ALLIED DRONES

October 2, 2014

U.S. Department of Transportation, Docket Operations
West Building Ground Floor, Room w12-140
1200 New Jersey Avenue, SE
Washington, DC 20590

Re: Exemption Request Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations from 14 C.F.R. 45.23(b);14 CFR Part 21;14 CFR 61.3(a) & (c); 61.113 (a) & (b); 91.7 (a);91.9 (b) (2);91.103(b); 91.109;91.119; 91.121; 91.151(a);91.203(a) & (b);91.405 (a); 91.407(a) (1); 91.409 (a) (2);91.417 (a) & (b).

Dear Sir or Madam:

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 (the Reform Act) and 14 C.F.R. Part 11, Allied Drones, developer and operator of tether-powered Small Unmanned Aircraft Systems ("sUAS") equipped to conduct aerial infrastructure inspections and surveys for the bridge, tower, and building construction and maintenance industries hereby applies for an exemption from the listed Federal Aviation Regulations ("FARs") to allow commercial operation of its sUAS, 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 Section 333.1

As described in detail below, the requested exemption would permit the operation of small, tether-powered, unmanned and relatively inexpensive sUAS under controlled conditions in airspace that is 1) limited 2) predetermined 3) controlled as to access and 4) would provide greatly enhanced safety advancements to hazardous inspection and surveying work currently performed manually by trained personnel. Approval of this exemption would thereby enhance safety and eliminate workplace accidents and deaths for certain industrial tasks which would fulfill the Secretary of Transportation's (the FAA Administrator's) responsibilities to "...establish requirements for the safe operation of such aircraft systems in the national airspace system." Section 333(c) of the Reform Act.

The name and address of the Applicant is:

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Regulations from which the exemption is requested:

14 CFR Part 21
14 CFR 45.23(b)
14 CFR 61.3(a) & (c)
14 CFR 61.113 (a) & (b)
14 CFR 91.7 (a)
14 CFR 91.9 (b) (2)
14 CFR 91.103
14 CFR 91.109
14 CFR 91.119
14 CFR 91.121
14 CFR 91.151 (a)
14 CFR 91.203 (a) & (b)
14 CFR 91.405 (a)
14 CFR 407 (a) (1)
14 CFR 409 (a) (2)
14 CFR 417 (a) & (b)

This exemption application is expressly submitted to fulfill Congress' goal in passing Section 333(a) through (c) of the Reform Act. This law directs the Secretary of Transportation to consider whether certain unmanned aircraft systems may operate safely in the national airspace system (NAS) before completion of the rulemaking required under Section 332 of the Reform Act. In making this determination, the Secretary is required to determine which types of UAS do not create a hazard to users of the NAS or the public or pose a threat to national security in light of the following:

- The UAS's size, weight, speed, and operational capability;
- Operation of the UAS in close proximity to airports and populated areas; and
- Operation of the UAS within visual line of sight of the operator.

Reform Act § 333 (a). Lastly, if the Secretary determines that such vehicles "may operate safely in the national airspace system, the Secretary shall establish requirements for the safe operation of such aircraft in the national airspace system." Id. §333(c) (emphasis added)[1].

The Federal Aviation Act expressly grants the FAA the authority to issue exemptions. This statutory authority by its terms includes exempting civil aircraft, as the term is defined under §40101 of the Act, that includes sUAS, from the requirement that all civil aircraft must have a current airworthiness certificate.

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[1] Applicant interprets this provision to place the duty on the Administrator to not only process applications for exemptions under section 333, but for the Administrator to craft conditions for the safe operation of the sUAS, if it should be determined that the conditions set forth herein do not fulfill the statutory requirements for approval.

The Administrator may grant an exemption from a requirement of a regulation prescribed under subsection (a) or (b) of this section or any sections 44702-44716 of this title if the Administrator finds the exemption in the public interest. 49 U.S.C. §44701(f) See also 49 USC §44711(a); 49 USC §44704; 14 CFR §91.203 (a) (1).

Allied Drones' sUASs are rotorcraft, weighing 55 or fewer lbs. including payload. One of the defining technical characteristics of the sUAS is that *all* of the electric power required to operate the rotors and electronics subsystems is transmitted to the sUAS via a tether cable. They operate, under normal conditions at a speed of no more than 2 knots and have the capability to hover, and move in the vertical and horizontal plane simultaneously. Because the length of the tether is relatively short and limited, the sUAS can only operate in line of sight and will operate only within the sterile area described in the Confidential Flight Operations and Procedures, attached as Exhibit 1 (hereinafter "the Manual")[2]. Such operations will insure that the sUAS will "not create a hazard to users of the national airspace system or the public."[3]

Given the small size of the sUAS involved and the restricted tether-limited sphere within which they can fly, and the industrial environment in which the sUAS is designed to operate, the Applicant falls squarely within that zone of safety (an equivalent level of safety) in which Congress envisioned that the FAA must, by exemption, allow commercial operations of sUAS to commence immediately. Also due to the size of the sUAS and the restricted areas in which the relevant sUASs will operate, approval of the application presents no national security issue. Given the clear direction in Section 333 of the Reform Act, the authority contained in the Federal Aviation Act, as amended; the strong equivalent level of safety surrounding the proposed operations, *and the significant public benefit, including enhanced workplace personal safety, more frequent infrastructure inspections leading to enhanced industrial maintenance and safety, the grant of the requested exemptions is in the public interest.* Accordingly, the Applicant respectfully requests that the FAA grant the requested exemption without delay.

AIRCRAFT AND EQUIVALENT LEVEL OF SAFETY

The Applicant proposes that the exemption requested herein apply to civil aircraft that have the characteristics and that operate with the limitations listed herein. These limitations provide for at least an equivalent or even higher level of safety to operations under the current regulatory structure because the proposed operations represent a safety enhancement to workplace personal safety for certain types of industrial inspection and surveying work.

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[2] Applicant submits this Manual as a Confidential document under 14 CFR 11.35 (b) as the entire manual contains proprietary information that the Applicant has not and will not share with others. the Manual contains operating conditions and procedures that are not available to the public and are protected from release under the Freedom of Information Act 5 USC 552 et.seq.

[3] Reform Act Section 333 (b).

These limitations and conditions to which Allied Drones agrees to be bound when conducting commercial operations under an FAA issued exemption include:

1. The sUAS will weigh approximately 10 lbs in most flight and payload configurations, but no more than than 55 lbs.
2. Flights will be operated within line of sight of the operator technician.
3. Flights will be operated at a typical altitude 60-250 feet, but no more than 400 feet AGL.
4. The sUAS will only operate within a confined "safety perimeter" as defined in the Manual. Safety cones and/or tape will define the safety perimeter when operating in areas that could pose a hazard to the general public.
5. A briefing will be conducted in regard to the planned sUAS operations prior to each day's inspection activities. It will be mandatory that all personnel who will be performing duties within the boundaries of the safety perimeter be present for this briefing.
6. As with any other industrial workplace setting, appropriate safety gear will be worn by all personnel within the safety perimeter including, but not limited to, hardhats and brightly colored safety vests.
7. Operator technician will have been trained in operation of sUAS and received up-to-date information on the particular sUAS to be operated as required Section E of the Manual.
8. Operator technician and other workers within the safety perimeter will at all times be able to communicate by voice or hand signals.
9. Written and/or oral permission from the relevant property holders will be obtained.
10. All required permissions and permits will be obtained from territorial, state, county or city jurisdictions, including local law enforcement, fire, or other appropriate governmental agencies for the work being done on site.
11. If the sUAS loses communications or loses its GPS signal, the sUAS will have capability to return to a pre-determined location within the Security Perimeter and land.
12. The sUAS will have the capability to abort a flight in case of unpredicted obstacles or emergencies.
13. The operator will file a FAA Form 7711-1, or its equivalent, as modified in light of the requested exemption, with the appropriate Flight Standards District Office for certain tethered sUAS operations that are substantially outside the immediate shielding vicinity of tower, bridge, or building work locations (§77.15)

TECHNICAL/OPERATIONAL LIMITATIONS AND PUBLIC SAFETY

The sUAS developed and operated by the Applicant are designed for very specific industrial inspection and survey work. One of defining characteristics of this sUAS platform is its power-tether subsystem. All electric power required for flight is transmitted to the sUAS through an electrical tether cable. With the power tether the sUAS is capable of nearly unlimited flight endurance, but only within a sphere defined by the length of the tether. Without the tether, the system is incapable of flight.

Similar to moored balloons, the tether in this sUAS provides a means to limit the range of the aircraft under normal operating conditions. However, unlike moored balloons or sUAS featuring *unpowered* tethers which would continue to fly free if the tether cable were severed, the sUAS operated by Allied Drones would have no potential to "fly away". The physical length of the tether defines the absolute limits of the range of the sUAS. Any persons or property outside this range would be safe in the unlikely event of a failure of one of the critical sUAS subsystems. In this way the tether-powered sUAS has more in common with cranes, manlifts, and camera masts than it does with traditional *untethered* sUAS.

Another aspect relating to public safety in regards to the operation of the Applicants sUAS is the environment in which it is designed to operate. The tether-powered sUAS does not pose a hazard to other aircraft in the vicinity when performing its intended mission, which is a close-range inspection of various infrastructure assets such as towers, bridges, and buildings. The altitude-limiting tether combined with the close proximity in which the proposed surveys are done, almost certainly means that the tower, bridge, or building under inspection by the sUAS is an equal, or even more hazardous obstacle to passing aircraft than the sUAS itself. The Applicant's proposal is to operate "shielded by existing structures of a permanent and substantial character"[4].

Finally, the location of the various infrastructure assets at which the sUAS operates are generally not in publicly accessible places. Much of the infrasture is on private property, behind fences, in remote locations, or in industrial settings that are not open to the public. The safety procedures described in the Manual, combined with the limitations and conditions outlined above would provide a sufficient level of public safety for the operation in the NAS.

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

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 and limited operating area associated with the aircraft to be utilized by the Applicant, an exemption from Part 21 Subpart H meets the requirements of an equivalent level of safety under Part 11 and Section 333 of the Reform Act. The Federal Aviation Act (49 U.S.C.§44701 (f)) 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 particular sUAS. In

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[4] 14 CFR §77.15

all cases, an analysis of these criteria demonstrates that the sUAS operated without an airworthiness certificate, in the restricted environment and under the conditions proposed will be at least as safe, or safer, than a conventional aircraft (fixed wing or rotorcraft) operating with an airworthiness certificate without the restrictions and conditions proposed.

The sUAS to be operated hereunder is less than 55 lbs. fully loaded, carries neither a pilot nor passenger, carries no explosive materials or flammable liquid fuels, and operates exclusively within a secured area as set out in the Manual. Unlike other civil aircraft, operations under this exemption will be tightly controlled and monitored by the operator, pursuant to the Manual's requirements, and under the requirements and in compliance with local public safety requirements when in operation where the general public could be a factor. The FAA will have advance notice of all operations where the sUAS is operating outside the immediate vicinity of a an existing tower, bridge, or building. Lastly, application of these same criteria demonstrates that there is no credible threat to national security posed by the sUAS, due to its size, speed of operation, location of operation, tether limited range, lack of explosive materials or flammable liquid fuels, and inability to carry a substantial external load.

14 C.F.R. § 45.23 (b). Marking of the Aircraft

The regulation requires:

When marks include only the Roman capital letter "N" and the registration number is displayed on limited, restricted or light-sport category aircraft or experimental or provisionally certificated aircraft, the operator must also display on that aircraft near each entrance to the cabin, cockpit, or pilot station, in letters not less than 2 inches nor more than 6 inches high, the words "limited," "restricted," "light-sport," "experimental," or "provisional," as applicable.

Even though the sUAS will have no airworthiness certificate, an exemption may be needed as the sUAS will have no entrance to the cabin, cockpit or pilot station on which the word "Experimental" can be placed. Given the size of the sUAS, two-inch lettering will be impossible. The word "Experimental" will be placed on the fuselage in compliance with §45.29 (f).

The equivalent level of safety will be provided by having the sUAV marked on its fuselage as required by §45.29 (f) where the pilot, observer and others working with the sUAV will see the identification of the sUAS as "Experimental." The FAA has issued the following exemptions to this regulation to Exemptions Nos. 10700, 8738, 10167 and 10167A.

14 C.F.R. §91.3(a) and (c): Requirements for certificates, ratings, and authorizations.

Section 91.3 (a) & (c) requires that a person must possess a valid pilot certificate as well as an appropriate medical certificate in order to act as pilot in command of a civil aircraft.

Because of the range-limiting power tether, close proximity to other shielding structures, relatively low operating altitudes, very slow speed, and low weight, the risks associated with the operation of the sUAS are better mitigated through equipment-specific training rather than through private pilot certification. Technicians working with cranes,

manlifts, scaffolding, antennas, masts, and other tall industrial equipment all receive special training for the safe operation of their equipment. The tethered sUAS in operation is very similar to these types of industrial equipment. It is the intent of the Applicant to operate the sUAS in much the same manner as a crane or manlift and therefore this type of power-tethered sUAS is fundamentally different in operation and type of risk than *untethered* sUAS.

The equivalent level of safety will be maintained by equipment-specific training and knowledge for the tethered sUAS as outlined in the Manual Section E.

The Applicant is open to finding a workable solution that puts this sUAS inspection tool into the hands of trained survey and inspection technicians without requiring every field level technician to become a certified pilot.

14 C.F.R. § 61.113 (a) & (b): Private Pilot Privileges and Limitations: Pilot in Command.

Sections 61.113 (a) & (b) limit private pilots to non-commercial operations. If an exemption is denied for section 91.3(a) and (b) mentioned above, then because the sUAS will not carry a pilot or passengers, the proposed operations can achieve the equivalent level of safety of current operations by requiring the PIC operating the aircraft to have a private pilot's license rather than a commercial pilot's license to operate this sUAS. Unlike a conventional aircraft that carries the pilot and passengers, the sUAS is remotely controlled with no living thing on board. The area of operation is controlled and restricted, and all flights are planned and coordinated in advance as set forth in the Manual. The level of safety provided by the requirements included in the Manual exceeds that provided by a single individual holding a commercial pilot's certificate operating a conventional aircraft. The risks associated with the operation of the sUAS are so diminished from the level of risk associated with commercial operations contemplated by Part 61 when drafted, that allowing operations of the sUAS as requested with a private pilot as the PIC exceeds the present level of safety achieved by 14 C.F.R. §61.113 (a) & (b).

14 C.F.R. §91.7(a): Civil aircraft airworthiness.

The regulation requires that no person may operate a civil aircraft unless it is in airworthy condition. As there will be no airworthiness certificate issued for the aircraft, should this exemption be granted, no FAA regulatory standard will exist for determining airworthiness. Given the size of the aircraft and the requirements contained in the Manual for maintenance and use of safety check lists prior to each flight, an equivalent level of safety will be provided.

14 C.F.R. § 91.9 (b) (2): Civil Aircraft Flight Manual in the Aircraft.

Section 91.9 (b) (2) provides:

No person may operate a U.S.-registered civil aircraft ...

(2) For which an Airplane or Rotorcraft Flight manual is not required by §21.5 of this chapter, unless there is available in the aircraft a current approved airplane or Rotorcraft Flight Manual, approved manual material, markings, and placards, or any combination thereof.

The sUAS, given its size and configuration, has no ability or place to carry such a flight manual on the aircraft, not only because there is no pilot on board, but because there is no room or capacity to carry such an item on the aircraft.

The equivalent level of safety will be maintained by keeping the flight manual at the ground control point where the operator flying the sUAS will have immediate access to it. The FAA has issued the following exemptions to this regulation: Exemption Nos. 8607, 8737, 8738, 9299, 9299A, 9565, 9565B, 10167, 10167A, 10602, 32827, and 10700.

14 C.F.R. § 91.103: Preflight action

This regulation requires each pilot in command to take certain actions before flight to insure the safety of flight. As FAA approved rotorcraft flight manuals will not be provided for the aircraft an exemption will be needed. An equivalent level of safety will be provided as set forth in the Manual. The operator will take all actions including reviewing weather, power source requirements, landing and takeoff distances and aircraft performance data before initiation of flight.

14 C.F.R. §91.109: Flight instruction:

Section 91.103 provides that no person may operate a civil aircraft (except a manned free balloon) that is being used for flight instruction unless that aircraft has fully functioning dual controls.

sUAS and remotely piloted aircraft, by their design, do not have fully functional dual controls. Primary flight control is accomplished through the use of a control box that communicates with the aircraft via radio communications. the Manual outlines procedures for new operator training and certification using a single set of controls during instruction. The FAA has approved exemptions for flight training without fully functional dual controls for a number of aircraft and for flight instruction in experimental aircraft. See Exemption Nos.5778K & 9862A. The equivalent level of safety provided by the fact that neither a pilot nor passengers will be carried in the aircraft and by the size and speed of the aircraft.

14 C.F.R. §91.119: Minimum safe altitudes

Section 91.119 establishes safe altitudes for operation of civil aircraft. Section 91.119 (d) allows helicopters to be operated at less than the minimums prescribed, provided the person operating the helicopter complies with any route or altitudes prescribed for helicopters by the FAA. As this exemption is for a sUAS that is a helicopter and the exemption requests authority to operate at altitudes from 0 AGL up to 400 AGL. An exemption may be needed to allow such operations. As set forth herein, the sUAS will never operate at higher than 400 AGL. It will however be operated in restricted areas with a safety perimeter, where the general public will not be exposed to operations.

The equivalent level of safety will be achieved given the size, weight, speed of the sUAS as well as the location where it is operated. No flight will be taken without the permission of the property owner. Because of the advance notice to the property owner and participants in the inspection activity, all affected individuals will be aware of the planned flight operations as set forth in Section C of the Manual. Compared to flight operations with aircraft

or rotorcraft weighing far more than the maximum 55lbs. proposed herein and the lack of flammable fuel, any risk associated with these operations is far less than those presently presented with conventional aircraft operating at or below 500 AGL in surveying and inspection work. In addition, the low-altitude operations of the sUAS will ensure separation between these small-UAS operations and the operations of conventional aircraft that must comply with Section 91.119.

14 C.F.R. §91.121 Altimeter Settings

This regulation requires each person operating an aircraft to maintain cruising altitude by reference to an altimeter that is set "...to the elevation of the departure airport or an appropriate altimeter setting available before departure." As the sUAS may only have a digital barometric sensor and/or a GPS altitude read out, an exemption may be needed. An equivalent level of safety will be achieved by the operator, pursuant to the Manual and Preflight Checklist, confirming the altitude of the launch site shown on the ground station altitude indicator before flight.

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

Section 91.151 (a) 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 tether-powered subsystem of the sUAS provides virtually unlimited flight endurance, the only limitation being the endurance of the ground power source. Given the limitations on the sUAS proposed flight area and the location of its proposed operations within a predetermined area, a 30 minute fuel reserve for flight in daylight or night VFR conditions is reasonable.

14 C.F.R. §91.203 (a) and (b): Carrying Civil Aircraft Certification and Registration

The regulation provides in pertinent part:

(a) Except as provided in § 91.715, no person may operate a civil aircraft unless it has within it the following:

(1) An appropriate and current airworthiness certificate. . . .

(b) No person may operate a civil aircraft unless the airworthiness certificate required by paragraph (a) of this section or a special flight authorization issued under §91.715 is displayed at the cabin or cockpit entrance so that it is legible to passengers or crew.

The sUAS fully loaded weighs no more than 55 lbs and is operated without an onboard pilot. As such, there is no ability or place to carry certification and registration documents or to display them on the sUAS.

An equivalent level of safety will be achieved by keeping these documents at the ground control point where the operator flying the sUAS will have immediate access to them, to the extent they are applicable to the sUAS. The FAA has issued numerous exemptions to

this regulation. A representative sample of other exceptions includes Exemption Nos. 9565, 9665, 9789, 9789A, 9797, 9797A, 9816A, and 10700.

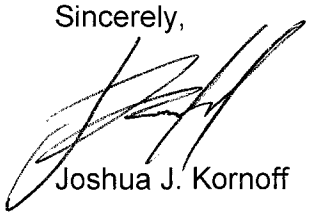
14 C.F.R. §91.405 (a); 407 (a) (1); 409 (a) (2); 417(a) & (b): Maintenance Inspections

These regulations require 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...," and others shall inspect or maintain the aircraft in compliance with Part 43.

Given that these section and Part 43 apply only to aircraft with an airworthiness certificate, these sections will not apply to the Applicant. Maintenance will be accomplished by the operator pursuant to the Flight Operations and Procedures as referenced in the Manual. An equivalent level of safety will be achieved because these small sUAS are very limited in size and will carry a small payload and operate only in restricted areas for limited periods of time. If mechanical issues arise the sUAS can land immediately and will be operating from no higher than 400 feet AGL. As provided in the Manual, the operator will ensure that the sUAS is in working order prior to initiating flight, perform required basic maintenance, and keep a log of any maintenance performed. Moreover, the operator is the person most familiar with the aircraft and best suited to maintain the aircraft in an airworthy condition to provide the equivalent level of safety.

Satisfaction of the criteria provided in Section 333 of the Reform Act of 2012--size, weight, speed, operating capabilities, proximity to airports and populated areas and operation within visual line of sight and national security – provide more than adequate justification for the grant of the requested exemptions allowing commercial operation of Applicant's sUAS in the infrastructure inspection survey industry pursuant to the Manual appended hereto.

Sincerely,



Joshua J. Kornoff

President, Allied Drones