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

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

CORRECTED COPY

The FAA is reissuing the August 14, 2015, grant of exemption of Exemption No. 12459. A correction was made to add closed set filming. Below is the amended Exemption No. 12459 that includes the aforementioned change. We made the correction in our records as of August 20, 2015.

August 14, 2015

Exemption No. 12459
Regulatory Docket No. FAA–2015–0912

Mr. Jonathan T. Cain
Counsel
Mintz Levin
701 Pennsylvania Avenue, NW.
Washington, DC 20004

Dear Mr. Cain:

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 March 25, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Unmanned Aerial Systems Development, Inc. (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial cinematography, conduct research on UAS safety protocols and to continue our development of enhanced platforms and systems.

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. However, the FAA received two comments in support of the petition made to the docket.

Airworthiness Certification

The UAS proposed by the petitioner are the UASD CarbonCore1 and 3D Robotics Solo.

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] and closed-set motion picture and television filming. 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, Unmanned Aerial Systems Development, 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 and closed-set motion picture and television filming. This exemption is subject to the conditions and limitations listed below.

Conditions and Limitations

In this grant of exemption, Unmanned Aerial Systems Development, 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 UASD CarbonCore1 and 3D Robotics Solo 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 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 August 31, 2017, unless sooner superseded or rescinded.

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

Enclosures

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March 25, 2015

BY HAND

Docket Operations, M-30
United States Department of Transportation
1200 New Jersey Ave., SE
West Building Ground Floor, Room W12-140
Washington, DC 20590-0001

Re: Petition for Exemption Pursuant To Section 333 of the FAA Modernization and Reform Act of 2012

Dear Sir or Madam:

Petitioner, Unmanned Aerial Systems Development, Inc., is a Massachusetts corporation doing business as UAS Development ("**UASD**"). This firm is legal counsel to Petitioner. We are writing pursuant to the FAA Modernization and Reform Act of 2012 (the "Reform Act") and the procedures contained in 14 C.F.R. § 11.81, to request that UASD, an owner and operator of small unmanned aircraft, be exempted from the Federal Aviation Regulations ("FARs") listed below so that UASD may operate its lightweight unmanned aircraft systems ("UAS") commercially in airspace regulated by the Federal Aviation Administration ("FAA").

Introductory Statement

UASD is a pioneer in capturing high definition feature film quality aerial cinematography with UASs. UASD has demonstrated its ability to carry a feature film quality camera system, the Blackmagic Design 4k Production camera, on a stable UAS platform.

UASD has been operating its lightweight UASs non-commercially in controlled and regulatory compliant venues without significant incident over the last year. UASD would now like authorization to fly and operate its UASs commercially in the United States, primarily to capture aerial cinematography, conduct research on UAS safety protocols and to continue our development of enhanced platforms and systems for broader UAS industrial applications.

USAD was founded by three partners, two from the cinematography and production industry and one from an electronics manufacturing and mechanical engineering background. Its chief engineer and pilot has over 15 years of flight experience in manned

aircraft as a licensed private pilot and on numerous unmanned airframes. UASD has documented operating standards, robust technical assessment and research. Its flight operations crew's certification and experience has enabled UASD to secure comprehensive commercial liability and operations insurance through a major U.S. underwriter.

UASD's UASs are among the most advanced remote control aircraft being used for these purposes. The airframe is described in detail in the Flight Operations Manual ("FOM") that accompanies this Petition. In summary, the airframe is based upon a Cortex 1000mm quadcopter manufactured by CarbonCore, Ltd. of Reading, England entirely of aircraft grade carbon fiber materials, fastened with stainless steel fittings. UASD builds the remainder of the UAS and integrates the motors, navigation and flight control systems, power systems, radio controls and gimbaled camera payload at its facility in Holliston, Massachusetts. The central hub of the unit consists of two layers of carbon fiber sheets layered to provide a protective housing for the flight control systems as well as the power distribution and motor controls. These layers also form the mounting structure for the four carbon fiber spars, to which the eight brushless propulsion motors are mounted. The motors, navigation, power, radio and flight control systems UASD employs are industry proven and are used in a broad array of UASs. The performance histories of these systems are well documented and regularly updated, allowing for continual assessment and refinement through UASD's own flight experience and many other users.

Granting UASD commercial UAS operations authority as outlined in this Petition would permit to operate its UAS in tightly controlled and limited airspace separated from persons not involved in the operations. Currently, similar lightweight, remote controlled UASs are legally operated by amateurs with no flight experience, safety plan or controls in place to prevent accidents. UASD's experienced remote control pilots, technicians and safety crew, operating under documented procedures will provide an enhanced level of safety.

To date, the FAA has granted exemptions to a select group of petitioners. Petitioner contends that UASD's operations, under similar mission parameters, are equivalent in effect to those of the currently authorized operators. With operations headquartered in the northeastern section of the United States, UASD's authorization would allow them to serve a region of the country with significant film production industry demand at a greater economic benefit to potential clientele and would further introduce a diversity of providers to the broader market, furthering the economic benefit to the industries to be served.

Granting UASD's request comports with the Secretary of Transportation's (FAA Administrator's) responsibilities to not only integrate UASs into the national airspace system, but to "...establish requirements for the safe operation of such aircraft systems [UASs] in the national airspace system" under Section 333(c) of the Reform Act. Further,

UASD will conduct its operations in compliance with the protocols described herein or as otherwise established by the FAA.

For these reasons, and in consideration of the information provided below, UASD respectfully requests the FAA grant this Petition.

1. UASD's Contact Information -- 14 C.F.R. § 11.81(a):

Unmanned Aerial Systems Development, Inc.
24 Water St
Holliston, MA 01746
Telephone: 617-823-9327
Attn: Jeffrey Adams
Email: jadams@uasdevelopment.com

Jonathan T. Cain
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2. Specific Sections of Title 14 of the CFR From Which UASD Requests Exemption – 14 C.F.R. § 11.81(b):

14 CFR Part 21, Subpart H;
14 CFR Part 27;
14 CFR § 45.27(a);
14 CFR § 61.113;
14 CFR § 91.7 (a);
14 CFR §§ 91.9 (b)(2) & (c);
14 CFR § 91.103;
14 CFR § 91.109(a);
14 CFR § 91.119(c);
14 CFR § 91.121;
14 CFR § 151(a);
14 CFR §§ 91.203(a) & (b);
14 CFR § 91.405(a);
14 CFR § 407(a)(1);
14 CFR § 409(a)(2);
14 CFR §§ 417(a) & (b).

3. The Extent of Relief UASD Seeks and the Reason It Seeks Such Relief – 14 C.F.R. § 11.81(c):

UASD submits this application in accordance with the Reform Act, 112 P.L. 95 §§ 331-334, seeking relief from currently applicable FARs operating to prevent UASD's contemplated commercial cinematic, photographic and research flight operations within the national airspace system. The Reform Act in Section 332 provides for such integration of civil unmanned aircraft systems into our national airspace system as it is in the public's interest to do so. UASD's lightweight UASs meet the definition of "small unmanned aircraft" as defined in Section 331 and therefore the integration of UASD's lightweight UASs are expressly contemplated by the Reform Act. Through this Petition, UASD seeks to operate its lightweight UASs prior to the time the FAA promulgates final regulations governing such operations pursuant to the Reform Act.

The Reform Act specifies the factors to be considered in determining the types of UASs that may operate safely in our national airspace system. These factors include:

- The weight, size, speed and overall capabilities of the UAS;
- Whether the UAS will be operated near airports or populated areas; and,
- Whether the UAS will be operated by line of sight.

112 P.L. 95 § 333 (a). Each of these factors compels the exemption sought by UASD.

UASD's UASs utilize eight counter-rotating propellers for extreme balance, control and stability. The combined "wheels up" weight (including airframe, gimbal and payload) is approximately 35 pounds. The operational gross weight varies slightly depending upon the equipment selected for each mission, but will never exceed 55 pounds. Each of UASD's small unmanned aircraft is designed to primarily hover in place and operate at airspeeds less than 50 knots. They carry no pilot, passenger, explosives or inflammable materials. They are capable of vertical and horizontal flight and operate only within the unaided line of sight of the remote control pilot in command. In addition to the remote control pilot, UASD uses a secondary visual spotter for redundant observation of the airframe and the surrounding area as well as a ground service technician, such that, at minimum, three UASD personnel govern the safe flight of any UASD aircraft at all time during active operations.

Utilizing battery power, flights generally last between ten and thirty minutes. UASD does not operate its UASs with less than twenty five percent battery capacity. Safety systems in place include a GPS mode that allows UASD's UASs to hover in place if communication with the radio control pilot is lost temporarily, then return to a predetermined sterile area and slowly descend to the ground if pilot control is not

reestablished. The flight crew has the ability to remotely engage the autonomous "return to home" function in the event the pilot in command is unable to fulfill his flight responsibilities.

UASD will not operate its UASs near active airports and conducts its operations over areas from which persons not engaged work related to the mission are excluded. To date, UASD has only conducted test flights of its fleet on private property, cordoned off areas under the direct control of UASD sponsors or research partners. UASD only operates its UASs in predetermined areas and only in compliance with established industry safety protocols. UASD adheres to all of the recommendations of the FAA in regards to model aircraft as well as those of the Aeronautical Modelers Association. To further these accepted standards, UASD has drafted, researched and applied its own comprehensive operations manual that is regularly reviewed by all operators and crew and enforced throughout all operations. A copy of this proprietary document is included and incorporated herein.

14 CFR Part 21, Subpart H and 14 CFR Part 27: In consideration of the size, weight, speed and limited operating area of the UAS, Petitioner submits that equivalent or higher level of safety will be achieved than would be possible with a certificated aircraft. Accordingly, Petitioner requests that it be relieved of the obligation to comply with the certification procedures and airworthiness standards of Part 21, subpart H and Part 27.

14 CFR § 45.27(a): Assuming that Petitioner's UAS is relieved of the certification requirement of Part 21, Petitioner requests that, given the size of the UAS, it also be relieved of the marking requirements of section 45.27(a).

14 CFR § 61.113: Petitioner requests relief from the regulation prohibiting a private pilot acting as pilot in command from conducting operations for compensation or hire. The fundamental requirement for the pilot in command of a UAS to hold an airman's certificate is to ensure that such pilots are familiar with the national airspace system and the regulations governing operations in such airspace. The airspace knowledge requirements to hold a private pilot certificate are not materially different from those required of a commercial pilot. The regulations proposed by the FAA for the operation of unmanned aircraft in the national airspace system acknowledge this fact and propose that a private pilot may command a UAS for compensation. Furthermore, as set forth in its Flight Operations Manual, Petitioner will conduct commercial operations only with pilots in command who hold a private pilot certificate, a third-class medical, and who have demonstrated minimum flight hours commanding unmanned aircraft, including minimums for time in the specific aircraft used by Petitioner. A commercial pilot's license does not ensure competency or proficiency in remote control piloting skills, whereas UASD's

pilot vetting and training programs will. Finally, grant of an exemption from section 61.113 is consistent with the FAA's decision in Grant of Exemption to Astraeus Aerial, No. 11062 (Sept. 25, 2014) and the rationale provided therein.

14 CFR § 91.7(a): Petitioner requests exemption from this requirement on the ground that no airworthiness certificate will be issued for the UAS, and thus no FAA regulatory standard exists for determining the airworthiness of the aircraft. An equivalent level of safety is assured by Petitioner's compliance with the preflight inspection requirements set forth in its Flight Operations Manual. In addition, Petitioner is not seeking exemption from section 91.7(b), which imposes upon the pilot in command the duty to ascertain that the UAS is in flightworthy condition before each flight.

14 CFR §§ 91.9(b)(2) & (c): The UAS is not certificated and does have an approved flight manual, placards and markings. The aircraft is not large enough to carry such a manual, and no pilot or passengers to read placards or other markings. An equivalent level of safety may obtained by having a copy of the Flight Operations Manual readily available to the pilot in command at the ground control station for the UAS. Petitioner requests exemption from the requirements of these sections. The FAA has previously issued exemptions to this regulation in Exemption Nos. 8607, 8737, 8738, 9299, 9299A, 9565, 9565B, 10167, 10167A, 10602, 10700 and 32827.

14 CFR § 91.103: The requirements of this section are not applicable to Petitioner's proposed flight operations in that it does not operate in IFR conditions, from runways, or with an approved flight manual containing takeoff and landing distances. Petitioner has established an equivalent level of safety by requiring in its Flight Operations Manual that its pilot in command evaluate all relevant flight conditions, battery charge requirements, and potential obstructions to the flight plan. Petitioner requests that it be exempted from this requirement.

14 CFR § 91.109(a): Petitioner may conduct training operations using its aircraft to train new pilots to operate the aircraft. The UAS does not have on-board flight controls. Petitioner will conduct training flights solely in dedicated training sessions in space at locations isolated from persons not involved in the training flight. This provides an equivalent level of safety to the availability of fully-functional dual controls.

14 CFR § 91.119(c): Petitioner requests exemption from the requirement in section 91.119(c) that the UAS may not be operated less than 500 feet above the surface or closer than 500 feet to any person, vessel, vehicle or structure. The regulations proposed for operations of a UAS limit operations to 400 feet or less above ground

level. Petitioner's operations will all be conducted in "sterile" areas where only persons involved in the filming operation will be permitted. Petitioner is not seeking exemption from sections 91.119(a) or (b). Petitioner's request is consistent with Order 8900.1 V3, C8, S1, which permits operations for motion picture and television filming below the altitudes specified in section 91.119(c). Petitioner further requests relief from the 500 foot horizontal separation requirement to permit operations within 200 feet horizontally from persons, vessels, vehicles and structures involved in the filming activity. The FAA has found that such separation is sufficient to protect non-participating persons in the event of an accident.

14 CFR § 91.121: Petitioner requests relief from the barometric altimeter setting requirement on the grounds that the GPS based digital altimeter readout provided to the pilot in command through the telemetric feed from the UAS to the pilot's control station provides an equivalent level of safety. The digital altimeter provides continuous altitude above ground, which is consistent with the proposed regulatory requirement that all flights be conducted below 400 feet AGL. The digital altimeter is specified to have vertical accuracy of ± 0.5 meters under the anticipated flight conditions.

14 CFR § 151(a): Petitioner requests exemption from the fuel requirements for VFR conditions consistent with the FAA's prior grant of exemptions for similar aircraft and operations granted in Exemption Numbers 10650, 10808 and others for daytime VFR operations. Petitioner's Flight Operations Manual provides that flights will be terminated when battery charge reaches 25%. The proposed operational limitation provides a level of safety equivalent to that provided by the regulation.

14 CFR §§ 91.203(a) & (b): Petitioner's UAS will not have an airworthiness certificate issued to it, and it will have no pilot or passengers. Petitioner requests that it be relieved if the requirement to display airworthiness certificate, special flight authorization and registration certificate. The FAA has previously issued exemptions to this regulation through Exemptions Nos. 8738, 10167, 10167A and 10700.

14 CFR §§ 91.405(a); 407(a)(1); 409(a)(2) and 14 CFR 417(a) & (b): Petitioner should be relieved of the maintenance requirements contained in Part 91 because the UAS has not been issued an airworthiness certificate. UASD conducts an extensive maintenance program that involves regular software updates and curative measures for any damaged hardware. Further, UASD adheres to a stringent "active use time" based component maintenance and replacement protocol, minimizing the potential for component failure due to wear issues. Petitioner intends to maintain written records of all such actions. Petitioner submits that its proposed maintenance program provides a level of safety equivalent to that provided to

certificated aircraft under the maintenance regulations from which relief is requested.

UASD's operation of its fleet of small unmanned aircraft will not "create a hazard to users of the national airspace system or the public." 112 P.L. 95 § 333 (b). Given the small size and weight of UASD's UASs, combined with their operation in cordoned off and well-controlled film production areas, UASD's fleet falls within Congress's contemplated safety zone when it promulgated the Reform Act and the corresponding directive to integrate UASs into the national airspace system. Indeed, UASD's UASs have a demonstrable safety record and do not pose any threat to the general public or national security. Further, UASD will file comprehensive flight/operations plans with the regional FAA offices and will comply in any additionally requested information or documentation for requisite notice to airmen.

4. How UASD's Request Will Benefit the Public As A Whole:

Granting UASD's Petition furthers the public interest.

First, Congress has already pronounced through passage of the Reform Act that it is in the public's interest to integrate commercially flown UASs into the national airspace system. Granting UASD's Petition will further that goal.

Second, UASD conducts research into safe UAS operations every time it flies one of its UASs. Flight data, visual inspections, recorded observations and flight analyses are compiled to further enhance current safety protocols. Allowing UASD to log more flight time under the diverse conditions of real world situations will serve to enhance its research and its ability to further refine current operational safety standards.

Third, the public has an interest in reducing the inherent risk of danger and fossil fuel emission associated with current aerial cinematic capture methods, namely, full size helicopters. UASD's UASs are battery powered and produce zero emissions during operations. Further, there is no liquid fuel onboard the vehicle to ignite and potentially explode in the event of a crash. Additionally, the likely physical impact resulting from a lightweight UAS crash is far less than that of a full size helicopter. The public's interest is furthered by minimizing ecological and crash impacts by permitting motion picture capture through UASD's lightweight UASs.

Fourth, UASD is working to establish a joint research program with the robotics department of Worcester Polytechnic Institute to research advancement of autonomous vehicle operations, most notably in the areas of collision avoidance, inertial guidance, autonomous multi-vehicle operations (swarm flights) and other "NextGen" UAS systems and standards. A letter from WPI supporting this petition is attached. UASD also has initiated plans to partner with numerous local technology companies and at least one internationally recognized engineering & technical university to provide an operational

test bed for advanced systems development. Our operational experience and flight data can provide related systems researchers and advanced degree candidates in aeronautical & robotics engineering with a platform to explore, develop and defend their research, studies and theses.

Granting UASD's exemption request substantially furthers the public's interest in ways known and currently unknown.

5. Reasons Why UASD's Exemption Will Not Adversely Affect Safety Or How The Exemption Will Provide a Level of Safety At Least Equal To Existing Rule:

UASD's exemption will not adversely affect safety. Quite the contrary, for the reasons previously stated, permitting UASD to log more flight time in FAA controlled airspace will allow UASD to innovate and implement new and novel, as of yet undiscovered safety protocols. In addition, UASD submits the following representations of enhancements to current aerial motion picture capture techniques:

- UASD's UASs weigh less than 55 pounds complete with feature length motion picture quality cameras like the Red Dragon;
- UASD only operates its UASs below 400 feet;
- UASD's UASs only operate for 10-30 minutes per flight;
- UASD lands its UASs when they reach 25% battery power;
- UASD's remote control pilots operate UASD's UASs by unaided visual line of sight;
- UASD's remote control pilots have access to onboard dynamic video guidance to augment visual line of sight observation;
- UASD staffs each flight with a remote control FAA licensed pilot in command, a spotter (co-pilot) and a payload technician with communication systems enabling real time communication between them;
- UASD employs FAA licensed pilot(s) who also possess a minimum of 3rd class medical certification;
- UASD conducts regimented, companywide systems and protocol training programs, with specific focus on the array of flight units and rigging configurations that may be employed;
- UASD's pilots have complete authority to abort any flight or refuse at any time to execute an operational request, particularly in regard to any flight safety parameter such as vehicle limitations, weather conditions, inherent danger of mission, or any such potential hazard to operating standards;
- UASD's UASs are programmed to switch to an autonomous GPS flight mode

whereby they hover and then return to a sterile area and slowly land if communication with the remote control pilot is lost or if battery power falls below 25%;

- UASD's autonomous "return to home" protocol can be initiated manually in the event that the PIC can no longer fulfill his flight obligations;
- UASD actively analyzes flight data and other sources of information to constantly update and enhance safety protocols;
- UASD only operates in quarantined areas that are strictly controlled, are away from airports and congested areas;
- UASD has procedures in place to mark and secure the active launch & recovery zone, with barriers and signage to prevent unauthorized access to the area;
- UASD conducts extensive briefings prior to flight, during which safety carries primary importance;
- UASD always obtains all necessary permissions and permits prior to operation; and,
- UASD has procedures in place to abort flights in the event of safety breaches or potential hazardous conditions.

UASD's safety protocols provide a level of safety at least equal to existing rules, and in nearly every instance, greater than existing rules. It is important to note that absent the integration of commercial UASs into our national airspace system, helicopters are the primary means of aerial motion picture capture. While the safety record of such helicopters is remarkable, it is far safer to operate a battery powered lightweight UAS. First, the potential loss of life is diminished because UASs carry no people on board and UASD only operates them in uncongested areas. Second, there is no fuel on board a UAS and thus the potential for fire or explosions is nil. Third, the small size and extreme maneuverability of UASD's UASs allow our remote control pilots to avoid hazards. Lastly, given their small size and weight, even when close enough to capture unique images, UASD's UASs need not be so close to the subjects or individuals they are filming. Accordingly, UASD's UASs have operated and will continue to operate at and above current safety levels.

6. A Summary The FAA May Publish in the Federal Register:

Section 14 CFR: 14 CFR Part 21, Subpart H; Part 27; § 45.27(a); § 61.113; § 91.7 (a); §§ 91.9 (b) (2) & (c); § 91.103; § 91.109(a); § 91.119(c); § 91.121; § 151(a); §§ 91.203(a) & (b); § 91.405(a); § 407(a) (1); § 409(a)(2); §§ 417(a) & (b). Description of relief sought: Unmanned Aerial Systems Development, Inc. is seeking an exemption pursuant to Section 333 of the FAA Modernization and Reform Act of

2012 to operate commercially a small unmanned aerial vehicle (55 pounds or less) in motion picture and television filming operations and to conduct research for additional commercial applications for unmanned aerial vehicles.

Summary

Granting UASD's petition will reduce current risk levels in motion picture and television filming and enhance safety of such operations. Currently, motion picture image capture relies primarily on the use of large scale, manned aircraft running on combustible fuel. UASD's craft do not contain potentially explosive fuel, are smaller, lighter and more maneuverable than conventional motion picture aircraft. UASD operates at lower altitudes, at slower speeds than conventional manned aircraft and in controlled access areas.

There are no people on board UASD's UASs and therefore the likelihood of death or serious bodily injury is significantly limited. UASD's operation of its UASs, weighting less than 55 pounds and traveling at speeds lower than 50 knots in cordoned off areas will provide at least an equivalent level of safety as that achieved under current FARs.

Accordingly, Petitioner respectfully requests that the FAA grant its exemption without delay.

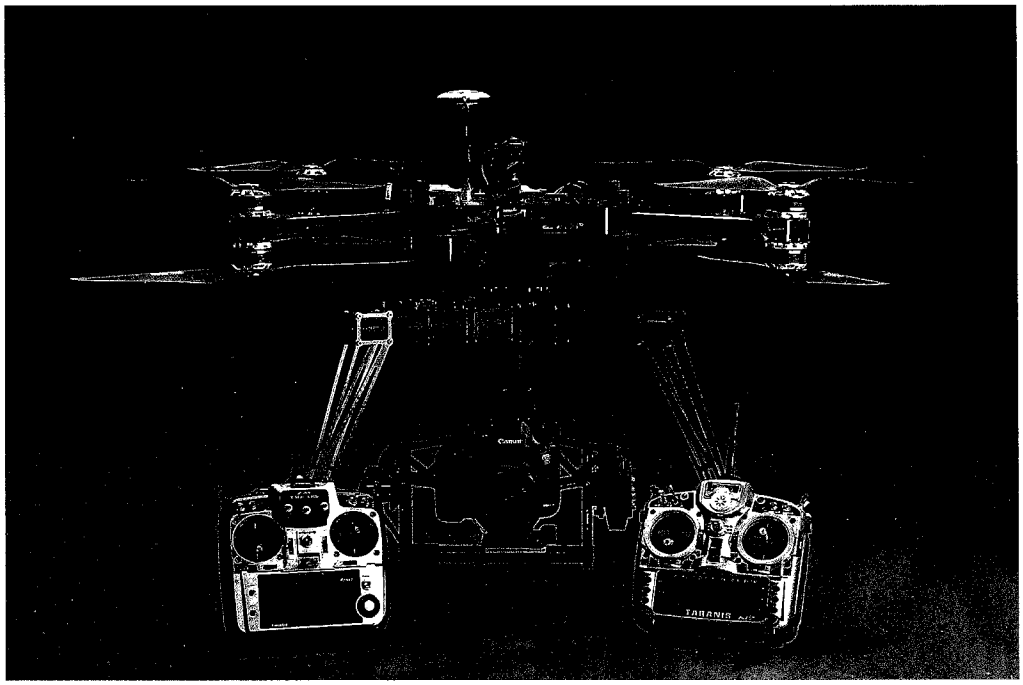
Sincerely,

Jonathan T. Cain
Counsel to Unmanned Aerial Systems Development, Inc.

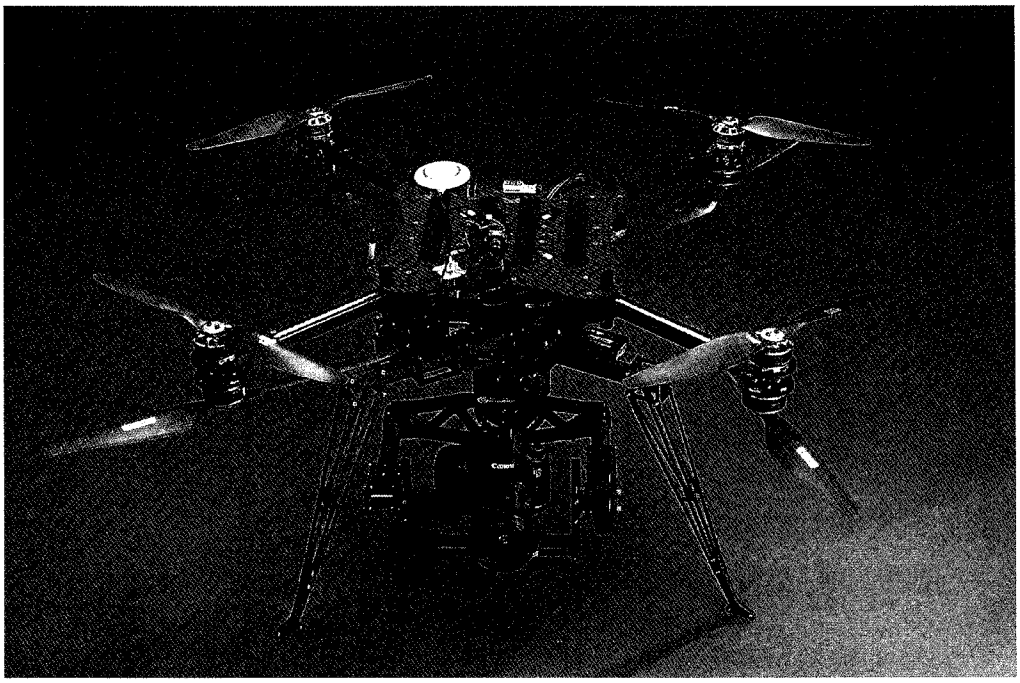
Attachments:

Photographs 1-7
UASD Flight Operations Manual for Aerial Cinematography
UASD Emergency Action Plan Checklist (blank form)
UASD In-Flight Emergency Action Plan Incident Debrief Report (blank form)
UASD Daily Mission Criteria Report (blank form)
UASD Pre-Flight Checklist (blank form)
UASD Battery Charging Manual

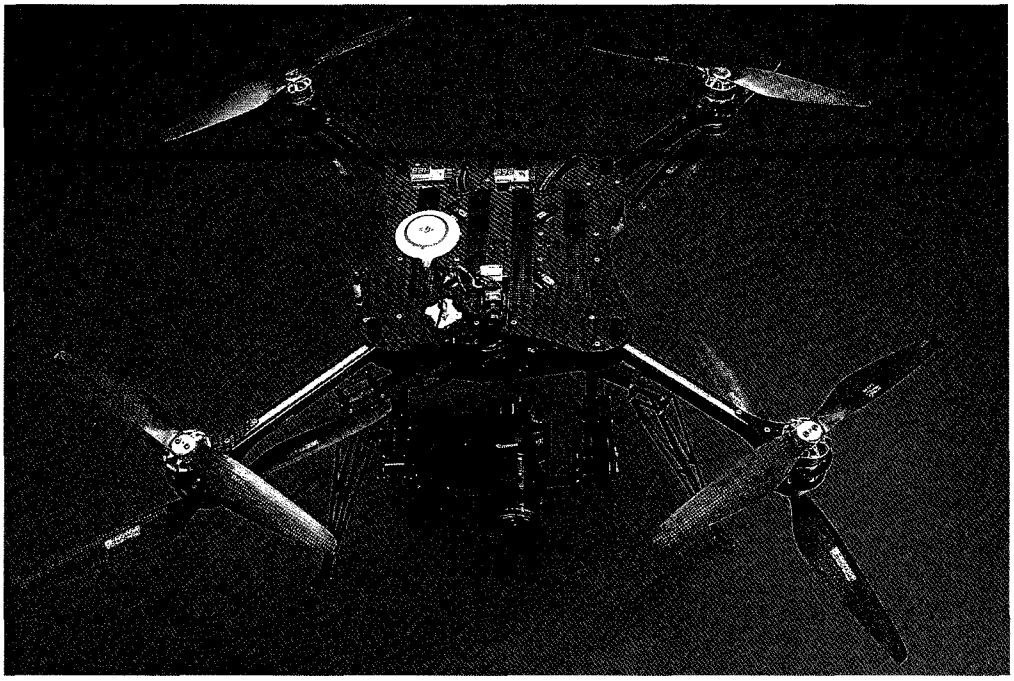
Supporting Visual Graphics:



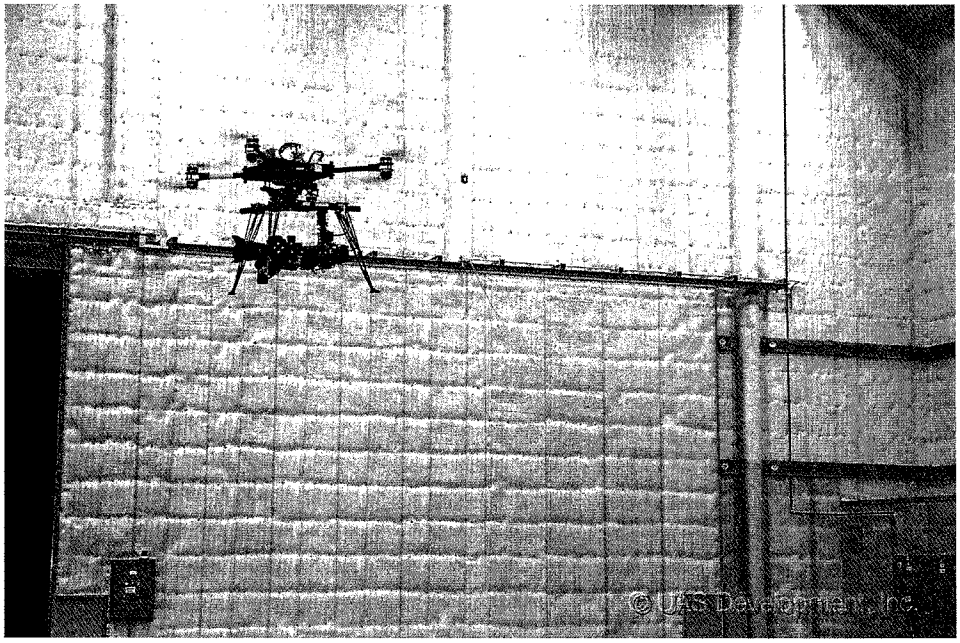
1. elevation view with controllers



2. 3/4 overhead view

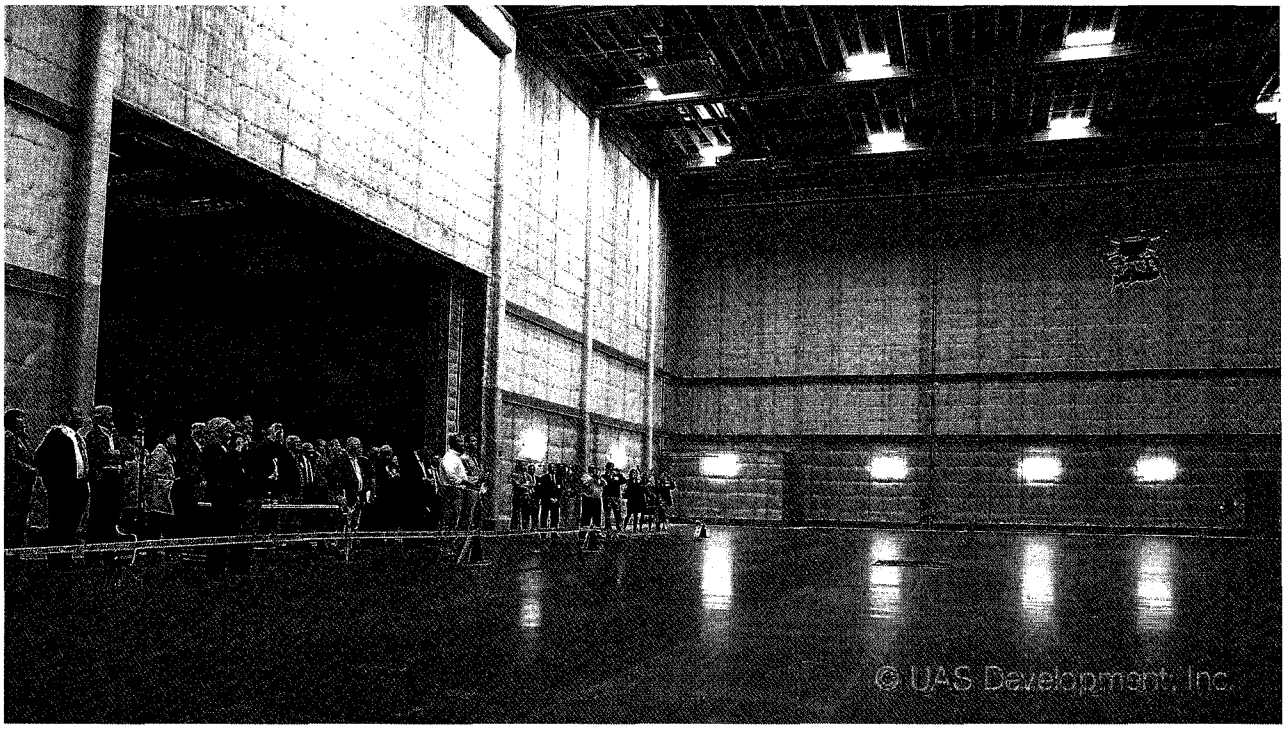


3. 7/8 overhead view



4. UAV airborne (at test facility) with production grade camera system mounted into 3 axis gimbal.

5. Test flight facility (Sept 16, 2014). Preflight systems check w/ pilot in command, Matt Greenway and flight operations manager, Jeff Adams.



6. and 7. Demonstration flight for robotics industry executives. (Sept 16, 2014)