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

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

June 23, 2015

Exemption No. 11873
Regulatory Docket No. FAA–2015-0688

Mr. Steven Chain
Steven Chain, Chain Enterprises
19812 Freshwater Drive
Cottonwood, CA 96022

Dear Mr. Chain:

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 14, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Steven Chain, Chain Enterprises (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial photography and videography for real estate marketing, construction site inspection, and special events.

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 REHawk500 and REHawk680.

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 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, Steven Chain, Chain Enterprises 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, Steven Chain, Chain Enterprises 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 REHawk500 and REHawk680 when weighing less than 55 pounds including payload. Proposed operations of any other aircraft will require a new petition or a petition to amend this exemption.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Sincerely,

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

Enclosures

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STEVEN CHAIN, CHAIN ENTERPRISES. REQUEST FOR EXEMPTION'S TO OPERATE SMALL UNMANNED AIRCRAFT SYSTEMS FOR PHOTOGRAPHY AND VIDEOGRAPHY

FAA REGULATORY DOCKET

March 14, 2015

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

PETITION SUMMARY

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 (the “Reform Act”) and 14 C.F.R. Part 11, Steven Chain, Chain Enterprises,(SCCE) an operator of Unmanned Aircraft Systems (“UAS(s)”) for aerial photography and videography for Real Estate Marketing, Construction Site Inspection, and Special Events hereby petitions for an exemption from the Federal Aviation Regulations (“FARs”) to allow commercial operation of it's UAS(s).

Exemptions Requested From; 14 CFR 61.113(a) and (b);91.7(a); 91.119(c); 91.121; 91.151(a); 91.405(a); 91.407(a)(1); 91.409 (a)(1) and (2); 91.417(a) and (b).

Proposed Operations

All UAS flights will occur over private or controlled access areas with the property owner’s prior

consent and knowledge. SCCE proposes to avoid flight over populated areas and operations over people who have not provided consent. SCCE's UAS Aerial photography and videography will be focused on Real Estate Marketing, Construction Site Inspections and Special Events.

Satisfying 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 provide adequate justification to grant SCCE's requested exemptions, thereby allowing SCCE's UAS commercial operations for the Real Estate Marketing, Construction Site Inspection and Special Events.

Prior to conducting operations, under this grant of exemption, SCCE will obtain a Certificate of Waiver or Authorization,(COA) from the Air Traffic Organization., (ATO). Commensurate with the COA SCCE will request Notice To Airman, (NOTAM) based upon the limits and time lines of the UAS flight operations. SCCE's requested exemption would permit the operation of small, unmanned UAS under controlled and “sterile” conditions defined as private properties and controlled access locations. .

As established by the exemptions previously granted by the FAA, approval of SCCE's exemption would enhance safety and fulfill the Secretary of Transportation’s (the FAA Administrator’s) responsibilities to “...establish requirements for the safe operation of such aircraft systems in the national airspace system.” Section 333(c) of the Reform Act. UAS(s) operated by SCCE weigh less t han 55 pounds, including the payload (IE. camera, lens, and gimbal). They operate at speeds of no more than 50 knots, can hover, and can simultaneously move vertically and horizontally. SCCE, UAS(s) will only be operated by a Certificated Private Pilot, (PIC), with supplemental Visual Observer,

(VO), maintaining visual line of sight and will operate only within the sterile environment described in the FOPM. Such operations will insure that the UAS will “not create a hazard to users of the

National Airspace System, (NAS) or the public.” Given the small size of SCCE's UAS(s) and the restricted sterile environment within which they will operate, the UAS(s) operations adhere to the Reform Act’s safety requirements while avoiding additional national security issues.

Aircraft And Equivalent Level Of Safety

The operating limitations proposed by SCCE provide for at least an equivalent or higher level of safety than presently exist with conventional aircraft providing aerial photography and videographic services. SCCE's UAS(s) are comprised of 1- REHawk500 and 1- REHawk680 as set forth in the Flight Operations And Procedures Manual, (FOPM).

The FOPM is of a proprietary nature containing procedures and information not available to the public. SCCE has not and will not share this information with others. Therefore, the FOPM shall be submitted separately with confidentiality. (See 14CFR, 11.35(b))

REQUESTED EXEMPTIONS

14 CFR 61.113(a) and (b) 14 C.F.R. 91.103 14 C.F. R. 91.119 14 C.F.R. 91.121 14 CFR 91.151(a) 14 CFR 91.405(a) 14 CFR 407(a)(1) 14 CFR 409(a)(2) 14 CFR 417(a) and (b)

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

Pilot in Command Sections 61.113 (a) and (b) limit private pilots to non-commercial operations. Because the UAS will not carry a pilot or passengers, the proposed operations can achieve the equivalent level of safety of current operations by allowing the PIC operating the aircraft to have a private pilot’s license rather than a commercial pilot’s certificate to operate a small UAS. Unlike a conventional manned aircraft, a UAS is remotely controlled by a ground-based operator. The operational area is controlled and restricted, and all flights are planned and coordinated in advance. The level of safety exceeds that provided by a single individual holding a commercial pilot’s certificate

operating a conventional aircraft. The risks associated with the use of a UAS are diminished from the level of risk associated with commercial operations contemplated by Part 61 allowing UAS use by a private pilot as the PIC exceeds the present level of safety sought by 14 C.F.R. §61.113 (a) and (b). (See Grant of Exemption No. 11062 Astraeus Aerial, Grant of Exemption No 11109, Clayco, Inc, for similar exemptions)

14 C.F.R. § 91.7 Civil Aircraft Airworthiness

91.7(a) No person may operate a civil aircraft unless it is in an airworthy condition. Although airworthiness certification does not exist for UAS, SCCE's, FOPM , provides guidance to establish and maintain an equivalent level of safety.

14 C.F.R. §91.119(c): Minimum Safe Altitudes

Section 91.119 establishes safe altitudes for operation of civil aircraft. Section 91.119 provides, in pertinent part, that: “except when necessary for takeoff or landing, no person may operate an aircraft below the following altitudes: .....

(c) Over other than congested areas. An altitude of 500 feet above the surface, except over open water or sparsely populated areas. In those cases, the aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure.” SCCE requests authority to operate at altitudes up to 400 AGL,

an exemption is needed to allow such operations. As stated in the FOPM, the UAS will not operate higher than 400 AGL. However, operations would be conducted in a sterile areas, where buildings and people will not be exposed to operations without their preapproval. (See Exemption NO 11109 to Clayco Inc.) The equivalent level of safety will be achieved given the size, weight, and speed of the UAS as well as the location where it is operated. No flight will be taken without the permission of property owners or local officials. Because of the advance notice to the property owners and

participants in the UAS flight activities all affected individuals will be informed of the planned operations. Compared to flight operations for manned aircraft and the lack of flammable fuel, the mitigated risks associated with the proposed UAS operations is far less than conventional aircraft operating at or below 500 AGL. In addition, the low-altitude operations of the UAS will ensure separation between a UAS and conventional aircraft.

14 C.F.R. §91.121 Altimeter Settings

Section 91.121 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 a UAS may not have a barometric altimeter, but instead a GPS providing altitude data, an exemption is needed. An equivalent level of safety will be achieved by the operator, pursuant to the FOPM and Safety Check list, confirming the altitude of the launch site shown on the GPS altitude indicator before flight.

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

Section 91.151(a) prohibits an individual from beginning "a flight in an airplane under VFR conditions unless (considering wind and forecast weather conditions) there is enough fuel to fly to the first point of intended landing, and, assuming normal cruising speed – (1) During the day, to fly after that for at least 30 minutes . . . ."

Battery power for SCCE UAS(s) provides approximately 12 to 20 minutes of powered flight, with 20% battery power remaining. To meet the 30-minute reserve requirement in 14 CFR §91.151, UAS flights would not be possible. Therefore, SCCE submits that safety can be achieved by limiting flights unless there is enough power to fly at normal cruising speed (given winds and forecast weather) to the

intended point of landing with at least 30% battery power remaining. Given the limitations on the UAS'(s)proposed flight area and its proposed operations within a predetermined location, and flight in daylight VFR conditions will meet the intended requirements.

(See Exemption Nos. 2689,5745 and 10650 for flight less than minimums. See Exemption Nos. 8811,10808 and 10673 for daytime VFR conditions)

14 C.F.R. §91.405 (a); 407 (a) (1); 409 (a)(1) (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 SCCE UAS operations. However, SCCE's FOPM provides guidance to

establish and maintain an equivalent level of safety. Maintenance will be accomplished by the operator. noting the UAS(s) are limited in size, will carry a small payload and operate only in sterile areas with brief flight times. If mechanical issues arise, the UAS can land immediately and will be operating no higher than 400 feet AGL. As provided for in the FOPM, the PIC will ensure that the UAS is airworthy for each flight.

PUBLIC INTEREST

The enhanced safety of small unmanned UAS eliminates the greater risk alternatives when using larger manned aircraft, carrying fuels at low altitudes. In addition this relatively new technology provides clients access to photographic and videographic services and information that were previously not

financially cost effective. SCCE proposes procedures and operational guidelines to provide the FAA good cause for granting instant Petition enabling the commercial operation of SCCE's UAS(s) and those being in the public interest.

The FAA, by granting SCCE's exemption request, will serve to stimulate development of viable commercial UAS operations while guiding the public's understanding of how UAS can be legally and beneficially integrated into the National Air Space, NAS.

CONCLUSIONS

For the foregoing reasons, the exemptions requested herein should be granted and Steven Chain, Chain Enterprises, SCCE should be permitted to conduct UAS commercial operations according to the FOPM and such additional parameters as the FAA should deem necessary.

Respectfully submitted,
Steven Chain
Steven Chain, Chain Enterprises (SCCE)
Petitioner