



U.S. Department  
of Transportation

**Federal Aviation  
Administration**

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

September 8, 2015

Exemption No. 12785  
Regulatory Docket No. FAA-2015-1259

Mr. Joseph Agenbroad  
Satstellar, LLC  
109 Janwall Street  
Annapolis, MD 21403

Dear Mr. Agenbroad :

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 April 17, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Satstellar, LLC (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial imaging for safety and monitoring of secured and controlled environment construction sites.

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 are the 3D Robotics X8-M, 3DRobotics Aero-M, 3DRobotics Iris+, 3DRobotics X8+, Altavian Nova 6500, Altavian Nova 8400, Delair-Tech DT-18, DJI Inspire 1, DJI Phantom 1, DJI Phantom 2 Vision, DJI Phantom 2 Vision +, DJI Phantom 3, DJI Phantom FC40, MicroDrones MD4-200, MicroDrones MD-1000, PrecisionHawk Lancaster, Riegl RiCopter, senseFly eBee, senseFly eXom, senseFly eBee RTK, Trimble UX5, and Trimble UX5 HP<sup>1</sup>.

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<sup>2</sup>. 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;

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<sup>1</sup> The petitioner also proposed to operate additional battery-powered UAS. The FAA must conduct an assessment on these aircraft, which also includes a finding that the proposed UAS meet the conditions in Section 333 of Public Law 112–95. When the FAA completes its review, we will proceed accordingly and no further action will be required by the petitioner.

<sup>2</sup> 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.

- 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, Satstellar, LLC is granted an exemption from 14 CFR §§ 61.23(a) and (c), 61.101(e)(4) and (5), 61.113(a), 61.315(a), 91.7(a), 91.119(c), 91.121, 91.151(a)(1), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b), to the extent necessary to allow the petitioner to operate a UAS to perform aerial data collection. This exemption is subject to the conditions and limitations listed below.

## **Conditions and Limitations**

In this grant of exemption, Satstellar, LLC is hereafter referred to as the operator.

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

1. Operations authorized by this grant of exemption are limited to the 3D Robotics X8-M, 3DRobotics Aero-M, 3DRobotics Iris+, 3DRobotics X8+, Altavian Nova 6500, Altavian Nova 8400, Delair-Tech DT-18, DJI Inspire 1, DJI Phantom 1, DJI Phantom 2 Vision, DJI Phantom 2 Vision +, DJI Phantom 3, DJI Phantom FC40, MicroDrones MD4-200, MicroDrones MD-1000, PrecisionHawk Lancaster, Riegl RiCopter, senseFly eBee, senseFly eXom, senseFly eBee RTK, Trimble UX5, and Trimble UX5 HP 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](http://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 September 30, 2017 unless sooner superseded or rescinded.

Sincerely,

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

Enclosures

April 17, 2015

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

Re: Exemption Request Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations from 14 CFR 61.113 (a) & (b); 91.103(b); 91.119; 91.121; 91.151(a); 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, Satstellar LLC hereby applies for an exemption from the listed Federal Aviation Regulations ("FARs") to allow commercial operation of its Small Unmanned Aircraft Systems ("suAS") for aerial imaging for safety and monitoring of secured and controlled environment construction sites, 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.

Satstellar will perform many different airborne solutions such as: mapping data, sensing, construction, photography, real estate, agricultural, environmental, inspections, and FAA certifications. These techniques and procedures often require our employees to be put in situations that require Satstellar to accept risk. We have found that by using a small unmanned aircraft system "suAS" with a high resolution camera mounted on it, often times we can accomplish the same inspection and alleviate the need to put our employees and public in danger.

# SatStellar, LLC

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a minority company...

Satstellar shares Congress's goal of getting SUAS flying commercially in the United States safely and soon. In the FAA Modernization and Reform Act of 2012, Congress directed the FAA "to safely accelerate the integration of civil unmanned aircraft systems into the national airspace system" and, under Section 333 of that law, gave the FAA power to grant innovators "expedited operational authorization" to do so. By this petition, Satstellar is seeking authorization to conduct SUAS commercial operations.

Further, granting this request will do nothing more than allow Satstellar to do what thousands of hobbyists and manufacturers of model aircraft do every day, except we will abide by much stronger safety measures. Under supervision of a certified pilot we would provide a safer level of operation that is superior to current regulations. This invaluable experience applied to Satstellar UAS program equates to safe SUAS use on our projects with no confliction with manned aircraft.

## Information Supporting this Petition as Specified in 14 C.F.R. §11.81

### A. Mailing address and other contact information:

**Satstellar, LLC**  
109 Janwall St.  
Annapolis, Maryland 21403

Christian Nieves  
301-785-2260  
[contact@satstellar.com](mailto:contact@satstellar.com)

**B. The specific section or sections of 14 C.F.R from which Satstellar seeks exemption.**

14 C.F.R. Part 21 14 C.F.R. 45.23(b)  
14 C.F.R. 61.113 (a) & (b)  
14 C.F.R. 91.7 (a)  
14 C.F.R. 91.9 (b) (2)  
14 C.F.R. 91.103  
14 C.F.R. 91.109  
14 C.F.R. 91.119  
14 C.F.R. 91.121  
14 C.F.R. 91.203 (a) & (b) 14 C.F.R. 91.405  
(a) 14 C.F.R. 407 (a) (1) 14 C.F.R. 409 (a)  
(2) 14 C.F.R. 417 (a) & (b)

**I. STATUTORY AUTHORITY FOR EXEMPTIONS**

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

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).

Section 333(b) of the Reform Act assists the Secretary in determining whether SUAS may operate in the National Airspace System (NAS) without creating a hazard to the user, the public, or a threat to national security. In making this determination, the Secretary must consider:

- The SUAS's size, weight, speed, and operational capability;
- Whether the SUAS operates within the visual line of sight of the operator
- Whether the SUAS operates outside of highly populated areas and away from close proximity to airports

Reform Act §333(a). If the Secretary determines that a SUAS "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).

Satstellar SUAS, weighing less than 55 lbs. including payload, and will operate under normal conditions at a speed of no more than 50 knots. The SUAS will operate only in the Pilot's visual line of sight at all times and will operate only within the preplanned area. Such operations will insure that the SUAS will "not create a hazard to users of the national airspace system or the public." Reform Act Section 333 (b).

Given the small size of the SUAS involved and the restricted and preplanned area within which they will operate, our application falls squarely within the 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 small size of the SUAS and the low altitudes and restricted areas in which the SUAS 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 safety, the grant of the requested exemptions is in the public interest. Accordingly, Satstellar respectfully requests that the FAA grant the requested exemption without delay.

## II. PUBLIC INTEREST

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 NAS before completion of the rulemaking required under Section 332 of the Reform Act. By granting an exemption the FAA will fulfill Congress's intent of allowing UAS to operate with significant safety

precautions in low risk environments.

The use of SUAS on a various site conditions can significantly reduce the risk to workers of falls while inspecting, surveying, or monitoring site progress. SUAS can inspect, photograph, and collect data on hard to get to areas that otherwise would require worker inspection. Falls are a leading source of workplace fatality and injury on construction sites<sup>1</sup>, and reducing falls through SUAS use for site imaging could save workers lives.

Additionally, SUAS could replace the use of helicopters and small aircraft to perform our intended tasks. The SUAS we propose to fly in this application are under fifty-five pounds, and carry no combustible material on board, as opposed to the much larger conventionally powered small aircraft. Shifting to SUAS from helicopters and airplanes presents a marked safety increase for our workers and the public.

Lastly, SUAS reduce the environmental impact by dramatically decreasing the energy used for aerial imaging and data collection. Our SUAS use rechargeable lithium ion batteries, as opposed to fossil fuels burned in operation of small aircraft that are many hundreds of times heavier.

### III. EQUIVALENT LEVEL OF SAFETY

Satstellar SUAS operations will provide a level of safety that far exceeds the level of safety required by the FAA for hobbyists and manufacturers of model aircraft. The following operating procedures will apply during the SUAS inspection operations under this exemption request.

1. Satstellar operations will be conducted:
  - i. Within the visual line of sight of the Pilot in Command (PIC) and one or more Visual Observers (VO).
  - ii. at less than 400 feet AGL
  - iii. within Class G airspace.
2. Satstellar inspection operations will be conducted in a

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<sup>1</sup> "Commonly Used Statistics", Occupational Safety & Health Administration. Available at: <https://www.osha.gov/oshstats/commonstats.html>

confined area over isolated private property located at least 5 miles away from any airport, heliport, seaplane base, spaceport or other location with aviation activities, and any military or U.S. government installations or airfields. If we are within the 5 mile radius of any of the above installations Satstellar will seek written approval from that installation's owner before SUAS operations take place. If said installation owner requires stricter guidelines for operation then Satstellar will comply.

3. All SUAS operations will remain within the lateral and vertical boundaries of the operating area, taking into account all factors, including wind, gross weight and glide distances, that may affect the capability of the SUAS to remain within the airspace boundary; moreover, the ceiling height will be no more than 400 feet AGL.
4. Satstellar SUAS inspection operations under this exemption will be conducted under the supervision designated PIC who ultimately has final responsibility for the operation in accordance with 14 C.F.R. 91.3 and either holds a current FAA private pilot certificated, a higher FAA pilot certification, or a FAA-recognized equivalent or has completed FAA private pilot ground instruction and passed the FAA private pilot written exam.
5. PIC will maintain the SUAS system in a condition for safe operation, and conduct a pre-flight inspection prior to each flight so as to ensure that the SUAS, control station, data link equipment, camera, and support equipment are in a condition for safe operation and in a configuration appropriate for the purpose of the intended flight.
6. The PIC and VO will maintain two-way communications with each other during all operations; if unable to maintain two-way communications, or if any condition occurs that may otherwise cause the operation to be unsafe, the operator will immediately conclude the operation.
7. Each SUAS that Satstellar will employ under this exemption will safely return automatically to a home

location designated by the PIC if the communications link is lost.

8. The aircraft documentation required by 14 C.F.R. §§ 91.9 and 91.203(b), as applicable, will be available to the PIC referred to above at any time Satstellar SUAS are operating.

Satstellar will effectively operate under our own standard operating procedures that will provide additional safeguards that go far beyond the level of safety for public model airplane fields.

#### IV. DESCRIPTION OF SPECIFIC REGULATIONS

##### 14 CFR 61.113 (a) & (b): Private pilot privileges and limitations: Pilot in command

Sections 61.113 (a) & (b) limit private pilots to non-commercial operations. 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 Pilot operating the aircraft to have completed a SUAS flight training course of 100 hours before flying a SUAS. Unlike a conventional aircraft that carries the pilot and passengers, the SUAS is remotely controlled with no living thing or cargo on board. The SUAS are also operated by an autopilot, which greatly reduces the danger of human error. The area of operation is controlled and restricted areas, and all flights are planned and coordinated in advance.

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 operation plan. Like other civil aircraft, operations under this exemption will be tightly controlled and monitored by the operator, and in compliance with local public safety requirements, to provide security for the area of operation. The FAA will have advance notice of all operations.

The risks associated with the operation of the SUAS are therefore diminished from the level of risk associated with commercial operations contemplated by Part 61 when drafted, and allowing operations of the SUAS as requested with a Pilot who has the

level of safety contemplated by 14 C.F.R. §61.113 (a) & (b).

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

This regulation requires each pilot in command take certain actions before flight to ensure the safety of flight. An exemption is needed from this requirement as the Pilot will take separate preflight actions, including checking for weather conditions, checking flight battery requirements, checking takeoff and landing distances, and all other actions in the Preflight Checklist in the Manual. These actions will provide an equivalent level of safety.

## 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 SUAS to be operated at less than the minimums prescribed, provided the person operating complies with any route or altitudes prescribed by the FAA. The SUAS will never operate at altitude higher than 400 AGL and will be in a restricted area with security perimeter, where buildings and people will not be exposed to operations without their pre-obtained consent.

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 or local officials. Because of the advance notice to the property owner and any onsite personnel, all affected individuals will be aware of the planned flight operations. Unlike flight operations with aircraft or rotorcraft weighing far more than the maximum 55 lbs. proposed herein, our SUAS will not carry flammable fuel. In addition, the low-altitude operations of the SUAS will ensure separation between SUAS 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 not have a barometric altimeter, but instead a GPS altitude read out, an exemption may be needed. An equivalent level of safety will be achieved by the operator confirming the altitude of the launch site

shown on the GPS altitude indicator before flight.

## 14 CFR 91.151 (a): Fuel requirements for flight in VFR conditions

Section 91.151 (a) outlines fuel requirements for beginning a flight in VFR conditions. Our SUAS is limited to operations in sterile and controlled environments, and has a limited range and flight time which require an exemption from 14 CFR 91.151(a).

The battery powering the SUAS provides approximately 35 minutes of powered flight. To meet the 30 minute reserve requirement in 14 CFR §91.151, SUAS flights would be limited to approximately 5 minutes in length. Given the limitations on the SUAS's proposed flight area and the location of its proposed operations within a predetermined area, a longer time frame for flight in daylight or night VFR conditions is reasonable.

Satstellar believes that an exemption from 14 CFR §91.151(a) falls within the scope of prior exemptions. See Exemption 10673 (allowing Lockheed Martin Corporation to operate without compliance with FAR 91.151 (a)). Operating the small SUAS, in a tightly controlled area where only people and property owners or official representatives who have signed waivers will be allowed, with less than 30 minutes of reserve fuel, does not engender the type of risks that Section 91.151(a) was intended to alleviate given the size and speed of the small UAS. Additionally, limiting SUAS flights to 10 minutes would greatly reduce the utility for which the exemption will be granted.

An equivalent level of safety can be achieved by limiting flights to 30 minutes, or enough battery reserve to ensure that the SUAS lands at the ground station with at least 20% of battery power (as determined by the onboard monitoring system and the Pilot), whichever happens first. This restriction would be more than adequate to return the SUAS to its planned landing zone from anywhere in its limited operating area.

Similar exemptions have been granted to other operations, including Exemptions 2689F, 5745, 10673, and 10808.

## 14 CFR 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 sections and Part 43 apply only to aircraft with an airworthiness certificate, these sections will not apply to Satstellar. Maintenance will be accomplished by the operator pursuant to the flight manual and operating handbook from the manufacturer. 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. The Pilot will ensure that the SUAS is in working order prior to initiating flight, perform required maintenance, and keep a log of any maintenance performed. Moreover, the Pilot 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.

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 needed:

Applicant seeks an exemption from the following rules: 14 C.F.R. §21, subpart H; 14 C.F.R 45.23(b); 14 C.F.R. §§ 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) and (b); 91.405 (a); 91.407 (a) (1); 91.409 (a) (2); 91.409 (a) (2) and 91.417 (a) & (b) to operate commercially a small unmanned vehicle (55lbs or less).

Approval of exemptions allowing commercial operations of SUAS in the construction industry enhances safety while reducing risk. Manned aircraft monitoring and surveying creates a greater risk because the craft are much larger, have combustible fuel, and carry an onboard human pilot. In contrast, a SUAS weighing fewer than 55 lbs. and powered by batteries eliminates virtually all of that risk given the reduced mass and lack of combustible fuel carried on board. The SUAS will carry no passengers or crew and, therefore, will not expose them to the risks associated with manned aircraft flights.

The operation of small SUAS, weighing less than 55 lbs., conducted in the strict conditions outlined above, will provide an equivalent level of safety supporting the grant of the exemptions requested herein, including exempting the applicant from the requirements of Part 21 and allowing commercial operations. These lightweight aircraft operate at slow speeds, close to the ground, and in a sterile environment and, as a result, are far safer than conventional operations conducted with turbine helicopters operating in close proximity to the ground and people.

## Privacy

All flights will occur over private or controlled access property with the property owner's prior consent and knowledge. Images taken will be of individuals who have also consented to being filmed or otherwise have agreed to be in the area where aerial photography will take place.

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.

Sincerely,

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