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

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

May 22, 2015

Exemption No. 11661
Regulatory Docket No. FAA–2015–0519

Mr. Justin Schwigen
Owner
GridHawk Aviation, LLC
3426 Elik Lane
Alton, IL 62002

Dear Mr. Schwigen:

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 February 26, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of GridHawk Aviation, LLC (hereinafter petitioner or operator) for an exemption. The exemption would allow the petitioner to operate an unmanned aircraft system (UAS) to conduct aerial inspections of high-tension power distribution lines, systems, and structures.

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

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

Airworthiness Certification

The UAS proposed by the petitioner is a Aeryon SkyRanger.

The petitioner requested relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*. In accordance with the statutory criteria provided in Section 333 of Public Law 112−95 in reference to 49 U.S.C. § 44704, and in

consideration of the size, weight, speed, and limited operating area associated with the aircraft and its operation, the Secretary of Transportation has determined that this aircraft meets the conditions of Section 333. Therefore, the FAA finds that the requested relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*, and any associated noise certification and testing requirements of part 36, is not necessary.

The Basis for Our Decision

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

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

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

Our Decision

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. 106(f), 40113, and 44701, delegated to me by the Administrator, GridHawk Aviation, LLC is granted an exemption from 14 CFR §§ 61.23(a) and (c), 61.101(e)(4) and (5), 61.113(a), 61.315(a), 91.7(a), 91.119(c), 91.121, 91.151(a)(1), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b), to the extent necessary to allow the petitioner to operate a UAS to perform aerial data collection. This exemption is subject to the conditions and limitations listed below.

Conditions and Limitations

In this grant of exemption, GridHawk Aviation, 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 Aeryon SkyRanger when weighing less than 55 pounds including payload. Proposed operations of any other aircraft will require a new petition or a petition to amend this exemption.

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

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

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

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

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

7. This exemption and all documents needed to operate the UAS and conduct its operations in accordance with the conditions and limitations stated in this grant of exemption, are hereinafter referred to as the operating documents. The operating documents must be accessible during UAS operations and made available to the Administrator upon request. If a discrepancy exists between the conditions and limitations in this exemption and the procedures outlined in the operating documents, the conditions and limitations herein take precedence and must be followed. Otherwise, the operator must follow the procedures as outlined in its operating documents. The operator may update or revise its operating documents. It is the operator's responsibility to track such revisions and present updated and revised documents to the Administrator or any law enforcement official upon request. The operator must also present updated and revised documents if it petitions for extension or amendment to this grant of exemption. If the operator determines that any update

or revision would affect the basis upon which the FAA granted this exemption, then the operator must petition for an amendment to its grant of exemption. The FAA's UAS Integration Office (AFS−80) may be contacted if questions arise regarding updates or revisions to the operating documents.

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

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

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

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

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

13. Under this grant of exemption, a PIC must hold either an airline transport, commercial, private, recreational, or sport pilot certificate. The PIC must also hold a current FAA airman medical certificate or a valid U.S. driver's license issued by a state, the District of Columbia, Puerto Rico, a territory, a possession, or the Federal Government. The PIC must also meet the flight review requirements specified in 14 CFR § 61.56 in an aircraft in which the PIC is rated on his or her pilot certificate.

14. The operator may not permit any PIC to operate unless the PIC demonstrates the ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption, including evasive and emergency maneuvers and maintaining appropriate distances from persons, vessels, vehicles and structures. PIC qualification flight hours and currency must be logged in a manner consistent with 14 CFR § 61.51(b). Flights for the purposes of training the operator's PICs and VOs (training, proficiency, and experience-building) and determining the PIC's ability to safely operate the UAS in a manner consistent with how the UAS will be operated

under this exemption are permitted under the terms of this exemption. However, training operations may only be conducted during dedicated training sessions. During training, proficiency, and experience-building flights, all persons not essential for flight operations are considered nonparticipants, and the PIC must operate the UA with appropriate distance from nonparticipants in accordance with 14 CFR § 91.119.

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

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

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

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

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

20. The PIC is prohibited from beginning a flight unless (considering wind and forecast weather conditions) there is enough available power for the UA to conduct the intended operation and to operate after that for at least 5 minutes or with the reserve power recommended by the manufacturer if greater.

21. Air Traffic Organization (ATO) Certificate of Waiver or Authorization (COA). All operations shall be conducted in accordance with an ATO-issued COA. The exemption holder may apply for a new or amended COA if it intends to conduct operations that cannot be conducted under the terms of the attached COA.

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

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

These documents must be made available to the Administrator or any law enforcement official upon request.

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

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

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

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

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

28. Any incident, accident, or flight operation that transgresses the lateral or vertical boundaries of the operational area as defined by the applicable COA must be reported to the FAA's UAS Integration Office (AFS−80) within 24 hours. Accidents must be reported to the National Transportation Safety Board (NTSB) per instructions contained on the NTSB Web site: www.ntsb.gov.

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

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

30. At least 3 days before aerial filming, the operator of the UAS affected by this exemption must submit a written Plan of Activities to the local Flight Standards District Office (FSDO) with jurisdiction over the area of proposed filming. The 3-day

notification may be waived with the concurrence of the FSDO. The plan of activities must include at least the following:

a. Dates and times for all flights;
b. Name and phone number of the operator for the UAS aerial filming conducted under this grant of exemption;
c. Name and phone number of the person responsible for the on-scene operation of the UAS;
d. Make, model, and serial or N−Number of UAS to be used;
e. Name and certificate number of UAS PICs involved in the aerial filming;
f. A statement that the operator has obtained permission from property owners and/or local officials to conduct the filming production event; the list of those who gave permission must be made available to the inspector upon request;
g. Signature of exemption holder or representative; and
h. A description of the flight activity, including maps or diagrams of any area, city, town, county, and/or state over which filming will be conducted and the altitudes essential to accomplish the operation.

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

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

This exemption terminates on May 31, 2017, unless sooner superseded or rescinded.

Sincerely,

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

Enclosures

February 26, 2015

United States Department of Transportation
Docket Management System
1200 New Jersey Avenue., SE
West Building Ground Floor Room W12-140
Washington, DC 20590

Re: Exemption Request of GridHawk Aviation, LLC, Pursuant to Section 333 of the Federal Aviation Reform Act of 2012, et. al.

Dear Sir or Madam:

Pursuant to the FAA Modernization and Reform Act of 2012 ("Reform Act") and the procedures outlined in 14 CFR 11, we are requesting that GridHawk Aviation, LLC, as the owner and operator of small unmanned aircraft, be exempted from the Federal Aviation Regulations ("FARs") listed below so that GridHawk Aviation, LLC, may operate its small unmanned aircraft/lightweight unmanned aircraft systems ("UAS") commercially in airspace regulated by the Federal Aviation Administration, so long as such operations are conducted within and under the conditions outlined herein or as may be established by the FAA as required by §333.

As described herein, Justin Schwigen is an experienced journeyman lineman and has held such a position for the past 16 years. He holds a Journeyman Lineman's credentials. Additionally, Justin Schwigen is a FAA licensed private pilot and actively flies and maintains his currency pursuant to the FARs.

Justin Schwigen has been actively involved in the process of inspection of high-tension power distribution lines, systems, and structures both as a lineman, but also as an airborne inspector and repairman. More specifically, Justin Schwigen has for several years engaged in the process of accessing, inspecting, and repairing structures and high-tension power distribution lines from an airborne platform, typically a helicopter. During those years of work in that capacity, and having been exposed to the associated dangers, Justin Schwigen and his company, GridHawk Aviation, LLC, are pioneering inspection and documentation of condition of various electrical distribution systems and structures in both highly populated areas as well as remote areas throughout the United States.

GridHawk Aviation, LLC envisions the use of a "SkyRanger", a UAS with a Ground Control System (GCS) to monitor (but not operate or control) the UAS unit's downlink of data and/or video. The Aeryon SkyRanger has weighs with imaging

payload less than 7 pounds. It can operate in line of sight (LOS) from the surface to 500 feet AGL for a period of between 35 and 40 minutes with on-board battery packs. (See attached documentations)

To date, Justin Schwigen and his company, GridHawk Aviation, LLC, have rejected all offers to conduct inspections of power distribution systems and structures through the use of UAS's for the purpose of first ensuring compliance with the Federal Aviation Regulations. Notwithstanding the decision of Judge Patrick G. Geraghty in the matter of Michael P. Huerta vs. Raphaelle Pirker, Docket Number CP-217, in which he reasoned that no FAR prohibited the use of small unmanned aircraft or lightweight UAS Grid Hawk Aviation, LLC, submits its Petition for Exemption under §333.

GridHawk Aviation, LLC's exemption request would permit its operation of lightweight unmanned UAS's remotely controlled in the line of site of the operator. The operation would take place in those areas surrounding power distribution systems and structures which may be near both populated or congested areas as well as extremely remote areas. It is contemplated that GridHawk Aviation will establish marked areas of operation, cordoned-off locations and corresponding predetermined enhancements in those areas of operations.

Generally, as we have detailed below, the operations contemplated by GridHawk Aviation, LLC, and Justin Schwigen serve the public interest in many ways. Inspections of power distribution systems and related structures are necessitated by both engineering limitations and regulations. The cost of these inspections are extensive and often involve the use of an individual perched on a platform associated with an airborne helicopter to perform inspections and repairs. There is a corresponding danger to the lineman, the pilot, the aircraft, and those on the ground. While the technology associated with UASs has not yet reached the level where repairs can be conducted to power distribution systems and related structures, location and identification of the nature and extent of needed repairs can be quickly, safely, and cost affectively identified by the use of UASs as contemplated by GridHawk Aviation, LLC, and Justin Schwigen.

Granting the Request for Exemption is consistent with the Secretary of Transportation's responsibilities to not only integrate UAS's into the National Airspace System, but to "establish requirements for the safe operation of such aircraft systems in the National Airspace System" under §333(c) of the Reform Act. GridHawk Aviation, LLC, and Justin Schwigen will conduct operations in compliance with protocols described herein or as otherwise established by the FAA.

Accordingly, GridHawk Aviation, LLC, respectfully requests the grant of an exemption allowing it to operate lightweight, remote controlled UASs to conduct Utility Company electrified power lines and associated structure inspections.

Name and Mailing Address:

GridHawk Aviation, LLC
c/o Justin Schwigen
3426 Elik Lane
Alton, IL 62002
(618) 372-3579
Email: Justin@gridhawkaviation.com

I. Federal Regulations from Which Exemption is Sought:

The Petition, pursuant to Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations, seeks exemption from:
14 CFR 21; 14 CFR 45.23(b);14 CFR 45.27 (a); 14 CFR 61.113 (a) and (b); 14 CFR 91, et. seq. including: 91.407(a)(1), 91.409(a)(1), 91.417(a)&(b), 91.7(a), 91.9(b)&(c), 91,103(b), 91.109(a), 91.119, 91.121, 91.151, 91.203(a), 91.405(a)(a).

Exemptions from the foregoing would allow the operation and use of a UAS for the purpose of inspections of electrical distribution and transmission lines and associated structures. Without such exemptions the benefits to safety and efficiency by reason of the use of UAS technology will be lost.

II. Nature and Extent of Relief Sought and Reasons Therefore:

The United States electric grid consists of thousands of miles of distribution and transmission power lines and related structures, all of which are inextricably interconnected. These thousands of miles of electrified lines and structures require an ongoing inspection and maintenance process and program to ensure uninterrupted service and minimized delays in delivery of the product, electricity. America's dependency on electricity justifies all efforts necessary to ensure minimal interruptions or delays in delivery of electricity. But, to date, inspection necessarily involves direct human interface almost always involving either ascending a tall structure or hovering above a structure in a helicopter. And, since most transmission lines and associated structures are located in remote areas with very difficult terrain, relocating teams of workers and all of their necessary gear to the site is often necessary simply to conduct an inspection or find a problem. The cost to Electricity vendors, the risk of interruptions in delivery of electricity, and the danger to workers who must scale structures or be lifted by helicopters, demands a more cost effective, reliable and safe approach to inspections and maintenance of transmission lines and associated structures.

With the advent of UAS technology, inspections and tasks leading up to necessary maintenance have become potentially much more inexpensive, effective and safe. It is important to note that these inspections may serve either the purpose of prevention or the locating and addressing an existing problem that threatens delivery. Routine inspections are often conducted at great expense and risk. UASs will not only conduct these on-site inspections and relay real-time video to the inspector, but the video can be stored for training and verification purposes. The operator and inspector remain safely on the ground, in sight of the UAS. Instead of teams of linemen and loads of equipment or the involvement of a helicopter, two individuals, a pilot/operator of the UAS and an inspector/observer is all that is needed to conduct the same inspection.

In terms of cost, the expense of the UAS-based inspections will prove to be a fraction of the cost of interfaced-human inspections. Currently, it is estimated that a helicopter costs the electricity vendor between $1,500.00 and $2,000.00 per hour of operation. In addition, the cost of locating teams and equipment can vary widely, depending on the access that the terrain allows, the distance, etc, but adds significantly to the expense of the inspection. It is difficult to estimate with certainty the per-hour cost with interfaced-human inspections, but it is clear that the use of UASs as a substitute will much more cost effective.

Accordingly, the petitioner seeks exemption from the Regulations noted above so that examination and inspection can be made to various electrified distribution and transmission lines, structures, and components throughout the continental United States while complying with other Federal Aviation Regulations.

III. The Benefit to the Public Interest as a Whole if Petition is Granted:

As mentioned above, the cost of using UAS technology is only a fraction of the cost of the current methods of inspections. This reduction in costs would presumably be passed along to the consumer. Since the distribution of electricity is heavily governed throughout the United States, these cost savings would become readily apparent to the regulating authority and presumably addressed accordingly.

The use of UAS technology for the purpose of conducting inspections will produce a higher degree of reliability in the delivery of electricity. This is so largely because inspections, as they would be more cost effective, will be conducted more regularly. Additionally, each inspection with UAS technology will have the capacity to download imagery and save the entirety of the inspection in a video format. These can be used for inspection on site or later by personnel in office. There is the added benefit that the efficacy of these inspections in the future will evolve due to the training capacity that stored videotaped inspections have.

As well, safety will be enhanced and the costs associated with safety will be reduced. With the introduction of human factor into a dangerous environment, such as when human inspections take place with transmission lines and associated structures, the cost of maintaining a level of safety naturally increases. Remove the human interaction with the structure itself, and the risk of harm naturally reduces. With use of UAS technology, and the lack of need for interfaced-human inspection, the dangers to those involved will be reduced and, accordingly, there will be a corresponding reduction in cost of delivery of the product.

Americans are highly dependent on the uninterrupted supply of electricity. Today, electrical distribution systems constitute targets for terrorists and with that threat comes the threat to lives. (http://www.bloomberg.com/news/articles/2012-11-14/thousands-seen-dying-if-terrorists-attack-vulnerable-u-s-grid). A widespread or regional interruption in the delivery of electricity, even if for a short period, will result in immeasurable monetary loss as well. It is anticipated that with the increase in the frequency and the thoroughness of the inspections, the efforts of terrorists to damage or destroy central distribution systems can possibly be at the very least, hindered, and very possibly completely thwarted, and disaster averted.

Reduction in costs, increase in reliability, and improvement of safety will enhance the benefit to the public and ensure the delivery of electricity to the consumer.

IV. The Grant of the Requested Exemption Will Not Adversely Affect Safety:

As indicted, the current method of inspection necessarily involves the human interfacing with the electrical transmission lines and associated structures. These inspections involve a high risk of injury or even death to those working around the site of the inspection. Those who are in danger include those on board the helicopter, if that method is used, as well as the linemen who climb the structures and the supporting crew below. Difficult and hazardous terrain often increases the risk of injury and death.

From these concerns alone, there is an obvious increase in the safety to those involved in the inspection. At the same time, there is a potential increase in safety to the members of the general public in that more frequent and thorough inspections can be conducted. With more frequent and thorough inspections, there comes a reduction in the probability of dangerous circumstances to present themselves.

A. UAS Platform and Safety Features

Gridhawk envisions the use of a UAS, the Aeryon SkyRanger platform ("SkyRanger").

The SkyRanger provides two semi-autonomous flight modes using a point-and-click map and video interface. The user clicks on a map to direct the SkyRanger to fly to point of the map where the operator is pointing, or program flight plans may be entered for a series of way points or grid based area. Additional navigation age including landing zones and flight areas may be designated to ensure the SkyRanger operates only within user specified flight parameters. All flight operations are GPS controlled making the system easy to navigate, and the flight control system also employs a variety of sensors including sonar, barometric pressure, temperature, wind speed, and others to ensure high stability and reliability even in challenging weather conditions. At all times during flight operations, the operator has the command authority to intervene a program flight and take immediate control. Attached hereto as Exhibit A is brochure material regarding anticipated UAS technology to be utilized.

The SkyRanger features the following additional automated safety functions:

- Automated pre-flight system performance checks.
- User pre-flight checklist.
- Automated condition or fault detection, warnings, and predefined responses to a number of flight and system conditions including winds, power status, temperature, and lost-link communications.
- Predefined responses include behavior such as attempting to reestablish radio communication, return to home position and hover, return to home position and land, or land in current position.
- In the case of lost GPS, a manual user flight mode is enabled which allows the operator to provide manual navigation inputs to assist in the landing of the vehicle.

The SkyRanger specifications are as follows:

Payload	up to 1.3 pounds
Empty weight	5.3 pounds
Maximum wind	40 MPH
Operational radius range	up to 1.6 nautical miles
Dimensions	40 inches diameter deployed
Fuel	lithium polymer batteries
Maximum altitude	1,500 feet
Maximum endurance	50 minutes

B. Operator-Pilot Qualifications, Experience, Currency and Safety

GridHawk will utilize only Private or Commercial Rated pilots who are current and hold at least a Class III FAA Medical Certificate. Furthermore, GridHawk will require at least 20 hours of flight time and 200 cycles prior to conducting operations pursuant to the grant of an exemption. Pilot currency demands consistent with existing FAR requirements will also be employed to ensure that pilots maintain their effectiveness.

For all exempted flight operations, one qualified individual will be designated as Pilot in Command (PIC) and second individual will be designated visual observer (VO). The PIC shall act as team leader and shall be responsible for safety of flight and operations. The VO shall be responsible for the Ground Control Station (GCS) assembly and will maintain visual identification of the UAS while scanning for and pointing out flight hazards, such as other aircraft, obstacles, boundaries of the pre-designated safe operations areas and persons.

C. Airspace and Related Safety

The UAS will only be used to conduct flight operations under day & VFR conditions. It is contemplated that the UAS will launched from a location within or very near and below the right of way for the transmission line and associated structures, unless more immediate hazard concerns dictate otherwise. Creation of the safe operation areas and the actual operations will take into account the possibility of equipment failure such that it will not present an undue hazard to persons or property.

On rare occasion, current inspections may be conducted in densely populated areas or areas extending over heavily traveled thoroughfares. It is contemplated that no UAS-based inspection will take place in areas where an unexpected accident would endanger members of the public. Alternative methods of inspection as well as density of the population or volume of traffic will be considered and any doubt for safety be resolved against UAS operations. It is anticipated that, in such areas, UAS-based inspections will be minimal and only be conducted in accordance with existing Federal Aviation regulations.

With regard to airspace concerns, it is not anticipated that there will be frequent entry into the existing airspace system as most operations will be in remote areas and within 400 feet of the surface. In those cases where an airspace is from the surface to a given altitude AGL, consultation with and notification of the local air traffic control system will be undertaken, and the publication, if appropriate, of notice to airmen through the normal channels will be posted. Operations shall be conducted in that airspace only after permission is obtained and only during the effective time of the NOTAMs. Again, given the remoteness of most flight operations, the frequency of operations involving anything other than Class G

airspace will be very low. And, it should be emphasized here that, since the exemption sought is to operate very near and at the same elevation as existing transmission lines and associated structures, the operation of GridHawk's UAS will not significantly expand or enlarge risks to other airborne aircraft beyond the risks already presented by the transmission lines and structures themselves.

All operators being FAA licensed pilots will be aware of and knowledgeable about any overlying or involved airspace as well as right of way rules.

V. Summary for Publication in the Federal Register:

GridHawk Aviation, LLC, seeks an exemption pursuant to Section 333 to conduct UAS-based inspections of power distribution and transmission lines, and associated structures, within the continental United States. The Petition seeks exemption from:
14 CFR 21; 14 CFR 45.23(b);14 CFR 45.27 (a); 14 CFR 61.113 (a) and (b); 14 CFR 91, et. seq. including: 91.407(a)(1), 91.409(a)(1), 91.417(a)&(b), 91.7(a), 91.9(b)&(c), 91,103(b), 91.109(a), 91.119, 91.121, 91.151, 91.203(a), 91.405(a)(a).

VI. List of Supporting Exhibits:

A. Brochure regarding anticipated UAS technology to be utilized consisting of the SkyRanger Aeyron UAS and supporting equipment.

B. Graphic-United States Electric Grid (2009)

C. GridHawk Operation limitations

Respectfully submitted,
GridHawk Aviation, LLC

By: _____

Justin Schwigen, Owner
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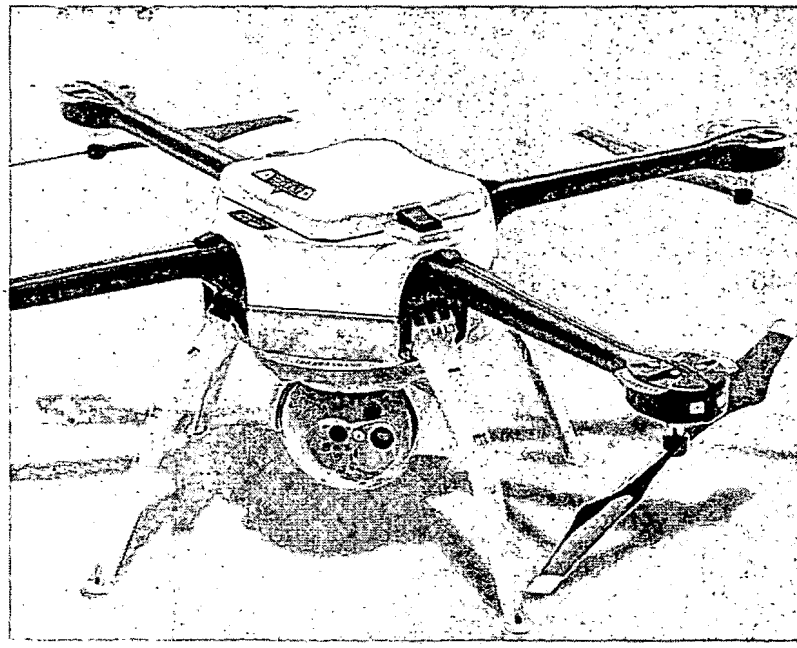
Alton, IL 62002
(618) 372-3579
Email: Justin@gridhawkaviation.com

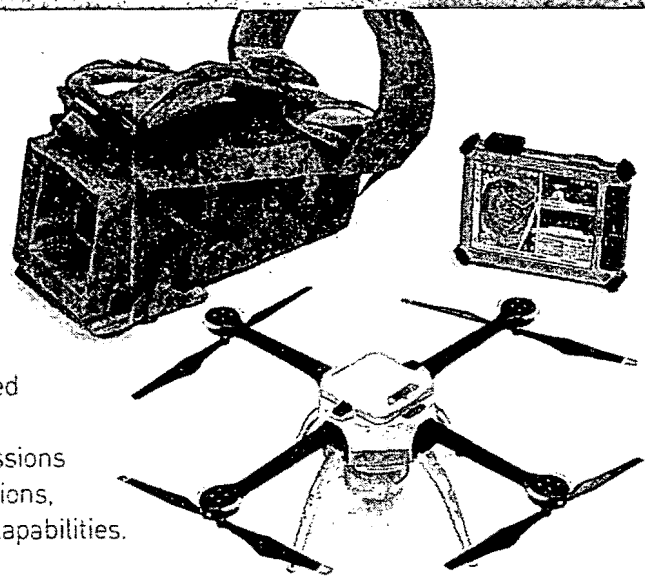


Aeryon SkyRanger

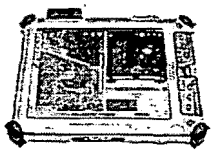
THE BENCHMARK IN VTOL sUAS FLIGHT PERFORMANCE, RELIABILITY AND EASE-OF-USE

Field-tested and battle-proven, Aeryon small UAS set the standard for immediate aerial intelligence gathering by **ANYONE, ANYWHERE,** at **ANYTIME**:

+ Intuitive touchscreen interface and advanced features, minimal user training
+ Single operator transport and deployment, *no* launch or recovery equipment
+ Reliable flight performance even in the most demanding weather conditions, when other systems cannot fly

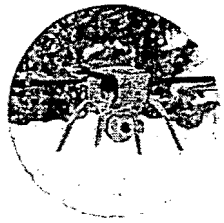


The **Aeryon SkyRanger™** introduces a new airframe and integrated system design to the Aeryon sUAS platform, based on thousands of hours of flight time and successful customer exercises and missions around the world. Designed to military and government specifications, **SkyRanger™** extends industry-leading performance and system capabilities.



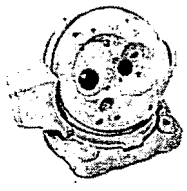
Intuitive interface and autonomous capabilities – no joysticks required

+ Point-and-click touchscreen navigation and camera control
+ Dynamic flight plans including Follow-Me™ protection and AutoGrid™ mapping modes



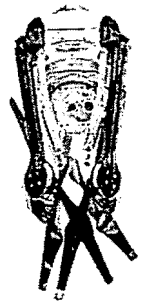
Rugged, reliable and capable – dependable in extreme environments

+ Up to 50-minute endurance with payload, continuous operation model
+ High wind tolerance – 40 mph (65 kph) sustained, 55 mph (90 kph) gusts
+ Ruggedized and weather-sealed
+ Environmental temperature range - -22°F to 122°F (-30°C to 50°C)



Advanced optics and networking – smart imagery and seamless integration

+ Stabilized, simultaneously-streaming dual EO/IR high resolution cameras
  - EO: 1080p24 HD H.264 video, 15MP still images
  - IR: 640x480 H.264 video and still images, white-hot and black-hot modes
+ Low-latency all-digital network – 256bit AES encrypted streaming video to multiple devices, embedded geotags and metadata
+ Beyond line-of-sight range – 1.9 mi (3 km) integrated capability, extensible beyond 3.1 mi (5 km)



Pre-assembled backpack deployment – airborne in seconds

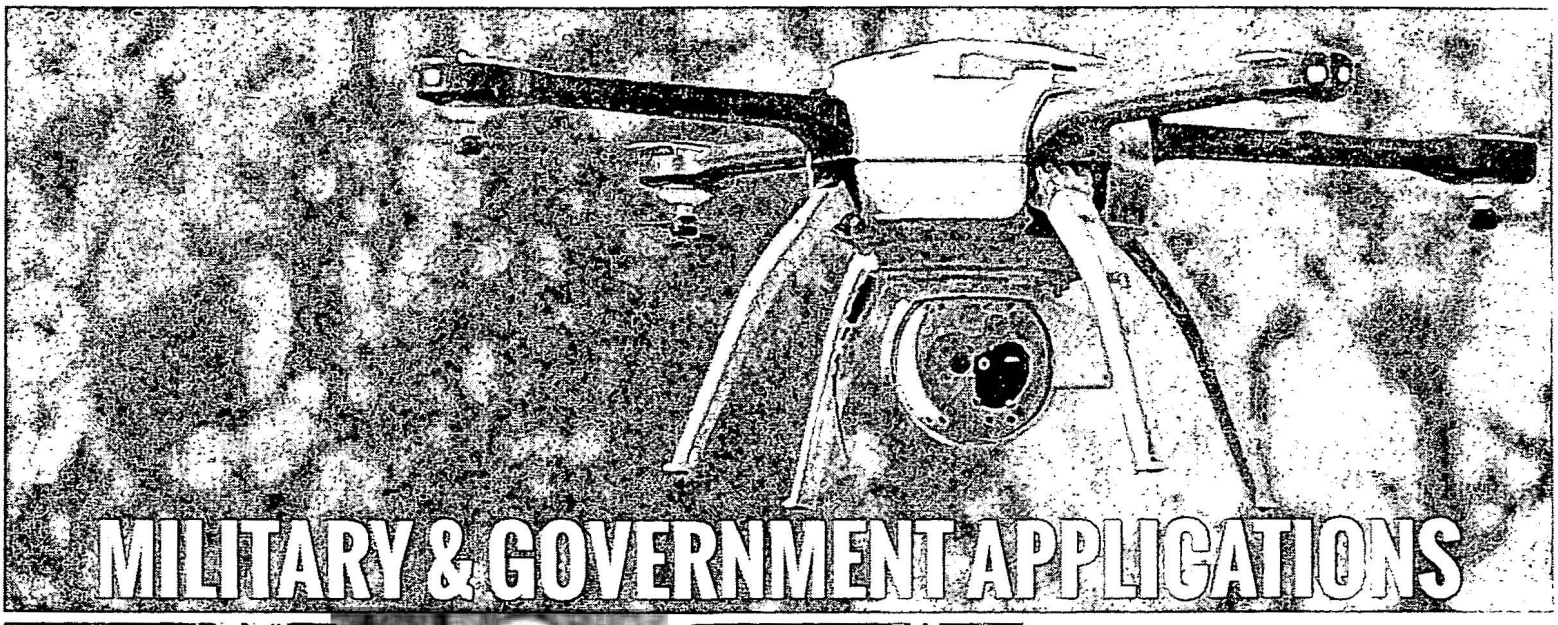
+ Folding design protects payload & includes battery for powered standby
+ Payload, battery, arms, and legs are easily replaced in the field without tools

EXHIBIT

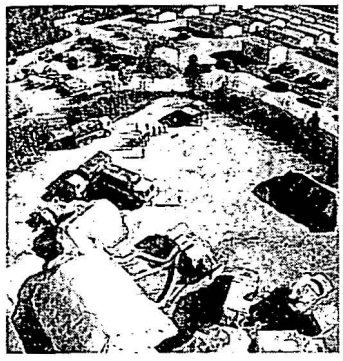
tabbies

A

Aeryon Labs Inc.



MILITARY & GOVERNMENT APPLICATIONS



The Aeryon sUAS platform brings secure, real-time and simultaneous tactical situational awareness to ground forces and remote command. Advanced autonomous capabilities and simple touchscreen controls require minimal training for soldier, squad, or platoon-level deployment.

Unlike fixed-wing systems, the **Aeryon SkyRanger™** is a Vertical Take-Off and Landing (VTOL) sUAS – ideal for providing continuous eyes-on-target for situational awareness, operations in confined environments, and low-risk launch and retrieval without peripheral equipment. **SkyRanger™** is ideally suited for both land and maritime military use including covert ISR, convoy and compound security, and ship boarding operations.

Immediate deployment, small size, quiet operation and specialized imaging payloads make **SkyRanger™** the ideal platform for a wide range of missions in any conditions, including:

+ Tactical situational awareness & targeting
+ Perimeter & convoy security
+ Covert Intelligence, Surveillance and Reconnaissance (ISR)
+ Anti-piracy, tactical ship boarding
+ De-mining
+ Emergency & disaster response
+ HAZMAT/CBRNE management

For information about Aeryon sUAS solutions, contact your Aeryon Sales Representative:

Call +1-519-489-6726 ext: 320 or email sales@aeryon.com
www.aeryon.com | @aeryonlabs

TECHNICAL **SPECIFICATIONS:**

ENDURANCE:
- Up to 50-minute flight time (with payload)

WIND TOLERANCE:
- 40 mph (65 kph) sustained
- 55 mph (90 kph) gusts

ENVIRONMENTAL TEMPERATURE RANGE:
- -22°F to -122°F (-30°C to 50°C)

BEYOND LINE-OF-SIGHT RANGE:
- 1.9 mi (3 km) integrated capability
- Extensible beyond 3.1 mi (5 km)

ALTITUDE:
- 1500 ft. (450 m) AGL, 15000 ft. (4500 m) MSL

LAUNCH & RECOVERY METHOD:
- Vertical Take-Off and Landing (VTOL)

DIMENSIONS:
- **Deployed**: 40 in. (102 cm) diameter, 9.3 in. (24 cm) height
- **Folded**: 20 in. (50 cm) length, 10 in. (25 cm) width

WEIGHT (WITHOUT PAYLOAD):
- 5.3 lbs (2.4 kg)

ADDITIONAL PAYLOADS:
- 3-axis stabilized high resolution EO camera
- Custom payload development

NAVIGATION LEDS:
- Red/Green and Red/NIR

RADIO FREQUENCIES:
- 900 mhz, 2.4 GHz, custom

CONTROL AND DATA LINK:
- Low-latency all-digital network

SECURITY:
- Secure network pairing, AES 256 bit encryption

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THE GRID SOURCES OF POWER POWER PLANTS SOLAR POWER WIND POWER

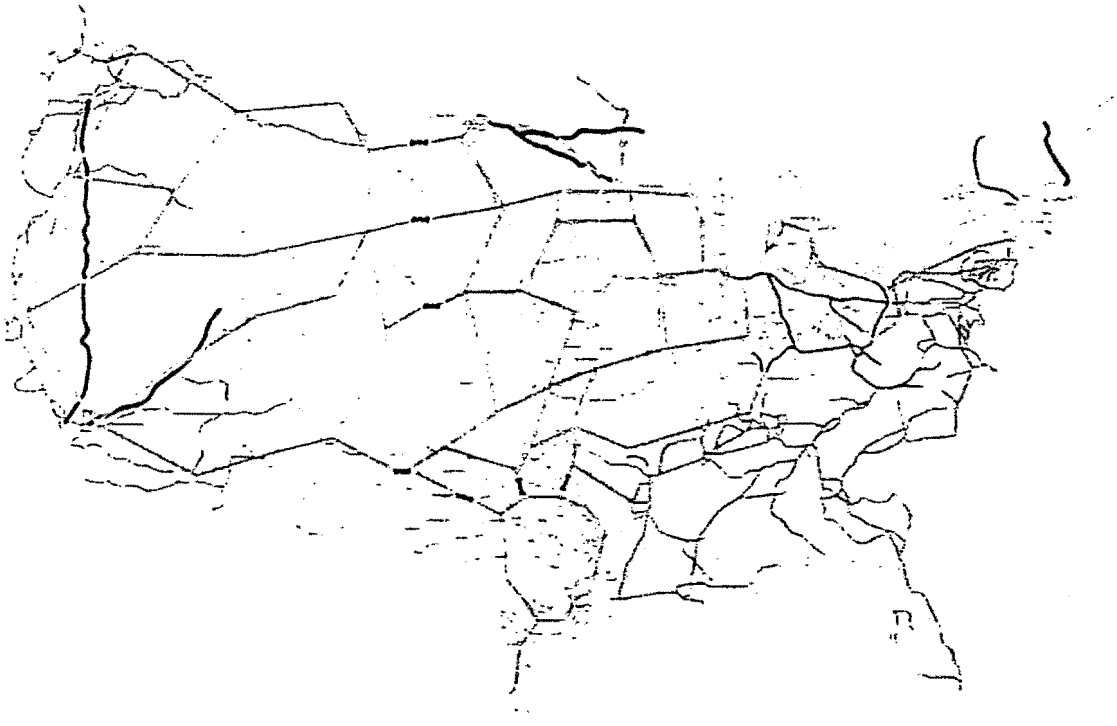
About This Map »

Click on the links below to switch layers on and off

EXISTING LINES
- 345-499 kV
- 500-699 kV
- 700-799 kV
- 1,000 kV (DC)

PROPOSED LINES
- New 765 kV
- AC-DC-AC Links

INTERCONNECTIONS
Major sectors of the U.S. electrical grid
- Eastern
- Western
- Texas (ERCOT)

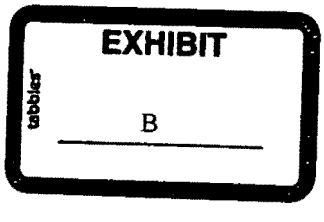


Source: American Electric Power, American Wind Energy Association, Center for American Progress, Department of Energy, Edison Electric Institute, Energy Information Administration, Electric Power Research Institute, Federal Energy Regulatory Commission, National Renewable Energy Laboratory, U.S. Environmental Protection Agency, Western Resource Advocates

Credit: Producer: Andrew Prince; Designer: Alyson Hurt; Editors: Avie Schneider and Vikki Valentine; Supervising Editors: Anne Gudenkauf and Quinn O'Toole; Additional Research: Jenny Gold; Database and GIS Analysis: Robert Benincasa

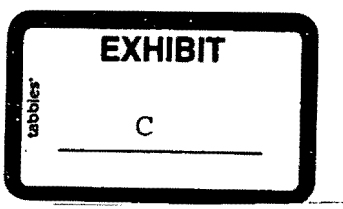
NPR Series

Power Hungry: Reinventing The U.S. Electric Grid May 1, 2009



OPERATION LIMITATIONS AND RESTRICTIONS FOR GRIDHAWK AVIATION, LLC

VER.1.00 February 2015



1. Operations authorized by this grant of exemption are limited to the following aircraft described in the operating documents which has four rotors and four motors in a quadcopter configuration and weighing less than 7 pounds including imaging payload: The *SkyRanger* currently manufactured by Aeryon. Proposed operations of any other aircraft will require a new petition or a petition to amend this grant.

2. UAS operations under this exemption are limited to the inspection electrical distribution and transmission lines, and associated structures.

3. The UA may not be flown at a ground speed exceeding 25 mph.

4. The UAS must be operated at an altitude of no more than 400 feet above ground level (AGL), or 50 feet above any structure being inspected, as indicated by the procedures specified in the operator's manual. All altitudes reported to ATC must be in feet AGL.

5. All operations to occur in Class G airspace unless otherwise authorized by local ground control/air control, ARTCC or other authority over the involved airspace.

6. Operations to avoid congested or populated areas, which are depicted in yellow on official VFR navigational Sectional Charts, unless it is determined that operation will be pose no unreasonable risk of harm or danger to those non-participating individuals and/or personal or real property.

7. All operations shall be within the right-of-way or easement, if any, of the utility except as may be necessary for the purpose of transition from the base of operation to the structure to be inspected and for ingress and egress purposes only, in which case permission of the affected landowner shall first be obtained.

8. All operations conducted in the vicinity of an airport are to remain more than 2.5 nautical miles from the center line azimuth of the corresponding runway center line measured from the runway threshold.

9. 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 observation unaided by any device other than corrective lenses, as specified on the PIC's FAA-issued medical certificate.

10. All operations must utilize a visual observer (VO) and within VLOS of the VO at all times. This requires the VO to be able to use human vision unaided by any device other than corrective lenses. 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 functions prescribed in the operating documents.

11. The VO must not perform any other duties beyond assisting the PIC with seeing and avoiding other air traffic and other ground based obstacles/obstructions and is not permitted to operate the camera or other instruments.

12. The operating documents and this grant of exemption must be accessible during UAS operations and made available to the Administrator upon request. If a discrepancy exits between the conditions and limitations in this exemption and the procedures outlines 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 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 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.

13. Prior to each flight the PIC must inspect the UAS to ensure it is in a condition for safe flight. If the inspection reveals a condition that affects the safe operation of the UAS, the aircraft is prohibited from operating until the necessary maintenance has been performed and the UAS is found to be in condition fore safe flight. The Ground Control Station must be included in the preflight inspection. All maintenance and alterations must be properly documented in the aircraft records.

14. Any UAS that has undergone maintenance or alteration that affect the UAS operation or flight characteristics, e.g. replacement of a flight critical component, must undergo a functional test flight. The PIC who conducts the functional test flight must make an entry of the flight in the UAS aircraft records.

15. The pre-flight inspection must account for all potential discrepancies, e.g. inoperable components, items, or equipment, not already covered in the relevant sections of the operating documents.

16. The operator must follow the UAS manufacturer's aircraft/component, maintenance, overhaul, replacement, inspection, and life limit requirements.

17. The operator must carry out its maintenance, inspections, and record keeping requirements, in accordance with the operating documents. Maintenance, inspection, alterations, and status of replacement/overhaul component parts must be noted in the aircraft records, including total time in service, description of work accomplished, and the signature of the authorized person returning the UAS to service.

18. Each UAS operated under this exemption must comply with all manufacturer Safety Bulletins.

19. The authorized person must make an entry in the aircraft record of the corrective action taken against discrepancies discovered between inspections.

20. The PIC must possess at least a private pilot certificate and at least a current third-class medical certificate. In accordance with 14 CFR 61.23, a pilot holding a commercial certificate must posses at least a second-class medical certificate. 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.

21. Prior to operations conducted for the purpose of inspection, the PIC must have completed the operator's training as prescribed in the operating documents. During that training, the PIC must have accumulated and logged, in a manner consistent with 14 CFR § 61.51(b), the minimum hours prescribe in the operating documents as UAS pilot operating the make and model of the UAS to be utilized for operations under the exemption. Training, proficiency, and experience-building flights can be conducted under this grant of exemption to qualify the operator's PIC(s), VO(s) and other essential personnel as defined in the operating documents. However, said training operations may experience-building flights the PIC is required to operate the UA with appropriate distances in accordance with 14 CFR § 91.119.

22. Prior to operations conducted for the purpose of inspection, the PIC must have completed the operator's currency requirements as prescribed in the operating documents. The PIC must have completed at least three take-offs and three landings in the preceding 90 days as UAS pilot operating the make and model of the UAS to be utilized for operations under the exemption to maintain currency. Take-off and landing currency flights can be conducted under this grant of exemption. When establishing or regaining currency, said currency flights may only be conducted during dedicated training/currency sessions. During

training, proficiency, experience-building flights, and dedicated currency flights the PIC is required to operate the UA with appropriate distances in accordance with 14 CFR § 91.119.

23. Prior to operations conducted for the purpose of inspection, the PIC, VO, and other essential personnel as defined in the operating documents, must have met all qualification, training, and currency requirements, as outlined in the operating documents. A record of completion of these requirements must be documents and made available to the Administrator upon request.

24. The operator may not permit the PIC to operate the UAS for the purpose of inspection unless the PIC has demonstrated and logged in a manner consistent with 14 CFR § 61.51(b), the ability to safely operate the UAS in a manner consistent with hoe the UAS will be operated under this exemption, including evasive and emergency maneuvers and maintain appropriate distances from people, vessels, vehicles, and structures.

25. 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.

26. The UA may not operate within 5 nautical miles of the airport reference point as denoted on a current FAA-published aeronautical chart.

27. 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.

28. If the UAS loses communications or loses its GPS signal, the UA must return to a pre-determined location within the planned operating area and land or be recovered in accordance with the operating documents.

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

30. The 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 UA with 25% batter power remaining.

31. The operator must obtain an Air Traffic Organization (ATO) issued Certificate of Waiver or Authorization (COA) prior to conducting any operations under this grant of exemption. This COA will also require the operator to request a Notice

to Airman (NOTAM) not more than 72 hours in advance, but not less than 48 hours prior to the operation. All operations shall be conducted in accordance with airspace requirements in the ATO issued COA including class of airspace, altitude level and potential transponder requirements.

32. 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.

33. Before conducting operations, the radio frequency spectrum used for operation and control of the UA must comply with the Federal Communications Commission (FCC) or other appropriate government oversight agency requirements.

34. The 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 UAS is operating. These documents must be made available to the Administrator or any law enforcement official upon request.

35. The UA must remain clear and yield the right of way to all manned operations and activities at all times.

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

37. The UA may not be operated over congested or densely populated areas.

38. Flight operations must be conducted no less than 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 are no longer under such protection and are within 500 feet of the UA, flight operations must cease immediately, and/or;

    b. The aircraft is operated near vessels, vehicles, or structures where the owner/controller of such vessels, vehicles, or structures has granted permission and the PIC has made a safety assessment of the risk of operating closer to those objects and determined that it does not present an undue hazard, and;

c. Operations nearer to the PIC, VO, Sensor Operator, other essential personnel as defined in the operating documents, do not present an undue hazard to those persons per § 91.119(a).

39. All operations shall be conducted with permission from the state or local government agency, organization, or owner, with authority for operating the bridge under inspection. Permission from the authority will be obtained for each flight to be conducted.

40. 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.

----------END----------