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

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

May 1, 2015

Exemption No. 11472
Regulatory Docket No. FAA-2015-0301

Ms. Carol Gosain
Counsel
Keystone Aerial Surveys, Inc.
1330 Connecticut Avenue, NW
Washington, DC 20036

Dear Ms. Gosain:

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

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

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

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

Airworthiness Certification

The UAS proposed by the petitioner is a Altavian Nova F6500.

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

The Basis for Our Decision

You have requested to use a UAS for aerial data collection[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.

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, Keystone Aerial Surveys, 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.

[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.

Conditions and Limitations

In this grant of exemption, Keystone Aerial Surveys, 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 Altavian Nova F6500 when weighing less than 55 pounds including payload. Proposed operations of any other aircraft will require a new petition or a petition to amend this exemption.

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

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

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

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

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

7. This exemption and all documents needed to operate the UAS and conduct its operations in accordance with the conditions and limitations stated in this grant of exemption, are hereinafter referred to as the operating documents. The operating documents must be accessible during UAS operations and made available to the Administrator upon request. If a discrepancy exists between the conditions and limitations in this exemption and the procedures outlined in the operating documents,

the conditions and limitations herein take precedence and must be followed. Otherwise, the operator must follow the procedures as outlined in its operating documents. The operator may update or revise its operating documents. It is the operator's responsibility to track such revisions and present updated and revised documents to the Administrator or any law enforcement official upon request. The operator must also present updated and revised documents if it petitions for extension or amendment to this grant of exemption. If the operator determines that any update or revision would affect the basis upon which the FAA granted this exemption, then the operator must petition for an amendment to its grant of exemption. The FAA's UAS Integration Office (AFS−80) may be contacted if questions arise regarding updates or revisions to the operating documents.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Sincerely,

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

Enclosures

February 6, 2015

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

Re: Keystone Aerial Surveys, Inc. Petition for Section 333 Exemption for Altavian Nova F6500

Dear Sir,

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 (FMRA) and 14 C.F.R. Part 11, Keystone Aerial Surveys, Inc. (Keystone) is petitioning the Federal Aviation Administration (FAA) for an exemption from the Federal Aviation Regulations (FARs) requested below concerning small unmanned aerial systems (UAS). Section 333 of the FMRA promotes UAS integration into the national airspace by granting the FAA authority to allow for the safe operation of certain UAS within the national airspace.

Keystone specializes in providing quality aerial surveys. Keystone has flown millions of survey miles throughout the United States on projects with varied specifications. We have four locations: Philadelphia, PA (headquarters); Tyler, TX; Tucson, AZ; and Los Angeles, CA. Our Flight Department has considerable experience collecting airborne imagery at high and low altitudes in several formats including digital, film and LiDAR. Keystone also collects and processes both Airborne GPS (ABGPS) and Inertial Measurement Unit (IMU) data.

Keystone currently operates twenty U.S.-registered manned aircraft, thirteen metric film camera systems, four large format digital sensors and one LiDAR system, and employs flight crews consisting of FAA-licensed commercial pilots, camera operators, four full time licensed aircraft mechanics and a fully equipped and staffed photo lab and IT Department for extensive post processing support. Six of Keystone's employees are ASPRS Certified Photogrammetrists. With this significant capability and over 50 years of aerial survey knowledge and the experience gained through managing and acquiring over 350 individual large-scale digital projects for various clients throughout the United States, Keystone is uniquely positioned to acquire aerial imagery collection projects with various requirements while ensuring the timely delivery of the best possible product.

As shown below, Keystone proposes to operate small UAS subject to restrictions and conditions that will ensure an equivalent level of safety and that are at least as stringent as those that FAA has found to be acceptable in its most recent grants of petitions under Section 333, including Exemption Nos. 11150 and 11153 issued on January 23, 2015. Further, this petition raises no national security or privacy concerns

for the reasons discussed below. Keystone therefore respectfully submits that prompt grant of this petition is warranted.

As a data provider, Keystone will not be analyzing or interpreting data; rather, Keystone exists to provide Remote Sensing in a safe and effective manner for multiple industries and governmental uses. For this reason, Keystone will use, in addition to other aircraft, the Altavian Nova F6500 (also known as the Nova Block III) with the metric camera sensor package. This aircraft is familiar to the FAA and has been approved for use in Exemption Nos. 11111 and 11114 issued on December 10, 2014. The detailed specifications of the aircraft are listed in a section below.

Keystone will use licensed pilots and visual observers (VOs) for all of its UAS operations. All pilots and VOs will receive factory training and flight hours in accordance with manufacturer and Keystone operational manuals before approval to fly is given. Recurrent training for UAS pilots and VOs will be outlined and implemented in a manner similar to what Keystone requires of its manned aircraft pilots, details of which appear in the Keystone Flight Operations Manual.[1]

Keystone is requesting this exemption in order to provide services for many industries, including but not limited to:

1. Mapping – High resolution imagery will be used for small area mapping in situations where UAS acquisition is safer, more cost effective or faster than manned aircraft (as in disaster response/assessment, etc.)
2. Government Agencies – Federal, State and Local (Local governments with limited budgets will be better able to afford UAS surveys as opposed to manned flights)
3. Engineering – Mining, waste disposal, pipelines, etc.
4. Insurance – Claim assessment
5. Geographic Information Systems – Populating data for analysis, including precision agriculture
6. Solar panel installation, maintenance and assessment
7. Wireless installation and maintenance

Keystone is requesting to use the UAS in remote or rural locations in states where it currently has bases (PA, CA, AZ, and TX) and contiguous states where Keystone often operates out of these bases (NJ, NY, MD, DE, OK, NM, and NV). These locations will fall outside of populated areas when plotted on VFR Sectional Aeronautical Charts, will not be within five (5) miles of any airport or helipad (unless FAA has approved such operations and Keystone has a written agreement with the airport/helipad manager), not be within 100 meters of federal or state roads having more than two lanes and not within 50 meters of all paved state roads having two lanes or less. Keystone is requesting permission to fly over state owned/maintained unpaved or unimproved roads in anticipation of meeting the known governmental need to cost effectively assess these types of rural roads.

Keystone's initial work will take place near its corporate headquarters in Philadelphia, PA with programs at its other offices in the southwest and west to follow. The plan will be to develop customer awareness and projects in the states closest to Philadelphia, further refining procedures and operational details.

[1] Keystone is submitting its Flight Operations Manual, the Altavian Nova F6500 Maintenance and Operator Manuals and the Altavian Nova Family Operations Manual confidentially pursuant to 14 CFR Section 11.35(b). The Manual contains confidential, proprietary and commercially sensitive information that has not been made available to the public and that is protected under the Freedom of Information Act, 5 U.S.C. § 552, *et seq.*

When Keystone is confident in its operations, has an experienced workforce and demand in other regions, the other offices will begin operations. This process is expected to take six months from receiving approval of the exemption.

Petitioner Name and Address:

Keystone Aerial Surveys, Inc.
Northeast Philadelphia Airport
9800 Ashton Road
PO Box 20159
Philadelphia, PA 19114
(215) 677-3119
dday@kasurveys.com

Exemption Requested:

Keystone Aerial Surveys, Inc. is requesting this waiver as it applies to the following FARs:

- 14 CFR Section 61.113 (a) and (b): Private pilot privileges and limitations
- 14 CFR Section 91.7: Civil aircraft airworthiness
- 14 CFR Section 91.119: Minimum altitude requirements
- 14 CFR Section 91.121: Altimeter requirements
- 14 CFR Section 91.151: Fuel requirements
- 14 CFR Section 91.405: Maintenance requirements
- 14 CFR Section 91.407: Maintenance requirements
- 14 CFR Section 91.409: Inspection frequency
- 14 CFR Section 91.417: Maintenance records

Keystone's History

Keystone Aerial Surveys, Inc., a United States based flyer, and a wholly owned subsidiary of PASCO Corp., has been safely performing aerial data acquisition throughout the US for over 50 years. Keystone takes safety and professionalism seriously in its role as a part 91 operator. Keystone has long operated in compliance with the rules governing use of the National Airspace. Keystone has worked successfully for both public and private entities in some of the most congested airspace in the United States (including New York, Philadelphia, Atlanta, Dallas, Los Angeles, and Washington, D.C.). Keystone has worked with military bases to obtain access to no-fly zones in support of USGS, USDA and other government agencies.

Keystone's fleet of 20 aircraft consists of a mix of single and twin engine Cessnas and several other fixed wing aircraft suited to the aerial acquisition industry. A staff of nearly twenty full time commercial pilots are employed across Keystone's four offices, while five full time maintenance personnel are dedicated to the care and safety of the aircraft. Additionally, Keystone has worked extensively with the Philadelphia Flight Standards District Office for aircraft modifications for survey missions.

Summary of operations

1. All flights will be conducted in accordance with Keystone's Flight Operations Manual (FOM) and the manufacturer operations manual(s) following Visual Flight Rules (VFR) during Visual Meteorological Conditions (VMC).
2. The UAS with payload will weigh less than 55 pounds.
3. The UAS pilot must hold at least an FAA private pilot's license with at least a third class medical certificate.
4. All flights will include a Pilot in Command (PIC) and Visual Observer (VO). Flights will be operated within line of sight of the PIC and VO. The PIC and VO will be able to communicate verbally at all times.
5. Maximum flight time will be less than 80 minutes per the manufacturer's recommendation.
6. Airspeed will not exceed 60 knots.
7. Flights will be operated at an altitude of 400 feet AGL or less and more than 100 feet above any building or structure to be imaged or inspected.
8. All flights will be conducted as to maintain a lateral distance of at least 500 feet from any structures, buildings, vehicles, vessels or persons not associated with or given consent to the operation, unless barriers or structures are present that sufficiently protect nonparticipating persons. Flights will be conducted at least 100 meters from roads with more than two lanes and at least 50 meters from all other paved roads.
9. The Pilot will have manufacturer training and flight hours with the Nova F6500 in accordance with the Keystone FOM and the manufacturer's requirements. Specifically, minimums of 25 UAS flight hours, 10 hours with the Nova F6500 or similar type (fixed wing UAS), 5 hours with the Nova F6500 and 3 takeoffs and landings with the F6500 in the last 90 days will be required.
10. The VO will have training on UAS operations and manufacturer training on the Nova F6500.
11. All required permissions and notifications to federal, state and local governments, Air Traffic Control and private land holders will be made/obtained prior to any flight.
12. In accordance to the Keystone FOM, alternate landing areas and contingency plans will be in place before any UAS flight is attempted.
13. The UAS will not be flown at night or when weather conditions may prevent a visual observation of the vehicle throughout the duration of the flight.
14. All flights will be performed with the safety and privacy of those not involved or aware of the flight as a key concern. The UA will remain clear and yield to all manned aircraft.
15. If GPS connectivity is lost but link remains, the PIC will manually return the aircraft to one of the pre-determined landing zones or perform an immediate emergency landing as per the Keystone FOM.
16. In the unlikely event of a lost link/communication loss, the PIC will notify ATC immediately and the VO will maintain visual of the UAS and document its location. According to manufacturer and Keystone protocols, prior to flight, the F6500 is preprogrammed with an automated landing location. The UAS will perform an automatic landing at the location within the mission site should a loss of link occur.
17. Prior to each flight, the PIC will inspect the UAS to confirm that it meets manufacturer specification for safe flight. After a maintenance event involving a critical component of the UA, a test flight will be performed and logged in the aircraft maintenance logs.

18. Keystone will follow all manufacturer maintenance and inspection procedures, schedules and documents for the UA and log each event in the aircraft maintenance logs in accordance with the Keystone FOM in similar manner to manned aircraft.

Aircraft to be Used

The Altavian Nova F6500 Aircraft is an all-electric drone that provides precision 3D mapping and real-time thermal infrared and high definition video capabilities. The system deploys quickly in nearly every environment due to its light weight and hand-launchable design. The Nova F6500 has been previously approved for use in the national airspace, has a 14 CFR 91.215 compatible transponder and has a proven safety record.

The F6500 can be landed in water for safety concerns and provides a generally stable platform for aerial sensing operations. The Altavian Nova F6500 is well suited for large area collections at higher accuracies due to its long endurance and quality or interchangeable payloads.

Specifications include:

- Wing Span: 108”
- Length: 67”
- Weight 15lbs without payload and <20lbs with payload
- Top speed: 60 knots
- Cruise Speed: 30 knots
- Endurance: 1.5 hours

Extent of relief

Keystone seeks an exemption from several and often interrelated provisions of 14 CFR Part 91 in conjunction with the operations it is requesting to undertake as part of the UAS exemption. The following list details the exemptions requested and the procedures that will ensure an equivalent level of safety to the public and the national airspace. FAA has granted similar exemptions to those requested below in, for example, Exemption Nos. 11136, 11138, 11150 and 11153.

A. 14 CFR Section 61.113 (a) and (b)

Section 61.113 (a) prohibits a pilot from operating an aircraft for hire or compensation with a private pilot’s license. Part (b) allows a private pilot to fly an aircraft for hire if the flight is incidental to the business; in as much as Keystone’s primary business is data acquisition during flight, an exemption from this section is also necessary.

Equivalent Level of Safety

Because the UAS does not carry crew or persons, the operations proposed in this request can be carried out with appropriate safety by pilots with private licenses. While it is likely that many of the pilots flying Keystone UAS will be commercial pilots, the type of flying and safety measures expected of the pilot and industry do not require this license. Additionally, all pilots will be under the

supervision and training of commercial pilots, ensuring professionalism and safety in the airspace. Keystone also believes that the awareness of airspace restrictions, communication with ATC and situational awareness concerns are satisfied by a private pilot's license. The FAA itself, in Exemption No. 11066, concluded that private pilot licensing will ensure that the PIC has proper knowledge and training by comparing skills side by side. For these reasons, Keystone is certain that an equivalent level of safety will be maintained with this exemption.

B. 14 CFR Section 91.7(a): Civil aircraft airworthiness

Section 91.7(a) requires that no person may operate a civil aircraft unless it is in an airworthy condition. To the extent that this regulation would require an airworthiness certificate for the aircraft, Keystone requests an exemption.

Equivalent Level of Safety

All UAS operated by Keystone will be under 55 pounds including payload and will operate in a defined area made known to local ATC. Furthermore, the vehicles Keystone will operate do not carry personnel, explosive materials or flammable liquid fuels or other potentially hazardous materials. The vehicles to be used will be maintained to the strict tolerances of Keystone's maintenance staff and the guidelines set out in the operations manuals of the manufacturer and Keystone's FOM. The NOVA series UAS from Altavian has been approved for use in two previous Section 333 exemptions (Exemption # 11111 and 11114) and many thousands of successful flight hours have been logged with this vehicle. This UAS, piloted by Keystone's pilots, does not represent a risk to the national airspace or the public.

C. 14 CFR Section 91.119(c): Minimum altitude requirements

Petitioner requests an exemption from the minimum safe altitude requirements specified in 14 CFR 91.119(c). The altitude required by this section is 500 feet above the surface and persons, vehicles, etc. However, section 91.119(d) allows for a helicopter to operate at less than those minimum altitudes when it can be operated safely and Keystone has received exemptions to fly fixed wing aircraft below 500 feet over uninhabited areas.

Keystone plans to operate the UAS at 400 feet AGL or below (but not less than 100 feet above structures, buildings, vehicles, etc.) in order to properly collect survey data and to avoid entering the national airspace at an altitude that could possibly conflict with manned aircraft.

Equivalent Level of Safety

As explained in this document, the manufacturer flight manual and Keystone's FOM, every precaution will be taken to assure that the UAS is operating safely with existing air traffic and poses no risk to ground assets and persons.

D. 14 CFR Section 91.121: Altimeter requirements

This section of Title 14 requires that the pilot of the aircraft use an altimeter on board the aircraft to determine altitude. The altimeter must be set based on the barometric pressure of the departing airport and airports in route. Petitioner seeks an exemption from 14 CFR Part 91.121 as the aircraft does not use an altimeter for elevation determination, but a GPS receiver instead.

Equivalent Level of Safety

As part of the flight monitoring software of each UAS, the GPS altitude is displayed to the VO. As the VO is in communication with the PIC, any deviations from the pre-planned altitudes of the flight will be communicated by the VO and feedback will be given during manually controlled flight when altitude approaches 400 feet. Pre-flight checks will confirm the GPS altitude of the location of the flight compared to the flight plan to confirm the plan's accuracy and make any necessary changes (including the abort of the mission).

E. 14 CFR Section 91.151: Fuel requirements

Petitioner requests exemption from 14 CFR Part 91.151 which 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"

The remaining section does not apply, as the UAS will not be flown at night. Since most UAS flights will be 45-60 minutes in duration, another method of determining safe flight limits must be considered.

Equivalent Level of Safety

Keystone will require that in order for the pilot to take off (initiate a survey), the battery charge displayed by the system must be a full charge (>97%) and the aircraft must end its survey such that the total flight time does not exceed 80 minutes, in accordance with the manufacturer's recommendation. This will ensure that the UAS lands safely at one of the two designated landing areas before battery life becomes critical or unstable.

F. **14 CFR Section 91.405, 14 CFR Section 91.407, 14 CFR Section 91.409, 14 CFR Section 91.417: Maintenance Reporting and Maintenance Inspection frequency**

Petitioner seeks an exemption from the above regulations and their references to 14 CFR Part 43. 14 CFR 91.405(a) states that each owner or operator of an aircraft "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". Since the UAS will not have an airworthiness certification, these regulations will not apply to these

aircraft. Additionally, the nature of the vehicles is that of easily replaced parts and a much smaller amount of parts that can be replaced – making inspection schedules less fixed and field repairs possible.

Equivalent Level of Safety

Using the manufacturer's operations manual, an inspection and preventative maintenance schedule will be created for the Nova F5600. Because the UAS is dismantled for storage and shipment after each flight, a thorough inspection will be performed after the reassembly of the vehicle and before each flight.
The maintenance will be overseen by Keystone's Director of Unmanned Airborne Vehicle Maintenance (DUAVM) who will ensure that the inspections and preventative maintenance are performed and logged and signed in the UAS log book. It is Keystone's intention to keep maintenance logs for each of its UAS in a similar manner as its manned aircraft and to make these available to FAA inspection at any time. The DUAVM will ensure that any PIC or VO is able to perform field repairs and replacements as necessary to the level of quality Keystone expects from its manned aircraft maintenance personnel. All field repairs and replacements will be correctly logged and signed on site by the PIC.

Public Interest

Granting Keystone this waiver is in the public interest for several reasons. The work that Keystone performs on a daily basis from its manned aircraft is largely for use in mapping and geographic information systems (GIS) activities that add to the public's benefit including flood plain mapping, disaster response and planning, street maps, crop damage, environmental studies, prevention of insurance and tax fraud through inventory and more. This will continue to be the case with data collected via UAS, with the hope that more uses can be developed by Keystone's clients with this new technology.

Additionally, because Keystone employs professional pilots with the purpose of safe and effective data collection, Keystone will perform safe and efficient surveys for the many and various industries that it currently supports. This will decrease the need for manned aircraft in the air and thus reduce pollution, airspace congestion, and risk to crews and others. As a leader in the aerial survey industry, Keystone recognizes and supports the need to establish standards for UAS operators which will safeguard the NAS. That same experience, capability and commitment will enable Keystone to offer and conduct UAS operations using skilled professionals who will adhere to the required safety standards.

The UAS operated by Keystone will be under 55 pounds including payload, will operate in a defined area made known to local ATC, and will not carry personnel, explosive materials or flammable liquid fuels or other potentially hazardous materials.

Summary to be Published in Federal Register

Petitioner: Keystone Aerial Surveys, Inc.

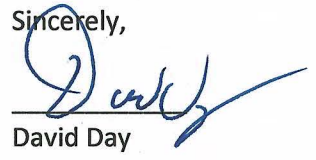
Sections of 14 CFR Affected: 14 CFR Section 61.113, 14 CFR Section 91.7, 14 CFR Section 91.119, 14 CFR Section 91.121, 14 CFR Section 91.151, 14 CFR Section 91.405, 14 CFR Section 91.407, 14 CFR Section 91.409, 14 CFR Section 91.417.

Description of Relief Sought: Petitioner seeks relief from the requirements of 14 CFR Section 61.113, 14 CFR Section 91.7, 14 CFR Section 91.119, 14 CFR Section 91.121, 14 CFR Section 91.151, 14 CFR Section 91.405, 14 CFR Section 91.407, 14 CFR Section 91.409 and 14 CFR Section 91.417 in order to conduct aerial survey missions using small unmanned aerial systems for commercial uses in the service of many business and governmental sectors.

Conclusion

Keystone Aerial Surveys, Inc. believes that the criteria provided in Section 333 of the FMRA regarding size, weight, speed, operating capabilities, proximity to airports and populated areas, operation within visual line of sight, and national security have been satisfied. Keystone's commitment to follow these criteria in a professional manner should justify the granting of this exemption request. Please contact Keystone or our counsel, Carol Gosain, with any question or for more information.

Sincerely,



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Attachments: Keystone Aerial Surveys' Flight Operations Manual, Nova F6500 Operator Manual, Nova F6500 Maintenance Manual and Nova Family of Systems Operations Manual. These Manuals are submitted as Confidential Documents under 14 CFR 11.35(b) and exempt from disclosure under the Freedom of Information Act, 5 USC 552 *et seq*.