pillsbury

Pillsbury Winthrop Shaw Pittman LLP
1200 Seventeenth Street, NW | Washington, DC 20036-3006 | tel 202.663.8000 | fax 202.663.8007

Kenneth P. Quinn
tel 202.663.8898
kenneth.quinn@pillsburylaw.com

December 15, 2014

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

Re: Exemption Request Under Section 333 of the FAA Reform Act, 49 U.S.C. § 44701(f), and Part 11 of the Federal Aviation Regulations

Dear Sir or Madam:

On behalf of our client, Industrial Skyworks (USA), Inc. ("Skyworks"),[1] and pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 (the "Reform Act") ("Section 333"), Subsection (f) of 49 U.S.C. § 44701, and 14 C.F.R. Part 11, we request an exemption from the Federal Aviation Regulations ("FARs") listed below and discussed in Appendix A to allow Skyworks to operate the Aeryon SkyRanger and Aeryon Scout small Unmanned Aircraft Systems (collectively, the "sUAS") to provide inspection services for its clients in the United States in the roofing and building, oil and gas pipeline, mining, and electricity transfer industries. These services include obtaining still photographs, video, and other data taken by onboard sensors.

The safety and public benefits of using sUAS for commercial inspection services are substantial. sUAS reduce the need to operate conventional aircraft in unconventional operations, providing more accurate data more safely, economically, and with reduced environmental impact. sUAS operations also reduce the need to have personnel perform dangerous inspections and maintenance-related functions on rooftop, scaffolding, and other elevated structures. The enhanced safety and efficiency of sUAS operations also increases the frequency of inspections, making buildings safer and more efficient.

This request is derived in part from an exemption request by Aeryon Labs Inc., ("Aeryon"), the developer of the sUAS, and is supported by Tremco Incorporated, a

[1] Industrial Skyworks (USA) Inc. is a wholly owned subsidiary of 8681384 Canada Inc., d/b/a Industrial Skyworks.

major provider of commercial roofing and building sealant and maintenance products and services.[2] Details of Aeryon and the sUAS are described in Appendix B.

Skyworks has extensive experience operating the sUAS in strictly controlled operations. Skyworks currently operates the sUAS in every region in Canada and is one of the first Canadian operators to obtain government approval for nighttime operations. As of the date of this exemption request, Skyworks operators have performed over 500 sUAS flights, logging more than 200 hours of flight time, including over 50 hours over populated areas at night, all without incident and in compliance with Transport Canada and all other applicable regulations. Operations under the exemption will be conducted under the limitations and conditions set forth in Appendix C and as may be modified by the FAA as required by Section 333.

As more fully described below, the requested exemptions would allow Skyworks to acquire photographs and other data using the Aeryon sUAS, which at 3.5 lbs. for the Scout and at 6.5 lbs. for the SkyRanger, including payload, are small in size and powered electrically by battery. The sUAS, which have extensive automated control features, will be operated under controlled conditions at very low altitudes in limited airspace. Additional precautions, in the form of additional operational conditions and training, described more fully below, will enhance safety during nighttime operations.

Although the sUAS can be operated by one person, flight operations carried on by Skyworks involve at least two people: a pilot-in-command ("PIC") and an observer. The PIC is responsible for flying the sUAS, monitoring its status and flight dynamics while maintaining visual line of sight and keeping the flight within the manufacturer's specified limits in terms of wind, flight range, battery life, etc., for safe operation of the vehicle. Observers will be responsible for monitoring the airspace for other aircraft and hazards, advising the operator before and during flight of all such observed risks, and monitoring the controlled operating area. In addition to completing Aeryon-specific sUAS training required of the PIC and observer(s), the PIC will be a certified airman with commercial pilot and medical certificates.

Applicant Information:

The name of the applicant is:

---

[2] *See* Aeryon Labs Inc., Exemption Request Under Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations, Docket No. FAA-2014-0642 (Aug. 25, 2014) (exemption request for operation of Aeryon SkyRanger). Skyworks is aware of five other exemption requests to commercially operate the Aeryon SkyRanger. *See* Aetos Group Exemption Request, Docket No. FAA-2014-0629 (Aug. 19, 2014); Southern Company Services Inc. Exemption Request, Docket No. FAA-2014-838 (Oct 9, 2014); VDOS Global LLC Exemption Request, Docket No. FAA-2014-0382 (June 9, 2014); Dow Chemical Company (Nov. 3, 2014); City of Roswell Coalition, Exemption Request Under Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations, Docket No. FAA-2014-0732 (Sept. 2014). The Aetos Group also requested exemptions for the Aeryon Scout. The FAA granted exemptions to VDOS Global LLC for operation of the Aeryon SkyRanger on December 10, 2014. *See* FAA, Grant of Exemption, Docket No. FAA-2014-0382.

Industrial Skyworks (USA), Inc.

The primary contact for this application is:

Michael Cohen
President
Industrial Skyworks
1715 Indian Wood Circle
Suite 200
Maumee, OH 43537
Ph: 416-307-2171
Fax: 416-534-7625

Exemptions Requested

Skyworks requests exemptions from the following regulations:[3]

14 C.F.R. Part 21;
14 C.F.R. 91.113;
14 C.F.R. 91.119(c);
14 C.F.R. 91.151;
14 C.F.R. 91.209;
14 C.F.R. 91.405(a) and (b);
14 C.F.R. 91.407(a)(1);
14 C.F.R. 91.409(a)(1) and (2);
14 C.F.R. 91.417(a).

Airworthiness of the sUAS

A critical element of the exemption application involves evidence of the airworthiness of the sUAS. Skyworks and Aeryon believe that the sUAS have been shown to be airworthy and compliant through a history of granted flight operations and successful flights, including those by Michigan State Police, US Navy Spawar, Mass Development (Joint Base Cape Cod), Unmanned Experts (NIJ Partnership), Western Washington University, Aetos (via Northwest Michigan College), University of Alaska Fairbanks, University of New Mexico, Kansas State University, as well as Skyworks' on-going commercial operations in Canada.[4] The SkyRanger also successfully completed the Department of Homeland Security RAPS trial in 2013. The FAA has already approved commercial operation of the larger SkyRanger for VDOS Global, LLC.[5] For additional

[3] As set forth in Appendix C, with the exception of additional operating conditions for safe nighttime operations, Skyworks will operate under similar operating conditions as those required of the movie industry and other grants of exemption, in which exemptions for certain FARs was deemed by the FAA as "not necessary." As a result, Skyworks is not requesting FAA exemption from FAR 45.23(b), 91.7(a), 91.9(b)(2), 91.103, 91.109(a), and 91.203(a) and (b).

[4] At the request of the FAA, Skyworks will be pleased to provide, under confidentiality, its standard operating procedures, including Safety and PreFlight Checklists and Operator Training Manual.

[5] FAA, Grant of Exemption, Docket No. FAA-2014-0382 (Dec. 10, 2014).

safety, the sUAS are equipped with automated features which enhance safe takeoff, flight, and landing in many conditions, further details of which are provided in Appendix B.

To maintain airworthiness, Skyworks will follow a strict inspection and maintenance regimen, which is further supported by the automatic checks performed by the sUAS. Malfunctions that occur during flight will be detected by the sUAS fault detection system, which communicates a fault warning to the PIC to take necessary action. For certain malfunctions and faults (i.e., lost communications), the sUAS may be pre-programmed to automatically respond and land either at a designated location or in-place. In addition, the PIC will have emergency checklists for proper and safe malfunction responses by the PIC and sUAS. In the event of any malfunction, the sUAS will undergo all maintenance required by the manufacturer and undergo flight testing before recommencing commercial operations.

Operating Conditions

Grant of the exemptions to Skyworks will be subject to the conditions listed in Appendix C, which are based upon the operating conditions required for the FAA's previous grants of exemptions.

Nighttime operations are a critical component to Skyworks' business, particularly infrared building inspections. The reduced night temperatures permit more accurate data regarding areas where air and/or heat are escaping the building. Skyworks respectfully proposes that it be permitted to conduct nighttime operations with the Aeryon SkyRanger, taking into account the special characteristics of this sUAS, additional operating conditions, and additional operator training.

The SkyRanger's design permits safe nighttime operations. The SkyRanger is equipped with LED lights on all four rotor arms. The lights are visible up to 2,500 feet. Thus, the SkyRanger's location may be easily seen by the PIC, observers, and other airspace users. These lights will be illuminated at all times during nighttime operations. In fact, with fewer visual distractions at night, the sUAS is easier to see at night.

Aeryon's sUAS are also characterized by a high degree of pre-programmed control and various built-in technical capabilities that limit the potential for operation outside of the conditions set forth in Appendix C. The sUAS also provides many built-in functional and safety features to assist the operator in safe and reliable operation.

The Aeryon sUAS provides two semi-autonomous flight modes using a point-and-click map and video interface. The user clicks on a map to direct the sUAS to fly to the point on the map where the operator is pointing, or programmed flight plans may be entered for a series of waypoints or grid-based area. Additional navigation settings, including landing zones and flight areas (including visual no-fly zones, maximum altitude, and minimum altitude), may be designated so that the sUAS operates only within operator-specified flight parameters. In other words, Skyworks will set up virtual fencing around

the operational area, preventing the sUAS and the PIC from operating outside the planned flight area, including altitude. This also reduces the needed operating area by omitting the need to factor in additional room for PIC operating error. These operations and inputs are identical for day and night operations, requiring little adaptation for the PIC.

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, and wind speed for high stability and reliability in challenging weather conditions. At all times through the ground control station, the PIC is able to monitor the sUAS location through the tablet mapping function and is provided with continuous altitude information. In the case of lost GPS, a manual user flight mode is enabled which allows the PIC to provide manual navigation inputs to assist in landing the vehicle. At all times during flight operations, the PIC can suspend a programmed flight and take immediate control of the vehicle.

With pre-programmed flights and manual control, operators will be able to maintain separation from manned aircraft operations and avoid other hazards. At night, there are fewer airspace users, and other aircraft in the area will be easily identified with operating lights. Previous nighttime operations have also taught Skyworks that incoming aircraft are also more easily identified by other aircrafts' noise with the reduced nighttime ambient noise. In the controlled environment under the operations conditions in Appendix C, operations will remain within visual line of sight (VLOS) and below 400 feet AGL. There are also fewer spectators and bystanders during nighttime operations. In addition, Skyworks will obtain a Certificate of Waiver or Authorization from the FAA Air Traffic Organization to address airspace requirements and provide notification by a Notice to Airman (NOTAM).

Additional automated safety functions and safety enhancing features of the SkyRanger include the following:

1) Automated pre-flight system performance checks, in which the system self-calibrates all of its sensors and performs self-tests prior to takeoff to check for errors;
2) Self-monitoring and intelligent fault handling with automated condition and fault detection, warnings, and pre-defined responses to a number of flight and system conditions, including:
    a. High winds with system and operator-defined safety thresholds;
    b. High temperature safety thresholds;
    c. Low battery with system and operator-defined safety thresholds;
    d. Lost-link communication;
    e. Pre-defined responses include attempting to re-establish radio communication, return to home position and hover, return to home position and land, or land in current position; and
3) Battery communication with battery minutes and flight time are displayed at all times for the PIC;
4) Auto-detection of lost GPS warns the pilot and initiates an immediate landing;

5) Low battery on the SkyRanger triggers a "Non-Fatal Warning" alarm to return home, land and replace the battery;
6) Very low battery on the SkyRanger triggers a "Fatal Error" alarm and initiates an emergency high speed descent landing; and
7) If the SkyRanger detects a lost-link to the base-station the vehicle will perform its pre-defined Non-Fatal Condition Response.

In addition, the SkyRanger has an all-digital software platform with advanced features previously restricted to full size unmanned aircraft.

Having tested tethering systems, Skyworks found that operating the sUAS with a tether will increase the operating hazards beyond the potential benefits and introduced unknowns that elevate the risks to unacceptable levels. Skyworks found the additional following risks:

- Entanglement and movement constraints during take-off and landing;
- Limited rate of descent and horizontal maneuvers in order to allow adequate time for the tether operator to adjust line tension or take-up slack;
- Difficult crew coordination is required between the pilot and the tether operator;
- Increased side forces and downward forces on the sUAS;
- Limited/reduced range of movement for the sUAS;
- sUAS oscillations introduced by line swing;
- Tether line snagging on persons or property;
- Tether line contacting sUAS rotor(s);
- Weight of tether line;
- sUAS design was not intended to carry a tether line; and
- Losing sight of tethering line location (exacerbated at nighttime).

In addition, due to the fault protection and encrypted telemetry with the sUAS, telemetry and lost communications were unlikely, requiring a highly sophisticated tethering system to achieve any net benefits. Skyworks believes that a tethering system with the required sophistication is not commercially available or feasible for the intended operations.

With the aircraft pre-programmed to compensate for wind and take specific actions upon triggering faults (i.e., pre-programmed to land in designated areas upon loss of communications), tethering and pulling the aircraft down may also result in the unanticipated and uncontrolled loss of altitude and increase the risk to persons and property on the ground. In addition, the ability to impose a virtual fence around the operating area provides an equivalent safety mechanism to prevent fly-away or non-compliant operations. Skyworks' operating area will also have strictly controlled access (i.e., no unauthorized persons in operating area).

To enhance safety, Skyworks will take extra precautions specific to nighttime operations. Operations will be limited to commercial buildings and be confined to the footprint of the building (except for take-off and landing). Skyworks will provide supplemental lighting for the operating area, consisting of high intensity overhead lighting and high intensity

ground LED markers to mark off the sUAS landing zone. The on-board camera must be an infrared device, permitting the PIC to view ground obstacles (illuminated or unilluminated) from the sUAS live video feed. Thus, the pilot will be able to monitor real-time streaming video from the vehicle, regardless of the night operations. Any operating area incursion, defect in lighting (ground or sUAS), or problem with the infrared camera feed will require the immediate termination of the flight and the immediate landing of the sUAS in a designated landing area, unless safety requires landing at an alternate landing area deemed safe by the PIC.

Skyworks' operating manual also sets forth additional general operational precautions to increase safety, including: (i) a Pre-flight Site Assessment to identify potential operational hazards; (ii) electronic scanning for potential frequency interference; (iii) laser range finder to determine the height of surrounding obstacles to improve flight planning; and (iv) performing daytime flights before nighttime flights for pilot familiarization with the operating area.

Operator Requirements

As a condition to the grant of the exemptions, Skyworks will require that the PIC hold a commercial pilot's certificate and a valid second-class medical certificate. The PIC will have accumulated and logged a minimum number of flight cycles and hours for daytime and nighttime operations, as necessary. The PIC will also be subject to the FAR flight review requirements.

The PIC will be required to have completed Aeryon's training program for operation of the sUAS. This training is specific to the Aeryon sUAS, familiarizing the PIC and observers to the sUAS's operations and limitations, and includes a built-in simulator.

Skyworks respectfully submits that operator qualifications take into account the operating conditions and characteristics of the particular sUAS. Skyworks does not believe that certified airmen, medical certificates, and the related operating conditions, are necessary or required to operate the Aeryon sUAS. Nonetheless, Skyworks is prepared to accept these requirements as a condition to the grant of the exemptions. If, and when, the FAA finds such conditions unnecessary for operations conducted pursuant to Section 333 exemptions, Skyworks reserves the right to amend its operating conditions and request exemptions from the relevant FARs to operate without such conditions.

Public Interest

Skyworks respectfully submits that its use of the sUAS in lieu of comparatively hazardous operations currently conducted with conventional fixed wing and rotary aircraft offers a net safety benefit and will achieve an enhanced level of safety, as mandated under Section 333(c) of the Reform Act. Approval of this application will also benefit the public interest by allowing better, safer, and more cost efficient information for the building maintenance and construction industries.

Conventional aerial survey and inspection operations using manned aircraft involve very heavy aerial vehicles, transiting to the operational location, carrying significant quantities of combustible fuels, and a multi-person crew in piloting and observation roles. The nature of surveying and inspection operations magnify the dangers of using conventional aircraft, as the aircraft fly in unconventional operations under FAA waivers and at dangerous altitudes in populated and developed areas. By contrast, the Scout weighs 3.5 lbs. and the SkyRanger weighs 6.5 lbs., including their payload, use a battery for power, are carried to and from the area of activity, remove the need for airborne pilots and observers, and pose less risk to people and infrastructure on the ground, as well as other aircraft.

sUAS operations also remove the need to have building maintenance and inspection personnel risk their lives on rooftops and scaffolding to perform building inspections. This hazard is exacerbated when inspecting at night with infrared technology. If more detailed in-person building inspections are required, planners can use preliminary sUAS data and target areas of concern without putting inspectors and contractors at risk in hazardous areas.

More frequent, safer, and more cost-efficient building inspections by sUAS will also increase employee and public safety. More frequent sUAS-performed inspections will permit improved maintenance of roofs and facades, reducing the number of construction employees working from dangerous heights.[6] Preliminary 2013 data indicates that the fatality rate for roofers is 38.7 per 100,000 workers, following only loggers, fishers and pilots.[7] The sUAS can also map the condition and problem areas of the rooftop, assisting construction and maintenance planners to determine areas of potential hazard and the need for safety measures.

Increased inspections will also facilitate keeping building conditions at high levels, keeping the public safe from building deterioration and improved building responses during significant weather events. In fact, many municipalities have, or are moving toward, building façade inspection requirements, including Boston, Columbus, Milwaukee, Pittsburgh, Chicago, Detroit, New York, and St. Louis. sUAS operations avoid the dangerous manned inspection functions on scaffolding and swing stages, keeping inspection personnel safely on the ground.

More frequent building inspection will also improve the potential to determine areas of building inefficiency and construction defects. The resulting building maintenance and improvements can reduce CO_2 emissions and increase building energy efficiencies. Fifty percent of all energy generated is North America is consumed by buildings, while 90% of building air leak (i.e., energy) is lost through 1% of the building envelope at connection points (e.g., wall-window joints that may be sealed by Tremco products). Ultimately, the

---

[6] Falls were the number one fatal accident in the construction industry in 2013. *See* https://www.osha.gov/stopfalls/ (last visited Dec. 9, 2014).

[7] Dep't of Labor, Bureau of Statistics, News Release, National Census of Fatal Occupational Injuries in 2013 (Preliminary Results) (Sept. 11, 2014) *available at* http://www.bls.gov/news.release/pdf/cfoi.pdf (last visited Dec. 10, 2014).

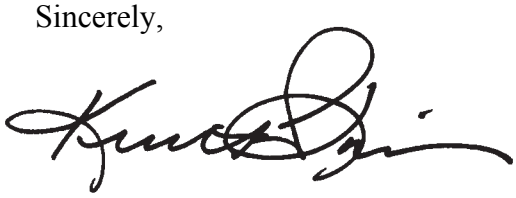
proposed sUAS operations will not only add safety, but result in significant energy and environmental benefits.

Additionally, the inspection services provide an equivalent level of public benefit in the gas and oil pipeline, mining, and electricity transfer industries. Safer, more efficient, and more frequent inspections will benefit those operating in these dangerous industries. sUAS will also provide broad public benefits in these industrial sectors, improving maintenance, reducing environmental impacts, and improving industrial efficiency.

No national security issue is raised by the grant of the requested exemptions. Given the size, load-carrying capacity, speed at which it operates (35 km/h), and the fact that it carries no explosives or other dangerous materials, the use of the Aeryon sUAS poses no threat to national security. In fact, the threat of causing damage to critical national infrastructure is significantly reduced with the extremely low sUAS weights and limited operating areas.

The grant of the requested exemption is in the public interest based on the clear direction in Section 333, the Federal Aviation Act,[8] the high and equivalent level of safety of the proposed operations, and the significant public benefit, including enhanced safety and cost savings to be realized as a result of the use of sUASs for aerial inspection and mapping services. Accordingly, the applicant respectfully requests that the FAA grant the requested exemption without delay.

Sincerely,



Kenneth P. Quinn

Cc: Michael Cohen, Industrial Skyworks
Lance Lehman, Industrial Skyworks

[8] The Federal Aviation Act ("FAAct") expressly grants the FAA the authority to issue exemptions: The Administrator may grant an exemption from a requirement of a regulation prescribed under subsection (a) or (b) of this section or any of sections 44702-44716 of this title if the Administrator finds the exemption is in the public interest. 49 U.S.C. § 44701(f).

APPENDIX A

EXEMPTION REQUEST AND EQUIVALENT LEVEL OF SAFETY SHOWINGS UNDER APPLICABLE RULES SUBJECT TO EXEMPTION

Industrial Skyworks requests an exemption from the following regulations as well as any additional regulations that may technically apply to the operation of the Aeryon SkyRanger and Scout:

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

Section 91.203(a)(1) requires all civil aircraft to have a certificate of airworthiness. Part 21, Subpart H, entitled Airworthiness Certificates, establishes the procedural requirements for the issuance of airworthiness certificates as required by FAR § 91.203(a)(1). Given the size of the aircraft (3.5 or 6.5 lbs. fully loaded) and the limited operating area associated with its utilization, it is unnecessary to go through the certificate of airworthiness process under Part 21 Subpart H to achieve or exceed current safety levels.

Such an exemption meets the requirements of an equivalent level of safety under Part 11 and Section 333 of the Reform Act. The Federal Aviation Act and Section 333 of the Reform Act both authorize the FAA to exempt aircraft from the requirement for an airworthiness certificate, upon consideration of the size, weight, speed, operational capability, and proximity to airports and populated areas of the sUAS involved.

In this case, an analysis of these criteria demonstrates that the sUAS operated without an airworthiness certificate, under the conditions proposed herein, will be at least as safe, or safer, than a conventional aircraft (fixed wing or rotorcraft) with an airworthiness certificate. The SkyRanger weighs 6.5 lbs. fully loaded and the Scout weights 3.5 lbs. fully loaded. Neither will carry a pilot, passenger, or flammable fuel. The sUAS will operate exclusively within a pre-disclosed controlled area and in compliance with conditions set forth herein. Unlike other civil aircraft, operations under this exemption will be tightly controlled and monitored by the operator and observer(s), pursuant to the conditions set forth in Appendix C, the Operator's Manual, and local public safety requirements. The FAA will have advance notice of all operations through the filing of NOTAMs. Receipt of the prior permission of the landowner (or lessee), the lack of flammable fuel, and the fact that the aircraft is carried to the location and not flown there all establish the equivalent level of safety. The sUAS provides at least an equivalent, and most likely an enhanced,[9] level of safety to that of such operations being conducted with

[9] An Aeryon internal report compares the crash kinetic energy dissipation rate of a commercial airline versus the Aeryon SkyRanger. The report found the MTTF of SkyRanger needs to only be > 2.3 hours to equal the energy dissipation of the gold standard commercial aircraft. Transport Canada, has issued a report on low energy RPA and determined the Aeryon Scout to be well below the peak energy level of 12J/cm2 on impact, since the SkyRanger is similar in construction it could be considered to be below this threshold as well.

conventional aircraft that would be orders-of-magnitude larger and would be carrying passengers, cargo, and flammable fuel. The automated safety features including redundant sensor systems, as described in Appendix B and throughout this document, highlight the design intentions towards safety and reliability of the sUAS.

14 C.F.R. § 91.113: Right-of-Way Rules

Section 91.113 requires that vigilance be maintained by each person operating an aircraft so as to see and avoid other aircraft. Unlike conventional aircraft, the sUAS pilot is not on board the aircraft to see and avoid other aircraft, operating the sUAS remotely from the ground.

Industrial Skyworks' proposed operating conditions will achieve an equivalent or enhanced level of safety. All operations will involve the use of two personnel – one certificated commercial pilot and one trained visual observer, monitoring the immediate airspace of the sUAS operation for potential obstruction hazards and other intrusions. The sUAS operations will also be limited to designated illuminated areas below 400 feet AGL, in Class G airspace, within a virtual fence. Industrial Skyworks will notify the FAA and other pilots of the sUAS operations by NOTAM.

14 C.F.R. § 91.119(c): Minimum Safe Altitudes

FAR Section 91.119 establishes safe altitudes for operation of civil aircraft. Specifically, Section 91.119(c) limits aircraft flying over areas other than congested areas to 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.

As set forth herein, the sUAS will never operate at higher than 400 feet AGL. Because aerial inspection work must be accomplished at relatively low altitudes and at altitudes less than 500 feet AGL, an exemption from Section 91.119(c) is needed.

The equivalent or enhanced level of safety will be achieved given the size, weight, speed, and material with which the sUAS are built. Also, no flight will be taken without the permission of the landowner or those who control the land. Because of the advance notice to the landowner (or lessee), all affected individuals will be aware of the flights. Compared to aerial inspection operations conducted with aircraft or rotorcraft weighing far more than 6 lbs. and carrying flammable fuel, any risk associated with these operations will be far less than those currently allowed with conventional aircraft operating at or below 500 feet AGL. Indeed, the low-altitude operations of the sUAS will maintain separation between these sUAS operations and the operations of conventional aircraft that must comply with Section 91.119.

14 C.F.R. § 91.151: Fuel Requirements for Flight in VFR Conditions

This regulation prohibits an individual from beginning "a flight in an airplane under VFR conditions unless (considering wind and forecast weather conditions) there is enough fuel to fly to the first point of intended landing and, assuming normal cruising speed – (1) During the day, to fly after that for at least 30 minutes; or (2) At night, to fly after that for at least 45 minutes."

The SkyRanger batteries provide approximately 50 minutes of powered flight. Without an exemption from 14 C.F.R. § 91.151, the sUAS's flights would be limited to approximately 20 minutes in length. Given the limitations on its proposed operations, a longer time frame for flight in VFR conditions is reasonable.

The Scout batteries provide approximately 25 minutes of powered flight. Without an exemption from 14 C.F.R. § 91.151, the sUAS would be prohibited from flying. Given the limitations on its proposed operations, flight in VFR conditions is reasonable.

Skyworks believes that an exemption from 14 C.F.R. § 91.151(a) is safe and within the scope of a prior exemption. *See* Exemption 10673 (allowing Lockheed Martin Corporation to operate without compliance with 91.151(a)). Operating the sUAS, without 30 minutes of reserve fuel does not engender the type of risks that Section 91.151(a) was meant to prevent given the size and speed at which the sUAS operates. The fact that the sUAS carry no pilot, passenger, or cargo also enhances its safety. Additionally, limiting SkyRanger flights to 20 minutes would greatly reduce their utility. In the unlikely event that the sUAS should run out of battery power, they would simply follow the pre-programmed command to land at a designated location. Given its weight and construction material, the risks are less than contemplated by the current regulation.

For the SkyRanger, Skyworks believes that an equivalent or enhanced level of safety can be achieved by maintaining 10 minutes of reserve power which, allowing 40 minutes of flight time, would be more than adequate to return the sUAS to its planned landing zone from anywhere in its limited operating area.

For the Scout, Skyworks believes that an equivalent or enhanced level of safety can be achieved by maintaining 10 minutes of reserve power, which allowing 15 minutes of flight time, would be more than adequate to return the sUAS to its planned landing zone from anywhere in its limited operating area.

The FAA has granted similar exemptions to others, including Exemptions 2689F, 5745, 10673 and 10808.

14 C.F.R. § 91.203: Aircraft Position Lights

FAR Section 91.203 requires that during the period from sunset to sunrise, no person may operate an aircraft unless it has lighted position lights. Due to the design of the sUAS with a camera on a gimbal, there is no consistent forward or aft position of the aircraft by

which to install red and green position lights. The SkyRanger has red LED lights installed on each rotor arm providing visibility of the aircraft from all sides up to distances of 2,500 feet. With the current light configuration, illuminated and limited operating area with monitored and controlled access, NOTAM notice to the FAA and other operators, and visual observers monitoring the airspace and operating area, Skyworks respectfully submits that the lack of position lights does not compromise safety of operations or the safety to other airspace users.

14 C.F.R. §§ 91.405(a) and (b), 407(a)(1), 409(a)(2), and 417(a): Maintenance Inspections

FAR Section 91.405(a) requires that an aircraft operator or owner "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 . . . ." Subsection (b) of 91.405 requires that maintenance personnel make appropriate entries in the aircraft maintenance records indicating the aircraft has been approved for return to service. Section 91.407 similarly makes reference to requirements in Part 43. Section 91.409(a)(2) requires an annual inspection for the issuance of an air worthiness certificate. Section 91.417(a) requires the owner or operator to keep records showing certain maintenance work that has been accomplished by certificated mechanics, under Part 43, or licensed pilots and records of approval of the aircraft for return to service.

The sUAS are nearly maintenance free, it performs automatic pre-flight checks and the failure of any check will prevent take-off. Checks which cannot be done by the system will be performed by a qualified person prior to each flight and at predefined intervals as part of the maintenance schedule.

The pre-flight checklist includes:

1. Visual inspection of the airframe;
2. Visual inspections of rotor integrity;
3. Visual inspection of the lighting; and
4. Check charge of all batteries (aerial vehicle, command station, radio repeater station).

In addition, as set forth in Industrial Skyworks' operating manual, scheduled inspections will require more in-depth inspection and maintenance tasks. Industrial Skyworks will incorporate any Aeryon or FAA required high-time component maintenance and replacement requirements into its operating manual.

An equivalent level of safety will be achieved because the sUAS is small in size, will carry no external payload, will operate only in restricted predetermined areas and is not a complex mechanical device. The operator will confirm that the sUAS is in working order prior to initiating flight, perform required maintenance, and keep a log of any maintenance that is performed. Moreover, the operator is the person most familiar with

the aircraft and is best suited to maintain the aircraft in an airworthy condition and to provide an equivalent level of safety. Last, the operator's manual will have instructions to develop and document maintenance, overhaul, replacement, and inspection requirements in the absence of Aeryon requirements, and procedures to document and maintain maintenance records for the sUAS.

The sUAS maintenance guidelines provide an equivalent level of safety to the maintenance requirements in Part 91. In addition, any component failure detectable by the system will be reported to the control station and will cause the sUAS to perform a Fatal Condition Response (FCR) or Non-Fatal Condition Response (NFCR), depending on the type of failure. The sUAS will not be returned to flight until required maintenance and a test flight have been performed.

APPENDIX B

SMALL UNMANNED AERIAL SYSTEM DESCRIPTION

Skyworks Corporate Overview: Industrial Skyworks (USA), Inc. is a Delaware corporation and is a wholly-owned subsidiary of 8681384 Canada Inc. d/b/a Industrial Skyworks, which has its head office in Toronto, Ontario, Canada, and which has operated as a provider of sUAS-based inspection support services in every region of Canada since 2013. If not owned by Skywork's U.S. citizen customers, the sUAS will be held in a Non-Citizen Trust on behalf of Skyworks for N-registration.

Aeryon systems have been approved by the FAA for research COAs and have demonstrated a safety track record. The Aeryon sUAS platforms were the first to officially fly at one of the FAA's UAS Test Sites (UAF Alaska). Many entities from military, to education to police and even commercial operations have been given approval to fly in US, Canada, UK, Australia, Japan, and other airspaces. The Aeryon SkyRanger has also been approved for commercial operations by VDOS Global, LLC.

Aeryon unmanned systems have been used to fight terrorism in Iraq, Afghanistan and Nigeria, monitor hostile borders between Saudi Arabia and Yemen, ensure the safety of world leaders at the G50 Nuclear Summit in Seoul, escort a fuel tanker and ice breaker into a remote Alaskan community, monitor wildlife on the Aleutian Islands, map remote communities in South America, keep our highways clear and safe; and provide volumetric analysis for open pit mines.

sUAS Operating Overview: The SkyRanger sUAS can carry payloads up to 600 grams (1.3 pounds). The SkyRanger flies with a maximum wind threshold of 40 M.P.H. for sustained winds and wind gusts up to 55 M.P.H. The SkyRanger has a standard operational range of 3 km (1.6 NM) and up to 5 km (2.7 NM).

The Scout sUAS can carry payloads up to 250 grams (0.5 pounds). The Scout flies with a maximum wind threshold of 30 mph for sustained winds and wind gusts up to 50 mph. The Scout has a standard operational range of 2.5 km (1.35 NM) and up to 5 km (2.7 NM).

The sUAS automatically compensate for wind rather than relying on the operator's 'sense of feel' for what the impact of the wind is at the altitude at which the system is flying. The result is a system capable of gathering high quality aerial data at high wind thresholds, imperative for many aerial inspection operations.

All flight operations are GPS controlled making the system extremely easy to navigate. At any point if the operator is not explicitly commanding the system to move, the system automatically holds its GPS position (i.e. GPS hold for reliable location hover). Camera positioning is also GPS controlled allowing for the most sophisticated camera targeting available. The flight control system employs not only GPS positioning but a variety of

sensors including sonar, barometric pressure, temperature, wind speed, and others to provide the most stability of any system in its class, regardless of the wind.

The sUAS can be operated in both semi and fully autonomous flight modes. Creating pre-planned flight paths to fly in autonomous mode is as simple as clicking on the map to create a pre-planned flight path. In semi-autonomous mode, the operator clicks on the map and the sUAS automatically flies to the corresponding point in space. Pre-mission waypoints, landing zone points, and flight area dimensions can all be entered during preflight, ensuring the sUAS operates only within specified parameters.

The sUAS includes many advanced safety features that makes the sUAS the safest choice for both urban and non-urban environments. Built-in intelligent fault handling allows the sUAS to detect a system fault while in the air, and to automatically fly back to its take-off location and land. Faults that can be detected include: loss of communication; pre-set wind thresholds exceeded; and low battery levels. In addition, the operator can create no fly zones or maximum flight ranges and altitudes so the system cannot enter areas deemed unsafe or unnecessary to fly over. And, before every take-off, automated flight checks confirm the system is flight ready before it takes off.

The sUAS can be operated entirely by a touch-screen, map based interface. This means that the operator needs only to command the system where to go, and the system does all the flying for the operator. Maps can be saved and flight plans can be made or recalled with no internet connection required.

Operating Manual – Operating manuals are available upon request.

Power – Lithium polymer batteries are self-contained, high duration systems with "SMART" intelligence on-board. This includes cycle charge times, locations, GPS antenna, chemical management, and real-time data feeds to provide maximum flight duration and sub-system safety processes. Charging is done in the included Aeryon Battery charger and can be charged via standard wall outlet, or via a vehicle.

Takeoff and Landing style/type – The sUAS have vertical lift autonomous launch and recovery. A Landing Zone ("LZ") is designated by the operators and identified in the GCS software. For launch procedures the aircraft will takeoff and hover 3 meters directly above the LZ and hold until further instruction is provided by the operator. The aircraft will automatically adjust for wind during this period.

Propulsion System – The sUAS are powered by 4 electric brushless DC motors. By their design, the motors do not spark or arc while being operated. The operating temperature of the motors and the battery is extremely low.

Navigation System – Specific maps can be downloaded to the display screen (such as air sectional and geographic maps) which are overlaid with GPS positional data. Waypoints can be created before and during flight operation creating specific locations and sequences for the aircraft.

Defined "No Fly Zones" – The navigation software allows for preplanning No Fly Zones which can allow the operator to maintain clearance from any "prohibited areas." The sUAS will operate with geo-fencing. This technology allows the operator to effectively put a GPS-based perimeter around the area of operations which will keep the aircraft in a designated "operational box" regardless of normal or emergency operations. The geo-fence is custom designed and can be adjusted based on each location of operation.

Maintenance – The sUAS are nearly maintenance free, performing automatic pre-flight checks and preventing take-off upon the failure of any check. Checks which cannot be done by the system will be performed by a qualified person prior to each flight.

Pre-flight checklist includes:

- Visual inspection of the airframe;
- Visual inspections of rotor integrity;
- Visual inspections of lights for nighttime operations;
- Check charge of all batteries (aerial vehicle, command station, radio repeater station).

Reliability – The sUAS are designed for maximum reliability and to maintain performance over the sUAS's life. The only components that experience routine wear are rotors, batteries, motors, and legs. Battery and motor conditions are monitored by the system with deviations reported to the operator.

Contact with other objects during flight may cause other components, particularly rotors, and motor arms, to become damaged. Damaged components are likely to be detected during the full visual inspection of the airframe performed before each flight. Structural damage affecting flight characteristics will be detected by on-board sensors.

The sUAS systems detect numerous conditions which may make flying unsafe, such as reduced GPS accuracy, magnetic anomalies, low battery charge, battery cell imbalances, and temperature fluctuations. Automatic pre-flight checks prevent the sUAS from taking off if such conditions are present. If such a condition is detected during flight, the system will trigger a Fatal Condition Response.

Fault Tolerance – The key feature of the sUAS fault tolerance is its mechanical simplicity. It uses four fixed pitched rotors, each mounted on a separate motor. No control surfaces or other actuators are required for the sUAS to fly. Any component failure detectable by the system will be reported to the control station and will cause the sUAS to perform a Fatal Condition Response (FCR) or Non-Fatal Condition Response (NFCR), depending on the type of failure.

Command and Control Systems - The sUAS Ground Control Station (GCS) allows the operator simultaneous control over aircraft and payloads. The touch screen control

allows for quick navigation and data entry while the display screen provides all essential flight data to the operator. Telemetry data is transmitted to the command station at least once per second.

Displayed on GCS:

- Navigation Route
- Tail Number
- Position
- Altitude
- Heading
- North Seeking Arrow
- Range to Target
- Calculated target position
- Battery voltage and time remaining
- GPS signal strength
- Radio link strength
- Aircraft status to include error messages or failures
- Date/time
- Sensor heading and orientation relative to sUAS

On-board Flight Instruments – The sUAS are equipped with an Inertial Navigation System (3-axis gyroscope, 3-axis magnetometer, GPS receiver, and static pressure sensor) and a sonar sensor for precision AGL altitude measurement.

On–board Computer Systems – The sUAS are equipped with on-board computer systems to monitor (sensors, battery, etc.), control (speeds, altitude, position, etc.), and communicate (control, telemetry, etc.) with the sUAS operator.

On-board Guidance and Navigation Equipment – The sUAS can operate autonomously. It does not require any input from ground-based equipment, or from the pilot, to hover in place.

Redundant Systems – The sUAS combine the input from a multitude of sensors. Even though the data from all sensors is required for optimal system performance, a single sensor malfunction is likely to result in degraded performance rather than leading to a catastrophic failure.

Emergency Procedures and System Failures

Lost Communications – The sUAS do not need constant signal from the GCS to continue flying. Communications outages are detected by the system and are reported to the PIC. During the communication outage, the sUAS will hover in place, climb to a pre-set safe altitude, and then fly to its takeoff location. If communication is still not established, the sUAS will descend slowly and make a landing at the point of takeoff. All of this is accomplished without input from the operator.

If the sUAS receives interference or another overpowering signal, the system will simply go into its lost communication procedure – it will climb to a safe altitude, fly to its take-off point and land.

Fly Away Protection – To prevent a "fly away" or other potentially dangerous situations, the sUAS employ a system of fail-safes that will either return the aircraft to its home origin point or land the aircraft in the present position. In addition, a flight termination link is available to the operator at the GCS.

Failure Handling – The sUAS have extensive failure detection and handling capabilities. All failures are determined to be either "fatal" or "non-fatal". Failures classified as fatal result in a Fatal Condition Response (FCR); and failures classified as non-fatal result in a Non-Fatal Condition Response (NFCR).

Sensor Failure – Failure of on-board flight instruments or sensors will degrade the sUAS' performance and will result in either a FCR or a NFCR, depending on the severity of the failure. If the sUAS becomes unstable due to sensor failure, it will stop all four motors and free fall to avoid a fly away condition.

Motor Failure – The sUAS flight performance will degrade significantly if one or more motors fails.

Airframe Failure – If the airframe is damaged in a manner that impacts flight characteristics, the sUAS will behave as though an on-board flight instrument has failed.

Navigation System Failure – In a navigation system failure, degraded GPS will result in a FCR or a NFCR, depending on the nature of the failure.

Power Failure – A complete battery failure which results in power loss to the sUAS will result in degraded flight performance.

Low Battery Condition – The battery voltage and flight time remaining are displayed to the operator throughout the flight. When 3 minutes of flight time is remaining, a warning is given to the operator. If the operator does not bring the sUAS home, the system will return home (takeoff point at a safe transit altitude) on its own. The sUAS is equipped with an intelligent battery monitoring system that will allow it to leave its present position and fly home with reserve battery power to make a safe landing.

Line-of-Sight Loss – All flight operations will be conducted with the sUAS within visual sight of the operator. If the operator's view becomes obstructed and line-of-sight is lost, the operator may instruct the sUAS to hover in place until line-of-sight is re-established, return to the take-off position, or land at the current position.

Weather Conditions Beyond Limits – The sUAS itself assesses wind conditions, including gusts. Conditions exceeding the preset threshold result in a NFCR.

Security -- The system and communication links are encrypted by the manufacturer's proprietary software. The communication system and protocol is designed in such a way that control of the sUAS cannot be taken over by accident. The video feed is also encrypted. Unauthorized persons attempting to receive the video see a scrambled picture.

Aeryon SkyRanger Characteristics

Measurements – 40" diameter deployed, 20x10" folded

Weight (without payload) – 2.4kg (5.3 lbs)

Performance Characteristics

- Maximum Altitude – 1,500 ft.
- Maximum Endurance – 50 minutes
- Maximum Range – 3 km
- Weather Minimums – None
- Winds Maximum – 40 mph sustained, 55 mph gusts
- Minimum ceiling: 500 ft
- Minimum visibility: 1 sm
- Precipitation and icing conditions – no visible moisture or icing conditions

Frequency Allocations – 900 MHz, 2.4 GHz, 5.8 GHz, and custom

Lighting – The SkyRanger is equipped with red LED lights at the end of each rotor arm, visible beyond 2,500 feet.

Aeryon Scout Characteristics

Measurements – 31.5 in. x 31.5 in. x 7.9 in.

Weight (without payload) – 1.4kg (3 lbs)

Performance Characteristics

- Maximum Altitude – 1,500 ft.
- Maximum Endurance – 25 minutes
- Maximum Range – 3 km
- Weather Minimums – None
- Winds Maximum – 30 MPH sustained, 50 mph gusts
- Minimum ceiling: 500 ft.
- Minimum visibility: 1 sm
- Precipitation and icing conditions – no visible moisture or icing conditions

Frequency Allocations – 900 MHz and 2.4 GHz

APPENDIX C

SKYWORKS OPERATING LIMITATIONS

1) Operations shall be limited to the following aircraft described in the operator's manuals, which are quad copters (4 blades, 4 rotors) weighing less than 6.5 pounds: Aeryon SkyRanger and the Aeryon Scout. Proposed operations of any other aircraft will require a new petition or a petition to amend this grant.

2) The sUAS shall not be flown at a ground speed exceeding 35 km/h.

3) Above Ground Level (AGL) altitude shall be restricted to 400 feet, as indicated by the procedures specified in the operator's manual. All altitudes reported to ATC shall be in feet AGL.

4) The sUAS shall be operated within Visual Line of Sight (VLOS) of the PIC and visual observer at all times. The PIC must use human vision unaided by any device other than corrective lenses, as specified on the PIC's FAA-issued medical certificate.

5) All operations must utilize a visual observer. The visual observer may be used to satisfy the VLOS requirement as long as the PIC maintains VLOS capability. The observer and PIC must be able to communicate verbally at all times. The PIC must be designated before the flight and cannot transfer his or her designation for the duration of the flight. The PIC must confirm that the visual observer can perform the functions prescribed in the operator's manual.

6) The additional requirements identified in the exemption grant shall be added to the operator's manual. The operator's manual must be maintained and made available to the Administrator upon request. If a discrepancy exists between the conditions and limitations in the granted exemptions and the operator's manual, the conditions and limitations in the granted exemptions shall take precedence and must be followed. Otherwise, the operator must follow the procedures outlined in the operator's manual.

   The operator may update or revise its operator's manual. It is the operator's responsibility to track such revisions and present updated and revised documents to the Administrator upon the request. The operator must also present updated and revised documents if it petitions for an extension or amendment of the granted exemptions. If the operator determines that nay update or revision would affect the basis upon which the FAA granted the exemptions, then the operator must petition for amendment to its exemptions. The FAA's UAS Integration Office (AFS-80) may be contacted if questions arise regarding updates or revisions to the operator's manual.

7) Prior to each flight the PIC must inspect the sUAS to confirm that it is in a condition for safe flight. The PIC shall not operate the aircraft if the inspection

reveals a condition that affects the safe operation of the sUAS until the necessary maintenance has been performed and the sUAS is found to be in a condition for safe flight. The Ground Control Station shall be included in the preflight inspection. All maintenance and alternations must be properly documented in the aircraft records;

8) Any sUAS that has undergone maintenance or alterations that affect the sUAS operation or flight characteristics (e.g., replacement of a flight critical component) must undergo a functional test flight in accordance with the operator's manual. The PIC who conducts the functional test flight must make an entry in the sUAS aircraft records of the flight. The requirements and procedures for a functional test flight and aircraft record entry shall be included in the operator's manual.

9) Skyworks must follow the manufacturer's UAS aircraft/component maintenance, overhaul, replacement, inspection, and life limit requirements, with particular attention to flight critical components that may not be addressed in the manufacturer's manuals.

10) Skyworks shall carry out their maintenance, inspections, and record keeping requirements, in accordance with the operator's manual. Maintenance, inspection, and alterations must be noted in the aircraft logbook, including total flight hours, description of work accomplished, and the signature of the authorized sUAS technician returning the sUAS to service.

11) sUAS technicians must receive and document training referenced in the operator's manual.

12) sUAS maintenance personnel must make a record entry in the sUAS logbook or equivalent document of the corrective action taken against discrepancies discovered between inspections.

13) The PIC must possess at least a commercial pilot certificate and at least a current second-class medical certificate. The PIC must also meet the flight review requirements specified in 14 C.F.R. § 61.56 in an aircraft in which the PIC is rated on his or her pilot certificate.

14) Prior to the operation, the PIC must 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 operator and at least ten hours logged as a UAS operator with a similar UAS type (single blade or multirotor).[10]

[10] Prior documented flight experience that was obtained in compliance with applicable regulations may satisfy this requirement. Training, proficiency, and experience-building flights can also be conducted under this grant of exemption to accomplish the required flight cycles and flight time. During training, proficiency, and experience building flights, all personnel not essential are considered nonparticipants, and the operator must operate the sUAS with appropriate distance from nonparticipants in accordance with 14 C.F.R. § 91.119.

15) Prior to the operation, the PIC must have accumulated and logged a minimum of 1 hour as sUAS pilot operating the sUAS and three take-offs and three landings within the preceding 90 days.[11]

16) Prior to operations, a flight demonstration as set forth in the operator's manual, administered by a Skyworks-approved and qualified-pilot must be successfully completed and documented. This documentation must be available for review upon request by the Administrator. The flight demonstration shall be conducted in accordance with the operator's manual.

17) The sUAS shall not be operated directly over any person, except authorized and consenting individuals, below an altitude that is hazardous to persons or property on the surface in the event of a sUAS failure or emergency.

18) Operating of the sUAS may be conducted at distances less than 500 feet from participating persons, vessels, vehicles or structures that perform an essential function in connection with these special purpose operations. Operations closer than 500 feet from the PIC, visual observer, operator trainees, and essential persons, are permitted when operationally necessary; but never so close as to present an undue hazard, per § 91.119(a).

19) Operations of the sUAS may be conducted at distances less than 500 feet from vessels, vehicles or structures so long as the owner/controller grants such permission and the operation closer to these objects presents no safety hazard to nonparticipating persons or property.

20) Operation of the sUAS must be conducted at least 500 feet from all nonparticipating persons, vessels, vehicles, and structures.

21) If the sUAS loses communications or loses its GPS signal, the sUAS must return to a pre-determined location within the security perimeter and land or be recovered in accordance with the operator's manual.

22) The sUAS must abort the flight in the event of unpredicted obstacles or emergencies in accordance with the operator's manual.

23) The PIC is prohibited from beginning a sUAS flight unless (considering wind and forecast weather conditions) there is enough power to fly to the intended point of landing and, assuming normal cruising speed, to fly after that for at least 10 minutes.

---

[11] Training, proficiency, experience-building, and take-off and landing currency flights can be conducted under this grant of exemption to accomplish the required flight time and 90 day currency. During training, proficiency, experience building, and take-off and landing currency flights all persons not essential for flight operations are considered nonparticipants and the operator must operate the sUAS with appropriate distance from nonparticipants in accordance with 91 C.F.R. § 91.119.

24) Skyworks shall obtain an Air Traffic Organization (ATO) issued Certificate of Waiver or Authorization (COA) prior to conducting any operation. This COA will also require the filing of the NOTAM not more than 72 hours in advance, but not less than 48 hours prior to the operation.

25) All aircraft operated in accordance with the requested exemption must be identified by serial number, registered in accordance with 14 C.F.R. Part 47, and have identification (N-Number) markings in accordance with 14 C.F.R. Part 45, Subpart C. Markings shall be as large as practicable.

26) Each sUAS must comply with all manufacturer System and Safety Bulletins.

27) The preflight inspection required in the operator's manual shall account for all discrepancies (i.e., inoperable components, items, or equipment) not covered in the relevant pre-flight inspection sections of the manufacturer's operating manual.

28) The radio frequency spectrum used for operation and control of the sUAS must comply with Federal Communication (FCC) or other appropriate government oversight agency requirements.

29) The documents required under 14 C.F.R. §§ 91.9 and 91.203 shall be available to the operator at the Ground Control Station of the sUAS any time the aircraft is operating.[12]

30) The sUAS must remain clear and yield the right of way to all other manned operations and activities at all times (including, but not limited to, ultralight vehicles, parachute activities, parasailing activities, hang gliders, etc.).

31) Operations shall occur during Visual Flight Rules Meteorological Conditions (VMC); flights under special visual flight rules (SVFR) shall not be conducted.

32) sUAS shall not be operated from any moving device or vehicle.

33) sUAS 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.

34) All operations shall occur in Class G airspace; the sUAS may not operate in Class B, C, or D airspace without written approval from the FAA. All operations will be conducted outside of a 5 NM range of the geographic center of a non-towered airport as denoted on a current FAA-published aeronautical chart unless a letter of agreement with that airport's management is obtained, and the operation is conducted in accordance with a NOTAM as required by the grant of this exemption.

[12] These documents shall be made available to the Administrator or any law enforcement official upon request.

35) Operations shall be conducted over private and/or controlled-access property (i.e. no unauthorized persons) with permission from the land owner/controller or authorized representative. Permission from land owner/controller or authorized representative will be obtained for each flight to be conducted.

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

37) Operations occurring at night, as defined by 14 C.F.R. § 1.1, shall also meet the following conditions:

    a. The operating area, consisting of the footprint of commercial buildings and a designated take-off, landing, and transit areas, will have controlled access (i.e., no unauthorized persons in operating area) and be illuminated in accordance with the operating manual;

    b. Only the SkyRanger sUAS will be used;

    c. Lights on the SkyRanger must be installed, operable, and used at all times;

    d. The sUAS must be operated with an infrared camera and the camera video feed must be available to the PIC through the ground control station at all times during flight;

    e. An unauthorized incursion into the operating area, malfunction of lights (ground or sUAS), or failure of infrared video requires immediate termination of the flight with a landing at a designated location, unless the PIC determines that safety requires landing at an alternative location; and

    f. The PIC must have accumulated and logged a minimum of 25 night flight cycles and 10 hours of total night time operation as a UAS rotorcraft operator and at least ten hours logged as a UAS operator with a similar UAS type (single blade or multirotor) during night operations.