herein, granting the requested exemption would not adversely affect safety. Indeed, as detailed below, operations pursuant to the limitations and guidelines addressed herein

and in the FOD will provide an equivalent or even higher level of to those regulations from which Sanborn seeks exemption.

The FAA has previously granted exemptions in circumstances similar, in all material respects, to those presented herein. *See* Exemption Nos. 11062, 11063, 11064, 11065, 11066, 11066A, 11067, 11067A, 11109, 11110, 11111, 11112, 11114, 11136, 11138, 11150, 11153, 11156, 11157, 11158, 11159, 11160, 11161.

For all of these reasons, Sanborn's operations pursuant to this Petition also qualify for an exemption under Section 44701.

G. Exemptions Sought By Sanborn And Reasons For The Requested Relief

Pursuant to Section 333, Sanborn seeks an exemption from the requirements of 14 C.F.R. §§ 45.27(a), 61.113(a) and (b), 91.7(a), 91.105, 91.119(c), 91.121(a)(1)(iii), 91.151(b), 91.405(a), 91.407(a)(1) and (2), 91.409(a)(1) and (2), 91.417(a) and (b).

1. Section 45.27(a). Location of marks; nonfixed-wing aircraft.

Section 45.27, entitled *Location of marks; nonfixed-wing aircraft*, subsection (a) states (emphasis added):

> (a) 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.

To the extent subsection 45.27(a) may be deemed to apply to the Leptron Avenger UAS, Sanborn seeks an exemption from the subsection (*i.e.*, that the marks be displayed on both surfaces of the cabin, fuselage, boom, or tail) because the Leptron Avenger UA is of insufficient size to accommodate any such marking. Thus marking the Leptron Avenger UA as required by this subsection would not be possible.

An equivalent level of safety can be provided instead by marking the Leptron Avenger UA, as may be applicable, with lettering as large as practicable (14 C.F.R. § 45.29(f)) on its

largest available surface so as to permit such marking to be displayed to pilot, crew, and others both when the Leptron Avenger UA is on the ground and airborne.

2. Section 61.113(a) and (b). Private pilot privileges and limitations: Pilot in command.

Sanborn seeks an exemption from 14 C.F.R. 61.113(a) and (b). Section 61.113, entitled *Private pilot privileges and limitations: Pilot in command*, subsections (a) and (b) state (emphasis added):

> (a) Except as provided in paragraphs (b) through (h) of this section, *no person who holds a private pilot certificate may act as pilot in command of an aircraft that is carrying passengers or property for compensation or hire; nor may that person, for compensation or hire, act as pilot in command of an aircraft.*
>
> (b) A private pilot may, for compensation or hire, act as pilot in command of an aircraft in connection with any business or employment if:
>
> (1) The flight is only incidental to that business or employment; and
>
> (2) The aircraft does not carry passengers or property for compensation or hire.

In general, subsections 61.113 (a) and (b) prohibit a private pilot from conducting commercial operations**.** Sanborn seeks exemption from the subsections because the UAS will not carry a pilot, passengers or property (other than a camera). As addressed, the Leptron Avenger is a very light, remotely controlled UAS with no persons or property on board. The area of operations is generally remote or sparsely populated. Each flight is planned and fully coordinated in advance in accordance with those procedures provided in the FOD. Thus the risk associated with the proposed operations is so diminished from that associated with commercial operations contemplated by Part 61, that allowing a PIC having a private pilot certificate, rather than a commercial certificate, met the minimum flight hour and qualification criteria, and operating according to the limitations and guidelines provided herein, provides a level of safety that exceeds that provided by a pilot having a commercial certificate operating a conventional

aircraft as required under the regulations.

The FAA has previously granted exemptions in circumstances similar, in all material respects, to those presented herein. *See* Exemption Nos. 11062, 11063, 11064, 11065, 11066, 11066A, 11067, 11067A, 11109, 11110, 11111, 11112, 11114, 11136, 11138, 11150, 11153, 11156, 11157, 11158, 11159, 11160, 11161.

3. Section 91.7(a). Civil Aircraft Airworthiness.

Either finding that Sanborn meets the Section 333 criteria or exemption from the airworthiness certification requirement under 14 C.F.R. Part 21 renders subsection 91.7(a) inapplicable.

Section 91.7, entitled *Civil aircraft airworthiness*, subsection (a) states (emphasis added): "No person may operate a civil aircraft unless it is in an *airworthy condition*." There is no FAA standard by which such a determination of airworthiness can be made. Nonetheless, given the limitations and procedures, as contained herein, and in the FOD, for maintaining the aircraft and checking it before each flight to ensure that it is in peak operational condition, an equivalent level of safety will be provided.

4. Section 91.105. Flight crewmembers at stations.

Sanborn seeks an exemption from 14 C.F.R. 91.105. Section 91.105, entitled *Flight crewmembers at stations*, states (emphasis added):

> (a) During takeoff and landing, and while en route, each required flight crewmember shall—
>
> (1) *Be at the crewmember station* unless the absence is necessary to perform duties in connection with the operation of the aircraft or in connection with physiological needs; and
>
> (2) *Keep the safety belt fastened* while at the crewmember station.
>
> (b) Each required flight crewmember of a U.S.-registered civil aircraft shall, during takeoff and landing, *keep his or her shoulder harness fastened while at his or her assigned duty station*. This paragraph does not apply if—

(1) The seat at the crewmember's station is not equipped with a shoulder harness; or

(2) The crewmember would be unable to perform required duties with the shoulder harness fastened.

In general, Section 91.105 requires pilot and crew to be at their duty stations and harnessed during flight**.** Sanborn seeks exemption from the Section 91.105 because the Leptron Avenger UA is by definition an unmanned aircraft, having neither pilot nor crew so as to be stationed or harnessed as required by the regulation. An equivalent or even higher level of safety can be provided instead by using an unmanned aircraft controlled by a PIC who at all times is located at and controls the UAS from the GCS.

5. Section 91.119(c). Minimum safe altitudes.

Sanborn seeks an exemption from 14 C.F.R. 91.119(c). Section 91.119, entitled *Minimum safe altitudes: General*, subsection (d) states (emphasis added):

> Except when necessary for takeoff or landing, no person may operate an aircraft below the following altitudes:
>
> ***
>
> (c) *Over other than congested areas.* An altitude of *500 feet above the surface*, except over open water or sparsely populated areas. In those cases, the aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure.

Section 91.119(c) establishes safe altitudes for operation of civil aircraft over other than congested areas. Sanborn seeks exemption from subsection 91.119(c) because, pursuant to this Petition, the Leptron Avenger UA will at times be operated below 500' AGL.

An equivalent or even higher level of safety can be provided instead by, as provided herein, operating so as to deconflict with manned vehicles operating above 500' AGL, within the VLOS of the PIC with the assistance of a VO so as to ensure the safety of and deconfliction with any persons or property in the air and on the ground, including participating and non-participating personnel, 100 feet and 500 feet, respectively, away from who the UA would

generally be restricted. Further the Leptron Avenger UAS flight operations will be monitored at all times by both the PIC and VO and will be in compliance with local public safety requirements, so as to prevent access to the restricted areas of operation.

The FAA has previously granted exemptions in circumstances similar, in all material respects, to those presented herein. *See* Exemption Nos. 11062, 11063, 11064, 11065, 11066, 11066A, 11067, 11067A, 11109, 11110, 11111, 11112, 11114, 11136, 11138, 11150, 11153, 11156, 11157, 11158, 11159, 11160, 11161.

6. Section 91.121(a)(1)(iii). Altimeter settings.

Sanborn seeks an exemption from 14 C.F.R. 91.121(a)(1)(iii). Section 91.121, entitled *Altimeter settings*, states in relevant part (emphasis added):

> (a) Each person operating an aircraft shall *maintain the cruising altitude* or flight level of that aircraft, as the case may be, *by reference to an altimeter* that is set, when operating—
>
> (1) Below 18,000 feet MSL, to—
>
> ***
>
> (iii) In the case of an aircraft not equipped with a radio, the elevation of the departure airport or an appropriate altimeter setting available before departure

Subsection 91.121(a)(1)(iii) requires persons operating an aircraft to maintain altitude by reference to an altimeter set "to the elevation of the departure airport or an appropriate altimeter setting available before departure." Sanborn seeks exemption from subsection 91.121(a)(1)(iii) because the Leptron Avenger UA does not use or have on board a typical barometric altimeter as contemplated by the regulation. Instead, the Leptron Avenger UAS has a laser altimeter to maintain altitude.

An equivalent level of safety will be provided instead by operating the UA below 1,200' AGL within the VLOS of the PIC (with the assistance of a VO) with laser altimeter information downlinked from the UA to the PIC to maintain altitude and ensure safety. Prior to

each flight, a zero altitude/AGL will be established at the launch site, as confirmed for accuracy by the PIC.

7. Section 91.151(b). Fuel requirements for flight in VFR conditions.

Sanborn seeks an exemption from 14 C.F.R. 91.151(b). Section 91.151(b), entitled *Fuel requirements for flight in VFR conditions*, states (emphasis added):

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

The Leptron Avenger is an unmanned aircraft, and thus would not begin a flight with a person in it as the regulation contemplates. To the extent the regulation applies to the Leptron Avenger, an equivalent level of safety can be achieved instead by limiting the Leptron Avenger flights to 1.5 hours or 20% battery power, whichever occurs first, as provided in the FOD. Given that the Leptron Avenger UA, has a maximum weight of approximately 32 pounds and will fly at approximately 12m/s, will be operated within the VLOS of the PIC, this restriction would provide more than enough battery reserve to accommodate a safe return to the landing zone from anywhere in the operating area with no adverse effect on the safety of persons and property in the air or on the ground.

See also e.g. Exemption Nos. 2689, 5745, 10650 (granted exemption to manned aircraft to operate at less than the minimums prescribed in Section 91.151) and Exemption Nos. 8811, 10808, 10673 (granted similar relief for UAS for day VFR conditions).

8. Sections 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), 91.417(a) and (b). Maintenance inspections and recording.

Section 91.405(a), entitled *Maintenance required*, states:

> Each owner or operator of an aircraft—

(a) Shall have that aircraft inspected as prescribed in subpart E of this part and shall between required inspections, except as provided in paragraph (c) of this section, have discrepancies repaired as prescribed in part 43 of this chapter;

Section 91.407(a)(1), entitled *Operation after maintenance, preventive maintenance, rebuilding, or alteration*, states:

(a) No person may operate any aircraft that has undergone maintenance, preventive maintenance, rebuilding, or alteration unless—

(1) It has been approved for return to service by a person authorized under § 43.7 of this chapter;

Section 91.409 (a)(1) and (2), entitled *Inspections*, states:

(a) Except as provided in paragraph (c) of this section, no person may operate an aircraft unless, within the preceding 12 calendar months, it has had—

(1) An annual inspection in accordance with part 43 of this chapter and has been approved for return to service by a person authorized by § 43.7 of this chapter; or

(2) An inspection for the issuance of an airworthiness certificate in accordance with part 21 of this chapter.

No inspection performed under paragraph (b) of this section may be substituted for any inspection required by this paragraph unless it is performed by a person authorized to perform annual inspections and is entered as an "annual" inspection in the required maintenance records.

Section 91.417(a) and (b), entitled *Maintenance records*, state:

(a) Except for work performed in accordance with §§ 91.411 and 91.413, 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.

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

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

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

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

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

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

In general, these regulations require that an airworthy certificated aircraft be inspected as prescribed in 14 C.F.R. Part 91, Subpart E (Maintenance, Preventive Maintenance, and Alterations), any discrepancies be repaired and the aircraft be approved for return to service as prescribed in Part 43 (Maintenance, Preventive Maintenance, Rebuilding, and Alterations) and that any work on the aircraft be recorded and such records maintained.

Sanborn seeks an exemption because, as addressed, the Leptron Avenger UA will operate pursuant to this Petition without airworthiness certification. An equivalent level of safety can be provided instead by requiring, as provided herein, that inspections and maintenance be accomplished according to the inspection, maintenance, and preflight sections of the FOD including the Leptron Inspection & Maintenance Manual. As provided in the FOD, among other things, the UAS will be inspected prior to each flight to confirm that it is in good working order, any maintenance or repairs will be performed and logged, and, upon any work being performed on the UA, the UA will be checked and approved for flight by qualified Sanborn personnel before being returned to service. No pilot or crew need be airborne flying a heavy, fuel-ladened aircraft, thereby providing for superior safety to persons and property in the air and on the ground. Further, all flights will be conducted during the day below 1,200' AGL within the VLOS of the PIC with the assistance of a VO so as to ensure deconfliction with objects in the air and on the ground. Given the Leptron Avenger UA's light weight, slow speed and low-altitude operations there is little risk of any damage to persons or property in the air or on the ground should a maintenance issue present itself when airborne. Accordingly, any risk associated with using the Leptron Avenger UAS as proposed is significantly reduced when compared to that presented by using manned aircraft to conduct the same operations.

The FAA has previously granted exemptions in circumstances similar, in all material respects, to those presented herein. *See* Exemption Nos. 11062, 11063, 11064, 11065, 11066, 11066A, 11067, 11067A, 11109, 11110, 11111, 11112, 11114, 11136, 11138, 11150, 11153, 11156, 11157, 11158, 11159, 11160, 11161.

H. A Summary That Can Be Published In The *Federal Register, s*tating:

The Rules From Which Sanborn Seeks Exemption:

The Sanborn Map Company, Inc. seeks exemption from the requirements of 14 C.F.R. §§

45.27(a), 61.113(a) and (b), 91.7(a), 91.105, 91.119(c), 91.121(a)(1)(iii), 91.151(b), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2),and 91.417(a) and (b).

A Brief Description Of The Nature Of The Exemption Sanborn Seeks:

Approval of the above mentioned exemptions will allow Sanborn LLC to operate the Leptron Avenger for compensation in the National Airspace system. In relation to Sanborn's current aerial surveying and mapping operations, such exemptions will increase safety, reduce risk to person and property on the ground, decrease carbon emissions, reduce the need for Air Traffic Control handling, and provide better aerial surveying footage. The Leptron Avenger runs on rechargeable batteries and does not carry any persons on-board. Sanborn's customer's will also benefit from greater operational flexibility and lower costs since Sanborn can operate the Leptron Avenger at a lower cost than traditional manned aircraft doing the same job.

Specifically, Sanborn is seeking exemptions to allow:

(1) The Leptron Avenger to be marked with its registration number on its largest available services;

(2) A private pilot with 3rd class medical to operate the Leptron Avenger as the Pilot in Command;

(3) Operate the Leptron Avenger even though it has not been certified as airworthy;

(4) Allow the Pilot in Command to control the Leptron Avenger from the controls that are located at the ground control station;

(5) Operate the Leptron Avenger below 500' AGL;

(6) Operate the Leptron Avenger with a laser altimeter instead of a barometric altimeter;

(7) Conduct operations lasting 1.5 hours or until the battery life reaches 20%, whichever occurs first; and

(8) Conduct inspections and maintenance in accordance with the Leptron Maintenance Operations Manual and Sanborn's Flight Operations Documents.

I. Conclusion

Accordingly, as set forth above, Sanborn Map Company, Inc. seeks an exemption pursuant to 14 C.F.R. § 11.61 and Section 333 of the FAA Modernization and Reform Act of 2012, to permit safe operation of the Leptron Avenger UAS commercially, without an airworthiness certificate, for the special purpose of conducting aerial imaging operations. By granting this Petition, the FAA Administrator will be fulfilling the Congressional mandate of Section 333 of the FAA Modernization and Reform Act of 2012 to expedite approval of operations of certain UAS in the NAS, while also advancing the interests of the public.

WHEREFORE, in accordance with the Federal Aviation Regulations and the FAA

Modernization and Reform Act of 2012, Section 333, Sanborn Map Company, Inc. respectfully requests that the Administrator grant this Petition for an exemption from the requirements of 14 C.F.R. §§ 45.27(a), 61.113(a) and (b), 91.7(a), 91.105, 91.119(c), 91.121(a)(1)(iii), 91.151(b), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2),and 91.417(a) and (b).

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Respectfully submitted,

Husch Blackwell LLP

/s/ Thomas L. Gemmell
Thomas L. Gemmell

HUSCH BLACKWELL LLP
120 South Riverside Plaza, 22nd Floor
Chicago, Illinois 60606
Tel: (312) 526-1523
Fax: (312) 655-1501
tom.gemmell@huschblackwell.com

Attorneys for Petitioner