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

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

June 26, 2015

Exemption No. 11929
Regulatory Docket No. FAA–2015–0345

Mr. Michael J. Lyons
President
9three Solutions Inc.
1281 Suncrest Towne Centre Drive
Morgantown, WV 26505

Dear Mr. Lyons:

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

The Basis for Our Decision

By letter dated February 5, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of 9three Solutions Inc. (hereinafter petitioner or operator) for an exemption. The exemption would allow the petitioner to operate an unmanned aircraft system (UAS) to conduct inspections of mining facilities and inspections of oil and natural gas pipelines and components.

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

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

Airworthiness Certification

The UAS proposed by the petitioner is an Align M690.

The petitioner requested relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*. In accordance with the statutory criteria provided in Section 333 of Public Law 112−95 in reference to 49 U.S.C. § 44704, and in consideration of the size, weight, speed, and limited operating area associated with the aircraft and its operation, the Secretary of Transportation has determined that this aircraft meets the conditions of Section 333. Therefore, the FAA finds that the requested relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*, and any associated noise certification and testing requirements of part 36, is not necessary.

The Basis for Our Decision

You have requested to use a UAS for aerial data collection[1]. The FAA has issued grants of exemption in circumstances similar in all material respects to those presented in your petition. In Grants of Exemption Nos. 11062 to Astraeus Aerial (*see* Docket No. FAA−2014−0352), 11109 to Clayco, Inc. (*see* Docket No. FAA−2014−0507), 11112 to VDOS Global, LLC (*see* Docket No. FAA−2014−0382), and 11213 to Aeryon Labs, Inc. (*see* Docket No. FAA−2014−0642), the FAA found that the enhanced safety achieved using an unmanned aircraft (UA) with the specifications described by the petitioner and carrying no passengers or crew, rather than a manned aircraft of significantly greater proportions, carrying crew in addition to flammable fuel, gives the FAA good cause to find that the UAS operation enabled by this exemption is in the public interest.

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

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

[1] Aerial data collection includes any remote sensing and measuring by an instrument(s) aboard the UA. Examples include imagery (photography, video, infrared, etc.), electronic measurement (precision surveying, RF analysis, etc.), chemical measurement (particulate measurement, etc.), or any other gathering of data by instruments aboard the UA.

Our Decision

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. 106(f), 40113, and 44701, delegated to me by the Administrator, 9three Solutions Inc. is granted an exemption from 14 CFR §§ 61.23(a) and (c), 61.101(e)(4) and (5), 61.113(a), 61.315(a), 91.7(a), 91.119(c), 91.121, 91.151(a)(1), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b), to the extent necessary to allow the petitioner to operate a UAS to perform aerial data collection. This exemption is subject to the conditions and limitations listed below.

Conditions and Limitations

In this grant of exemption, 9three Solutions Inc. is hereafter referred to as the operator.

Failure to comply with any of the conditions and limitations of this grant of exemption will be grounds for the immediate suspension or rescission of this exemption.

1. Operations authorized by this grant of exemption are limited to the Align M690 when weighing less than 55 pounds including payload. Proposed operations of any other aircraft will require a new petition or a petition to amend this exemption.

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

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

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

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

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

duration of the flight. The PIC must ensure that the VO can perform the duties required of the VO.

7. This exemption and all documents needed to operate the UAS and conduct its operations in accordance with the conditions and limitations stated in this grant of exemption, are hereinafter referred to as the operating documents. The operating documents must be accessible during UAS operations and made available to the Administrator upon request. If a discrepancy exists between the conditions and limitations in this exemption and the procedures outlined in the operating documents, the conditions and limitations herein take precedence and must be followed. Otherwise, the operator must follow the procedures as outlined in its operating documents. The operator may update or revise its operating documents. It is the operator's responsibility to track such revisions and present updated and revised documents to the Administrator or any law enforcement official upon request. The operator must also present updated and revised documents if it petitions for extension or amendment to this grant of exemption. If the operator determines that any update or revision would affect the basis upon which the FAA granted this exemption, then the operator must petition for an amendment to its grant of exemption. The FAA's UAS Integration Office (AFS−80) may be contacted if questions arise regarding updates or revisions to the operating documents.

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

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

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

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

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

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

14. The operator may not permit any PIC to operate unless the PIC demonstrates the ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption, including evasive and emergency maneuvers and maintaining appropriate distances from persons, vessels, vehicles and structures. PIC qualification flight hours and currency must be logged in a manner consistent with 14 CFR § 61.51(b). Flights for the purposes of training the operator's PICs and VOs (training, proficiency, and experience-building) and determining the PIC's ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption are permitted under the terms of this exemption. However, training operations may only be conducted during dedicated training sessions. During training, proficiency, and experience-building flights, all persons not essential for flight operations are considered nonparticipants, and the PIC must operate the UA with appropriate distance from nonparticipants in accordance with 14 CFR § 91.119.

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

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

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

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

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

20. The PIC is prohibited from beginning a flight unless (considering wind and forecast weather conditions) there is enough available power for the UA to conduct the

intended operation and to operate after that for at least five minutes or with the reserve power recommended by the manufacturer if greater.

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

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

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

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

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

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

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

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

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

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

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

30. At least 3 days before aerial filming, the operator of the UAS affected by this exemption must submit a written Plan of Activities to the local Flight Standards District Office (FSDO) with jurisdiction over the area of proposed filming. The 3-day notification may be waived with the concurrence of the FSDO. The plan of activities must include at least the following:
    a. Dates and times for all flights;
    b. Name and phone number of the operator for the UAS aerial filming conducted under this grant of exemption;
    c. Name and phone number of the person responsible for the on-scene operation of the UAS;
    d. Make, model, and serial or N−Number of UAS to be used;
    e. Name and certificate number of UAS PICs involved in the aerial filming;
    f. A statement that the operator has obtained permission from property owners and/or local officials to conduct the filming production event; the list of those who gave permission must be made available to the inspector upon request;
    g. Signature of exemption holder or representative; and
    h. A description of the flight activity, including maps or diagrams of any area, city, town, county, and/or state over which filming will be conducted and the altitudes essential to accomplish the operation.

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

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

This exemption terminates on June 30, 2017, unless sooner superseded or rescinded.

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

Enclosures

February 5, 2015

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

Re: Petition of 9three Solutions, for an Exemption Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012

Dear Gentlemen:

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 ("Reform Act") and 14 C.F.R. Part 11, 9three Solutions ("9three"), hereby applies for an exemption from the Federal Aviation Regulations ("FARs") identified below, to allow commercial operations of small unmanned aerial vehicles (i.e. "small unmanned aircraft " or "UAS").

The exemption is made based on information in this petition, as well as the accompanying Align M690 Operations and Safety Manual ("Operations Manual") and the flight and maintenance manuals for the UASs identifies and incorporated by reference into the accompanying packet

For your convenience, the petition is organized as follows:

I. DESCRIPTION OF PETITIONER

9three is a privately held company that provides technical solutions for energy companies in the Southwestern Pennsylvania and Northern West Virginia regions: offering innovative approaches to solve these companies' operational, engineering, and business challenges. 9three has a wide variety of experience in the coal and gas industry and holds unique understanding of how large energy companies operate. 9three also understands how state government requirements impact energy company operations and has built automated hardware and software enterprise-grade systems that optimize processes and reduce workload by utilizing cutting-edge technologies.

Recently, multiple companies have approached 9three expressing interest in using an UAS to inspect power substations, oil and gas wells, and private wireless towers as well as provide 3D mapping and aerial photogrammetry of proposed and existing construction sites. Currently these companies use commercial aircraft to perform these roles. Companies are looking for not only a lower cost option, but a solution that can yield better information and reduce the risk to human life. Utilizing a UAS will meet these requirements with the most important factor being safety, as personnel would not be inside or in proximity to the equipment.

II. TYPES OF OPERATIONS

A. Request to Use UASs for Survey and Inspection of Mining Facilities

9three is requesting exemptions pursuant to Section 333 to conduct inspections of mining companies' surface operations. 9three will use its ability to conduct inspection to maintain safety at the facilities and provide predictive failure analysis and engineering design considerations. These inspections are conducted on private property, not accessible to the public, to help ensure safety. Using a UAS to conduct inspections may reduce human risk as some of these structures can be dangerous due to their height above ground, proximity to electricity, heat generation, etc.

B. Request to Use UASs for Survey and Inspection of Oil and Natural Gas Pipelines and Associated Components

9three also seeks exemption pursuant to Section 333 to conduct inspections of Oil and Natural Gas pipelines and the associated components. These inspections are conducted every two weeks using a rotorcraft and crew that fly along the pipeline looking for problems. There are many advantages to using a UAS to conduct these inspections versus a rotorcraft.

Using a UAS will be much safer than a rotorcraft in the inspection process. The UAS will weigh no more than 17 pounds compared to thousands of pounds for a rotorcraft. The UAS will not carry any flammable fuel compared to the rotorcraft and will not carry anyone onboard; reducing the risk to human life substantially. Utilizing a UAS will reduce the risk to both human life and property substantially while still being able to properly inspect pipelines.

III. RELEVANT STATUTORY AUTHORITY

This petition for exemption is submitted in accordance with Section 333(a) through (c) of the FAA Modernization and Reform Act of 2012. Congress has directed the FAA "to safely accelerate the integration of civil unmanned aircraft systems into the national airspace system." Pursuant to Section 333 of the Reform Act, The FAA Administrator is to permit unmanned aircraft systems to operate in the National Airspace ("NAS") where it is safe to do so based on the following considerations:

- 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 the visual line of sight of the operator.

Additionally, the FAA Administrator has general authority to grant exemptions from the agency's safety regulations and minimum standards when the Administrator decides a requested exemption is in the public interest. *See* 49 U.S.C. § 106(f) (defining the authority of the Administrator); 49 U.S.C. § 44701(f) (permitting exemptions from § 44701(a), (b) and § 44702 – 44716, et seq.). A party requesting an exemption must explain the reasons why the exemption: (1) would benefit the public as a whole, and (2) would not adversely affect the safety (or how it would provide a level of safety at least equal to the existing rules). *See* 14 C.F.R. § 11.81 (petitions for exemption).

IV. 9three PROPOSED OPERATIONS MEET THE REQUIREMENTS OF SECTION 333 OF THE REFORM ACT

The proposed operations in the Petition for Exemption qualify for expedited approval under Section 333 of the Reform Act. Each of the statutory criteria and other relevant factors are satisfied.

A. Approval is Warranted Based on the UASs Size, Weight and Operational Capability

9three will employ the UASs identified in Section 2 of the accompanying Operations Manual. This UAS will be used for all of the operations as set forth in the Operations Manual. The UAS will be limited to a maximum flight speed of 33mph, and vertical ascent speed will be limited to 14mph, and will not have a weight in excess of 17 pounds. The UAS has an integrated GPS system to calculate the UASs' position and height and to relay that information via a secure connection to the operator. In addition, the UAS has failsafe modes that are triggered by certain events. The system permits the aircraft to return to a predetermined location and land to prevent injury.

B. Approval is Warranted Based on the Operational Restrictions Set Forth in the Operations Manual

The 9three Operations Manual contain all of the procedures and limitations to successfully perform inspections of Oil and Gas facilities, pipeline and associated equipment. To assist the FAA in its safety assessment of 9three operations, listed below is a summary of operational limitations and conditions which will ensure a level of safety equal to or exceeding the level of safety for operations that are conducted under the current regulatory guidelines:

1. The UAS that is used by 9three will weigh 17 pounds or less.

2. Flights will be operated within the line of sight of both the pilot and observer at all times

3. Maximum total flight time for each flight will be limited to the amount of time the UAS can be flown and still land with at least 25% battery power remaining.

4. Flights will be operated at an altitude of no more than 400 feel AGL.

5. Flights will be operated at a lateral distance of at least 100 feet from any persons or property that are not directly related to the operation who have not given prior permission.

6. Aircraft speed will be limited to 33mph for forward flight and vertical ascent will be limited to 14mph.

7. Minimum crew for each operations will consist of the IAS PIC, one or more Visual Observers dependent on the safety requirements of the operation, and a Sensor Operator if the onboard sensor requires human control.

8. The PIC will have at least a private pilot's license and will have sufficient knowledge of the area where the operation is taking place, as well as training to

safely operate the UAS in accordance with the standards set forth in the Operations Manual.

9. The designated Observer will be in constant voice contact with the PIC during the entire operation.

10. The UAS will operate in accordance with the safety and operational requirements of the Operations Manual.

11. Prior to any operation a Mission Plan will be created setting forth the limitations for the flight as well as any hazard information

12. A NOTAM will be issued no more than 48 hours in advance of flight, but not less than 24 hours before flight.

13. If the UAS lose communications or loses its GPS, it will have the capability to return to a pre-determined home location set up before flight and safely land.

14. Contingency plans will be in place to safely terminate the flight if there is a loss of communication between the pilot and the observer.

15. The UAS will have the capability to abort a flight in case of unpredicted obstacles or emergency while in flight.

V. REGULATIONS FROM WHICH EXEMPTION IS REQUESTED

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, including UASs, from its safety regulations and minimum standards when the Administrator decides a requested exemption is in the public interest.

9three seeks and exemption from several interrelated provisions of 14 C.F.R. Parts 21, 45, 61, and 91 for purposes of conducting the requested operations using a UAS. Listed below are (1) the specific sections of 14 C.F.R. for which exemption is sought, and (2) the operating procedures and safeguards that 9three has put into place which will ensure a level of safety that is better than or equal to the rules from which the exemption is sought.

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

The FAA has stated that no exemption is necessary from this section if a finding is made under the Reform Act that the UAS selected provides an equivalent level of safety when compared to aircraft normally used for the same application. These criteria have been met, and

therefore no exemption is needed. *See* Grant of Exemption to Clayco, Inc., Docket No. FAA-2014-0507 at page 5. If however, the FAA determines that there are characteristics of the UAS that fail to meet the requirements of the Reform Act, an exemption is requested.

Equivalent Level of Safety

The UAS identified in Section 1 of the Operations Manual is safe when its size, weight, speed and operational capability are taken into account. As set forth in Section II, *Supra*, the UAS weigh less than 17 pounds and will be flown less than 33mph and in a sparsely populated area. Additionally, the UAS will not be carrying pilots or passengers, explosive materials, flammable liquid fuels, and will operate exclusively within the parameters that are outlined in the Operations Manual.

Operations that take place under this exemption will be closely monitored and controlled by the PIC and will be conducted in compliance with local public safety requirements. 9three will also provide the FAA with advance notice of all operations via NOTAM prior to any operations. During all operations the UAS operated under the proposed conditions, will be at least as safe as, or safer than conventional rotorcraft operating with an airworthiness certificate without the restrictions and conditions of the proposed UAS operations.

The UAS themselves do not need to communicate with other aircraft or ATC, due to the fact that those capabilities will be possessed by the PIC and observer, who are not onboard the UAS. Additionally, no sense and avoid technology is necessary on the UAS due to the fact that it will be operated by VLOS at all times.

B. 14 C.F.R. Part 27 Airworthiness Standards: Normal Category Rotorcraft

14 C.F.R. Part 27 sets forth the procedural requirements for airworthiness certification of normal category rotorcraft. To the extent 9three's UAS would otherwise require certification under Part 27, 9three seeks an exemption from Part 27's airworthiness standards for the same reasons which were identified in the request for exemption from 14 C.F.R. Part 21, Subpart H, *supra*.

C. 14 C.F.R. §§ 91.9(c), 45.23(b) and 45.27(a): Aircraft Marking and Identification Requirements

9three seeks and exemption from the aircraft marking and identification requirements contained within 14 C.F.R. §§ 91.9(c), 45.23(b) and 45.27(a).

- 14 C.F.R. § 91.9(c), Civil Aircraft Flight Manual, Marking and Placard requirements, provides that:

  > No person may operate a U.S.-registered civil aircraft unless that aircraft is identified in accordance with Part 45 of this chapter.

- 14 C.F.R. § 45.23(b), Markings of the Aircraft, states:

  > 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.

- 14 C.F.R. § 45.27(a), Rotorcraft, states:

  > Each operator of a rotorcraft must display on that rotorcraft horizontally on both surfaces of the cabin, fuselage, boom, or tail the marks required by § 45.23.

In a previous Grant of Exemption, the FAA determined that exemption from these requirements was warranted provided that the aircraft "have identification "(N-Number) markings in accordance with 14 CFR part 45, Subpart C if the markings are as large as practicable." FAA Docket No. FAA-2014-0352.

Equivalent Level of Safety

9three will mark all aircraft with appropriate markings on a prominent place on the fuselage as large as possible if relief is not granted from 14 C.F.R. Part 21, Subpart H.

D. 14 C.F.R. § 91.9(b)(2): Civil Aircraft Flight Manual in the Aircraft and 14 C.F.R. § 91.203(a) and (b): Carrying Civil Aircraft Certification and Registration

Pursuant to 14 C.F.R. § 91.9(b)(2):

> (b) No Person may operate a U.S.-registered civil aircraft –
>
> …
>
> (2) For which an Airplane or Rotorcraft Flight Manual is 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.

Pursuant to 14 C.F.R. § 91.203(a) and (b):

> (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 entrances so that it is legible to passengers or crew.

9three does not request an exemption from this section but instead notifies the FAA that, in accordance with FAA Office of Chief Counsel's Opinion dated August 8, 2014, the UAS flight manual and other documentation will be kept at the control station with the PIC during flight, The Chief Counsel's Office has held that for all UAS operations, this alternate method constitutes full compliance with the regulations.

E. 14 C.F.R. § 91.7(a): Civil Aircraft Airworthiness

9three seeks and exemption from 14 C.F.R § 91.7(a), which requires that all civil aircraft be in airworthy condition to be operated. The FAA has stated that no exemption is required to the extent that the requirements of Part 21 are waived or found inapplicable. Accordingly, 9three requests that the requirements for Section 91.7 be treated in accordance with Section V (A), *supra.*

F. 14 C.F.R. § 91.103: Preflight Action

9three seeks an exemption from 14 C.F.R. § 91.103, which requires a PIC to become familiar with specific information before each flight, including information contained in the FAA-approved Flight Manual on board the aircraft. While the PIC will be familiar with all information necessary to safely conduct flight operations, an exemption is requested to the extent that an FAA-approved Flight Manual is required.

Equivalent Level of Safety

An equivalent level of safety will be provided by following the Aircraft Operations Manual and the flight manual provided by the manufacturer. The PIC will take all required preflight actions; including performing all required checklists, and reviewing the following: flight requirements, battery charge, mission requirements, aircraft performance data, takeoff and landing distance, weather, and emergency landing areas before flight. The Operations Manual and manufacturer's flight manual will be kept at the ground station with the PIC at all times.

G. 14 C.F.R. § 91.109(a): Flight Instruction

9three seeks an exemption from 14 C.F.R. § 91.109(a), which provides that "{n}o 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." UASs and remotely piloted aircraft, by their design do not have functional dual controls. Instead, flight control is accomplished through the use of a device that communicates with the aircraft via radio communication through the output of the transmitter.

Equivalent Level of Safety

Given the size and speed of the UAS used by 9three, and equivalent level of safe training can still be performed without dual controls because no pilot or passengers are aboard the UAS, and all persons will be a safe distance away in the event that the UAS experiences and difficulties during flight instruction. In addition 9three will conduct flight training at AMA approved flying sites. The training flights will be conducted in a sterile training area and will otherwise comply with the provisions in the Operations Manual for flights at the test site. In addition, 9three's proposed method of operation provides superior levels of safety.

H. 14 C.F.R. § 91.119: Minimum Safe Altitudes

9three requests and exemption from the minimum safe altitude requirements of 14 C.F.R. § 91.119. Section 91.119 prescribes the minimum safe altitudes under which aircraft may not operate, including 500 feet above the surface and away from any person, vessel, vehicle, or structure in non-congested areas. *See* 14 C.F.R. § 91.119(c). Section 91.119(d) allows for a helicopter to operate at less than those minimum altitudes when it can be operated "without hazard to persons or property on the surface," provided that "each person operating the helicopter complies with any routes or altitudes specifically prescribed for the helicopters by the FAA."

Equivalent Level of Safety

Compared to flight operations that are conducted with rotorcraft weighing far more than the maximum weights proposed herein, and given the lack of flammable fuel, any risk associated with these operations is far less than those that presently exist with conventional aircraft. An equivalent level of safety will be achieved given the size, weight, and speed of the UAS, as well as the location where it will be operated. In order to avoid any risk to aircraft, flight operations will be restricted to 400' AGL or below.

I. 14 C.F.R. § 91.121: Altimeter Settings

9three seeks an exemption from 14 C.F.R. § 91.121, which requires a person operating an aircraft to maintain cruising altitude or flight level by reference to an altimeter that is set to the elevation of the departure airport or barometric pressure. An exemption is required to the extent that the UAS does not have a barometric altimeter, but rather a GPS altitude read out.

Equivalent Level of Safety

The FAA has states that an equivalent level of safety can be achieved if the UAS will be operated at 400' AGL or below and within VLOS in addition to GPS based altitude information relayed in real time to the operator. *See* Grant of Exemption to Astraeus Aerial, Docket No.

FAA-2014-0352. As the attached Operations Manual indicates, the chosen UAS meets these requirements in that a zero altitude initiation point will be obtained prior to flight operations.

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

9three requests an exemption from 14 C.F.R. § 91.151(a)'s fuel requirements for flight in VFR conditions. Section 91.151 states:

> (a) No person may begin a flight in an airplane under VFR conditions unless (considering wind and forecast weather conditions) there is enough fuel to fly to the first point of intended landing and, assuming normal cruising speed –
>
> (1) During the day, to fly after that for at least 30 minutes; or
>
> (2) At night, to fly after that for at least 45 minutes.

Here, the technological limitations on UAS battery power means that no meaningful flight operations can be conducted while still maintaining a 30 minute reserve power supply. 9three proposes that all flights comply with this requirement by mandating that the aircraft be safely landed with no less than 25% of remaining battery life.

Equivalent Level of Safety

The FAA has states that an equivalent level of safety is provided if the UAS flight is terminated with at least 25% reserve battery power still available. *See* Grant of Exemption to Astraeus Aerial, Docket No. FAA-2014-0252. The Operations Manual confirms this limit, which provides an equivalent level of safety.

K. 14 C.F.R § 91.405(a), 91.407(a)(1), 91.409(a)(2); 91.417(a) and (b): Maintenance Inspections

9three seeks an exemption from the maintenance inspection requirements contained in 14 C.F.R. § 91.405(a), 91.407(a)(1), 91.409(a)(2); 911.417(a) and (b). These regulations specify maintenance and inspections standards in reference to 14 C.F.R. Part 43. *See, e.g.,* 14 C.F.R. § 91.405(a) (stating that each owner or operator of an aircraft "[s]hall have the aircraft inspected as prescribed in subpart E of this part and shall between required inspections …have discrepancies repaired as prescribed in part 43 of this chapter"). An exemption from these regulations is needed because Part 43 and these sections only apply to aircraft with an airworthiness certificate, which the UAS will not have.

Equivalent Level of Safety

An equivalent level of safety will be achieved because maintenance and inspections will be performed in accordance with the UAS Manufacturer's Manual, as referenced in the Operations Manual. As provided in the Operations Manual, flights will not be conducted unless a

flight operations checklist is completed by the PIC that includes all aircraft components. The Operations Manual also sets requirements for maintenance log book and record keeping as well as routine and post-flight maintenance. The Operations Manual sets requirements for both annual maintenance and preventative maintenance based on hours of flight.

L. 14 C.F.R. § 61.113: Private Pilot Privileges and Limitations

9three seeks exemption from 14 C.F.R § 61.113, which restricts private pilot certificate holders from flying aircraft for compensation or hire, and would also require a second class medical certificate. The purpose of Part 61 is to ensure that the skill and competency of any PIC matches the airspace in which both the PIC and UAS will be operating, as well as requiring certifications if the private pilot is carrying passengers or cargo for hire. In this care, while the UAS will be operated as part of a commercial operation, it will carry neither passengers nor cargo. In the Grant of Exemption in FAA Docket No. FAA-2014-0507, the FAA determined that a person holding a private pilot certificate "would not adversely affect operations in the NAS or present a hazard to persons or property on the ground."

9three will operate in a sterile area away from persons and property not directly involved in the operation. It will be flown within VLOS at 400' AGL or below. A NOTAM will be issued between 24 and 48 hours before the flight is to occur.

Equivalent Level of Safety

In addition to these flight restrictions, 9three will further ensure safe flight operation by requiring that any PIC be thoroughly familiar with the airspace being operated in but also in the unique aspects of UAS flight. Pilots will also be required to conduct training flights at a local AMA site to gain flight experience and become familiar with the way the UAS flies and how it responds to inputs. 9three believes that this system will provide a higher level of competency and proficiency for its pilots resulting in a safer operational environment.

VI. DRUG AND ALCOHOL PROGRAM

9three has a very strict policies in place regarding drug and alcohol use that ensures no person may act as a PIC, observer, or sensor operator if they are under the influence of alcohol or any drug

VII. PUBLIC INTEREST

Granting 9three's exemption request furthers the public interest in many ways. National policy set by Congress favors early integration of UAS into NAS in controlled, safe working environments such as those proposed with this petition. Additionally the public also has an interest in reducing the hazards and emissions associated with the alternate use of helicopters or other aircraft used to conduct similar inspections. The UAS are much lighter than their passenger carrying counterparts, do not carry any human life or flammable fuel thus reducing the risk to human life in the event of an accident. Currently these inspections are done with helicopters or light aircraft; if these inspections were done with a UAS instead it would benefit the public as the risk of an accident affecting human life are drastically reduced. Having a 15 pound UAS operate

around oil and gas facilities also poses far less risk to the facilities if there was an accident. If there was an accident during an inspection of oil and gas facilities in a full size helicopter full of flammable fuel the potential for death and sever damage to the facilities including environmental consequences is much higher than if a drone crashed while doing the same inspection. In light of all these advantages it furthers the public interest to use a UAS instead of other aircraft for these inspections.

VIII. PRIVACY

All flights will be conducted in accordance with any federal, state or local laws regarding privacy.

IX. FEDERAL REGISTER SUMMARY

Pursuant to 14 C.F.R. Part 11, the following summary is provided for publication in the Federal Register, should it be determined that publication is necessary:

9three seeks an exemption from the following rules:

14 CRF Part 21, Subpart H; 14 CFR Part27; 14 CFR 45.23(b); 14 CFR § 61.113; 14 CFR 91.7(1); 14 CFR 91.9(b)(2); 14 CFR 91.103; 14 CFR 91.109(a); 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 91.407(a)(1); 14 CFR 91.409(a)(2); 14 CFR 91.417 (a) & (b).

This exemption will enhance the safety by reducing risk to the general public and property owners from the hazards associated with performing the same work with conventional rotorcraft and aircraft.

X. CONCLUSION

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, operation within visual line of sight, and national security; provides more than adequate justification for the grant of the requested exemptions to permit 9three to operate the selected UAS in the manner described within.

Granting the requested exemption will benefit the public interest in many ways including (1) significantly improving safety and reducing risk to human life, and (2) improving the quality of services offered and decreasing the operating costs compared to those of conventional aircraft and rotorcraft.

9three Solutions Inc.

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Michael J. Lyons, President

Attachments: UAS Operations Manual, Flight Log, Preflight Checklist.